HBK 2255

with Building Acoustics Partner
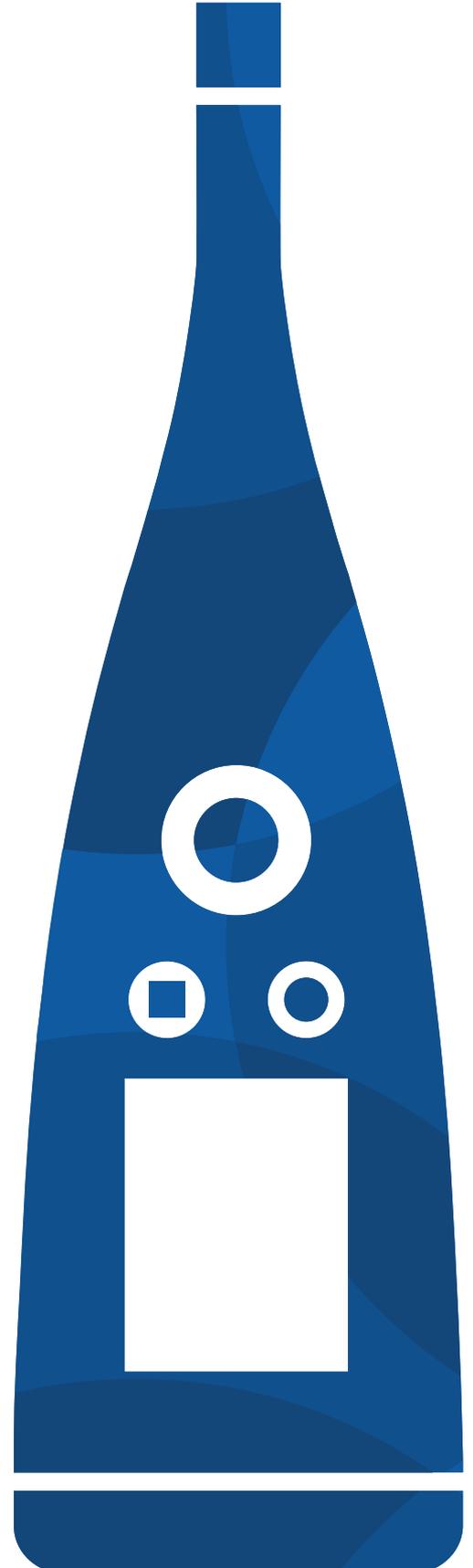
User Guide

for Version 1.3

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TYPES OF TESTS

Sound insulation tests

The purpose of sound insulation measurements is to quantify how easily sound transfers between spaces in a building which are separated by building elements, such as walls, floors and windows. These separating elements are typically called partitions in the context of sound insulation tests. For each test, a result spectrum and single-number result is calculated and reported. The report format must follow international and national standards.

There are three types of tests: airborne sound insulation, impact sound insulation and façade sound insulation.

Airborne sound insulation

Airborne sound insulation measurements assess the reduction of airborne sound from the source room to the receiving room. Airborne tests characterize the acoustic performance of the sound insulation by the relative reduction in sound levels through the separating partition. The higher the level, the better the results.

Airborne sound insulation is calculated from the spatially averaged sound pressure levels in the source and receiving rooms, adjusted for the background levels and reverberation time in the receiving room. For some result parameters, the volume of the receiving room and the area of the common partition are required.

The most common test in building acoustics measurements is airborne sound insulation.

Typical result parameters:

- Level difference

  $D = L1 - L2$

  L1 is the sound pressure level in the source room, and L2 is the sound pressure level in the receiving room. This is the simplest parameter.

- Standardized level difference

  $D_{nT} = D + 10\log(T/T_0)$

  D is the level difference, T is the reverberation in the receiving room, and T_0 is the reference reverberation time.

- Apparent sound reduction index

  $R' = D + 10\log(S/A)$

  S is the common sound partition, and A is the equivalent absorption area of the receiving room (both in square meters).

Impact sound insulation

Impact sound insulation measurements assess the amount of sound that is transferred from a standardized impact sound source operating in the source room to the receiving room. Impact tasks characterize the acoustic performance of the sound insulation by the absolute level of sound in the receiving room. The lower the level, the better the results.

Impact sound insulation is calculated from the spatially averaged sound pressure levels in the receiving room, adjusted for the background level and reverberation time in the receiving room. For some result parameters, the volume of the receiving room and the area of the common partition are required.

Typical result parameters:

- Normalized impact sound pressure level

  $L'_n = L_i - 10\log(A/A_0)$

  L_i is the impact sound pressure level, A is the absorption area in the receiving room, and A_0 is the reference absorption area.

- Standardized impact sound pressure level

  $L'_{nT} = L_i - 10\log(T/T_0)$

  L_i is the impact sound pressure level, A is the absorption area in the receiving room, and A_0 is the reference absorption area.

Façade sound insulation

Façade sound insulation measurements assess the reduction of airborne sound from outside the building to the receiving room inside the building. As with airborne tests, façade tests characterize the acoustic performance of the sound insulation by the relative reduction in sound levels through the separating partition. The higher the level, the better the results.

Façade sound insulation is calculated from the spatially averaged sound pressure levels in front of or incident to the façade, and the spatially averaged sound pressure levels in the receiving room, adjusted for the background level and reverberation time in the receiving room. For some result parameters, the volume of the receiving room and the area of the common partition are required.

Typical result parameters:

- Level difference

  $D_{2m} = L_{1.2m} - L_2$

  $L_{1.2m}$ is the average outdoor sound pressure level at a distance of 2 m in front of the façade, and L_2 is the energy-average sound pressure level in a room.

- Standardized level difference

  $D_{2m,nT} = D_{2m} + 10\log(T/T_0)$

  D_{2m} is the level difference, T is the reverberation in the receiving room, and T_0 is the reference reverberation time.

- Apparent sound reduction index

  $R'_{45°} = L_{1,s} - L_2 + 10\log(S/A) - 1.5 \text{ dB}$

  $L_{1,s}$ is the average outdoor sound pressure level on the test surface, and L_2 is the energy-average sound pressure level in a room. S is the area of the test specimen, and A is the equivalent absorption area of the receiving room (both in square meters).

Field vs laboratory measurements

Measurements in the field are performed in situ on partitions of buildings. The results are used to document conformance to building regulations and design criteria. In field measurements, sound and vibration propagate not just via the partition under investigation, but also via other partitions, structures and leaks. This propagation is called 'flanking' transmission.

Measurements in the laboratory are made on building elements such as wall panels or windows mounted in special test rooms, designed and tested to prevent 'flanking'. The measurements follow uniform and strict procedures, and the measuring equipment is usually permanently installed. The results are used by manufacturers to document the performance of their products.

Room background noise tests

The purpose of room background noise tests is to quantify background noise levels to determine if the levels are suitable for the purpose of the room. The frequency spectrum is measured and compared to noise curves to rate the background noise in a room. A common application of room background noise tests is to confirm background noise from HVAC (heating, ventilation, and air conditioning) systems complies with room acoustics design criteria.

Sound insulation tests and room background noise tests are often performed on the same building. Sometimes room background noise tests can be performed at the same time as sound insulation tests, but sometimes the tests are performed at different stages in the construction. For example, you might be able to test sound insulation when only a few sample rooms are ready, but you might wait to test room background noise until the HVAC system is balanced.

EQUIPMENT AND ACCESSORIES

To perform sound insulation tests as described in this documentation, you will need HBK 2255 Sound Level Meter with Building Acoustics Partner and a sound source. The sound source can be HBK 2755 Smart Power Amplifier and OmniPower Sound Source Type 4292-L, or it can be a different sound source that fulfils the requirements of the standard to which you are testing.

If you are testing impact sound insulation, a sound source such as Tapping Machine Type 3207 is recommended. However, with Building Acoustics Partner, it is possible to use any equipment which fulfils the requirements of the standard used.

A few other helpful accessories include a sound calibrator and a rigid extension rod for the microphone (UA-0049). The sound calibrator can be used to document the quality of your data, or it can help troubleshoot a problem. The extension rod can make manual scans using the cylinder transverse and corner measurements for the low-frequency method of ISO 16283 much easier.
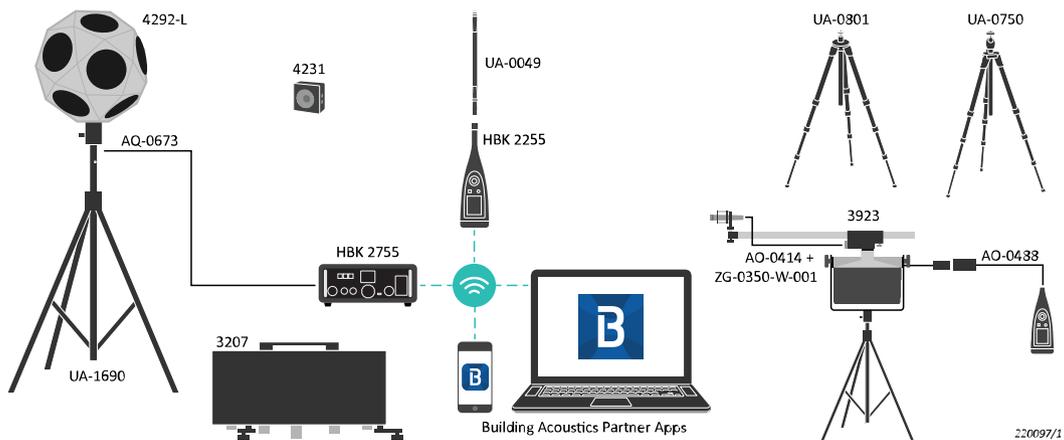
- HBK 2255 Sound Level Meter with Building Acoustics Partner (mobile and PC applications)
- OmniPower™ Sound Source Type 4292-L with UA-1690 (tripod)
- HBK 2755 Smart Power Amplifier
- Sound Calibrator Type 4231
- Tapping Machine Type 3207
- Optional tripods for HBK 2255: UA-0801 or UA-0750
- Microphone Extension UA-0049

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SUPPORTED STANDARDS

Building Acoustics Partner supports a wide variety of national standards as well as ISO standards, for both field and laboratory use.

You can only use one standard per project.

The mobile app and the PC app include information about which version of the standard Building Acoustics Partner supports.

	Org.	Typ. Param.	Airborne			Impact		RT	Rating	
			Lab	Field	Façade	Lab	Field		Airborne	Impact
Int'l	ISO	R' $L'n$	140-3 10140-2	140-4 16283-1	140-5 16283-3	140-6 10140-3	140-7 16283-2	3382-2	ISO 717-1	ISO 717-2
DEU	DIN	R $L'n$	EN 20140-3	52210-1	52210-5	52210-1		52212	52210-4	52210-4
SWE	SS	R' $L'n$	EN 20140-3	EN 20140-4 SS 25267	EN 20140-5	EN 20140-6	EN 20140-7 SS 25267		ISO 717-1	ISO 717-2
CHE	Sia	DnT $L'nT$		181	181		181		181	181
AUT	ÖNORM	DnT $L'nT$	S 5101	S 5100-1	S 5100-3	S 5101	S 5100-2		S 5100-1	S 5100-2
GBR	BS	DnT $L'nT$	EN 20140-3	2750-4	2750-5	2750-6	2750-7		5821-1, -3	5821-2
England Wales	BREW	DnT		BREW					BS EN 717-1	
ITA	UNI	Dn Ln	8270-1	8270-4	8270-5	8270-6	8270-4		8270-7	8270-7
FRA	NF-S31	$DnAT$ $LnAT$	-051	-054, -057	-055, -057	-052	-056, -057		-057	-057
ESP	NBE	$DnAT$ $LnAT$	74-040-8-4(3)	74-040-8-4(4)	74-040-8-4(5)	74-040-8-4(6)	74-040-8-4(7)		NBE-CA-8-8	NBE-CA-8-8
	CTE	DnT,A $L'nT$	CTE:2008	CTE:2008	CTE:2008	CTE:2008	CTE:2008		CTE:2008	CTE:2008

NLD	NEN'06	*DnT,A* *LnT,A*		5077	5077			5077	NPR 5097	
	NEN	*Ilu* *Ico*		5077	5077		5077	5077	5077	5077
USA	ASTM	*FTL* *Ln*		E336-90	E966-90		E1007-11		E413-73 E1332-90	E989

DOWNLOAD THE APPS

The mobile app and the PC app have many common functions. Both apps can be used to create projects, configure project settings, and view measurements and results. The biggest differences in functionality are that the mobile app is used for measurements and the PC app is used to create reports.

Download the mobile app

Download the Building Acoustics Partner mobile app from the App Store®.

The app can be installed onto an iOS-based phone or tablet. See supported iOS versions for current app version in the App Store, under **Building Acoustics Partner** > **Information** > **Compatibility**.

Updates

You will be informed of updates via the App Store.

Download the PC application

System Requirements:

- Windows® 10 or 11 (64-bit) operating system
- Microsoft® .NET 6 framework

Recommended PC:

- Intel® Core™ i5 or better
- Sound card
- Solid State Drive (SSD)
- 8 GB of memory
- At least one available USB port
- Microsoft Office 2016 or later

Procedure:

1. Go to: www.bksv.com/downloads.
2. From the list of available downloads, expand the HBK 2255 section.
3. Select the software downloads option.
4. Scroll down to Building Acoustics Partner.
5. Once the download is complete, double-click the file (Setup.exe) to start installation.

   ✎ **Note:** The file will be placed in a location that is defined by the settings in your web browser.

The PC application will start immediately after installation.

Updates

You will be informed of updates via the application.

CONNECT DEVICES

You will use both the mobile app and the PC app to work with Building Acoustics Partner projects. Projects are stored on the instrument, and you connect the apps to the instrument to work with the project. The mobile app and the PC app do not connect to each other.

The instrument communicates with the apps through a common network using Wi-Fi® and Bluetooth®. The common network can be either a local network or the instrument's hotspot. It is also possible to connect the instrument directly to your PC using a USB cable.

Connect the mobile app to the instrument

To start using the mobile app, you will need to connect the mobile app to the instrument.

To communicate, the instrument and the mobile app connect to a common network. There are two options:

- The Wi-Fi access point of your personal or work network
- The instrument's hotspot

The mobile app detects and connects to the instrument via Wi-Fi and Bluetooth.

The first time you connect the mobile app to the instrument, the mobile app will prompt you for permissions (namely, to access the camera on your device and how to use location data) and to perform the steps necessary for connection.

1. Turn on the instrument and start the mobile app.
2. Wait for the mobile app to detect the instrument, it will become visible in the list of instruments.
3. Tap the instrument.

✏ **Note:** If the mobile device does not detect the instrument, check that the instrument is not in Airplane mode (**Menu** > **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**).

After the mobile app and the instrument are connected, tap ⌀ in the mobile app at any time to manage the connection to the instrument, view the status of the instrument (battery and available storage space) and to access a few of the settings on the instrument.

> **A note about nicknames**
>
> The mobile device will detect all instruments within range. To make an instrument easier to identify, you can give the instrument a nickname.
>
> 1. Open the instrument menu:
>
>   - On the instrument, press ▤.
>   - On the mobile app, tap ⌀.
>
> 2. Go to: **System settings** > **Network settings**.

Connect multiple instruments to the mobile app

Building Acoustics Partner supports the use of multiple instruments. The ability to connect two instruments enables you to measure two positions simultaneously, which is a requirement for some façade sound insulation test methods.

The process is similar to connecting one instrument, with the addition of setting the primary and secondary instruments.

1. In the list of instruments on the mobile app, select the primary instrument.

    The first instrument you tap becomes the primary instrument.

2. Select a second instrument.

    The second instrument becomes the secondary instrument.

3. Tap **Connect**.

See **Multiple instruments** for more information about using multiple instruments for sound insulation tests.

Connect the PC app to the instrument

To upload project definitions from the PC app to the instrument or to import projects from the instrument to the PC app, you will need to connect the PC app to the instrument. You do not need to be connected to the instrument to create a project or to work with a project that has been imported and saved to a location on your PC or network.

1. Turn on the instrument and start the PC app.

2. Make sure the devices can communicate. You can do one of two things:

    - Connect the devices to a common network (a personal or work network or the instrument's hotspot).
    - Use a cable to connect the devices.

3. Click ⤓ to import a project or measurements, or click ⇄ to upload a project definition to the instrument. If the devices can communicate, you will see the instrument in the dialog box.

CREATE A PROJECT

A Building Acoustics Partner project stores the settings, measurements and results for sound insulation and/or room background noise tests. Projects are stored on the instrument.

You can create a project, configure project settings and add rooms and partitions to the project using either the mobile app or the PC app. The option to use either app gives you the flexibility to choose your preferred method.

Most likely, you will create projects on site using the mobile app. The project settings of the last project are reused, so it is normally just a matter of defining geometries and making small adjustments before you can start to measure. The advantage of defining geometries on site is that it allows you to select the best rooms to use based on the actual conditions of the site.

In some cases it is easier to set up the project in the office using the PC app, such as for surveys with a large number of partitions to test. To transfer the project setup to the mobile app, you will upload what is called the project definition to the instrument. A project definition is a copy of a project settings minus any measurement data, if it exists. When you connect the mobile app to the instrument, you will be able to work with the project you created on the PC app. In this way, you can use a previous project as a template.

Create a project using the mobile app

Once the mobile app and the instrument are connected, you will be able to create a new project or open an existing project.

Tap **Create new project** to start a new project. The project overview opens, with access to project settings, partition creation and measurement screens.

If you need to delete a project:

- Tap and hold a project tile
- Swipe left on a project in the list of all projects

Create a project using the PC app

You do not need to connect the PC app to the instrument to start a project, but you will need to connect the instrument to the PC to upload the project definition to the instrument.

Click ⬜ to start a new project. A dialog opens which you can use to name the project, to configure project settings, and to add rooms and partitions.

CONFIGURE PROJECT SETTINGS

You can configure the settings for your sound insulation tests and room background noise tests using either the mobile app or the PC app. If you configure the settings on the PC app, you will need to upload the project definition to the instrument before you can open the project on the mobile app. See **Connect devices** for more information.

The focus of this section is the commonly used methods for sound insulation tests and examples of how to set up your project to use the different methods. There is also a complete list of settings, with information about each setting.

✏ **Note:**

- Settings are organized into groups and subgroups to help make it clear how they affect the setup.
- The settings are adaptive; that is, the apps enable and disable settings so only the settings relevant to your setup are available.
- Project settings persist from one project to the next, in both the mobile app and the PC app, so the settings will be as they were last time you opened/imported/defined the settings.

Fixed or scanned measurements

With Building Acoustics Partner, you can measure at fixed points or along a traverse to find the average sound pressure level in a room.

How to set the measurement method

Use the Indoor method setting to define the method you will use for level measurements in indoor tests, that is L1 measurements in airborne sound insulation tests, and L2 and B2 measurements in airborne, impact and façade sound insulation tests.

In the mobile app, you can find the setting here: **Sound insulation setup** > **Indoor method**.

In the PC app, you can find the setting here: **Setup** > **Project**.

✏ **Note:** The setting locks after the first measurement is added to the project.

- Select *Discrete points* to place the microphone in a series of positions and measure at each position.
- Select *Manual scanning* to make a single measurement while moving the microphone manually along a traverse .

> If you plan to measure at fixed positions, it is recommended to measure for a preset length of time. If you plan to use the manually-scanned method, it is recommended that you control measurement time manually. See **Frequency range and measurement time** for information about setting up automatic and manual measurement times.

Guidelines from ISO 16283

Below are some general guidelines for microphone positions and traverses from ISO 16283, but you should refer to the standard you are using.

Fixed measurement points

- ≥ 0.7 m (2.3 ft) between microphone positions
- ≥ 0.5 m (1.64 ft) from the room boundary
- ≥ 1 m (3.28 ft) from the loudspeaker

Manually-scanned microphone traverse

.5 m
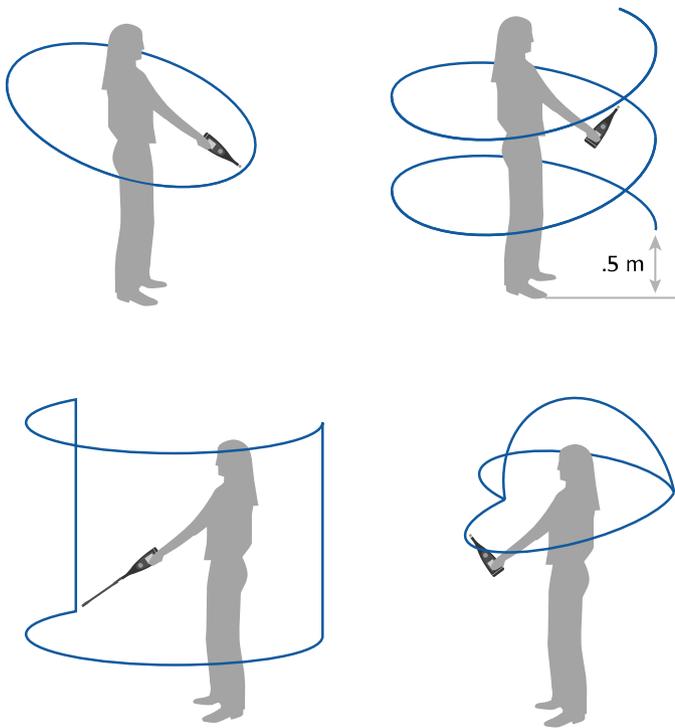
Note: The cylindrical scan requires Microphone Extension UA-0049.

Low-frequency procedure

The low-frequency procedure requires fixed microphone positions in a minimum of four corners, with two corners at ground level and two corners at ceiling level. Microphones may be mounted on a tripod or hand-held.

Hint: Microphone Extension UA-0049 is a great accessory for measuring in corners.

See **Low-frequency measurements** for more information about sound insulation tests at low frequencies.

Pros and cons of measurement methods

	Manually-scanned method	**Measurements at fixed points**
Pros	Scans can be faster than measuring at fixed positions. You are able to listen to the sound field as you make measurements.	You can control measurements from outside the room, without introducing extra absorption or noise inside the room.
Cons	Your body introduces noise and absorption into the sound field. You are exposed to high sound levels for L1 measurements; hearing protection is recommended.	Fixed positions require you to reposition equipment frequently. Measurements at multiple fixed positions can take longer than a scan.

> With Building Acoustics Partner, you can stream live audio to your mobile device, which can eliminate the need to be in the room while measuring. See **Listening to audio** for more information about live audio.

Room background noise tests

Sometimes only the loudest position is measured, other times a room average may be used (measure at multiple fixed points or along a traverse). Avoid measuring at the centre of the room or within 1 m of a wall.

Measurements are frequently made at the typical ear level for people in the room, that is seated or standing (in general, in the 1.2 to 1.8 m range).

See **Room background noise** for more information.

Impulsive or interrupted method

Building Acoustics Partner supports reverberation time measurements using either an impulsive or interrupted noise.

Impulsive noise method

The instrument finds an impulse and integrates backwards to find the decay.
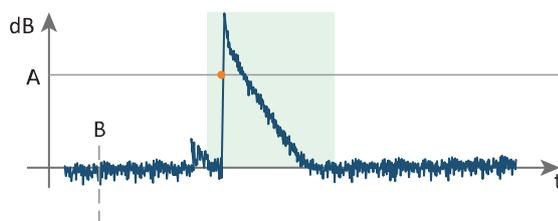
A = Trigger level

B = Start the instrument

X- axis shows time, Y-axis shows sound levels, the shaded area represents the total impulse measurement time.

Example setup (impulsive noise)

The following is an example of the settings used to make reverberation time measurements using impulsive noise.

- On the mobile app: **Sound insulation setup** > **Measurement plan** > **Reverberation measurements**

  On the PC app: **Sound insulation setup** > **Reverberation measurements**

  - **No. of source positions** = *1*
  - **No. of mic. pos. per source** = *6*
  - **Increment** = *Mic. position first*

- On the mobile app: **Sound insulation setup** > **Measurement control T2**

  On the PC app: **Measurement control** > **Measurement control T2**

  - **Excitation** = *Impulsive noise*
  - **Trigger level** = *80 dB*

Typical T2 measurement cycle (impulsive noise)

1. Press the start button on the instrument or the mobile app.

   The instrument is ready and waits for the sound level which will trigger the impulse measurement to start. The light ring flashes green quickly while the instrument waits for the trigger level.

2. Make the impulsive noise.

   ✔ **Note:** The use of hearing protection is highly recommended.

3. The impulse measurement starts up to one second before the sound level exceeds the trigger level.
4. The impulse measurement stops automatically when the instrument detects the background noise level (or the elapsed time exceeds 30 s).
5. The instrument performs backward integration of the impulse measurement.
6. The instrument stores and displays the measurement result, including the calculated EDT, T20 or T30 values.
7. Move the instrument to the next position and start another measurement cycle.

Interrupted noise method

The instrument finds the decay time of built-up sound levels in the room.
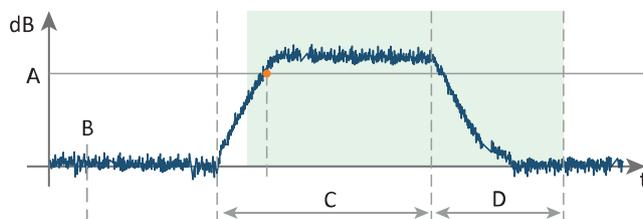
A = Trigger level

B = Start the instrument

C = Length of time for which the sound source is active

D = Decay time

X- axis shows time, Y-axis shows sound levels, the shaded area represents the total decay measurement time.

Example setup (interrupted noise)

The following is an example of the settings used to make reverberation time measurements using the interrupted noise method and Smart Power Amplifier HBK 2755.

- On the mobile app: **Sound insulation setup** > **Measurement plan** > **Reverberation measurements**

  On the PC app: **Sound insulation setup** > **Reverberation measurements**

    - **No. of source positions** = *1*
    - **No. of mic. pos. per source** = *3*
    - **Increment** = *Mic. position first*

- On the mobile app: **Sound insulation setup** > **Measurement control T2**

  On the PC app: **Measurement control** > **Measurement control T2**

    - **Excitation** = *Interrupted noise*
    - **Number of decays** = *3*

- On the mobile app: **Sound insulation setup** > **Source control T2**

  On the PC app: **Source control** > **Source control T2**

    - **Source type** = *HBK 2755*
    - **Noise type** = *Pink*
    - **Escape time** = *0*
    - **Build-up time** = *1*
    - **Output gain** = *0*
    - **Power compression compensation** = *Disabled*

      You do not need power compression compensation when making reverberation time measurements as the sound source is not active for long periods of time.

