Sorama CAM iV64

User Manual

Sorama

December 2025 v.2.20

CONTENT

1 CONFORMITY

Sorama B.V.
Achtseweg Zuid 153H
5651 GW Eindhoven
The Netherlands

This document is subject to change without notice.

Declare under our sole responsibility that the product:

Product name	Acoustic Camera
Model number	CAM iV64

is in conformity with the requirements of the following EU Directive or other normative documents. This declaration is based on the full compliance of the products with the following European standards:

- General Safety
  - IEC 61010-1
- For Electromagnetic compatibility directive (EMC)
  - EN 301 489-17 V3.2.4 referring to EN 301 489-1 V2.2.3
  - EN 55032:2015 Class B
  - EN 61000-4-3:2006
  - EN 61000-4-2:2009
- RoHS3 Restriction of Hazardous Substances
  - EU2011/65/EU RoHS2
  - EU2015/863

Technical Compliance Data held by:

Sorama B.V.
Achtseweg Zuid 153H
5651 GW Eindhoven, NL

https://www.sorama.eu/
info@sorama.eu

Signed for and on behalf of Sorama B.V.
Address: Achtseweg Zuid 153H, 5651 GW, Eindhoven

2 WARRANTY INFORMATION

The Sorama CAM iV64 is covered by a one-year warranty from the date of purchase. This warranty covers repair services for malfunctions or abnormalities caused by product quality issues. The warranty does not cover damage resulting from improper use, accidental impacts, or unauthorized disassembly. Disassembling the product without authorization voids the warranty. Sorama offers repair services for damage outside warranty conditions.

The device is factory calibrated. Sorama accepts no liability for injuries, accidents, or damage resulting from improper use or operation in unsafe conditions. Non-compliance with safety guidelines, including tampering with the casing, will invalidate the warranty.

3 SAFETY INFORMATION

Note: Please read the document "Safety Instructions" along with this.

This section contains essential information for safe operation. It must remain accessible to all users throughout the product's operational life.

Refer to the latest version of the manual on the Sorama website, as digital updates are published regularly. The revision number and date appear on the first page of each version.

Operate the product only as instructed and according to local safety regulations.

This product is designed solely for sound measurement. It performs reliably under the conditions described in this manual.

Follow the operating instructions to ensure accurate results.

Physical Damage

If visible physical damage occurs, stop using the product immediately and remove the battery. Contact Sorama with a description of the damage for further assessment.

Replacement Parts and Accessories

Use only manufacturer-approved parts and accessories. Using unapproved components may compromise the product's safety and function.

To avoid electric shock, fire, or injury, follow these guidelines:

Product-specific

- Read all safety information before operating the product.
- Do not open or attempt repairs yourself.
- Use the product only as intended to maintain its safety rating.
- Avoid use near explosive gases, vapors, or in wet environments.
- Do not operate a damaged or malfunctioning product.
- Maintenance must be performed by Sorama-authorized personnel.
- Contact Sorama if service is required.

Battery-specific

- Do not disassemble or crush battery cells or packs.
- Batteries contain hazardous chemicals. If exposed, rinse with water and seek medical attention.
- Contact Sorama if the battery leaks.
- Remove batteries if not used for extended periods or stored above 35°C (95°F).
- Use only Sorama-approved power adapters for charging.
- Do not short-circuit battery terminals or store batteries where short-circuiting could occur.
- Keep batteries away from heat, fire, or direct sunlight.
- If a battery becomes hot (≥50°C/122°F) while charging, unplug the charger and move the product to a cool, non-flammable place.
- Only Sorama can supply replacement batteries.

4 BATTERY

4.1 Specifications

Model	RRC2057 (2S2P)
Type	Lithium Ion
Voltage	7.20V
Capacity	6.90Ah
Max. charge current	4.83A
Max. charge voltage	8.40V
Max. discharge current	9.50A
Dimensions (L x W x H)	85.35 x 77.65 x 23.0 mm
Weight	230g

⚠️ ⚠️ **Warning**

- For personal safety and safe operation:
- Keep battery cells and packs away from heat or fire.
- Avoid direct sunlight exposure.
- Do not disassemble or crush battery components.
- Remove batteries during long storage periods to prevent leakage or damage.
- Always connect the charger to a power outlet before charging.
- Only use Sorama-approved adapters for charging.
- Keep battery contacts clean and dry. Use a clean, dry cloth if cleaning is necessary.

⚠️ **Caution**

To prevent battery damage:

- Do not store in high-temperature environments (e.g., parked vehicles in the sun).
- Avoid leaving the battery in the charger longer than 24 hours.
- Charge at least every six months for best battery life. Batteries self-discharge over time.
- Operate only within the specified temperature range.
- Do not incinerate the battery or device.

The Sorama CAM iV64 includes two lithium-ion batteries, allowing quick replacement during use.
Charging is done through a single-bay base powered by a supplied adapter. Country-specific plug adapters are included.

The battery is successfully tested and complies with:

- UN Model regulations, Manual of Tests and Criteria Part III Subsection 38.3
- FCC part 15
- UL2054/UL60950-1
- IEC62133

- RoHS
- CE

And has been manufactured under a quality management program as specified in 2.9.4 of the UN Model regulations.

4.2 Symbols

Symbol	Description
	The product has been assessed by the manufacturer and complies with EU safety, health and environmental protection requirements.
	Certifies that the electromagnetic interference from the product is under the limits approved by the Federal Communications Commission.
	Dispose of this product according to local Regulations. Do not dispose of this product as unsorted municipal waste.
	Cautionary notice!
	Consult accompanying documents.

⚠ Caution

To replace the battery in the Sorama CAM iV64:

- Slide the battery cover lock to open the battery compartment.
- Remove the used battery.
- Insert a fully charged battery into the compartment.
- Close and secure the battery cover.

5 CONTACT

Supplier will, during the warranty period in office hours (GMT +1), provide the required first line support when possible technical faults occur. Customers can request support by sending an email to helpdesk@sorama.eu. After receiving the defect checklist, the customer should send this document filled out back to helpdesk@sorama.eu. Sorama will then evaluate the problem. When the issue does not have any relation to the services of Sorama or is outside the warranty period, costs will be charged to the customer.

6 DESCRIPTION

The Sorama CAM iV64 is a high-performance acoustic camera that visualizes sound intensity and localizes sources in real-time. It features a 7-inch touchscreen display and is optimized for portability, enabling precise in-field measurements.

6.1 Features

- Class 1 performing sound level meter functionalities
- Realtime spectrum
- Realtime spectrogram
- Far-field sound source localization and visualization
- Measurement workflows for norm measurements
- Sorama Portal-compatible recording format for in-depth post-analysis

6.2 Technical data

6.2.1 Physical properties

Size	420 x 320 x 160 mm	L x W x D
Weight	2.33 kg	Including battery
Connectivity	USB-C and Wireless	USB 3.2 Gen 2, Bluetooth 5.1[1] and 802.11ac Wi-Fi[1]
Battery	Rechargeable battery	Battery life ~3.5 hours
Hardware connections	1/4" screw connection	Tripod mountable

6.2.2 Storage

Internal	~6.4 GB / Optional 500GB upgrade
External	Storage expandable with High-Speed USB-C drive
Storage formats	The Sorama File Format EX (.sor file) is compatible with Sorama Portal for report generation.

6.2.3 Display camera

Touch display	7-inch LCD capacitive touchscreen
Display resolution	720p
Camera Resolution	720p

6.2.4 Acoustics

SNR (A-weighted, at 1 kHz)	66 dB per channel	At 1 kHz, 94dB SPL

[1] Available in select markets

Sensitivity	-37 dB FS +/- 1 dB FS	At 1 kHz, 94 dB SPL
Acoustic overload point	132.5 dB SPL	At 1 kHz, <10% THD

6.2.5 Measurement features

Sampling rate	125 kHz	
Frequency resolution	29 Hz	
Operating distance	0.3m to 120m	
Spectrum analysis	29 Hz — 27 kHz	
Beamforming (far-field)	500 Hz — 27 kHz	Streaming + recording

6.3 Environment

6.3.1 Ambient temperature

The CAM iV64 can operate in ambient temperatures between -20 °C to 50 °C (-4 °F to 122 °F). Note that water can cause condensation, which can lead to damage in the device. The ambient operating relative humidity is between 10-90% RH (non-condensing).

6.4 Protection

⚠ ⚠ **Warning**

The AOP (Acoustic Overload Point) of the microphones is 132.5 dB. A user could potentially damage the microphones if the microphones are subjected to sound sources higher than the AOP.

⚠ ⚠ **Warning**

The USB-C connector port is not used for charging, and it is solely used for data communication.

Any water entering the MEMS microphones may cause the device to show incorrect measurement output values. Water entering the holes of the microphones should always be avoided. In case water was in contact with the microphones, place the sensor head such that any water can drip out from the microphone holes and let it dry in this position.

7 GETTING STARTED

7.1 List of items

The items listed below are included when you receive the Product.

Number	Description	Quantity
1	External Battery Charger	1
2	Rechargeable Lithium-ion Battery Pack	2
3	Country-Specific Adapters for Battery Charger	1
4	USB-C to USB-A Cable (1.5m)	1
5	Sorama CAM iV64 Acoustic Camera	1
6	Protective Case	1
7	Accessory Bag	1
8	Shoulder Strap	1

9	Hand Strap	1

7.2 Hardware features and configuration

Number	Description
1	LED Indicator
2	USB-C Connector
3	Touchscreen Display
4	Shoulder Strap Anchor
5	Battery Compartment / Tripod Connector
6	Acoustic Sensor / Webcam
7	Power on / Measurement Trigger Button / Force Shut Down
8	Hand Strap Anchor and Screw Point

⚠️ ⚠️ **Warning**

The USB-C port is only for data communication. It does not support charging.

7.3 Power up and LED indicator

To power on the device, press the trigger button located on the grip. The LED near the USB-C connector indicates the device status:

LED Color	Description
Red	The device is booting
Green	The device is fully booted, and the default user interface is running
Blue	The device is still switched ON, but the application is not running anymore

7.4 Power off

To shut down the device, press and hold the trigger button for 2 seconds.
To perform a hard reset, press and hold the trigger button for 10 seconds.

7.5 Home screen

When the device is booted, the home screen displays several icons with the following meanings:

Symbol	Description
	Battery level
	Storage space is less than 1 GB
	Recording disabled, memory full or no target directory selected
	Wi-Fi Enabled
	Bluetooth Enabled
	Screen Sharing Enabled

7.6 Good to know / background info

- **Sound Pressure Level**
  Sound is defined as pressure variations in the air. Sound pressure level (SPL) quantifies these variations and is expressed in decibels (dB SPL). It is a weighted sum of the frequency components of the acoustic signal.
- **SoundSurface**
  A SoundSurface visualizes SPL values across the area under investigation. It identifies the origin of sound sources, often overlaid on the camera feed to match sound with visual locations.
- **Frequency Spectrum**
  Frequency Spectrum is the distribution of the amplitudes (dB SPL) of each frequency component against frequency (Hz). In other words: The signal consists of different frequency components which all contribute to the sound.
- **Spectrogram**
  Spectrogram shows how the frequency content of a signal changes over time. It is useful for identifying short, transient sounds such as clicks or glitches that may be hard to see in other views.
- **Field of View (FOV)**
  The webcam's observation angles are:
  No features open: Horizontal FOV 23.8° and Vertical FOV 41°
  All features open: Horizontal FOV 53° and Vertical FOV 38.2°.
- **Beamforming**
  Beamforming is a signal processing technique that uses a microphone array to localize sound. It calculates the location based on the time delay of sound arrival at each microphone.
- **Frequency band selection**
  This feature lets users isolate and display only selected frequency ranges by filtering out all others.
- **Frequency and Time Weightings**
  When measuring sound pressure level (SPL), it is important to account for how the human ear perceives different frequencies and changes over time.

