CRYSOUND

CRY2850、CRY2851

SLM User Manual

Contents

Warranty and Calibration

This product comes with a one-year warranty from the date of purchase, providing free repair services for abnormalities or failures caused by product quality issues. The free warranty service does not cover non-quality issues resulting from improper use, drops, or other human errors.

For equipment failures caused by improper use, accidental drops, etc., our company promises to provide repair services at cost price.

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CRYSOUND

⚠ Safety Usage Reminder

To prevent potential fire hazards or personal injuries, please note the following:

- Carefully read this safety information before using the product.
- Use the product only for its intended purpose.
- Do not disassemble the device without authorization.
- Stop using the device if it malfunctions or overheats.
- Contact the manufacturer for device repairs.
- Do not place the device near heat sources, flames, or in high-temperature environments.
- Do not charge the device in environments exceeding $45^{o}C$.
- If the internal lithium-ion battery leaks, stop using the device immediately.
- If the leakage contacts the eyes, rinse immediately with clean water and seek medical attention.
- If the leakage contacts the skin, rinse immediately with clean water.
- If storing for more than one month, keep the product in an environment with a temperature below $40^{o}C$.

CRYSOUND

中华人民共和国
计量器具型式批准证书

杭州兆华电子有限公司：

根据中华人民共和国计量法第十三条和中华人民共和国计量法实施细则有关规定，对你单位申请型式批准的计量器具新产品经审查合格，现予批准，并可使用以下标志和编号：

(PA)

2021S680-33

批准人：

经批准的计量器具新产品（名称，型号）：

计量器具名称	型号	规格	准确度等级
声级计	CRY2850	测量范围 (27~135)dB(A) (30~135)dB(C) (33~135)dB(Z) 频率范围 20Hz~8kHz	2级

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发证日期：二〇二一年五月二十一日

发证机关（盖章）：

![CRYSOUND]

CRY2851 Type Approval Certificate
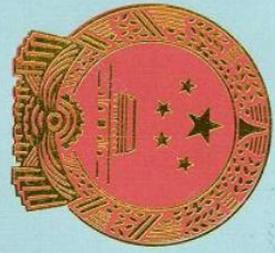
中华人民共和国

计量器具型式批准证书

杭州兆华电子股份有限公司：

根据中华人民共和国计量法第十三条和中华人民共和国计量法实施细则有关规定，对你单位申请型式批准的计量器具新产品经审查合格，现予批准，并可使用以下标志和编号：

（PA）

2022S553-33

批准人：
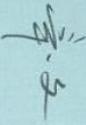
经批准的计量器具新产品（名称、型号）：			
计量器具名称	型号	规格	准确度等级
声级计	CRY2851	量程：(27～135)dB(A) (30～135)dB(C) (33～135)dB(Z) 频率范围：10 Hz～20 kHz	1级

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发证日期：二O二二年五月二十七日

发证机关（盖章）：

1. Overview

1.1. Product Introduction

The CRY2850/CRY2851 sound level meter is equipped with a high-performance processor, specifically designed for measuring occupational, environmental, and product noise. While meeting the requirements for accurate and reliable acoustic measurements, the device also supports functions such as frequency analysis, data logging, and wireless control and transmission. It offers optional modules for octave band and spectral analysis to meet users' advanced needs.

The design balances aesthetics and ergonomics, featuring a 4-inch high-definition capacitive touch screen that provides a user-friendly and comfortable experience. The instrument can store data via an SD card and supports data transmission and remote control through Ethernet/Wi-Fi, with GPS location system support for precise timing and positioning.

This device is applicable in fields such as environmental protection, industry, and occupational health, enabling environmental noise measurement, product quality control, and occupational noise assessment.

1.2. System Block Diagram
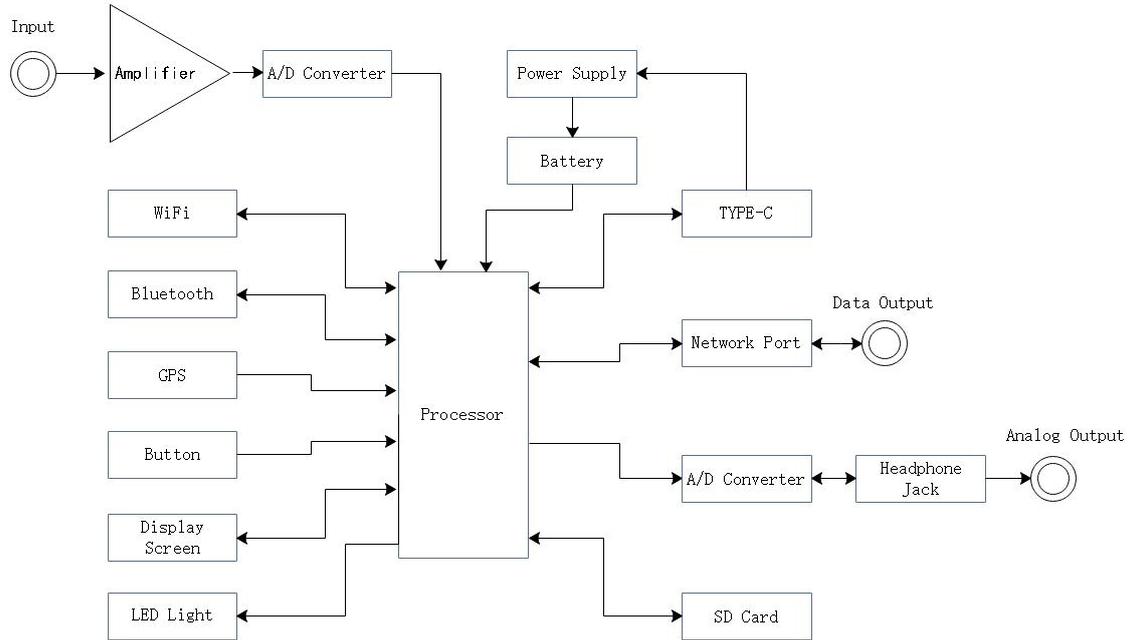
Fig 1.1 Sound Level Meter System Block Diagram

1.3. Product Photos

Fig 1.2 Photos of CRY2850 and CRY2851 Sound Level Meters

2. Product Features

1. Dynamic range exceeds 115 dB, no manual range switching required.

2. Supports SD card storage, expandable to over 64GB.

3. Supports USB/Ethernet/Bluetooth/WiFi for multiple remote connection options.

4. Fully functional, supports optional sound level meter app, statistical analysis app, spectrum analyzer app, 1/1 octave band app, 1/3 octave band app, and monitoring app.

5. GPS support for providing precise time and location.

6. Supports connection to Bluetooth printers for printing test data at any time.

7. 4-inch capacitive touch screen with button collaboration for convenient operation.

3. Performance Specifications

Sound Level Meter Technical Specifications

Model	CRY2850	CRY2851
Microphone	CRY331 Free-field 1/2" microphone, nominal sensitivity 40 mV/Pa	CRY333 Free-field 1/2" microphone, nominal sensitivity 50 mV/Pa
Preamp	CRY2850PA preamplifier	
Dynamic Range (Background to Max Sound Level)	18-145dB（A）	16-143dB（A）
Linear Working Range	23-145dB（A）	21-143dB（A）

(@1kHz)		
Time Weighting	F、S、I（simultaneously）	
Frequency Weighting	A、C、Z（simultaneously）	
Sampling Frequency	48kHz	
A/D Bit Depth	24 位	
Measurement Bandwidth	10Hz-20kHz	
Standards Compliance	Environmental Quality GB/T 3096-2008	
	Sound Level Meter GB/T 3785.1-2010 Class 2 / IEC 61672-1:2013 Class 2	Sound Level Meter GB/T 3785.1-2010 Class 1 / IEC 61672-1:2013 Class 1
	Filter GB/T 3241-2010 Class 1 / IEC 61260-1:2014 Class 1	
	Personal Noise Exposure Meter GB/T 15952-2010 / IEC 61252:2017	
Measurement Functions	Integration Measurement, statistical analysis, 1/1 octave band, 1/3 octave band, spectrum analysis, monitoring	
Main Measurement Parameters	Equivalent sound pressure level for minute/hour/day/night, Lp, Lmax, Lmin, Leq, L10, L50, L90 statistical sound levels, Lxpeak, SD, LN, LAFN, LAE, EA, etc. (Note: x can be A, C, Z)	
Display Screen	4-inch color LCD touch screen, brightness adjustable to off	
Battery	Built-in lithium battery, nominal 6600 mAh	
Typical Battery Life	17 hours (screen off, Bluetooth and WiFi turned off)	
Charging Time	Approximately 3.5 hours to full at room temperature	
External Interfaces	RJ45, WiFi, Bluetooth, 3.5mm headphone jack, USB Type-C	
Reference Sound Level	94 dB @ 1 kHz / 114 dB @ 1 kHz	
Reference Environment	23°C, atmospheric pressure 101.325 kPa, relative humidity 50%	

Operating Conditions	-20°C to 60°C, relative humidity ≤ 90% (non-condensing), 65 kPa - 108 kPa
Dimensions	L*W*H=260mm*90mm*40mm
Weight	460g
Control Method	Touchscreen / Buttons

4. Structural Features
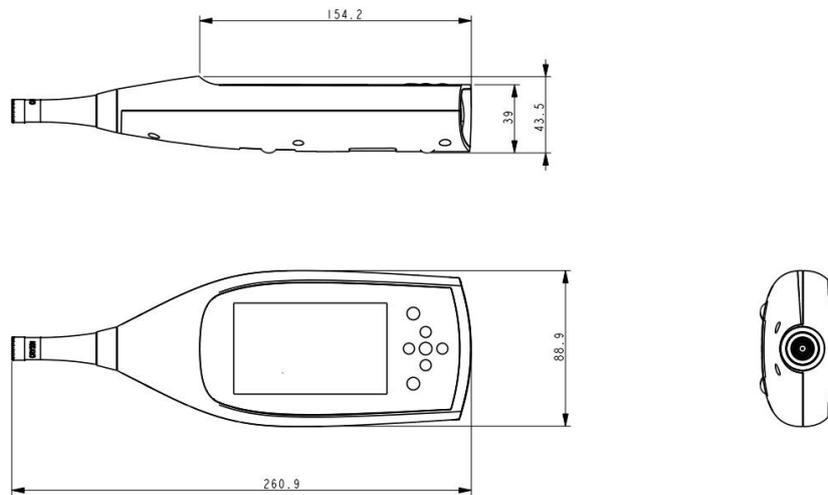
Fig 4.1 Equipment Dimension Diagram
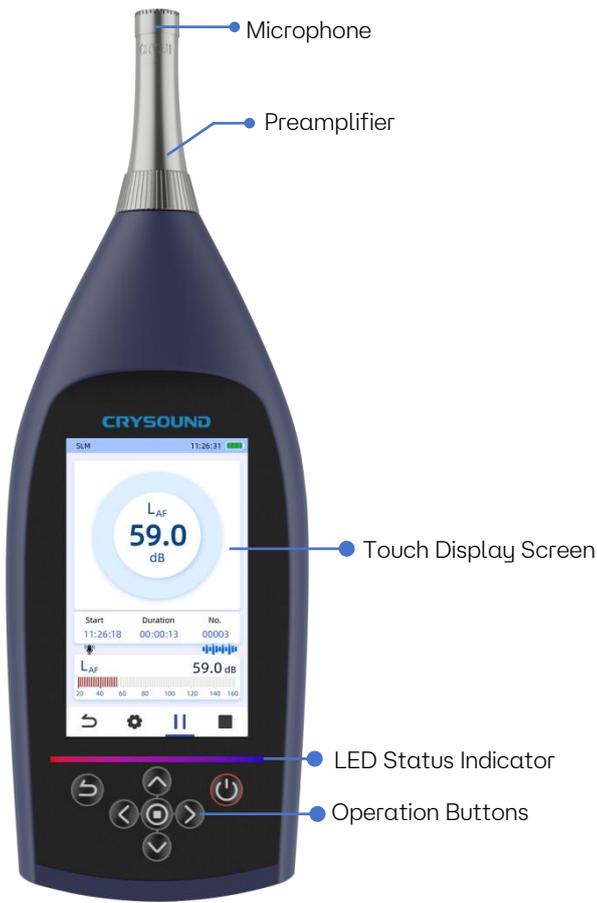
Fig 4.2 Front View of the Sound Level Meter

Fig 4.3 Back View of the Sound Level Meter
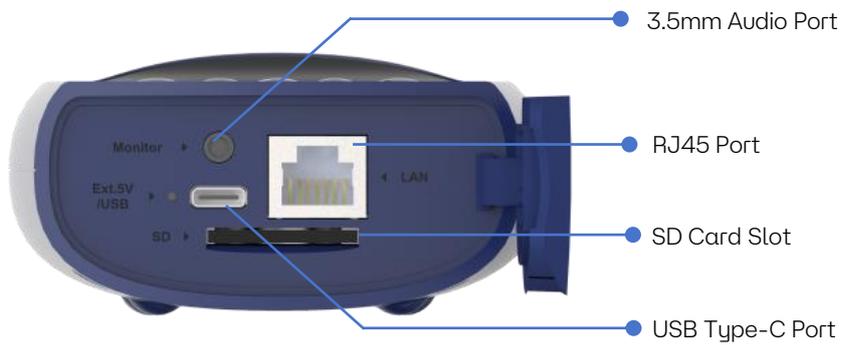
Fig 4.4 Bottom View of the Sound Level Meter

The appearance of the instrument is shown in Figures 4.1, 4.2, and 4.3. The main components of the instrument include the microphone (CRY2850 uses CRY311, and CRY2851 uses CRY333), the pre-amplifier, and the sound level meter host. The device is equipped with a built-in 6600mAh lithium battery, and the screen resolution is 480x800, supporting touch operation. The LED light strip below the screen typically displays white; it turns red as a warning when the sound pressure exceeds the measurement range.