Typical T2 measurement cycle (interrupted noise)

1. Press the start button on the mobile app.

   The instrument is ready, and the light ring flashes green quickly.

2. The mobile app switches on HBK 2755.

3. After the build-up time has passed, the instrument calculates the sound level generated.

4. The mobile app switches off HBK 2755 and tells the instrument to start the decay measurement.

5. The decay measurement stops automatically when the instrument detects the background noise level (or the elapsed time exceeds 30 s).

6. The decay measurement is repeated automatically for the set number of decays. The measured decays are averaged together to reduce the uncertainty of the measurement.

7. The instrument stores and displays the measurement result, including the calculated EDT, T20 or T30 values.

8. Move the instrument to the next position and start another measurement cycle.

Number of positions

The characteristics of the room (size, shape and furnishings) affect the reflection of sound within the room and change the sound field within the room, which can cause variations in sound pressure level within the room. For this reason, measurements are normally made at several points in each room.

Source positions

Generally, you will use two sound source positions for level measurements and one source position for reverberation time measurements. For level measurements, you can use a single sound source operating at each position individually, or two sound sources operating at each position simultaneously.

For the low-frequency procedure of ISO 16283, use the same source positions used for the default procedure.

Microphone positions

Sound insulation tests

For level measurements, you can measure at fixed points or along a traverse. When using fixed measurement points, you should measure at a minimum of five microphone positions. For manually-scanned measurements, you should perform a minimum of one scan. Ideally, the background noise in the receiving room (B2) should be measured consecutively with the sound level in the receiving room (L2) at the same measurement positions or traverse.

✎ **Note:** It is important that the time spent measuring, for either a single manually-scanned measurement or multiple measurements at fixed points, meets the averaging time requirements of the standard used. See **Frequency range and measurement time** for more information about averaging times and **Fixed or scanned measurements** for information about measurement methods.

For reverberation time measurements (T2), you should measure a minimum of 6 decays at a minimum of 3 fixed microphone positions.

The low-frequency procedure of ISO 16283 requires fixed microphone positions in a minimum of four corners, with two corners at ground level and two corners at ceiling level. Microphones may be mounted on a tripod or hand-held.

Room background noise tests

For room background noise tests, you have the option to measure at one position only (the worst affected position) or at multiple positions to determine the average noise levels in the room.

See **Room background noise** for more information.

Measure L1 and L2 simultaneously

Building Acoustics Partner supports the use of multiple instruments. The ability to connect two instruments enables you to measure two positions simultaneously, which is a requirement for some façade sound insulation test methods.

Example sound insulation test setups

For planned measurements, the number of source and microphone positions for airborne, impact and façade sound insulation tests are set in the Sound insulation setup group of settings (in the Measurement plan group of settings in the mobile app). The settings for source and microphone positions are separated for level and reverberation time measurements. The separation allows you to use different settings for the two types of measurements.

✎ **Note:** The Planned measurement setting must be enabled to set the number of source and microphone positions in the project.

For unplanned measurements, you do not set the number of source and microphone positions in the project settings. Instead, you will add source and microphone positions to a partition as you make measurements.

You can set the number of source and microphone positions using the mobile app or the pc app.

- On the mobile app: **Sound insulation setup** > **Measurement plan**.

- On the pc app: **Setup** > **Sound insulation setup** .

Level measurements

You can set the number of source and microphone positions for level measurements in the Level measurements group of settings.

Example settings for airborne sound insulation tests at fixed points:

- **B2: No. of mic. positions** = *1*

  The background noise in the receiving room (B2) should be measured close to the time at which the sound level in the receiving room (L2) is measured. This ensures your B2 measurements are a good representation of the background noise levels at the time of your L2 measurements. Normally, the background noise level in the receiving room does not vary much over time, so one measurement should be sufficient to give a good representation of the background noise level.

  ✎ **Note:** The B2: No. of mic. positions setting is not grouped with a type of sound insulation test because the setting applies to all types of sound insulation tests.

- In the Airborne group:

  - **No. of source positions** = *2*
  - **L1: No. of mic. pos. per source** = *5*
  - **L2: No. of mic. pos. per source** = *5*

If you plan to use a manually-scanned method, enter the number of scans you will perform in the B2: No. of mic. positions, L1: No. of mic. pos. per source and L2: No. of mic. pos. per source settings instead. Generally, you will perform one scan per source position.

Reverberation time measurements

You can set the number of source and microphone positions for reverberation time measurements in the Reverberation measurements group of settings.

- **No. of source positions** = *1*
- **No. of mic. pos. per source** = *3*

Low-frequency procedure

You can set the number of source and microphone positions for level measurements according to the low-frequency procedure in the Level measurements group of settings.

- **No. of LF receiving room pos.** = *4*
- In the Airborne group: **No. of LF source room pos.** = *4*

✏ **Note:**

- Settings for the low-frequency procedure are available when using the ISO 16283 standard: **Sound insulation setup** > **Standard** = *ISO 16283*.
- You will use the same source positions for both the default procedure and the low-frequency procedure, so there is not a source position setting specific to the low-frequency procedure.

Measure L1 and L2 simultaneously

1. Connect two instruments to the mobile app. See **Connect devices** for more information.
2. In the Measurement control group of settings, set **Measure L1 and L2** = *Simultaneously*.

Example room background noise test setup

For planned measurements, the number of microphone positions for background noise tests are set in the **Room background noise setup** group of settings.

- **B2: No. of mic. positions** = *3*

✏ **Note:** The Planned measurement setting must be enabled to edit the setting.

Frequency range and measurement time

Frequency range

Sound insulation tests are based on measured 1/1-octave or 1/3-octave spectra within the 50 Hz to 10 kHz range.

With Building Acoustics Partner, the Frequency range settings are applied according to the type of test or tests to perform. A project can be set up to use different frequency ranges and bandwidths for sound insulation tests and for room background noise tests. Furthermore, the settings do not lock after you make a measurement, which allows you to change the frequency range and bandwidth as you make measurements. In this way, it is possible to measure different partitions in a single project at different frequency ranges and bandwidths. See **Add rooms and partitions** for more information about setting the type of test.

Measurements at low frequencies

It is very hard to get a good average of low-frequency levels in small rooms. For this reason, some standards (such as ISO 16283) include measurement procedures which are used to adjust low-frequency bands in sound insulation calculations. For ISO 16283, the procedures are for measurements below 100 Hz where the source or receiving room is smaller than 25 m^3.

Building Acoustics Partner includes an option to extend the lower limit of the frequency range down to 20 Hz. The extended range allows you to perform, for example, impact sound insulation tests on lightweight or wooden structures according to Swedish standard SS 25267:2015.

Measurement time (averaging time)

In general, use an averaging time that gives a good representation of the average sound levels in the frequency range you are measuring. Higher frequencies require less averaging time than lower frequencies, so the lowest frequency band you choose to include in your measurements will normally determine the minimum appropriate averaging time. As always, refer to the standard used for averaging time requirements.

For level measurements (L1, L2 and B2), you can measure at fixed points or along a traverse.

With Building Acoustics Partner, measurement times can be preset or controlled manually. If you plan to measure at fixed positions, a preset measurement time allows you to minimise the time you spend measuring and to ensure that you meet the averaging time requirements. If you plan to use the manually-scanned method, a manually-controlled measurement time ensures that the measurement does not automatically stop before the you complete the scan. See **Fixed or scanned measurements** for information about measurement methods.

Example sound insulation test setups

Frequency range

The bandwidth and frequency range settings for sound insulation tests are found in the Sound insulation setup group of settings (in the Frequency range group of settings in the mobile app, or in the Project group of settings in the PC app).

- **Bandwidth** = *1/3 octave*
- **Bottom frequency** = *50 Hz*
- **Top frequency** = *5 kHz*

✏ **Note:** The Frequency range settings set the frequency range to display and analyse.

Measurement time (averaging time)

Settings for measurement times are found in the Measurement control groups of settings. There is one group for background noise level measurements (B2) and one group for sound level measurements (L1 and L2). You can use different Measurement time settings for each group of measurements.

✏ **Note:** There is also a Measurement control group of settings for reverberation time measurements (T2), but the Measurement time setting does not apply to T2 measurements. Reverberation time measurements operate differently, using a sound level to trigger the measurement to start and detection of the background noise level (or a maximum elapsed time) to stop the measurement.

If you plan to measure at fixed positions, it is recommended to set up level measurements to stop automatically after a set length of time. Use the following settings:

- In the mobile app: **Sound insulation setup** > **Measurement control L1 & L2**

  In the PC app: **Setup** > **Measurement control** > **Measurement control L1 & L2**

  - **Measurement time** = *Preset*
  - **Preset time** = *15 s*

    ✎ **Note:** A shorter time may be appropriate if **Bottom frequency** > *80 Hz*.

- In the mobile app: **Sound insulation setup** > **Measurement control B2**

  In the PC app: **Setup** > **Measurement control** > **Measurement control B2**

  - **Measurement time** = *Preset*
  - **Preset time** = *15 s*

If you plan to use the manually-scanned method, it is recommended that you control measurement time manually. Use the following settings:

- **Measurement control L1 & L2**:
  - **Measurement time** = *Free*
- **Measurement control B2**:
  - **Measurement time** = *Free*

> 🔒 **Pocket mode**
>
> Pocket mode locks the screen on your mobile device so you can put it in your pocket and continue your test using the controls on the instrument, which is perfect for manually-scanned measurements where it makes sense to start and stop a measurement using the instrument. Pocket mode does not disable the functionality of the mobile app, so Building Acoustics Partner continues to manage your test from the safety of your pocket.

Low-frequency measurements

When **Standard** = *ISO 16283*, **Bottom frequency** = *50 Hz* and there is at least one partition with a receiving room with a volume less than 25 m^3 in the project, settings for low-frequency measurements are enabled in the Measurement plan group of settings.

Extended frequency range

When **Standard** = *ISO 16283* and **Bottom frequency** = *50 Hz*, you will have the option to extend the bottom frequency down to 20 Hz.

See **Low-frequency measurements** for more information.

Room background noise test setup

For background noise tests, the frequency range and measurement time can be set independently from sound insulation tests. The Frequency range and Measurement time settings are found in the Room background noise setup group of settings.

See **Room background noise** for more information.

Planned or unplanned measurements

The Measurement plan group of settings allows you to customise the support the mobile app gives you during tests.

A measurement plan establishes a step-by-step procedure that is applied to each test in your project. A measurement plan defines the number of measurements to make, the order in which to make measurements, the rules for reusing measurements and whether or not you want the mobile app to provide assistance.

Alternatively, an unplanned measurement gives you the freedom to perform sound insulation tests as you desire. If you are performing an unplanned measurement, then you will add measurements to a partition in any order you like.

✏ **Note:** Standards that require more than one source position also require you to use a measurement plan, such as ISO 16283.

Planned measurement	Measurement assistant	Notes
On	On	The mobile app follows the measurement plan and prompts you to set up your equipment accordingly at each step. Prompts are visible on both the instrument and your mobile device.
On	Off	The mobile app follows the measurement plan, but does not provide prompts.
Off	Not applicable	You are in control of the measurement process. Set up your equipment as desired. In the mobile app, select the partition, type of measurement, and microphone and source position then start your measurement. 💡 **Hint:** Predefined metadata on HBK 2255 makes it possible to use only the instrument to make sound insulation measurements. Manage metadata at the end of each measurement, then import your measurements to the mobile app or the PC app. See **Building acoustics metadata** for more information.

Example setup

In the Sound insulation setup group of settings:

- **Planned measurement** = *Enabled*
- **Measurement order** = *B2, L2, L1, T2*

  The recommended order is B2, L2, L1 and T2. The reason for this order is because it is efficient. Measure B2 first, before you turn on the sound source, which is used at a minimum for L1 and L2 measurements, and at a maximum for L1, L2 and T2 measurements. Once the sound source is active, make L2 measurements first. This is for two reasons: you are already set up to measure in the receiving room (if you made your B2 measurements first) and it is the quickest way to check that the sound pressure levels are high enough above the background noise levels to meet the requirements of the standard you are using. This check gives you the opportunity to make adjustments, for example, to the gain settings of the sound source before you make more measurements.

- **Measurement assistant** = *Enabled*

  The Measurement assistant setting enables or disables the mobile app to give you prompts and messages which help guide you through your tests. The assistant can be helpful if you do not have a lot of experience performing sound insulation tests. If you have a lot of experience, the assistant will probably not be helpful.

  The standard used and the measurement plan determine which prompts and messages the app displays. For this reason, the Measurement assistant setting is enabled only when **Planned measurement** is set to *On*.

- **Reuse B2 measurements** = *Off*

- **Reuse T2 measurements** = *Automatic* (default)

  It is highly unlikely that the amount of acoustical absorption in the receiving room will change during your survey, so it is generally safe to automatically reuse T2 measurements.

- **Reuse L1 measurements** = *Off* (default)

Plans with low-frequency measurements

To enable settings for low-frequency measurements in the Measurement plan group of settings:

- **Standard** = *ISO 16283*

- **Bottom frequency** = *50 Hz*

To enable low-frequency measurements (B2 LF, L2 LF and L1 LF) in the Measurement order setting at least one partition with a room (source or receiving) with a volume less than 25 m^3 must be set up in the project.

Low-frequency reverberation time measurements are measured simultaneously with normal reverberation time measurements, so there are no settings specific to low-frequency reverberation time measurements.

Example setup

- **Planned measurement** = *Enabled*

- **Measurement order** = *B2, B2 LF, L2 LF, L2, L1, L1 LF, T2*

  T2 includes low-frequency and normal reverberation time measurements.

Room background noise test

You can set the measurement plan for your room background noise tests in the Room background noise setup group of settings.

See **Room background noise** for more information.

Example setup

- **Planned measurement** = *Enabled*
- **B2: No. of mic. positions** = *3*

✎ **Note:** You will also need to add background noise tests to the desired rooms in your project. See **Add rooms and partitions** for information about adding a background noise test to a room.

Plan your survey for measurement reuse

A survey where you test multiple partitions with a **common receiving room** allows you to reuse T2 and B2 measurements. T2 measurements are ideal for reuse since it's extremely unlikely that new sound absorption will be installed in the room during your survey. B2 measurements can be reused but with caution. B2 measurements should be representative of the background sounds occurring during your receiving room level (L2) measurements. If the background sound levels vary throughout your survey, it is safest to remeasure B2 for each partition close to when you measure L2.

A survey where you test multiple partitions with a **common source room** allows you to reuse L1 measurements. However, this can become a little complicated to manage when measuring according to ISO 16283, where all L1 and L2 positions must be measured for each source position before moving the source.

Normally, you will save more time when you reuse T2 measurements than when you reuse L1 measurements. Therefore, plan your survey with common receiving rooms instead of common source rooms.

Override the plan

For planned measurements, there might be times when you need to make a measurement out of order; for example, if you need to remeasure. At any time, it is possible to select any position or type of measurement in the mobile app interface. If you leave the plan, you can:

- Make a measurement by navigating to the Measurement tab. After you make the new measurement, the mobile app will return to the next step in the measurement plan.
- Return to where you were in the plan by navigating to the Overview tab, where the measurement-start button is now a return-to-the-plan button.

Smart Power Amplifier HBK 2755

When you use Building Acoustics Partner with Smart Power Amplifier HBK 2755, the mobile app can adjust the settings on the amplifier and control the amplifier during measurements. HBK 2755 also makes it possible to make serial measurements with Building Acoustics Partner. See **Serial measurements** for more information.

If you are not using HBK 2755, do not worry. With Building Acoustics Partner, you can use any sound source which fulfils the requirements of the standard used, but you will set up and control the amplifier manually.

To manage your connection to HBK 2755, use the External devices page in the mobile app. The External devices page is accessible from the project overview or from the measurement page. See **External devices** for more information.

✎ **Note:** To enable the External devices page, the **Source type** setting must be set to *HBK 2755*. See the example setups below for information about how to do so.

Example setups in the app

Use the Source control group of settings to set up the sound source for sound insulation tests.

The Source control settings are divided into two groups: One for sound level measurements (L1 and L2) and one for reverberation time measurements (T2).

Level measurements, airborne or façade tests

Go to: **Sound insulation setup** > **Source control L1 & L2**.

Example settings for airborne insulation tests using HBK 2755:

- **Source type** = *HBK 2755*

- **Noise type** = *Pink*

  Pink noise is most commonly used for building acoustics measurements, where its flat spectrum on a 1/3-octave band frequency analysis makes it easy to interpret level measurement displays.

- **Escape time** = *0 seconds*

  In general, you do not need to set an escape time because you can use the mobile app to start a measurement after you exit the room. If the wireless signal cannot penetrate the walls for some reason, then set an escape time of about 3 seconds.

- **Build-up time** = *1 second*

  Stabilization of sound levels should take about one second in ordinary rooms, but it can take longer in larger rooms.

- **Output gain** = *−3 dB*

  Apply a gain to the output levels to produce a sound pressure level 15 to 20 dB above the background noise level in the measured frequency range, which ensures you meet the requirements of the standard without being too hard on your equipment. Also, an initial gain setting gives room for power compression compensation (a feature of HBK 2755) to work, if used.

- **Loudspeakers** = *Single loudspeaker*

- **Power compression compensation** = *Enabled*

  Power compression compensation works by increasing the gain as the loudspeaker heats up to maintain a constant acoustical output during longer measurement times.

Example settings for level measurements using an amplifier that is **not** HBK 2755:

- **Source type** = *Manual*

  When using an amplifier that is not HBK 2755, the mobile app will wait for the sound level to exceed a preset trigger level before starting a measurement. Trigger levels are set in the Measurement control group of settings.

- **Build-up time** = *1 second*

  Stabilization of sound levels should take about one second in ordinary rooms, but it can take longer in larger rooms.

Reverberation time measurements

The Source control settings for T2 measurements are enabled when Building Acoustics Partner is set to use the interrupted noise method: **Sound insulation setup** > **Measurement control T2** > **Excitation** = *Interrupted noise*.

Go to: **Sound insulation setup** > **Source control T2**.

Example settings for reverberation time measurements using HBK 2755:

- **Source type** = *HBK 2755*
- **Noise type** = *Pink*
- **Escape time** = *0 seconds*
- **Build-up time** = *1 second*
- **Output gain** = *0*

- **Power compression compensation** = *Disabled*

    You will not generally need power compression compensation when making reverberation time measurements as the sound source is not active for a long period of time.

Example settings for reverberation time measurements using an amplifier that is **not** HBK 2755:

- **Source type** = *Manual*

All settings

The following tables contain information about all settings used for all types of sound insulation tests (for all standards) and room background noise tests. Some of the settings will apply to your setup and some of the settings will not apply to your setup.

The last table contains information about a few settings which are available only in the mobile app.

Project settings

Settings that apply to the project as a whole.

Standard	Defines the standard to which you are testing. The standard you select affects the available settings, and in some cases, the ability to edit settings. When the **Measurement assistant** settings is set to *On*, the mobile app provides prompts to guide you through the measurement process for the selected standard. ✎ **Note:** You can only use one standard per project. You can change the standard after you add measurements to the project as long as the change does not create a conflict with the measurement data. See **Supported standards** for a table of supported standards.
Bandwidth	Sets the width of the band filters for frequency analysis (one-third or full octaves). The setting is applied according to the type of test or tests to perform. A Building Acoustics Partner project can be set up to use different bandwidths for sound insulation tests and room background noise tests. See **Add rooms and partitions** for more information about setting the type of test. Furthermore, the Bandwidth setting does not lock after you make a measurement, which allows you to change the bandwidth as you make measurements. In this way, it is possible to measure different partitions in a single project at different bandwidths. Location of the setting in the mobile app: • For sound insulation tests: Sound insulation setup > Frequency range • For background noise tests: Room background noise setup > Frequency range

Bottom frequency Top frequency	Sets the frequency range on the graphical displays and for analysis. The setting is applied at the room/partition level, according to the type of test or tests to perform. A Building Acoustics Partner project can be set up to use different frequency ranges for sound insulation tests and room background noise tests. See **Add rooms and partitions** for more information about setting the type of test. Furthermore, the frequency range settings do not lock after you make a measurement, which allows you to change the frequency range as you make measurements. In this way, it is possible to measure different partitions in a single project at different frequency ranges. Location of the setting in the mobile app: • For sound insulation tests: Sound insulation setup > Frequency range • For background noise tests: Room background noise setup > Frequency range
Extend frequency range to 20 Hz	Extends the lower limit of the frequency range down to the 20 Hz 1/3-octave band for impact sound insulation tests according to Swedish standard SS 25267:2015. To enable the setting: • **Standard** = *ISO 16283* • **Bottom frequency** = *50 Hz*
Indoor method	Defines the method you will use for level measurements in indoor tests, that is L1 measurements in airborne sound insulation tests, and L2 and B2 measurements in airborne, impact and façade sound insulation tests. Building Acoustics Partner supports measurements at fixed points or along a traverse. ✏ **Note:** The setting locks after the first measurement is added to the project. • Select *Discrete points* to place the microphone in a series of positions and measure at each position. • Select *Manual scanning* to make a single measurement while moving the microphone manually along a traverse . Refer to the standard you are using for guidelines about microphone positions and traverses.
Outdoor method	Defines the method you will use for façade sound insulation tests. • Select *Element loudspeaker* to calculate the R' of façade elements using a loudspeaker as the sound source. The method can be used to compare the performance of a façade element in situ to its performance in the laboratory. • Select *Global loudspeaker* to determine the difference between indoor and outdoor sound levels using a loudspeaker as the sound source. ✏ **Note:** The setting locks after the first measurement is added to the project.

Measurement plan settings

The Measurement plan group of settings allows you to customise the support the mobile app gives you during tests.

A measurement plan establishes a step-by-step procedure that is applied to each test in your project. A measurement plan defines the number of measurements to make, the order in which to make measurements, the rules for reusing measurements and whether or not you want the mobile app to provide assistance.

Alternatively, an unplanned measurement gives you the freedom to perform sound insulation tests as you desire. If you are performing an unplanned measurement, then you will add measurements to a partition in any order you like.

✎ **Note:** Standards that require more than one source position also require you to use a measurement plan, such as ISO 16283.

Planned measurement	Enables or disables the measurement plan. • Select *On* to enable the mobile app to follow an ordered plan for measurements. • Select *Off* if you want to keep track of measurements yourself. ✎ **Note:** • If the standard you are using requires a measurement plan, you will not be able to change the Planned measurement setting. • If you choose to disable the setting, it is recommended you have experience performing sound insulation tests.
Measurement order	Sets the order in which you make the different types of measurements (L1, L2, B2 and T2). To enable the setting: **Planned measurement** = *On*. To edit the list order on the mobile app: long tap the ≡ icon next to list item, then drag the item up or down. The recommended order is B2, L2, L1 and T2. The reason for this order is because it is efficient. Measure B2 first, before you turn on the sound source, which is used at a minimum for L1 and L2 measurements, and at a maximum for L1, L2 and T2 measurements. Once the sound source is active, make L2 measurements first. This is for two reasons: you are already set up to measure in the receiving room (if you made your B2 measurements first) and it is the quickest way to check that the sound pressure levels are high enough above the background noise levels to meet the requirements of the standard you are using. This check gives you the opportunity to make adjustments, for example, to the gain settings of the sound source before you make more measurements. To enable types of measurements for low-frequency measurements (B2 LF, L2 LF, and L1 LF): • **Standard** = *ISO 16283* • **Bottom frequency** = *50 Hz* • At least one partition with a receiving room with a volume less than 25 m^3 must be set up in the project. See **Add rooms and partitions** for information about setting up a partition.

Measurement assistant	Enables or disables prompts and messages which help guide you through your tests. The standard you are using and the measurement plan determine which prompts and messages the app displays. To enable the setting: **Planned measurement** = *On*.
No. of source positions	Sets the number of positions at which you will operate the sound source (or sound sources) in the source room. • If you are using HBK 2755 to drive two loudspeakers simultaneously in two positions, set the number of source positions to one. • If you are using a single loudspeaker in multiple positions, enter the number of positions at which you will operate the loudspeaker. For the low-frequency procedure of ISO 16283, use the same source positions used for the default procedure.
No. of LF source room pos.	Defines the number of microphone positions at which you will measure in the source room for low-frequency procedures. To enable the setting: • **Standard** = *ISO 16283* • **Bottom frequency** = *50 Hz* The low-frequency procedure of ISO 16283 requires fixed microphone positions in a minimum of four corners, with two corners at ground level and two corners at ceiling level. Microphones may be mounted on a tripod or hand-held.
B2: No. of mic. positions L1: No. of mic. pos. per source L2: No. of mic. pos. per source No. of mic. pos. per source	Sets the number of microphone positions at which you will measure. • If you are using fixed microphone positions, enter the number of positions at which you will measure for each sound source. • If you are measuring along a traverse, enter the number of scans you will perform for each sound source.
No. of LF receiving room pos.	Defines the number of microphone positions at which you will measure in the receiving room for low-frequency procedures. To enable the setting: • **Standard** = *ISO 16283* • **Bottom frequency** = *50 Hz* The low-frequency procedure of ISO 16283 requires fixed microphone positions in a minimum of four corners, with two corners at ground level and two corners at ceiling level. Microphones may be mounted on a tripod or hand-held.

