



USER MANUAL



Building Acoustics Assistant



Note: Because of continuous product improvement SVANTEK reserves the right to make changes to product specifications without notice. To download the most up to date user's manual please visit our web site at www.svantek.com. This user manual corresponds to the software revision 2.1.x.

The succeeding software revisions (marked with the higher numbers) can change the view of some screens presented in the text of the manual.

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1 INTRODUCTION

Building Acoustics Assistant (BA Assistant) is an application for smartphones and tablets with the Android operating system, dedicated to assessments of airborne or impact sound insulation in buildings and of building elements in accordance with the next standards:

- ISO 16283-1:2014 Acoustics -- Field measurement of sound insulation in buildings and of building elements -- Part 1: Airborne sound insulation,
- ISO 16283-2:2018 Acoustics -- Field measurement of sound insulation in buildings and of building elements -- Part 2: Impact sound insulation,
- ISO 16283-3:2016 Acoustics -- Field measurement of sound insulation in buildings and of building elements -- Part 3: Façade sound insulation,
- ISO 140-4:1998 Acoustics -- Measurement of sound insulation in buildings and of building elements -- Part 4: Field measurements of airborne sound insulation between rooms,
- ISO 140-5:1998 Acoustics -- Measurement of sound insulation in buildings and of building elements -- Part 5: Field measurements of airborne sound insulation of façade elements and façades,
- ISO 140-7:1998 Acoustics -- Measurement of sound insulation in buildings and of building elements -- Part 7: Field measurements of impact sound insulation of floors.

BA Assistant is dedicated as well to assessments of speech intelligibility (STI) induced by the transmission channel in accordance with the standards: IEC 60268-16:2011, DIN VDE 0833-4 and AS 1670.4.

The applications of STI include evaluation of sound reinforcement and emergency systems, communication channels, speech intelligibility, communication in rooms and auditoria, etc.

1.1. REQUIREMENTS FOR MOBILE DEVICES

BA Assistant can be installed on any mobile device with the Android platform (7.0 or higher).



Note: Be sure that your mobile device has installed Excel or Excel viewer application (for example, POLARIS Office Viewer) for reports creation purposes.

1.2. INSTALLING BA ASSISTANT

To install BA Assistant either find it in Google Play and perform installation with Google Play assistance or:

1. Download the *BAassistant_xx.apk* file from the Svantek website.

2. On your Android device, enable the “*Allow installation of apps from unknown sources*” option. It can be found in different locations, depending on the Android version, *e.g.*:
Settings → Personal → Security → Unknown sources, or:
Settings → Applications → Unknown sources.
3. Find and open the *BAassistant_xx.apk* file.
Note: If you downloaded the file directly from the Internet to the Android device, it can be accessed through the notification on the navigation bar.
4. Accept the permissions required by BA Assistant and press *Install*.













After successful installation the  icon will appear on your device.
















When you open the application for the first time after installation the history of last updates will be displayed.

1.3. WORKING WITH THE APPLICATION

BA Assistant is managed as all other mobile device's applications – by tapping on icons or fields or by swiping the screen. Most functions are intuitive.

The table below presents active icons used by the application.

Icon	Name	Functionality
	<i>select</i>	– select task(s)
	<i>navigation</i>	– open navigation strip / task check list
	<i>Task setup</i>	– open Task setup
	<i>import</i>	– import task or selected data from the task
	<i>export</i>	– export task(s) to other devices
	<i>filter</i>	– separate task(s) from the task list
	<i>support</i>	– send e-mail with ba.log file to the Svantek support
	<i>delete</i>	– delete selected task(s) or measurement
	<i>add</i>	– <i>add task / position / point</i>
	<i>system</i>	– open system settings. Icon is blinking if there is no radio connection with measuring devices.

	<i>go back</i>	– go to upper screen
	<i>parameters</i>	– open Application parameters list
	<i>rotation</i>	– change display layout
	<i>camera</i>	– take photo
	<i>report</i>	– display or send report
	<i>data base</i>	– send, backup or restore data
	<i>archives</i>	– archive selected task(s)
	<i>complete</i>	– measurements are completed
	<i>non complete</i>	– measurements are not completed
	<i>measure</i>	– open measurement screen
	<i>start</i>	– start measurement
	<i>stop</i>	– stop measurement
	<i>settings</i>	– change measurement settings
	<i>source test</i>	– Start source test
		– extend section
		– squeeze section
		– show formula or value
		– accept changes / check task step
		– delete task / position / point
		– open task navigation



- change instrument assessment to the room



- set speaker position relative to the external wall



- check out of range measurement data alert



- toggle to the spectrum plot view



- toggle to the table view









- excluded measurement point



- included measurement point

There are several informative icons (not active) that describe measurement tasks.

Icon	Name	Measurement task
	<i>Airborne</i>	– Airborne insulation
	<i>Facade</i>	– Façade insulation
	<i>Tapping machine</i>	– Impact-tapping machine
	<i>Rubber ball</i>	– Impact-rubber ball
	<i>STIPA</i>	– STIPA
	<i>Ambient noise</i>	– Ambient noise

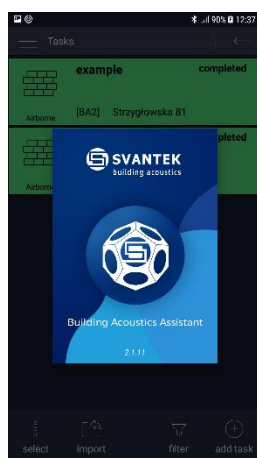
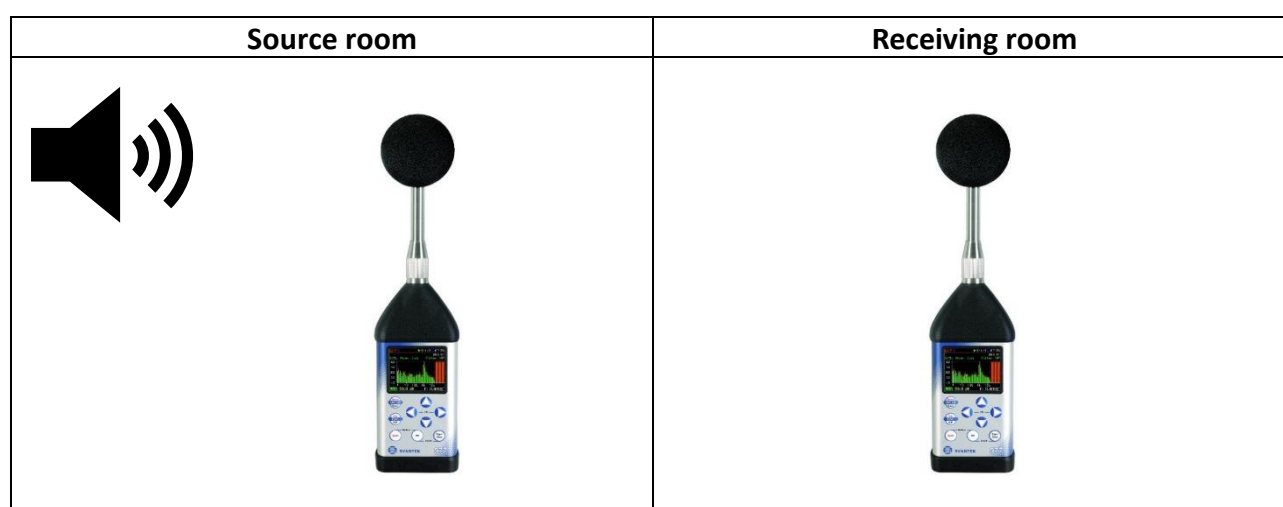
More details on how to use each of these icons can be found in subsequent chapters of this manual.

2 SYSTEM CONFIGURATION

Building Acoustics Assistant application works with the SV 973, SVAN 977A, SVAN 977W and SVAN 979 measuring instruments. *BA Assistant* task files are automatically saved to the measuring instruments and can be opened in the SvanPC++ software with "one click" (see SvanPC++ User Manual).

All these devices are equipped with the radio module that enables wireless communication with your smartphone.

With *BA Assistant* the user may simultaneously start measurement by two instruments connected with your smartphone, one located in the source room, another – in the receiving room.

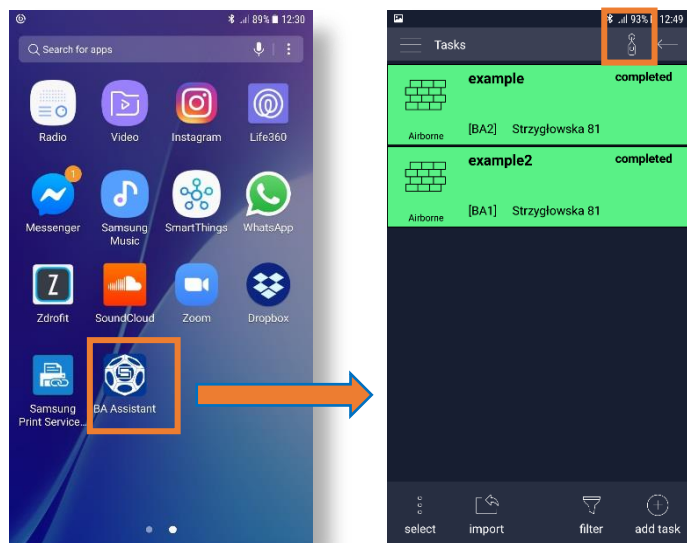



Note: For Building acoustics measurements, the measuring instrument should have active **1/3 Octave** and **RT60** options.



Note: For STIPA measurements the measuring instrument should be of SVAN 979 type with active **1/1 Octave**, **1/3 Octave** and **STIPA** options.