  Frequency weightings apply a filter to the measured SPL to reflect typical hearing sensitivity. Common options include:
  - **Z-weighting** (flat, unweighted)
  - **A-weighting** (approximates human hearing at lower levels)
  - **B-weighting** (less commonly used)
  - **C-weighting** (represents perception at higher sound levels)

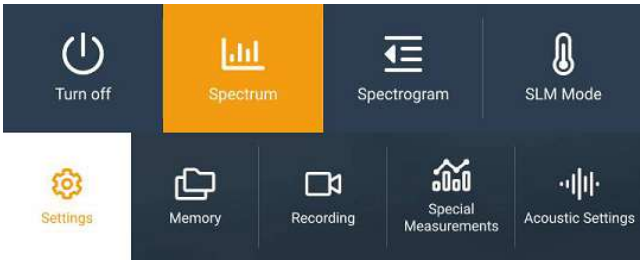
  Time weightings affect how quickly changes in SPL are displayed. They help interpret fluctuating signals by smoothing rapid variations:
  - **Impulse** (very fast response)
  - **Fast** (moderate response time)
  - **Slow** (slower, more stable display)

  These settings help tailor SPL measurement to the needs of different applications and standards.

8 NAVIGATION MENU

Swipe down from the top to open the navigation menu.

Tap any icon to open a feature or setting. Active icons are highlighted in orange (top row) or white (bottom row). Tap the icon again or press X to close it.



Menu options:

	Turn off	This button turns off the device.
	Spectrum	Displays the frequency spectrum from the microphone array.
	Spectrogram	Shows how frequencies change over time.
	SLM	Displays sound pressure levels (SPL).
	Recording	Set the type and duration of sound measurements.
	Memory	View, transfer, rename, or delete saved recordings.
	Special Measurements	Select formats for specific measurement tasks.
	Acoustic Settings	Adjust acoustic parameters.
	Settings	Access general device settings.

8.1 Turn off

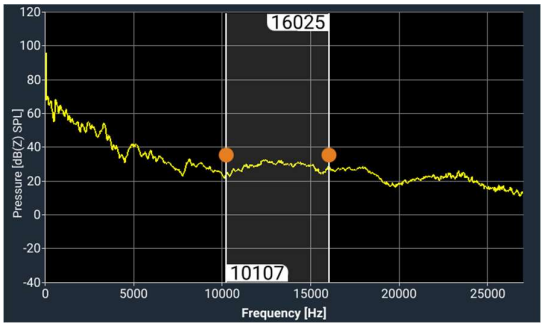
Press on to power off the device. Alternatively, press and hold the **trigger button**:

- For 2 seconds to power off

- For 8 seconds to perform a hard reset

8.2 Spectrum

Press on to toggle the spectrum chart on or off.



When the spectrum is visible, you can select a specific frequency range to visualize:

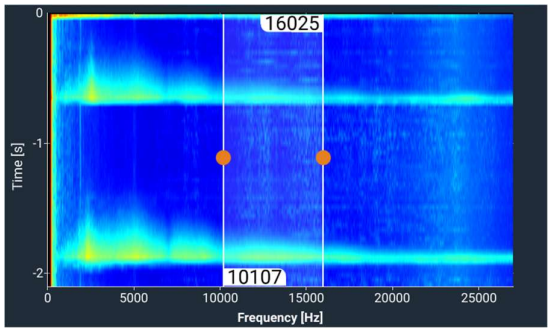
- Drag the **orange dots** to set the lower and upper frequency limits.
- To move the entire band, drag it from the **center** to a new position.

8.2.1 Spectrum zoom

Double-tap or use a pinch gesture in the spectrum module to zoom in on the selected frequency range for a more detailed view.

8.3 Spectrogram

Press on to toggle the spectrogram view on or off.

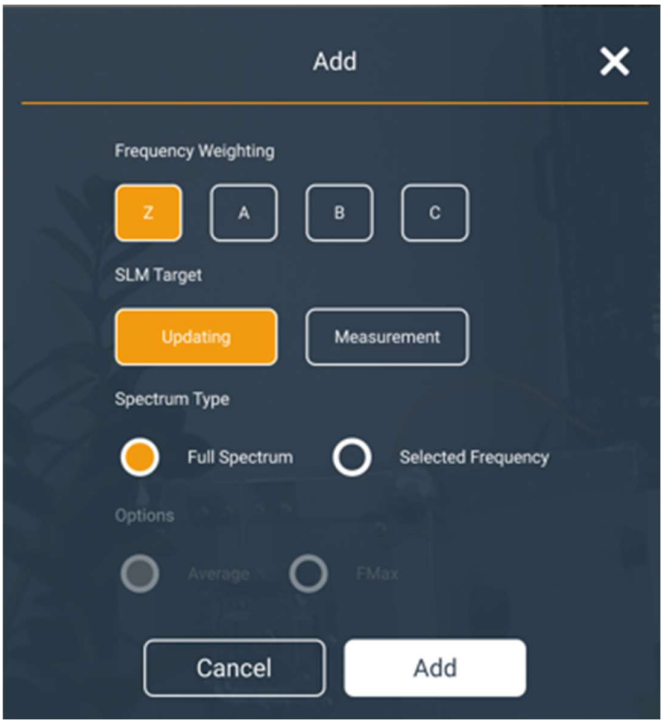


To select a specific bandwidth, see the previous section.

8.4 Sound Level Meter (SLM)

Press on to view the sound pressure level (SPL) of the microphone data.

Press on "**+**" to add a new SPL measurement or press on an existing SLM indicator to adjust its settings.



8.5 SLM Settings

To configure a new SLM entry:

1. Choose a **frequency weighting**: Z, A, B, or C
2. Select an **SLM target**:
    - **Updating** — refreshes the dB value every second
    - **Measurement** — starts recording when a measurement begins; displays the average value after it ends
3. Choose a **frequency range**:
    - **Full spectrum** — includes all frequencies from 28.2 Hz to 22,387.2 Hz
    - **Selected frequency** — includes only the range set with the frequency sliders in the spectrum or spectrogram modules (this updates automatically if the selection changes)
4. In case you have selected '**Measurement**' two separate options become available:
    - **Average** — The average SPL level that was measured during the measurement duration is displayed
    - **FMax** — The maximum SPL level that was measured during the measurement duration is displayed

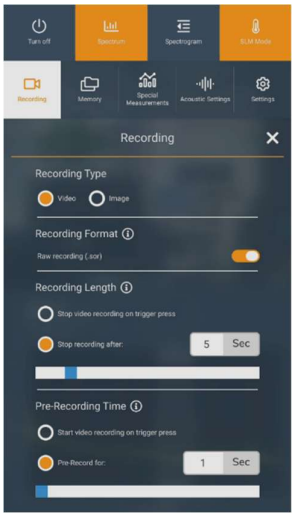
Tap **Add** to save the new measurement.

If a microphone reaches its acoustic overload point (132 dB SPL), **OL** (Overload) will be shown.

8.6 Recording

In the **Recording** menu, you can choose the capture type (image or video), set the video length, and adjust the pre-recording time.

Tap **Video** to open the sound measurement recording settings.



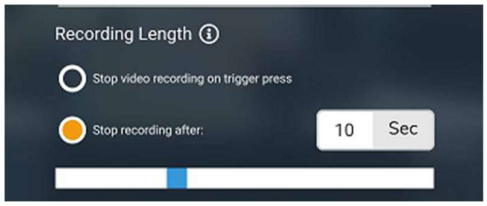
Choose the recording type for your measurement:

- **Image** — Captures a screenshot. Press the trigger button to take the image.
- **Video** — Records a video of the measurement.

When **Video** is selected, you can enable **RAW recording**:

- **RAW video** — Larger file size, suitable for post-processing in the Sorama Portal.
- **Standard video** — Smaller file size, ideal for sharing. Includes fixed sound visualization; not editable in the Portal.

By default, **Stop video recording on trigger press** is enabled.



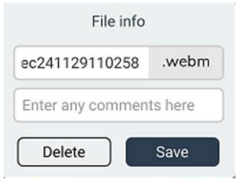
Press the **trigger button** to start recording. The recording time will appear on the home screen icon. Press the trigger again to stop.

If **Stop recording after** is enabled, the recording will stop automatically after the set duration.

Pre-recording time stores a few seconds of audio before recording starts. This helps capture unexpected events that happen just before you press record.

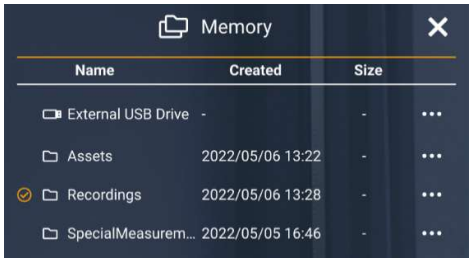
After a measurement, a window appears where you can:

- Tap the text box to rename the measurement
- Enter comments in the **Enter any comments here** field
- Tap **Save** to store the measurement



8.7 Memory

To view and manage saved recordings, open the **Memory** window. Tap the **folder icon** to access file storage.



The **orange checkmark icon** indicates the current destination folder for new recordings.
Tap the **ellipsis icon** (⋮) to:

- Rename the folder
- Set it as the destination folder
- Delete the folder

At the bottom of the screen, you can:

- View used and available device storage
- See the memory limit
- Create a new folder for organizing recordings

8.7.1 External USB drive

You can connect an external USB drive via the USB-C port for data storage. When connected, a notification confirms that the drive is recognized.
The CAM iV64 can:

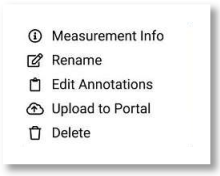
- Record directly to the USB drive (requires sufficiently fast storage)
- Transfer recordings from internal memory to the USB drive

Note: Only FAT32/VFAT and NTFS formats are supported.

Tap on ellipsis icon next to **External USB Drive** to set the USB drive as **Destination Folder** or to **Eject** the USB drive.

8.7.2 File Operations

To view or edit additional information for a saved measurement, tap the **ellipsis icon** next to the measurement name.



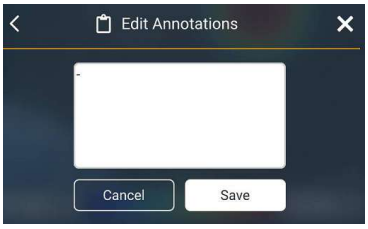
After tapping the **ellipsis icon**, select **Measurement Info**. Additional rows will appear below the measurement name, showing:

- **Annotations**
- **Distance**
- **Duration**

These fields provide details about the selected measurement.

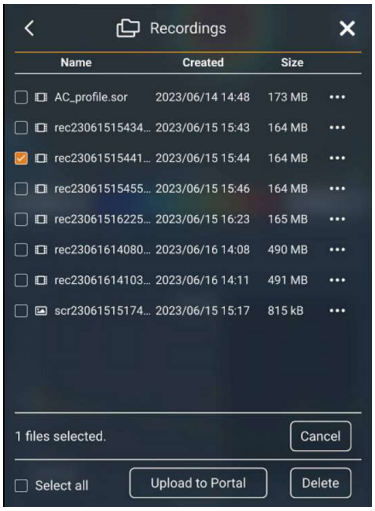
If no annotations have been added, you can still add them later.

Tap the **ellipsis icon** next to the measurement name and select **Edit Annotations**. A text box will appear where you can describe the measurement conditions.



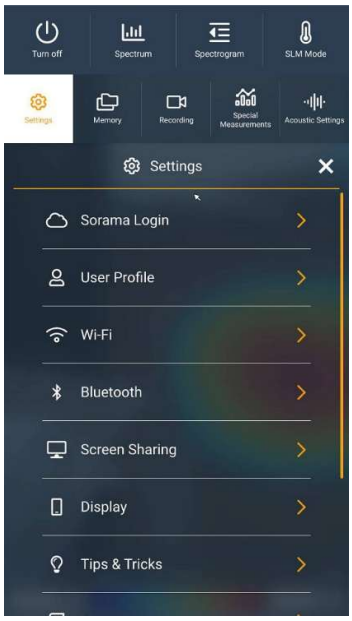
To enable multiselect mode, press and hold on a folder. You can then select multiple files or folders to delete or copy to an external USB drive or the Sorama Portal.

For more details, see **§11.3 Data Management**.



