acoust IQ

MEASURABLY MORE.

User Manual

(V1.0, June 2025)

Portable Sound Level Meter with Digital Microphone and iPhone
Complete guide to operating and understanding the acoust IQ measurement system.

BBM TESTLAB

Table of Contents

1 Introduction

This app enables the measurement of sound levels with an iPhone (15 or newer) or iPad (with USB-C port) and a connected digital microphone of Class 1 or Class 2. For simplicity, only the iPhone is mentioned below. The microphone data are stored on the iPhone and, along with other captured data such as position or measurement documentation, can be exported.

Additionally, the most important single values of the calculated sound pressure levels and the 1/3-octave spectrum are displayed on the screen.

2 Product Components

The measurement system consists of the following components (Figures 1 and 2):

- iPhone (15 or newer) or iPad
- Protective case with microphone holder (by Quadlock)
- ½″ measurement microphone capsule MKS 225 and preamplifier Microtech Gefell MV 240 digital with built-in analog/digital converter
- Alternatively, UMIK-2 (miniDSP)
- Connection cable between microphone and iPhone (4-pin Lemo at microphone, USB-C at iPhone) for power supply from the iPhone and digital measurement data transmission from microphone to iPhone (two lengths: 0.15 m, 2 m, 5 m)
- Windshield (recommended)

Figure 1: Product components: connection cable, measurement microphone, microphone capsule, and windshield. Source: www.microtechgefell.de

Figure 2: Product components: microphone in holder, iPhone in protective case, short connection cable.

3 Installing and Setting up the App

- Download the acoust IQ app from the Apple App Store and install it on your smartphone or tablet. Ensure that the Wi-Fi connection is active.
- Open the app and follow the setup instructions.
- Make sure your smartphone's battery is charged. Operating time with connected microphone is approximately 4 hours at full battery.
- Attach the microphone to the holder.
- Connect the external digital microphone (Class 1) to the USB-C port on the iPhone.

3.1 Placement of the Measurement Microphone

The sound level meter should be positioned away from shielding, reflective, or absorbing objects. In a diffuse sound field, measured sound pressure levels are reduced by absorbing objects. In a free sound field, measured sound pressure levels can be increased by reflective objects.

3.2 Mounting the External Digital Microphone

Please observe the following precautions when mounting the measurement microphone:

- Keep dust and foreign particles away from the microphone membrane. Do not touch the membrane as it is very sensitive.
- Carefully slide the microphone into the holder on the smartphone.
- Connect the cable (4-pin Lemo connector) to the microphone until it locks in place.
- Connect the USB-C to the smartphone until it locks in place.

3.3 Mounting the Windshield

For outdoor measurements or indoor measurements with air movement, place the windshield fully onto the microphone.

3.4 Measurement Procedure with Remote Microphone

The measurement microphone can be positioned remotely from the smartphone by using a 2 m or 5 m connection cable and mounting the microphone on a microphone stand.

4 Calibration

To verify functionality and ensure high measurement accuracy of sound level measurements, we recommend performing a check with an acoustic calibrator before measuring.

Follow these steps for acoustic calibration:

1. Keep away from loud sound sources during calibration.
2. Attach the calibrator to the microphone and switch on the test tone on the calibrator.
3. Place the calibrator with microphone and smartphone on a table.
4. Go to the gear icon ⚙ at the top right, enter the measurement setup, and tap "Calibration" near the bottom (Figure 3).

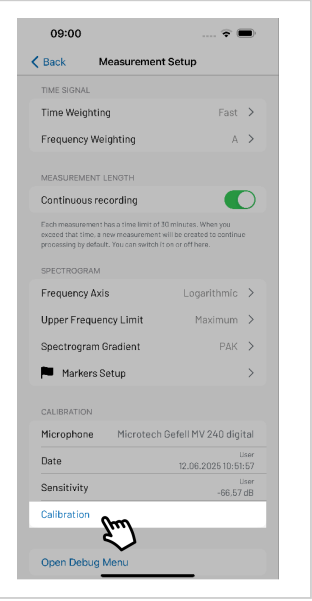


Figure 3: Start of calibration.

5. If the calibrator frequency and level deviate from the standard values, enter the values in the designated fields. Frequency can be entered between 125 Hz and 4000 Hz, level between 90 dB and 130 dB (Figure 4.1).
   Note: Confirm frequency and level input by tapping "Done".
6. Start calibration with the green Start button (Figure 4.2).
7. Calibration can be cancelled with the Cancel button (Figure 4.3).
8. Complete calibration with the green "Save" button (Figure 4.4).

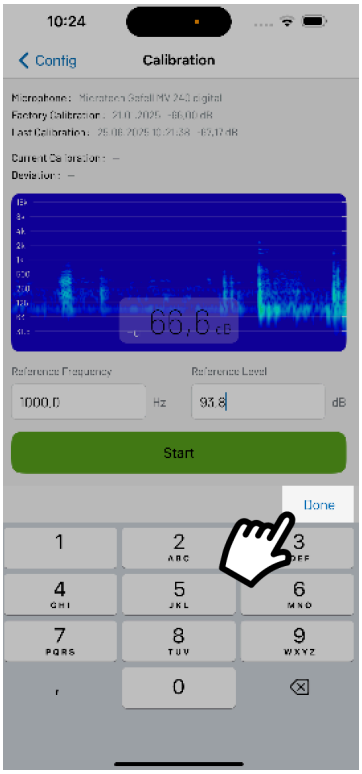


Figure 4.1

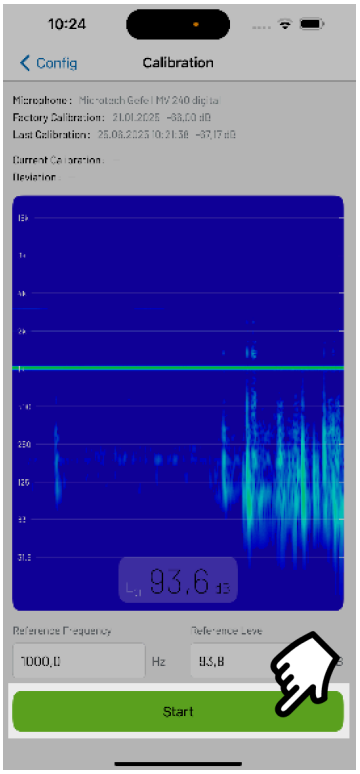


Figure 4.2

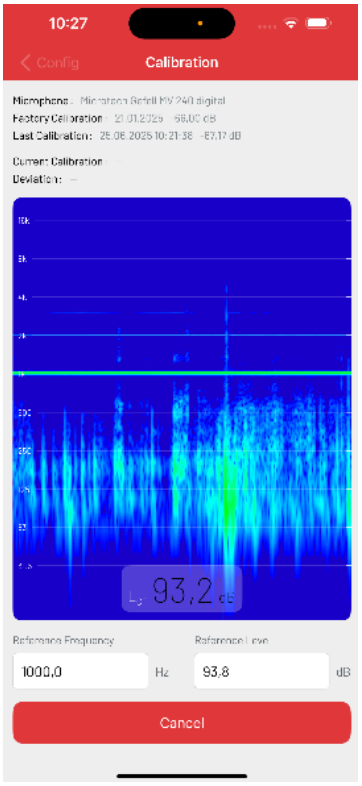
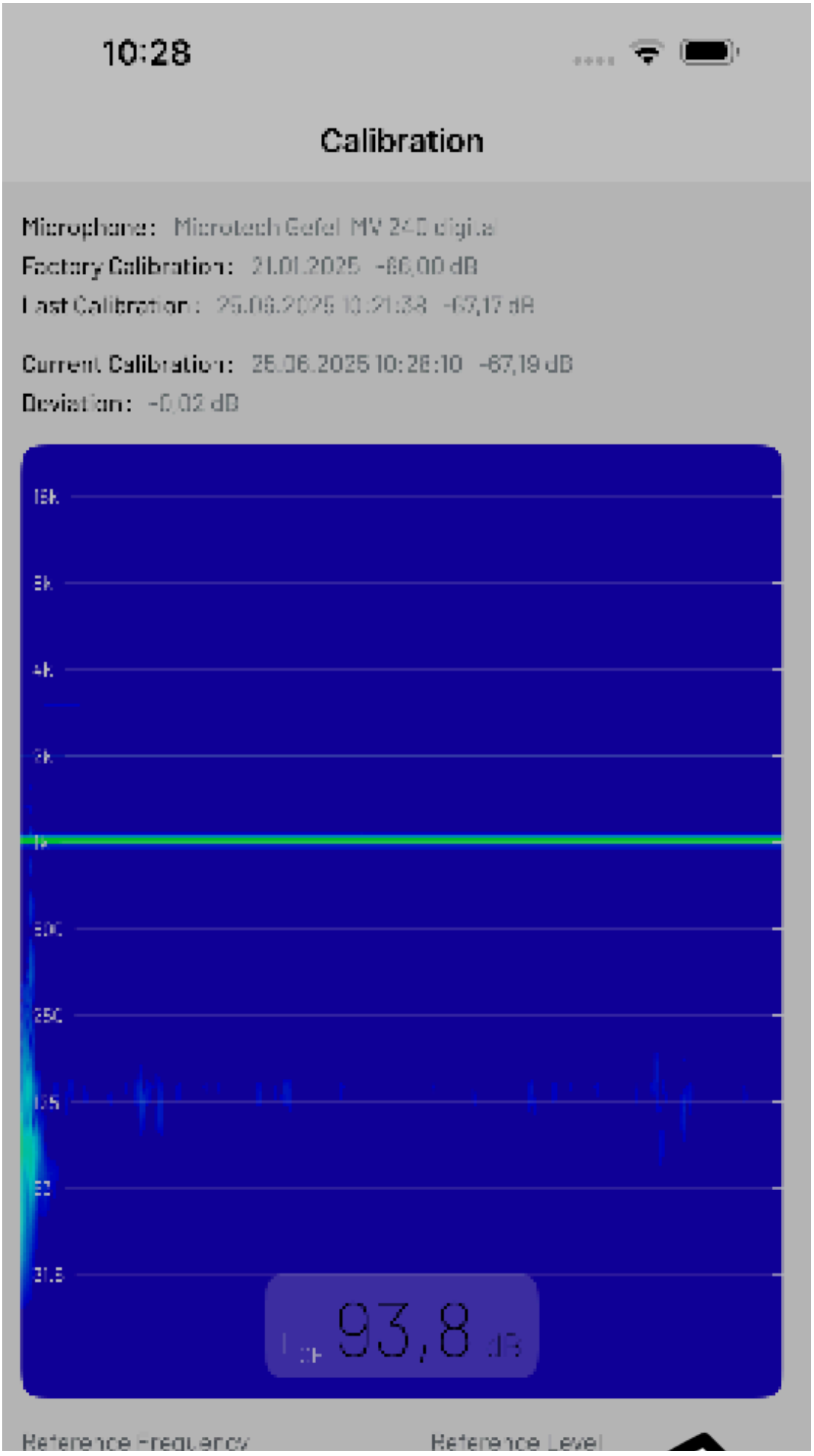