Increment	Defines the order in which measurements are made, which ultimately determines how you will move equipment and yourself around the test site. • Select *Mic. position first* to measure at each microphone position for the first sound source position, then measure at each microphone position for the second sound source position, and so on. The setting minimises the number of times you must reposition your sound source. It also fulfils the requirement of ISO 16283 to measure the source and receiving room levels before moving the loudspeaker. This is the reason **Increment** = *Mic. position first* when **Standard** = *ISO 16283*. • Select *Source position first* to measure at the first microphone position for all sound source positions, then measure at the second microphone position for all sound source positions, and so on.
Reuse B2 measurements Reuse T2 measurements Reuse L1 measurements	Enables or disables the reuse of measurements. Reusing measurements is an excellent way to reduce the total number of measurements to make. Building Acoustics Partner makes measurement reuse safe and easy. The mobile app identifies where partitions share a source or receiving room, and where measurements may potentially be reused. It is possible to reuse L1, B2 and T2 measurements, as applicable to the type of test. 🔗 indicates a reused measurement. Tap or hover over the icon for information about the measurement. • **Automatic**: Measurements are applied automatically to the relevant partitions. In more words, all L1, B2 or T2 measurements that are added to one partition will be added automatically to all relevant partitions, and the measurements will be included in room averages. Default: **Reuse T2 measurements** = *Automatic*. During a test, the mobile app will skip measurements at positions where a measurement is reused. • **On**: Reusable measurements are listed, but not applied. The setting gives you control over the application or exclusion of reusable measurements and can serve as a prompt to consider whether reusing the measurement is appropriate at the time. The option is only available for unplanned measurements. Default: **Reuse B2 measurements** = *On*. • **Off**: Measurements will not be reused. L1, B2 and T2 shall be measured for each partition (as applicable). In the measurement overview, measurements are only shown and used in the partition in which they are created. Default: **Reuse L1 measurements** = *Off*. In the mobile app, you can also set the rules for measurement reuse in the Measurement control groups of settings. See **Measurement reuse** for more information.

Measurement control settings

The Measurement control settings specify how your measurements will run. The settings are divided into three groups, one for each of the three types of measurements used in sound insulation tests: Sound level measurements (L1 and L2), background sound level measurements (B2), and reverberation time measurements (T2).

Measurement time	Controls how the measurement stops: automatically or manually. • Select *Preset* if you want the instrument to measure for the time specified in **Preset time**, then stop and save automatically. • Select *Free* if you want to stop the measurement manually. Applies to level measurements (L1, L2 and B2) only. For reverberation time measurements (T2), the measurement stops automatically when the background noise level is detected by the instrument (or if elapsed time > 30 s).
Preset time	Defines the length of time for which the instrument will measure when **Measurement time** = *Preset*. The Preset time setting sets the averaging time for a measurement. In general, use an averaging time that gives a good representation of the average sound levels in the frequency range you are measuring. Higher frequencies require less averaging time than lower frequencies, so the lowest frequency band you choose to include in your measurements will normally determine the minimum appropriate averaging time. As always, refer to the standard used for averaging time requirements.
Trigger level	Defines the sound level (in dB) which will cause a measurement to start. Set the trigger higher than background noise levels, but low enough to be sure to trigger a measurement. A level between 80 and 100 dB is normally adequate. ✎ **Note:** If you are using HBK 2755, the Trigger level setting is not used.
Measure L1 and L2	Defines how to measure L1 and L2 measurements. • Select *Simultaneously* to make L1 and L2 measurements at the same time. ✎ **Note:** Requires two sound level meters. • Select *Separately* to make L1 and L2 measurements at different times. See **Multiple instruments** for more information.
Listen to live L2 audio Listen to live B2 audio	Enables or disables the streaming of L2 and/or B2 audio to the mobile device running the Building Acoustics Partner mobile app. See **Listening to audio** for more information about streaming audio.
Level measurement mode, Measurement mode	Sets the measurement mode for level (L1, L2) and reverberation time (T2) measurements. • Select *Parallel* to measure all frequency bands at the same time. • Select *Serial* to measure selected frequency bands individually.

Serial bands	Set the frequency band or bands to measure for serial measurements. The setting can only be configured using the mobile app.

Excitation	Defines the excitation method you will use for reverberation time measurements in sound insulation tests and/or room acoustics tests. See **Impulsive or interrupted method** for more information about setting the excitation method for reverberation time measurements.
	
	• Select *Impulsive noise* to use an impulsive noise, such as starting pistol or a balloon burst, to measure reverberation time. The integrated impulse response method is often the first choice because it is fast, easy and repeatable.
	
	The measurement starts automatically when the instrument detects the level defined for **Trigger level**.
	
	✎ **Note:**
	
	    • Check with your local rules and regulations before using a starter pistol.
	    • You will also need to set the trigger level.
	
	• Select *Interrupted noise* to use an amplifier (and a loudspeaker) to emit a wide band of random noise (white or pink) into the receiving room and measure the sound level decay when the sound source is switched off.
	
	    ✎ **Note:** You will also need to set up the sound source in the Source control T2 settings.

Number of decays	Sets the number of times you want to measure the decay when using interrupted noise as your excitation method for reverberation time measurements. To enable the setting: **Excitation** = *Interrupted noise*.

Source control settings

The Source control settings are where you set up the amplifier and loudspeaker (or loudspeakers) you will use in your tests. Tapping machines and impulsive noises require very little or no additional set up in a Building Acoustics Partner project. The Source control settings are divided into two groups: One for sound level measurements (L1 and L2) and one for reverberation time measurements (T2).

Source type	Tells the mobile app how the sound source will be controlled: manually or automatically.
	You can use any sound source which fulfils the requirements of the standard used, but HBK 2755 is the only sound source the mobile app can control automatically. See **External devices** for information about connecting HBK 2755 to the mobile app.
	• Select *Manual* if you will control the sound source manually. The instrument will automatically detect when the sound source is active or inactive.
	This option can be used with any amplifier, including HBK 2755.
	For level measurements (L1 and L2), you will also need to enter a build-up time. The instrument will detect when the sound source is active then count down the build-up time before starting the measurement.
	For impact sound insulation tests, Building Acoustics Partner always sets the Source type setting to Manual.
	• Select *HBK 2755* if you are using HBK 2755 Smart Power Amplifier and want the mobile app to control the sound source.
	The mobile app will configure HBK 2755 according to the Noise type, Escape time, Build-up time, Output gain, Loudspeakers (for L1 and L2 measurements) and Power compression compensation settings you enter.
	In the event of connection problems, you will be prompted to retry the connection or switch to manual control.
	To enable the Source type setting for reverberation time measurements:
	• **Measurement control T2** > **Excitation** = *Interrupted noise*

Noise type	Specifies the type of noise signal that Power Amplifier HBK 2755 sends to the loudspeaker(s). • Pink: A pink noise signal has equal energy within every octave. An octave represents a doubling in frequency, for example from 400 to 800 Hz. As the frequency increases, octave bands encompass a larger frequency range. For the energy level within each octave band to remain constant, the energy level must decrease as the frequency increases. Pink noise is most commonly used for building acoustics measurements, where its flat spectrum on a 1/3-octave band frequency analysis makes it easy to interpret level measurement displays. • White: A white noise signal has equal energy at every frequency. As the frequency increases, octave bands encompass a larger number of frequencies. This means that the energy level of octave bands increases as the frequency increases. White noise can be preferred in situations where increased output is needed at higher frequencies. HBK 2755 has special pink and white noise signals which contain more energy at higher frequencies. The special signals are used when the frequency range is set to include the 10 kHz frequency band. ✎ **Note:** For level measurements (L1 and L2), the setting locks for all partitions after the first accepted measurement.
Escape time	Sets the amount of time you have to leave the room. For example, after you start a measurement, the mobile app counts down the escape time before turning on HBK 2755. To enable the setting: **Source type** = *HBK 2755* In the mobile app: Use the keypad to enter a value. Tap **Done** to save the value or tap **Cancel** to exit the setting without saving.
Build-up time	Sets the amount of time to wait for the sound pressure level in a room to stabilize. After the sound source has been turned on, the mobile app will count down the build-up time before starting the measurement. In the mobile app: Use the keypad to enter a value. Tap **Done** to save the value or tap **Cancel** to exit the setting without saving. **Why do you need build-up time?** If you position a microphone in a room and then switch on a sound source, the sound pressure level does not immediately reach a steady state. This is because the first reflection, and the reflections that follow, take time to reach the microphone. And instead of rising indefinitely as an increasing number of reflections arrive at the microphone, the sound pressure level stabilizes. This is because the reflected energy eventually escapes from the room or it is absorbed by the room and its contents. Stabilization should take about one second in ordinary rooms, but it can take longer in larger rooms.

Output gain	Allows you to lower (attenuate) the output of HBK 2755. In other words, the Output gain setting allows you to control how much noise HBK 2755 will make. To enable the setting: **Source type** = *HBK 2755* You can enter values between –90 and 0 dB. A value of zero gives no attenuation, or full output. A value of –90 is the maximum attenuation, which gives the minimum output. In the mobile app: Use the keypad to enter a value. Tap **Done** to save the value or tap **Cancel** to exit the setting without saving. ✎ **Note:** • For level measurements (L1 and L2), the Output gain setting locks for all partitions after the first accepted measurement. • For reverberation time measurements (T2), you can change the Output gain setting at any time. • If you plan to enable the Power compression compensation setting, set the gain to –3 dB so the feature has room to work. **Why apply gain?** It's not always a good idea to run the sound source at full output. Even with hearing protection, 100+ dB can be uncomfortable. However, standing in the room while measuring is generally recommended because it helps you to hear any issues that might affect your measurement. Running at full power all of the time also increases the wear and tear on your loudspeaker. The ideal output level is just high enough to produce a sound pressure level 15 to 20 dB above the background noise level in the measured frequency range to meet the requirements of the standard.
Loudspeakers	Sets the number of loudspeakers you will be using with HBK 2755. The amplifier supports stereo output to two loudspeakers with independent signals. This makes it possible to measure both source positions simultaneously, which halves the number of measurements to make. • Select *Single loudspeaker* if you are using one loudspeaker. • Select *Dual loudspeakers* if you are using two loudspeakers. ✎ **Note:** • If you are using two loudspeakers, both must be the same type. • Using two loudspeakers simultaneously reduces the maximum possible sound power of the system by 6 dB. In cases where you are measuring close to the limits of the system, use one loudspeaker. To enable the setting: **Source type** = *HBK 2755*

Power compression compensation	Enables or disables a feature on HBK 2755 which stabilises loudspeaker output power.
	
	✎ **Note:**
	
	    • Power compression compensation works by increasing the gain as the loudspeaker heats up to maintain a constant acoustical output during longer measurement times. Therefore, the setting requires some room in the gain setting. For example, at an attenuation of −2 dB, the acoustic output level of OmniPower™ Sound Source Type 4292-L will be kept stable for 1 hour. This time will extend at −3 dB and reduce at −1 dB.
	    • The setting locks for all partitions after the first accepted measurement for level measurements (L1 and L2).
	
	In general, power compression compensation is only needed when the loudspeaker will be active for long periods of time to maintain a consistent output level. It is safe to disable the setting when you are making reverberation time measurements as the loudspeaker is only active for a relatively short period of time.
	
	To enable the setting: **Source type** = *HBK 2755*

Settings for calculations, checks and corrections

The Calculations group of settings contains settings for the reference curve, reverberation time calculations, background noise corrections and measurement checks. In addition there are a few settings used for specific standards: ISO 10140, NEN and NEN'06, and ASTM.

Reference curve increment	Sets the shift of the reference curve. The reference curve is defined in ISO 717. Shift the reference curve by increments until the sum of negative deviations between the reference curve and the result equals the desired value.
	
	    • Use a 1 dB shift when calculating result parameters.
	    • Use a 0.1 dB shift when estimating the uncertainty of the results.

Ensemble averaging	Sets the type of averaging to use for reverberation time (T2) measurements: ensemble or arithmetic.
	
	    • Ensemble averaging: The average reverberation time in a room is calculated by averaging the decay curves and then calculating the reverberation time for the average decay. Ensemble averaging produces average parameters (such as T20) that are calculated based on the ensemble averaged decay. Average decays can be viewed in reverberation time displays.
	    • Arithmetic averaging: The average reverberation time in a room is calculated by averaging the reverberation times. Arithmetic averaging produces average parameters that are averages of reverberation times, it does not produce an average decay.

T0	Sets the reference reverberation time, in seconds. You can choose a time between 0.01 and 10 s. Refer to the standard you are using for guidance.

Calculate using	Reverberation time is calculated by analysing part of the decay, the evaluation range, to calculate a slope of best fit. Evaluation ranges: • T20: –5 to –25 dB • T30: –5 to –35 dB ✎ **Note:** • T20 is preferred in most of the current standards for building acoustics. • If you select T30 but the measured decay is <30 dB, T20 is used instead (automatically). Quality indicators are applied to the measurement. See **Quality indicators** for more information about the indicators.
Correct for background noise	If the background noise level (B2) comes within 15 dB of the receiving room level (L2), it starts to affect the measured L2 level. Enable the Correct for background noise setting to apply corrections to L2 measurements to account for the influence of the background noise level. Corrections depend on the standard you are using and the level difference between L2 and B2. When the background noise level comes too close to the receiving room level, a fixed correction to L2 is made and quality indicators mark where corrections have been made. See **Quality indicators** for more information about the indicators. If L2 – B2 < 6 dB and you are using HBK 2755 Smart Power Amplifier, you can set up the project to make measurement in serial. See **Serial measurements** for more information.
L1, L2: Check std. deviation	Enables checks of the standard deviation of the averaged sound spectra in the source and receiving rooms (L1 and L2, respectively). If the standard deviation in a frequency band is greater than twice the theoretical (and therefore expected) value, then the band is marked with a yellow quality indicator. See **Quality indicators** for more information about the indicators.
L1: Check dB rule	Enables the app to check that the level differences between adjacent third-octave bands are within the tolerance defined by the standard you are using. See **Quality indicators** for more information about the indicators.
Number of elements	The Number of elements setting is for airborne sound insulation tests of small building elements according to ISO 10140. The setting allows you to enter how many sound insulation elements, such as windows, are installed in the test opening.
Rubber hammer and Floor type	For impact sound insulation tests according to NEN or NEN'06. When using a rubber hammer for the sound source, you can set the type of floor.
Cr, CL, and Traffic type	For façade sound insulation tests according to NEN or NEN'06. The Cr setting allows you to enter the reflection and façade shape conversion term. The CL setting allows you to enter the sound level conversion term. The Traffic type setting allows you to set the type of traffic used for the sound source.

OILR correction and OITL correction	For façade sound insulation tests according to ASTM. The OILR correction settings allows you to enter the level correction (in dB) for outdoor-indoor level reduction. The OITL correction setting allows you to enter the level correction (in dB) outdoor-indoor transmission loss.
Result parameter and Result	For room background noise tests. The Result parameter setting allows you to choose the parameter for comparison with the background noise spectrum: noise curves or A-weighted Leq. The Result setting allows you to choose the result parameter: the highest noise level or an average. See **Calculation settings** for more information.

Instrument settings

Tap the sound level meter button (🔔) on a project screen in the mobile app to access instrument settings.

Display settings

Settings that control how measurement data is displayed on the instrument.

See **Display settings** for more information about the settings and how to edit them.

System settings

- **Regional settings**: Settings for your location and preferences.
- **Power management**: Settings for automatically turning off the screen and the instrument.
- **Data management**: Settings for managing your measurement data.
- **Network settings**: Settings for networking your instrument, PC and mobile device.
- **Voltage output**: Settings that allow you to output an input signal.
- **External devices**: Settings for using a weather station with HBK 2255.
- Advanced settings: Most of the advanced settings can only be accessed on the instrument. See **Calibration settings** for more information.

ADD ROOMS AND PARTITIONS

You can perform room background noise tests and sound insulation tests using Building Acoustics Partner, and both types of test can be included in a single Building Acoustics Partner project. A Building Acoustics Partner project can include room background noise tests for one or more rooms as well as sound insulation tests for one or more partitions. Each partition in the project is assigned a type of sound insulation test (airborne, impact or façade), so each Building Acoustics Partner project can contain multiple types of tests. For each room in the project, you can add a background noise test.

Partitions are structures that separate the source room from the receiving room. A partition can be, for example, all or part of an interior or an exterior wall, a window or a door.

Use either the mobile app or the PC app to add rooms and partitions to a project.

Set up rooms and partitions in the application

You can set up rooms and partitions many different ways in a Building Acoustics Partner project. It is possible to set up rooms and partitions during project setup (using the PC app or the mobile app) or while you are making measurements (using the mobile app). You can even add rooms after you are finished measuring, while analysing your measurement data using the PC app.

The important thing to know is that the rooms and partitions setup is where you define the geometric properties of the room or partition, the type of test to perform, and which rooms are the source and receiving rooms.

The basic procedure is as follows:

1. Create and name rooms, and enter their volumes.

    ✏ **Note:**

    - For façade sound insulation tests, you do not need to create a room to represent the outside.

    - To add a room background noise test to the project, set **Background noise** to *Yes*.

        See **Room background noise** for more information.

2. Create partitions from the rooms you have created. Set the type of test to perform at the partition, enter the partition area, and assign the source (if needed) and receiving rooms.

Notes about the settings:

- **Name**: The short form of the room name.

    Description: The long form of the room name.

    Use the long form to enter a descriptive name for each room and the short form to abbreviate the room name.

    Room names and descriptions are used in the interface of the mobile and PC apps, and room names are used to create IDs for partitions. For these reasons, the names and descriptions should be meaningful and unique within a single project. Consider creating a naming convention to create unique, relevant names with minimal effort. Another option is to use the room numbers defined by the architect, if possible.

- **Floor/Level**: The storey of the building in which the room lies.

- **Volume**: The volume of the room.

    You can enter a single calculated value, or you can enter the three dimensions of the room separated by spaces.

- **Reuse measurements from**: The room from which to reuse measurements.

  You can choose any room that has been added to the project or *None* if you do not want to specify a single room from which to reuse measurements. See **Measurement reuse** for more information.

- **Background noise**: Adds a room background noise test for the room.

  ✎ **Note:** You will also need to set up the background noise test using the settings in the Room background noise setup group of settings.

- **Test type**: The type of sound insulation test to perform on the partition.

- **Partition area**: The area of the partition common to the source and receiving rooms.

- **Source room** and **Receiving room**: The source and receiving rooms for the partition.

  The list of options is populated by the rooms which you have added to the project.

How to delete rooms and partitions

In the mobile app, swipe left and tap **Delete** to confirm. In the PC app, there is a delete option in the context-sensitive menu for rooms and partitions in the project browser (left panel).

Typical source and receiving room layouts
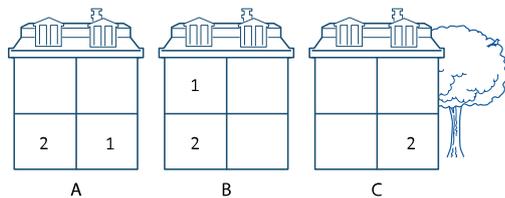
A = Airborne tests

B = Impact tests

C = Façade tests

1 = Source room

2 = Receiving room

✎ **Note:** For façade sound insulation tests, the outside is treated as the source room.

Geometry

It is important to calculate the room and partition geometries accurately for accurate results.

Volume of a room

The receiving room volume is used in the calculation of results, and some standards require the source room volume for reports. Also, ISO 16283 uses the source room volume to determine if the low-frequency procedure is needed for L1 measurements.

✎ **Note:**

- In the calculation of the receiving room volume, subtract the volumes of objects in the room that will reflect sound, such as closed cabinetry.

- Room volume is not used in room background noise calculations. For rooms only used in room background noise tests, you do not need to enter the volume of the room. For rooms used in both sound insulation tests and room background noise tests, you need to enter the volume of the room.

Surface area of a partition

The partition area is used in the calculation of results. Only calculate the area of the partition that is common to both the source room and the receiving room.
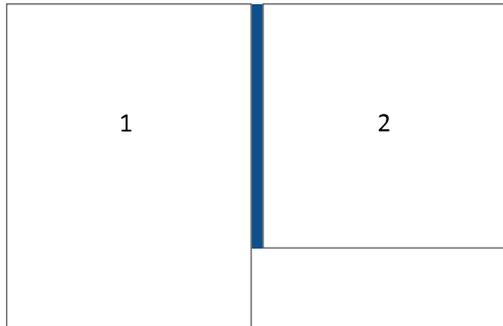
How to choose rooms and partitions

In general, when choosing source and receiving rooms, use the smaller of the two rooms as the receiving room. When choosing a wall to use as a partition, select one without fixed cabinetry or wardrobes.

Plan your survey for measurement reuse

A survey where you test multiple partitions with a **common receiving room** allows you to reuse T2 and B2 measurements. T2 measurements are ideal for reuse since it's extremely unlikely that new sound absorption will be installed in the room during your survey. B2 measurements can be reused but with caution. B2 measurements should be representative of the background sounds occurring during your receiving room level (L2) measurements. If the background sound levels vary throughout your survey, it is safest to remeasure B2 for each partition close to when you measure L2.

A survey where you test multiple partitions with a **common source room** allows you to reuse L1 measurements. However, this can become a little complicated to manage when measuring according to ISO 16283, where all L1 and L2 positions must be measured for each source position before moving the source.

Normally, you will save more time when you reuse T2 measurements than when you reuse L1 measurements. Therefore, plan your survey with common receiving rooms instead of common source rooms.

See **Measurement reuse** for more information about reusing measurements in your Building Acoustics Partner project.

Building site conditions

Sound insulation tests can be performed on new buildings or on renovations of existing buildings. Ideally, the building is essentially finished, with all doors and windows installed, but unfurnished. Ideally, electrical work is complete and electricity is supplied to the building. Work at the building should be stopped when measuring. Soft floor coverings, unless a permanent installation, should not be installed.

Low-frequency method

It is very hard to get a good average of low-frequency levels in small rooms. For this reason, some standards (such as ISO 16283) include measurement procedures which are used to adjust low-frequency bands in sound insulation calculations. For ISO 16283, the procedures are for measurements below 100 Hz where the source or receiving room is smaller than 25 m^3.

Building Acoustics Partner includes an option to extend the lower limit of the frequency range down to 20 Hz. The extended range allows you to perform, for example, impact sound insulation tests on lightweight or wooden structures according to Swedish standard SS 25267:2015.

See **Low-frequency measurements** for more information about sound insulation tests at low frequencies.

MEASURE

You can use the instrument or the mobile app to make a measurement. The mobile app makes it possible to start measurements remotely and its interface has a lot of functionality that is not on the instrument. However, if you are using a hand-held measurement method, it makes sense to start a measurement using the instrument.

> 🔒 **Pocket mode**
>
> Pocket mode locks the screen on your mobile device so you can put it in your pocket and continue your test using the controls on the instrument, which is perfect for manually-scanned measurements where it makes sense to start and stop a measurement using the instrument. Pocket mode does not disable the functionality of the mobile app, so Building Acoustics Partner continues to manage your test from the safety of your pocket.

Regardless of how you make a measurement, all measurements are stored on the instrument in the project to which they belong.

Import measurements

The Import button (⤓) allows you to add measurements that are stored on the instrument to the project. The Import button is available on the project screen.

Locked settings

After you start to add measurements to your project, some of the settings in your project will lock. The settings lock to protect the integrity of your measurement data. If you find that you need to change a locked setting, create a new project using the mobile app then change the setting. See **Create a project** for more information.

Calibration checks

As always, it is a best practice to perform calibration checks. A check before you make your first measurement of the day and after you make your last measurement of the day should be sufficient, but you can perform a calibration check as often as you like. For example, if your measurement data is not as expected, perform a calibration check to ensure that the instrument is measuring correctly. See **Calibration check** for more information about calibration checks.

Basic measurement procedure

Sound insulation tests

1. Set up the equipment.

   - For a planned measurement: Set up the equipment according to the plan.
   - For an unplanned measurement: Set up your equipment as desired.

2. Set the position in the mobile app. (Tap **Measurements** on the project overview to open the measurement interface.)

   - For a planned measurement: The mobile app performs this step automatically. However, it is a good idea to check that the equipment and the mobile app are in sync.

- For an unplanned measurement: Use the buttons to set the partition, type of measurement and position to match your equipment.

In the example above, the mobile app is set to measure L2 for the first source position (S1) at the first microphone position (R1) for the partition between rooms 1 and 2. The asterisk on the microphone position button indicates the number of the position that will be measured next. The far right is a readout that shows the elapsed time.

3. Make a measurement.

On the mobile app: Tap ◯.

For level measurements (B2, L2, and L1), the measurement will proceed according to the Measurement time settings for the type of measurement being made. For reverberation time measurements (T2), the instrument will wait for the trigger level to start the measurement and stop the measurement automatically.

✎ **Note:** If you are making a measurement that will replace a saved measurement, the start button on the mobile app will be red.

4. Review the measurement.

You can review the profile and spectrum graphs before you add the measurement to the project.

- Check any quality indicators that were applied to the measurement.
- Switch between instantaneous and level averages in the profile graph.
- Check that the levels are what you expect to see, compare the measured parameter to the reference parameter.
- Add markers to exclude portions of the measurement you do not want to include in the average.

5. Accept the measurement to add it to the project, or reject the measurement to remeasure.

6. Move the equipment to the next position and make another measurement.

Room background noise tests

Measurements are performed the same way as for B2 measurements in sound insulation tests, and you will have the opportunity to review the measurement before adding it to the project.

For planned measurements, the mobile app advances to room background noise tests after sound insulation tests are complete. For unplanned measurements, use the left button to select the room for background noise tests.

Multiple instruments

Building Acoustics Partner supports the use of multiple instruments. The ability to connect two instruments enables you to measure two positions simultaneously, which is a requirement for some façade sound insulation test methods.

For airborne and façade tests, the primary instrument makes the B2, L1 and T2 measurements, the secondary instrument makes L2 measurements only, and the L1 and L2 measurements are made simultaneously. For impact tests, the primary instrument makes the B2, L2 and T2 measurements, the secondary instrument is not used.

When the Measurement assistant setting is enabled, prompts and messages display on the primary instrument.

Low-frequency and serial L1 and L2 measurements will be made simultaneously as well.

Reusing measurements

Reusing measurements affects the measurement process. Building Acoustics Partner allows you to set up measurement reuse so that it is automatic, manual or off. See **Measurement reuse** for more information.

When reuse is automatic

- Measurements are listed and applied in the measurement overview.
- For planned measurements, the mobile app will skip measurements at positions where a measurement is reused.
- If you exclude a reused measurement, it will be excluded from all partitions in which is it reused.

When reuse is on

- Reusable measurements are listed in the measurement overview, but not applied.

When reuse is off

- Reusable measurements are not listed in the project overview.
- The mobile app will not skip any measurement positions.

Override the plan

For planned measurements, there might be times when you need to make a measurement out of order; for example, if you need to remeasure. At any time, it is possible to select any position or type of measurement in the mobile app interface. If you leave the plan, you can:

- Make a measurement by navigating to the Measurement tab. After you make the new measurement, the mobile app will return to the next step in the measurement plan.
- Return to where you were in the plan by navigating to the Overview tab, where the measurement-start button is now a return-to-the-plan button.

Example airborne sound insulation test

Here is an example of the measurement procedure of an airborne sound insulation test according to ISO 16283.