3 GETTING STARTED



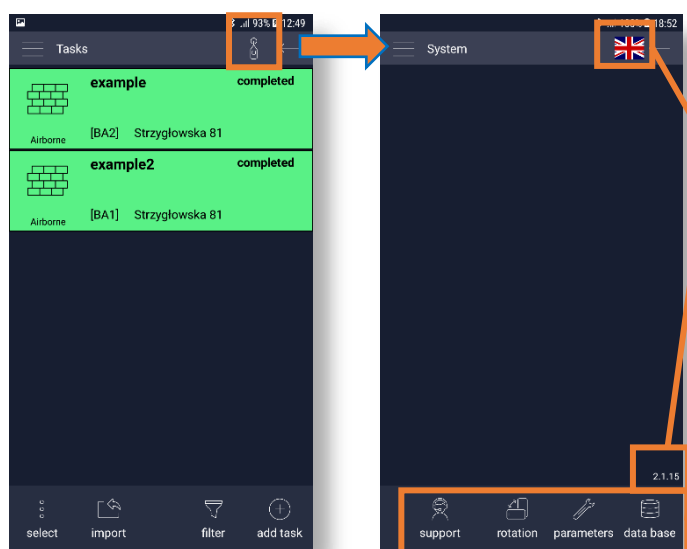
Start the BA Assistant application by tapping the  icon on your mobile device.


The **Projects** screen with the list of created projects will be opened.

After launching the application, the smartphone is trying to establish connection with nearby instruments.

During this time the  icon will blink.

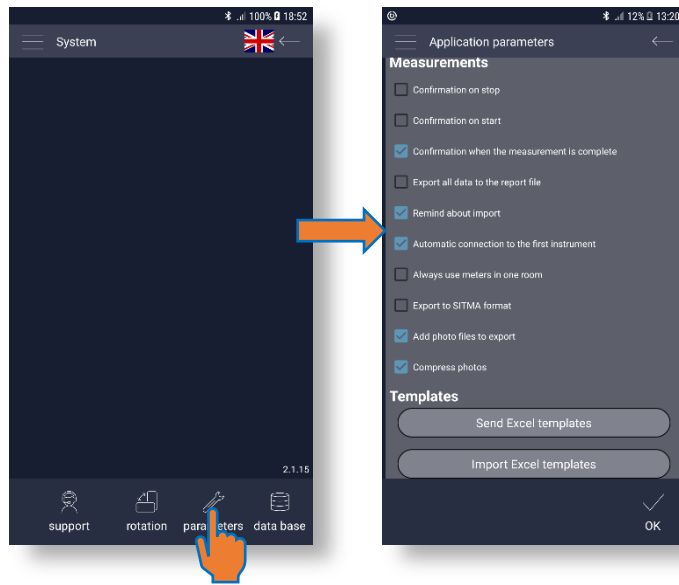
3.1. SYSTEM SETTINGS



Before starting measurements, you may tap the  icon and:

- select language,
- check the app version,
- send e-mail with ba.log file to the Svantek support, change layout (from vertical to horizontal), set application parameters and perform operations on Data Base.

If connections with the measuring devices were not installed the System screen is empty.



In the Measurements check list, you can switch:

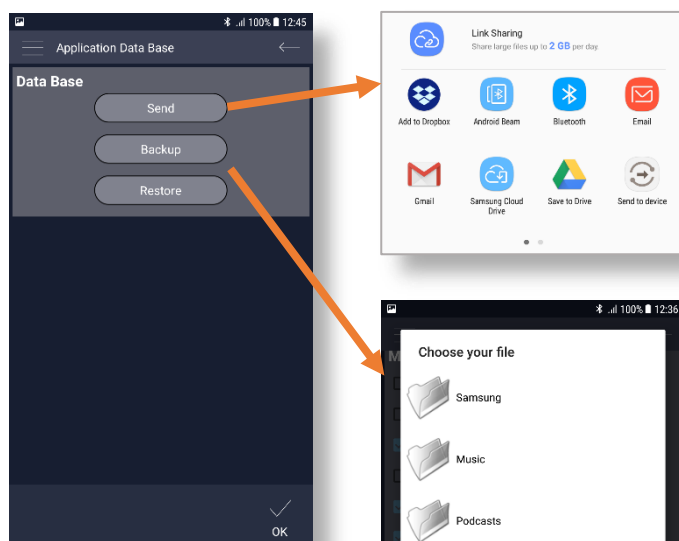
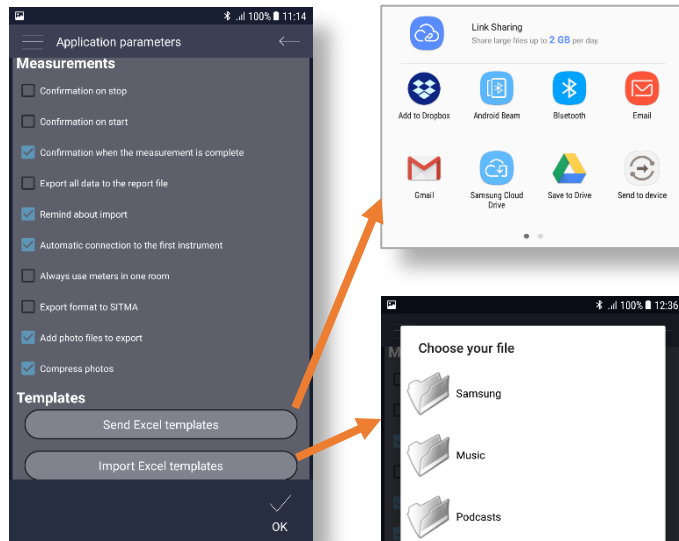
- confirmations on start, stop or complete measurement,
- export all or limited data to the report file,
- reminder about import,
- automatic connection to the first instrument,
- using two instruments in one room,
- export to SITMA format,
- addition of photo files to export,
- photo compression.

In the Template section you can:

- send Excel report templates to the external device/cloud (for update)

and

- import Excel report templates from the smartphone catalogue.




Application Data Base screen allows you to:

- send the database to the external device/cloud

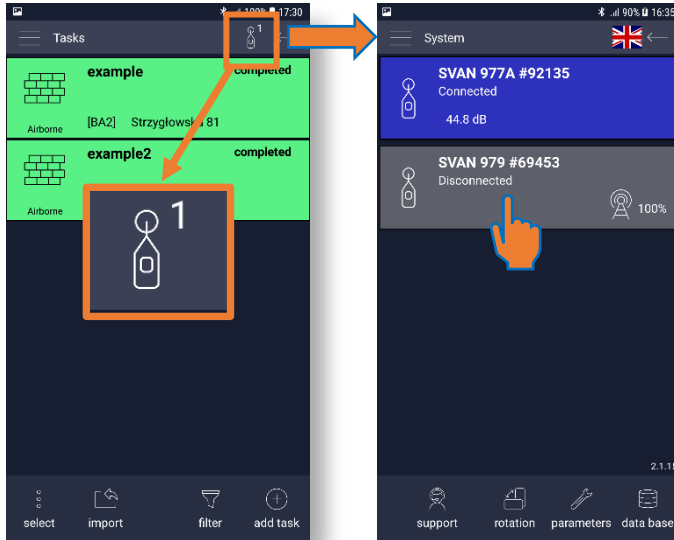
and

- backup or restore database to/from the smartphone's catalogue.


3.2. CONNECTING MEASURING INSTRUMENTS

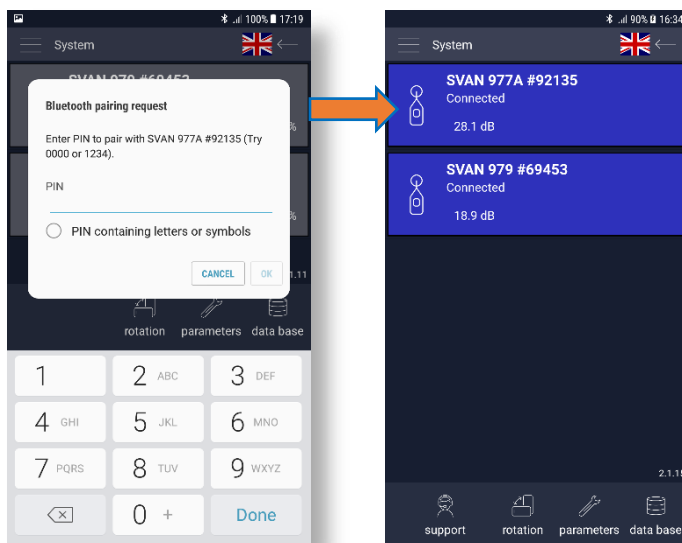
When there are no instruments connected to the smartphone the  icon will blink.

To pair the instrument(s) with your smartphone you should enable Bluetooth in both devices.



Then the application will try to pair the devices, and if pairing is successful, the icon will stop flashing and the number of connected instruments (1 or 2) will be glued to the icon.

Tapping the  icon you will see in the System screen visible instruments: connected (blue) and disconnected (grey).



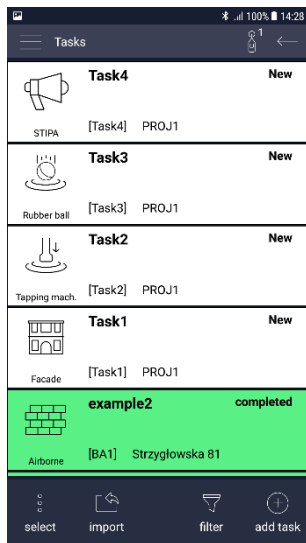
If the instrument is disconnected, you can pair it tapping on the grey bar with this instrument name.

If you are trying to pair the instrument for the first time the application may ask you to enter a PIN code.

The connected instrument bar shows the current SPL in dB. Disconnected instrument bar shows the radio signal power in %.

To disconnect the instrument, tap on the blue bar with this instrument name.