In addition to touch operation, there are buttons for control. The device is equipped with directional keys, a confirmation button, an exit button, and a power button. A short press of the power button for one second turns the device on, while a long press for three seconds forces it to shut down.

Direction Key (Up)	Direction Key (Down)	Direction Key (Left)	Direction Key (Right)

Power Button	Confirmation Button	Exit Button
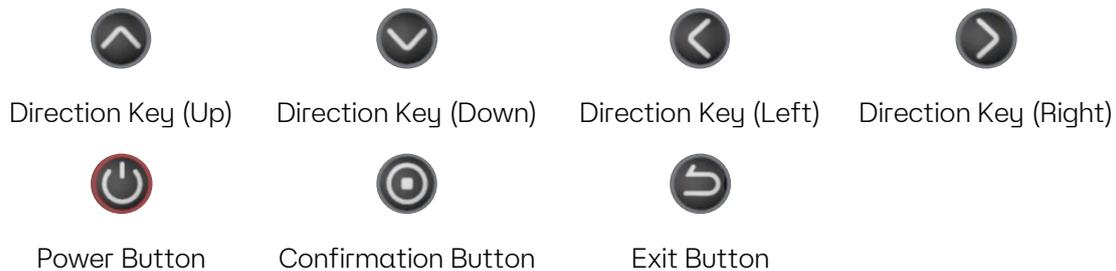
Additionally, the back of the device has mounting holes (1/4 inch threaded holes) for securing it. The device label records the serial number, compliance information, and other details. The bottom of the device features a 3.5mm audio port for outputting electrical signals to control electrostatic excitation , and CIC Calibration(with the NA43 kit), a USB Type-C port for charging, an RJ45 port for data communication, and an SD card slot for data storage (insert the card with the gold contacts facing up).

5. Parameter Definitions

5.1. Acoustic Parameter Definitions

Parameter Name	Parameter Definition
Lp	Maximum sound pressure level within 1 second
Leq	Equivalent sound level
Lmax	Maximum sound pressure level
Lmin	Minimum sound pressure level
Lpeak	Peak sound level
SEL	Sound exposure level
EA	Personal sound exposure quantity
SD	Standard deviation
L5	Sound pressure level exceeded by 5%
L10	Sound pressure level exceeded by 10%
L50	Sound pressure level exceeded by 50%
L90	Sound pressure level exceeded by 90%
L95	Sound pressure level exceeded by 95%
A	Simulated loudness for 40 phons pure tone
C	Simulated loudness for 100 phons pure tone
Z	Unweighted
F	Fast time weighting
S	Slow time weighting
I	Impulse time weighting
A/F	A-weighted sound level measured with F weighting
A/S	A-weighted sound level measured with S weighting
A/I	A-weighted sound level measured with I weighting
C/F	C-weighted sound level measured with F weighting

C/S	C-weighted sound level measured with S weighting
C/I	C-weighted sound level measured with I weighting
Z/F	Z-weighted sound level measured with F weighting
Z/S	Z-weighted sound level measured with S weighting
Z/I	Z-weighted sound level measured with I weighting
1/1OTC	1/1 octave band filter analysis
1/3OTC	1/3 octave band filter analysis
FFT	Fast Fourier Transform

5.2. Icon Definitions

Main Interface

Settings	Calibration	SLM	Statistical Analysis
1/1 Octave Band	1/3 Octave Band	Spectrum Analysis	Monitoring App

Settings

Settings	BT Connection	GPS Location	Network Settings
Brightness Settings	Time Settings	Language Settings	Storage Space
Authorization	Device Mode Switch	About Device	

Function Buttons

Exit	Settings	Start Testing	Pause

■	✎	☑	🗑
End Testing	Edit	Multi-Select	Delete
🖶	⛛		
Print	Filter		

6. Usage Instructions

6.1. Preparations Before Testing

1. Ensure that all components of the sound level meter are complete and check that the host, pre-amplifier, and microphone are properly installed.

2. Ensure that the device has sufficient battery power to last throughout the testing period.

3. In testing scenarios with high wind speeds, the sound level meter should be used in conjunction with a windproof cover.

4. When monitoring outdoors for extended periods, it is recommended to use a tripod.

6.2. Powering On

1. Remove the sound level meter from its packaging and use the appropriate charger to fully charge it before official use, ensuring the instrument operates normally during measurements.

2. Press the power button for 1 second; the startup animation will appear after about 3 seconds, and the function menu will display after 25 seconds.

3. As shown in Figure 6.1, the current function menu includes settings, calibration, sound level meter, statistical analysis, 1/1 octave band, 1/3 octave band, spectrum analysis, and monitoring applications. Enter the corresponding application interface by clicking or using the buttons.
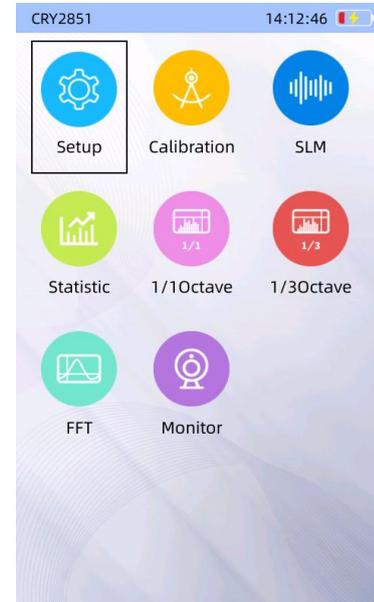
Fig 6.1 Main Interface on Startup

6.3. Instrument Calibration

6.3.1. Interface Introduction

Click "Calibration" on the main interface to enter the calibration screen, as shown in Figure 6.2:

1. **Sound Pressure Level:** Displays the current sound pressure level being measured by the sound level meter, defaulting to dBA, with options for dBC and dBZ.

2. **Sensitivity Level:** Displays the sensitivity of the microphone saved from the last calibration, in mV/Pa. If the microphone sensitivity is known, click on the sensitivity box to enter the manual setting interface.

3. **Free-field Correction:** The correction value for the microphone's sensitivity in free-field conditions at the calibration frequency relative to the pressure field of the calibrator, defaulting to 0.1 (suitable for the 1/2 inch free-field response measuring microphone CRY333 and CRY331).

4. **Range:** Records the measurement range of the sound level meter at the sensitivity level.
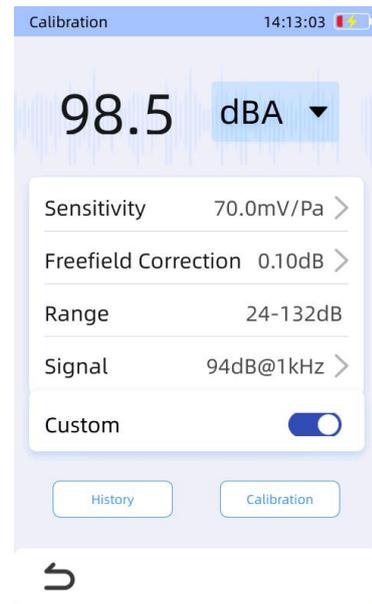
Fig 6.2 Calibration
Record Page

5. **Calibration Signal:** Default is 94.0 dB at 1 kHz.

6. **Custom Parameters:** An edit switch that allows manual editing of sensitivity, free-field correction, range, and calibration signal.

7. **Calibration:** Click "Calibrate"; once the reading stabilizes, the device will prompt for sensitivity changes. Click "Yes" to save changes.

8. **Calibration History:** Historical calibration records showing calibration time, sensitivity, free-field correction, range, sound level of the calibrator, and post-calibration sound pressure level.

6.3.2. Calibration Procedure (with Calibrator)

Before starting calibration, ensure the sound level meter and calibrator are ready and that the calibrator is sufficiently charged (the indicator light on the back should be green):

1. Set the corresponding free-field correction based on the microphone used; CRY333/CRY331 free-field correction is 0.1 dB, CRY311 is 0.3 dB.

2. Set the calibration signal according to the nominal sound level of the calibrator; for instance, if the calibrator signal is 94 dB@1kHz, select 94 dB@1kHz in the software.

3. During calibration, place the calibrator over the microphone and turn the power on.

Fig 6.3 Device Calibration

4. Once the calibrator stabilizes, press the "Calibrate" button;the interface will display "Calibrating." The sound pressure level should reflect the

sound pressure level produced by the calibrator (94.0 dB) plus the free-field correction (0.10 dB), resulting in 93.9 dB.

5. After calibration, a dialog box will appear as shown on the right; click "Confirm" to save the sensitivity.

6. If the calibration signal is unstable, calibration will fail. Users should check if the calibrator is turned off/damaged/low on battery or if there is excessive environmental interference. If the interference is significant, users can use a 114 dB calibrator and set the sound level meter signal to dBC/dBA.

Fig 6.4 Modification Confirmation

6.3.3. Calibration History

Clicking on calibration history will display the historical calibration records table, with the left side showing calibration time and the right side showing calibration sensitivity. Users can scroll through different calibration records and click on any record to view the details, as shown in Figure 6.5. The details include calibration time, sensitivity, correction, range, and calibration signal. Click the application button below to replace the existing parameters with the sensitivity from that calibration record.
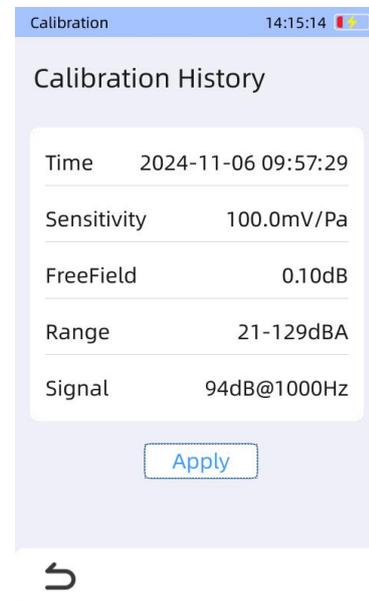
Fig 6.5 Calibration Records

6.4. Noise Measurement

6.4.1. Quick Operations

After powering on and entering the main interface, click to access the desired app. Four key buttons are available at the bottom of the app: Exit, Settings, Start Test, End Test:

1、Start Test: Click the third button (highlighted in red) to begin recording data.

2、Pause Test: During testing, click the start button to pause; click again to resume.

3、End Test: Click the far-right end button to conclude the test and save the data.

4、View Test Data: Enter the settings interface and click on data playback to view the test data.

SLM	14:15:37	SLM	14:15:41	SLM	14:15:47
L_{AF}	92.2 dB	L_{AF}	92.2 dB	L_{AF}	92.3 dB
L_{CF}	92.2 dB	L_{CF}	92.2 dB	L_{CF}	92.2 dB
L_{ZF}	92.2 dB	L_{ZF}	92.2 dB	L_{ZF}	92.3 dB
L_{AFMax}	--- dB	L_{AFMax}	92.2 dB	L_{AFMax}	92.3 dB
L_{CFMax}	--- dB	L_{CFMax}	92.2 dB	L_{CFMax}	92.3 dB
L_{ZFMax}	--- dB	L_{ZFMax}	92.2 dB	L_{ZFMax}	92.3 dB

Start	Duration	No.	Start	Duration	No.	Start	Duration	No.
00:00:00	00:00:00	----	14:15:40	00:00:00	00001	14:15:40	00:00:05	00001

Fig 6.6 Prepare/End Test   Fig 6.7 During Test   Fig 6.8 Pause Test

6.4.2. Sound Level Meter

The sound level meter app provides basic noise data measurement and calculation functions, including sound pressure level, LMax, LMin, Leq, and Lpeak measurements. It supports A, C, and Z frequency weighting, as well as F, S, and I time weighting. Three display modes are available: single value, multi-value, and curve display. The multi-value mode can show up to six data points simultaneously and supports data playback and recording functions.

6.4.2.1. Sound Level Meter Testing Interface

As shown in Figure 6.10, this is the measurement interface for the sound level meter, currently displaying the measurement in "Single Value Mode" for LAF.

1. Test Data Display Box: Shows the specific values obtained during testing.
2. Test Data Information:
   a. Start Time: The time measurement began.
   b. Test Duration: The duration of the current test.
   c. Storage Number: The storage number for the current test data, which can be found in data playback and the corresponding SD card directory.
   d. Sound Pressure Level Bar: Visually displays the current sound pressure level.
3. Recording Indicator: Indicates that audio data is being saved during the test.
4. Operation Button Box: Four sets of buttons provide functionality for back, settings, start, pause, continue, and stop.

6.4.2.2. Sound Level Meter App Settings
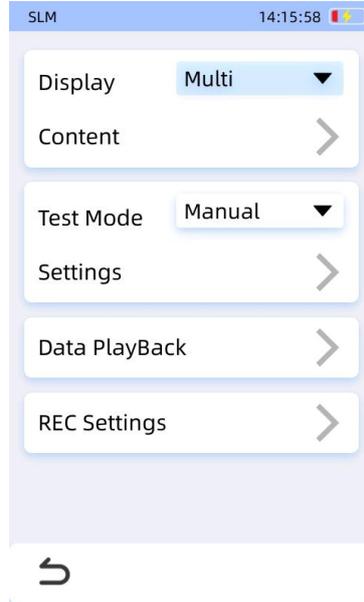
Fig 6.9 Sound Level Meter App Settings Interface

Clicking the "Settings" button in the operation button area will bring up the settings interface, as shown in Figure 6.9.