Figure 4.3


10:28
Calibration
Microphone: Microtech Gefell MV 24
Factory Calibration: 21.01.2025 -66,00 dB
Last Calibration: 25.06.2025 10:21:38 -67,17 dB
Current Calibration: 25.06.2025 10:26:10 -67,19 dB
Deviation: -0,02 dB
93,8
Reference Frequency
Reference Level

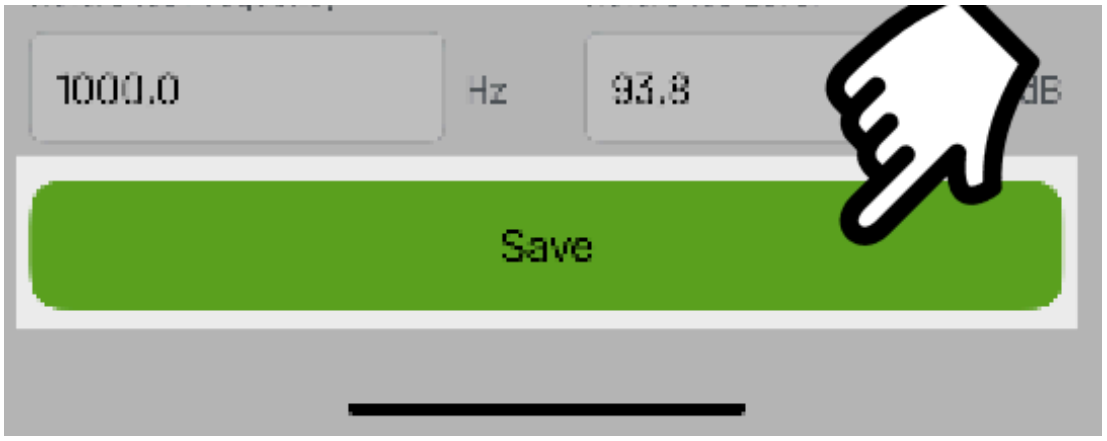


Figure 4.4

Figure 4: Performing calibration:

4.1 Displays in the Calibration Menu

1. Microphone: Designation of connected microphone
2. Date and Time: Last calibration
3. Microphone Sensitivity: dB

4.2 Plausibility Check

The supported measurement microphone (Microtech Gefell MV240/MKS225) has a sensitivity of approx. -66 dB (0.50119 mV/Pa). After calibration, the sensitivity should not deviate significantly from this value.

5 Measurement Settings

Go to the gear icon ⚙ at the top right to access the measurement setup. Here you can make your settings (Figure 5).

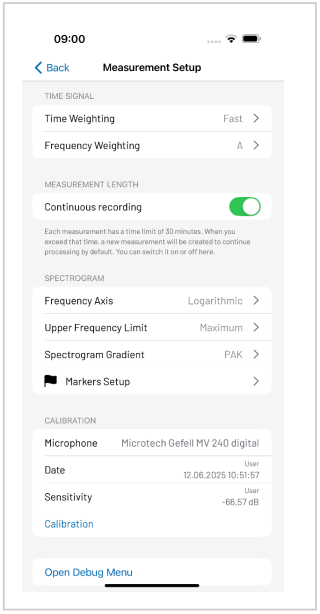


Figure 5: Settings menu for display and recording adjustment.

5.1 Time and Frequency Weighting

Time weighting (Figure 6.1):
- F (FAST, t = 125 ms)
- S (SLOW, t = 1000 ms)

Frequency weighting (Figure 6.2):
- A-weighting
- C-weighting
- Linear (no weighting)

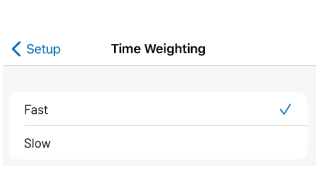


Figure 6.1

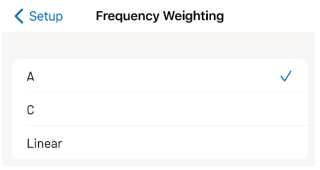


Figure 6.2

Figure 6: Signal settings

5.2 Measurement Duration: On/Off

Each measurement has a time limit of 30 minutes.
On: If exceeded, a new measurement is automatically created to continue measuring.
Off: The measurement stops after 30 minutes.