3.3. TASKS SCREEN

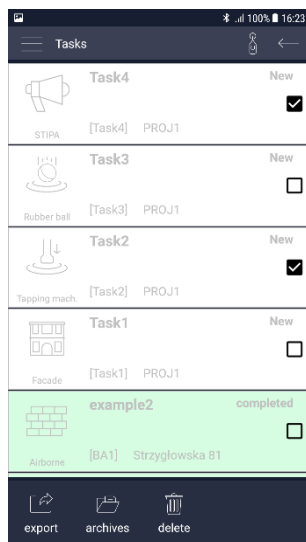



The Tasks screen presents the list of tasks as task bars. The project bar consists of:

- icon that describes the type of the task (*Airborne, Façade, Tapping machine, Rubber ball, STIPA, Ambient noise*),
- task name (*example2, Task1, Task2*), name of the file with task data (*[BA1], [Task1], [Task2]*), object (*Strzylowska 81, PROJ1*) and status (*green - completed, white – New, In progress*).

Using icons of the toolbar below the task list you can:

- select tasks for export, archive or delete,
- import task,
- filter tasks by string of characters included in the type, name, filename, object or status,
- create new task.

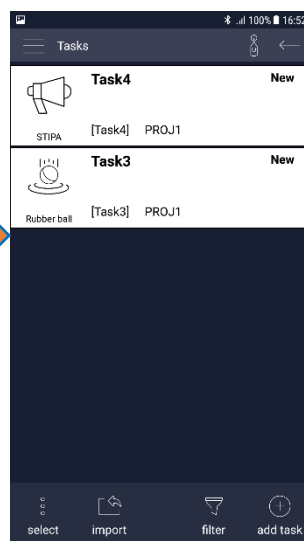
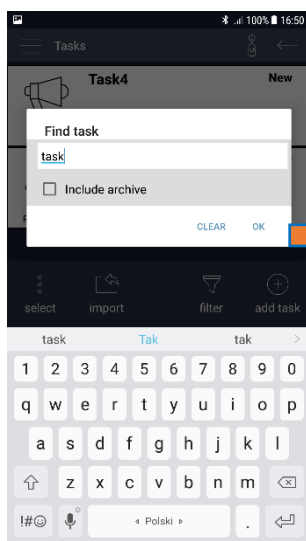



To select tasks, tap  and in check boxes of tasks you would like to select.

The selected tasks can then be exported to the other device/cloud, archived or deleted.


Archived or deleted tasks should be confirmed. Archived tasks can be restored.

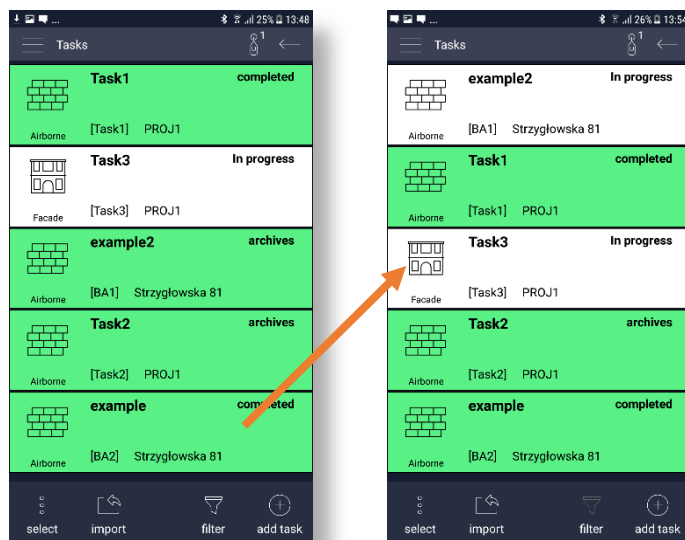
You can select a single task tapping on it and pressing for a longer time.



To filter tasks, tap on  and in the **Find task** dialog box enter the string of characters as a key for filtering. The tasks with such character string included in the type, name, filename, object or status will be filtered.

For example, if you write "PROJ1 completed" the application will select all tasks in which the object is PROJ1 and status is completed.

If filter is applied the  icon blinks.



You can include also archived tasks checking the **Include archive** position.

If you have included archives the archived tasks will appear on the task list with the status **archives**.

To change their status, you should open it and uncheck completeness of some measurements.

After this the status of the archived task will be changed.

3.4. CREATING TASKS

To create new task, tap in the **Tasks** screen and define task parameters in the **Task setup** screen:

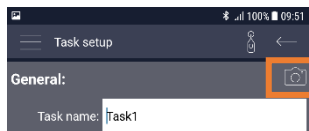
- task credentials in the **General** section: Task name, Object name and File name,
- task approach in the **Measurement** section: task Type (*Airborne insulation, Facade, Impact-tapping machine, Impact-rubber ball, STIPA, Ambient noise*),
- other task dependent parameters.

In the last **Description** section, you may describe the task.


To select parameter from the list, tap on and then tap on the required item on the list.

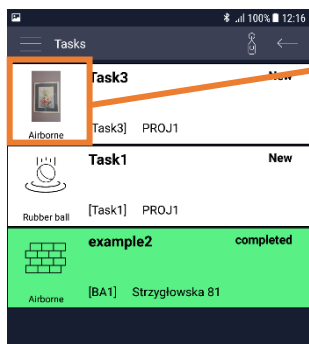
In case the parameter is a value, you can enter it as a value or as an equation. The icon toggles the way of parameter presentation from value to equation.

Note: the application suggests values if we point to a room already used in another task.



All task types have predefined icons (see Chapter [3.3](#)), but you can use your own photo.

To make photo, tap the  icon. The Camera application will be opened enabling you making picture.



The photo will be placed in the task bar instead of the predefined icon.

The link of this photo will be attached to the task and can be also exported with the task if you check “Add photo files to export” (see Chapter [3.1](#)).

This photo file is also displayed in the SvanPC++ software after opening this task (see SvanPC++ User Manual).

After confirmation the task is opening for measurements performance and at the same time appears on the task list.

4 BUILDING ACOUSTICS MEASUREMENTS

4.1. CREATING NEW TASK

Building Acoustics tasks allows to measure source and receiving sound levels as well as reverberation time and the background noise and automatically generate reports in accordance with the relevant standard.



Note: For the Building acoustics measurements the measuring instrument(s) should have active **1/3 Octave** and **RT60** options.

While creating new Building Acoustics task in the **Task setup** screen you should select one of the next task types in the **Measurement** section: *Airborne insulation*, *Facade*, *Impact-tapping machine* or *Impact-rubber ball*.

For the *Airborne insulation*, *Facade*, *Impact-tapping machine*, *Impact-rubber ball* tasks, you should define in the **Measurement** section:

- **Standard** which depends on the selected task type (*ISO-140* or *ISO-16283*) and
- **Method** (*Discrete points* or *Scanning*).

Other sections depend on the task type.

For the *Airborne insulation*, *Impact-tapping machine*, *Impact-rubber ball* task, you should define in the **Partition** section the area of the partition between source and receiving room and describe it, e.g. as a “wall”.

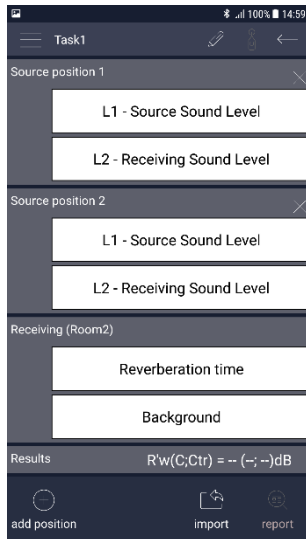
For the *Facade* task, you should define the area of the **Façade**.

For the *Airborne insulation* task, you should define the name and volume of the **Source room**.

For all tasks, you should define the name and volume of the **Receiving room**.

Discrete points method is used when you fix your microphone in the measurement point. When you start the measurement, it lasts 15 seconds and stops automatically.

Scanning method is used when you perform the manual-scanning path: circle, helix or cylindrical. In this method you should start and stop the measurement manually.

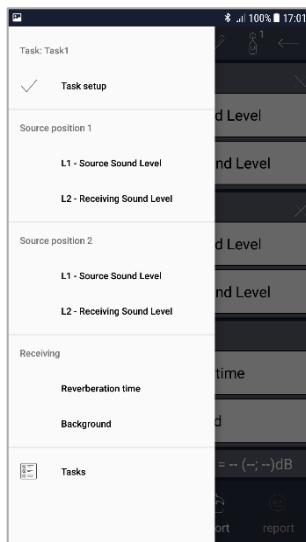


After tapping ✓ the new task screen is opened.

The task screen is divided into sections. Depending on the task type the task screen may include:

- **Source** sections for measurements of noise level in the source room and noise level in the receiving room.
- **Receiving** section for measurements of reverberation time and background noise level.
- **Results** section for presenting calculated total insulation indexes and insulation indexes in 1/3-octave bands with central frequencies from 50 Hz to 5 kHz.

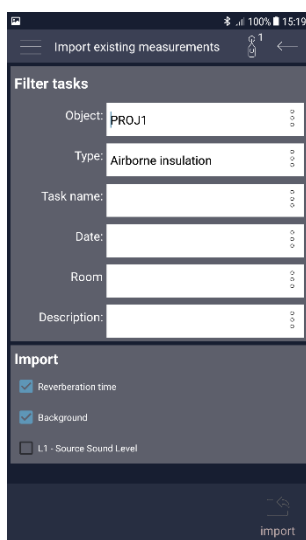
Some regulations require performing measurements for several source positions. Therefore, you can add source position or delete it tapping ⊕ or ✕.



You can open **Task setup** tapping and change all parameters.

Note: If you change **Task name**, **Object**, **Type** or **Standard**, new project will be automatically created.

If you tap ≡ or flick from the left edge of the screen, the task navigation will appear which enables controlling the task steps. After performing (completing) the step it is checked as being performed ✓. Tapping on every step you can open the associated screen and reperform the step.



If you have already measured noise in the source room, reverberation time or background noise in the receiving room you don't need to do it again.