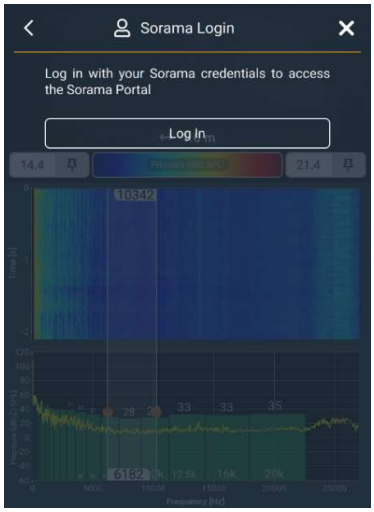
8.8 Settings

Press on **gear icon** to view the general device settings.

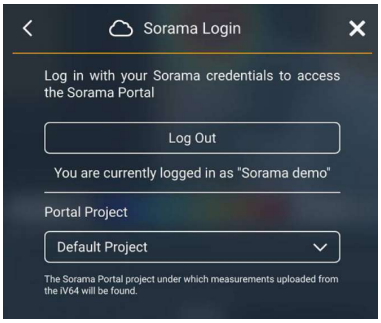


8.8.1 Sorama Login

Connect to a Wi-Fi network with internet access, then log in using your Sorama credentials to access the Sorama Portal.



After logging in, select an active project. Files uploaded from **Memory** will be added to this project in the Sorama Portal.



8.8.2 User Profile

Use profiles to personalize settings for different users or workflows on the same device. You can add, switch, or delete profiles as needed.

Profiles store settings such as:

- Sorama login and selected project
- Acoustic settings
- Recording settings

Note: All users share access to the device memory.

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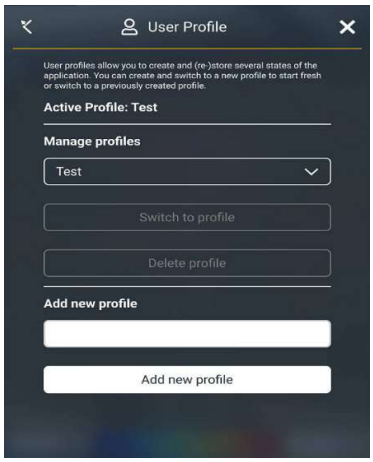
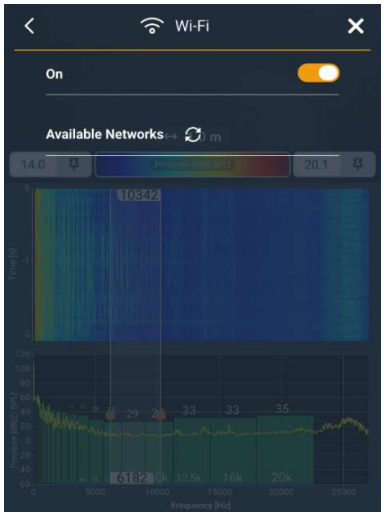


8.8.3 Wi-Fi

Enable Wi-Fi to connect to the internet. This allows you to:

- Access the Sorama Portal
- Perform firmware updates
- Use screen sharing



When Wi-Fi is enabled, available networks are listed.

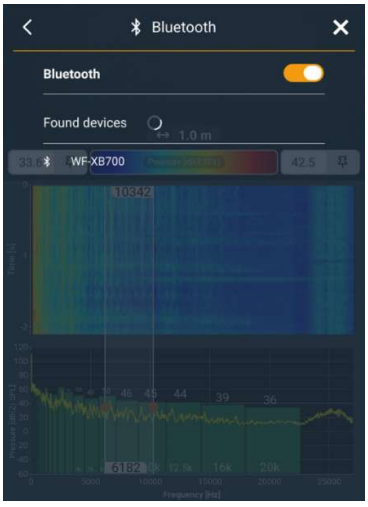
Tap a network name to view its signal strength and security type.
Tap **Connect** to join the network, or **Cancel** to return to the list.

8.8.4 Bluetooth

Enable Bluetooth to connect with supported Bluetooth devices. You can:

- Play built-in test signals through a Bluetooth speaker
- Replay recorded measurements to a Bluetooth headset

Note: User-provided test signals are not supported.



When Bluetooth is enabled, available devices are listed.

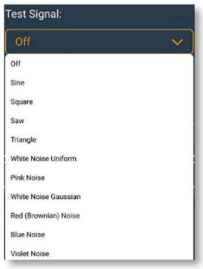
- Tap a device name to connect
- Tap the **refresh icon** to update the list

Once connected, you can stream audio to the device.

To play a test signal:

1. Tap the connected device

2. Select a tonal or noise test signal from the menu
3. Adjust **volume** and/or **frequency** using the sliders (options vary by signal type)

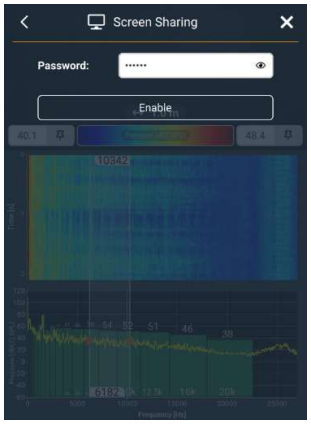


Click again on the device in the Bluetooth menu to disconnect or to forget the device.

8.8.5 Screen Sharing

To use screen sharing, connect the CAM iV64 and your computer to the **same Wi-Fi network**.
On the CAM iV64, open the **Screen Sharing** page:

- Set a password for the session
- Use this password on your computer to view the CAM iV64 screen



Once screen sharing is enabled, you can remotely access and control the CAM iV64 using a **VNC (Virtual Network Computing)** client. Make sure to use a VNC client that supports the **Tight Encoding** protocol, such as **Remote Ripple**.

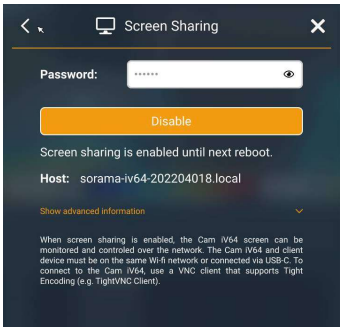
If you're unable to connect using the **host name**, use the device's **IP address** instead. You can find it by selecting **Show advanced information** on the CAM iV64.

Through the VNC client, you can:

- View the device screen in real time

- Control all features remotely
- Start a measurement by pressing **F1** on your keyboard

Note: The screen sharing password cannot be changed while screen sharing is active.



8.8.6 Display

Select **Display** to adjust screen settings:

- Use the **Brightness** slider to set screen brightness (lower brightness helps save battery)
- Set the **Standby Mode** timeout to control when the device goes to sleep

8.8.7 Documentation

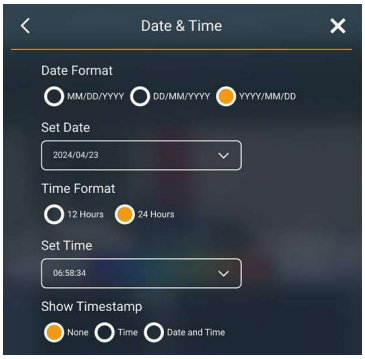
Scan the QR-code to quickly navigate to the Sorama CAM iV64 documentation page: https://sorama.eu/products/sorama-cam-iv64-2/documentation/

8.8.8 Licenses

This menu displays a list of active licenses on the device. For instructions on how to enable specific feature licenses, see **§11.4.2**.

8.8.9 Date & Time

Select your preferred **date and time format**, and adjust the **current date and time** if needed. You can also enable the **timestamp** option to display the current time on screen. The timestamp will be included in all recordings.



8.8.10 System Info

Select **System info** to view key device details, including:

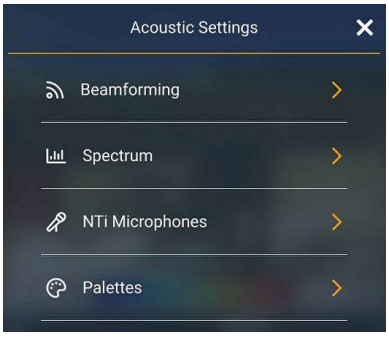
- Firmware version
- Installation date
- Device name
- Serial number
- Wi-Fi MAC address

This page also allows you to check for firmware updates and reset user settings to factory defaults

For update instructions, see **§11.4.3 Firmware Update/Factory Reset**.
Legal and regulatory information is available under **Legal**.

8.9 Acoustic Settings

Here you can adjust the acoustic settings for **Beamforming, Spectrum, NTi Microphones,** and **Palettes**.

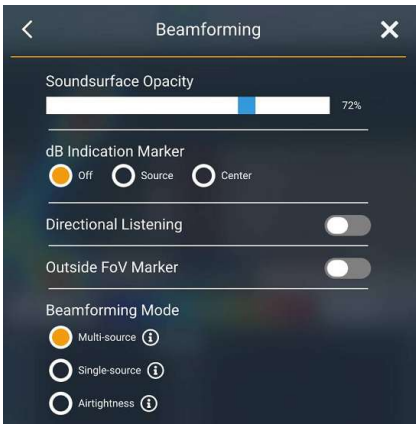


8.9.1 Beamforming

Select **Beamforming** to adjust settings related to the sound surface display, including:

- **Sound surface opacity**
- **dB indication marker**
- **Directional listening**

- **Outside FoV marker**
- **Beamforming mode**



8.9.1.1 SoundSurface opacity

Use the slider to adjust the opacity of the sound surface overlay on the video image.

8.9.1.2 dB indicator Marker

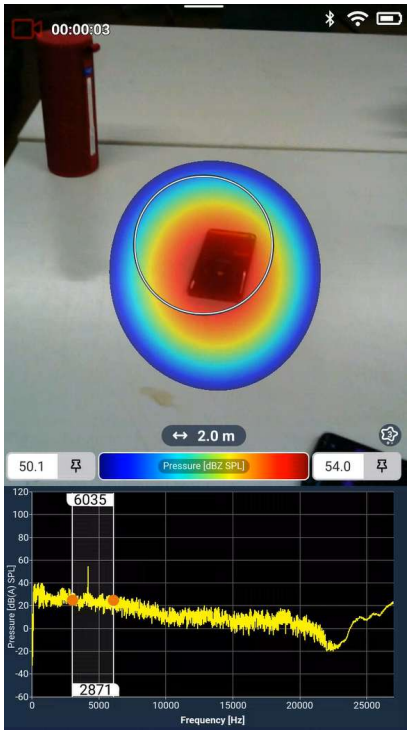
Displays a dB value at a specific point within the selected frequency range. The marker can be set to:

- **Center** — fixed at the center of the screen
- **Peak** — automatically placed on the most dominant source within the field of view (FoV)

Note: The dB marker does not show absolute SPL. The displayed value depends on frequency selection and distance, and may be lower than nearby SLM readings.

8.9.1.3 Directional Listening

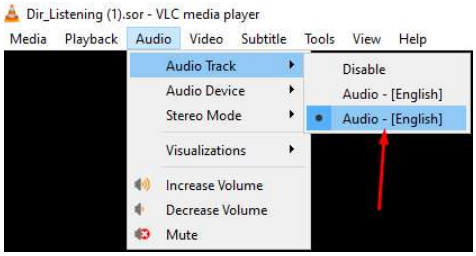
Displays a circular zone on screen that emphasizes sounds within the circle and reduces those outside it. When Bluetooth headphones are connected, you can listen in real time to the focused sound within the circle. This helps isolate a specific sound source from surrounding noise.



You can listen to sounds within the **Directional Listening** circle during real-time use of the Sorama CAM iV64. When playing back a recorded measurement, directional sound can be accessed in two ways:

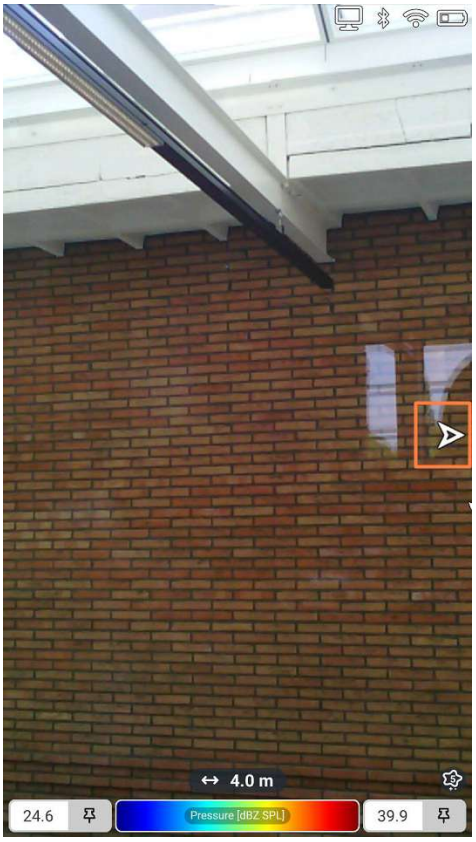
- **.webm file** — Open in any media player to directly hear the directional audio.
- **.sor file** — Open in **VLC media player**, then manually select the correct audio track:
    1. Go to **Audio > Audio Track**
    2. Select the bottom option labeled **Audio — [English]**

This ensures you hear the Directional Listening information during playback.