Settings to note

- **Standard** = *ISO 16283*
- **Indoor method** = *Discrete points*
- **Measurement plan** = *On*
    - **Measurement order** = *B2, L2, L1, T2*
    - Level measurements

- **Increment** = *Mic. position first*
    - In the Airborne group: **No. of source positions** = *2*
- **Measurement control T2** > **Excitation** = *Impulsive noise*

Procedure

1. Measure the background noise level in the receiving room (B2).
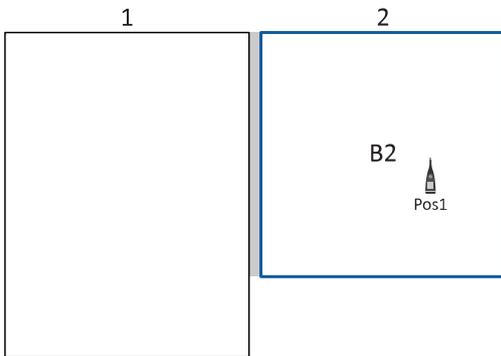
2. Measure the sound pressure level in the receiving room (L2) for the first source position (S1) at each microphone position (R1 to Rn).
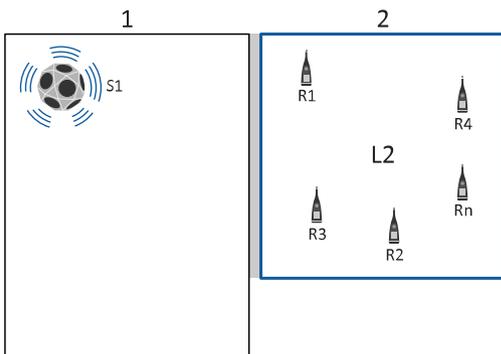
3. Measure the sound pressure level in the source room (L1) for the first source position (S1) at each microphone position (R1 to Rn).
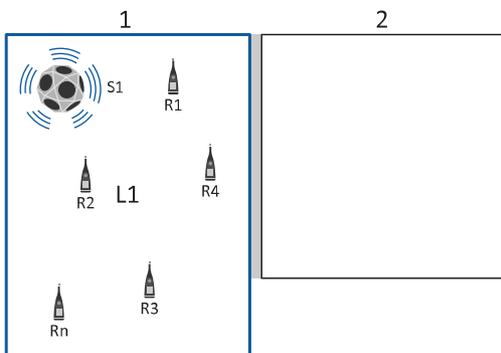
4. Measure the sound pressure level in the receiving room (L2) for the second source position (S2) at each microphone position (R1 to Rn).
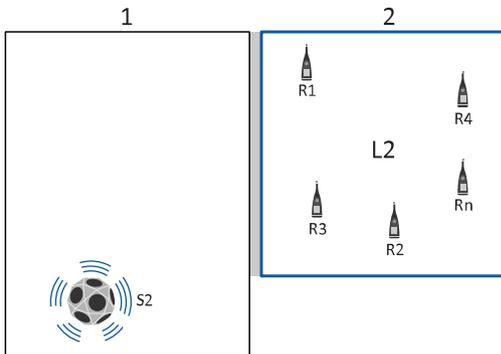
5. Measure the sound pressure level in the source room (L1) for the second source position (S2) at each microphone position (R1 to Rn).
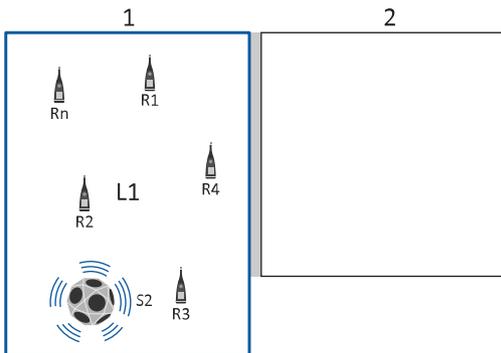
6. Measure the reverberation time in the receiving room (T2) at each microphone position (R1 to Rn).
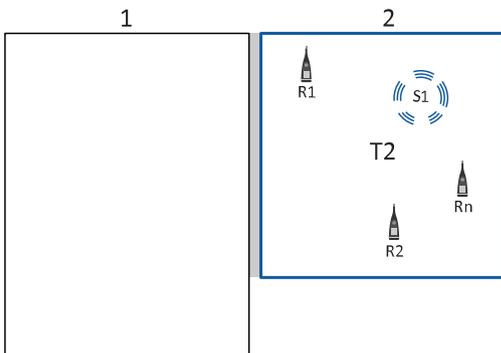
7. The mobile app calculates the results.

Typical measurement cycles

B2

1. Press the start/pause button on the instrument or the mobile app.

   You can be inside the room or outside the room. If you plan to make L2 measurements in the room, ISO 16283 requires that you also make B2 measurements in the room. The requirement is because a body changes the sound field in the room and introduces noise. Regardless of the requirement, you should be consistent for the quality of your data.

   You can measure at fixed microphone positions or along a traverse (manually-scanned method).

2. The instrument starts to measure.

3. At the end of the measurement, the instrument averages the measured spectra in the measurement time.

   The measurement time (averaging time) can be preset or controlled manually.

L1 and L2

1. Press the start/pause button on the mobile app.

   You can be inside the room or outside the room. You can measure at fixed microphone positions or along a traverse (manually-scanned method).

   You can make L1 and L2 measurements simultaneously if you have two sound level meters. See **Multiple instruments** for more information.

2. If you are using HBK 2755 and you set an escape time, Building Acoustics Partner counts down the time to exit the room.

3. The sound source starts.

4. If you set a build-up time in the Source control L1 & L2 settings, Building Acoustics Partner waits for the time to pass.

5. The instrument starts to measure.

6. At the end of the measurement, the instrument averages the measured spectra in the measurement time.

   The measurement time (averaging time) can be preset or controlled manually.

7. The sound source stops.

T2

1. Press the start/pause button on the mobile app.

   The instrument is ready and waits for the sound level which will trigger the measurement to start. The light ring flashes green quickly while the instrument waits for the trigger level.

2. The impulsive noise is made, or the sound source starts.

3. The measurement starts when the sound level exceeds the trigger level.

4. The measurement stops automatically when the instrument detects the background noise level (or the elapsed time exceeds 30 s).

5. The instrument stores and displays the measurement result, including the calculated EDT, T20 or T30 values.

If you are using the interrupted noise method and HBK 2755, you can set escape and build-up times. Escape and build-up times work as they do in the level measurement cycles.

Graphical displays

Detailed measurement views in the mobile app allow you to understand exactly what is happening with your data.

Basic controls and information

- Double tap a graph to switch between raw and processed data.
- Pinch to zoom.
- Tap and drag to move cursors or to scroll through data.
- Double tap the Y-axis to auto-scale the graph to the range of values.
- Measured parameters are displayed in blue, and reference parameters are displayed in green. The exception is the calculated decay for reverberation time measurements, which is displayed in green.

Profile displays

Level measurements (L1, L2, or B2)

During a level measurement, the profile shows the instantaneous levels over time (time profile).
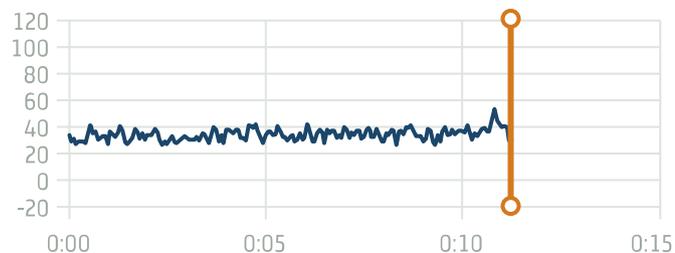
At the end of the measurement, the profile shows the running average.
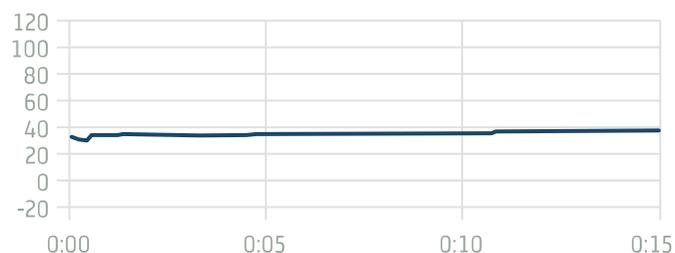
Before you accept or reject the measurement, you can double tap the profile graph to switch between instantaneous and the running average views. If a loud transient noise occurred during the measurement, you can look for the peak in the instantaneous levels and add an exclude marker to that part of the measurement. Otherwise, you can reject the measurement and remeasure.

After you accept the measurement, the profile shows the average levels by frequency (spectrum profile).

For low-frequency level measurements (B2 LF, L2 LF, L1 LF), only the three lower bands are shown while measuring and when reviewing data.

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Reverberation time measurements (T2)

The profile graph helps you to visualise the reverberation time calculation. The graph shows either the raw time data without any manipulation on levels and time and without any markings, or the calculated regression line. Double tap the graph to switch between the views.

The decay graph shows the decay of one frequency band for the selected position: T20@Pos or T30@Pos (if available). Tap the blue readout to switch parameters.

For reverberation time measurements using the interrupted noise method with more than one decay at each position, the decay graph shows each individual decay.

The curvature and correlation are shown to indicate the quality of the fitted line.

Spectrum displays

During a measurement, the spectrum shows instantaneous levels at each frequency band. After a measurement, the spectrum shows the average levels at each frequency band. For level measurements in the source room (L1), you can use this graph to quickly check that the spectrum is fairly flat.

> **Check 6/8 dB rule setting**
>
> If you did not know, Building Acoustics Partner has a setting in the Calculations group that will check adjacent bands and apply a smiley (quality indicator) to bands that violate the 6 or 8 dB rule.

Readouts

The readouts show the measured parameter in blue and a reference parameter in green.

Tap a readout to select a different parameter to display.

Reference parameters

Reference parameters are a quick way to see relationships between different level measurements (B2, L2 and L1). B2 is default reference for L2 measurements, and L2 is the default reference for L1 measurements.

For reverberation time measurements, use the reference parameter to add the room average to the spectrum display.

You have the option to change reference parameters, which includes the option not to display a reference parameter. If there does not exist a reference parameter which is applicable to the measurement, no reference parameter is displayed.

Exclude part of a measurement

An exclude marker excludes the selected part of a measurement from the average.
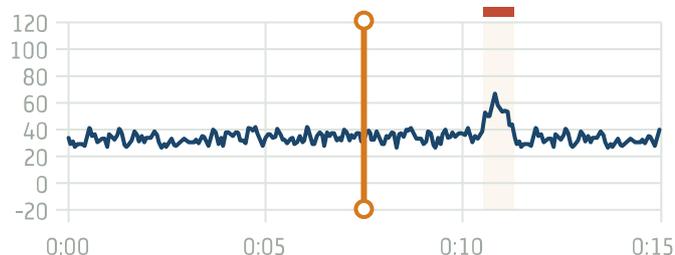
To add an exclude marker in the mobile app:

1. Tap and hold to set the first marker boundary.

2. Without lifting your finger, drag the cursor left or right to set the second boundary.

3. Lift your finger.

   Once you lift your finger, you will not be able to move the boundaries of the marker until after you add the marker.

4. Tap Exclude to add the marker or tap Cancel to not add the marker.

✎ **Note:** When applying exclude markers, the excluded portion of the measurement is subtracted from the averaging time. If the length of the measurement is not sufficient, the measurement may not meet the averaging time requirements of the standard used. To avoid this problem, use a measurement time longer than the minimum defined by the standard when measuring in environments with high or unpredictable background noise.

To edit an exclude marker in the mobile app:

1. Tap the red bar to select the marker.

2. Make your edits.

   - Tap to drag the boundaries.
   - Tap the region to open a menu with the option to delete the marker.

3. Tap outside the marker to deselect the marker.

Adjust the slope of the regression line

For reverberation time measurements (T2), it is possible to adjust the slope of the regression line. This can be useful if you disagree with the algorithm-calculated decay or want to look at different scenarios, such as when the decay first started.

Tap and drag the vertical cursors on the decay graph to adjust the slope of the regression line.

The algorithm-calculated regression is still visible, and you can revert your changes at any time.

Multiple instruments

When L1 and L2 are measured simultaneously, the L2 measurement displays as the reference curve (L2@Pos) during the measurement, which allows you to view both L1 and L2 measurements in real time.

You can use the mobile app to open and edit measurements made with the primary instrument (B2, L1, and T2), but you will **not** be able to open or edit measurements made with the secondary instrument (L2).

Exclude markers applied to simultaneous L1 and L2 measurements are applied to both measurements.

See **Multiple instruments** for more information about using multiple sound level meters.

Room background noise tests

Two parameter readouts, the frequency spectrum with a noise curve overlay and LZeq for the band selected in the spectrum are displayed for room background noise tests.

Measurement overview

The Overview page in the mobile app gives you a test-level view of your data. The page helps you to keep track of measurements, to visualise the measurement data, and to evaluate the quality of each measurement. Use the page to make sure you have the data you need to complete your report before you leave the site.

- See which positions have been measured and which positions have not been measured.
- See the range of position averages in a room (sound insulation tests).
- View position and room averages in the same graph (sound insulation tests).
- Include and exclude position averages in the room average to see how each position affects the room average or the results.
- Inspect the measurement quality indicators.

Basic controls

Tap the Overview tab to open the page.

Use the buttons to select the partition and the type of measurement (or the result, if all measurements are complete). The far right is a readout that shows the frequency for the cursor. If the project contains serial measurements, the far right becomes a button which allows you to switch between views of the parallel measurement or serial measurements.

When you select the partition, you will also have the option to see information about the overall status of the project. The overall status comes from the quality indicators which have been applied to the measurements.

If you use the buttons to select a specific source and microphone position, the measurement for that position will open. In this way, you can review the data for individual measurements.

Overview: B2, L2, L1 and T2

For each type of measurement, the overview shows the profile and a list of measurements.

The profile shows the room average as a solid line, and position averages as dashed lines. The shaded area represents the range of position averages.
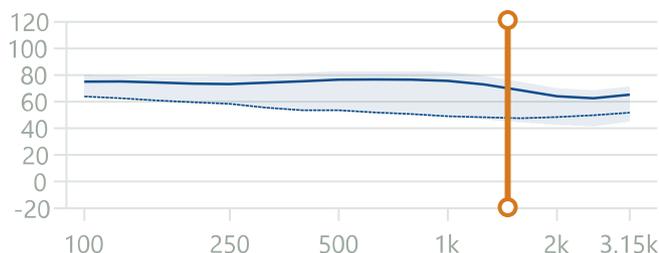
The profile allows you to view individual measurements in the context of the room and to visualise how individual measurements affect the spatial averaging in the room (each position can be included or excluded from the room average).

56

The list of positions allows you to see quickly which measurements have been completed, and to include or exclude positions from the room average. The room average is at the top of the list with the source/microphone positions nested below. Any serial measurements are listed below the source/microphone position by frequency band.

- Use the plus/minus button to the right of the room average to expand or contract the list.
- Tap a position to see its profile. You can only view one position at a time. The selected position is highlighted.
- Use the checkbox to the right of each position to include or exclude measurements in the room average. The default is to include each position in the room average.
- Tap quality indicators to get more information about the quality of the measurements.
- 🔗 indicates a reused measurement. Tap the icon for information about the measurement.

Reverberation time measurements

For reverberation time measurements that use ensemble averaging, you will be able to view the average decay. For reverberation time measurements that use arithmetic averaging, you will only be able to view the average reverberation times.

Double tap the the reverberation graph to view the time data without any manipulation on levels and time and without any markings.

Multiple instruments

Simultaneous measurements are grouped in the L1&L2 category. You have the ability to toggle between the L1 and L2 averages. See **Multiple instruments** for more information about using multiple sound level meters.

Clear data versus remeasure

If you want to remove the measurement data for a position, swipe left on the position and tap Clear. If you clear a position and you are using a measurement plan, the mobile app and instrument will set up to make the missing measurement, following (of course) the rules of the measurement plan. Depending on the data you clear and where you are in the process, you may find yourself going back a few steps in the measurement plan.

Another option is to remeasure. You can remeasure at any position at any time. To remeasure select the position you wish to measure. This will open the measurement. Set up your equipment and make the measurement. In the mobile app, you will notice that the start button is coloured red, which indicates that a measurement for the position already exists.

Move measurement data

During a survey, you can move the measurement at one position to another position. In order to do this, at least one position must have measurement data and one position must have no measurement data. You cannot overwrite measurement data at one position with measurement data from another position.

1. Swipe left on the position with data that you want to move.
2. Tap **Move**.
3. Swipe left on the position to which you want to move the data.
4. Tap **Insert**.

Overview: result

After all measurements for a partition are complete, the mobile app calculates and displays the results automatically. The mobile app calculates all rating parameters relevant to the standard you are using.

The overview shows a profile display and a list below. The rating parameter is at the top of the list with all measurements for the partition nested below.

- Tap the profile to move the cursor.
- Tap the rating parameter to select a different parameter to view.
- Tap the plus/minus button to expand or contract the positions for each type of measurement.
- Use the checkbox to the right of each position to include or exclude measurements in the room average and see how the change affects the results. The default is to include each position in the room average.
- Tap quality indicators to get more information about the quality of the measurements.

Reverberation time measurements

For reverberation time measurements using the interrupted noise method with more than one decay at each position, the result view shows an ensemble averaged decay per position.

Overview: room background noise

For each room, the overview screen shows the spectrum with noise curve overlay, the result parameter and classification, and the list of measurements. Measurements (positions) are nested below the room average. Select a measurement in the list to see its LZeq spectrum and noise curve. When no measurements are selected the graph shows the room average. As for sound insulation tests, you can include or exclude measurement positions in the average.

Quality indicators

Quality indicators (smileys) are used to indicate quality and alert you to potential problems. A red smiley indicates a major problem while a yellow smiley indicates a minor problem.

Quality indicators can be applied to:

- Partitions
- Measurements
- Individual frequency bands

Quality indicators have multiple meanings. In the mobile app, tap on an indicator for detailed information. In the PC app, hover over an indicator to see the information.

If multiple quality indicators apply to a partition, measurement or frequency band, all messages will be displayed when you tap or hover over the indicator. If both red and yellow indicators apply, a red indicator will display.

Table of quality indicator messages

	Message	Explanation
😞	The receiving room volume is undefined	The chosen result parameter cannot be calculated as the receiving room volume has not been defined.
😞	The partition area and the receiving room volume are undefined	The chosen result parameter cannot be calculated as the receiving room volume and the partition area have not been defined.

☹	The partition area is undefined	The chosen result parameter cannot be calculated as the partition area has not been defined.
😐	Manual data input	Data entered by user (level, reverberation time)
😐	Affected by manual input	Data entered by user (level, reverberation time)
😐	No B2 measurements	No B2 measurements available
😐	Background noise correction used	Background noise correction used
😐	Maximum background noise correction used	High background noise
😐	High background noise T2: High background noise	Background noise too close to level at lower evaluation point Consider making serial measurements at the frequency bands with high background noise
☹	Background noise too high T2: Background noise too high	Background noise is above the upper or lower evaluation point Consider making serial measurements at the frequency bands with high background noise
☹	No decay start found	No decay start found
☹	No decay end found	The end of the decay cannot be determined because it does not end in the background noise
😐	Decay is bent	The difference between T20 and T30 is greater than 10% (Recommended quality indicator from ISO 3382-2 Annex B)
😐	Decay is non-linear	Correlation coefficient in linear regression is too low (less than 0.005 or ξ (Xi) > 10%)
☹	No decay found	The slope of the decay is positive, that is, the reverberation time is negative
😐	Short reverberation time	B×T below 16 (B = filter bandwidth and T = reverberation time of detector)
😐	Short reverberation time	Less than four points in evaluation range
☹	Reverberation time too short	Less than two points in evaluation range
☹	Measurement too short	Measurement was stopped before the decay had settled
☹	Excitation sound level too high	Overload (or wrong L1 and L2 level range)

🙂	T20 used (T30 unavailable)	T20 used (T30 unavailable)
🙂	Receiving room volume limited	Used on the SS standard only
🙂	L1: >6 dB difference to adjacent band L1: >8 dB difference to adjacent band	Try other source or microphone positions, or increase the amplitude of the generator signal at the affected frequencies
🙂	L1 or L2: High standard deviation	The standard deviation in a frequency band is greater than twice the theoretical expected value
🙂	Ref. Curve Increment 0.1 dB	You should use Ref. Curve Increment 1 dB when reporting results
🙂	Band measured serially	The frequency band has been measured using band-limited noise
🙁	L1 or L2 (not both) measured serially	Make sure all positions in L1 and L2 are measured serially
🙁	Not all positions measured serially	Make sure all positions for the test are measured serially
🙂	Receiving room volume limited	Used on the SS standard only
🙂	Underrange	Below the measurement range
🙁	All data underrange	Below the measurement range
🙂	LF Project data is incomplete	Low-frequency data is incomplete
🙂	Result approximated from sum of post-weighted LZeq spectra due to Exclude marker(s)	When an Exclude marker is added to a background noise measurement, the result approximation is found by post-weighting the LZeq spectrum. See **Exclude part of a measurement** for more information.

Adapt to conditions

The flexibility of Building Acoustics Partner allows you to change your plans as necessary – without the need to start over.

Add partitions at any time

If a particular source or receiving room cannot be used as planned, just add another partition. Use the mobile app to add partitions at any time, which allows you to quickly change your plan depending on the site conditions.

- During setup: Tap Rooms or Partitions in the project overview.
- During measurements: Tap the partition selector to find an option to create a new partition.

See **Add rooms and partitions** for information about adding partitions.

Remeasure

Building Acoustics Partner helps you respond to problems that may arise, such as unexpected noises during measurements or measurements in the wrong position. The opportunity to review measurements and quality indicators helps you to determine immediately if you need to remeasure. The ability to reject, remeasure and move measurements gives you options to find the best method to correct a problem.

✏ **Note:** It is a best practice to review measurements before you move the sound source.

See **Remeasure** for information about remeasuring.

Exclude part of a measurement

Another option for dealing with unexpected sounds is to exclude them from the average. Look for peak levels in the time profile and add a marker that will exclude the levels from the position average; just remember the averaging time requirements of the standard you are using. Exclude markers can be added during a sound insulation test using the mobile app or during post-processing using the PC app.

See **Graphical displays** for information about adding exclude markers in the mobile app.

See **Analyse data** for information about adding exclude markers in the PC app.

Room background noise measurements

You can add exclude markers to room background noise measurements in the PC app.

When an exclude marker is added to a room background noise measurement, the LAeq result level is approximated by post-weighting the LZeq spectrum and summing the post-weighted spectrum. The error in this approximation is very small for typical background noise measurements, but can be significant in situations with strong tonal components far from the centre-frequency of an nth-octave band and where the A-weighting curve is steep. LAeq result levels without exclude markers are calculated directly from the broadband LAeq levels measured by the sound level meter, and do not have this potential approximation error.

Room background noise measurements with exclude markers will be marked with a quality indicator. See **Quality indicators** for more information.

REVIEW DATA

The mobile app gives you plenty of opportunities to review your measurement data. Detailed measurement views and quality indicators allow you to understand what is happening with your data before you leave the building site.

At the end of a measurement

At the end of each measurement, you have the opportunity to review the measurement. Use the opportunity to check the graphical displays of measurement data and check any quality indicators that were applied to the measurement. After you review the measurement, you will be prompted to accept or reject the measurement.

- Accept the measurement to add it to the project and move to the next position.
- Reject the measurement to remeasure the position automatically.

Use the overview

The Overview page in the mobile app gives you a test-level view of your data. The page helps you to keep track of measurements, to visualise the measurement data, and to evaluate the quality of each measurement. Use the page to make sure you have the data you need to complete your report before you leave the site.

- See which positions have been measured and which positions have not been measured.
- See the range of position averages in a room (sound insulation tests).
- View position and room averages in the same graph (sound insulation tests).
- Include and exclude position averages in the room average to see how each position affects the room average or the results.
- Inspect the measurement quality indicators.

Open a measurement

You can open sound insulation test measurements at any time during a test. In addition to reviewing measurement data, adding exclude markers and checking quality indicators, you have the ability to remeasure.

- Review the instantaneous and average profile displays.
- Check the distribution of sound energy in the spectrum display.
- Compare measured parameters with reference parameters.
- Add or edit exclude markers
- Inspect the measurement quality indicators
- Remeasure

How to open a measurement in the mobile app

To open a measurement in the mobile app, use the buttons to select the partition, type of measurement and source and microphone position you want to open.

1 ◦|◦ 2   L2   S1   R1*   ⏱ 0:00.0

Expected results

There are a few things that you can easily check to know that your sound insulation test is on track.

- **Is the spectrum fairly flat?**

  The measured spectrum of level measurements in the source room (L1) should have characteristics similar to the output of the sound source, that is pink or white noise.

  If not, check your sound source and perform a calibration check on the instrument (HBK 2255).

- **Are the levels matching your expectations?**

  Receiving room levels (L2) should be above the background noise levels (B2) and below the source room levels (L1).

  Add a reference parameter to be able to check quickly that the sound levels are as expected.

- **Does the regression match the decay?**

  The profile graph helps you to visualise the reverberation time calculation, and you can adjust the slope of the regression line if you disagree with the calculation.

See **Graphical displays** for information about the spectrum graph, adding reference parameters and changing the slope of a regression line.

Find problems

Building Acoustics Partner has tools to help you find problems so you can decide how to address them.

Quality indicators

Quality indicators (smileys) are used to indicate quality and alert you to potential problems. A red smiley indicates a major problem while a yellow smiley indicates a minor problem.

Quality indicators can be applied to:

- Partitions
- Measurements
- Individual frequency bands

Quality indicators have multiple meanings. In the mobile app, tap on an indicator for detailed information. In the PC app, hover over an indicator to see the information.

If multiple quality indicators apply to a partition, measurement or frequency band, all messages will be displayed when you tap or hover over the indicator. If both red and yellow indicators apply, a red indicator will display.

See **Quality indicators** for information about quality indicator messages.

Checks

In the Calculations settings, there are some settings you can enable which will check for common problems.

- L1: Check dB rule: Enables the app to check that the level differences between adjacent third-octave bands are within the tolerance defined by the standard you are using.
- L1, L2: Check std. deviation: Enables checks of the standard deviation of the averaged sound spectra in the source and receiving rooms (L1 and L2, respectively). If the standard deviation in a frequency band is greater than twice the theoretical (and therefore expected) value, then the band is marked with a yellow quality indicator.