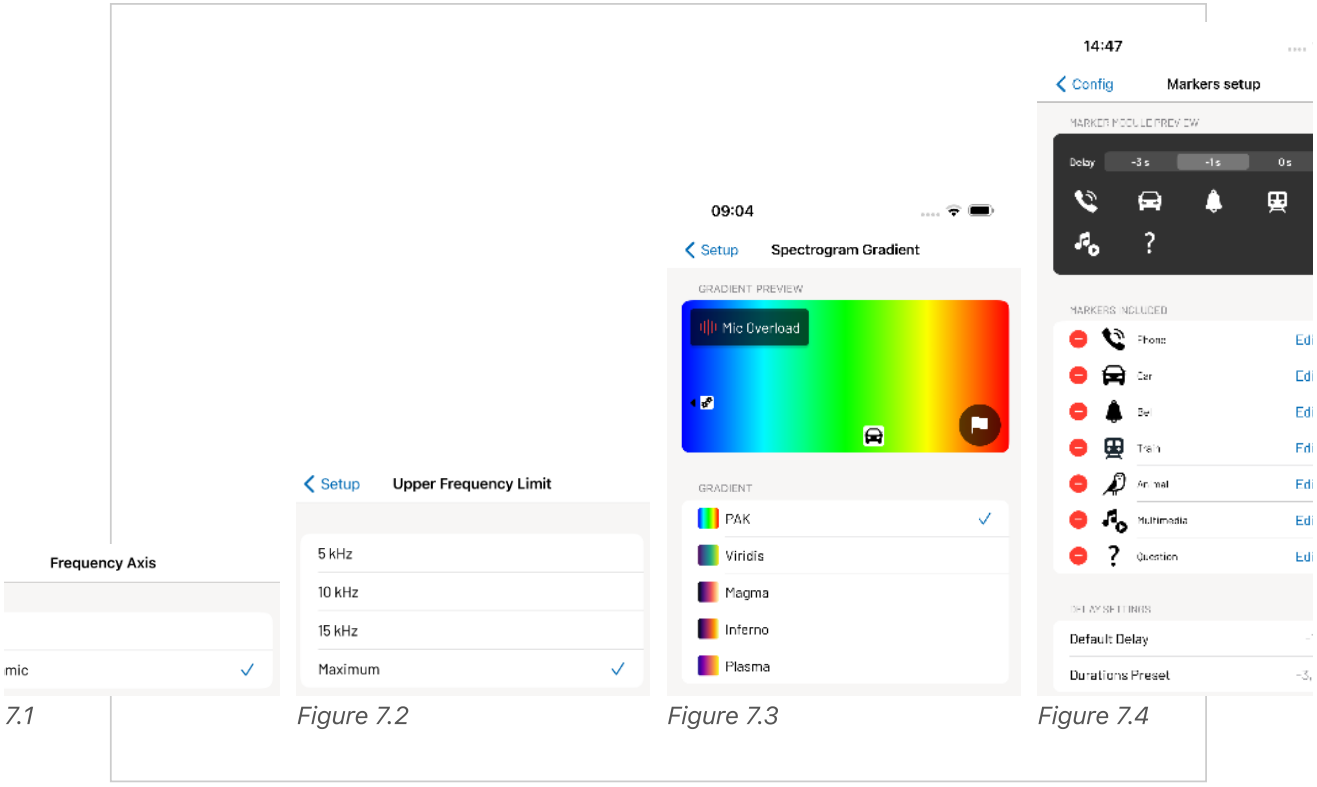
5.3 Spectrogram

Frequency axis (Figure 7.1):
- Linear
- Logarithmic

Frequency limit (Figure 7.2):
- 5 kHz
- 10 kHz
- 15 kHz
- Maximum 24 kHz

Spectrogram color scale (Figure 7.3):
- PAK, Viridis, Magma, Inferno, Plasma

Markers setup (Figure 7.4):
- Selection of icons to mark noise disturbances.



7.1 *Figure 7.2* *Figure 7.3* *Figure 7.4*

Figure 7: Spectrogram settings

6 Sound Level Measurement

If you follow the description below, you can start measuring immediately with the high-quality sound level meter while simultaneously becoming familiar with it.

6.1 Measurement "Quick Start"

In the home menu, you have the option to enter the measurement pre-run by pressing the "Start" button. For this, press "Start" at the bottom area. After the measurement is finished, a task is automatically created in which the measurement is saved.

Alternatively, first create a new folder or task via the "-button," which you can name directly. The new task/folder is labeled after the measurement with the date, number of files, and the total length of the measurements.

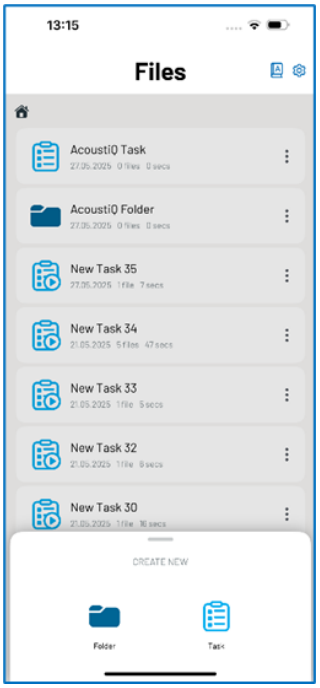


Figure 8.1: Directory structure

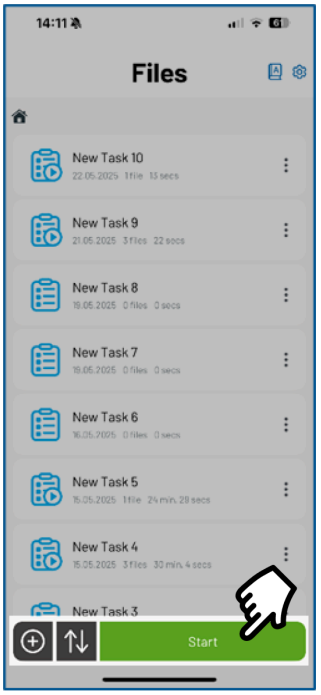


Figure 8.2: Start of measurement

Figure 8: Creating the directory structure and starting measurement preparation

After pressing Start, the app now shows the current sound levels in the measurement pre-run (Figure 9). By swiping right or left, switching between level values, spectrogram and octave bands is possible.

Please note: No measurement (recording) has started yet!

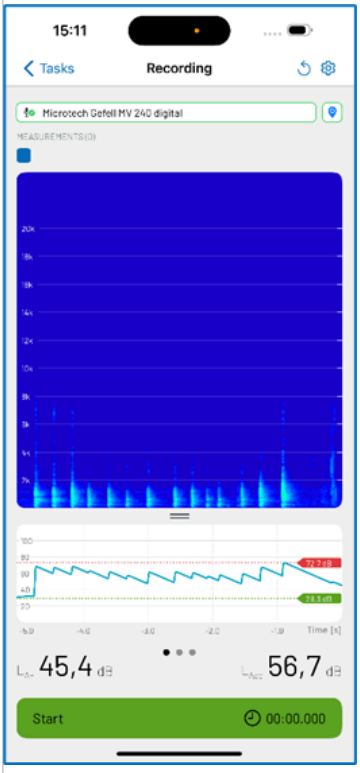


Figure 9.1: Spectrogram

Figure 9.2: Level values

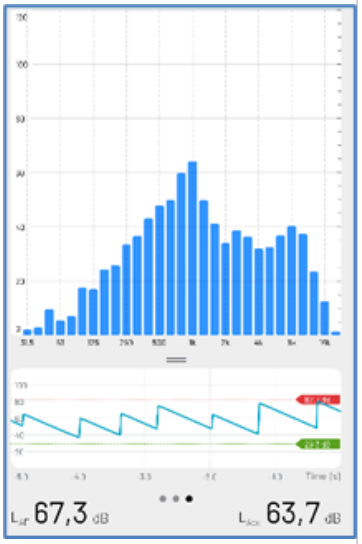


Figure 9.3: Third-octave progression

Figure 9: Views of the measurement preparation

- Press the lower green start button to start recording. The displayed level values are reset. The app shows the current sound level in decibels (dB).
- After starting the measurement, the red color on the display indicates that recording is active (Figure 10.1).

6.2 Stopping a Measurement

- Stopping a measurement can occur no earlier than after 5 seconds by pressing the "Stop" button (Figure 10.2). Pressing "Finish" completes and saves the measurement.

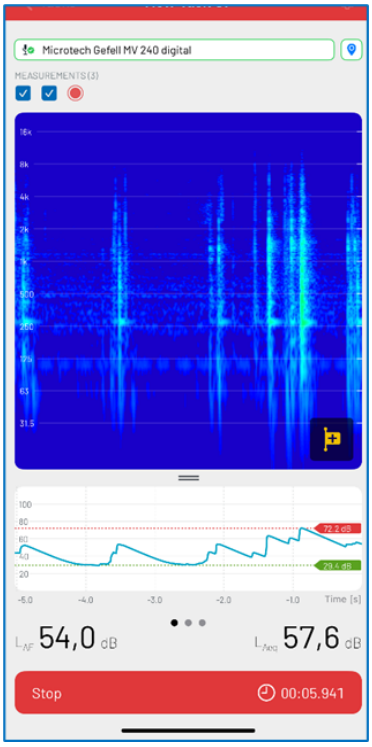


Figure 10.1: Measurement running

Figure 10.2: Stop measurement

Figure 10: Running and stopping measurement

6.3 Discarding a Measurement

- If you want to discard the measurement, swipe across the red area at the top from “left to right” (Figure 11).

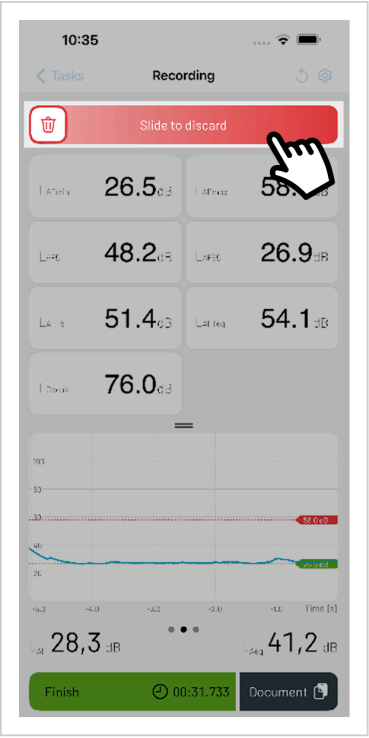


Figure 11: Discarding a measurement.