1.   Display Settings:

On this page, you can set the display and its contents, selecting the desired measurement target and display mode. Available display settings include single value mode, curve mode, and multi-value mode.在此页面中，可对显示
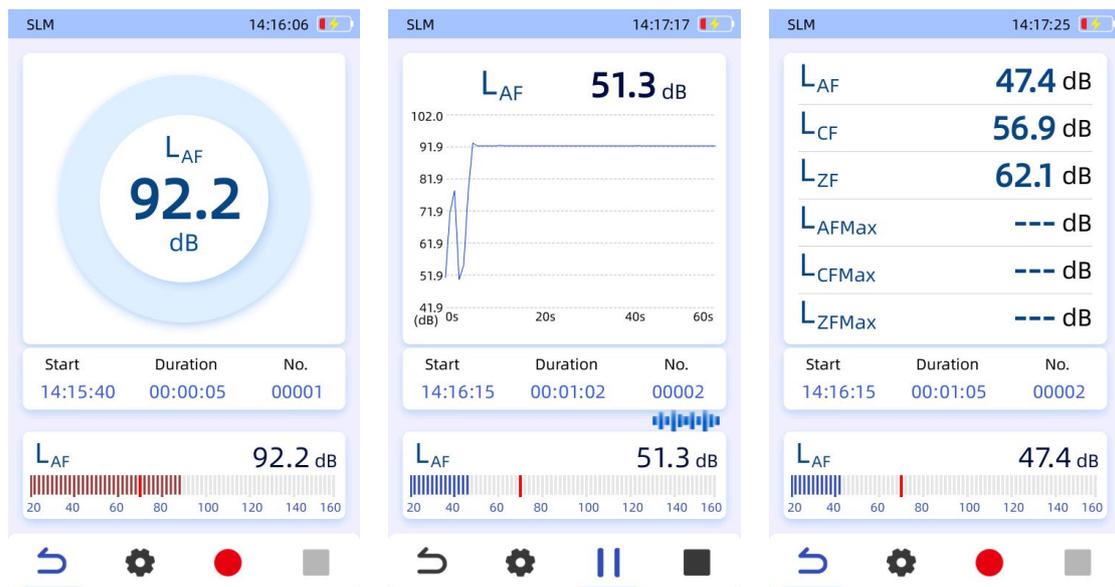
Fig 6.10 Single Value   Fig 6.11 Curve Mode   Fig 6.12 Multi-Value

Mode   Mode

Single Value Mode: Displays a single measurement value, as shown in Figure 6.10.

Curve Mode: Displays a curve showing how the current measurement values change over time, as shown in Figure 6.11.

Multi Value Mode: Simultaneously displays the currently selected measurement values, with a maximum of six displayed, as shown in Figure 6.12.

2. Display Content Settings

The available data types are as follows:

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Equivalent SPL	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak

3. Testing Mode Settings:

Click "Testing Mode" to select "Manual Mode," "Automatic Mode," "Timed Mode," or "Trigger Mode." Click "Testing Mode Settings" to configure the relevant test items based on the selected mode, as shown in Figure 6.13 for the "Timed Mode" settings. In this interface, users can select the appropriate mode based on their needs and set the corresponding duration for testing.
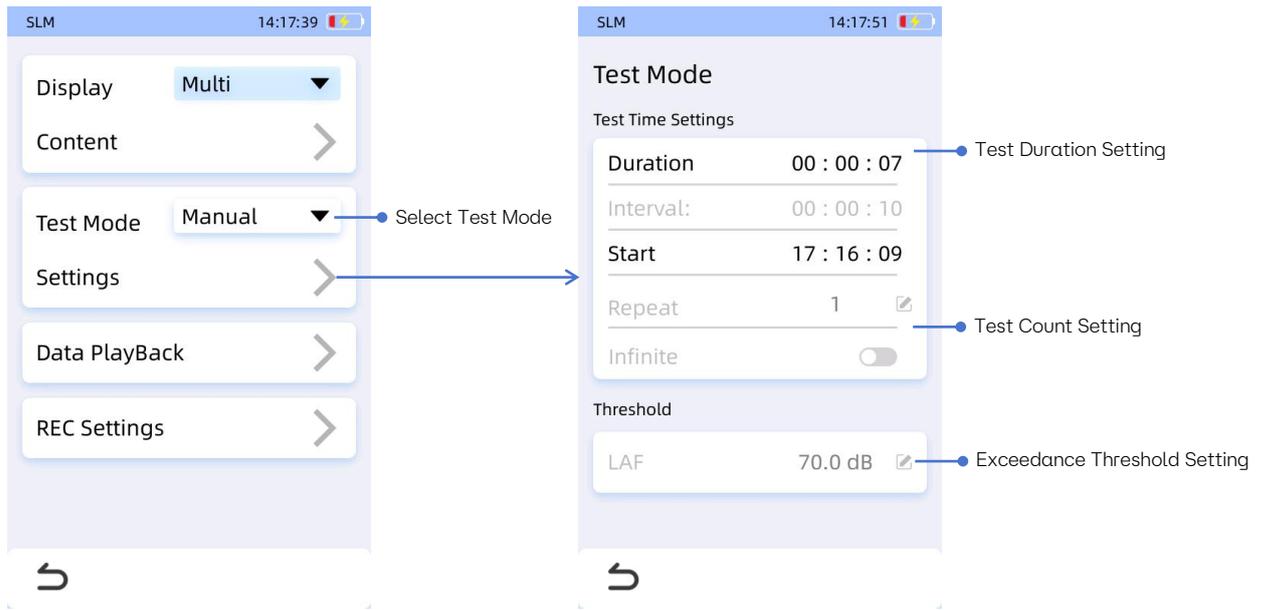
Fig 6.13 Testing Mode Settings

a. Manual Mode: The user manually starts and stops the measurement from the main interface button area. Figure 6.14 shows that in manual mode, the test is controlled solely by user actions, making any time settings in the test mode configuration ineffective and uneditable.
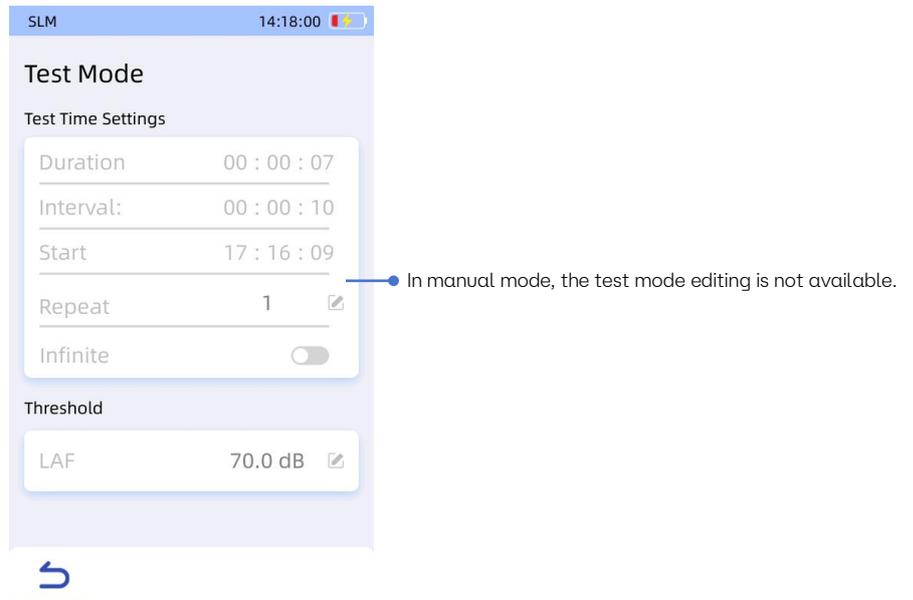
Fig 6.14 Manual Mode Parameter Settings

b. Automatic Mode: After clicking the start test button in the main

interface, the application will automatically conduct the first test based on the user's set duration. After the first test, it will conduct a second test after the user's specified interval, and so on. The number of repetitions refers to how many times the test will be conducted, as set by the user. If the user enables the infinite repeat option, the automatic tests will continue indefinitely until the user manually stops them. When automatic testing is selected, the settings interface for the test mode will appear as shown in Figure 6.15, where the start test duration cannot be edited.
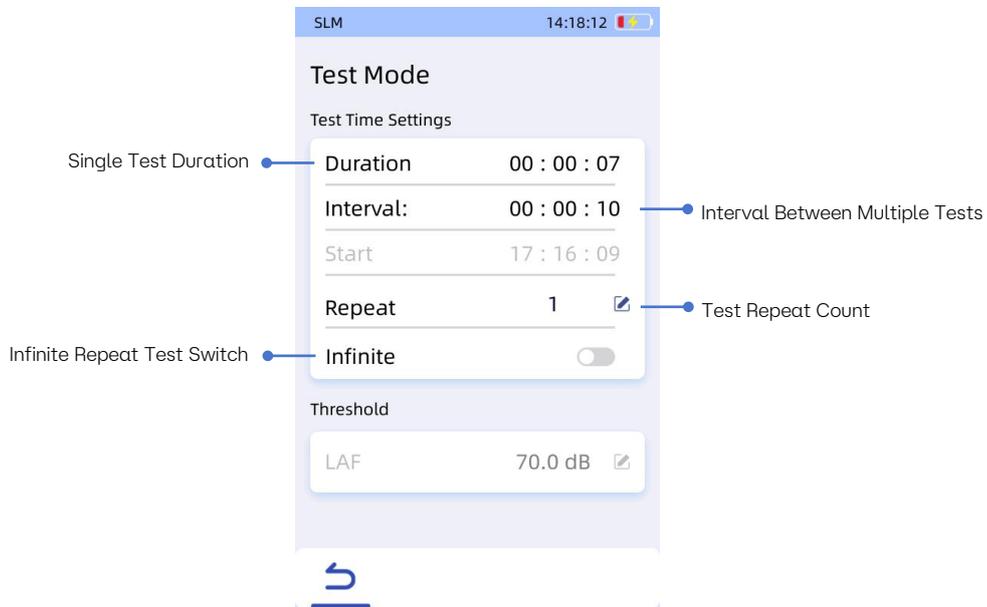
Fig 6.15 Automatic Mode Parameter Settings

c. Timed Mode: The application will automatically start testing at the user-defined start time, with a duration as set on the test settings interface. In timed testing mode, the options for test interval, repeat testing, and infinite repeat will be unavailable as they are meaningless.
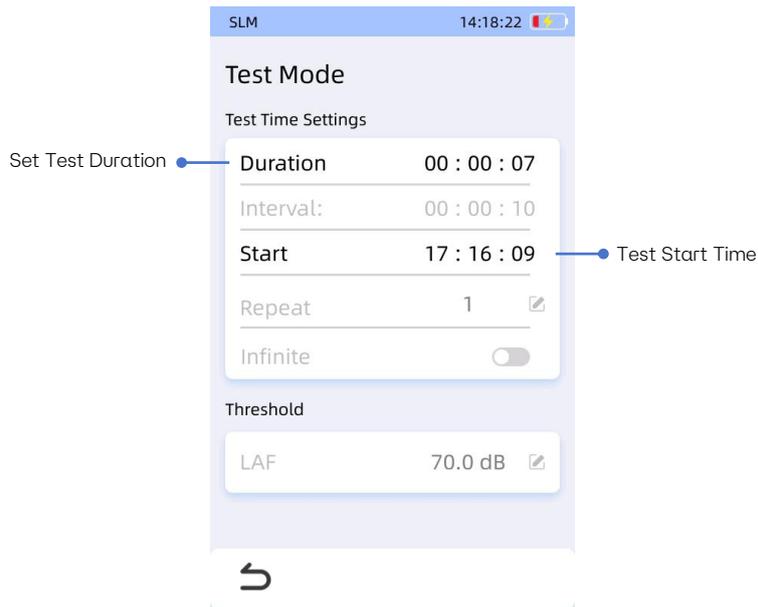
Fig 6.16 Timed Mode Parameter Settings

d. Trigger Mode: Users can set the test duration and threshold in the settings interface. When LAF reaches the set threshold, testing will start automatically, lasting for the duration specified by the user.
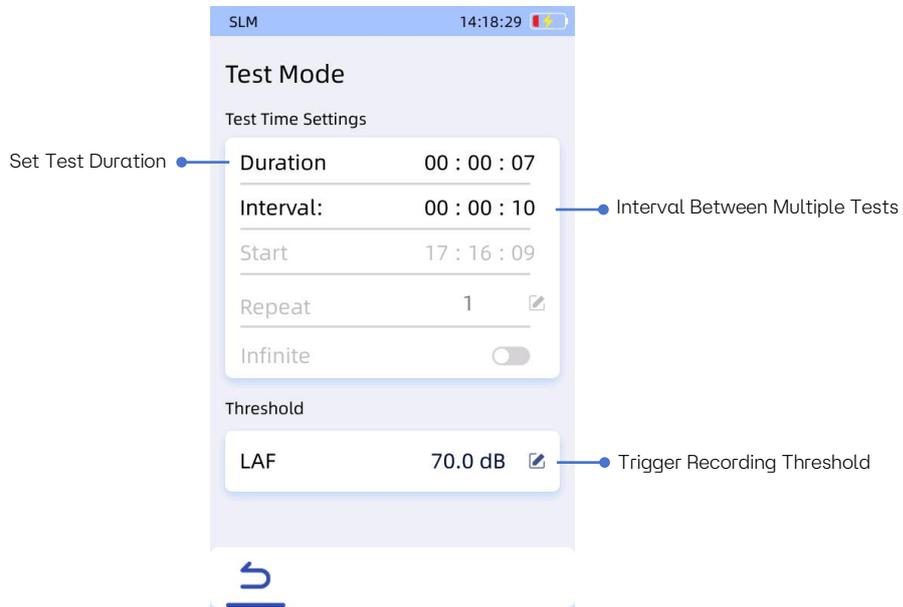
Fig 6.17 Trigger Mode Parameter Settings