Measured levels

Use the graphical displays to look for relatively large peaks or dips in measured levels.

- Exclude a portion of the measurement using a marker.
- Move the sound source to a different position and remeasure.
- Check the sound source and the instrument are operating correctly.

See **Graphical displays** for more information.

Adjust the slope of the regression line

For reverberation time measurements (T2), it is possible to adjust the slope of the regression line. This can be useful if you disagree with the algorithm-calculated decay or want to look at different scenarios, such as when the decay first started.

Tap and drag the vertical cursors on the decay graph to adjust the slope of the regression line.

The algorithm-calculated regression is still visible, and you can revert your changes at any time.

Listen to audio

It is a good idea to listen to receiving room measurements so you can monitor the measurement for disturbances which may affect the results. Building Acoustics Partner allows you to stream live audio during measurements, so you can listen to measurements from outside the room. You can also record audio, which can be useful when analysing data.

See **Listening to audio** for more information about live and recorded audio.

Remeasure

Building Acoustics Partner helps you respond to problems that may arise, such as unexpected noises during measurements or measurements in the wrong position. The opportunity to review measurements and quality indicators helps you to determine immediately if you need to remeasure. The ability to reject, remeasure and move measurements gives you options to find the best method to correct a problem.

✏ **Note:** It is a best practice to review measurements before you move the sound source.

Review the measurement

At the end of each measurement, you have the opportunity to review the measurement. Use the opportunity to check the graphical displays of measurement data and check any quality indicators that were applied to the measurement. After you review the measurement, you will be prompted to accept or reject the measurement.

- Accept the measurement to add it to the project and move to the next position.
- Reject the measurement to remeasure the position automatically.

Check the quality indicators

Quality indicators are a valuable resource that can help you determine if you need to remeasure. Tap a quality indicator to see the details. You can check quality indicators when you review a measurement (before you accept or reject the measurement) or in the measurement overview (after you accept the measurement).

See **Quality indicators** for more information about quality indicators.

Remeasure

If you decide you need to make a new measurement at a position that has been measured, you can remeasure at any point during the test.

Sound insulation tests

1. Open the measurement to replace in the mobile app.
2. If necessary, reposition your equipment.
3. Tap ◯ on the mobile app to start a measurement.

   The button will be red to indicate that a measurement for this position already exists.
4. Review the measurement, then accept or reject the measurement.
5. If you accept the measurement, you will be prompted to confirm that you wish to replace the measurement.

Room background noise tests

Navigate to the measurement screen and select the room and position you want to remeasure. The measurement start button will be red to indicate that a measurement for this position already exists.

Move a measurement

In some cases, you do not need to remeasure; for example, if you find that your equipment and the measurement position in the mobile app are not in sync. You can move the measurement to the position that matches the setup of your equipment.

1. Go to the Overview tab.
2. Swipe left on the measurement you want to move.
3. Tap **Move**.
4. Swipe left on the position to which you want to move the measurement.

   ✎ **Note:** If the position has been measured, you will not be able to overwrite the data. You will need to move the data to another position or remove the data.
5. Tap **Insert**.

IMPORT DATA TO THE PC APP

Import a project to the PC app to analyse measurement data, to generate reports, or to export raw data for use in another application (such as Microsoft® Excel®).

Import a project

To import projects from to the PC app, you will need to connect the PC app to the instrument. You do not need to be connected to the instrument to create a project or to work with a project that has been imported and saved to a location on your PC or network.

1. Turn on the instrument and start the PC app.

2. Make sure the devices can communicate. You can do one of two things:

   - Connect the devices to the same local network (a home or office network or the instrument's hotspot).
   - Use a cable to connect the devices.

3. Click ↓, to import a project or measurements. If the devices can communicate, you will see the instrument in the dialog box.

Import from multiple instruments

1. Import the project stored on the primary instrument.

   a. Connect the primary instrument to the PC application.

      See **Import data to the PC app** for more information about connecting an instrument to the PC application.

   b. In the PC application, click ↓, to open the Import dialog.

   c. Select the instrument in the list on the left.

   d. Click **Projects**.

   e. Select the project you want to import.

      ✎ **Note:** You can only import one project at a time.

   f. Click **Import**.

2. (Optional) Import the measurements stored on the secondary instrument.

   a. Connect the secondary instrument to the PC application.

   b. In the PC application, click ↓, to open the Import dialog.

   c. Select the instrument in the list on the left.

   d. Click **Measurements**.

   e. Select the L2 measurements for the project.

   f. Click **Import**.

See **Multiple instruments** for more information about using multiple sound level meters.

Measurement icons

Measurement icons indicate the type of measurement.

⌂ : Building acoustics level measurement

: Building acoustics reverberation time measurement

Share a project

Another way to transfer data is to share the project. A shared project makes it possible for anyone to view the measurement data. You can share a project from the mobile app or the PC app. The sharing feature uploads the project to the HBK cloud and generates a download link which you share by email or message (when sharing via the mobile app). When you share the project, you have the option to password-protect the download. You do not need to be connected to the instrument to open a shared project, but you do need to have the Building Acoustics Partner PC app installed on your PC.

- In the mobile app, tap ⬆.
- In the PC app, click ✉.

Tasks

At the bottom of the panel on the left, is the Tasks window. Use the window to monitor the import progress.

ANALYSE DATA

Upon import to the PC application, all measurement data is available in graphical and tabular formats.

Basic controls and general information

Left panel
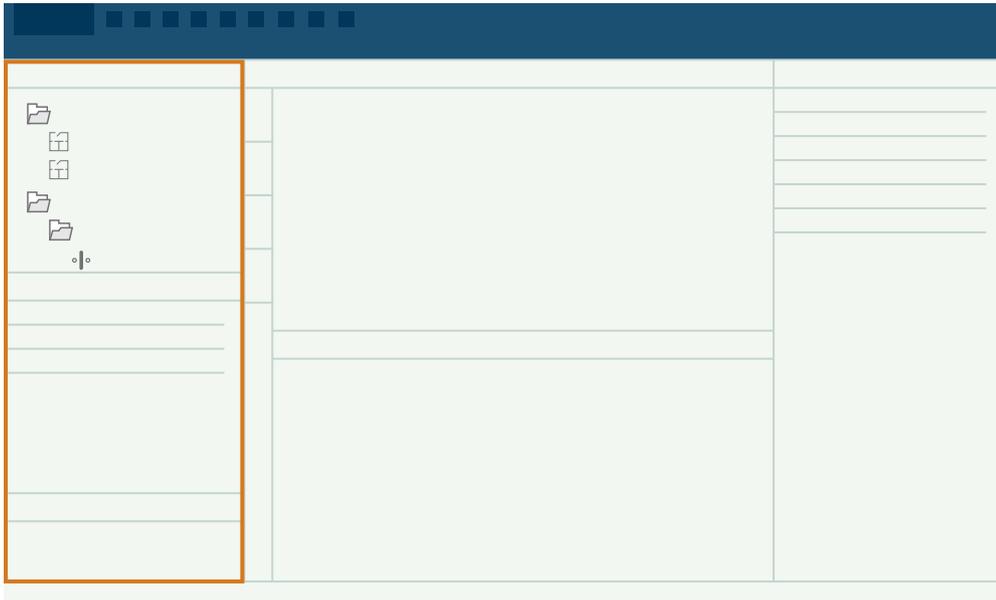
The panel on the left includes a project browser and a task monitor.

Select an item in the project browser to view data, settings, options and annotations for that item.

Centre window

The main window provides context-sensitive views of the project. Depending on what is selected in the project browser, you can view setup information, the graphical and tabular displays of measurement data and report previews.

Select the **Measurements** tab to view the measurement data. The vertical tabs on the left side of the window open the different views for reverberation time measurements, level measurements, results and a list of measurements. Measurement data is available in both tabular and graphical displays. The two displays are interactive, meaning the selection you make in one display is reflected in the other display.

Graphs

- Click to move the cursor.
- Use the left and right arrow keys on your keyboard to move the cursor or scroll the Y-axis.
- Double-click the Y-axis to auto-scale the graph to the range of values.
- A context-sensitive menu includes the option to copy the graph to your clipboard. The graphic pastes in either PNG or SVG format, depending on the application into which you paste.
- Hover over quality indicators to show the message.

Tables

- Select a measurement type to view its graphical display.

- Double-click a header to sort the table.

- Use the context-sensitive menu to access options to copy the table data (in CSV format), to revert overwritten data, and to delete, cut or paste positions.

- Double-click a cell to overwrite the data. Data that has been edited is indicated by green-coloured text. All edits are marked with quality indicators on the edited cells and on cells affected by the edit.

   It is possible to edit most values in the tables, which allows you to correct errors or to explore what-if scenarios.

- Cells with a background colour (red or yellow) represent a quality indicator. Hover over cells to show the message.

- Use the arrow keys on your keyboard to move from cell to cell.

Right panel
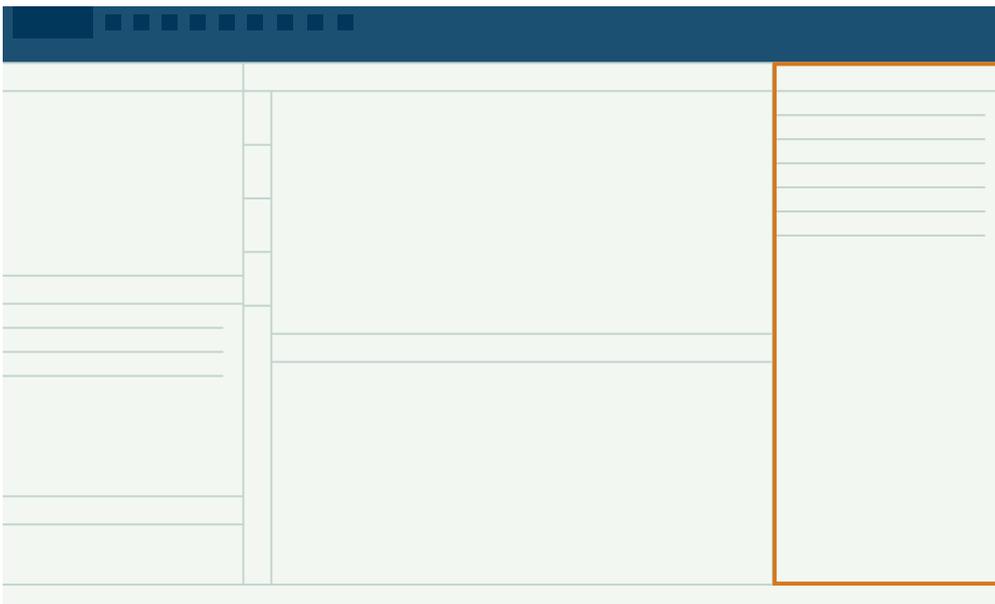
The panel on the right provides context-sensitive windows based on what is selected in the project browser.

Geometry settings: Settings for the partition selected in the project browser.

Report settings: Settings that allow you to customise your report. The window is enabled when a partition or group of partitions is selected in the project browser.

Calculation settings: Settings for calculations that the application performs. The window is always enabled.

Room settings: Settings for the name and location of the room selected in the project browser.

Annotations: Window for reviewing photo, video, voice and text annotations and location information. The window is always enabled.

Project browser

The project browser gives an overview your Building Acoustics Partner project and allows you to select items to view. The project browser organises projects by rooms, partitions and background noise (rooms).
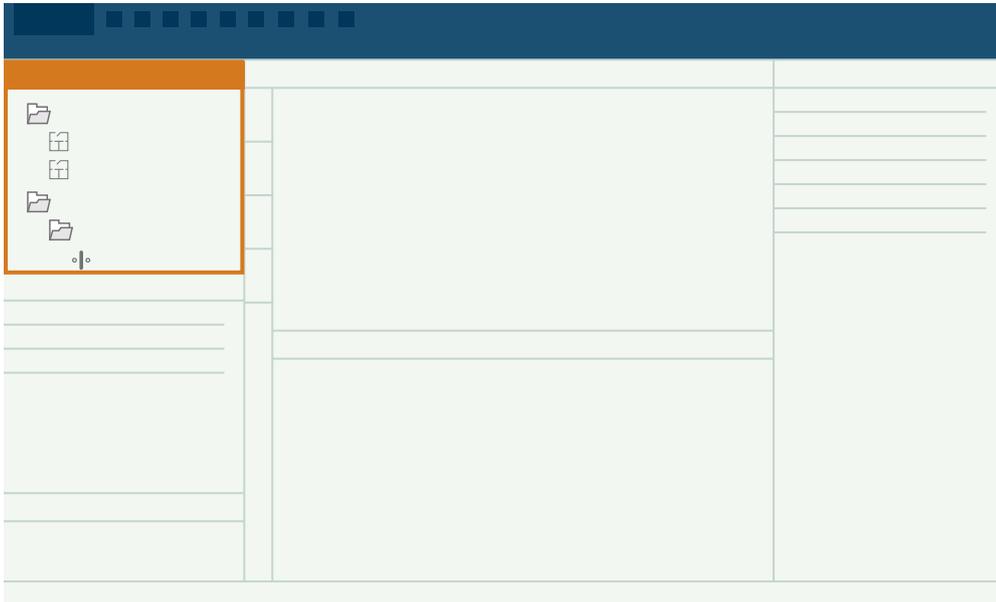
Basic controls and functionality

The project browser controls what is displayed in the application. Select an item in the project browser to view the data, settings, options and annotations for that item. You can select individual items, or you can select a group of items.

A context-sensitive menu includes options to delete or add rooms and partitions, and to copy and paste measurements.

Drag and drop annotation files on rooms and partitions in the project browser to attach annotations. Files can be a part of the project (as attached or unattached annotations) or stored on your PC.

Project icons

⊞ Room

∘|∘ Airborne sound insulation test

▬ Impact sound insulation test

⁊|∘ Façade sound insulation test

▮▮▮ Room background noise test

Reverberation measurement view

The Reverberation tab shows the reverberation time measurement view. The view gives a complete overview of all reverberation time measurements for a partition.

Graphical displays
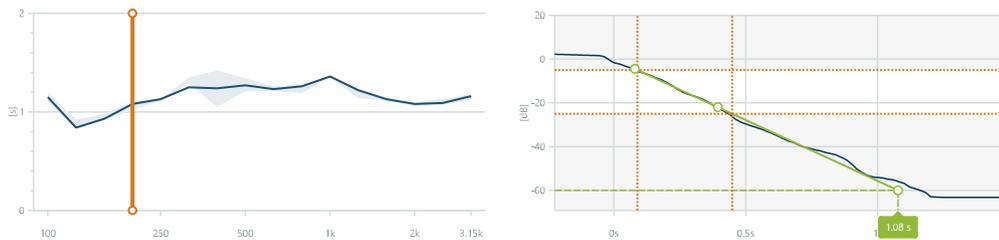
The reverberation time graphical display includes side-by-side graphs of the reverberation time spectrum (left) and the decay (right). The reverberation time spectrum shows the room average as a solid line and position averages as dashed lines. The shaded area represents the range of position averages. The decay graph shows the decay for the frequency selected on the reverberation time spectrum. The decay graph shows either the instantaneous sound pressure level (for interrupted noise measurements) or the backwards integrated decay (for impulsive noise measurements). The instantaneous sound pressure level profile for an impulsive noise measurement can be displayed by double-clicking the graph.

For reverberation time measurements using the interrupted noise method with more than one decay at each position, the view shows the results per position. A drop-down menu at the top of the page allows you to view the individual decays for each position.

Regression line

The decay graph shows the regression line in green. You can adjust the slope of the regression line in the decay graph by adjusting the vertical cursors. This can be useful if you disagree with the algorithm-calculated decay or want to look at different scenarios, such as when the decay first started. The graph also shows the curvature and correlation, which indicate the quality of the fitted line.
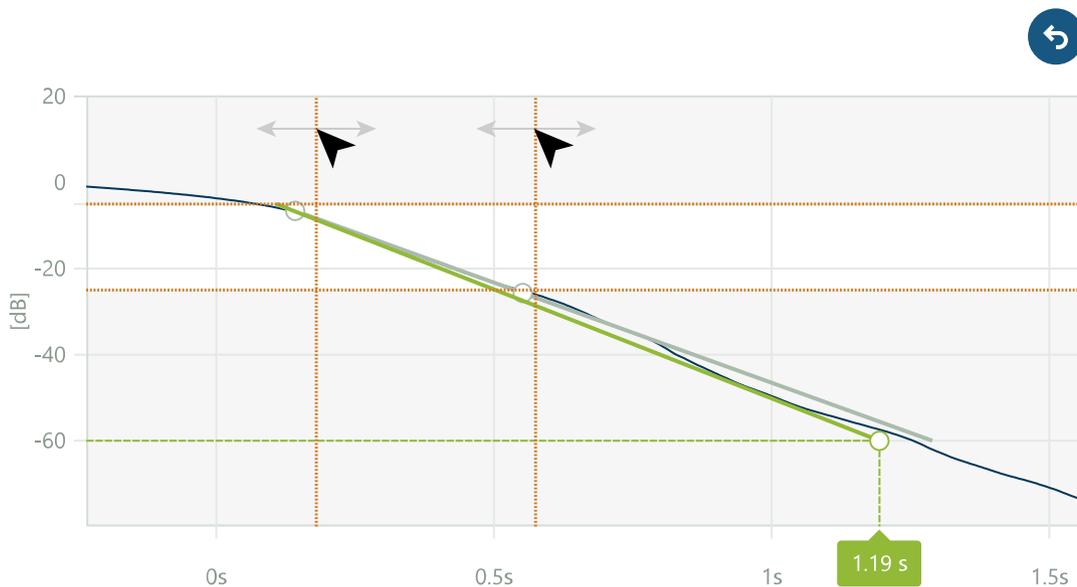
The image above shows which cursors to click and drag to adjust the range. The algorithm-calculated decay curve is still visible (in grey), and you can revert your changes at any time (upper right button).

Tabular display

The table shows the average reverberation time in bold, with the reverberation times for each position nested below. The table also includes information about quality indicators, a checkbox which allows you to include or exclude positions in the total average, and links which indicate reused measurements and give information about the original measurement.

Select a measurement in the table to view its graphical displays.

Levels measurement view

The level measurement view is a complete overview all level measurements for all types of measurements for each source position. Use the drop-down menu in the upper left of the window to change source positions.

The view includes one graph for an overview and a graph for each type of measurement (L1, L2 and B2). The overview graph allows you to compare L1, L2 and B2 average levels quickly, while the L1, L2 and B2 graphs allow you to see the relationship between position averages and the room average. The graph shows the room average as a solid line and position averages as dashed lines. The shaded area represents the range of position averages.

The ⊡ button in the upper right corner of each graph allows you to maximize the graph to fit the window, if you want a larger view.

The table shows the average levels for each frequency band. Room averages are in bold text, and position averages are nested below. The table also includes information about quality indicators, a checkbox which allows you to include or exclude positions in the room average, and links which indicate reused measurements and give information about the original measurement.

Low-frequency measurements

For low-frequency level measurements (B2 LF, L2 LF, L1 LF), only the three lower bands are shown.

Result view

The result view gives an overview of calculated results. The result view changes based on what is selected in the project browser.

Individual partitions

For individual partitions, the result view shows the result and reference curves alongside the single value ratings.

In the window, there is one drop-down menu which allows you to change the result parameter, and there is one drop-down menu which allows you to view results for a single source position or all source positions. The checkboxes allow you to view or hide the reference curve, the shifted reference curve and the deviations (between the result parameter and the shifted reference curve).

The table shows results and all measurements for the partition (L1, L2, B2 and T2).

Reverberation time measurements

For reverberation time measurements using the interrupted noise method with more than one decay at each position, the result table shows the ensemble average for each position.

Reference curve increment

Use the Calculation settings group (in the panel on the right) to change the reference curve increment between 1 dB and 0.1 dB. Generally, you will use an increment of 1 dB for calculating results, and an increment of 0.1 dB for evaluating uncertainty.

Partition groups: Partitions, Airborne, Impact, Façade

For groups of partitions, the result view gives an overview of the partitions in the group and the results of the sound insulation tests in tabular format.

Uncertainty

Uncertainty allows you to see, for example, if a partition meets the target.

Uncertainty settings

Select the situation that applies to your measurements and a coverage factor for calculating the expanded uncertainty in the application menu. See **Application menu** for more information.

View uncertainty results

1. Select the Partitions group in the project browser.

2. Select the Result tab in the Measurements window.

3. In the Target level column, enter the target sound insulation result for each partition.

   The target level can be either the relative reduction in sound levels through the partition (as for airborne or façade sound insulation tests) or the absolute sound level (as for impact sound insulation tests). The target level will be defined for the project, either by regulations or building specifications.

You can, at any time, return to the application menu and change the uncertainty settings.

Background noise rooms

For individual rooms, the Result view shows the frequency spectrum for the row selected in the table (result, or a single position) with the result parameter overlaid.

The drop-down menu allows you to select the result parameter to view.

The table gives an overview of the result and the room average, with individual positions nested beneath.

See **Room background noise** for more information.

List view

The list view gives a complete overview of all measurements. The view shows the frequency spectrum and time profile for each measurement. The time profile also shows the running average.

The table gives information about the measurement.

Select a measurement in the table to view its graphical displays. Click on the spectrum graph to select a frequency band to investigate. Click on the profile graph to move the cursor. In the active window (spectrum graph, profile graph or table), you can also use the arrow keys to move your selection.

Reverberation time measurements

For reverberation time measurements using the interrupted noise method with more than one decay at each position, the list view shows the individual decays.

Exclude markers

Use the list view to add exclude markers in the time profile. Click and drag to select a portion of the measurement in the time profile, then use the context-senstive menu to add a marker.

✎ **Note:** You cannot exclude data in reverberation time (T2) measurements.

Listen to audio

If you recorded audio during measurements, you can listen to the recordings in the PC app. There are playback controls in the list view, below the time profile. See **Listening to audio** for more information.

Audio recordings can help you identify extra noises in L1 and L2 measurements which may give you an incorrect result; for example, extra noises during L2 measurements can make it seem like the wall is performing worse than it really is.

Multiple instruments

If you import the project from the primary instrument and the measurements from the secondary instrument, you can view the raw measurement data for all measurements in the List view. If you only import the project, you can only view the raw data for B2, L1 and T2 measurements.

Room background noise tests

When the group is selected, the List view shows the frequency spectrum and time profile for the row selected in the table (result). When a room is selected, the List view shows the frequency spectrum for the row selected in the table (result, or a single position). The time profile also shows the running average.

The table shows an overview of the measurements for each room.

See **Room background noise** for more information.

Calculation settings

The Calculation settings window gives you easy access to settings for calculations. Easy access to the settings allows you to quickly see how the settings affect the results.

Standard

It is possible to change the standard as long as the change does not create any conflicts with the measurement data in the project.

Calculate using

Reverberation time is calculated by analysing part of the decay, the evaluation range, to calculate a slope of best fit.

Evaluation ranges:

- T20: –5 to –25 dB
- T30: –5 to –35 dB

✏ **Note:**

- T20 is preferred in most of the current standards for building acoustics.
- If you select T30 but the measured decay is <30 dB, T20 is used instead (automatically). Quality indicators are applied to the measurement. See **Quality indicators** for more information about the indicators.

Reference curve increment

Sets the shift of the reference curve. The reference curve is defined in ISO 717. Shift the reference curve by increments until the sum of negative deviations between the reference curve and the result equals the desired value.

- Use a 1 dB shift when calculating result parameters.
- Use a 0.1 dB shift when estimating the uncertainty of the results.

T0

Sets the reference reverberation time, in seconds. You can choose a time between 0.01 and 10 s. Refer to the standard you are using for guidance.

Correct for background noise

If the background noise level (B2) comes within 15 dB of the receiving room level (L2), it starts to affect the measured L2 level. Enable the Correct for background noise setting to apply corrections to L2 measurements to account for the influence of the background noise level.

Corrections depend on the standard you are using and the level difference between L2 and B2. When the background noise level comes too close to the receiving room level, a fixed correction to L2 is made and quality indicators mark where corrections have been made.

If L2 – B2 < 6 dB and you are using HBK 2755 Smart Power Amplifier, you can set up the project to make measurement in serial. See **Serial measurements** for more information.

L1: Check 8 or 6 dB rule

Enables the app to check that the level differences between adjacent third-octave bands are within the tolerance defined by the standard you are using.

L1, L2: Check standard deviation

Enables checks of the standard deviation of the averaged sound spectra in the source and receiving rooms (L1 and L2, respectively). If the standard deviation in a frequency band is greater than twice the theoretical (and therefore expected) value, then the band is marked with a yellow quality indicator.

Ensemble averaging

Enable or disable ensemble averaging.

- Ensemble averaging: The average reverberation time in a room is calculated by averaging the decay curves and then calculating the reverberation time for the average decay. Ensemble averaging produces average parameters (such as T20) that are calculated based on the ensemble averaged decay. Average decays can be viewed in reverberation time displays.
- Arithmetic averaging: The average reverberation time in a room is calculated by averaging the reverberation times. Arithmetic averaging produces average parameters that are averages of reverberation times, it does not produce an average decay.

Low-frequency correction

The setting allows you to apply corrections for low frequencies so you can assess how much the correction impacts the results.

Reuse measurements

You can change the reuse settings for L1, B2 and T2 measurements during post-processing.

- **Automatic**: Measurements are applied automatically to the relevant partitions.
- **On**: Reusable measurements are listed, but not applied. The setting gives you control over the application or exclusion of reusable measurements and can serve as a prompt to consider whether reusing the measurement is appropriate at the time. The option is only available for unplanned measurements.
- **Off**: Measurements will not be reused. L1, B2 and T2 shall be measured for each partition (as applicable).

Number of elements

The Number of elements setting is for airborne sound insulation tests of small building elements according to ISO 10140. The setting allows you to enter how many sound insulation elements, such as windows, are installed in the test opening.

NEN and NEN'06

Impact sound insulation tests

Enable the Rubber hammer setting to set the type of floor.

Façade sound insulation tests

The Cr setting allows you to enter the reflection and façade shape conversion term.

The CL setting allows you to enter the sound level conversion term.

The Traffic type setting allows you to set the type of traffic used for the sound source.

ASTM

The OILR correction and OITL correction settings are for façade sound insulation tests according to ASTM.