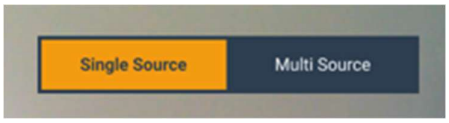


8.9.1.4 Outside FoV Marker

This marker appears at the edge of the screen when the CAM iV64 detects a sound source located outside the standard field of view. It is useful when searching for sources with unknown or off-screen locations.



8.9.1.5 Beamforming Mode



On the main screen there is a toggle to switch between beamforming modes

- **Multi-source —** This mode allows multiple sources to be visible at the same time
- **Single-source -** This mode shows only the most dominant sound source

8.9.2 Spectrum

Select **Spectrum** to adjust settings related to the frequency spectrum display, including:

- **Frequency axis**
- **Pressure axis scaling**
- **Frequency weighting**
- **Time weighting**
- **Octave bands**
- **SPL precision**

For details on these settings, see **§4.3**.

8.9.3 NTi Microphones

Select **NTi Microphones** to perform sound level measurements using the **SLM feature** with a connected NTi sound level meter. (For details on the SLM feature, see **§9.5**.)

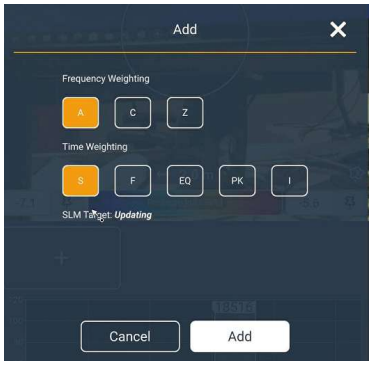
To connect:

1. Ensure both the **NTi sound level meter** and the **CAM iV64** are powered on.
2. Use the provided **micro-USB to USB-A cable** with a **USB-A to USB-C adapter** to connect the devices.
3. The CAM iV64 supports connections to **NTi XL2** and **NTi XL3** models.

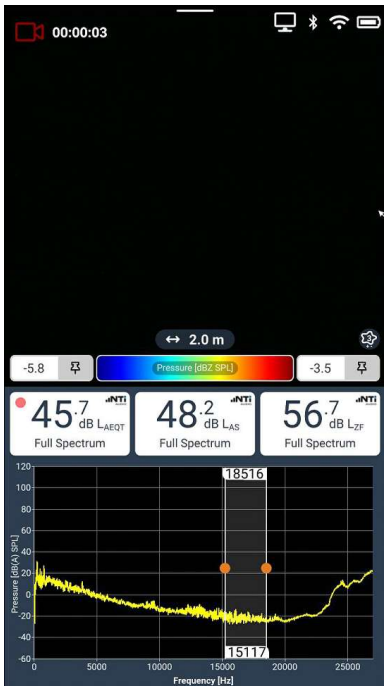
Select which **NTi sound level meter** you want to connect to the CAM iV64.

Open the SLM Mode and press on the '+' button.

Choose which **Frequency Weighting** and **Time Weighting** you would like to apply to the measurement.

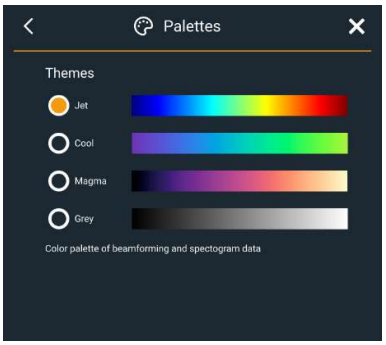


When an NTi sound level meter is connected, the **NTi logo** appears at the top right of the **SLM tile**. This indicates that the displayed sound levels are measured by the **NTi device**, not the CAM iV64. All standard SLM features remain available, but the recorded data reflects measurements from the connected NTi sound level meter.



8.9.4 Pallettes

Choose the color palette for the **SoundSurface** display. Available options: **Jet**, **Cool**, **Magma**, and **Grey.**



8.10 Special Measurements

The CAM iV64 includes specialized workflows designed to support measurements in compliance with **NEN/ISO (EU)** and **ASTM (USA)** standards. Available workflows include:

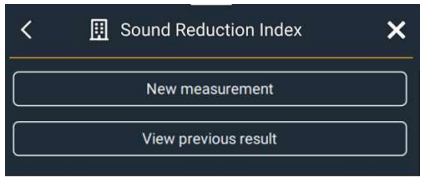
- Sound Reduction Index
- Reverberation Time (EU and USA versions)
- Speech Level Reduction
- Sound Transmission Class

Note: These workflows are paid features and require a separate license.

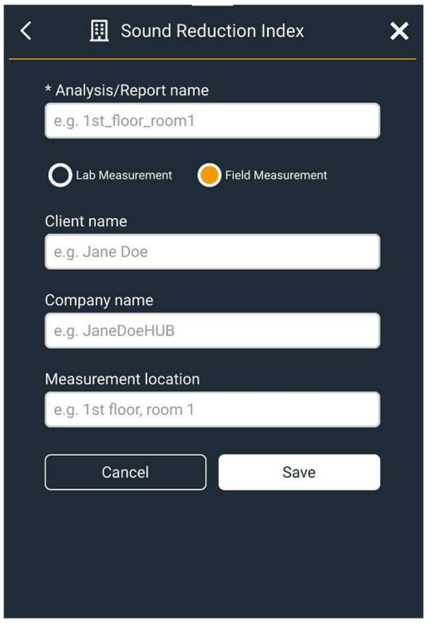
8.10.1 Sound Reduction Index

Step 1: Select the **Sound Reduction Index**.

Step 2: Make a **New measurement** or load results from an existing measurement in **View previous result**.



Step 3: When making a new measurement, tap **New Measurement**. The following screen will be displayed.



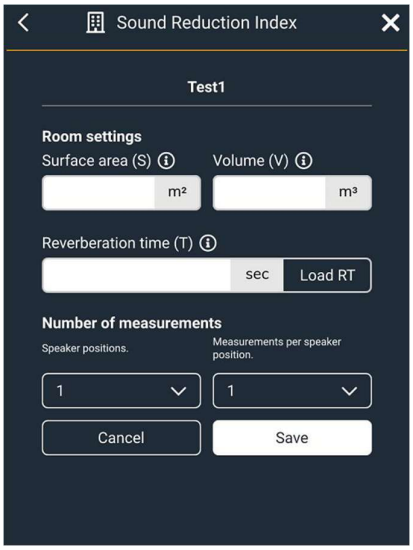
To create a new project:

- Enter an **Analysis/Report name**

- Select the **measurement type**:
  - **Lab measurement** — sound reduction index is labeled **R**
  - **Field measurement** — sound reduction index is labeled **R'**
- (Optional) Add:
  - **Client name**
  - **Company name**
  - **Measurement location**
- Tap **Save** to create the project, or **Cancel** to discard it.

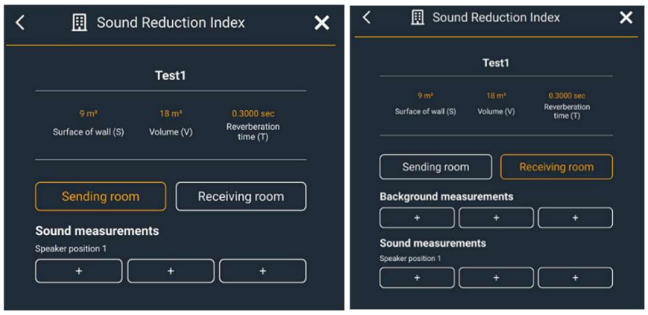
Step 4: Input the room dimensions, the reverberation time, the number of speaker positions, and the number of measurements per speaker position.

The next screen shows the input project name at the top, in this case, **Test1**.



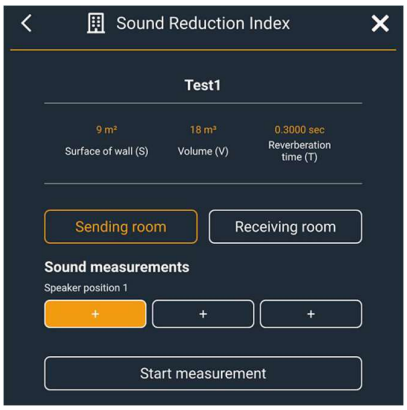
Step 5: Perform measurements in the source room and the receiving room.
The total number of measurements is based on your input for speaker positions and measurements per position.
For example, if you selected 1 speaker position and 3 measurements per position, you will perform 9 measurements in total:

- 3 measurements in the source room (speaker position 1)
- 3 background measurements in the receiving room
- 3 measurements in the receiving room (speaker position 1)



Tap one of the boxes to activate it. A **Start measurement** button will appear at the bottom of the screen. Tap **Start measurement** to begin. The device will measure the sound pressure level in 1/3 octave bands for 15 seconds and automatically save the result.

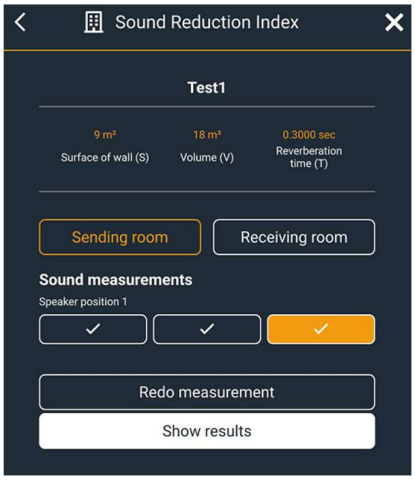
saved.



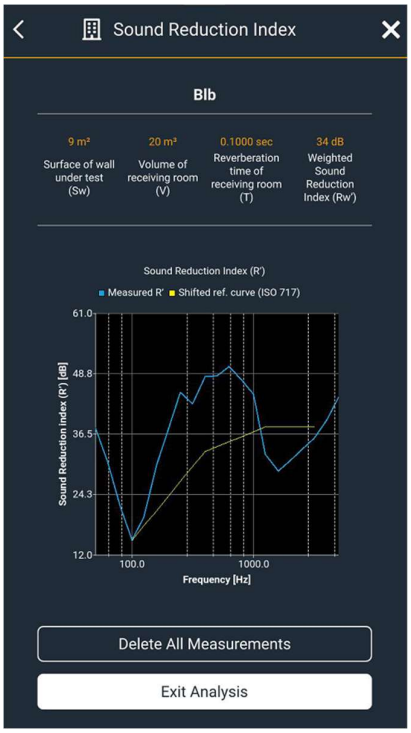
After a measurement is completed, a checkmark replaces the **+** in the box. To redo a measurement, tap the box again. The previous result will be replaced with the new one.

Step 6: View results

Once all measurements are completed, the **Show results** button appears. Tap this button to display the calculated results.



Tap on **Show results** and the results will appear on the screen.



View results from a previous measurement

In **Step 2**, tap **View previous result** to see all projects related to Sound Reduction Index.

To view results:

- Select a folder to open the associated measurement data.

To manage a measurement:

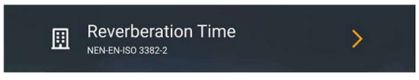
- Tap the **ellipsis icon** (⋮) next to the measurement name
- Choose **Delete**, **Rename**, or **Edit**

Viewing and managing previous measurements is available in all special measurement workflows.