4. Data Playback Settings
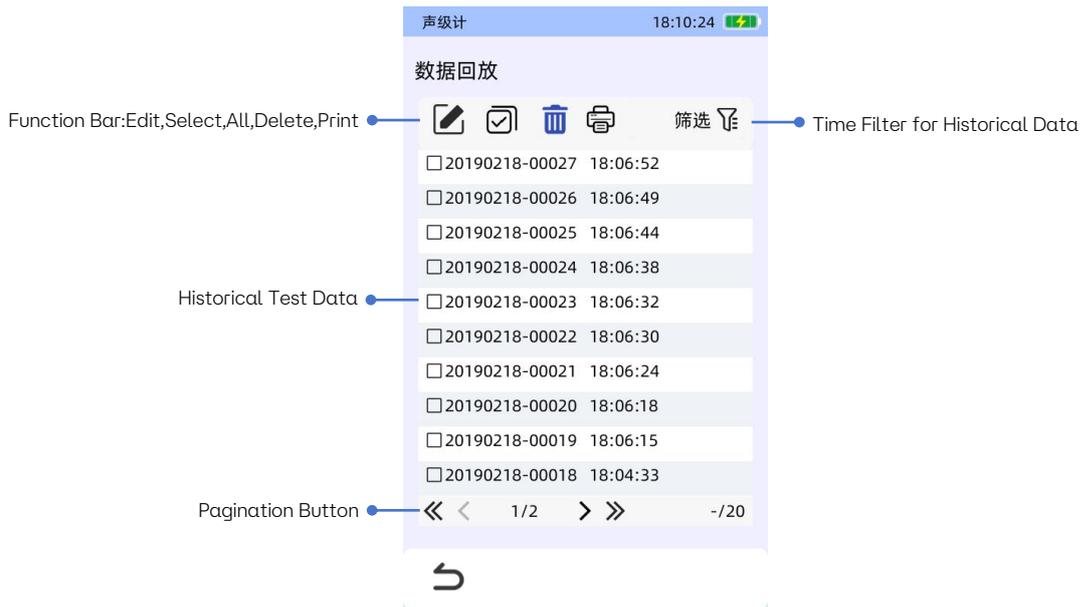
Fig 6.18 Data Playback List

Click "Data Playback" to enter the interface shown in Figure 6.15. In this mode, users can filter the data according to a time interval and click on the corresponding data for a preview. The function buttons above include: Select, Select All, and Delete, allowing users to manipulate the data. Additionally, the data playback interface can also facilitate printing operations, as detailed in the appendix "Using the Printer."

5. Recording Settings

As shown in Figure 6.19, this is the interface accessed by clicking the "Recording Settings" button. In this interface, users can choose whether to enable recording, set the recording mode, and specify the recording duration.
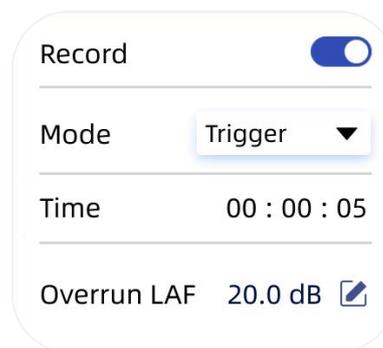
Fig 6.19 Recording Mode Settings

a. Automatic Mode: Recording starts as soon as testing begins, with no need to set a recording duration.

b. Trigger Mode: Users can specify the recording duration; recording will

automatically commence when LAF reaches the set threshold, lasting for the user-defined recording duration.

6.4.3. Statistical Analysis

The Statistical Analysis app provides comprehensive noise data measurement and calculation, as well as statistical analysis of noise data such as LAE, EA, LN, etc. It supports A, C, Z frequency weightings and F, S, I time weightings. The app offers three display modes: Data, LN Distribution, and Sound Pressure Level Distribution, with the Data mode capable of displaying up to eight data points simultaneously. It also supports data playback and recording functions.

6.4.3.1. Statistical Analysis Testing Interface
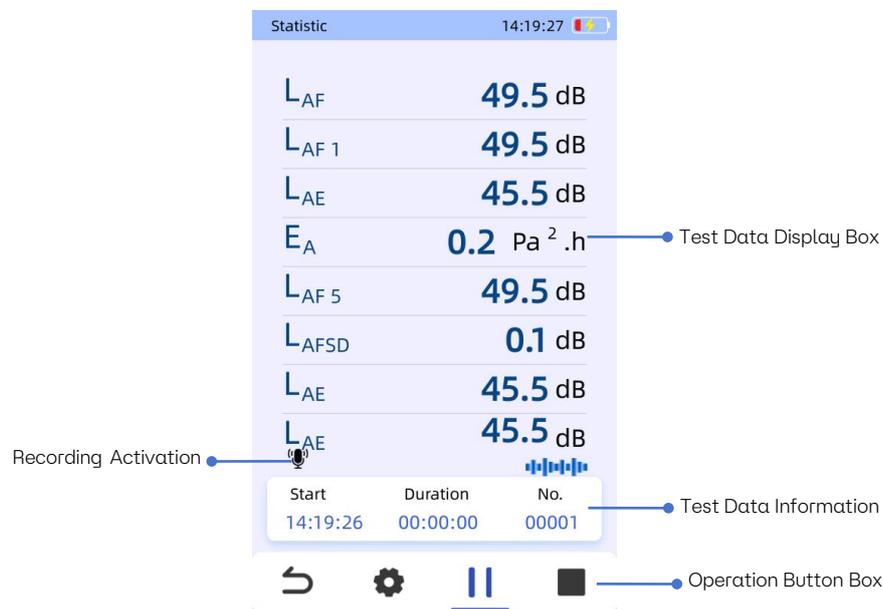
Fig 6.20 Main Interface of Statistical Analysis APP

As shown in Figure 6.20, this is the measurement interface for statistical analysis, currently in "Data Mode."

1. Test Data Display Box: Shows the specific values obtained during testing.
2. Test Data Information:

a. Start Time: The time the measurement began.

b. Test Duration: The duration of the current test.

c. Storage Number: The storage number for the current test data, which can be found in the data playback and corresponding SD card directory.

3. Recording Indicator: Indicates that audio data is being saved during the test.

4. Operation Button Box: Four sets of buttons provide functionality for returning, settings, starting, pausing, continuing, and stopping.

6.4.3.2. Statistical Analysis App Settings

Fig 6.21 Settings Interface of Statistical Analysis APP

Clicking the "Settings" button in the operation button area will bring up the settings interface, as shown in Figure 6.21.

1. Display Settings:

In this page, users can set the display contents. Options include displaying Data Mode, LN Distribution, and Sound Pressure Level Distribution.

Statistic	14:19:42
L_{AF}	**49.5** dB
$L_{AF\,1}$	**52.9** dB
L_{AE}	**56.1** dB
E_A	**1.9** Pa^2.h
$L_{AF\,5}$	**52.5** dB
L_{AFSD}	**1.7** dB
L_{AE}	**56.1** dB
L_{AE}	**56.1** dB

Start	Duration	No.
14:19:42	00:00:05	00001
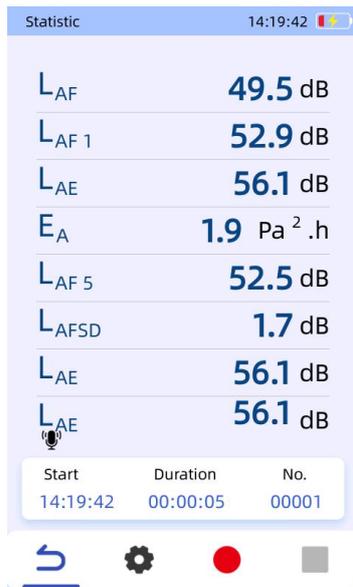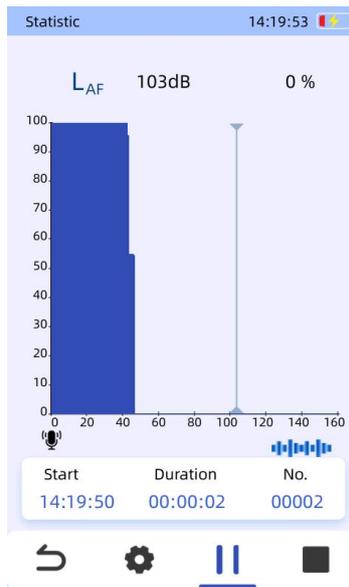
Fig 6.22 Data Mode   Fig 6.23 LN Distribution   Fig 6.24 Sound Pressure Level Distribution
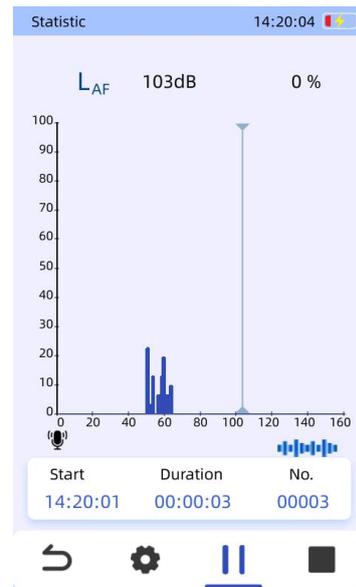
Data Mode: Users can customize test data.

LN Distribution: Sound pressure level is on the x-axis, ranging from 0 to 160 dB; the y-axis represents percentage, ranging from 0 to 100%.

Coordinate: Indicate the proportion of test values exceeding the sound pressure level indicated on the x-axis during the test.

Sound Pressure Level Distribution: Sound pressure level is on the x-axis, ranging from 0 to 160 dB; the y-axis represents percentage, ranging from 0 to 100%. The coordinates indicate the proportion of test values equal to the sound pressure level indicated on the x-axis during the test.

2.   Display Content Settings:

The following data types are available

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin

Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak
Statistics	LAF 1-99, LAS 1-99, LCF 1-99, LCS 1-99, LZF 1-99, LZS 1-99, SD
Sound Exposure	LAE, EA

3. Testing Mode Settings

Click "Testing Mode" to select from "Manual Mode," "Automatic Mode," "Timed Mode," or "Trigger Mode." Click "Testing Mode Settings" to configure the relevant test items based on the selected mode, as shown in Figure 6.23 for the "Timed Mode" settings. In this interface, users can select the appropriate mode based on their needs and set the corresponding duration for testing.
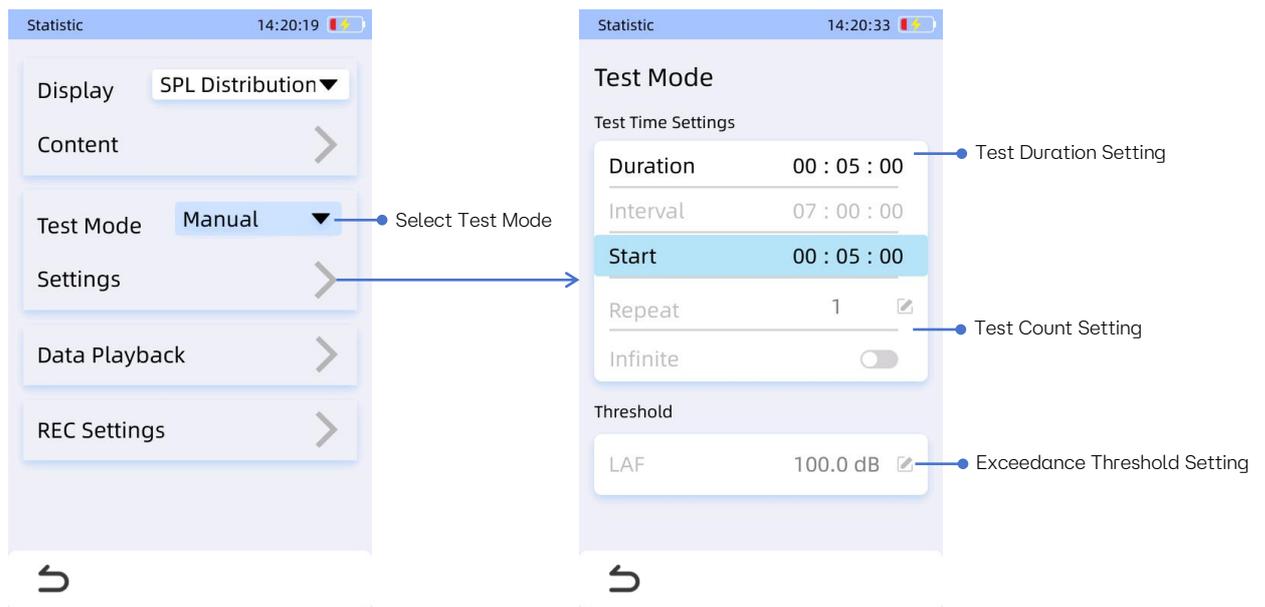
Fig 6.25 Testing Mode Settings

a. Manual Mode： The user manually starts and stops the measurement from the main interface button area. Figure 6.24 shows that in manual mode, the testing is entirely controlled by user actions, making any time settings in the testing mode configuration ineffective and uneditable.