- OILR correction: Level correction (in dB) for outdoor-indoor level reduction
- OITL correction: Level correction (in dB) outdoor-indoor transmission loss

Room background noise tests

The Room background noise setup group of settings includes settings for the evaluation of background noise levels.

See **Room background noise** for more information.

Result parameter

Choose the parameter with which to compare the measured background noise spectrum:

- NC (noise criteria) curves
- NR (noise rating) curves
- RC (room criteria) curves
- NCB (balanced noise criteria) curves
- LAeq

Result

- Highest level: Use the highest noise level for the result. The highest noise level is the most commonly used and is the default setting.
- Arithmetic average: Use the average of noise levels for the result.
- Energetic average: Use the average of noise energy for the result.

GENERATE A REPORT

Building Acoustics Partner generates custom reports that conform to the requirements of the standard used. A report can include the results for one or more partitions (sound insulation tests) or a single room (room background noise tests).

Report settings

The Report settings group in the panel on the right allows you to customize reports, including the option to upload signature and logo files. Information that can be pulled from the project, such as the date of testing and descriptions of the tests, are generated automatically to save you time and reduce the chance of errors in your report. If you wish to overwrite the automatically-generated information, just enter text in the field. If you delete the text, the field will revert to the automatically-generated information.

The most important thing to know is that report settings are applied according to what is selected in the project browser.

- Select the Partitions group in the project browser to apply settings to all partitions in the project.
- Select a type of test (Airborne, Impact, Façade) to apply settings to all partitions in the group.
- Select a single partition (sound insulation tests) or room (room background noise tests) to apply settings to that partition or room only.

Add additional report pages

You can use the settings window to include additional pages in your report: a page with a description of the test method and equipment used, a page with a description of the partition geometries and a page with a summary of the results.

Preview the report

The Report preview window provides an easy-to-read preview of each page in the report, which allows you to know exactly what your report will look like before you generate it.

Preview format

Select a preview format from the drop-down menu: HTML (default) or PDF.

✏ **Note:**

- The HTML preview is faster but less accurate than the PDF preview.
- The choice of preview format does not affect the final report when using the ⬒ button to generate a report.
- The HTML preview is platform independent, which is helpful if you do not have Microsoft® Word installed on your PC. The PDF preview requires Microsoft Word.

Select the result parameter

There is a drop-down menu to select the result parameter for the report. The result parameter applies to all items in the report, regardless of the selection in the project browser. You can select one result parameter per report.

Create a PDF

In the PDF preview, the Report preview toolbar includes tools to magnify, rotate and change the view (one or two pages at a time), as well as tools to print or save the report.

In the toolbar:

- Print to PDF (or print directly to a printer).
- Save as PDF to a location on your computer or network.

Create a Word document

In the application toolbar, click to generate a report in .docx, which is the native Word format. Afterwards, you can apply your own custom styles, formats and layouts to the report.

SUPPLEMENTARY INFORMATION

Topics to support sound insulation tests using Building Acoustics Partner:

- **Calibration check**
- **Download the apps**
- **Multiple instruments**
- **Listening to audio**
- **Building acoustics metadata**
- **Measurement reuse**
- **Low-frequency measurements**
- **Serial measurements**
- **Room background noise**
- **External devices**
- **Annotations**

Topics about using the Building Acoustics Partner PC app:

- **Application menu**
- **Open a project**
- **Export data**
- **Import from Measurement Partner Suite**

Calibration check

It is a best practice to check the accuracy of your instrument before and after a measurement by performing a calibration check. A calibration check is not a calibration. **Calibration** includes an adjustment of the instrument's sensitivity. A **calibration check** compares the current sensitivity of the instrument with the sensitivity from its most recent and initial calibrations, checking that it has not changed too much.

When you place a sound calibrator on the microphone, the instrument detects the tone and automatically checks the deviation of the sensitivity of the instrument from its initial calibration.

How to perform a calibration check

You will need:

- The instrument

- A sound calibrator such as Type 4231

  A sound calibrator generates a known sound level, against which the measured level can be checked. Type 4231 generates a tone at 1 kHz with levels at 94 dB or 114 dB.

  ✏ **Note:** Be sure to add the calibrator's serial number in the calibration settings of the instrument. Go to: **Menu** > **System settings** > **Advanced settings** > **Calibration** > **Type 4231 no.**

Procedure:

1. Turn on the instrument.

   ✎ **Note:** Ensure that the **instrument is not measuring** and that the **menu is not open**.

2. Gently seat the calibrator on the microphone.
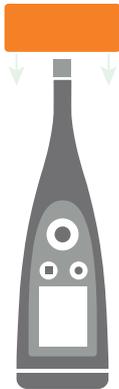
3. Turn on the sound calibrator.
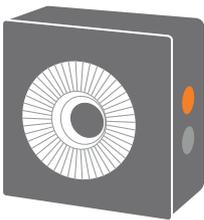
4. After a short period the instrument will initiate a calibration check, choose **Yes**.

   💡 **Hint:** You can respond to the calibration dialog using the mobile app if you are using B&K 2245 with firmware versions greater than 1.1.3.1653 or HBK 2255 with firmware versions greater than 1.2.1325.

5. The calibration check will have one of two results:

   - *Pass*: The measured sound level is within tolerance. The instrument is ready for use.
   - *Fail*: The measured sound level is greater than the acceptable tolerance. The instrument should be recalibrated or serviced.

6. Exit the calibration check.

Calibration history

To view the history of calibrations and calibration checks, go to: **Menu** > **Calibration history**.

Calibration settings

Menu location: **Menu** > **System settings** > **Advanced settings** > **Calibration**.

Automatic calibration check

By default, the instrument is set to perform a calibration check automatically when it detects the constant sound level produced by the calibrator. Use the Automatic check setting to disable automatic calibration checks.

If you disable automatic calibration checks, you can still initiate a calibration check.

1. Go to: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration** > **Calibrate**.
4. Follow the prompts on the instrument.

Calibration reminder

The instrument is set to remind you when it is time to calibrate by default.

To change the settings:

1. Go to: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration**.
4. Edit the **Calibration reminder** and **Calibration interval** settings as desired.

Custom calibration

The instrument is set to use Sound Calibrator Type 4231 by default.

To use a different calibrator and set a custom calibration level:

1. Go to: **Menu** > **System settings** > **Advanced settings**.
2. Enable the **Service mode** setting.
3. Go to: **Calibration**.
4. Go to: **Calibrator**.
5. Select **Custom**.
6. Use **Custom calibrator no.** to add the calibrator's serial number.
7. Select **Custom level** to specify the sound level in dB.

Multiple instruments

Building Acoustics Partner supports the use of multiple instruments. The ability to connect two instruments enables you to measure two positions simultaneously, which is a requirement for some façade sound insulation test methods.

When using two instruments, one instrument is the primary instrument and the other is the secondary instrument. The primary instrument stores project information (project settings and test results, for example) as well as the measurements it makes. The secondary instrument stores the measurements it makes.

Connect multiple instruments to the mobile app

The process is similar to connecting one instrument, with the addition of setting the primary and secondary instruments.

1. In the list of instruments on the mobile app, select the primary instrument.

   The first instrument you tap becomes the primary instrument.

2. Select a second instrument.

   The second instrument becomes the secondary instrument.

3. Tap **Connect**.

See **Connect devices** for more information about connecting an instrument to the mobile app.

Configure the project to use two instruments

In the Measurement control group of settings, set **Measure L1 and L2** = *Simultaneously*.

Making measurements

For airborne and façade tests, the primary instrument makes the B2, L1 and T2 measurements, the secondary instrument makes the L2 measurements, and the L1 and L2 measurements are made simultaneously. For impact tests, the primary instrument makes the B2, L2 and T2 measurements, and the secondary instrument is not used.

When the Measurement assistant setting is enabled, prompts and messages display on the primary instrument.

Low-frequency and serial L1 and L2 measurements will be made simultaneously as well.

In the mobile app

- On the Measurement tab: The L2 measurement displays as the reference curve (L2@Pos) during the measurement, which allows you to view both L1 and L2 measurements in real time.

- You can use the mobile app to open and edit measurements made with the primary instrument, but you will **not** be able to open or edit measurements made with the secondary instrument.

- Simultaneous measurements are grouped in the L1&L2 category on the Overview page. You have the ability to toggle between the L1 and L2 averages.

- Any annotations you make are attached to measurements made with the primary instrument.

- Exclude markers applied to simultaneous L1 and L2 measurements are applied to both measurements.

Import measurements to the PC application

1. Import the project stored on the primary instrument.

    a. Connect the primary instrument to the PC application.

       See **Multiple instruments** for more information about connecting an instrument to the PC application.

    b. In the PC application, click ↓ to open the Import dialog.

    c. Select the instrument in the list on the left.

    d. Click **Projects**.

    e. Select the project you want to import.

       ✎ **Note:** You can only import one project at a time.

    f. Click **Import**.

2. (Optional) Import the measurements stored on the secondary instrument.

    a. Connect the secondary instrument to the PC application.

    b. In the PC application, click ↓ to open the Import dialog.

    c. Select the instrument in the list on the left.

    d. Click **Measurements**.

    e. Select the L2 measurements for the project.

    f. Click **Import**.

Analyse data in the PC application

Projects with simultaneous measurements are handled just as projects with separate measurements.

The information stored on the primary instrument is sufficient to create a report using the PC application. The primary instrument stores project information, which includes project settings, room and position averages for all measurements, and test results, as well as the raw measurement data for the measurements it makes. Therefore, it is only necessary to import the measurements stored on the secondary instrument if you wish to view the measurements or listen to the audio recordings.

If you import the project from the primary instrument and the measurements from the secondary instrument, you can view the raw measurement data for all measurements in the List view. If you only import the project, you can only view the raw data for B2, L1 and T2 measurements.

Listening to audio

It is a good idea to listen to receiving room measurements so you can monitor the measurement for disturbances which may affect the results. Building Acoustics Partner allows you to stream live audio during measurements, so you can listen to measurements from outside the room. You can also record audio, which can be useful when analysing data.

Live audio

You can listen to live L2 and/or B2 audio.

Enable the Listen to live B2 audio and Listen to live L2 audio settings to stream live audio to your mobile device during a measurement. You can find the settings nested in their respective Measurement control groups of settings.

✏ **Note:** You can only listen to the audio stream using headphones. Audio streams automatically.

Audio recordings

HBK 2255 can record listen-quality audio while measuring.

If the BZ-7451 licence is installed and enabled on HBK 2255, the instrument can record analysis-quality audio while measuring. The sound signal is recorded as 24 bit samples at 65536 Hz.

Listen quality

The instrument records audio in a format suitable for listening but not for analysis, using MP3 compression. MP3 recordings are compressed to 48 kbps, approximately 3% of the original signal size.

Analysis quality

The instrument records audio in a format suitable for analysis. The raw time signal is compressed using the FLAC (free lossless audio codec) format, which retains all of the information in the raw time signal while reducing file size.

The size of FLAC recordings depends on the signal. Low-level signals are typically compressed down to approximately 15% of the original signal size, while high-level signals are typically compressed to approximately 60% of the original signal size.

Enable audio recordings

You can set up the instrument to record the audio signal using the mobile app or directly on the instrument.

- On the mobile app, go to: **Sound insulation setup** > **Measurement settings** > **Audio recording**.
- On the instrument, go to: **Menu** > **Measurement settings** > **Audio recording**.

Listen to audio recordings

You can listen to audio recordings in the PC app. The audio playback controls are in the Measurements window, in the List view.

Playback speed options: *1×*, *1.25×*, *1.5×*, *2×* or *4×*

Repeat loop: Enable this setting to repeat the audio playback in an endless loop. The setting is enabled when the background of the button is dark.

Digital gain allows you to adjust the sound levels for listening purposes. This is because the sound card in your PC cannot recreate the range of sound levels that the instrument can measure.

Auto: The default gain setting. This setting uses dynamic compression to squeeze the measurement range down to what your sound card can play. The compressor has been optimized to maintain natural sounding dynamics of typical measurements while allowing comfortable listening for measurements with extremely high or low levels.

With the Auto setting, you will be able to hear everything in your sound recording without adjusting the volume when the level changes. While this is very convenient, there may be situations where a normal manual gain is more appropriate. For example, when focusing on the relative levels of different sounds.

Manual gain options: Increase the level of measurements from 0 to 60 dB, in 5 dB increments, before the signal is sent to the sound card.

In addition to digital gain, there is also a normal **volume** control and a **mute** button.

💡 **Hint:**

- When you press play, the recording will start from the location of the cursor.
- If you have selected a range, the application will play back only the audio recording for the selection.
- Move the cursor or click in the audio bar to skip around in the recording.

Building acoustics metadata

When HBK 2255 is in the Building acoustics setup mode, the instrument is configured with predefined metadata. The mobile app uses the metadata to manage the measurements in your sound insulation test for you. However, the metadata makes it easy for you to make and manage your sound insulation measurements using only the instrument, with no app connected. This gives you greater flexibility in the way you work, and your ability to respond to the conditions of the test.

Defined metadata

There are nine metadata fields on HBK 2255. For Building Acoustics Partner, they have been predefined as follows:

- 1 = **Project:** Name of the project
- 2 = **Source Room:** Name of the source room
- 3 = **Receiving Room:** Name of the receiving room
- 4 = **Test Type:** Type of sound insulation test performed
- 5 = **Measurement Type:** Type of measurement performed
- 6 = **Source Number:** Position number of the sound source
- 7 = **Position:** Position number of the microphone
- 8 = **Decay Number:** Number of the decay measurement
- 9 = **Serial Band:** Frequency band measured (for serial measurements)

Each metadata has been named and formatted, and in the case of picklist-type fields, a list has been defined.

See **Metadata** for more information about the setup of metadata fields on the instrument.

What happens when you use the app?

If the mobile app is used to make measurements, the mobile app automatically maintains metadata and manages the measurement data accordingly.

If the mobile app is in pocket mode during measurements, the mobile app automatically maintains metadata and manages the measurement data accordingly.

If the mobile app is minimized during measurements and metadata is maintained, measurement data imports automatically according to the metadata when the mobile app is opened again.

What happens when you do not use the app?

You will be responsible for maintaining metadata. At the end of each measurement, the metadata diaolg opens:

1. Update the necessary metadata values.

2. Navigate to the OK option and press ⊜ to close the metadata dialog.

3. Start a new measurement.

After you complete all your measurements, you can import the measurements to either the mobile app or the PC app.

Import measurements to the app

You can import measurements made using only the instrument to the mobile app or the PC app.

✎ **Note:** When you import measurements into a project, the measurements are matched to the measurement plan settings in the project. Therefore, the measurements need to match the measurement plan for you to be able to specify the metadata successfully.

Import to the mobile app

1. Connect the mobile device and the instrument.

2. In the mobile app, open an existing project or create a new project.

3. Review the Measurement plan settings of the project to make sure they match the measurements you are about to import.

4. Tap ⤓.

5. Select the measurements you want to import.

6. Tap **Import**.

Measurements with missing or inconsistent metadata trigger a warning and an import wizard. The wizard prompts you to review the problem metadata, one at a time. You can make changes in the metadata to resolve the problem, but you also have the option not to import the measurement, or to import the measurement regardless of the problem.

After import, you can finish setting up the rooms and partitions from the project overview page if necessary. See **Add rooms and partitions** for more information about rooms and paritions.

Import to the PC app

1. Connect the PC and the instrument.

2. In the PC app, click ⤓.

   Measurements are imported to the project that is open in the PC app. If no project is open, then a new project is created.

3. If you are importing into a project, review its Measurement plan settings to make sure they match the measurements you are about to import.

4. Select the measurements you want to import.

5. Tap **Import**.

6. Save the project.

As with the mobile app, measurements with missing or inconsistent metadata trigger a warning and an import wizard. The wizard gives you an overview of the measurements with conflicts, and you can make corrections to resolve the conflicts. You will only be able to import a measurement once the conflicts have been resolved.

After import, you can finish setting up the rooms and partitions if necessary. There are context-sensitive windows for room and partition settings in the panel on the right when a room or partition is selected in the project browser. See **Add rooms and partitions** for more information about rooms and partitions.

Measurement reuse

Reusing measurements is an excellent way to reduce the total number of measurements to make.

Building Acoustics Partner makes measurement reuse safe and easy. The mobile app identifies where partitions share a source or receiving room, and where measurements may potentially be reused. It is possible to reuse L1, B2 and T2 measurements, as applicable to the type of test.

Measurement reuse settings

The rules for measurement reuse are set here:

- **Sound insulation setup** > **Measurement plan**

  There is a reuse setting for each type of measurement that can be reused: L1, B2 and T2. If you are not using a measurement plan, you can set the rules for measurement reuse in the Measurement control groups of settings using the mobile app.

  Measurement reuse can be automatic, manual or off.

    - **Automatic**: Measurements are applied automatically to the relevant partitions.

      Default: **Reuse T2 measurements** = *Automatic*.

    - **On**: Reusable measurements are listed, but not applied. The setting gives you control over the application or exclusion of reusable measurements and can serve as a prompt to consider whether reusing the measurement is appropriate at the time. The option is only available for unplanned measurements.

      Default: **Reuse B2 measurements** = *On*.

    - **Off**: Measurements will not be reused. L1, B2 and T2 shall be measured for each partition (as applicable).

      Default: **Reuse L1 measurements** = *Off*.

- **Rooms** > **Room X** > **Reuse measurements from**

  The Reuse measurements from setting allows you to specify from which room you want to reuse measurements. This setting can be useful in large surveys which contain many rooms. You can choose any room that has been added to the project or *None* if you do not want to specify a single room.

  ✎ **Note:** Keep the setting in mind when you choose the order in which to test the partitions.

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Measurement reuse during a test

Reusing measurements affects the measurement process.

When reuse is automatic

- Measurements are listed and applied in the measurement overview.
- For planned measurements, the mobile app will skip measurements at positions where a measurement is reused.
- If you exclude a reused measurement, it will be excluded from all partitions in which is it reused.

When reuse is on

- Reusable measurements are listed in the measurement overview, but not applied.

When reuse is off

- Reusable measurements are not listed in the project overview.
- The mobile app will not skip any measurement positions.

How is a reused measurement indicated?

🔗 indicates a reused measurement. Tap or hover over the icon for information about the measurement.

Plan your survey for measurement reuse

A survey where you test multiple partitions with a **common receiving room** allows you to reuse T2 and B2 measurements. T2 measurements are ideal for reuse since it's extremely unlikely that new sound absorption will be installed in the room during your survey. B2 measurements can be reused but with caution. B2 measurements should be representative of the background sounds occurring during your receiving room level (L2) measurements. If the background sound levels vary throughout your survey, it is safest to remeasure B2 for each partition close to when you measure L2.

A survey where you test multiple partitions with a **common source room** allows you to reuse L1 measurements. However, this can become a little complicated to manage when measuring according to ISO 16283, where all L1 and L2 positions must be measured for each source position before moving the source.

Normally, you will save more time when you reuse T2 measurements than when you reuse L1 measurements. Therefore, plan your survey with common receiving rooms instead of common source rooms.

Low-frequency measurements

It is very hard to get a good average of low-frequency levels in small rooms. For this reason, some standards (such as ISO 16283) include measurement procedures which are used to adjust low-frequency bands in sound insulation calculations. For ISO 16283, the procedures are for measurements below 100 Hz where the source or receiving room is smaller than 25 m^3.

Building Acoustics Partner includes an option to extend the lower limit of the frequency range down to 20 Hz. The extended range allows you to perform, for example, impact sound insulation tests on lightweight or wooden structures according to Swedish standard SS 25267:2015.

ISO 16283

To enable settings for the low-frequency procedure in Building Acoustics Partner:

- **Standard** = *ISO 16283*

- **Bottom frequency** = *50 Hz*

- At least one partition with a receiving room with a volume less than 25 m^3 must be set up in the project.

For ISO 16283, the source positions used for the default procedure should also be used for the low-frequency procedure. The standard requires fixed microphone positions in a minimum of four corners, with two corners at ground level and two corners at ceiling level. Microphones may be mounted on a tripod or held.

💡 **Hint:** Microphone Extension UA-0049 is a great accessory for measuring in corners.

Reverberation time measurements

For low-frequency reverberation time measurements, Building Acoustics Partner gathers 1/1-octave spectra simultaneously with 1/3-octave spectra and uses the 63 Hz 1/1-octave band instead of the three lower 1/3-octave bands. This effectively measures the low-frequency and the normal reverberation time simultaneously, which is a big time saver when making low-frequency measurements.

Level measurements

For low-frequency level measurements (B2 LF, L2 LF, L1 LF), only the three lower bands are shown while measuring (mobile app) and when reviewing data (mobile and PC app).

Low-frequency correction

In the Calculation settings group (in the panel on the right of the PC app), you can apply corrections for low frequencies so you can assess how much the correction impacts the results.

SS 25267:2015

To enable the extended frequency range option in Building Acoustics Partner:

- **Standard** = *ISO 16283*

- **Bottom frequency** = *50 Hz*

Follow the test procedure of ISO 16283-2 when you enable the extended frequency range setting, regardless of the size of the room. As always, refer to the standard for information about correction and result calculations.

Reverberation time

Reverberation time measurement data is undefined for the 20 to 40 Hz bands, which means L'n and L'nT will be identical in these bands and contain no correction for reverberation.

Spectrum adjustment term

$$C_{I,20-2500} = 10 log[\sum 10^{(L_{nT,i} + X_i)/10}] - L_{nT,w}$$

Where

- $L_{nT,i}$ = Standardized impact sound level in 1/3-octave band, i
- X_i = Correction term for $C_{I,20-2500}$ in 1/3-octave bands

Centre fre-quency	20	25	31.5	40	50 to 400	500	630	800	1000	1250	1600	2000	2500
X_i	−7	−9	−11	−13	−15	−14	−13	−12	−11	−10	−9	−8	−7

Serial measurements

Sound insulation tests normally measure all frequency bands of interest at the same time using a sound source which produces a broadband excitement. However, if you limit the frequency range of the noise to cover just a single frequency band while keeping the output power constant, you can enhance the signal-to-noise ratio of your measurements. A better signal-to-noise ratio allows you to measure high performance (well-insulated) partitions or in the presence of high background noise levels.

The Building Acoustics Partner mobile app can set up and control Smart Power Amplifier HBK 2755, including its ability to concentrate sound energy into a single frequency band. Serial measurements are a feature of sound insulation tests in which the mobile app controls HBK 2755.

See **Smart Power Amplifier HBK 2755** and **External devices** for more information about using the amplifier with Building Acoustics Partner.

Measurements in the mobile app

You may not know if you will need to make serial measurements before you start to measure. Luckily, the mobile app will check L2 – B2 as you measure. If L2 – B2 < 6 dB, the mobile app will prompt you to take action; either to set up serial measurements or to adjust the gain on the sound source. Sometimes an adjustment to the gain setting on the amplifier can increase the signal-to-noise ratio, which can correct the problem. However, if the gain setting on HBK 2755 is within 3 dB of maximum power, you will need to make serial measurements.

When you choose to set up serial measurements, the mobile app automatically enables serial measurements and selects the frequency bands to measure. You will be able to confirm or edit the selected bands before you continue.
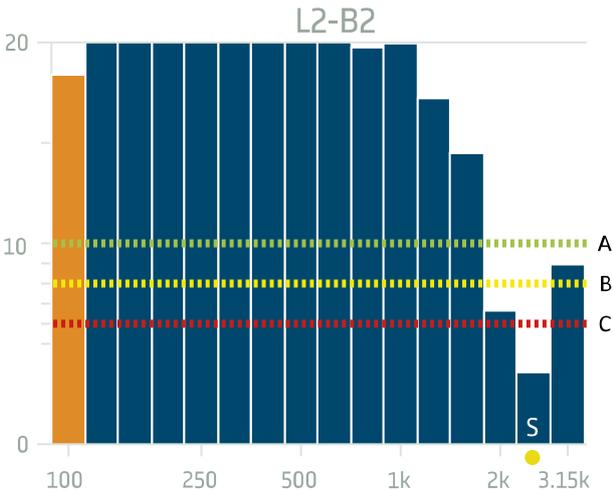
A indicates a green line which shows the 10 dB level.

B indicates a yellow line which shows the 8 dB level.

C indicates a red line which shows the 6 dB level.

The band with an 'S' indicates that the band has been selected to measure serially.

The image shows a magnified view of the mobile app interface for selecting frequency bands to measure serially. You can quickly see the selected band is below the 6 dB level, and it is the only band that has been selected. You can override the selections of the mobile app. Tap a single band to select or deselect it. Tap and drag to select or deselect multiple bands.

Once you resume measurements, the mobile app first measures all unselected frequency bands in parallel then measures the selected frequency bands in series. Afterwards, the app merges the serial measurements with the parallel measurement.

✎ **Note:**

- To ensure that the amplifier can achieve the desired boost, disable **Power compression compensation** (if enabled).

- You will need to measure the same bands serially at all positions, which means you will need to remeasure at the measured positions.

- As you measure, it is possible that you will find more frequency bands which will need to be measured serially. If you add a frequency band to the setup, you will need to remeasure at the measured positions.

When making and reviewing measurements, the frequency band is clearly indicated in the mobile app interface.

Measurements in the PC app

Frequency bands that were measured in series are marked with quality indicators.

Example setup for serial measurements

You can measure L1, L2 and T2 serially or in parallel. The setting is located in the Measurement control group of settings.

It is possible to enable serial measurements before you start to measure, using either the PC app or the mobile app. However, you can only use the mobile app to select the frequency bands to measure individually.

- For L1 and L2 measurements: **Measurement control L1 & L2** > **Level measurement mode** = *Serial*.

- For T2 measurements: **Measurement control T2** > **Measurement mode** = *Serial*.

- Select one or more frequency bands to measure.

  ✎ **Note:** You can only use the mobile app to select the frequency bands to measure individually.

Room background noise

The purpose of room background noise tests is to quantify background noise levels to determine if the levels are suitable for the purpose of the room. The frequency spectrum is measured and compared to noise curves to rate the background noise in a room. A common application of room background noise tests is to confirm background noise from HVAC (heating, ventilation, and air conditioning) systems complies with room acoustics design criteria.

Sound insulation tests and room background noise tests are often performed on the same building. Sometimes room background noise tests can be performed at the same time as sound insulation tests, but sometimes the tests are performed at different stages in the construction. For example, you might be able to test sound insulation when only a few sample rooms are ready, but you might wait to test room background noise until the HVAC system is balanced.