6.4 Photos and Description/Notes

- If everything is okay, you can now document the measurement. Press Document at the bottom to directly add photos and notes to your measurement (Figure 12.1). A description can be added in the upper text field (Figure 12.4). By pressing the “Photo icon +” you can take a photo directly or select one from the photo library of already saved pictures (Figure 12.3). The notes and photo descriptions are used for later report generation. Up to 8 images can be assigned to one measurement. Make sure to accept the photo description with "Done"

Figure 12.1: Completed measurement

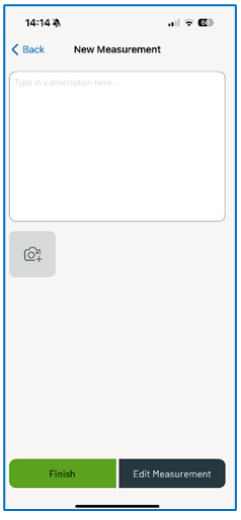


Figure 12.2: Documentation of the measurement

Figure 12.3: Adding photos

Figure 12.4: Measurement description

Figure 12: Measurement documentation

- The new measurement can now be saved ("Finish") or edited using “Edit measurement” (Figure 12.2). All modifications are non-destructive and can be undone. It is also possible to switch between different steps. Detailed information can be found in the chapters "Audio player and editing measurement" and "Measurement parameters".

6.5 Saving, Sharing and Deleting a Measurement

- After completeing the measurement, if not created manually beforehand, a new task is automatically created (“New Task”). The date, number of files and total length of the measurement are displayed in the new task's tab.
- These tasks can be deleted immediately by swiping left. Via the three dots the tasks can be shared, renamed, moved into a folder or deleted (Figure 13).

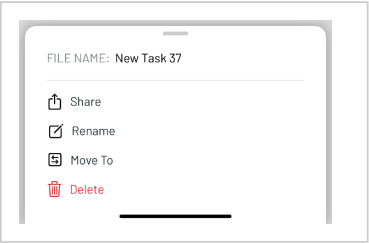


Figure 13: Share, rename, move or delete measurement.

6.6 Sharing Tasks

- Using the share button, a selection window appears where the respective sections can be deselected or selected:
- Normalize audio: When the slider is on, the audio file is adjusted for playback due to the high dynamic range.
- Photos: Up to 8 photos belonging to the measurement
- Description: Notes for the measurement
- Ignore areas: Excluded measurement areas
- Marker: Marking noise disturbances

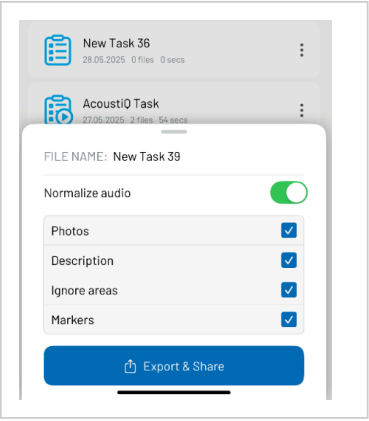


Figure 14: Sharing a measurement.

6.7 Exporting & Sharing Measurements

- Measurements are compressed as *.zip files and can be shared, for example via AirDrop, email, messages, etc.
- Note that longer measurements contain large amounts of data, and some services may be less suitable.
- For Apple® users, data export via AirDrop and iCloud is possible.
- Connection to Microsoft® Windows products can be made, for example, via OneDrive cloud or Dropbox.

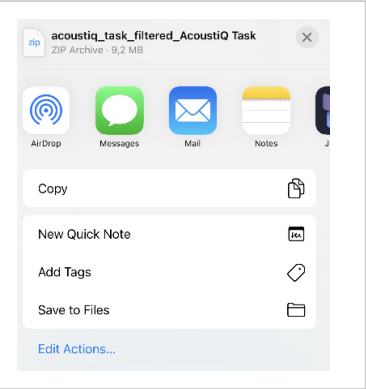


Figure 15: Exporting a measurement.

6.8 File Management

- Within a task, the measurements "New Measurement" are located. These can be renamed or deleted via the "three dots ".
- A new measurement can be started here directly via the Start button.
- Measurements can be sorted by name, date, or length via the arrow button.

6.9 Generating a Report

6.9.1 Report Step 1

- By clicking on Report in the upper right corner, a report is generated in the next steps. In the first mask (Report: Step 1, Figure 16), recurring details for the report are entered. These are directly available on the next call and do not have to be selected again. The language in which the report is created can be selected (English, German, Japanese, Portuguese). Additionally, the responsible person for the measurement can be entered. Under "Upload Logo" a logo can be selected from the photo library or taken with the camera. Next, the organization can be entered.

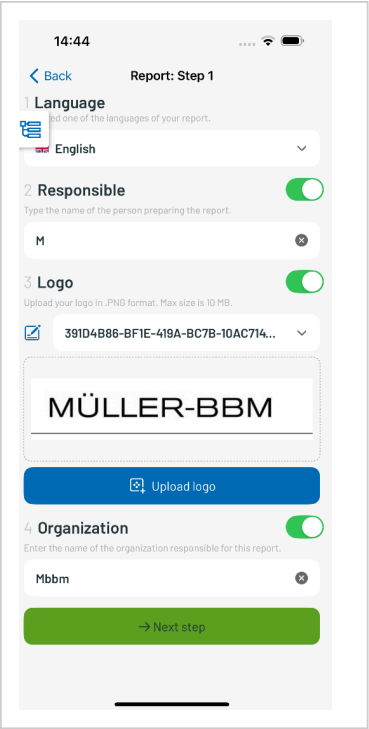


Figure 16: Report generator step 1.

6.9.2 Report Step 2

- Step 1 is completed by pressing the “next step” button. Now measurement-specific data can be entered and selected:
  - Project description
  - Measurements, their modifications and metadata
  - Signature
- These points are all activated by default and can be individually deactivated if necessary. For the “Measurements” item, the respective required measurement(s) must be selected to create the report.
- Additional measurements can be selected via the symbol , which are then displayed in the report. The dropdown menu shows all measurements (original and modifications) and allows them to be opened and modified. Furthermore, another modification can be created within the measurement via the Modify and Add button. Measurements can be deleted by deselecting the measurement with the green slider and deleting it with the button. In this view, geolocation can also be selected. A map with the respective location will be displayed in the report. acoust IQ automatically distinguishes between a stationary measurement and a measurement path.
- The green Generate report” button now generates the report preview. Via the share button at the top right, it can be exported as a PDF document.

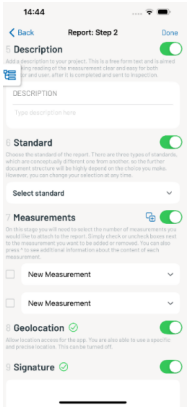


Figure 17.1: Preselected settings

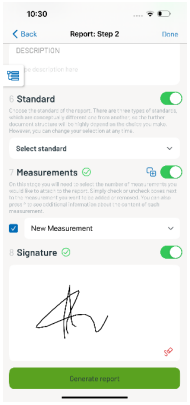


Figure 17.2: Selected measurement

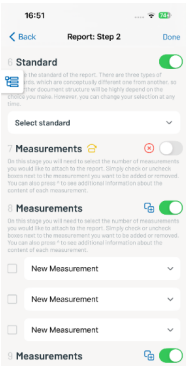


Figure 17.3: Additional measurements

Figure 17.4: Measurement modification

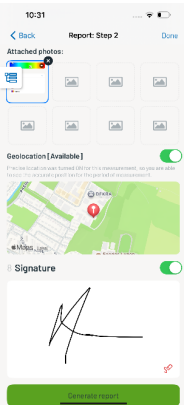


Figure 17.5: Geoposition and signature

Figure 17: Report generator

6.9.3 Report Preview

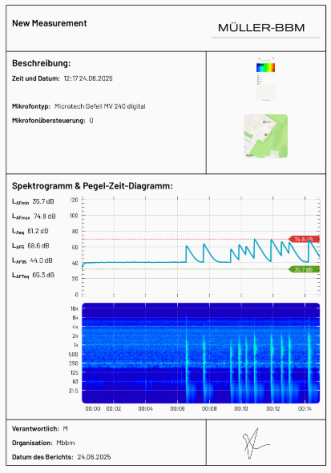


Figure 18.1: Main page

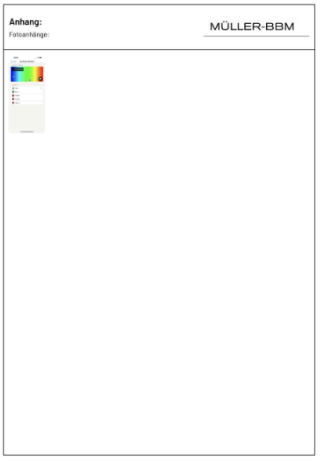


Figure 18.2: Photo appendix

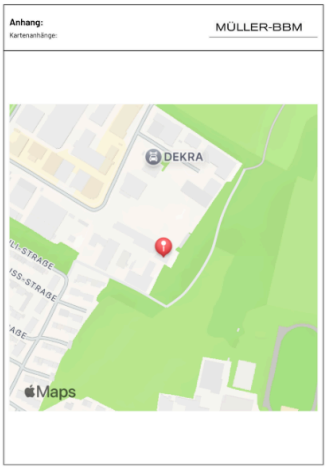


Figure 18.3: Map appendix

Figure 18: Report preview

7 Audio Player and Measurement Editing

When a measurement is selected in the directory structure (task) by tapping, the audio player and “Edit Measurement” area appear. Here, markers, ignored areas, notes, and photos can be added afterwards. In addition, the recorded levels and curves can be viewed. You can also listen to the audio recording here. Be aware, that a measured signal might be very low compared to the possibilities of the phone speakers due to the high dynamic range of the measuring microphone.
The central reference for values or modifications is the middle cursor (Figure 19). Further individual functions are explained below.