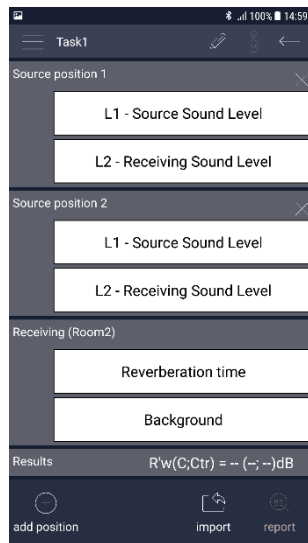
You can import previous measurements from another project if you tap and select the task in the **Filter tasks** section.

If the selection exists, the icon becomes active.

Make a choice what would you like to import in the **Import** section: **Reverberation time**, **Background** or/and **L1-Source Sound Level** and tap the icon to perform importation.

The imported data will fill tables in the **L1 – Source Sound Level**, **Reverberation time** or **Background** measuring screen.

4.2. AIRBORNE INSULATION TASK



The *Airborne insulation* task screen includes Source, Receiving and Results sections.

Source sections include two measurement bars for:

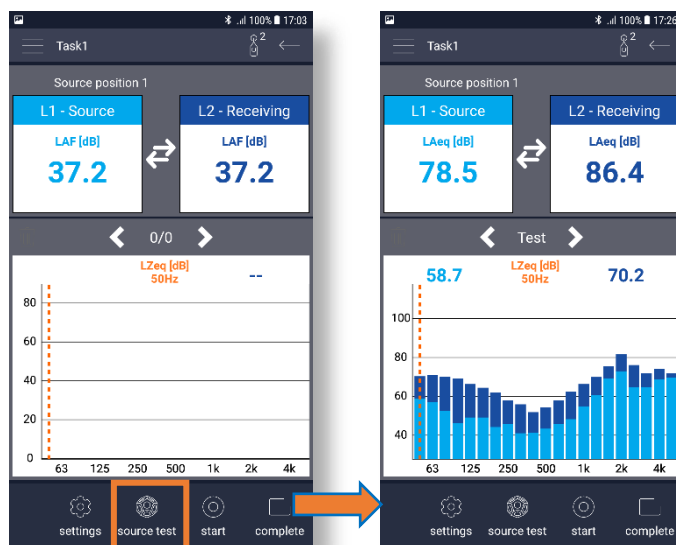
- noise level in the source room (**L1 - Source Sound Level**) and
- noise level in the receiving room (**L2 – Receiving Sound Level**).

Receiving section includes two measurement bars for:


- Reverberation time and
- Background noise level.


Results section presents calculated apparent sound reduction index $R'w(C;Ctr)$, standardized level difference $DnT,w(C;Ctr)$ and R' values in twenty one 1/3-octave bands with central frequencies from 50 Hz to 5 kHz.

To start measurements, tap on any measurement bar in the **Source position** section. The measuring screen with LAF results and 1/3-octave spectrum will be displayed.



Having two measuring instrument you can perform measurements simultaneously in the source and receiving rooms.

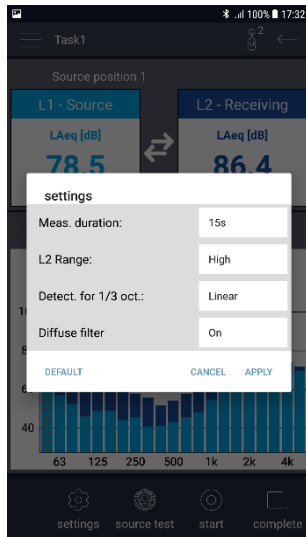
If you are not sure which instrument was installed in which room you can perform a source test , i.e. make a real measurement with the switched-on sound source.


If the result in the receiving room is higher than in the source room, you should change the instruments assignment tapping .

If you tap on the meter box (i.e. *L1-Source* or *L2-Receiving*) the instrument screen will be flashing that enables simple identification of the instrument.



Note: The application will configurate the instrument for the measurement automatically according to the measurement settings. The application allows configuring only few measurement parameters, while most of them are not visible through the application. These not visible configurations are in accordance with the selected standard. You can check the settings through the user interface of the used instrument but should not change them!



Before measuring you can check and configure measurement settings tapping .


The example screen shows default settings which you can redefine:

- **Measurement duration:** *1÷60s, Inf or Auto*;
- **Range:** *Low or High*;
- **Detector for 1/3 octave:** *Linear, Fast or Slow*;
- **Diffuse filter:** *On or Off*.

You can return to the default setting tapping **DEFAULT**.

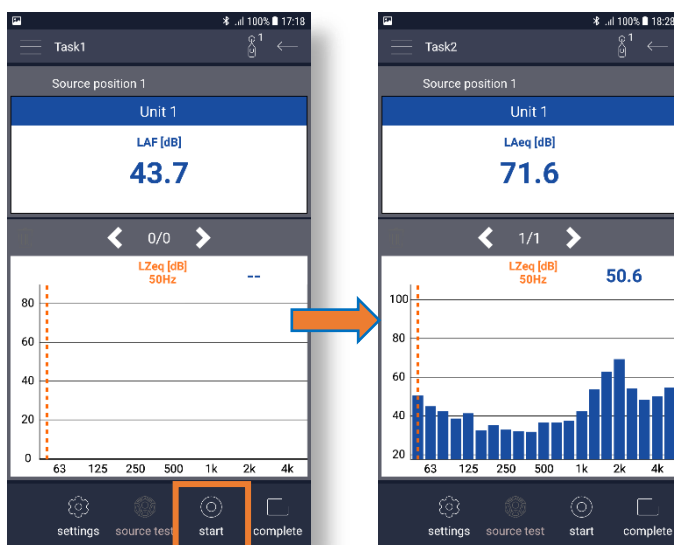
Tap **APPLY** or **CANCEL** to return to the measuring screen.



To start measurement, tap  and wait until measurement will stop.

While measuring the progress bar will be displayed. You can stop the measurement manually tapping on the **stop** icon at the progress bar.

During and after measurement both instrument boxes will show current LAeq result and 1/3-octave spectra will be displayed for both instruments.



If there is only one instrument connected to your smartphone, the measuring screen will have only one box of LAF result and one spectrum.

In this case you should install your instrument first in the one room and make measurements, then install it in the other room and make measurements.

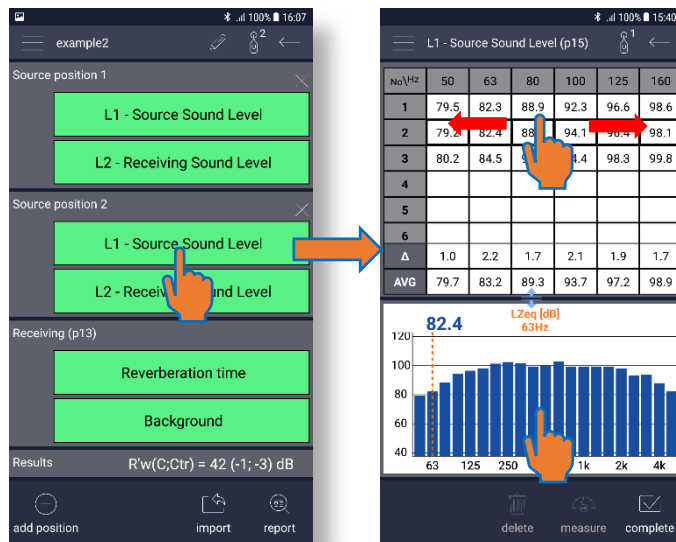
You can perform several measurements in accordance with the local regulations.



Note: In the case of the **Discrete point** measuring method, measurements will be performed for 15 seconds and will be stopped automatically. In the case of the **Scanning** measuring method, measurements should be stopped manually.

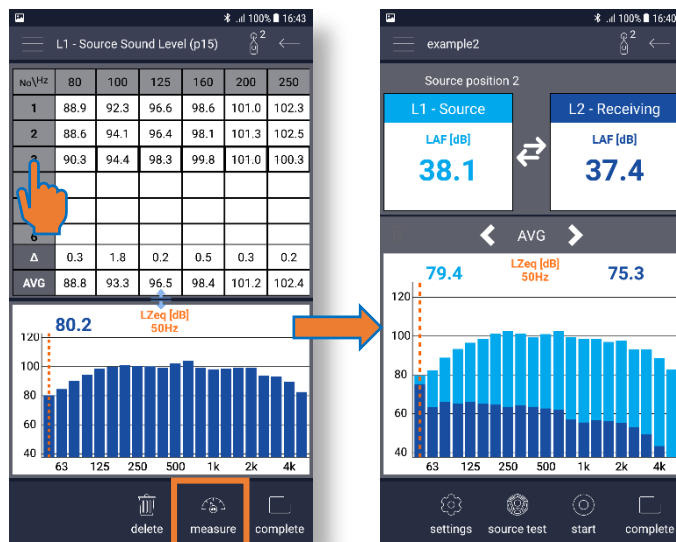
Tap the **complete** icon to go to the measurement summary screen.

You can open the measurement summary screen also from the task screen tapping on some measurement bar.



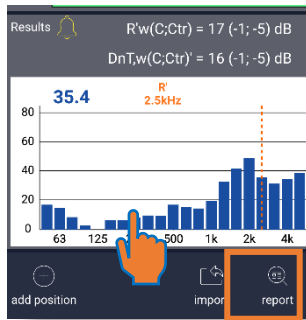
If the measurement bar is green it means that measurements are completed which is stated by the icon and in the completed screen you can only study results:

- scroll the table right-left, up-down,
- select the measurement to display its spectrum and
- change the cursor position on the spectrum plot.