In manual mode, the test mode editing is not available.
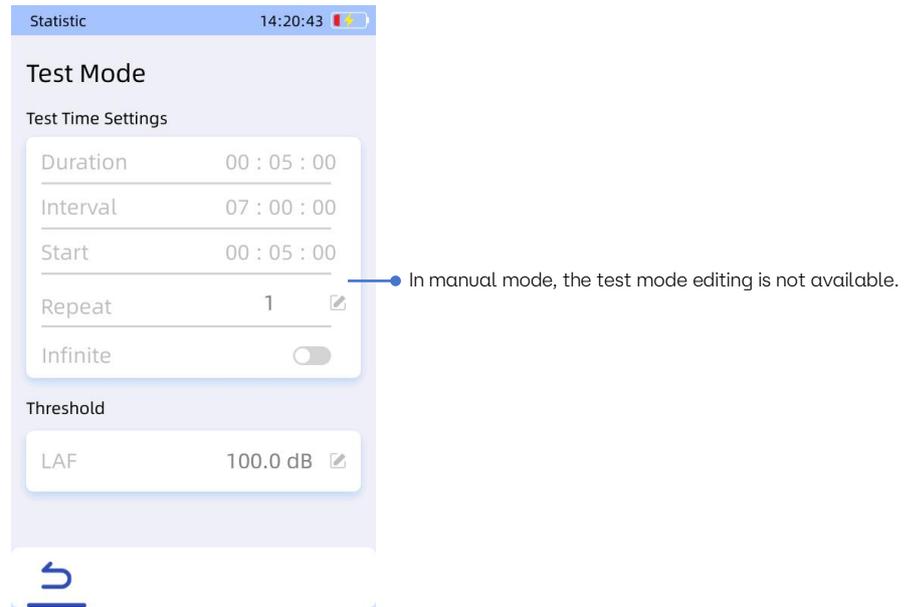
Fig 6.26 Manual Mode Parameter Settings

b. Automatic Mode: After clicking the start test button in the main interface, the application will automatically conduct the first test based on the user's set duration. After the first test, it will conduct a second test after the user's specified interval, and so on. The number of repetitions refers to how many times the test will be conducted and is set by the user. If the user enables the infinite repeat option, the automatic tests will continue indefinitely until the user manually stops them. When automatic testing is selected, the testing mode settings interface will appear as shown in Figure 6.25, where the start test duration cannot be edited.
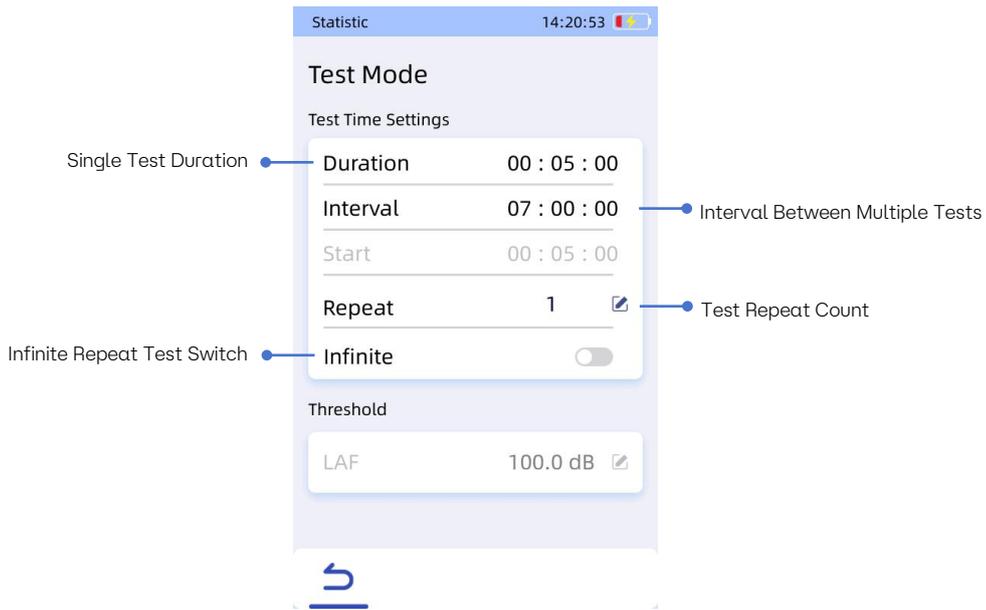
Fig 6.27 Automatic Mode Parameter Settings

c. Timed Mode: The application will automatically start testing at the user-defined start time, with a duration as set in the test settings interface. In timed testing mode, the options for test interval, repeat testing, and infinite repeat will be unavailable as they are meaningless.
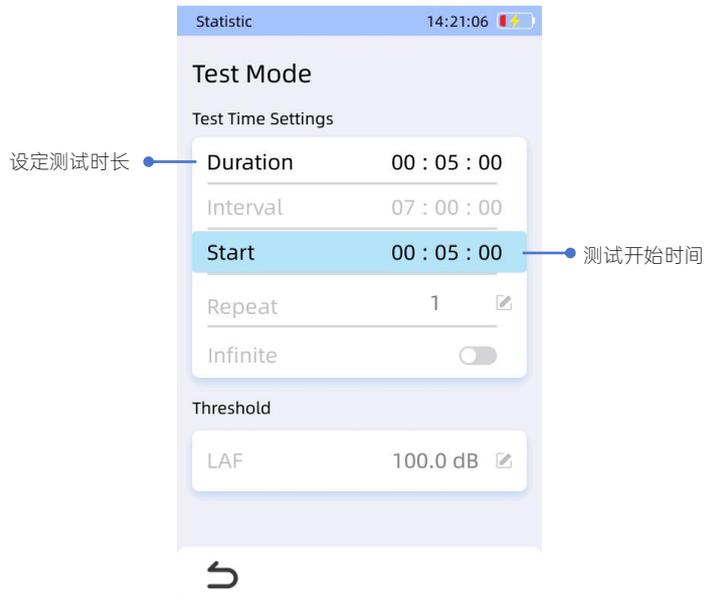
Fig 6.28 Timed Mode Parameter Settings

d. Trigger Mode: Users can set the test duration and threshold in the

settings interface. When LAF reaches the set threshold, testing will start automatically, lasting for the user-defined duration.
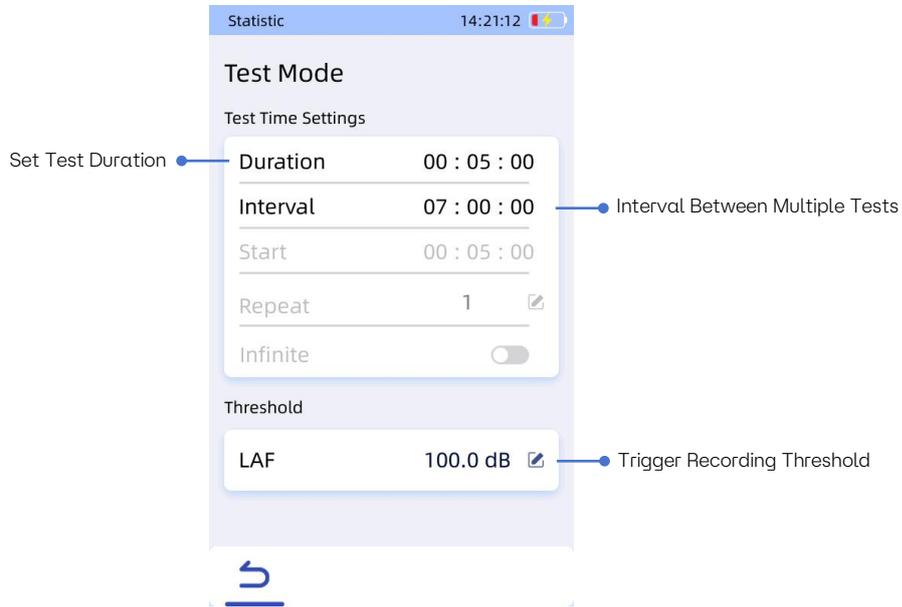
Fig 6.29 Trigger Mode Parameter Settings

4. Data Playback Settings
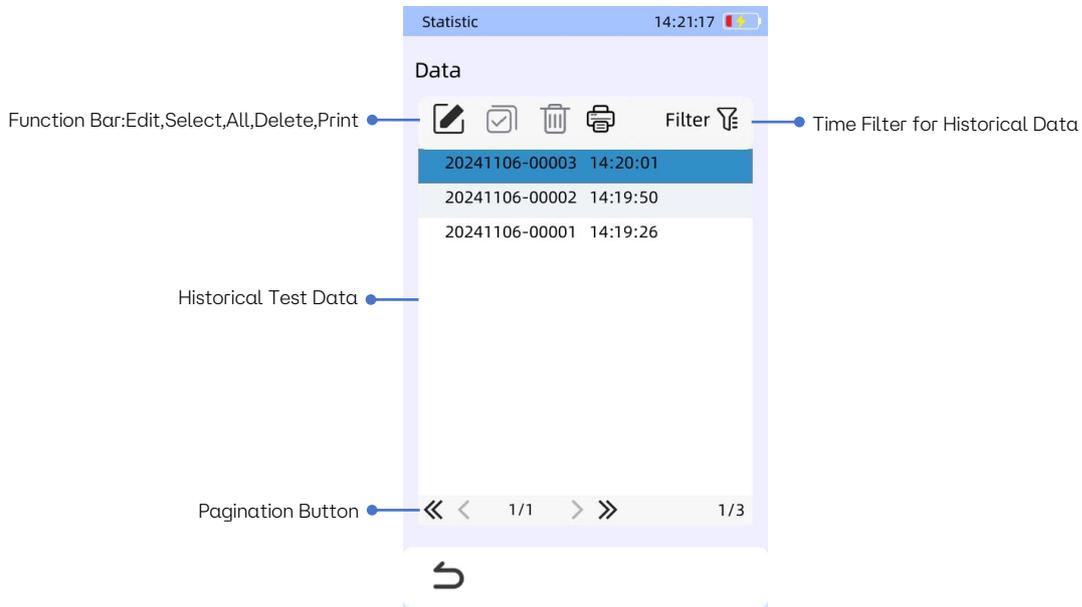
Fig 6.30 Data Playback List

Clicking "Data Playback" takes you to the interface shown in Figure 6.15. In this mode, users can filter data based on time intervals and click on specific data points for preview. The upper function buttons include: Select, Select All,

and Delete, allowing users to manipulate the data. Additionally, the data playback interface can facilitate printing operations, as detailed in the appendix "Using the Printer."

5. Recording Settings

As shown in Figure 6.17, this is the interface accessed by clicking the "Recording Settings" button. In this interface, users can choose whether to enable recording, set the recording mode, and specify the recording duration.
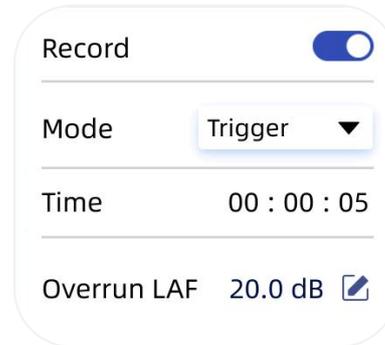
Fig 6.31 Recording Mode Settings

    a. Automatic Mode: Recording starts as soon as testing begins, with no need to set a recording duration.

    b. Trigger Mode: Users can specify the recording duration; recording will automatically commence when LAF reaches the set threshold, lasting for the user-defined recording duration.

6.4.4. 1/1OCT

The 1/1 Octave Band app provides noise data measurement and calculation for 1/1 octave bands, supporting A, C, Z frequency weightings and F, S time weightings. It offers two display modes: Data and Graph. There are four testing modes available: Manual Test, Automatic Test, Timed Test, and Trigger Test. The app saves per-second data from the test to the SD card in the DATA/1_1Octave directory and supports data playback and recording functions.

6.4.4.1. 1/1 Octave Testing Interface
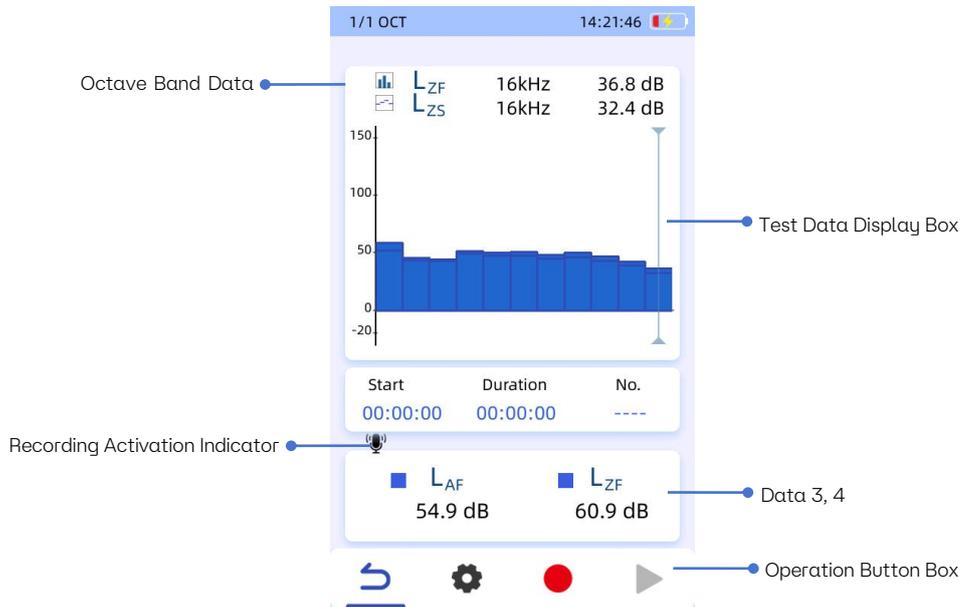
Fig 6.32 Main Interface of 1/1 OCT APP

As shown in Figure 6.30, this is the measurement interface for the 1/1 Octave app, currently in "Graph Mode."