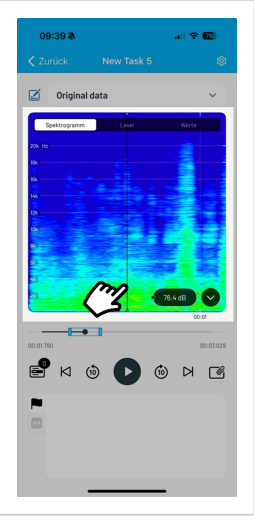


Figure 19: Audio player with central cursor.

8 Measurement Parameters

The acoust IQ app and the measurement microphone (Microtech Gefell MV240/MKS225) together form a precise Class 1 handheld Sound Level Meter, which meets the requirements of the following standards for sound measurement and frequency analysis:

DIN 45 641

DIN EN 61672-1

DIN EN 61260-1

The following calculated level quantities are simultaneously available (reference sound pressure p_0 = 20 µPa):

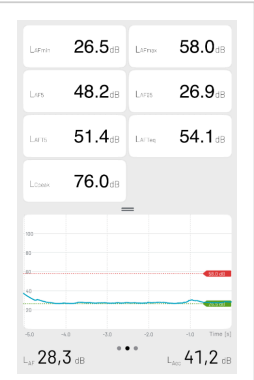


Figure 20: Available level displays.

- L_{AF} current A-weighted sound pressure level with time constant F (Fast)
- L_{Aeq} equivalent continuous A-weighted sound level
- L_{AFmin} minimum A-weighted sound pressure level
- L_{AFmax} maximum A-weighted sound pressure level
- L_{AF5} 5% percentile level
- L_{AF95} 95% percentile level
- L_{AFT5} A-weighted "Taktmaximalpegel" with 5 second time interval
- L_{AFTeq} energy-averaged A-weighted "Taktmaximalpegel"

- L_{Cpeak} C-weighted peak sound pressure level
- Frequency weightings: A, C, Linear (Z)
- Time weightings: F (fast) and S (slow)

Taktmaximalpegel: parameter, mainly used in Germany

The time limit of each measurement is preset to 30 minutes. When this time is reached, a new measurement is recorded in the task until the “stop” button is pressed.

The measurement time is determined by “Start” and “Stop.”

The spectrogram as well as the level time course with the sound level LAF (instantaneous value and third-octave level) are now continuously updated.

8.1 Symbol Overview

 Marker

 Ignored-area

 Photos & description

 Display of the number of markers, ignored areas

 Number of markers, ignored area

 Add ignore area

 Add markers

8.2 Markers

Markers can be set to mark specific acoustic events. Seven out of eleven selectable markers can be configured for individual characterization of noises. The symbols represent the following noise types: airplane, bell, telephone, unknown, multimedia, animal, vehicle, train, machine, conversation, ship.

8.2.1 Markers Setup

In the Markers Setup (in Measurement Setup), an overview of several markers appears. The icons can be individually renamed and exchanged via the edit function (Figures 21.1, 21.2).

In the lower area, “Delay Settings” can be specified. This function places the marker at a time offset before the button press, which accounts for individual reaction time.

Default Delay: -3 sec, -1 sec, 0 sec: In “Live Measurement” the marker is set with delay (Figure 21.3).

Durations Preset: 0 to -5 sec: Selection of max. 3 “Default Delay” values (Figure 21.4).

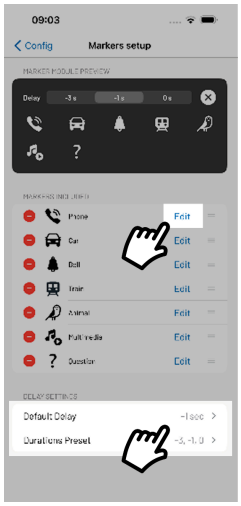


Figure 21.1: Marker Setup

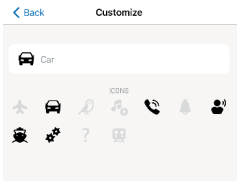


Figure 21.2: Marker Icons

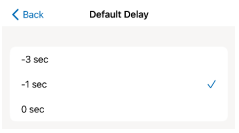


Figure 21.3: Default Delay

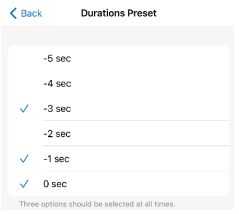


Figure 21.4: Possible Delays

Figure 21: Marker Setup

8.3 Setting Markers During Measurement

During the measurement, different markers can be set manually by pressing the “white flag” . Specific acoustic events are subjectively marked here.