Method

Measurements

Sometimes only the loudest position is measured, other times a room average may be used (measure at multiple fixed points or along a traverse). Avoid measuring at the centre of the room or within 1 m of a wall.

Measurements are frequently made at the typical ear level for people in the room, that is seated or standing (in general, in the 1.2 to 1.8 m range).

Rating background noise

Typically, criteria curves (for example: NC, NR) and a procedure for rating measurement data relative to the criteria curves are used to rate the background noise in a room.

Reports

Precise location of measurement should be noted for reports.

Building Acoustics Partner apps

Use the mobile app to set up tests, make measurements and view measurement data and results. Use the PC app to create and view projects, analyse data, create reports and export data to other formats.

Mobile app

Building Acoustics Partner supports planned or unplanned room background noise tests. Projects can include room background noise tests as well as sound insulation tests. Measurement plans for the two types of tests are independent of one another. You can select the type of test to perform from the measurement screen.

Test settings: Use the Room background noise setup screen to edit the settings for your room background noise test: measurement plan, measurement control and calculation settings. See the individual topics in the **Configure project settings** section for more information.

Add rooms: Use the Rooms screen to add rooms to a project: create rooms, define their geometry and add background noise tests. See **Add rooms and partitions** for more information.

✏ **Note:** Room volume is not used in room background noise calculations. For rooms only used in room background noise tests, you do not need to enter the volume of the room. For rooms used in both sound insulation tests and room background noise tests, you need to enter the volume of the room.

Measurement screen: The procedure for making room background noise measurements is very similar to B2 measurements for sound insulation tests, but the measurement screen is slightly different. The measurement screen for room background noise tests shows two parameter readouts, the frequency spectrum with a noise curve overlay and LZeq for the band selected in the spectrum. Tap a parameter readout to change the parameter as you measure. See **Graphical displays** for more information.

Measurement overview: For each room, the overview screen shows the spectrum with noise curve overlay, the result parameter and classification, and the list of measurements. Measurements (positions) are nested below the room average. Select a measurement in the list to see its LZeq spectrum and noise curve. When no measurements are selected the graph shows the room average. As for sound insulation tests, you can include or exclude measurement positions in the average. See **Measurement overview** for more information.

PC app

Import projects stored on the instrument to the PC app. See **Import data to the PC app** for more information.

Project browser: Select the Background noise group or individual rooms within the group to view data and create reports.

The **Measurements** tab:

- The List view: Shows the frequency spectrum and time profile for the row selected in the table. The time profile also shows the running average and the table gives an overview of the measurements for each room. You can also use the time profile to add exclude markers. See **List view** for more information.

- The Result view: Shows the frequency spectrum for the row selected in the table with the result parameter over-laid. Use the drop-down menu to select the result parameter to view. The table gives an overview of the result and the room average, with individual positions nested beneath. See **Result view** for more information.

Report: Use the Report settings to customize your report and the Report preview tab to preview and generate the report. See **Generate a report** for more information.

External devices

In the mobile app, the External devices page allows you to manage connections to devices other than the instrument, specifically HBK 2755 Smart Power Amplifier. When the mobile app and amplifier are connected, the mobile app can control the amplifier during sound insulation tests.

How to connect the mobile app to an external device

1. Connect the mobile app to the instrument.

   If the instrument and the mobile device are not on the same network, the mobile app will connect using Bluetooth® and you will be prompted to connect devices to a common network (for instance, the instrument hotspot).

   ✎ **Note:** If you will be using a hotspot for the common network, it is recommended to use the instrument hotspot instead of the amplifier hotspot.

2. In the mobile app, navigate to the External devices page.

   The mobile app detects the external device (for example, HBK 2755) using Bluetooth.

3. Tap the external device to which you want to connect.

   The mobile app connects the external device to the same network to which the instrument and mobile device are connected.

The connection setting is stored in the Building Acoustics Partner project. This means if you restart the mobile app or the external device, the mobile app will automatically reconnect to the external device when the external device becomes available again.

Annotations

Annotations are comments you can attach to a measurement. There are four types of annotations: photo, video, note, and commentary. Every measurement can have multiple annotations of different types.

It is always a good idea to add annotations to your measurements. For example, they can help you and your colleagues identify measurements at a later date and provide valuable information about the context of a measurement.

Annotations in the mobile app

You can make annotations before, during and after measurements. Annotations made during a measurement upload to the instrument automatically and are stored with the measurement data to which they belong. Annotations made before and after measurements will be stored on the instrument as unattached annotations. Use the Annotations page in the mobile app to attach unattached annotations to a measurement.

Make annotations

1. From the measurement screen, tap ⬰.

2. Choose the kind of annotation you want to add:

    - 📷 : Photos
    - ◼◀ : Videos
    - ✎ : Notes
    - 🎤 : Commentary

3. Snap a photo, make a recording or write a note.

4. Repeat as needed.

✎ **Note:**

- Long press the photo or video button to attach photos and videos stored in the gallery of your mobile device.
- To delete an annotation: Go to **Annotations**, swipe left on the unwanted annotation and tap **Delete**.

The annotations page

The Annotations page in the mobile app gives you an overview of all annotations attached to a project. It also lists annotations that are not attached to a project.

To attach an annotation to a measurement:

1. Start a measurement, or open a past measurement.
2. Navigate to the Annotations page.
3. Tap **Attach** at the desired annotations (or tap ⬰ if you want to create more annotations).

Annotations on simultaneous measurements

Any annotations you make while measuring L1 and L2 simultaneously are attached to the L1 measurements and stored on the primary instrument. See **Multiple instruments** for more information about using multiple sound level meters.

Annotations in the PC app

Attached annotations

Use the Annotations window (in the panel on the right) to view and edit attached annotations.

1. Select a single room or partition, or a group of rooms or partitions in the project browser.

2. In the Annotations window:

    ⊡: View photos and videos. The context-sensitive menu has options to cut, copy, paste and delete.

    ♪)): Listen to voice memos. The context-sensitive menu has options to cut, copy, paste and delete.

    ✎: Read notes. Click on a note to edit the text. The context-sensitive menu has options to cut, copy, paste and delete.

Each annotation is marked with the measurement to which it is attached.

To remove an annotation:

- Drag and drop, or use the context-sensitive menu to cut and paste, the annotation in the Unattached annotations window.

- Use the context-sensitive menu to delete the annotation from the project.

Unattached annotations

Use the Unattached annotations window (in the panel on the left) to view and edit unattached annotations.

To attach an annotation:

1. Select a room or partition in the project browser.

2. Drag and drop, or use the context-sensitive menu to cut and paste, the annotation in the Annotations window.

    By default, the annotation attaches to the first measurement of the room or partition.

Use files stored on your PC

To add annotation files stored on your PC, drag and drop items from Windows Explorer into the application interface. You can add photo, video, text and audio files.

- To add a file as an unattached annotation, drop the file in the Unattached annotations window.

- To add a file as an attached annotation, drop the file on a room or partition in the project browser or select an item in the project browser then drop the file in the Annotations window.

Application menu

The application menu in the PC application gives you access to select project tools, as well as options for and information about the application.

Open the application menu

Click on the Building Acoustics Partner tab in the upper left corner to open the application menu. Click the tab again to close the menu.

Project tools

Access tools to create a new project, open a project or save a project, and learn their keyboard shortcuts.

💡 **Hint:** Open a project from the application menu to choose from a list of recent projects.

Application options

The Options tab opens settings specific to the application.

Language

Use the drop-down menu to set the language of the user interface.

Decimal places

As on the instrument, you can choose to display one decimal place or two for level measurements.

Standard deviation

Enable the setting to show standard deviation data in tables. Standard deviation (Std.Dev.) rows will be added to the applicable tables.

Imperial units

Room and partition geometries can be in either SI (metric) or US/UK (US customary units or imperial units). Enable the setting to use imperial units.

Uncertainty

Measurement situations

- Situation A : Reproducibility conditions

  Measurements at different locations performed by different people with different equipment on the same (or similar) building elements.

  Standard uncertainty = reproducibility standard deviation (σ_R)

- Situation B: In-situ conditions

  Measurements at the same location performed by different people with different equipment on the same building elements.

  Standard uncertainty = in-situ standard deviation (σ_{situ})

- Situation C: Repeatability conditions

  Measurements at the same location performed by the same people with the same equipment on the same building elements.

  Standard uncertainty = repeatability standard deviation (σ_r)

Coverage factor

Expanded uncertainty, U, is calculated by $U = ku$, where k is the coverage factor and u is the standard deviation.

Coverage factor, k	Confidence level, %	
	Two-sided test	One-sided test
1.00	68	84
1.28	80	90
1.65	90	95
1.96	95	97.5
2.58	99	99.5
3.29	99.9	99.95

Connecting to an instrument

If it is not possible to connect to instruments remotely via HTTPS, enable the setting to connect via HTTP. HTTP does not have the certificate requirements of HTTPS, which can cause problems with security features like firewalls. See **Remote connections** for more information about connecting to an instrument remotely.

About the application

The About section is where you will find open source licences, the EULA (end user licence agreement), release notes and version numbers.

Open a project

Use the Open dialog to open projects that have been saved to a location on your PC or your local area network (LAN). You can open a project using the 🗁 button in the toolbar or from the application menu.

Export data

The Export dialog allows you to export data and annotations. Export data to use it in other applications or to perform your own calculations. You can export data to a Microsoft® Excel® workbook or a text file.

How to export a project

1. In the project browser, highlight the measurements you want to export.
2. Click ⬆.
3. Specify the name and location of the export file in the **Destination file** field.

4. Choose the format into which you want to export the measurement data:

   - *Excel Workbook (*.xlsx)*

     File extension *.xlsx is compatible with Microsoft Excel 2007 and newer.

   - *Tab separated values (*.txt)*

5. If you are exporting to a workbook, you have the option to use a master file.

   When you export a measurement to a workbook, master files tell the PC application what to do with the data. You can create custom master files.

6. If you are exporting to a workbook, the export method sets how the data is written to the workbook.

   - *Auto*: The application chooses the best option; this is the default setting.
   - *Open XML (DOM)*: A memory-based method for writing to a workbook, which can tie up processing resources.

     ✎ **Note:** The DOM method cannot be used for big exports.

   - *Open XML (xmlWriter)*: A sequentially-based method for writing to a workbook, which can be time-consuming for large quantities of data.
   - *COM Interop (requires Excel)*: A faster method than the xmlWriter method, if it works. Issues with Microsoft Office installations (this method requires Microsoft Exel to be installed on your PC) and security settings can prevent this method from working.

7. Enable or disable:

   - **Launch Excel after export**: When exporting to an .xlsx file, open the exported Excel file.
   - **Open in file explorer**: When exporting to a .txt file, open the location of the exported file in the file explorer.
   - **Use invariant export language**: Export parameters in a consistent language.

     It is recommended that you enable this setting if a program (or macro) is going to interpret the parameters. This setting will output parameters in English and the names of the parameters will be kept over time from version to version of the program. This is not guaranteed for other languages, where the parameter names might change over time.

   - **Setup**: Create an .xml file that includes the settings for the export.
   - **Export annotation files**: Include annotations in the export. Photographs export as .jpg files, notes as .txt files, and commentary and video as .mp3 files.
   - **Export each partition in a separate document**: When exporting data for multiple partitions, create a separate file for each partition.
   - **Result**, **L1**, **L2**, **B2**: Include the results and level measurement data in the export.
   - **Spectra**, **Decay**: Include reverberation time measurement data in the export.

8. Click **OK**.

About master files

When you export a measurement to a workbook, master files tell the PC application what to do with the data. You can create custom master files.

How to create master files

You can create your own (custom) Microsoft Excel files that define the data you wish to export. This can be used to filter your measurement data in the exported file, to perform custom calculations or to create graphs automatically.

1. In the Export dialog, set a destination and use the following settings:

    - **Export formats**: *Excel Workbook*

    - **Master file**: *None*

    - **Launch Excel after export**

2. Click **OK**.

3. In the Excel file:

    a. Delete the unwanted data columns (data columns correspond to measurement parameters).

    b. Arrange the columns as desired.

    c. Add sheets for calculations and graphs, for example.

    d. Select all rows with contents, except for the first row (the header row).

    e. Right-click and select **Clear Contents**.

4. Use the Save as... option to name and save your new master file.

How to create a report master file

Master files can also contain calculations and graphics for reporting.

1. Export data using EmptyMaster or a custom master file.

2. In the Excel file:

    a. Add one or more sheets containing calculated data, tables and graphs.

    b. Create links between the report sheets and the data sheets.

    c. Use the Clear Contents option from the Edit menu to remove data but preserve the links to the empty cells.

3. Use the Save as... option to name your new report master file and save it to the same location as the other master files.

✎ **Note:**

- To export to a master file, set the Master file field in the Export dialog to your master file.

- When you export to your master file, it will contain only the sheets and parameters included in that master file.

- Master files work best when exporting measurement data that is similar. The reason is because parameters must be in both the data set and the master file to be included in the exported file. Luckily, you can create multiple master files for use with different types of measurement data.

Tasks

At the bottom of the panel on the left, is the Tasks window. Use the window to monitor the export progress.

Import from Measurement Partner Suite

You can import measurements made using Type 2250 or 2270 into the Building Acoustics Partner PC app by exporting the data from Measurement Partner Suite (MPS).

1. Decide where you want the data to go:

   - To an existing project: Open the Building Acoustics Partner project before you export from MPS.
   - To a new project: You do not need to start the Building Acoustics Partner PC application before you export.

2. Open MPS.

3. Select the data you would like to import in the project browser of MPS.

4. Click ↑.

5. Select the **Export to Building Acoustics Partner** option.

   ✎ **Note:** The option is only enabled if the application supports the selected data.

6. Click **Finish**.

The PC application will open (if it is not open already) and automatically import the data.

If the imported data cannot be grouped within a single project, for example tests that use different standards, Building Acoustics Partner will automatically sort the data and open each group in a separate instance of the application.

💡 **Hint:** The Tasks window in MPS provides useful information about the export, including what was exported, what was not exported and why.

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ABOUT THE INSTRUMENT

Hardware interface

The **microphone** and **preamplifier** are at the top of the instrument.

HBK 2255 has a removable microphone preamplifier and supports TEDS (transducer electronic data sheet).

⊜ is the **power/menu/reboot** button.

Press and hold the button to power the instrument on or off. When the instrument is on, press the button briefly to open the menu. If the instrument becomes unresponsive, press and hold the button for approximately 40 seconds (remove cables first).

Press ▲ and ▼ briefly to scroll through measurement displays.

Press ◄ and ► briefly to scroll through the parameters for each display.

■ is the **stop/reset** button.

Press the button once to stop a measurement. At this point, averaged measurement parameters will stop updating and you can review the results. Press the button again to clear the results and reset the instrument for the next measurement. Data is saved automatically.

◉ is the **start/pause** button.

Press the button once to start a measurement, press it again to pause the measurement, press it a third time to resume the measurement.

The **screen** displays sound levels and the menu.

The **light ring** is colour-coded to reflect the status of the instrument.

The light ring is solid **green** while measuring.

The light ring flashes **yellow** slowly while idle or quickly while paused (measuring).

The light ring flashes **red** quickly for intermittent overloads.

The light ring is solid **purple** for latched overloads.

The light ring flashes **white** slowly when switched off and charging the battery.

The light ring flashes **blue** while pairing a mobile device with the instrument.

On the base of the instrument is a **threaded hole** for mounting the instrument on a tripod and a **USB-C™ socket**. Use the USB socket as a connector or as signal output.
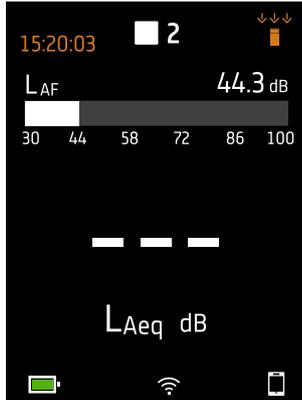
Instrument GUI

This is an example of the instrument graphical user interface (GUI) in dark colour scheme while measuring and connected to the mobile app.

💡 **Hint:** You can view the GUI in a web browser via the instrument's IP address. See **Web server display** for more information.
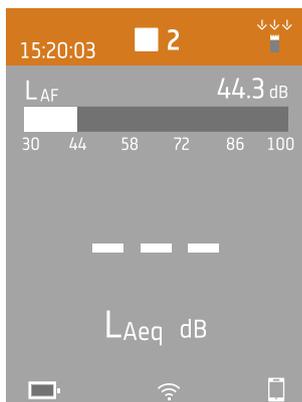
The top region shows measurement information and instrument status.

When idle, the instrument displays the current time (to the left) and input settings (to the right).

⚠ : Indicates that the clock is estimated to be more than 2 s wrong.

: Indicates that Sound field is set to Free-field and there is not a windscreen.

: Indicates that Sound field is set to Free-field and there is a windscreen.

: Indicates that Sound field is set to Diffuse-field and there is not a windscreen.

: Indicates that Sound field is set to Diffuse-field and there is a windscreen.

During a measurement, the instrument displays the start time (to the left) and the elapsed time (to the right).
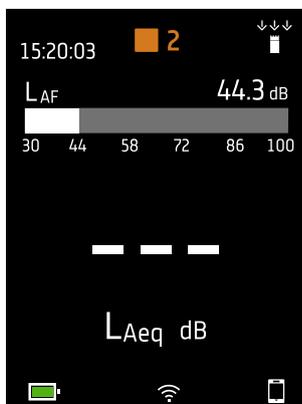
The number in the centre is the measurement number. The first measurement of every day is number 1. The number increments with each new measurement.

The background colour of the top region and the centre symbol change to indicate the state of the instrument.

: Indicates that the instrument is ready to measure.

◉ : Indicates that the instrument is measuring.

❚❚ : Indicates that the instrument is paused.

: Indicates that the instrument is stopped and displaying results from the measurement.

In the middle is the measurement display. There are views for broadband parameters (SLM view and List view), spectrum parameters (Spectrum view), reverberation time measurements (Reverberation time view) and a view for information about your data (About data view).

Press ▲ and ▼ briefly to scroll through measurement displays. Press ◄ and ► briefly to scroll through the parameters for each display.
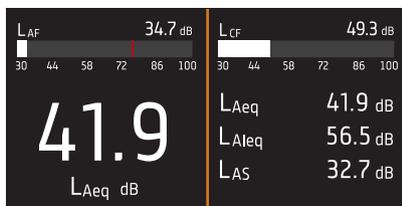
SLM view (left) and **List view** (right) are the main displays for single measurements. SLM view shows a bar graph and one broadband parameter. List view shows a bar graph and a list of broadband parameters.
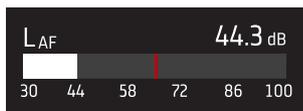
The bar graph shows the instantaneous sound level (L) with frequency and time weightings. This display is sometimes called the fast bar or fast display.

| : Indicates the maximum instantaneous sound level during a measurement.

✎ **Note:** The bar graphs in SLM view and List view are unique, that is they can each be set to show a different parameter.

- Go to **Menu** > **Display settings** > **SLM view** > **Graph parameter** to set the parameter for the bar graph when displaying one broadband parameter.
- Go to **Menu** > **Display settings** > **List view** > **Graph parameter** to set the parameter for the bar graph when displaying a list of broadband parameters.
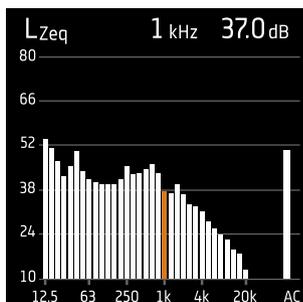
Spectrum view displays the frequency analysis of spectrum parameters, shown as decibel (dB) levels by Hertz (Hz).

Press and hold ◄ or ► to move the cursor in the display. The readout above the graph shows the location of the cursor and its decibel level. Press and hold ▲ to auto-scale the Y-axis to fit the data.

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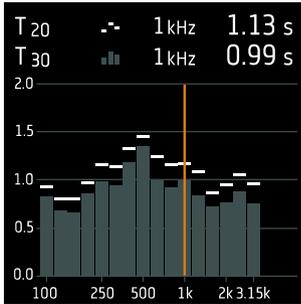
Reverberation time view displays the reverberation time measurement.

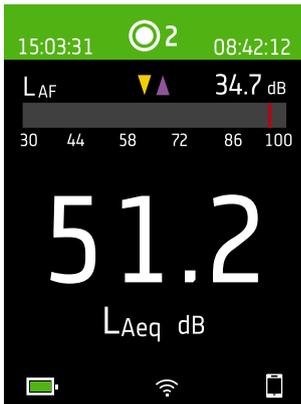Press and hold ◀ or ▶ to move the cursor in the display. The readout above the graph shows the location of the cursor and its decibel level. Press and hold ▲ to auto-scale the Y-axis to fit the data.

For very low or very high sound levels, you will see indicators.

▼ : Indicates a signal that is under the measurement range.

Overload occurs when the signal is over the measurement range. There are two types of overload indicators: latched and instantaneous. The latched-overload indicator is triggered at the first instance of overload and persists until the instrument is reset. The instantaneous-overload indicator is triggered every time the signal is over the measurement range.

▲ : Indicates instantaneous overload.

▲ : Indicates latched overload.

The bottom region provides information about the system: battery, network, and connectivity status.

The battery icons show the status of the battery. For example, 🔋 (charging) or 🔋 (full).

The network icons show the current network settings and its status. For example, 📶 (connected to a wireless network), 📡 (acting as a hotspot), 🖧 (Ethernet connection) or ✈ (aeroplane mode).

The connectivity icons show you to which application the instrument is connected: ▯ (mobile) or 🖥 (PC).

↥ indicates that a backup is in progress.

The menu
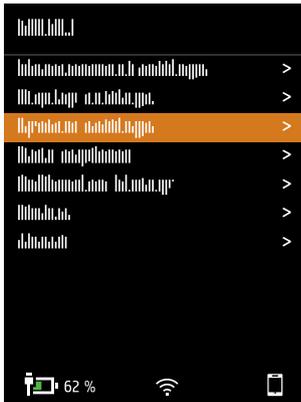
Use the buttons on the instrument to interact with the menu.

(≡) : Open / close the menu; open a response dialog; confirm a setting in a response dialog; enable / disable parameter selection boxes.

▲ : Navigate up a list; increment a value in a response dialog.

▼ : Navigate down a list; decrement a value in a response dialog.

◄ : Navigate down a level in the menu; exit a response dialog (without confirming a setting).

► : Navigate up a level in the menu; enter a response dialog.

Web server display

You can display the instrument GUI in a web browser.

You will need:

- Your instrument
- A computer or mobile device with Wi-Fi® and a web browser installed

Procedure:

1. Go to: **System settings** > **Network settings** > **Web server display**.
2. Select **Enabled**.
3. Network your devices.

    This is one way to network your devices:

    a. On the instrument, go to: **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**.
    b. Select **Act as hotspot**.
    c. Make note of the hotspot name (example: BK2255-000000) and password.
    d. Connect your device to the hotspot as per the manufacturer's instructions.
4. On your mobile device or computer, open a web browser.
5. Type <*IP address*/**display**> in the address bar of the browser.

    When acting as a hotspot, the IP address of the instrument is 10.42.0.1, so you will type <**10.42.0.1/display**>.

✎ **Note:** You can find the instrument's IP address here: **System settings** > **Network settings**. Look under Wi-Fi settings or Ethernet settings depending on your connection.

Charge the battery

The instrument has an internal Lithium-ion rechargeable battery.

Procedure

1. Connect the instrument to a power source.

   indicates that the battery is charging with a readout of the percentage charged.

2. Disconnect the power source to stop charging.

Approved power sources

- Mains
- Base station (the base station is powered via mains)
- Computer
- Power bank

Status

Go to **Menu** > **Status** to see the status of the battery.

- **Status**: Either *Full*, *Charging*, or *Discharging*
- **Time remaining**: The approximate time left on the charge
- **Charged**: The percentage to which the battery is currently charged

Power consumption

Settings for the screen and wireless configuration can have a noticeable effect on the instrument's power consumption. The type of measurement you perform will not have a large effect on battery consumption.

To manage power consumption, you can modify these settings:

- **System settings** > **Power management**
- **System settings** > **Network settings** > **Wi-Fi settings** > **Wi-Fi mode**
- **Display settings** > **Screen brightness**
- **System settings** > **Network settings** > **Web server display**

Battery calibration

To improve the accuracy of battery readings, it is recommended to calibrate the battery regularly.

1. Press briefly to open the menu.
2. Go to: **System settings** > **Advanced settings** > **Service mode**.
3. Select **Enabled**.
4. Go to: **Calibrate battery**.

Follow the prompts to calibrate your battery.

Fix an unresponsive instrument

If your instrument freezes, try rebooting the instrument.

1. Remove all external connections, including the charger.

2. Press and hold ⏻ until the instrument reboots.

   This should take approximately 40 seconds.

Input settings

Input settings ensure that you are collecting accurate data. The instrument optimizes the frequency response based on the selected microphone and makes corrections based on the selected sound field and windscreen.

Menu location: **Measurement settings** > **Input**

Microphone

The Microphone setting tells the instrument which microphone is attached. The microphones in the microphone database populate the options for the Microphone setting. See **Microphone database** for more information about the database.

HBK 2255 is designed to be used with different combinations of microphone cartridges and microphone preamplifiers, which enables the instrument to perform a variety of applications. HBK 2255 uses TEDS (transducer electronic data sheet) to set the attached microphone cartridge/preamplifier pair automatically. If you change the microphone cartridge/preamplifier pair, the instrument will change the Microphone setting according to the TEDS information of the new pair. See **TEDS, Microphones and HBK 2255** for more information about TEDS, supported microphone cartridges and preamplifiers, and how it works with HBK 2255.

✏ **Note:** If you are using a single microphone preamplifier with multiple microphone cartridges, check that the Microphone setting is correct. By default, the instrument selects the first microphone cartridge/preamplifier pair with the correct preamplifier for the Microphone setting.

Sound field

It is important that the instrument knows the type of sound field in which you are measuring so it can apply the appropriate correction to your measurements. These corrections will enhance the overall frequency response of the system regardless of whether or not the microphone you are using is designed for the sound field in which you are measuring.

- Choose **Free-field** if you are in an environment with no (or very few) objects or surfaces that will reflect sound. Free-field sounds generally come from the sound source.
- Choose **Diffuse-field** if you are in an environment with a lot of objects or surfaces that reflect sound. Diffuse-field sounds come randomly from all angles (random incidence) due to reflection off surfaces within the environment.