1. Test Data Display Box: Displays the specific data obtained during testing.
2. Test Data Information:
   a. Start Time: The time the measurement began.
   b. Test Duration: The duration of the current test.
   c. Storage Number: The storage number for the current test data, which can be found in the data playback and corresponding SD card directory.
3. Recording Indicator: Indicates that audio data is being saved during the test.
4. Operation Button Box: Four sets of buttons provide functionality for returning, settings, starting, pausing, continuing, and stopping.

6.4.4.2. 1/1OCT App Settings
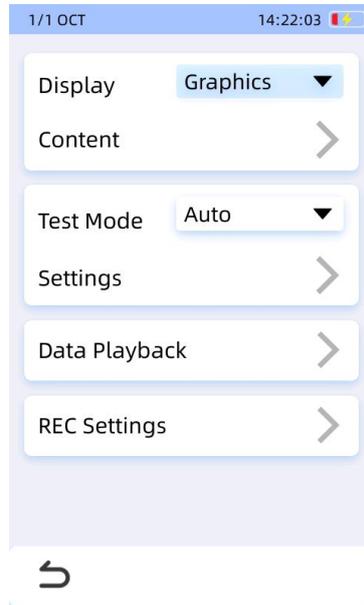
Fig 6.33 Settings Interface of 1/1 OCT

Clicking the "Settings" button in the operation button area will bring up the settings interface, as shown in Figure 6.31.

6. Display Settings:

In this page, users can set the display and its contents, selecting the desired display mode. Options include Data Mode and Graph Mode.

Fig 6.34 Graph Mode
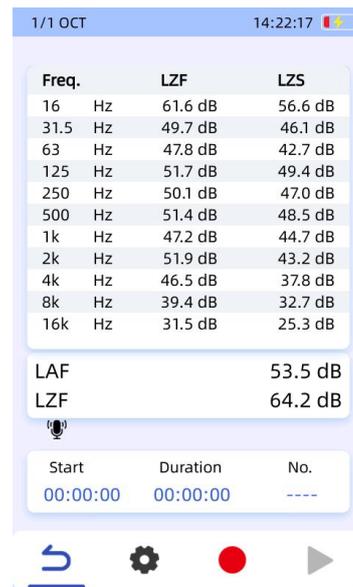
Fig 6.35 Data Mode

7. Display Content Settings:

The following data types are available as shown in the table, with octave data 1, 2; data 3, 4 corresponding as shown in Figure 6.30.

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak

8. Testing Mode Settings:

Click "Testing Mode" to select from "Manual Mode," "Automatic Mode," "Timed Mode," or "Trigger Mode." Click "Testing Mode Settings" to configure the relevant test items based on the selected mode, as shown in Figure 6.23 for the "Timed Mode" settings. In this interface, users can select the appropriate mode based on their needs and set the corresponding duration for testing.
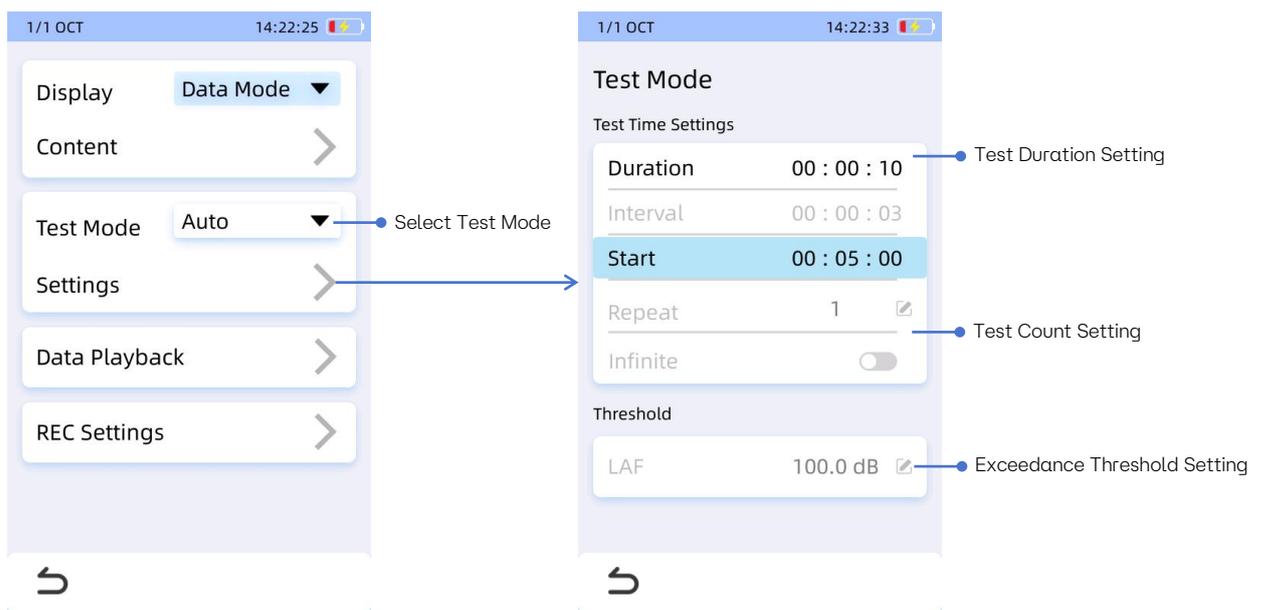
Fig 6.36 Testing Mode Settings

a. Manual Mode: Users manually start and stop measurements from the main interface's operation button area. In this mode, as shown in Figure 6.35, the test can only be controlled manually by the user, making any time settings in the testing mode configuration ineffective and uneditable.
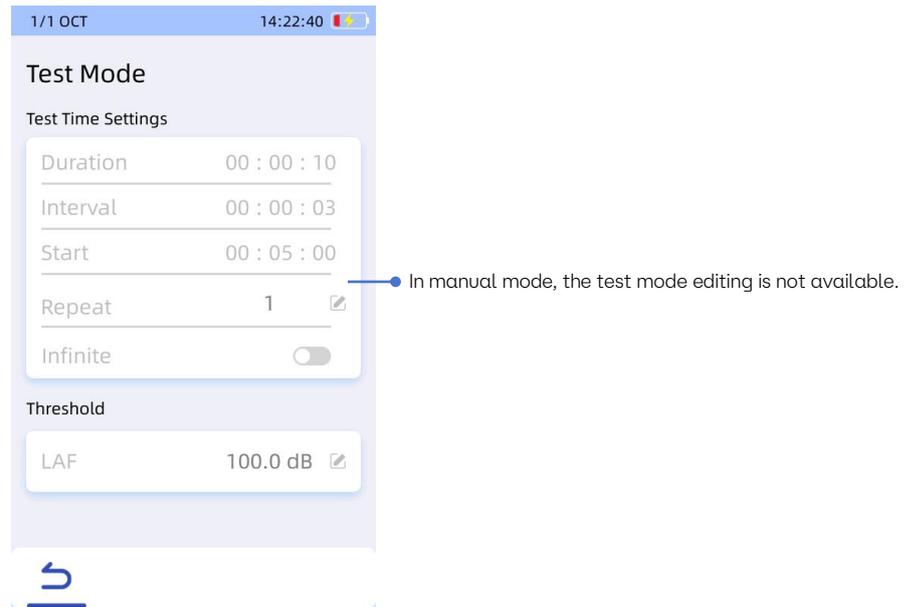
Fig 6.37 Manual Mode Parameter Settings

b. Automatic Mode: After the user clicks the start test button, the application will automatically conduct the first test based on the user's defined duration. After the first test, it will perform a second test after the interval set by the user, and this process will repeat. The number of repetitions is set by the user. If the infinite repeat option is enabled, automatic testing will continue until manually stopped by the user. The settings interface for automatic testing is shown in Figure 6.36, where the start test time cannot be edited.
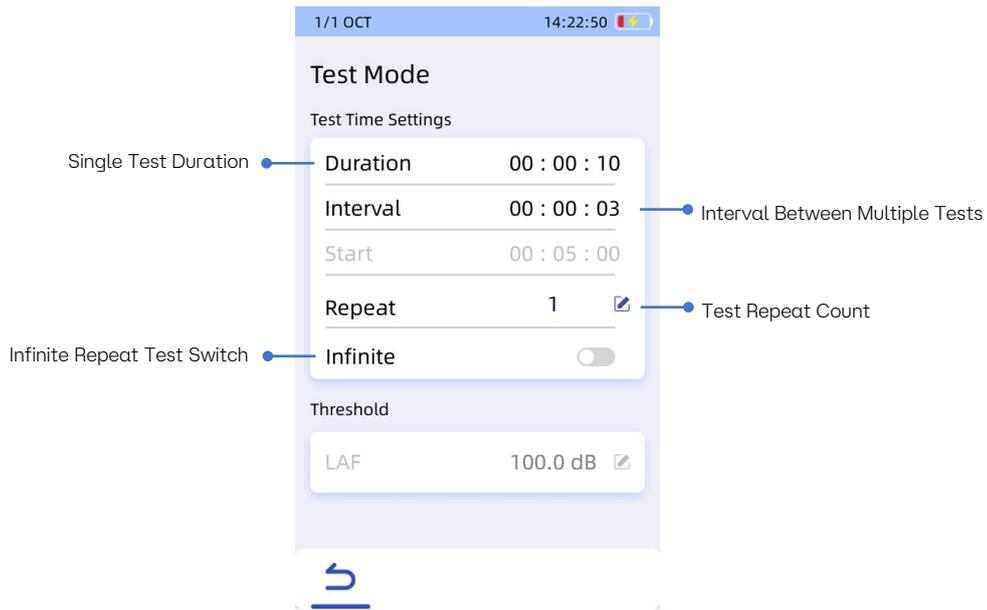
Fig 6.38 Automatic Mode Parameter Settings

c. Timed Mode: The application will automatically start testing at the user-defined start time, with a duration set in the test settings interface. In Timed Mode, the options for test interval, repeat testing, and infinite repeat will be disabled as they are irrelevant.
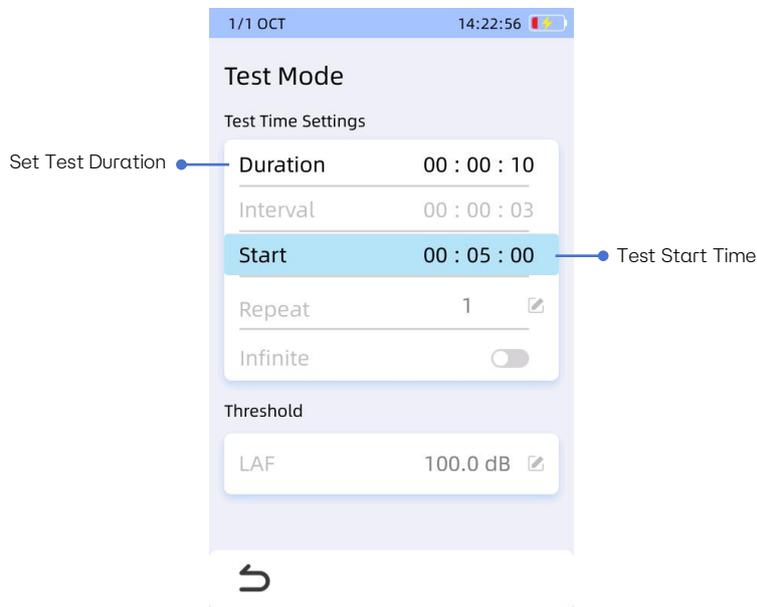
Fig 6.39 Timed Mode Parameter Settings

d. Trigger Mode: In this mode, users can set the testing duration and threshold. When LAF reaches the specified threshold, testing will

automatically begin, lasting for the duration defined by the user.

Fig 6.40 Trigger Mode Parameter Settings

9. Data Playback Settings
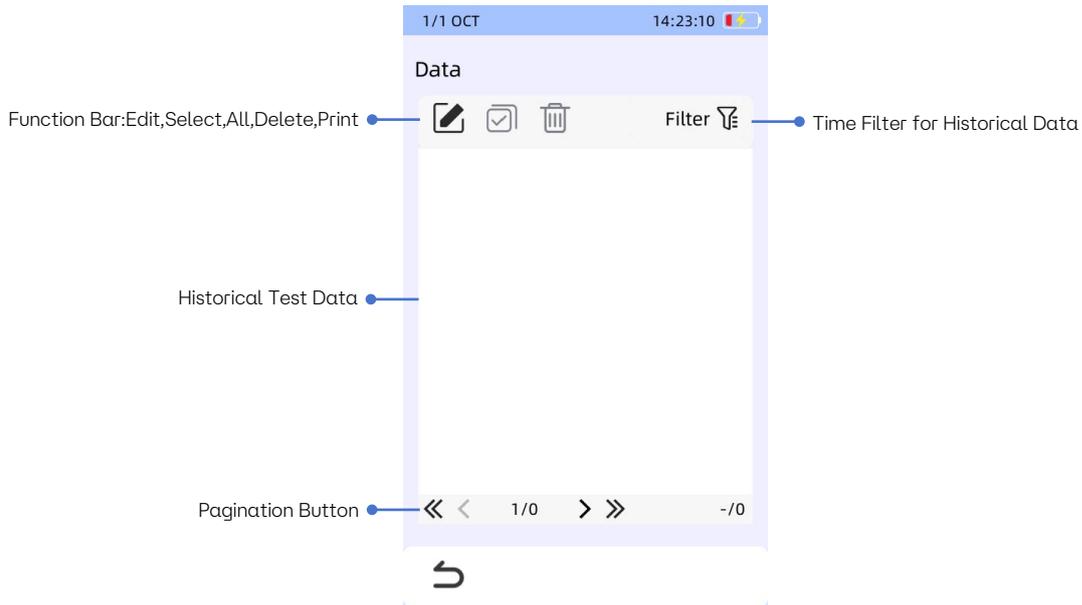
Fig 6.41 Data Playback List

Clicking "Data Playback" takes users to the interface shown in Figure 6.39. In this mode, users can filter data according to time intervals and click on specific data points to preview them. The function buttons include: Select, Select All, and Delete, allowing users to manage the data. Additionally, the

data playback interface supports printing operations, as detailed in the appendix "Using the Printer."