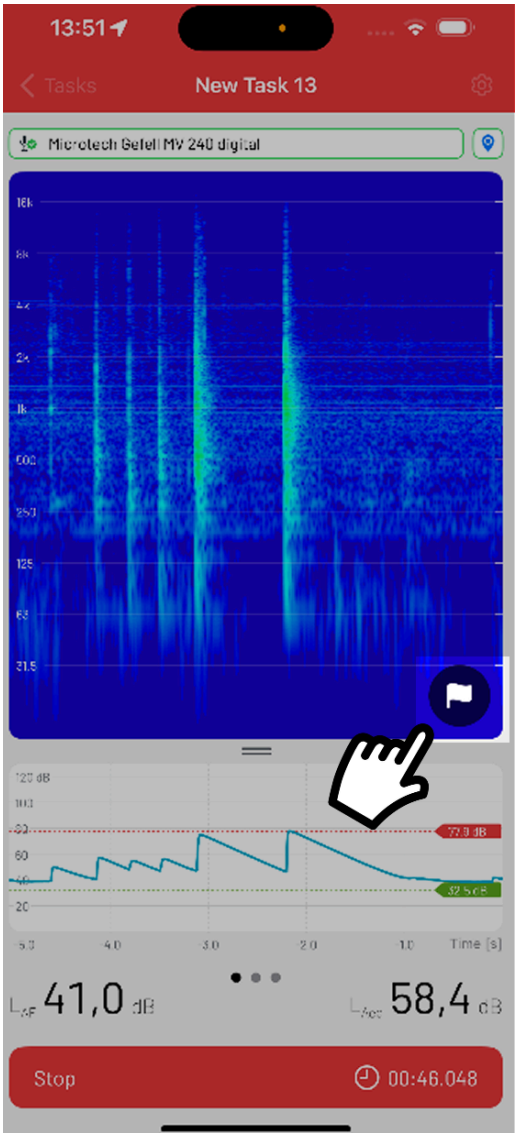


Figure 22.1: Calling Marker Selection

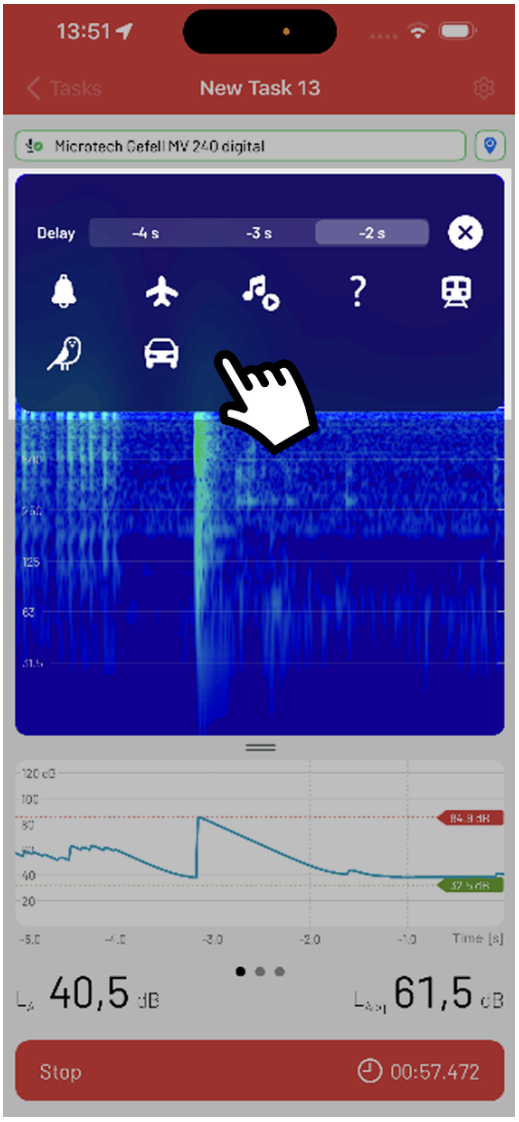


Figure 22.2: Selecting Marker

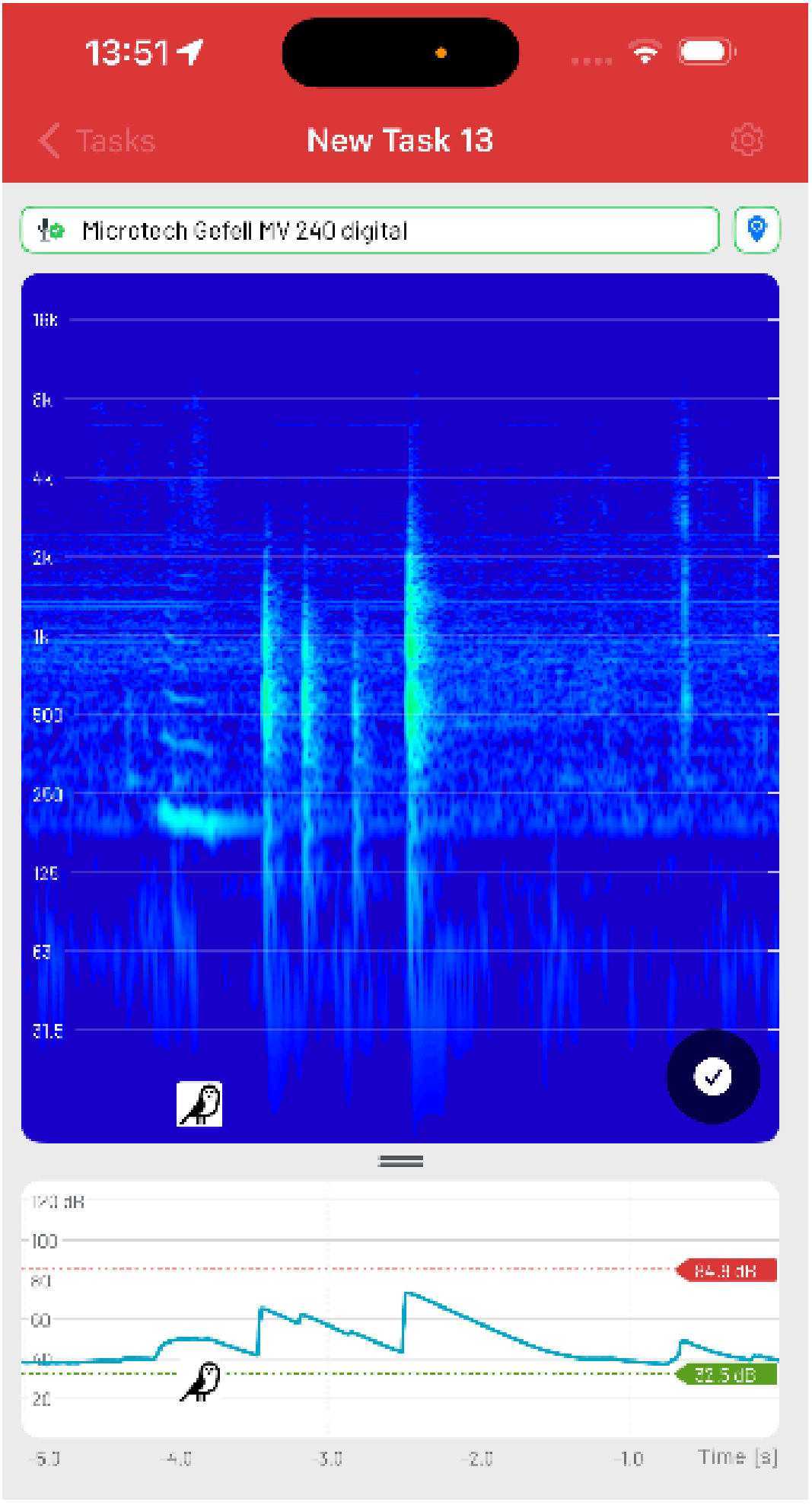

13:51
Tasks
New Task 13
Microtech Gefell MV 240 digital
16k
8k
4k
2k
1k
500
250
125
63
31.5
120 dB
100
80
60
40
20
84.3 dB
32.5 dB
-5.0
-4.0
-3.0
-2.0
-1.0
Time [s]

Figure 22.3: Marker in Spectrogram

Figure 22: Setting Markers During Recording.

8.4 Setting Markers After Measurement (Modification)

After the measurement, the set markers can be edited or new markers can be placed.

To place new markers, open the dropdown menu and enter the marker selection mask via the “white flag” . Here the new desired marker can be set. The reference point is the position of the central cursor.