✏ **Note:** Generally, ISO requires free-field conditions and ANSI requires diffuse-field conditions. Be sure to check your local standards for the setting you require.

Windscreen

Windscreens are used to reduce the amount of wind-induced noise in measurements. Therefore, windscreens are generally used for outdoor measurements, but they can be used any time you want to protect measurements from unwanted noise caused by air movement.

Windscreen detect is the setting that enables or disables automatic detection of Windscreen UA-1650.

- *Enabled*: The instrument detects the windscreen and applies the appropriate correction.
- *Disabled*: Specify the windscreen manually under **Windscreen type**.

Frequency range

HBK 2255 has a few options for extending the lower limit of the frequency range of your measurements. The options available will vary according to the licences installed and enabled on your instrument.

	Normal	Extended	Very low
1/3-octave	12.5 Hz to 20 kHz	6.3 Hz to 20 kHz	0.8 Hz to 20 kHz
1/1-octave	16 Hz to 16 kHz	8 Hz to 16 kHz	1 Hz to 16 kHz

✎ **Note:** The usable lower frequency will be limited by the specifications of the attached microphone.

TEDS, Microphones and HBK 2255

TEDS

HBK 2255 uses TEDS (transducer electronic data sheet) to detect the attached microphone (microphone cartridge/preamplifier pair), add new microphones to the microphone database and set the attached microphone as the input. If the TEDS information changes (that is, if you change the microphone), the instrument changes its configuration accordingly. The instrument performs all of these tasks automatically, which makes it very easy to change microphones on HBK 2255.

TEDS scenarios

For preamplifiers with a built-in TEDS chip, the chip contains information about the microphone preamplifier, and in some cases, the microphone cartridge as well. The instrument supports three TEDS scenarios using three different templates. The templates are standardized in compliance with IEEE 1454.4.

- **Microphone preamplifier**: TEDS describes the preamplifier (serial number and some characteristics).
- **Microphone with integrated preamplifier**: TEDS describes the microphone preamplifier and microphone cartridge as one unit, with one serial number and one sensitivity.
- **Combined microphone cartridge and preamplifier**: TEDS describes a microphone preamplifier with one serial number and a microphone cartridge with another serial number, but a single sensitivity (the sensitivity of the system).

The information the instrument enters in the microphone database depends on the TEDS scenario of the attached microphone (microphone cartridge/preamplifier pair). See **Microphone database** for more information about the database.

Microphones supported by HBK 2255

Below is a list of all Brüel & Kjær microphone cartridges, microphone preamplifiers, and microphone cartridge/preamplifier combinations which can be used with HBK 2255.

Microphone preamplifiers	• 1/2-inch Microphone Preamplifier Type 2669 • 1/4-inch Microphone Preamplifier Type 2670 • 1/2-inch Microphone Preamplifier ZC-0043 (with 1/2-inch to 1/4-inch adapter for use with 1/4-inch Microphone Types 4954 and 4944)
Microphone with integrated preamplifier	• Outdoor Microphone Type 4952 (integrated preamplifier)
Combined microphone cartridge and preamplifier	Standard combinations for HBK 2255 using Preamplifier ZC-0043: • Type 4966-Z-041: 1/2-inch Microphone Cartridge Type 4966 + ZC-0043 • Type 4964-Z-041: 1/2-inch Microphone Cartridge Type 4964 + ZC-0043 • Type 4954-Z-047: 1/4-inch Microphone Cartridge Type 4954 + Adapter UA-0056 + ZC-0043 • Type 4944-Z-047: 1/4-inch Microphone Cartridge Type 4944 + Adapter UA-0056 + ZC-0043 ✎ **Note:** The microphone cartridge, preamplifier and adapter (if used) are sealed with tape. Calibration is void if the seal is broken.

Microphone cartridges
 	
Microphone cartridges do not have built-in TEDS. Microphone cartridges may be used with one of the supported (known) preamplifiers or an unknown preamplifier.
	Microphone cartridges treated as known:
	
	    • 1/2-inch Microphone Cartridge Type 4966
	
	    • 1/2-inch Microphone Cartridge Type 4964
	
	    • 1/4-inch Microphone Cartridge Type 4954
	
	    • 1/4-inch Microphone Cartridge Type 4944
	
	Microphone cartridges treated as unknown:
	
	    • 1/2-inch Microphone Cartridge Type 4188
	
	    • 1/2-inch Microphone Cartridge Type 4189
	
	    • 1/2-inch Microphone Cartridge Type 4942
	
	    • Outdoor Microphone Type 4198 (includes Preamplifier Type 2669-C)

Microphone usage scenarios

Using a standard combination

Standard microphone combinations are set up for use with the instrument prior to delivery. When you detach and reattach the combination, the instrument reads the TEDS information and recognizes the attached microphone as a microphone in the microphone database. The instrument sets the attached microphone as the input, and you are ready to measure.

Using Type 4952

The instrument comes with a standard microphone. In addition, you purchase Type 4952 for use with the instrument. The first time you attach Type 4952 to the instrument, the instrument reads the TEDS information but does not recognize the attached microphone because it is not in the microphone database. The instrument adds a new microphone to the database using TEDS. The instrument sets the attached microphone as the input, and you are ready to measure.

Using a new preamplifier with TEDS

You attach a microphone preamplifier that has not been connected to the instrument before. The instrument reads the TEDS information in the preamplifier and adds a new microphone cartridge/preamplifier pair to the microphone database. The new microphone consists of an unknown microphone cartridge with serial number 0 together with the preamplifier and its serial number. You can manually edit the microphone cartridge in the database as needed. See **Microphone database** for more information about editing the database.

Using one microphone preamplifier with multiple cartridges

Each microphone cartridge/preamplifier pair must be set up in the microphone database. When you attach a microphone to the instrument, the preamplifier will be recognized in more than one microphone cartridge/preamplifier pair. By default, the instrument selects the first microphone cartridge/preamplifier pair with the correct preamplifier for the Microphone setting. You will need to manually change the Microphone setting if the default selection is not correct.

Microphone database

The microphone database populates the list of options in the dialog box of the Microphone setting. Initially, the database only contains the microphone supplied with the instrument.

You can only access the microphone database on the instrument: **Menu** > **System settings** > **Advanced settings**.

HBK 2255 has a detachable microphone preamplifier. The instrument can be used with different combinations of microphone cartridges and microphone preamplifiers. The instrument uses TEDS to detect the attached microphone and add new microphones to the microphone database. The microphone database stores the type and serial number, sensitivity and sound field for each microphone cartridge along with the type and serial number of its associated microphone preamplifier to create a microphone cartridge/preamplifier pair. If TEDS only contains information about the microphone preamplifier, you can edit the information about the microphone cartridge in the microphone database. If TEDS contains information about the microphone cartridge/preamplifier pair, it is not possible to edit information about the microphone cartridge or preamplifier in the microphone database.

For more information about TEDS and HBK 2255, see **TEDS, Microphones and HBK 2255**.

Known vs unknown microphones

Known microphone cartridges and preamplifiers are microphone cartridges and preamplifiers that the instrument recognizes.

HBK 2255 recognizes all microphone cartridges and preamplifiers listed in the table below.

Standard microphone combinations for HBK 2255	• Type 4966-Z-041: 1/2-inch Microphone Cartridge Type 4966 + Preamplifier ZC-0043 • Type 4964-Z-041: 1/2-inch Microphone Cartridge Type 4964 + Preamplifier ZC-0043 • Type 4954-Z-047: 1/4-inch Microphone Cartridge Type 4954 + Adapter UA-0056 + Preamplifier ZC-0043 • Type 4944-Z-047: 1/4-inch Microphone Cartridge Type 4944 + Adapter UA-0056 + Preamplifier ZC-0043
Microphone (with integrated preamplifier)	• Outdoor Microphone Type 4952
Microphone preamplifiers	• 1/2-inch Microphone Preamplifier Type 2669 • 1/4-inch Microphone Preamplifier Type 2670 • 1/2-inch Microphone Preamplifier ZC-0043 (with 1/2-inch to 1/4-inch adapter for use with 1/4-inch Microphone Types 4954 and 4944)

All microphone cartridges and preamplifiers that the instrument does not recognise are unknown.

While it is possible to use unknown microphones with the instrument, known microphones enhance the functionality of the instrument. For example, the instrument will not apply any filter corrections for unknown microphones.

How to edit the microphone database

1. Press 🔘 briefly to open the menu.

2. Go to: **System settings** > **Advanced settings**.

3. Enable **Service mode**.

4. Go to: **Microphones**.

5. Select a microphone in the list and choose an action:

   - *Edit*: Opens the microphone in the database so you can make changes to its type, serial number, sensitivity and sound field.
   - *Delete*: Deletes the microphone from the database.
   - *Create new*: Creates a copy of the selected microphone which you can edit as needed.
   - *Select*: Sets the microphone as the microphone attached to the instrument.

✏ **Note:**

- You cannot delete the microphone that the instrument is currently set to use.

- For HBK 2255, the ability to edit or delete microphones in the database depends on the TEDS scenario which applies to the attached microphone/preamplifier pair. If TEDS only contains information about the microphone preamplifier, it is possible to edit information about the microphone cartridge and/or delete the microphone. If TEDS contains information about the microphone cartridge/preamplifier pair, it is not possible to edit or delete the microphone. See **TEDS, Microphones and HBK 2255** for more information about TEDS scenarios.

Audio recording

Audio recordings allow you to listen to a measurement while you analyse it. For example, you may want to investigate the cause of a sudden change in levels or to identify sounds during a measurement.

Menu location: **Measurement settings** > **Audio recording**

Recording quality

HBK 2255 can record listen-quality audio while measuring.

If the BZ-7451 licence is installed and enabled on HBK 2255, the instrument can record analysis-quality audio while measuring. The sound signal is recorded as 24 bit samples at 65536 Hz.

Listen quality

The instrument records audio in a format suitable for listening but not for analysis, using MP3 compression. MP3 recordings are compressed to 48 kbps, approximately 3% of the original signal size.

Analysis quality

The instrument records audio in a format suitable for analysis. The raw time signal is compressed using the FLAC (free lossless audio codec) format, which retains all of the information in the raw time signal while reducing file size.

The size of FLAC recordings depends on the signal. Low-level signals are typically compressed down to approximately 15% of the original signal size, while high-level signals are typically compressed to approximately 60% of the original signal size.

Audio recording settings

	HBK 2255
Disabled	Do not record audio.
Continuous	Record audio for the duration of each measurement.

Audio recordings in the apps

See [Listening to audio](#) for information about listening to audio on your mobile device and in the PC application.

You cannot listen to audio recordings on the instrument.

Display settings

Display settings control how the instrument screen looks (brightness, colour scheme), the brightness of the light ring, and the data that is displayed.

Go to: **Display settings**.

Screen brightness

Screen brightness controls how bright the screen on the instrument is. You can choose from six levels of brightness.

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Light ring brightness

Light ring brightness controls the brightness of the light ring on the instrument. Choose from four settings: *Off*, *Low*, *Normal* or *High*.

Colour scheme

This setting controls the colour of the screen and text.

- *Light* is a light background with dark text.
- *Dark* is a dark background with light text.

Display views

SLM view

Set up the instantaneous display (bar graph) and the readout for one broadband parameter (single measurement).

The SLM view displays the readout of a single broadband parameter level in a large font so it is easy to see. Use the display when you only want to view a single parameter.

Spectrum view

Set up the display of frequency analysis spectra.

Reverberation time view

Set up the display of reverberation time measurements.

About data view

Display information about the instrument and the data.

Display view settings

The following list contains information about the settings for the different views.

- **Graph parameter** (SLM view)

  The Graph parameter setting defines the parameter for the bar graph; that is, the instantaneous (or fast) display of instantaneous sound levels.

- **Parameter** (Spectrum view)

  The Parameter setting defines the parameter for the spectrum display; that is, the display of the sound level for each frequency band.

  HBK 2255 can display two parameters.

- **Parameter 1**, **2** (Reverberation time view)

  The Parameter settings define the parameters for the reverberation time display. The instrument can show up to two parameters. Choose between EDT, T20, T30 and None.

  The instrument determines reverberation time using three methods: EDT, T20 and T30. EDT (early time decay) is used in room acoustics only, while T20 and T30 may be used for building acoustics, sound power and absorption coefficient measurements as well.

- **Graph max** (Reverberation time view)

  The Graph max setting defines the range on the Y-axis of the reverberation time display.

- **Graph max level**, **Graph min level** (SLM view, Spectrum view)

  Together, the Graph max level and Graph min level settings define the range (maximum and minimum levels) for the bar graph in dB.

  The range that you define should match the dynamics of the signal you are measuring. In other words, it should include all the sound levels that are present.

- **Lower display limit**, **Higher display limit** (HBK 2255: Spectrum view)

  Together, the Lower display limit and Higher display limit settings define the display range on the X-axis. This allows you to exclude frequencies from the spectrum view which are not of interest.

- **Parameter** (SLM view)

  The Parameter setting defines the parameter to display in the area below the bar graph.

- **Display**

  The Display setting allows you to enable or disable each type of display.

About data view

About data view displays information about the instrument with which you are measuring. It can also include the location of the instrument (latitude and longitude) using GPS (global positioning system).

To enable latitude and longitude coordinates in About data view:

1. Enable Service mode on the instrument.

   a. Press ⊜ briefly to open the menu.

   b. Go to: **System settings** > **Advanced settings** > **Service mode**.

   c. Select **Enabled**.

2. Using the instrument or the mobile app, go to: **System settings** > **Advanced settings** > **GPS location**.

3. Select **Enabled**.

✎ **Note:** To use the mobile app to enable latitude and longitude coordinates in About data view, Service mode must be enabled on the instrument. You cannot use the mobile app to enable Service mode.

Regional settings

The Regional settings group controls settings that often vary by your geographical location: language, date, time, numerical formats and measurement units.

Menu location: **System settings** > **Regional settings**.

Language

Choose the language of the user interface of the instrument.

✎ **Note:**

- If the mobile app and the instrument are not set to display the same language, text in the graphical user interface (GUI) of the mobile app will be in two languages.
- Access the settings on your mobile device to set your language preference for the device, or to set your language preference for the app.

Time zone

Set the time zone in which you are measuring.

✎ **Note:** It is very important that the instrument, mobile device and PC are all set to the same time zone. Otherwise, you may not be able to import measurements from the instrument to the PC application.

Date format

Choose the order of day, month, year (in numerical format).

Time format

Display time as a 24- or 12-hour clock.

Date separator

Choose the symbol that separates the day, month and year.

Decimal point and places

Choose the decimal separator: decimal comma or decimal point.

Choose the number of decimal places to display: *1* or *2*.

Measurement units: Wind speed, temperature and dimensions

HBK 2255 works with weather station kits MM-0316-A and MM-0256-A, which are based on Vaisala weather stations.

The measurement unit settings allow you to choose your preferred measurement unit for wind speed, temperature and dimensions.

- SI = metric system
- US/UK = imperial system

✎ **Note:** Wind speed and temperature data requires a weather station. See **External devices** for more information.

Power management

Use the Power management settings to switch off the screen or instrument after periods of inactivity. These settings can be helpful if you want to maximise battery life for long, unattended measurements.

Menu location: **System settings** > **Power management**.

Switch screen off after

Use this setting to switch off the screen on the instrument automatically after a period of inactivity (that is, when you are not pushing its buttons). The instrument will stay on and continue to measure even if the screen is off.

- *Never*: The screen will not switch off.

- *2, 5 or 10 minutes*: After 2, 5 or 10 minutes, the screen switches off.

Shut down after

Use this setting to shut down the instrument automatically after a period of inactivity (that is, when you are not pushing its buttons).

- *Never*: The instrument will not turn off.

- *2, 5 or 10 minutes*: After 2, 5 or 10 minutes, the instrument turns off.

✎ **Note:** If the instrument is measuring, it will not shut off. If the instrument is charging, it will shut off.

Data management

Data management settings include settings for storing a backup and for data retention.

Go to: **System settings** > **Data management**.

Backup settings

You can set up your instrument to store backups of your data to a USB stick or network storage (either a network attached storage (NAS) device or a shared folder). Data transfers automatically when the storage device is available. An icon on the instrument indicates the status of the backup.

Store a backup on network storage

You will need:

- Network storage
- Your instrument

✎ **Note:** If you are using NAS, you will need to set it up according to the manufacturer's instructions first.

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Procedure:

1. Go to: **Backup settings** > **Backup**.
2. Select **Disabled**.
3. Enter the host name or IP address of the device or network (so the instrument can find it).
4. Enter the user name and password (so the instrument can access the device or network).
5. Specify the path (so the instrument knows where to upload the data).
6. Specify the domain if the network belongs to a domain.
7. Set **Backup** to *Network storage*.

Store a backup on a USB stick

You will need:

- A USB-C™ (or USB-A with an adaptor) memory stick with at least 16 GByte formatted as FAT32 or exFAT
- Your instrument

Procedure:

1. Go to: **Backup settings** > **Backup**.
2. Select **USB stick**.
3. Connect the USB stick. The transfer will start automatically.

Data retention

Data retention is set to *Manual* by default. This means that you will need to manually move data to Trash.

To set the instrument to remove data automatically:

1. Set **Data retention** to *Automatic*.
2. Use the **Retention period** setting to specify how long to keep the data.

After the specified time, data will be moved to Trash.

✎ **Note:** Data that is in the Trash folder is deleted only when you empty the folder or if space is needed.

Network settings

Network settings enable you to control your local (or remote) network connections. There are also settings to give the instrument a nickname, to protect it with a password and to view the instrument GUI in a web broswer.

Go to: **System settings** > **Network settings**.

Nickname

A nickname can make your instrument easier to identify if you have multiple instruments. This is because the default name of an instrument is based on its type and serial number, so they all look very similar.

Add a nickname using the mobile app

1. Tap **Nickname**.

2. Use the keypad to enter a nickname.

3. Tap **Done**.

💡 **Hint:** You can also use emojis!

Add a nickname using the instrument

1. Select **Nickname**.

2. Use the arrow keys to enter a name.

3. Press ⊜ to exit the dialog.

💡 **Hint:** Use the mobile app, it is much easier.

Tips for nicknames

- Make the nickname short.
- Make the nickname unique.
- Use a naming pattern such as the phonetic alphabet.
- Use the location of the instrument.

Password

This setting allows you to password protect your instrument. The password will be required to connect to the instrument through Wi-Fi or Ethernet.

You can add or change the password using either the instrument or the mobile app.

Add a password using the instrument

1. Go to: **System settings** > **Network settings**

2. Select **Password**.

   ✏ **Note:** If the instrument is already password protected, you will need to confirm that you want to enter a new password.

3. Use the arrow keys to enter a password.

4. Press ⊜.

💡 **Hint:** Use the mobile app, it is much easier.

Add a password using the mobile app

1. Tap **Password**.

2. Use the keypad to enter a password.

3. Tap **Done**.

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Web server display

Web server display is a setting that allows you to view the instrument GUI on a web browser that is connected to the same network as the instrument. This can be useful if more than one person wants to be able to monitor a measurement from a distance.

✏ **Note:** The display is not interactive, it is for viewing purposes only.

The setting can be accessed from either the instrument or the mobile app. See **Web server display** for more information.

Wi-Fi settings

Wi-Fi settings control the wireless connections of the instrument.

Wi-Fi mode: Airplane mode

Use this setting to switch off Wi-Fi and Bluetooth on the instrument.

Wi-Fi mode: Connect to network

Use this setting to connect your instrument to your local wireless network, such as your work or home network. The instrument will be able to communicate with the other devices on the network, that is your iOS device or PC.

1. Set **Wi-Fi mode** to *Connect to network*.
2. If you are using the instrument, select **Wi-Fi name**.

   If you are using the mobile app, the iOS device will search for the available networks.
3. Select your network from the list of available networks.
4. Enter the network password.

Wi-Fi mode: Act as hotspot

Use this setting to enable the instrument's hotspot to which you can connect your iOS device or PC so they can communicate.

1. Set **Wi-Fi mode** to *Act as hotspot*.
2. Connect your iOS device or PC to the hotspot as per the manufacturer's instructions. If you are using the mobile app, follow the prompts to connect your iOS device to the hotspot.

Change the hotspot password on the instrument

1. Select **Password**.
2. Use ▲ and ▼ to scroll through the character menu.
3. Press ⊜ to confirm the changes.

✏ **Note:** Restart the instrument to apply the new password.

Change the hotspot password using the mobile app

✎ **Note:** To edit the hotspot password on the mobile app, the mobile device must be connected to the instrument's hotspot.

1. Use the keypad to enter a new password.

2. Tap **Done**.

The instrument and mobile app will reconnect automatically.

Reset network settings

You can reset the network settings so that the instrument will forget all networks to which it has connected. This will not affect any settings that have been saved on your iOS device.

This setting can only be accessed from the instrument.

How to reset network settings

1. Select **Reset network settings**.

2. Select **Yes**.

External devices

For HBK 2255, the External devices setting includes settings that allow you to output the analog signal and to connect the instrument to a weather station.

See **Voltage output** for information about how to output the analog signal.

Menu location: **System settings** > **External devices**

Weather station

The atmospheric conditions, such as humidity and wind speed, in which measurements are made are an essential part of environmental measurements.

HBK 2255 works with weather station kits MM-0316-A and MM-0256-A, which are based on Vaisala weather stations.

- MM-0316-A measures wind speed and wind direction.
- MM-0256-A measures wind speed, wind direction, ambient temperature, ambient pressure, relative humidity and rainfall.

MM-0316-A and MM-0256-A connect to the instrument using either a wired or a wireless connection.

- Wired: USB Adapter ZH-0698 and a USB-C to USB-A female adapter
- Wireless: via Bluetooth®

Set **Weather station** = *Vaisala* if you have connected a weather station to the instrument.

The measured weather parameters are saved with data and displayed together with the broadband parameters.

See **Regional settings** for information about how to set the measurement unit for wind speed, temperature and dimensions.

Voltage output

The Voltage output setting allows you to output the analog signal through the USB-C™ socket on the bottom of the instrument. To output the signal requires an output cable. One option is the AO-0846 cable, which has a stereo-mini plug for connecting headphones.

How to output the analog signal

1. Select the analog signal to output.

    For HBK 2255, go to **Menu** > **System settings** > **External devices** > **Voltage output**.

    -   *Input X-weighted*: Output the frequency-weighted input signal for listening purposes.
    -   *LXF*: Output the frequency-weighted instantaneous sound level with time weighting F as 10 mV/dB.

    ✏ **Note:**
    -   *X* = the frequency weighting.
    -   The frequency weightings available correspond to the parameters that the instrument is set to measure.

2. Attach the output cable to the instrument.
3. Start a measurement.

Metadata

Metadata is information which describes data in the context of the measurement process and helps you to make sense of your data. The instrument automatically stores information about the data it collects, such as the date and time of each measurement, the measurement number, the microphone used, and the GPS coordinates (if enabled).

For HBK 2255, the Metadata setting allows you to create custom metadata. Custom metadata is stored with the measurement and supported in the Enviro Noise Partner and Building Acoustics Partner PC applications. If you export your measurement data from the PC application, the export file includes the custom metadata.

Menu location: **Metadata**

How to create custom metadata

To use custom metadata on your measurements, you will need to create metadata before you start to measure. There are 9 metadata on the instrument, numbered from 1 to 9.

1. Enable metadata collectively (as a whole).

    a. Go to: **Metadata** > **Metadata**.
    b. Select *Enabled*.

2. Enable metadata individually (one by one).

    a. For example, go to **Metadata 1** > **Metadata 1**.
    b. Select *Enabled*.

    Once a metadata is enabled, you will be able to edit it.

3. Use the **Name** setting to name the metadata.

This is the name you will see when prompted to edit/confirm metadata before saving each measurement.

4. Use the **Type** setting to define the format of the metadata.

    - Choose *Text* for metadata which consists of letters, numbers, symbols and spaces.

    - Choose *Number* for metadata which consists of numbers only. Values can be from 000 to 999.

    - Choose *Picklist* to create a list from which you can pick a value.

5. If **Type** = *Picklist*, you will also need to create entries to populate the list. Entries can consist of letters, numbers, symbols and spaces. You can create up to 11 entries.

6. Enter a default value for the metadata.

    Only the setting that corresponds to the type of metadata will be enabled: Text value, Number value or Picklist value.

How metadata works

To add metadata to your measurements, you will need to enable metadata collectively. Each individual metadata (Metadata 1 through Metadata 9) that is enabled will be added to each measurement you make.

Before a measurement is saved, you will be prompted to confirm the metadata. At this point, you can edit the values before you confirm.

✏ **Note:** Number metadata do not automatically increment with each measurement.

Data explorer

Menu location: **Menu** > **Data explorer**

Folder structure

There are two top-level folders in the data explorer: Data and Trash. Within the two folders are subfolders, named by date. Within each date folder are all measurements made that day.

Data folder	Trash folder
Date folders	Date folders
Measurement folders	Measurement folders

Navigate the folders

Each time you open the Data explorer, you will start in the Data folder. With each folder you select, there will be different options depending on your location in the folder structure.

Options for the Data folder	Options for the Trash folder
- Show Trash: Opens the Trash folder. - Move Data to Trash: Moves all data to the Trash folder.	- Show Data: Opens the Data folder. - Empty Trash: Deletes all data in the Trash folder permanently.

Options for date folders	
In the Data folder	In the Trash folder
- Open: Opens the folder. - Move to Trash: Moves the folder to the Trash folder.	- Recover: Sends the folder and its contents to the Data folder. - Open: Opens the folder. - Delete: Permanently deletes the folder.

Options for measurement folders	
In the Data folder	In the Trash folder
- Open: Opens the measurement. - Move to Trash: Moves the measurement to the Trash folder.	- Recover: Sends the measurement to the Data folder. - Delete: Deletes the measurement permanently.

Delete data

There are two stages to remove data from the instrument forever. The first stage is to send the data to the Trash folder and the second stage is to delete data from the Trash folder. By default, you will need to move data to the Trash folder manually.

To learn how to set up the instrument to move data to the Trash folder automatically, see **Data management**.

💡 **Hint:** Move data with which you are not currently working to the Trash folder. This will keep the Data folder tidy so you can use the Data folder as you would a working folder. Data in the Trash folder can be returned to the Data folder at any time.