10. Recording Settings

As shown in Figure 6.40, this is the interface accessed by clicking the "Recording Settings" button. In this interface, users can choose whether to enable recording, set the recording mode, and specify the recording duration.
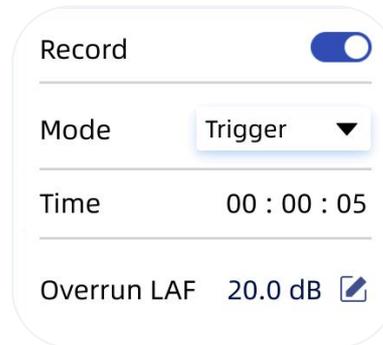
Fig 6.42 Recording Mode Settings

a. Automatic Mode: Recording starts as soon as testing begins, with no need to set a recording duration.

b. Trigger Mode: Users can specify the recording duration; recording will automatically start when LAF reaches the set threshold, lasting for the duration defined by the user.

6.4.5. 1/3OCT

The 1/3 Octave Band app provides noise data measurement and calculation for 1/3 octave bands, supporting A, C, Z frequency weightings and F, S time weightings. It offers two display modes: Data and Graph. Users can choose from four testing modes: Manual Test, Automatic Test, Timed Test, and Trigger Test. The app saves per-second data from the test to the SD card in the DATA/1_3Octave directory and supports data playback and recording functions.

6.4.5.1. 1/3OCT Testing Interface
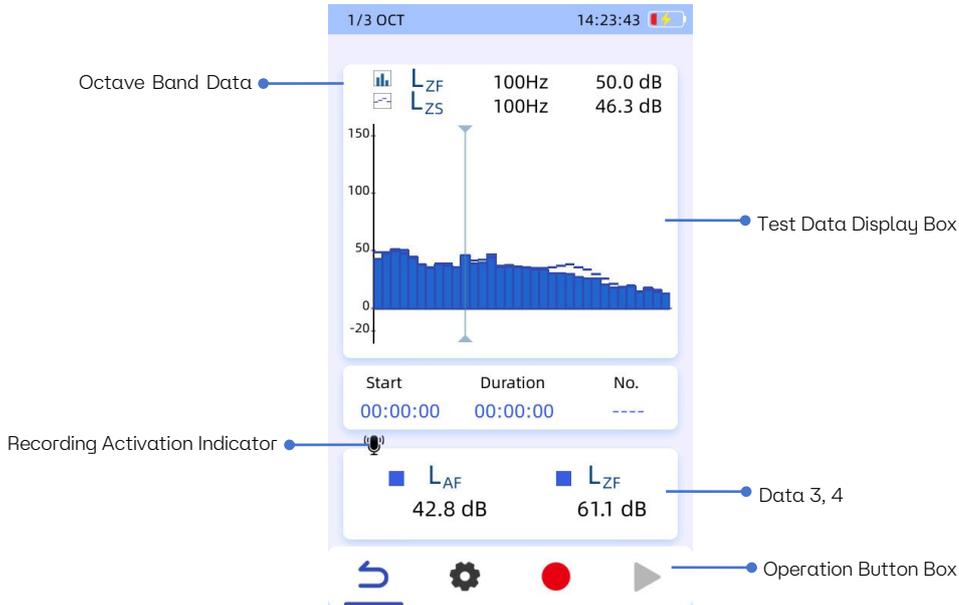
Fig 6.43 1/3 Octave App Main Interface

As shown in Figure 6.41, this is the statistical analysis measurement interface, and the current display mode is "Graphical Mode."

1. Test Data Display Box: Displays the specific data obtained during testing.

2. Test Data Information:

    a. Start Time: The time when measurement began.

    b. Test Duration: The duration of the current test.

    c. Storage Number: The storage number for the current test data, which can be found in the data playback and corresponding SD card directory.

3. Recording Indicator: Indicates that audio data is being saved during the test.

4. Operation Button Box: Four sets of buttons provide functionality for return, settings, start, pause, continue, and stop.

6.4.5.2. 1/3 Octave App Settings
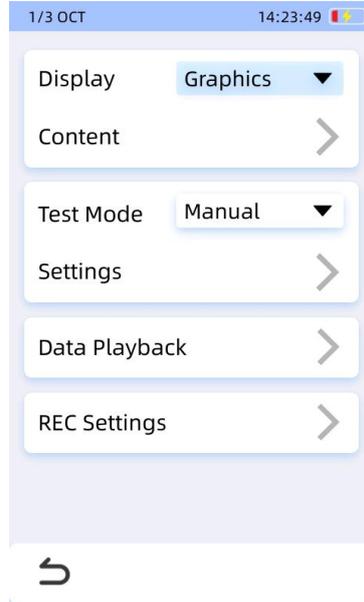
Fig 6.44 Settings Interface of 1/3 OCT APP

Clicking the "Settings" button in the operation button area brings up the settings interface, as shown in Figure 6.42.

1. Display Settings:

In this page, users can set display preferences, choosing between Data Mode and Graph Mode.
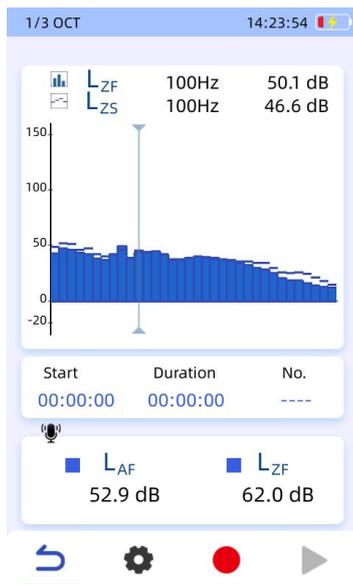
Fig 6.45 Graph Mode
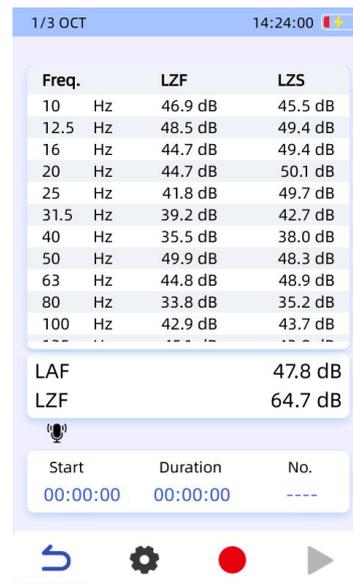
Fig 6.46 Data Mode

2. Display Content Settings:

The following data types are available:

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak

3. Testing Mode Settings:

Clicking "Testing Mode" allows selection of "Manual Mode," "Automatic Mode," "Timed Mode," or "Trigger Mode." The relevant test item settings can be configured based on the selected mode, as shown in Figure 6.47 for the "Testing Mode" settings.
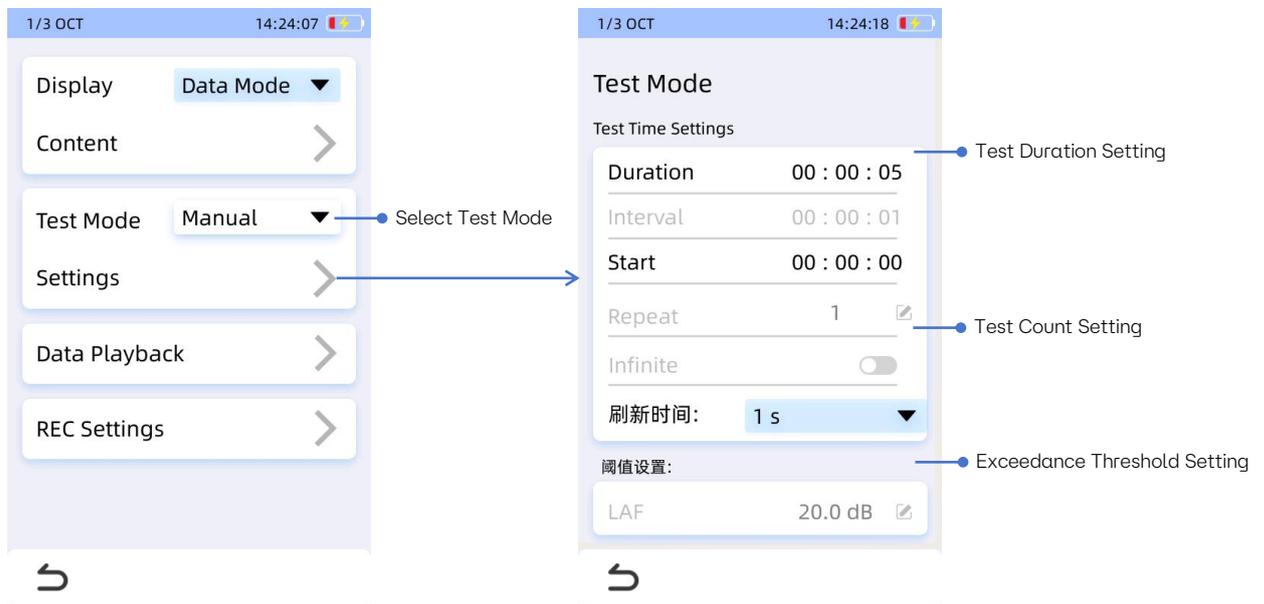
Fig 6.47 Testing Mode Settings

a. Manual Mode:Users can manually start and stop measurements from the main interface. In this mode, as shown in Figure 6.46, the testing is controlled solely by the user, making any time settings in the testing

mode configuration ineffective and uneditable.

In manual mode, the test mode editing is not available.
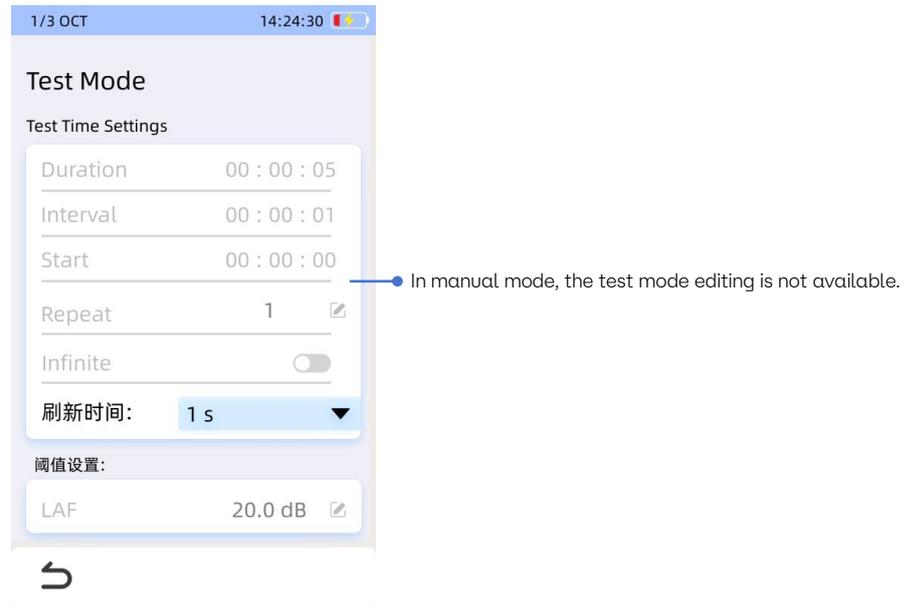
Fig 6.48 Manual Mode Parameter Settings

b. Automatic Mode: After clicking the start test button, the application performs the first test based on user-defined duration. Afterward, it will conduct a second test after the defined interval, repeating this process. The number of repetitions is set by the user. If the infinite repeat option is enabled, automatic testing will continue until manually stopped. The settings interface for automatic testing is shown in Figure 6.49, where the start test time cannot be edited.
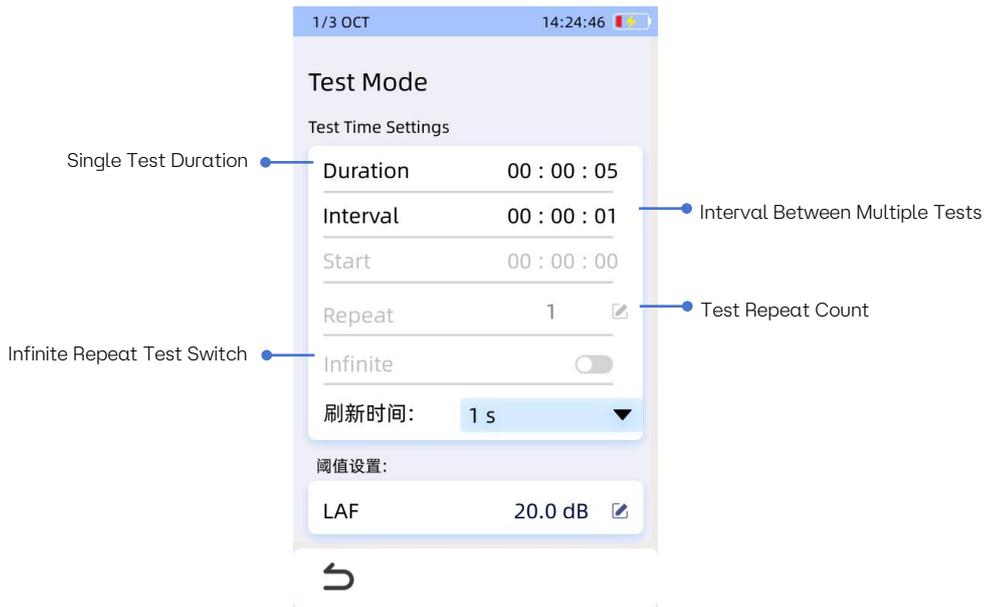
Fig 6.49 Automatic Mode Parameter Settings

c. Timed Mode: The application will automatically start testing at the user-defined start time, with a duration set in the test settings interface. In Timed Mode, options for test interval, repeat testing, and infinite repeat will be disabled.