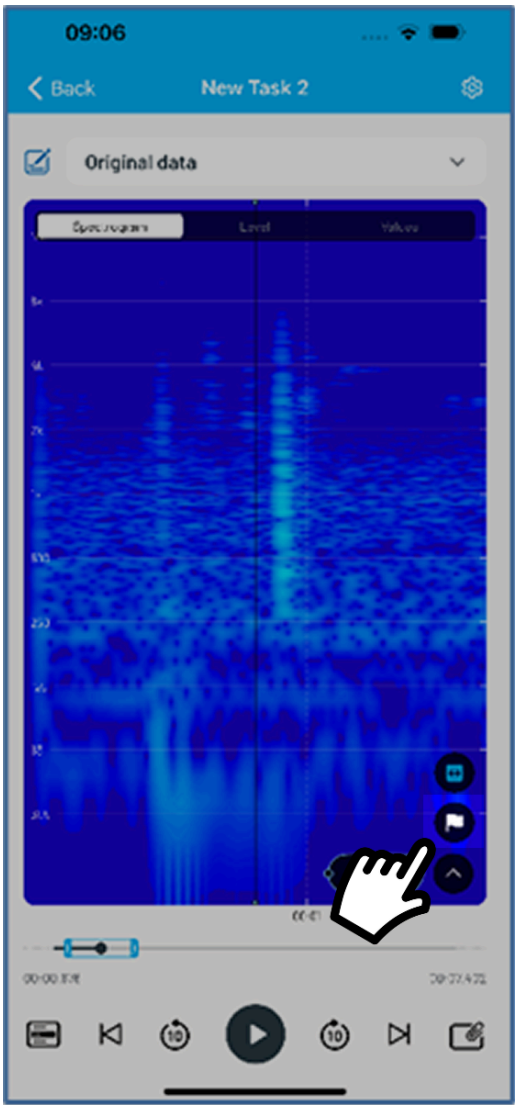


Figure 23.1: Calling Marker Selection

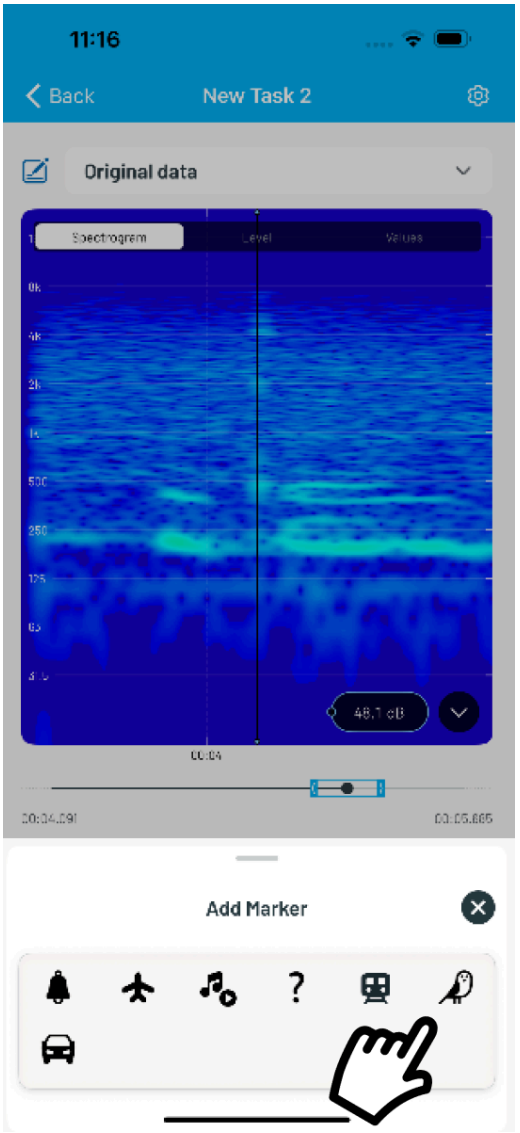


Figure 23.2: Selecting Marker

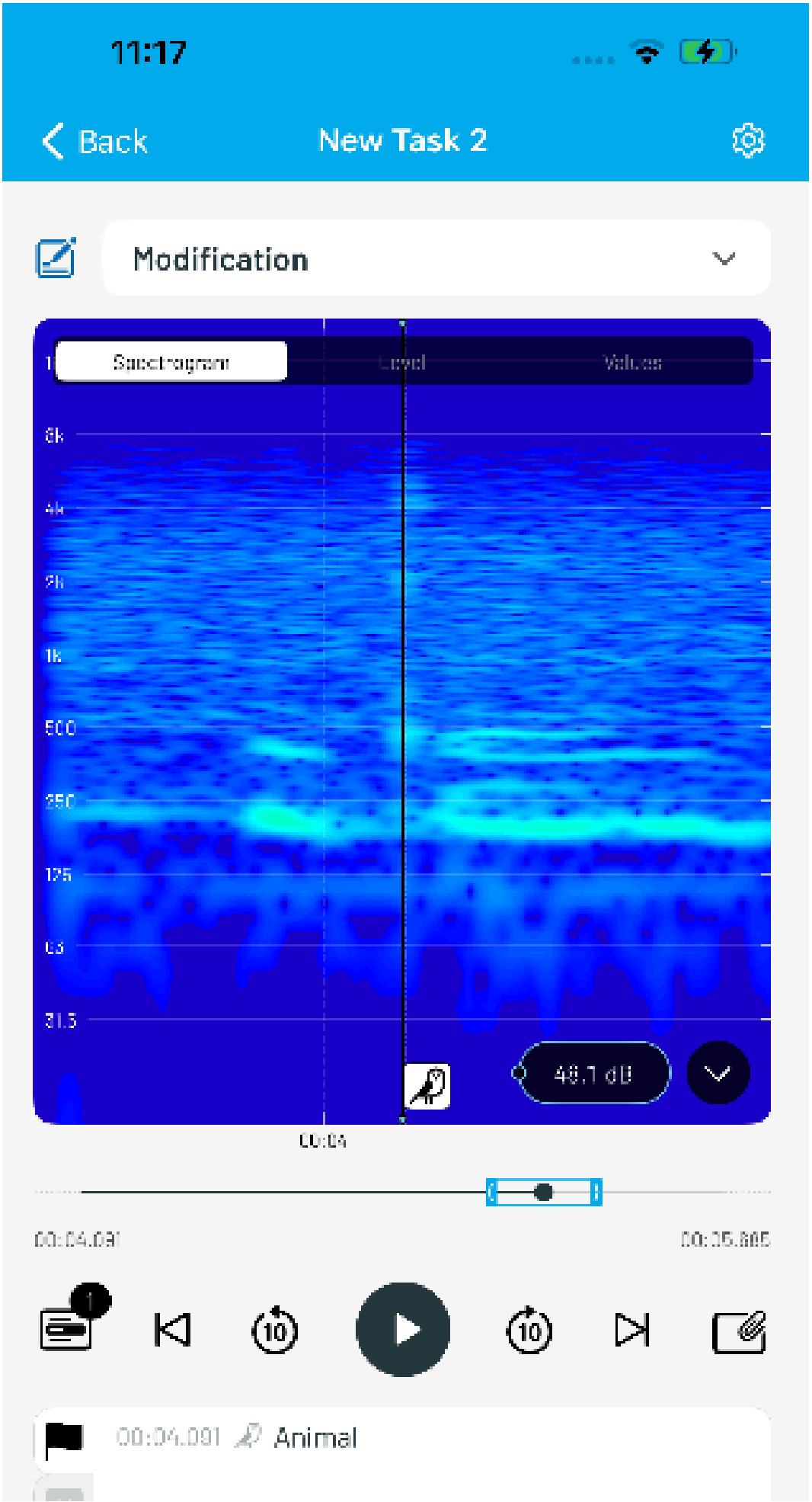

11:17
Back
New Task 2
Modification
Spectrogram
Level
Values
8k
4k
2k
1k
500
250
125
63
31.5
48.1 dB
00:04.091
Animal

Figure 23.3: Marker in Spectrogram

Figure 23: Setting Markers After Recording.

To edit already set markers, open the selection icon and choose the marker to be edited. In the edit mask, the desired marker position can be chosen via the slider, to which the marker should be moved. In the lower area, use the "-/+" buttons to set the desired time. Confirm and save the change by pressing the green checkmark.