If you uncheck the **complete** icon, you can also edit results:

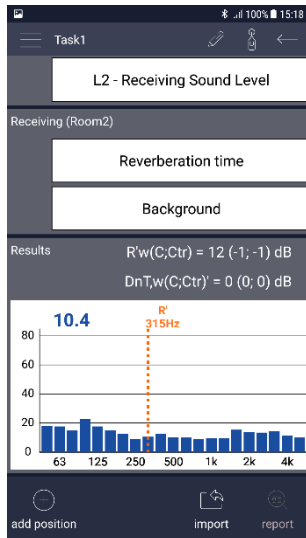
- delete the selected row tapping ,
- exclude the row from calculation of Δ and AVG results tapping on the measurement number. The excluded measurement will be crossed out,
- start additional measurement tapping .



If measurements for at least one source point were done, the **$R'w(C;Ctr)$** index and **R'** values for 1/3-octave bands will be calculated and displayed the **Results** section.

If measurements for the receiving room (**Reverberation time** and **Background**) were done, also **$DnT,w(C;Ctr)$** index is calculated.

You can put a cursor on the required band tapping on it and reading its value.



Import existing measurements

Filter tasks

Object: PROJ1

Type: Airborne insulation

Task name: Task2

Date: 2020-04-29

Room: Room2

Description:


Import

☒ Reverberation time

☒ Background

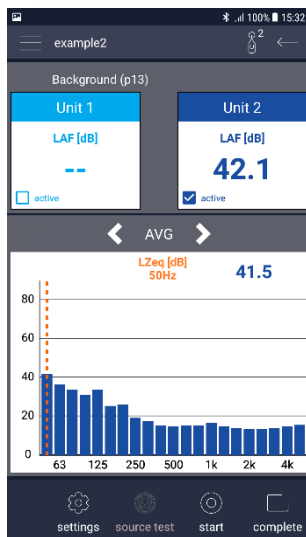
☐ L1 - Source Sound Level

import

If measurements for the same receiving room (**Reverberation time** and **Background**) were already done in the previous task, you can use them in the next tasks. For this, you should import them tapping .

In the **Import existing measurements** screen:

- select the task for which such measurements had been done and
- choose data you wish to import.

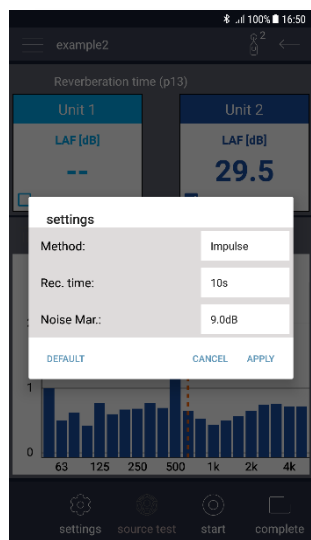


Otherwise make measurements of **Background** noise and **Reverberation time** in the receiving room.

The Background noise measurement summary screen is identical to the Sound Level measurement summary screen.

But the measuring screen for two instruments is slightly different. Namely, in the instrument box you can select or deselect each instrument.

For example, if one instrument is located in the source room, you should disable it. But if both instruments were installed in the receiving room, you can use them both to measure the background noise simultaneously. In the last case results of two measurements will be displayed and added to the summary measurement table.

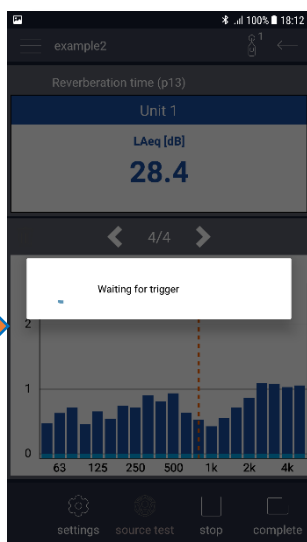
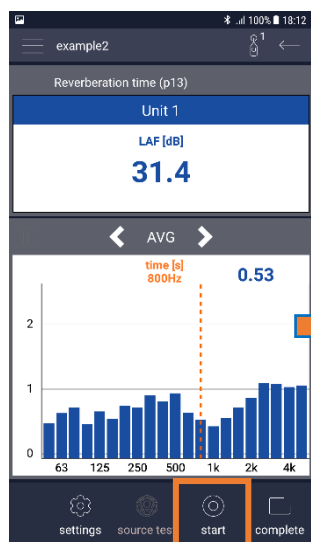


The same principle applies to the Reverberation time measuring screen.

The Reverberation time measurements have different settings from the sound level measurements. The **settings** box for the RT measurements enables defining next parameters:

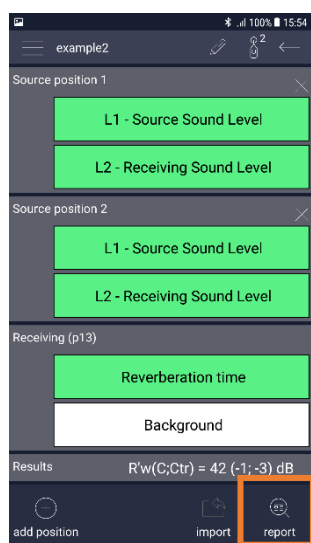
- **RT Method:** *Impulse* or *Decay*;
- **Recording time:** $1 \div 20$ s;
- **Noise Margin:** $0.1\text{dB} \div 20.0\text{dB}$.


Other parameters are set by default.

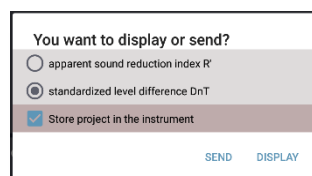


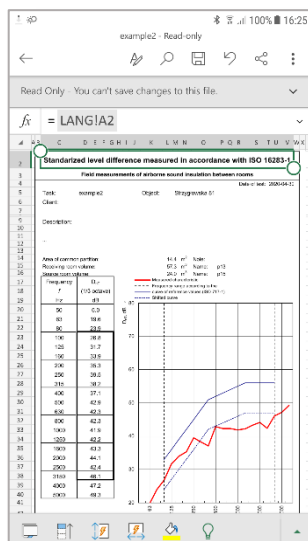
After starting the **Reverberation time** measurement, the instrument usually waits for the trigger (especially for the Impulse method) and during this time the application displays the information about it.

The RT spectrum presents reverberation times in seconds for 1/3-octave bands.



When all sound level measurements in the source and receiving room for all source positions are done and complete and reverberation time measurements complete, you can generate a report tapping on the active  icon and selecting the report type - based on apparent sound reduction index R' or on standardized level difference DnT .

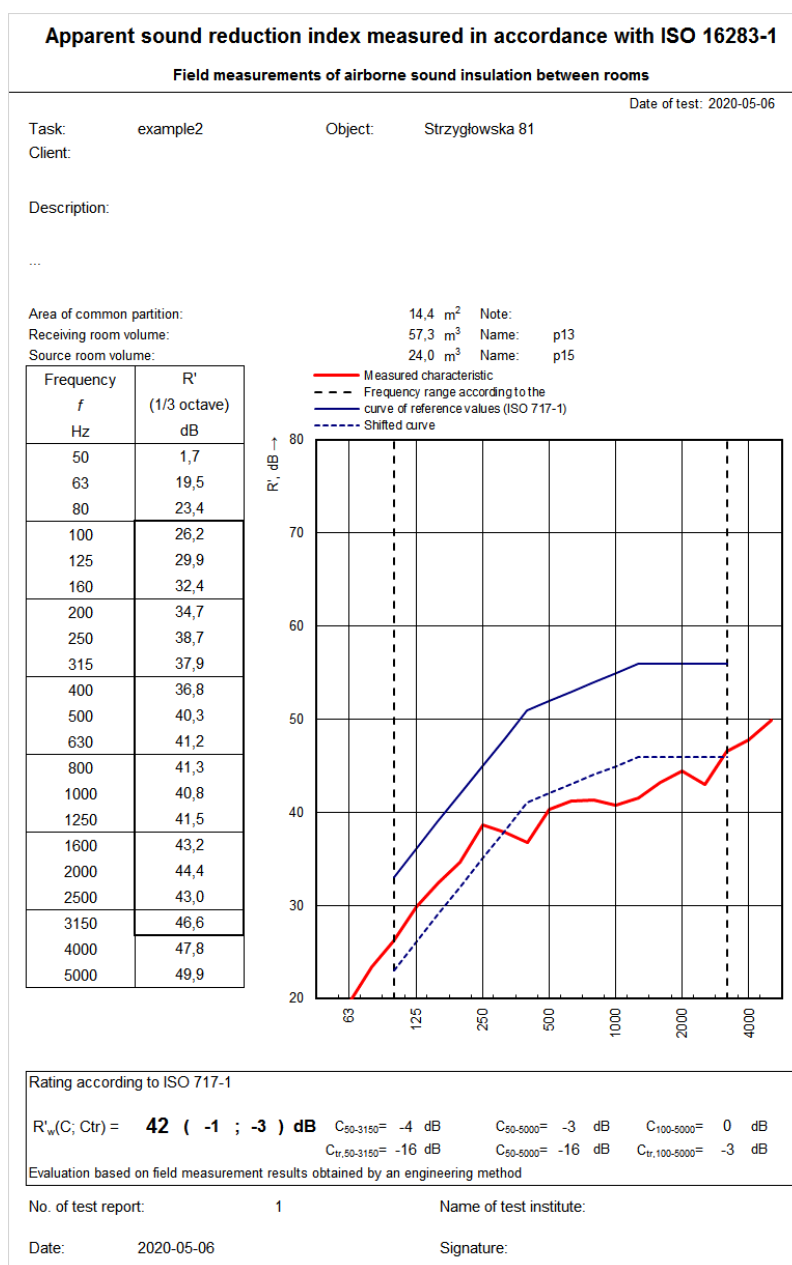




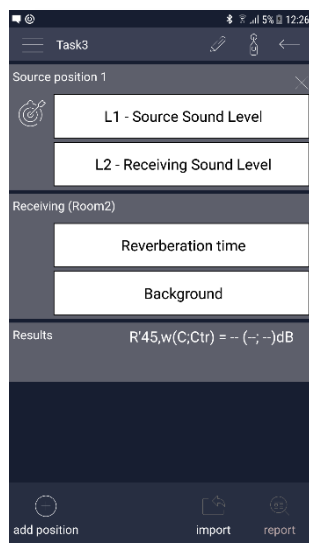
If you wish to store the project in the instrument's memory you should check the box "Store project in the instrument".