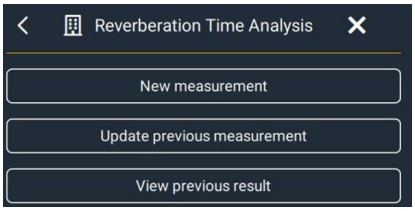
8.10.2 Reverberation Time

This section describes the special measurement workflow for Reverberation Time according to European standards described in NEN-EN-ISO 3382-2.

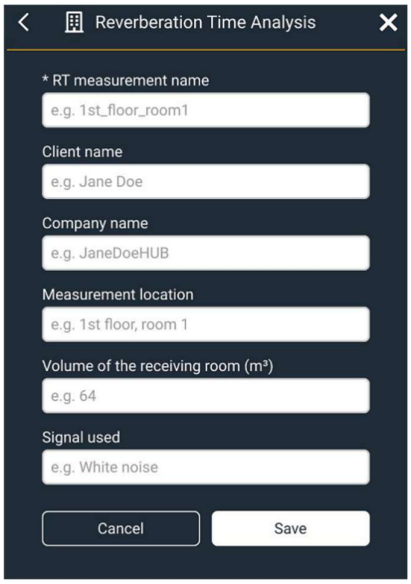
Step 1: Select the Reverberation time.



Step 2: Make a **New measurement**, change a previously performed measurement in **Update previous measurement** or load results from an existing measurement in **View previous result.**



Step 3: When making a new measurement, tap **New measurement**. The following screen will be displayed.



To start, enter an **RT measurement name**.
(Optional) Add the following information for reporting purposes:

- Client name
- Company name
- Measurement location
- Volume of the receiving room
- Signal used

Tap **Save** to create the project or **Cancel** to discard it.

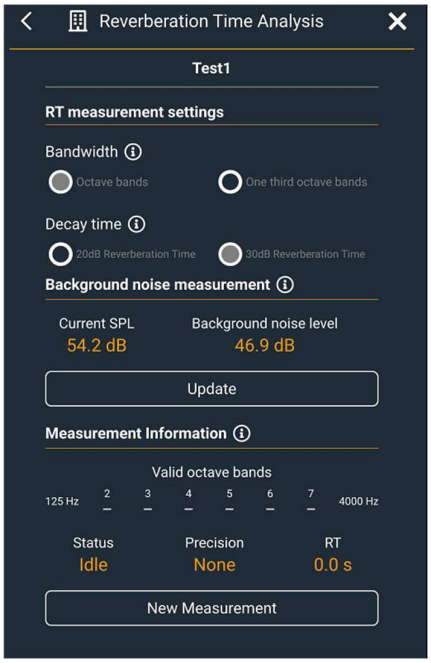
Step 4: Under **RT measurement settings**, choose how to display the results:

- Octave bands or One-third octave bands
- 20 dB or 30 dB reverberation time (decay time)

Tap the circle next to your preferred option.
More information is available by tapping the **info icon** on the device.

Background noise measurement
Under **Background noise measurement**, tap **Measure** to begin.
You can repeat this process multiple times. After each measurement, tap **Update** to display the average background noise level.

- **Current SPL** shows the level of each individual measurement
- Ensure a quiet environment, avoid external noise such as talking, music, traffic, or construction during the measurement



Performing reverberation time (RT) measurements

To begin an RT measurement, tap **New Measurement** at the bottom of the screen.

Important: The **New Measurement** button should be pressed while the sound source is already playing. The CAM iV64 uses the interrupted noise method, which requires a steady broadband noise that is suddenly stopped.

We recommend using an omnidirectional speaker playing white noise or pink noise.

Measurement status indicators

The **Status** field shows the current state of the measurement:

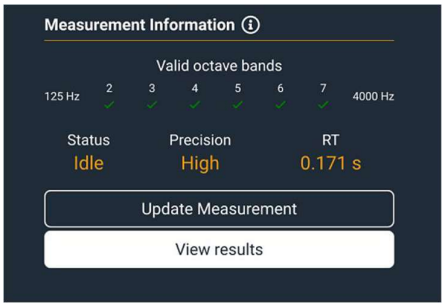
- **Idle** — Sound level is too low compared to the background noise
- **Armed** — Sound level is sufficiently above background noise
- **Active** — A decay is detected after stopping the sound source

Once the required decay (20 dB or 30 dB, depending on your setting) is measured, the status returns to **Idle** and the result is saved. While the system checks the input level, the **New Measurement** button changes to **Measuring...**.

Repeating measurements and averaging results

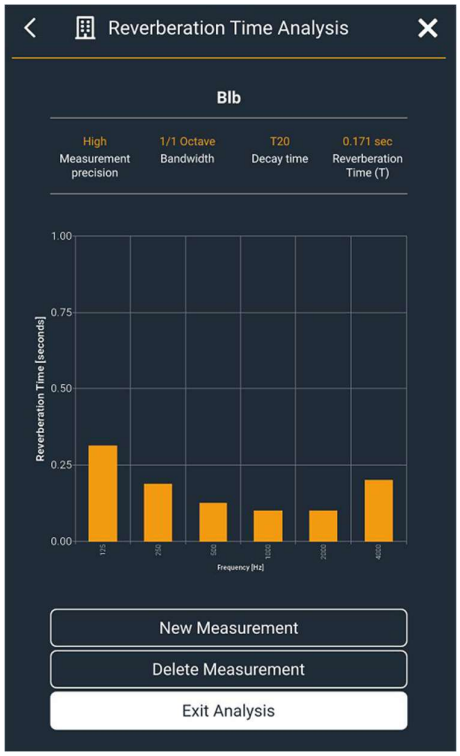
You can perform multiple RT measurements. After completing more than one, tap **Update measurement** to calculate the **average reverberation time (RT)**.

- **Status** indicates the current measurement state
- **Precision** reflects the reliability of the averaged result, adding more measurements improves precision



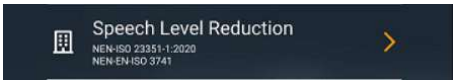
Step 5: View results

After completing the desired number of measurements, tap **View results**. The calculated reverberation time results will then be displayed.



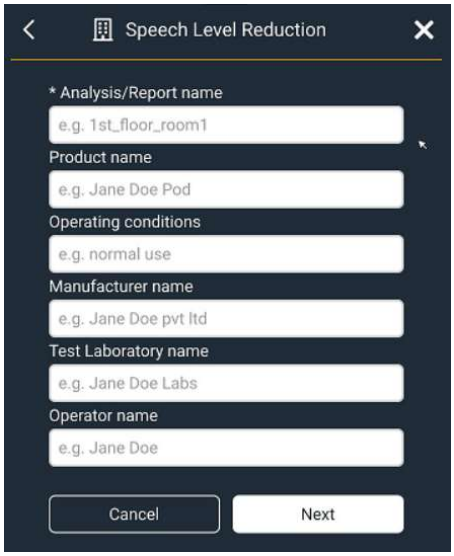
8.10.3 Speech Level Reduction

Step 1: Select the **Speech Level Reduction**.



Step 2: Make a **New measurement** or load results from an existing measurement in **View previous result**.

Step 3: When making a new measurement, tap **New Measurement**. The following screen will be displayed.



Enter an **Analysis/Report name** to create new **speech level reduction or STC project.**

(Optional) Add the following information for reporting purposes:

- Product name
- Operating conditions
- Manufacturer name
- Test laboratory name
- Operator name

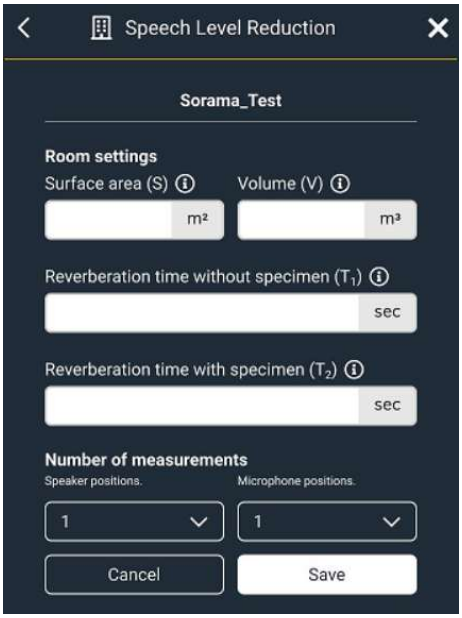
Tap **Next** to proceed to the measurement settings, or **Cancel** to exit.

Step 4: Enter the room settings and specify the number of speaker and microphone positions required for the test.

The next screen displays the project name at the top (e.g., *Sorama_Test*).

For details on performing the reverberation time measurement, see **§9.10.2.**

Note: The number of speaker positions depends on how many participants can be accommodated within the test specimen.



Surface area (S):

Total surface area S of the test room in m^2

Volume (V):

Volume of the test room V in m^3

Reverberation time without specimen (T1):

The reverberation time T_{60} of the test room without specimen in s.

Reverberation time with specimen (T2):

The reverberation time T_{60} of the test room with specimen in s.

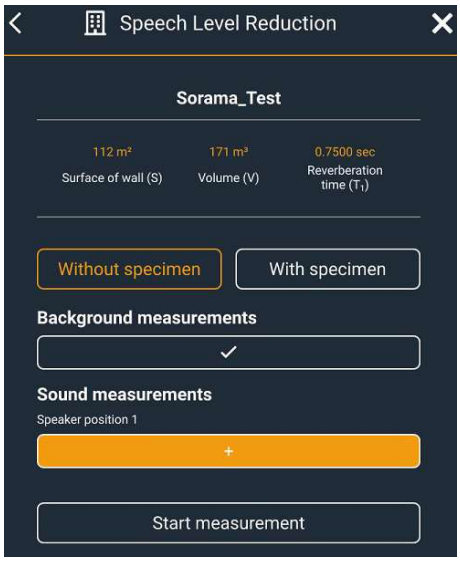
Speaker/Microphone positions:

Amount of speaker positions and microphone positions needed for the measurement.

Step 5: To determine the sound power level of the reference box (without the specimen), follow these steps for each selected microphone position:

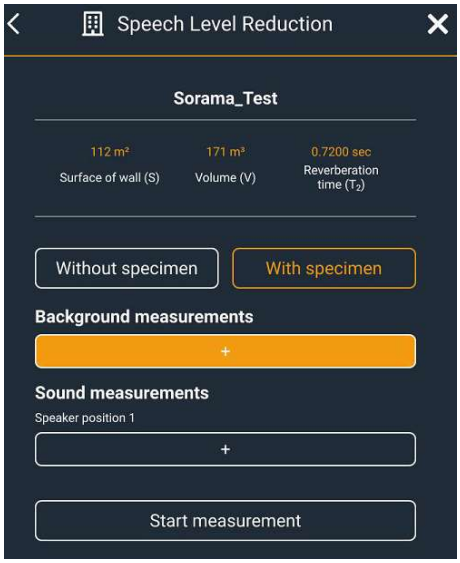
1. Tap **"+"** and then **Start measurement** to perform the background noise measurement.
    - A 10-second measurement is performed in one-third octave bands from 100 Hz to 10,000 Hz.
2. Repeat the process for the sound measurement, this time with the sound source active at the position representing an occupant inside the specimen.

Note: The sound measurement must be taken directly before or after the corresponding background noise measurement for accurate comparison.



Step 6: Determine the sound power level of the reference box with specimen in the test room. Tap on '+' and 'start measurement' to start measuring the background noise in the test room for every microphone position selected. A 10 second measurement in one third octave bands from 100 Hz to 10000 Hz is performed each time. The same process will follow for the sound measurement, however this time with a sound source switched on at the location where an occupant would be within the specimen.