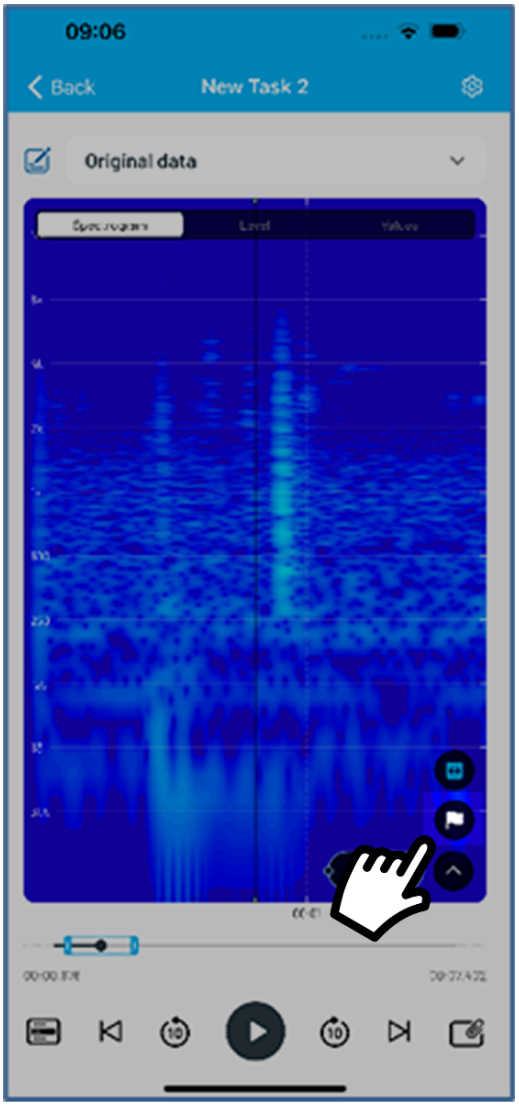


Figure 24.1: Open Marker List

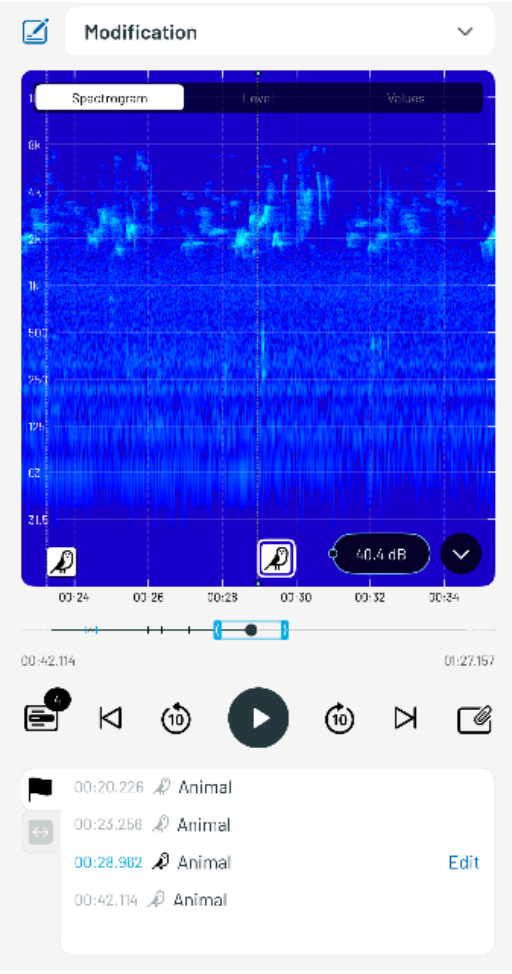
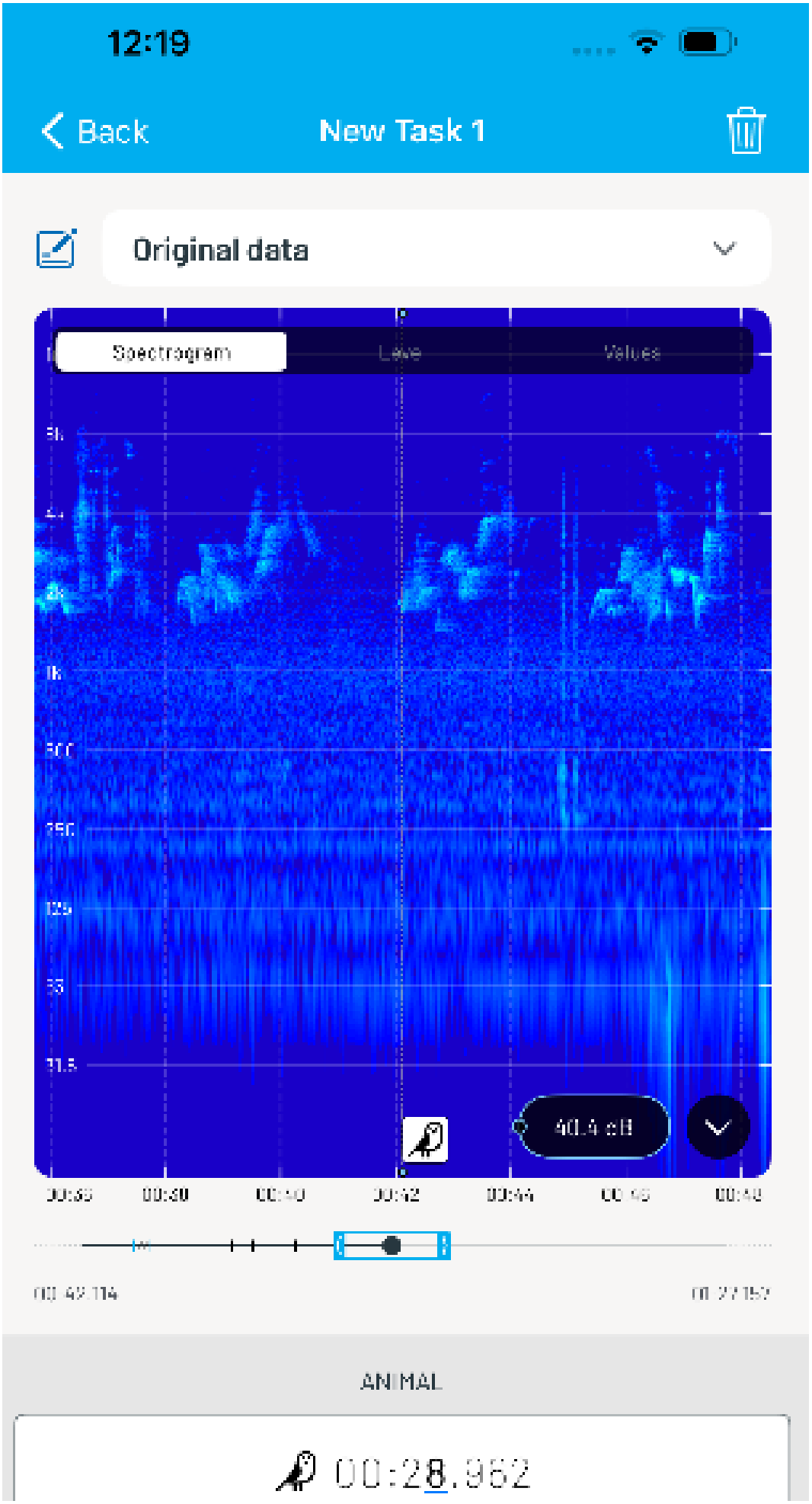


Figure 24.2: Marker List


12:19
Back
New Task 1
Original data
Spectrogram
Level
Values
40.4 dB
ANIMAL
00:28.962

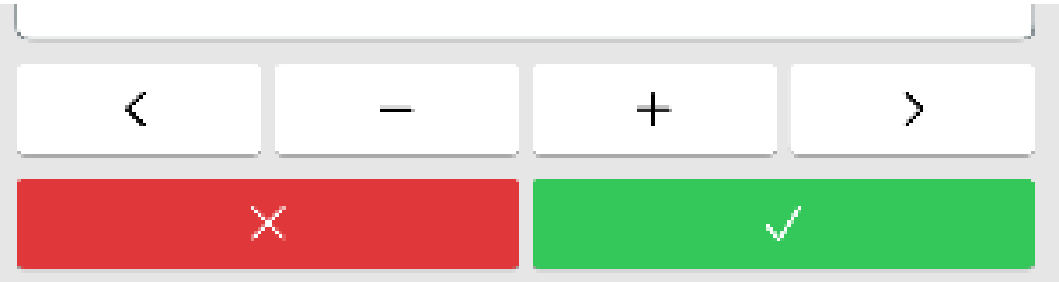


Figure 24.3: Adjust Marker Position

Figure 24: Editing Existing Markers.

8.5 Ignored-area

If disturbing noises occurred during the measurement, it is possible to ignore this area afterwards and exclude it from the averaging level calculation.

Tap on the dropdown menu in the measurement to be edited and then on the “Ignored-area icon”. A new modification with an editable name will be created. In the “Ignored-area setting mask” select the start and end of the ignored-area relative to the cursor via the “+/-” buttons. Confirm the selected changed area by pressing the blue checkmark. The original data remains and can be accessed at any time via the upper dropdown menu. (Figure 25.1)

Modifications can be further edited via the buttons and. Tap the start and stop time in the selection window to enter the edit menu. Now the start and stop time for the ignored-area can be adjusted in detail. Press the blue checkmark to finish. (Figure 25.2)

All changes can be canceled via the button and the ignored-area can be deleted via the trash bin icon at the top right of the display.

The ignored-area is displayed grayed out in the level view for control. The calculated level values without the ignored-area are displayed in the values section.

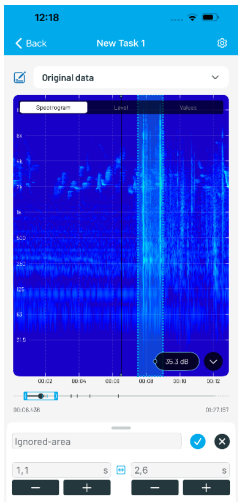


Figure 25.1: Creating Ignored Area

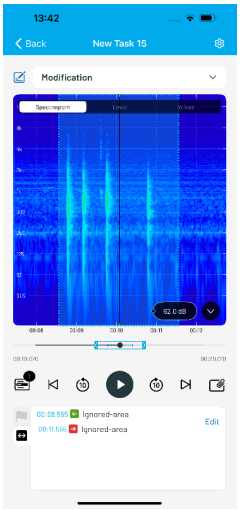


Figure 25.2: List of Ignored Areas

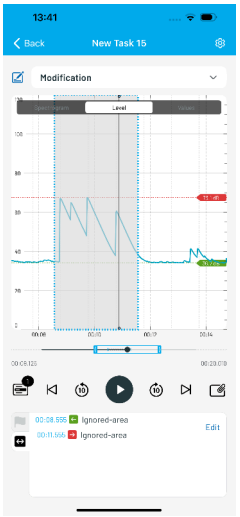


Figure 25.3: Ignored Areas over Sound Level

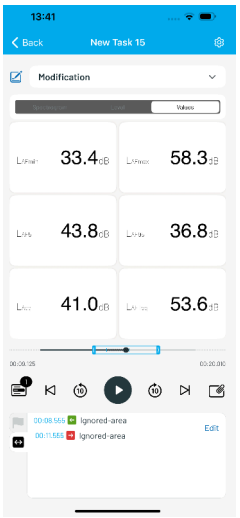


Figure 25.4: Recalculated Values

Figure 25: Ignored Areas

9 Technical Data

9.1 Microtech Gefell MV240/MKS225

Frequency range: 1 Hz to 80 kHz

Self-noise with MKS 225: 7 dB(A)

Maximum sound pressure level: 160 dB

Digital connection via USB 2.0 (Audio Class 2.0) with USB-C

For more technical details, please visit the following link:
https://www.microtechgefell.de/mikrofonverstaerker?wl=1118-MV240USB#start

9.2 UMIK-2 (miniDSP)

Self-noise: approx. 18 dB(A)

Maximum sound pressure level: 125 dB

USB 2.0 streaming, USB Type-C connector

When using the UMIK-2, the classification of the sound level measurement system is reduced to Class 2. For more details about the alternative microphone UMIK-2 (miniDSP), please refer to the manufacturer's website:
https://www.minidsp.com/products/acoustic-measurement/umik-2 Measurement Microphone

10 Important Notes

- Ensure that the sound level meter is properly calibrated to obtain accurate measurement results.
- Familiarize yourself with the applicable regulations and guidelines for sound level measurement to ensure that measurements are performed correctly and in compliance with legal requirements.
- Hold the sound level meter steadily during measurement and do not place it on mechanically vibrating surfaces.
- Individual figures in this document may differ in detail, language, or format.

11 Tips

- Practice using the app and the sound level meter before conducting the actual measurement.
- The app is easy to use and requires no technical expertise.
- If you have questions, contact the app support.

Enjoy conducting your sound level measurements!