The report can be displayed or send to another device or cloud – by e-mail, wireless communication or with the use of other mobile application like messenger etc.

If you decide to send a report to the other device the application will create an Excel file with the task name.



4.3. FACADE TASK



The *Facade* task screen includes Source, Receiving and Results sections.

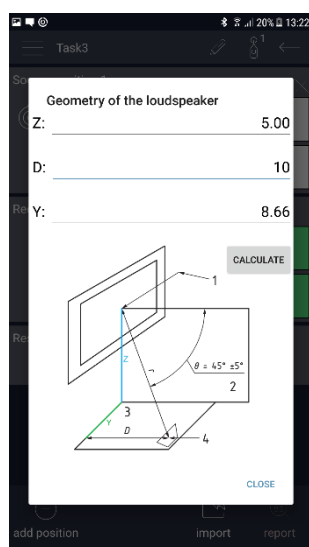
Source sections include two measurement bars for:

- noise level outside the building (L1 - Source Sound Level) and
- noise level in the receiving room (L2 – Receiving Sound Level).


Receiving section includes two measurement bars for:

- Reverberation time and
- Background noise level.

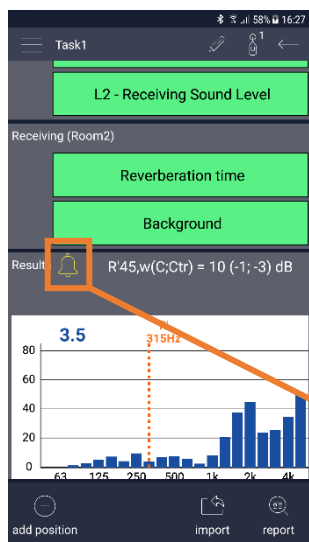
Results section presents calculated apparent sound reduction index $R'_{45,w}(C;Ctr)$ and R'_{45} values in twenty one 1/3-octave bands with central frequencies from 50 Hz to 5 kHz.




In the Source section you can set the speaker position relative to the external wall in accordance with the standard requirements.

For this, tap on the  icon and in the **Geometry of the loudspeaker** box set the coordinates of the loudspeaker according to the attached figure.

An example presents a case when the distance **Z** is 5 meters and distance **D** is 10 meters. To be in line with the standard, which assumes angle between the line connected the source with the center point of the façade and the line perpendicular to this point in a range $45^\circ \pm 5^\circ$, you should shift your source left or right to the distance **Y**. This distance is calculated when you tap CALCULATE (8.66 meters).



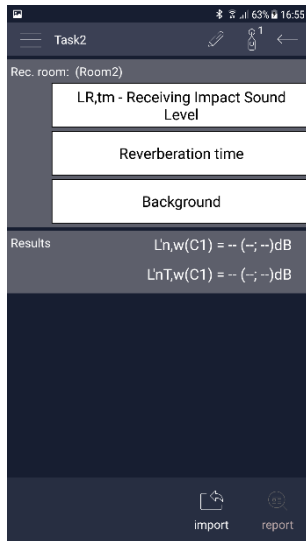
As in case of *Airborne insulation* tasks you can measure a source sound level outside the building and a receiving sound level simultaneously by two measuring instruments or consequently by one instrument. You can also import Reverberation time and Background measurements from another task.

Sometimes the flashing  icon appears in the Results section what means that some measurement data are out of range. If you tap on the alert information will be displayed.

- Background level is too high at 5.0kHz
- Sound level in Receiving higher then in Source.

CLOSE

4.4. IMPACT-TAPPING MACHINE AND IMPACT-RUBBER BALL TASKS



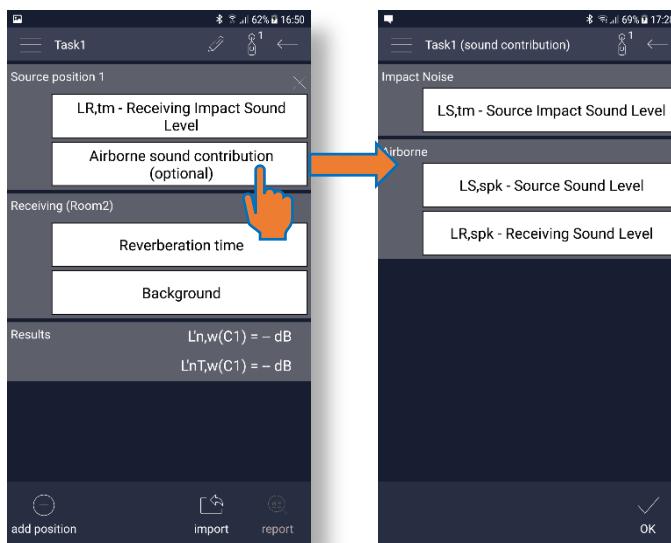
Estimation of the impact noise with the use of a tapping machine according to ISO-140 assumes no measurements in the room where a tapping machine is used. Therefore, the task screen includes Receiving room and Result section.

Rec. room section includes three measurement bars for:

- noise level in the receiving room (**LR,tm – Receiving Impact Sound Level**),
- **Reverberation time** and
- **Background** noise.

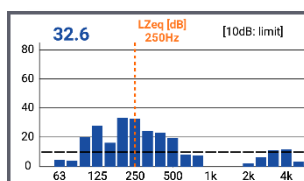
Results section presents calculated normalized impact sound pressure level **L'n,w(C1)**, standardized impact sound pressure level **L'nT,w(C1)** and **L'n** values in twenty one 1/3-octave bands with central frequencies from 50 Hz to 5 kHz.

If the *Impact-tapping machine* task is according to ISO-16283, the application allows you to define more than one source position. Since the *Impact-rubber ball* task is according to ISO-16283 only this rule is always applied.



Each Source section includes additional optional measurements bar of **Airborne sound contribution**, which in turn includes two sub-sections:

- **Impact Noise** which is dedicated for measurements of impact sound levels in the Source room (**LS,tm**) and
- **Airborne** which is dedicated for measurements of airborne sound levels in the Source (**LS,spk**) and Receiving (**LR,spk**) rooms.



This plot shows the difference: $LR,tm - (LS,tm - (LS,spk - LR,spk))$ and a 10-dB level. If the difference is above 10 dB for all bands the influence of the airborne sound from the tapping machine can be considered as negligible in accordance with ISO 16283.

5 STIPA MEASUREMENTS

The Speech Transmission Index (STI) is applied in the deterioration of the speech intelligibility induced by the transmission channel. The STI method involves the use of a test signal applied to the transmission channel, and an analysis of the received test signal. The speech transmission quality of the channel is determined and expressed in values from 0 to 1 in the form of STI. Using the obtained STI value, it is possible to determine the potential speech intelligibility.

STIPA (speech transmission index for public address systems) is a STI derivative approach that was developed for fast measurements of electro-acoustic and acoustic environments effects that affect the speech intelligibility in the room acoustics and/or public address systems.



Note: STIPA projects require the SVAN 979 instrument. You can create new STIPA project only if your mobile device is paired with the SVAN 979. In other cases, you can only watch results of earlier created projects.

5.1. CREATING STIPA TASK

To create the STIPA task, tap  in the **Tasks** screen, and select **STIPA** in the **Type** position of the **Measurement** section.

Define **Area**, **Project** and **File name** in the General section and select **Standard** according to which averaging in measurement points will be performed (*Manual, IEC 60268-16x2, IEC 60268-16x3, AS 1670.4, DIN 0833-4, PN-EN 60849:2001, PN-EN 50849:2017 or PN-B-02151-4:2015*) and decide whether consider or not the ambient noise in the STI assessment.

If you wish to consider the ambient noise in the STI assessment, you should tap on the **Ambient noise** position and instead of *None* select *[Included]* or the name of the Ambient noise task (for example, *Task2*) – see Chapter [5.3](#).

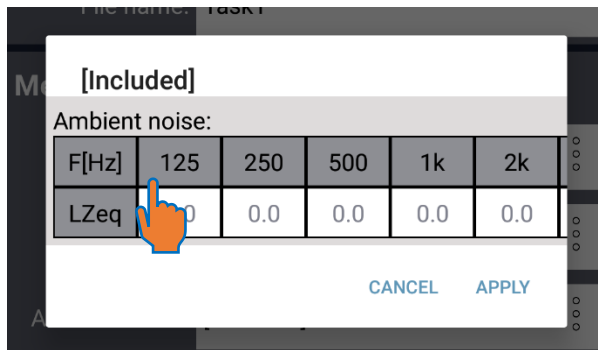
When choosing a standard, the application will notify you after measuring whether if the tested area meets this standard or not. Criteria for standards are presented in the table.

Standard	Criterium
IEC 60268-16	$STI - \sigma \geq 0.45$
AS 1670.4	$STI > 0.50$
DIN 0833-4	$STI > 0.50$
PN-EN 60849:2001	$CIS - \sigma \geq 0.70$
PN-EN 50849:2017	$STI \geq 0.50 \ \& \ STI_{min} \geq 0.45$
PN-B-02151-4:2015	$STI \geq 0.60 \ \& \ STI_{min} \geq 0.55$

In addition, IEC 60268-16x2, IEC 60268-16x3 standards define automatic averaging that is applied in this case for the measurement point:

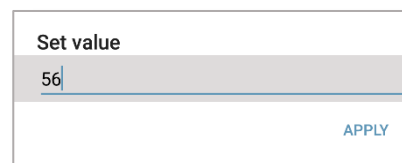
- in case of *IEC 60268-16x2* the application will perform 2 measurements automatically and if the difference is higher than 0.03 dB one more measurement will be automatically performed;
- in case of *IEC 60268-16x3* the application will always perform 3 measurements automatically.