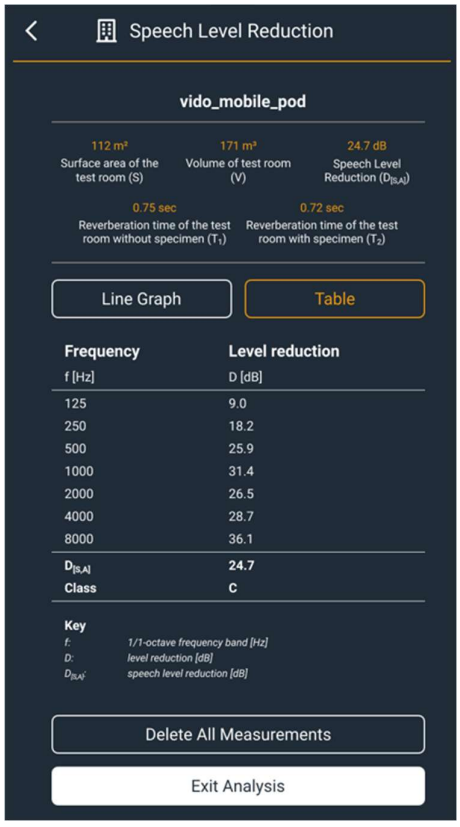
Please note the sound measurement must be measured directly before or after the background noise measurement.



Step 7: Once all measurements are completed, the **Show results** button appears. Tap this button to view the results.

- The Line Graph displays the Level Reduction D across the measured frequency range.
- The Table section shows numerical values for Level Reduction D and the reduction classification.

Both sections also display the overall Speech Level Reduction $D_{S,A}$ as a single summary value.



D = level reduction

The level reduction is the difference between the sound power levels measured without and with specimen. This level reduction is calculated and reported in 1/1 octave frequency bands from 125 Hz to 8000 Hz and is Z-weighted.

$D_{S,A}$ = A-weighted Speech Level Reduction.

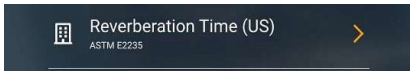
Class = Classification of enclosures according to the Speech Level Reduction, $D_{S,A}$

For details of the determinations please refer to the norms, NEN-ISO 23351-1:2020 and NEN-EN-ISO 3741.

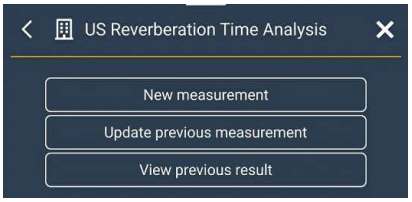
8.10.4 Reverberation Time

This section describes the special measurement workflow for Reverberation Time, following the ASTM E2235 standard as used in the United States.

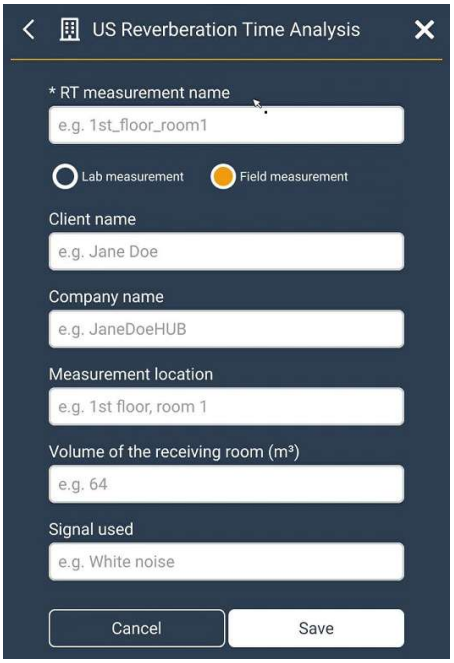
Step 1: Select the Reverberation time.



Step 2: Make a **New measurement**, change a previously performed measurement in **Update previous measurement** or load results from an existing measurement in **View previous result**.



Step 3: When making a new measurement, tap **New Measurement**. The following screen will be displayed.



Enter an **RT measurement name** and select the measurement type:

- Lab measurement — Uses T_{30} decay time in 1/3 octave bands
- Field measurement — Uses T_{20} decay time in 1/3 octave bands

(Optional) For reporting purposes, you can also enter:

- Client name
- Company name
- Measurement location

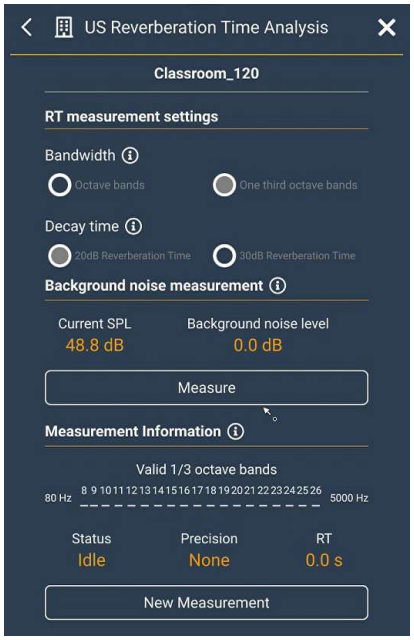
- Volume of the receiving room
- Signal used

Tap **Save** to create the project, or **Cancel** to discard it.

Step 4: Perform a background noise measurement by tapping **Measure** under the **Background noise measurement** header to start. You can repeat this step as needed. After performing multiple measurements, tap **Update** to calculate the average background noise level.

- Current SPL shows the result of each individual measurement.

For accurate results, ensure the room is quiet and free from external noise (e.g. music, speech, traffic, or construction).



• Performing reverberation time measurements

To begin, tap **New Measurement** at the bottom of the screen.

Important: The CAM iV64 uses the interrupted noise method - a steady broadband noise is played and then suddenly stopped. Start the measurement while the sound source is playing. Use an omnidirectional speaker with white noise or pink noise for best results.

• Status indicators

After tapping **New Measurement**, the button changes to **Measuring...**, indicating that the device is checking the input level. The **Status** field shows the current measurement state:

- **Idle** - Sound level is too low compared to the background noise
- **Armed** - Sound level is high enough to begin measurement
- **Active** - A decay is detected after the sound source stops

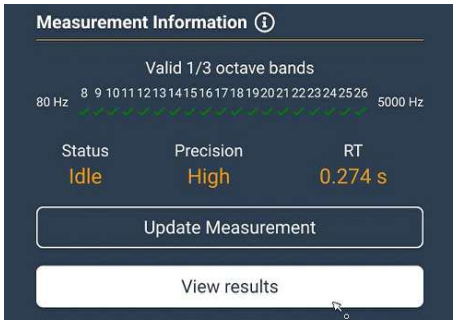
Once the required decay time is reached (20 dB or 30 dB, depending on settings), the measurement ends and the status returns to **Idle**.

• Repeating and updating measurements

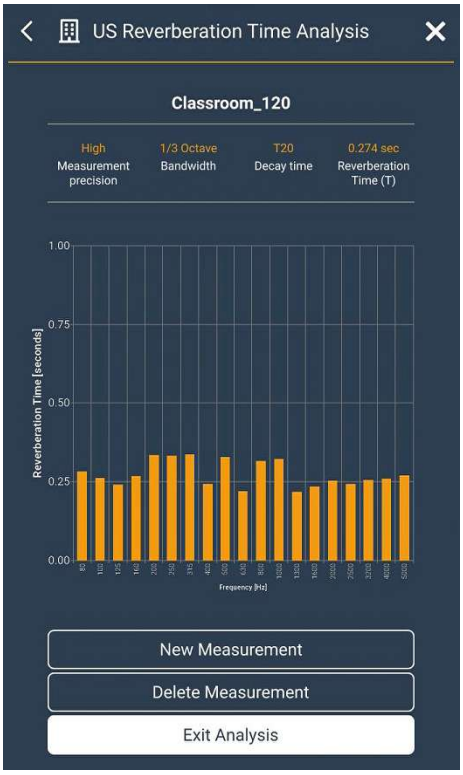
You can perform multiple reverberation time measurements.

After completing additional measurements, tap **Update measurement** to display the **average Reverberation Time (RT)**.

- **Status** shows the current measurement condition
- **Precision** reflects the consistency of results, more measurements improve accuracy



Step 5: After completing the desired number of reverberation time measurements, tap **View results** to display the calculated results.



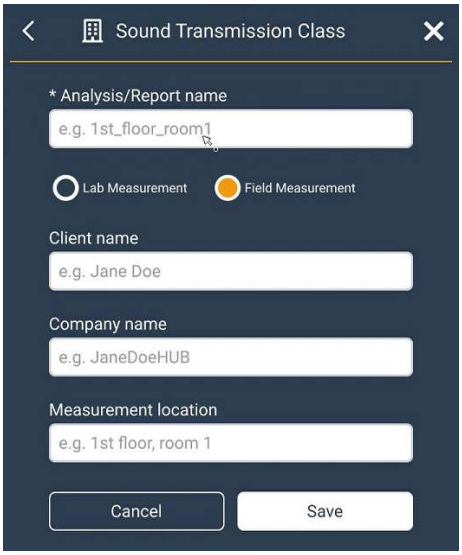
8.10.5 Sound Transmission Class

The CAM iV64 contains a special measurement workflow for the Sound transmission class measurements, which is the USA equivalent of the European Sound reduction index.

Step 1: Select the Sound Transmission Class.

Step 2: You can start a **new measurement** or load results from an existing one by selecting **View previous result**.

Step 3: To start a new measurement, tap **New Measurement**. The next screen will then be displayed.

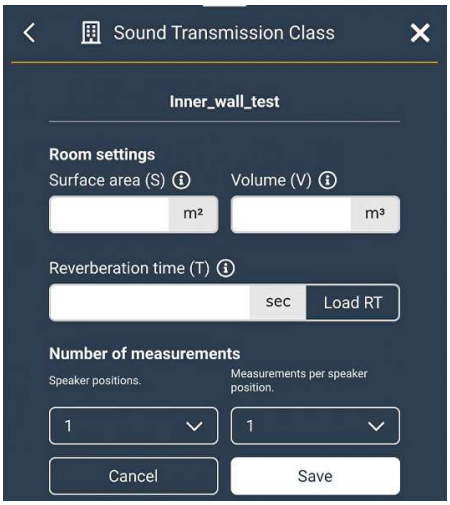


Create a project by entering the Analysis/Report name and selecting a measurement type. If Lab measurement is selected, the Sound Transmission Class is labeled STC. If Field measurement is selected, it is labeled ASTC.

For reporting purposes, you can also enter the Client name, Company name, and Measurement location.

Tap **Save** to create the project, or **Cancel** to discard it.

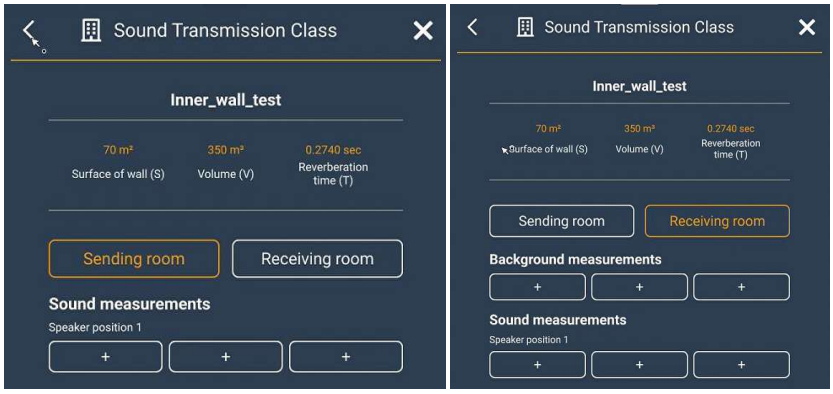
Step 4: Enter the room dimensions, reverberation time, number of speaker positions, and number of measurements per speaker position. The next screen will display the project name at the top, for example, *Inner_wall_test*.



Step 5: The total number of measurements depends on the number of speaker positions and measurements per position you entered. For example, with 1 speaker position and 3 measurements per position, a total of 9 measurements are required:

- 3 measurements in the source room
- 3 background measurements in the receiving room
- 3 measurements in the receiving room

Make sure to follow the same order for each speaker position.

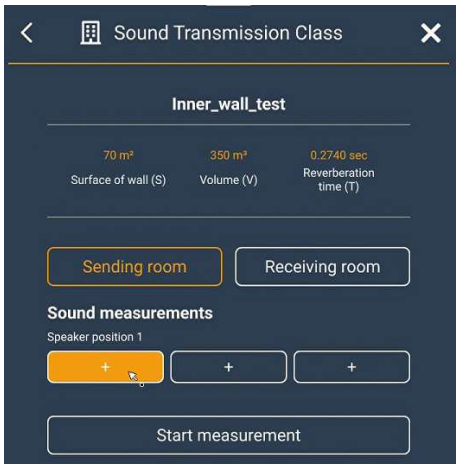


When a box is tapped, a **Start measurement** button appears at the bottom of the screen.