Manual means that the user may perform as many measurements manually as he needs and will decide when to stop a measurement series.

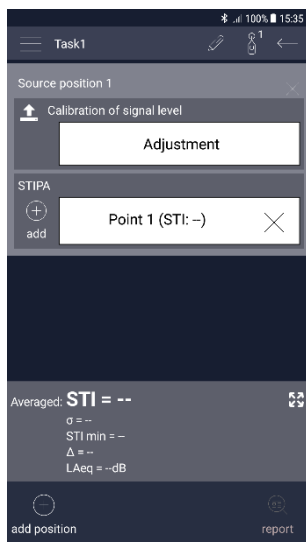


If you tap on *[Included]* or the Ambient noise task name, the table with LZeq values will appear.

In case of *[Included]* you may enter values manually tapping on each cell.



5.2. STIPA TASK SCREEN



The STIPA task screen includes measurement section(s) for the **Source position** and section for presentation of averaged results.

The measurement section for the **Source position** includes:



- **Calibration of signal level** sub-section for adjusting the level of the reference STIPA signal and
- **STIPA** sub-section for measuring Speech Transmission Index (STI) in the set of points of the tested Area.

Calibration of the reference STIPA signal is used for adjusting the level of the reference STIPA signal to the level of a real voice in the tested area.

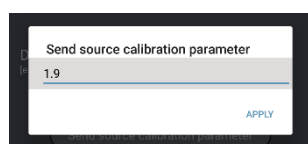
For this, follow next steps:

1. In the STIPA project screen tap the **Adjustment** section to open the **Calibration of signal level** screen.



2. Run the voice signal and measure LAeq tapping . The measurement duration is set automatically to 40 seconds, but if the signal is shorter you can stop the measurement manually.
3. Switch it off the voice signal and tap the **Stipa signal** box.
4. Run the reference STIPA signal and measure LAeq tapping .

After measuring both results the **Difference** (Real signal – Stipa signal) will be calculated.

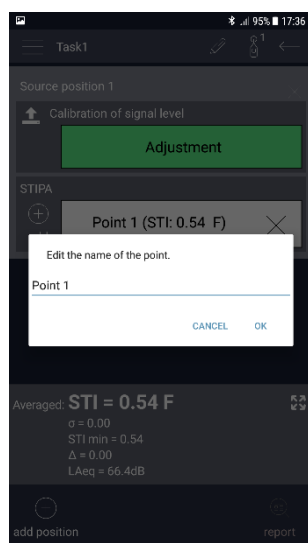


If the difference is other than -3 dB, you should adjust the loudness of the STIPA signal and repeat the calibration. An empirically derived factor of 3 dB is applied to compensate the silent parts of the speech signal - gaps between words (in accordance with IEC 60268-16:2011).


If the difference is acceptable, tap **Send source calibration parameter** to send the correction factor to the instrument.



Note: Correction factor is not a calibration factor and is used only in the STIPA calculations.



The **STIPA** sub-section is dedicated for measurements of STIPA signal in the set of points of the tested Area for the fixed source position.

In this subsection includes one or more bars for the measurement points which you can create tapping on the  icon.

You can change the default name of the measurement point touching and holding the bar.

You can open the measurement screen for this point tapping its bar.

Point 1

No	STI	Cat.	LAeq	LCeq	Status
1					
2					
3					
4					
5					
6					
Δ	--	--	--	--	--
AVG	--	--	--	--	--

Meas. No.: 1

f[Hz]	LZeQ	m(f1)	m(f2)
125	--	--	--
250	--	--	--
500	--	--	--
1K	--	--	--
2K	--	--	--

settings delete start complete

The measurement screen presents two tables:

- upper with results, such as **STI** index, STI category (**Cat.**), **LAeq**, **LCeq** results and **Status** (whether this measurement was correct **✓** or Error type) for a series of measurements and their averaged values (**AVG**) and spread (**Δ**),
- lower with results for the selected measurement, such as **LZeQ** and modulation indexes (**m(f1)**, **m(f2)**) for seven octave bands with central frequencies from 125 Hz to 8 kHz.

Instead of the second table, you may display the bar plot with **LZeQ** results tapping on the icon

settings

Range: High

Ambient noise: [Included]

Source calibration: 1.9

DEFAULT CANCEL APPLY

Tapping the icon in measurement screen, you can check or change the measurement settings: measurement **Range** (High or Low), **Ambient noise** and **Source calibration**.

settings

Range: High

Ambient noise: None

Source calibration: [Included]

DEFAULT CANCEL APPLY

Tap on the text in the **Ambient noise** field to change the option selected during the task creation to the one from the list: *None*, *[Included]* or the name of the Ambient noise task (in this example, *Task2*).

[Included]

F[Hz]	125	250	500	1k	2k
LZeQ	43.6	43.4	38.7	50.1	62.2

CANCEL APPLY

Set value

38.7

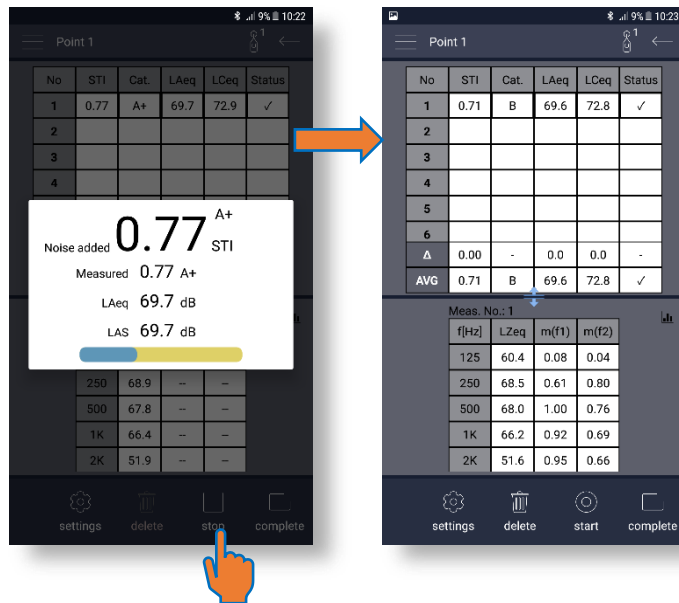
APPLY

If you tap , the table with current ambient noise data will be displayed.

You can adjust each value in this table before each measurement.



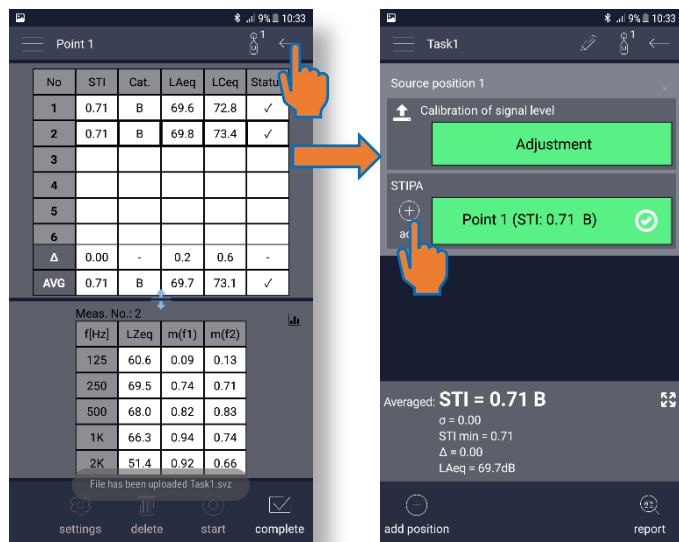
Note: After each edition (if you **APPLY** changes) the new ambient noise table with new current data will be considered during next STI measurements.



To make STIPA measurement, start the STIPA record, and in the measurement screen, start the measurement tapping

During the measurement the pop-up box with the progress bar appears.

The measurement lasts 15 seconds during which the measured results are updated every 1 second: STI index calculated with considered ambient noise, measured STI index, STI qualification scale, LAeq and LAS results.



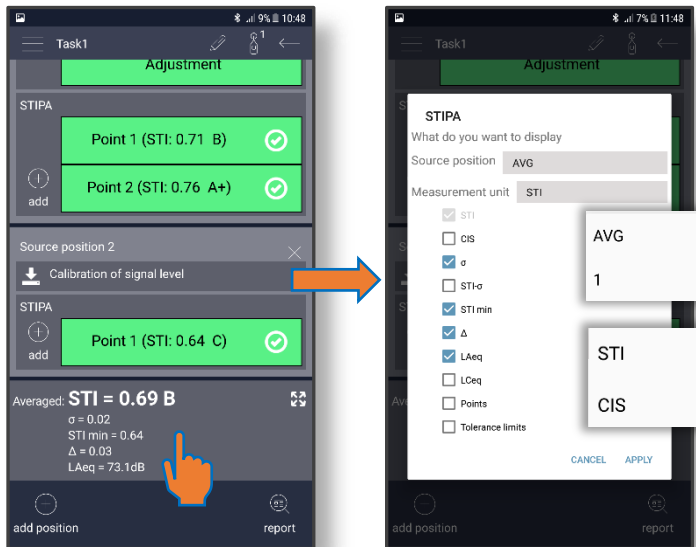
Perform as many measurements in the point as is required by the used standard, complete measurements and tap to return to the Task screen (the measurement bar changes its colour to green).

Perform additional measurements in different measurement points for which tap the icon in the STIPA section of the Task screen.



If required by your test conditions, change the position of the source, tap the **add position** icon in the Task screen instrument tool and repeat measurements. If necessary, calibrate the test signal for the new source position before performing STIPA measurements.