Tap **Start measurement** to begin:

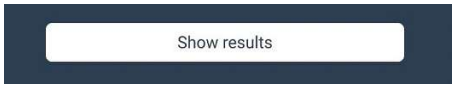
- For sound measurements in the source and receiving rooms, the device measures for 10 seconds in 1/3 octave bands
- For background noise measurements in the receiving room, the measurement lasts 30 seconds

Each result is saved automatically after completion.

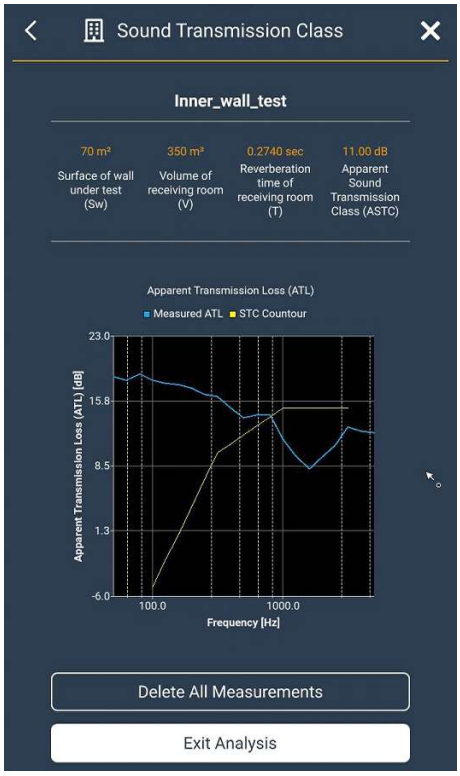


After a measurement is completed, a **checkmark** appears in the box, replacing the **+** icon. To redo a measurement, tap the box again.

Step 6: Once all measurements are completed, the Show results button appears.



Tap **Show results** to display the calculated results on screen. An example of the results is shown in the following image.

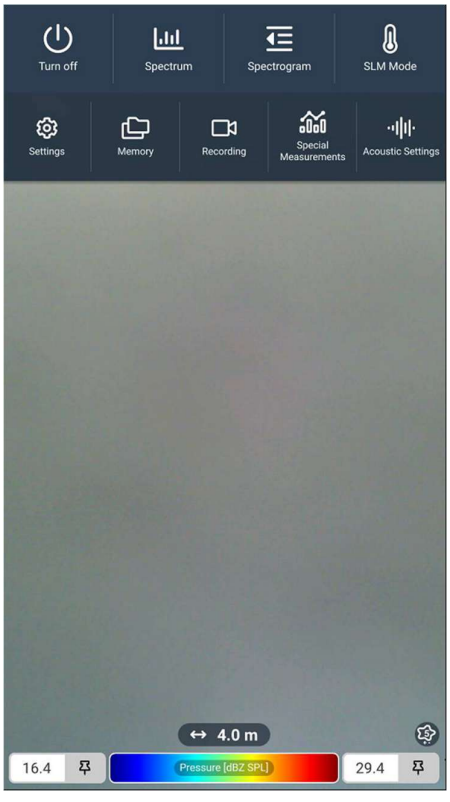


9 OPERATIONS

9.1 Basics

Power on the device by pressing the trigger button. A LED indicator located above the USB-C connector (left side) will light up when the device is on. Booting takes approximately 30 seconds.

To show the menu, swipe down from the top. Tap to activate the spectrum feature.

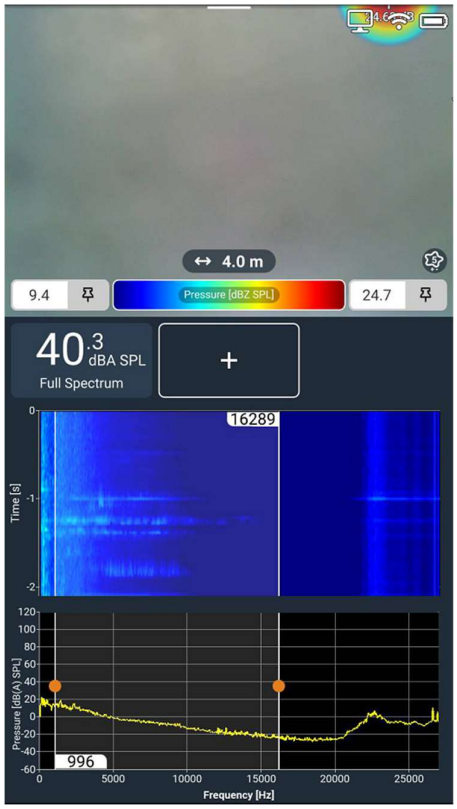


The microphone data from the array can be visualized on screen for a specific frequency bandwidth.

When the spectrum is displayed:

- Drag the orange dots to set the lower and upper frequency limits
- To move the entire band, drag it from the center to reposition it within the spectrum

To view the spectrum, spectrogram, and SLM mode at the same time, tap their respective icons. All selected modes will then appear on screen simultaneously.



9.2 Mount Sorama CAM iV64 on a Tripod

⚠ **Caution:** The product is heavier than standard cameras. Use a stable and firm tripod to ensure safe operation. Check the balance carefully before mounting. Sorama is not responsible for any damage or injury caused by improper tripod use.

A tripod with a ¼-inch UNC camera screw is required.

Before mounting:

- Adjust and secure the tripod legs
- Position the tripod under the bottom insert of the device and mount it securely

9.3 Data Management

Recording Format

A short press of the trigger button on top of the handgrip starts and saves a screen recording in WEBM format, with a duration of up to 30 seconds. This format is lightweight and ideal for sharing or presentations.

You can change the recording format to:

- **RAW video** - Saves as a .SOR file containing all data needed for post-processing in the Sorama Portal (approx. 600 MB per 30 seconds)

- **Image** - Saves a PNG screenshot of the current screen

Choose the format that best fits your workflow before starting the recording.

Exporting

Measurement data is stored in the device's internal memory as .sor, .webm, or .png files. Data can also be saved to an external drive connected via the USB-C port.

To export data:

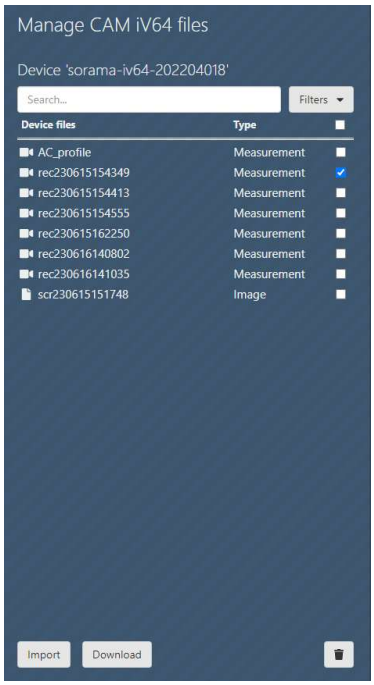
- **Option 1:** Transfer files from the external drive to a computer
- **Option 2:** Connect the device to your PC using the supplied USB-C cable and access files through the Sorama Portal

In the **Sorama Portal**:

1. Click **Manage**
2. Select your device from the list
3. Once connected, select the files you want to export
4. Click **Download** to save the selected files to your computer

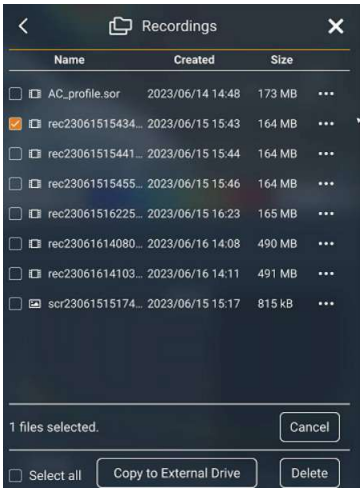
The supported export formats are .sor, .webm, and .png.

.



9.3.1 Transferring measurements from local storage to an external USB drive

In the selected folder in **Memory**, press and hold a file for 2 seconds to activate multi-selection mode.



Click on **Copy to External Drive**, then click **Copy** to export the selected file to the external drive.

Once the export is complete, the file will be saved in a newly created folder named **SoramaExport** on the external drive.

9.4 Sorama Portal

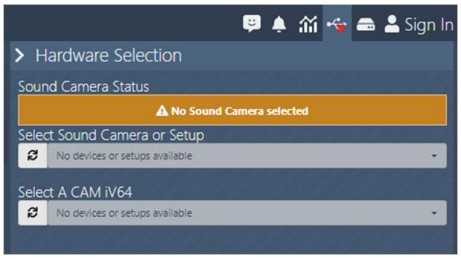
You can upload performed measurements in .sor format and special measurement data to the Sorama Portal for in-depth analysis and digital report generation.

Note: Files in .png and .webm format cannot be uploaded for analysis, as they do not contain raw audio data.

To begin:

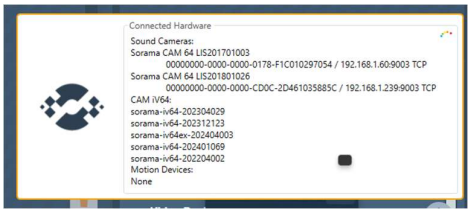
1. Go to portal.sorama.eu
2. Click the **Hardware selection** icon (USB symbol)
3. Select your connected CAM iV64 from the dropdown menu

Once connected, you can upload and analyze supported measurement files.



If your CAM iV64 device does not appear in the list, click the **refresh** button next to the hardware selection dropdown. Ensure that you have installed the latest version of the Sorama Acquisition Client.

When you hover over the Sorama Acquisition Client icon, a list of connected devices will be shown, as illustrated in the example below.

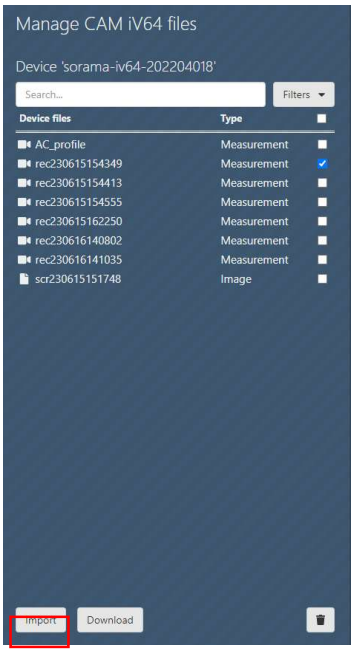


Uploading measurement data to Sorama Portal

Your measurement data can be uploaded to the Sorama Portal using the Sorama Acquisition Client, which is required for this process. You can download the client directly from the Sorama Portal.

There are three ways to upload data:

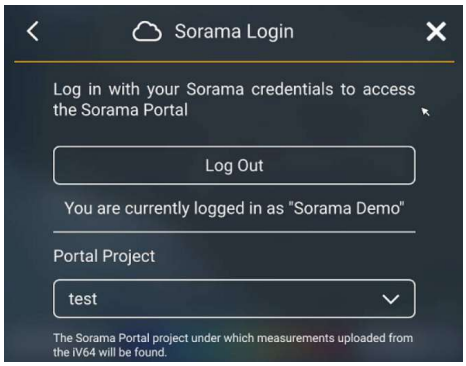
1. Connect your CAM iV64 to your computer using the supplied USB-C cable, or ensure the device is connected to the same Wi-Fi network as the computer running the Sorama Portal.
2. In the Sorama Portal, go to the **Manage** workflow. If the CAM iV64 is connected properly, the file structure of your recordings will be displayed.
3. Select the desired files and click **Import** to upload them to your Sorama Portal account.



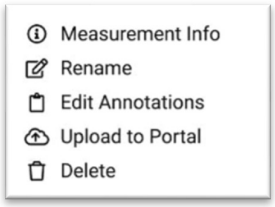
1. Import using an external memory drive Insert the external drive into the computer you're using to access the Sorama Portal. Then go to the **Manage** workflow and click **Import** in the **Measurements** section to upload the files.

This allows you to drag and drop the .sor files from your external drive into the Sorama Portal.

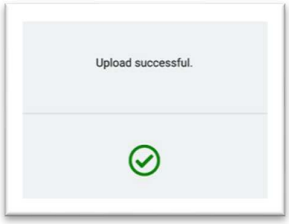
2. Over the air upload. First, select your destination Portal Project on the CAM iV64 from **Settings > Sorama Login > Portal Project**.



Navigate to the Memory view. Click on the **ellipsis** symbol next to a measurement, and tap on **Upload to Portal.**



To upload multiple measurements at once, long press on a measurement to enter multiple selection mode. Select the desired measurements, then tap **Upload to Portal** at the bottom of the screen. Once the upload is complete, the measurements will be available in the **Analyze** section of the Sorama Portal.



NOTE: Only RAW measurements (.sor) can be uploaded.

9.4.1 Downloading reports of special measurement workflow measurements

For every measurement performed using the special measurement workflows on the CAM iV64, a report can be downloaded via the Sorama Portal. This applies to the following workflows:

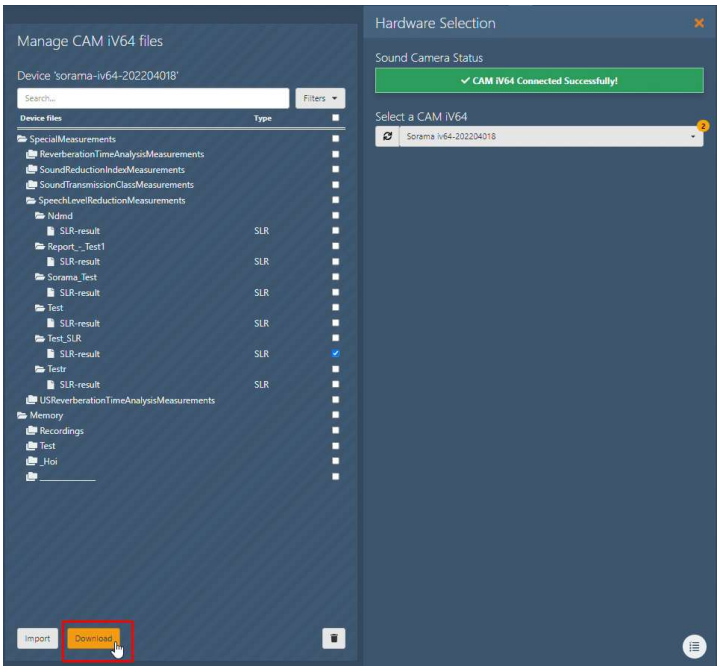
- Sound Reduction Index
- Reverberation Time (EU and USA versions)
- Speech Level Reduction
- Sound Transmission Class

To download a report:

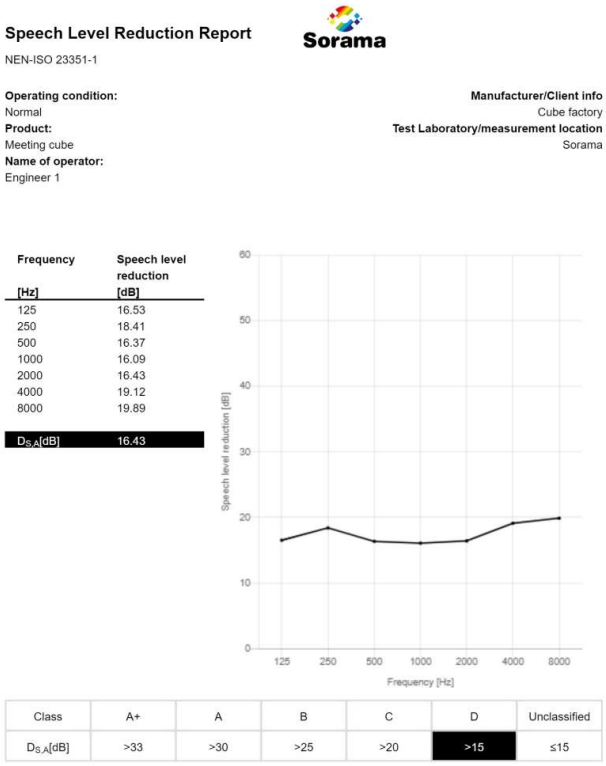
1. Connect the CAM iV64 to your computer using the supplied USB-C cable.
2. Open the Sorama Portal and ensure the CAM iV64 is recognized. If not, download and install the Sorama Acquisition Client when prompted.
3. Once connected, go to the **Manage** workflow and open the **Manage CAM iV64 files** tab.

4. Navigate to the **Memory** folder for screenshots and videos, or to the **SpecialMeasurements** folder for measurement data.
5. Locate the workflow folder for your measurement (e.g., SpeechLevelReductionMeasurements) and open the specific project folder (e.g., *Test_SLR*).
6. Select the checkbox next to the desired result file (e.g., SLR-result) and click **Download** at the bottom of the screen.

This will download the report to your computer for further use.



A report will be downloaded in PDF format, presenting the results of the measurement performed on the CAM iV64.
Below is an example of a report generated after completing a Speech Level Reduction measurement.



Speech Level Reduction Report

NEN-ISO 23351-1

Operating condition:
Normal
Product:
Meeting cube
Name of operator:
Engineer 1

Manufacturer/Client info
Cube factory
Test Laboratory/measurement location
Sorama

Frequency [Hz]	Speech level reduction [dB]
125	16.53
250	18.41
500	16.37
1000	16.09
2000	16.43
4000	19.12
8000	19.89
$D_{S,A}$[dB]	16.43

Class	A+	A	B	C	D	Unclassified
$D_{S,A}$[dB]	>33	>30	>25	>20	>15	≤15

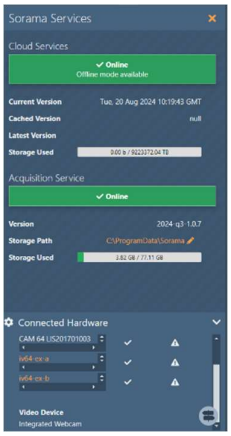
9.4.2 Feature Licensing

Enable specific features on your CAM iV64 by installing Feature Licenses through the Sorama Portal.

To begin:

1. Connect the CAM iV64 to your computer using the provided USB Type-C cable, or connect it to the same network using Wi-Fi.
2. Log in to the Sorama Portal.
3. Navigate to the Sorama Services tab.
4. Ensure that the latest version of the Sorama Acquisition Client is installed.

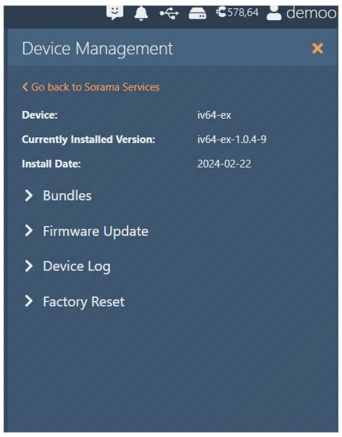
The screen will appear as shown in the example below.



Click on your device name under **Connected Hardware** at the bottom of the **Services** tab. This will open the **Device Management** page.

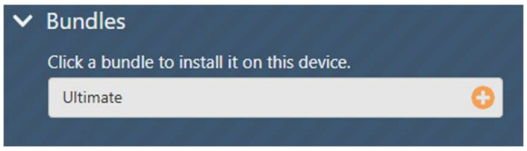
On this page, you can view information such as the device name, currently installed firmware version, and installation date. You will also find four available options:

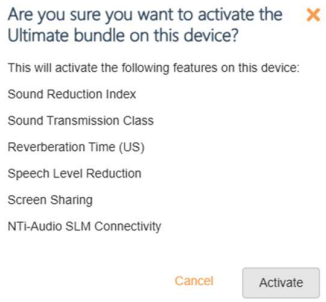
- Bundles
- Firmware Update
- Device Log
- Factory Reset



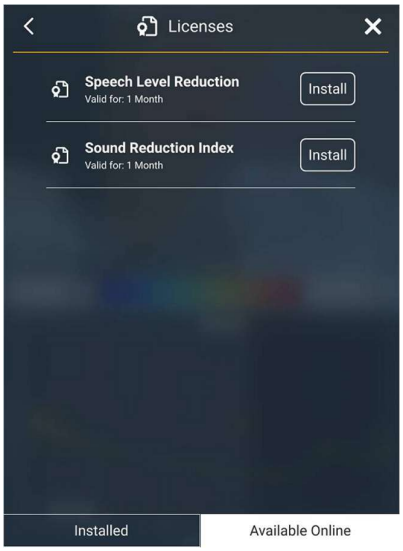
Bundles

To add a required bundle, click the **"+" icon** next to the bundle name. A prompt will appear with the options **Activate** or **Cancel**. Select **Activate** to install the bundle on your device. Once the installation is complete, a confirmation message will appear: **"Successfully placed the license on your device."** Screens illustrating this process are shown below.

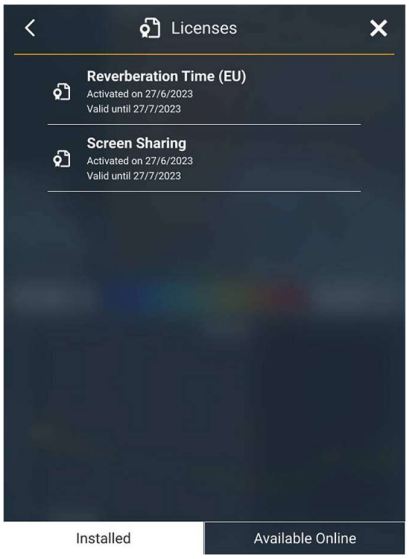




Alternatively, you can install the bundle from the **Available Online** section under **Licenses** on the device, after logging into your **Sorama Portal** account.



Once the feature licenses have been successfully transferred to the device, they can be found under **Settings** > **Licenses** > **Installed**.



⚠️ **NOTE:** Currently, only individual licenses can be activated directly from the device. **Bundles** must be activated through the **Sorama Portal**.

⚠️ **NOTE:** If you have multiple devices, you can choose which device to install a license on. Once a feature is installed, it will remain on that device and cannot be revoked or transferred until it expires. Features that have not yet been installed will remain visible on all logged-in devices.

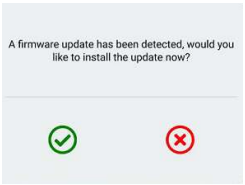
9.4.3 Device Management

Firmware Update:

Alternatively, if the CAM iV64 is connected to the internet, the device can be updated without using the Sorama Portal.

Go to **Settings** > **System Info**, then tap **Check for Updates**. Log in to your Sorama Portal account directly on the device to download and install the latest firmware.

Once the download is finished a small window will pop up asking for the firmware installation, click **Yes** and the on-device firmware update is complete.

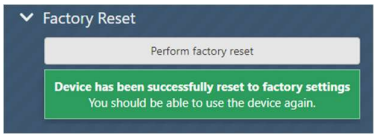


Device Logs:

This will download the device logs. These will be used by Sorama for troubleshooting in case the device is not functioning properly.

Factory Reset:

The device can be reset to the factory firmware version using this option. The screen for the following is shown below:



10 Maintenance

10.1 The Imager

⚠ Caution

The imager does not require routine maintenance.
The lens features high-quality optical coatings. Avoid contact with the optical surfaces and protect them from dirt and damage.

10.2 The case

Clean the case with a clean, damp cloth. Do not use abrasives, isopropyl alcohol, or solvents to clean the case or lens/window.

10.3 Acoustic Sensor Care

⚠ Caution

The imager has sensitive acoustic sensors. Do not expose the sensors to water or fluids, dust, and other contaminates. Accumulation of these in the sensor will affect the performance.

10.4 Environmental

The product contains electronic printed circuit boards that require special disposal at the end of the device's life cycle.
To support environmentally responsible disposal, the manufacturer offers a take-back service. Contact Sorama for more information or to arrange return of the device.

10.5 Service

Contact Sorama for information by sending an email to helpdesk@sorama.eu.

10.6 Specifications

Complete specifications are at https://sorama.eu/products/sorama-cam-iv64-2/. See the CAM iV64 Product specifications.