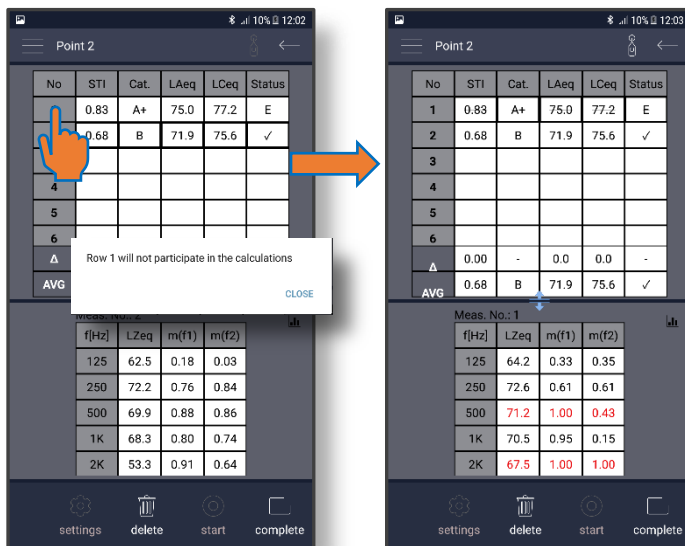
After completion of measurements in the first point the bottom section of the Task screen presents default averaged results for the area.



If you would like to change the set of presented results, tap this section and in the dialog box, select new set of results to be displayed.

In the **Source position**, you can select what the averaged results will cover: all source positions (AVG) or just selected (1, 2, ..).

In the **Measurement unit**, you can select what index (STI or CIS) will be displayed during the measurement.



If decide to exclude or remove the measurement, you should select it tapping on one of the result cells.

To delete the selected measurement, tap .

To exclude the selected measurement from the averaging, tap the cell with the measurement number. The excluded data will be crossed out and averaged data will be updated.

You can tap this cell again to restore the measurement data.



Note: Before excluding or deleting measurement data you should unlock this measurement point. The application allows to unlock only the last measurement point of each source position; therefore, you can exclude or delete measurement data only for the last points.



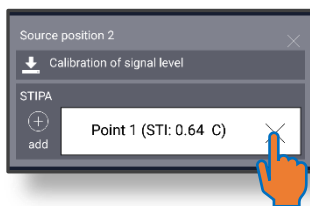
If you decide to exclude all measurements for a point from the averaging process, you can do this on the Task screen.

To exclude a measurement point from averaging, tap . The excluded point will be crossed out and averaged data will be updated.

Tapping brings this measurement point back to the averaging family.



Note: The application allows to exclude measurement data for all points, not for the last ones.

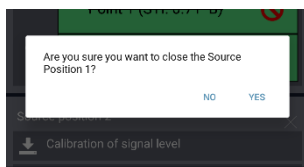


If the measurement point is not complete (white), you can delete it tapping .

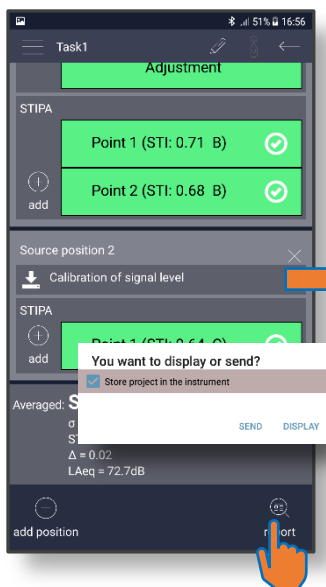
If the measurement point is complete (green) you should first unlock it and then delete.



Note: The application allows to unlock only the last measurement point of each source position; therefore, you can delete unlocked measurement data only for the last points.



You can delete all measurements for the source position tapping on the source position header. The application will ask you to confirm this action.



Task1 - Read only

Read Only - You can't save changes to this file.

	A	B	C	D	E	F	G	H
1	Task1	2020-05-14						
2								
3								
4								
5	Source position 1							
6								
7	Point 1							
8								
9								
10								
11								
12	STI	Cal.	L _{Aeq}	L _{Ceq}	L _{Zeq} (125)	L _{Zeq} (250)	L _{Zeq} (500)	
13			69.55	72.76	69.38	69.53	67.9	
14			69.77	73.35	69.59	69.53	68.9	
15	Point 2							
16								
17								
18								
19								
20	STI	Cal.	L _{Aeq}	L _{Ceq}	L _{Zeq} (125)	L _{Zeq} (250)	L _{Zeq} (500)	
21			68.8	71.85	75.63	62.46	72.16	69.9
22								
23								
24	Arre[1]							
25	STI	Cal.	0.70					
26	CIS		0.85					
27	Δ		0.02					
28	STI+Δ		0.68					
29	STI min		0.68					
30	A		0.05					
31	L _{Aeq}		70.9					
32	L _{Ceq}		74.5					
33	Points		2					

After all measurements are completed (all measurements bars are green), the **report** icon becomes active. Tap it and select in the dialog box:

- **DISPLAY** the report on the mobile device or
- **SEND** it to the PC or other mobile device via e-mail, wireless connections or communication applications.

In parallel, you can store the project in the instrument.

5.3. AMBIENT NOISE TASK SCREEN

Task setup

General:

Area: Task2

Project: PROJ1

File name: Task2

Measurement:

Type: Ambient noise

Description:

...

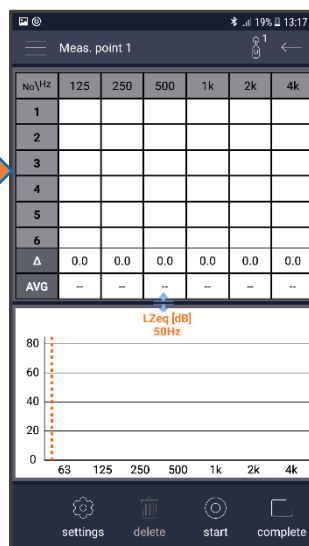
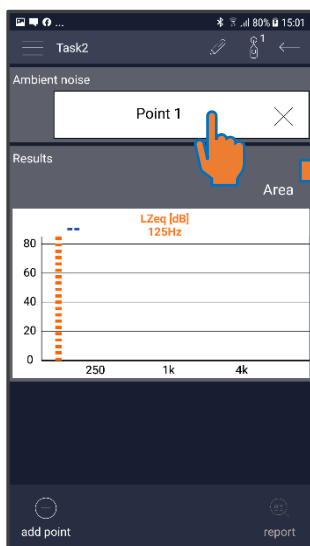
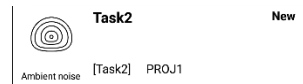
OK

The Ambient noise task is used for measuring distortions independently and then use them in different STIPA tasks.

To create the Ambient noise task, tap in the **Tasks** screen, and select *Ambient noise* in the **Type** position of the **Measurement** section.

The **Area** name in this case occurs as a project name which can be used in STIPA settings while selecting option in the **Ambient noise** field.

The Ambient noise task is marked as in the **Tasks** screen.



To make measurements for the measurement point, tap its bar to open a measurement screen.

The measurement screen presents a table of LReq results for seven octave bands with central frequencies from 125 Hz to 8 kHz and a bar plot which presents results for the selected measurement, averaged values (**AVG**) or spread (**Δ**).

settings

Meas. duration: 15s

Range: High

Detect. for 1/3 oct.: Linear

Diffuse filter: On

DEFAULT CANCEL APPLY

Tapping the icon in measurement screen, you can check or change the measurement settings: **Measurement duration** ($1\div 60s$, *Inf* or *Auto*), measurement **Range** (*High* or *Low*), **Detector for 1/3 octaves** (*Linear*, *Fast* or *Slow*) and **Diffuse filter** (*On* or *Off*).

To start measurement, tap .

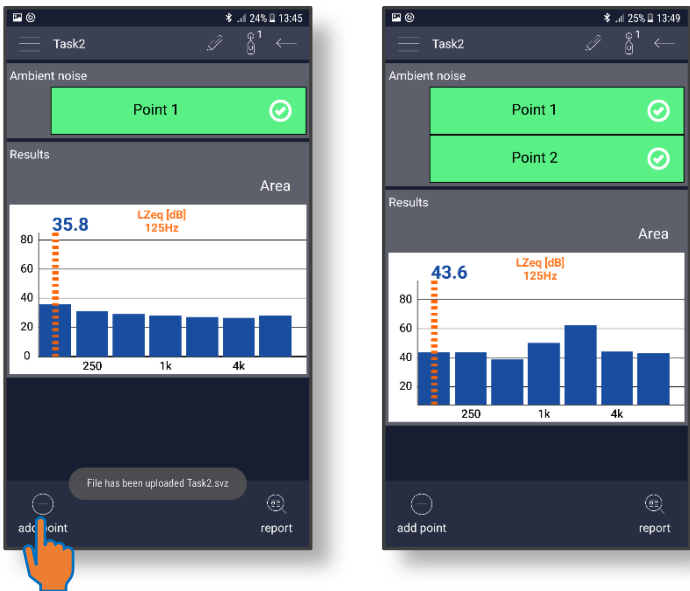


During the measurement, the progress bar on the bottom of the screen is displayed.

You can stop the measurement tapping **stop**.

The bar-plot presents averaged L_{Req} and Max values for the octave bands.

Perform additional measurements in the point if required, complete measurements and tap to return to the Task screen (the point bar changes its colour to green).



The **Results** section shows the Ambient noise distortions that can be taken into consideration during STIPA measurements when you select an Ambient noise task for the **Ambient noise** parameter.

If necessary, you can add the measurement point and make additional measurements.

The **Result** section will present averaged results for all points.

The 'Task2 - Read-only' screen displays a table of results. The table has columns for frequency bands (250, 500, 1k, 2k, 4k, 8k) and rows for individual measurements (1-6) and averages (Δ, AVG). The table shows the averaged L_{Req} [dB] for 125Hz, with a maximum value of 47.5.

No\Hz	250	500	1k	2k	4k	8k
1	31.0	28.9	28.0	26.9	26.3	27.9
2						
3						
4						
5						
6						
Δ	0.0	0.0	0.0	0.0	0.0	0.0
AVG	31.0	28.9	28.0	26.9	26.3	27.9

After completion of all measurements you can display or send a report.