Fig 6.50 Timed Mode Parameter Settings

d. Trigger Mode: Users can set the testing duration and threshold. When LAF reaches the specified threshold, testing will automatically start,

lasting for the duration specified by the user.
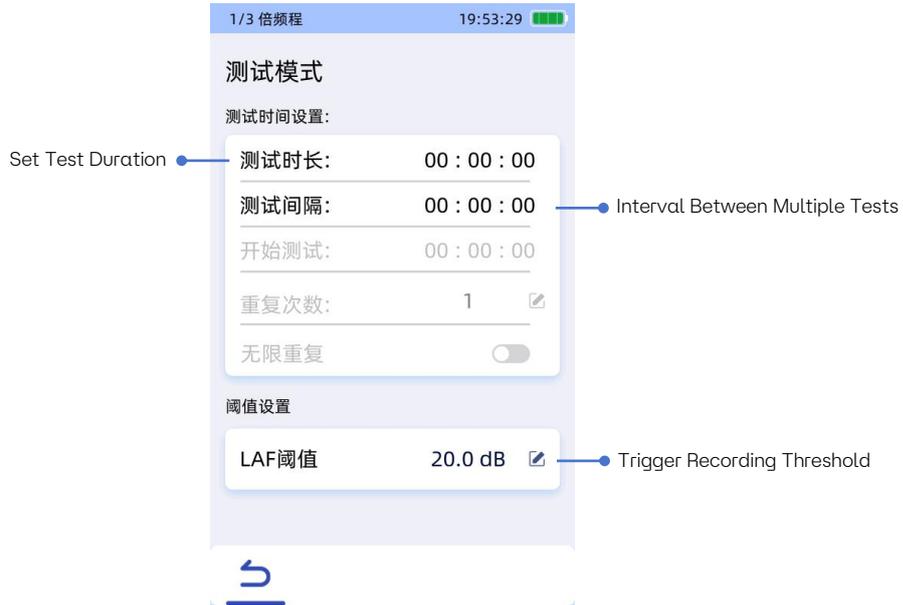
Fig6.51 Trigger Mode Parameter Settings

4. Data Playback Settings
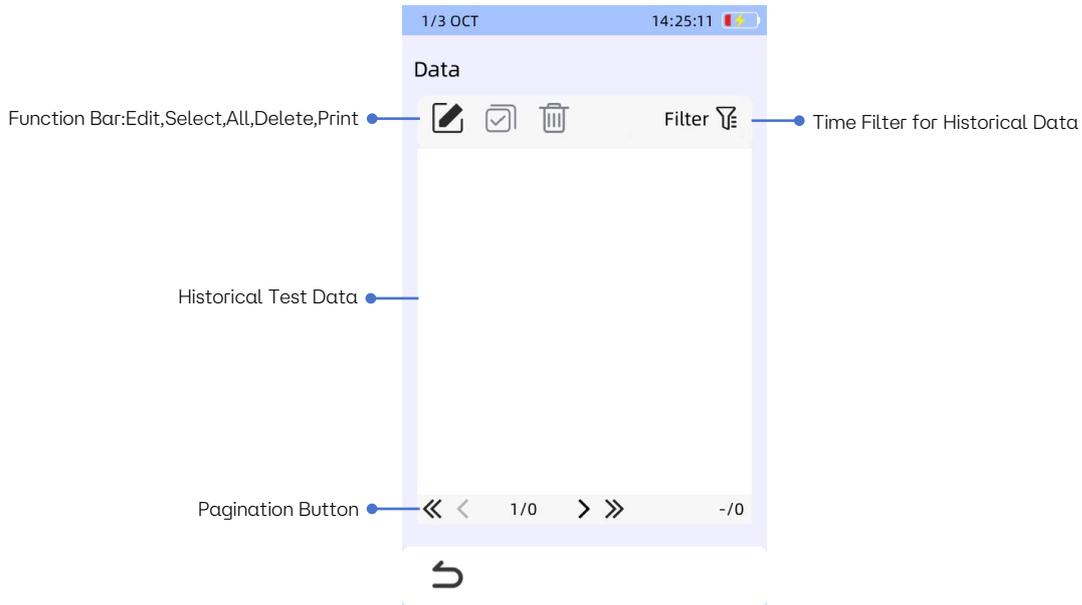
Fig 6.52 Data Playback List

Clicking "Data Playback" leads to the interface shown in Figure 6.52. In this mode, users can filter data according to time intervals and click on specific data points for preview. The function buttons include: Select, Select All, and Delete, allowing for data management. Additionally, the data playback

interface supports printing operations, as detailed in the appendix "Using the Printer."

5. Recording Settings

As shown in Figure 6.53, this is the interface that appears after clicking the "Recording Settings" button. In this interface, you can choose whether to enable recording, set the recording mode, and specify the recording duration.

Record	⬤
Mode	Trigger ▼
Time	00 : 00 : 05
Overrun LAF	20.0 dB ✎
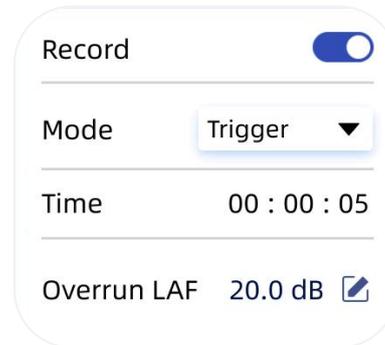
Fig 6.53 Recording Mode Settings

a. Automatic Mode: Recording starts when testing begins, with no need to set a recording duration.

b. Trigger Mode: Users can set a recording duration; recording will automatically start when LAF reaches the defined threshold, lasting for the user-specified duration.

6.4.6. Spectrum Analysis

The Spectrum Analysis app provides accurate noise spectrum analysis and displays spectrum graphs. It supports A, C, Z frequency weightings and F, S time weightings. Users can choose from four testing modes: Manual Test, Automatic Test, Timed Test, and Trigger Test. The app saves per-second data to the SD card in the DATA/FFT directory and supports data playback and recording functions.

6.4.6.1. Spectrum Analysis Testing Interface
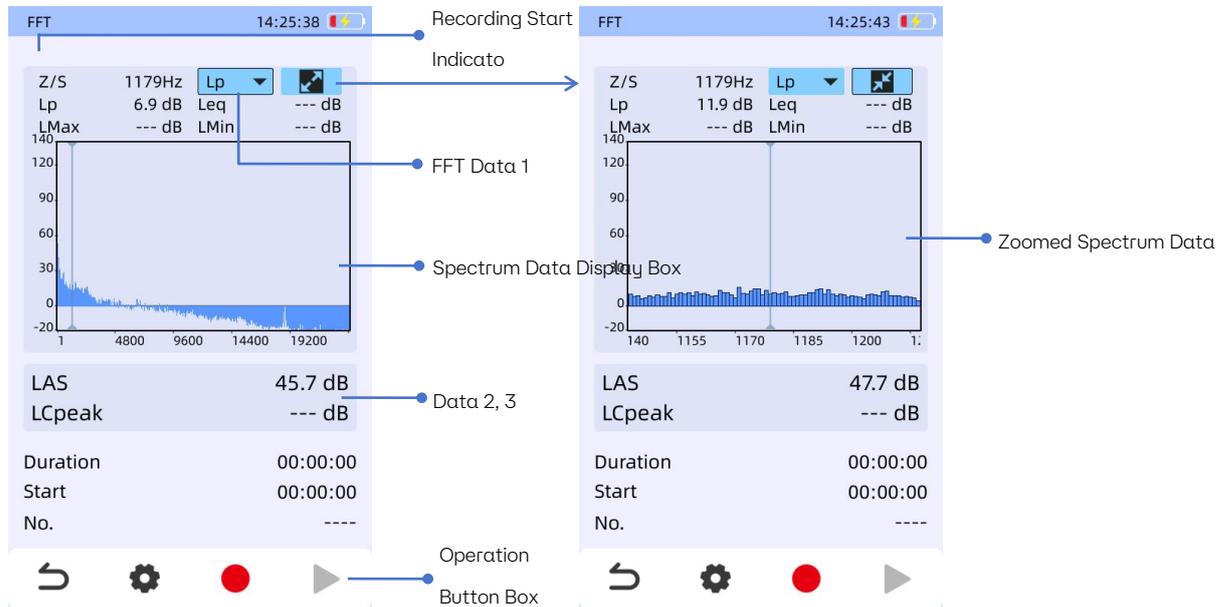
Fig 6.54 Spectrum Analysis Main Interface

As shown in Figure 6.54, this is the measurement interface of the spectrum analyzer, and the current display mode is "Graphical Mode."

1. Spectrum Data Display Box: Shows spectrum analysis data; users can move the cursor to specific frequency positions to read values for Lp/Leq/LMax/LMin.

2. Overall Test Values: Displays values like LAF, LCF.

3. Measurement Status:

   a. Start Time: When the measurement began.

   b. Test Duration: Duration of the current test.

   c. Storage Number: Identifier for current test data, useful for data playback.

4. Recording Indicator: Indicates that audio data is being saved during the test.

5. Operation Button Box: Buttons for returning, settings, starting, pausing, continuing, and stopping.

6.4.6.2. Spectrum Analysis App Settings
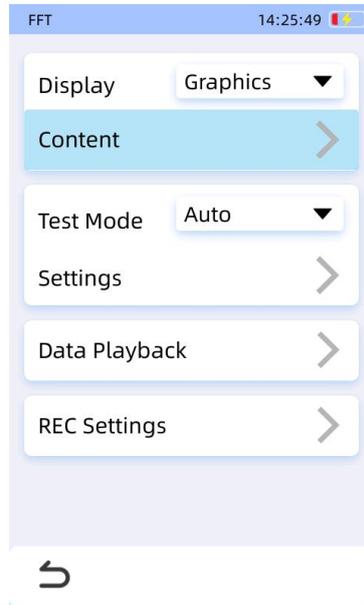
Fig 6.55 Spectrum Analysis App Settings Interface

After clicking the "Settings" button, users enter the settings interface, shown in Figure 6.55.

6. Display Settings:

Users can configure display preferences, selecting the desired measurement goals and display modes (only Graph Mode is available for spectrum analysis).

7. Display Content Settings:

Available data types include.

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak

a. FFT settings for frequency weighting and time weighting.

b. b. Data 2 and Data 3 correspond to the test data 2 and 3 shown in the illustration;

c. In the display content settings, FFT window function settings can also be configured, as shown in Figure 6.56. The window functions include: Hanning, Rectangular, Blackman, and Flat Top.
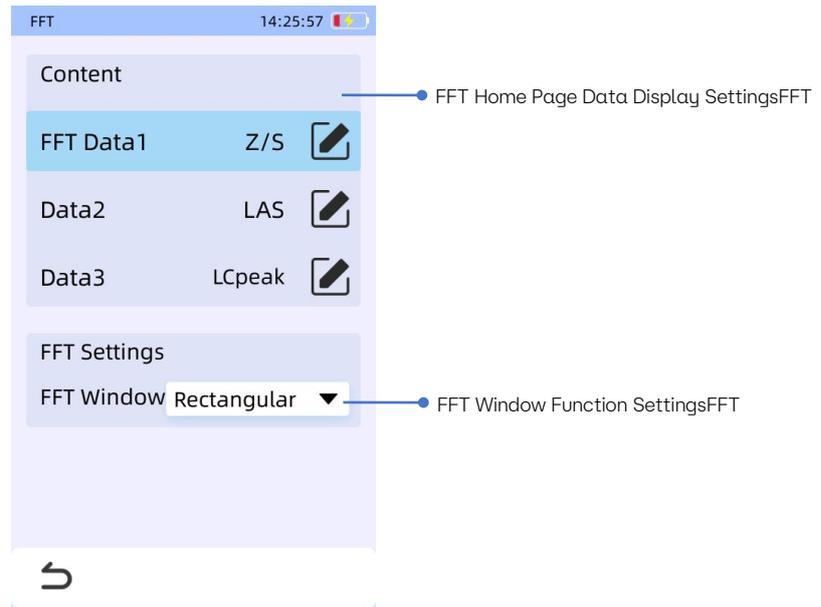
Fig 6.56 Spectrum Analysis Display Content Settings

8. Test Mode Settings

By clicking on "Test Mode," you can select "Manual Mode," "Automatic Mode," "Timed Mode," or "Triggered Mode." By clicking on "Test Mode Settings," you can configure the corresponding test items based on the selected test mode, as shown in Figure 6.57, which displays the test time settings under "Timed Mode." In this interface, you can choose the appropriate mode based on different needs and set the corresponding time for testing.
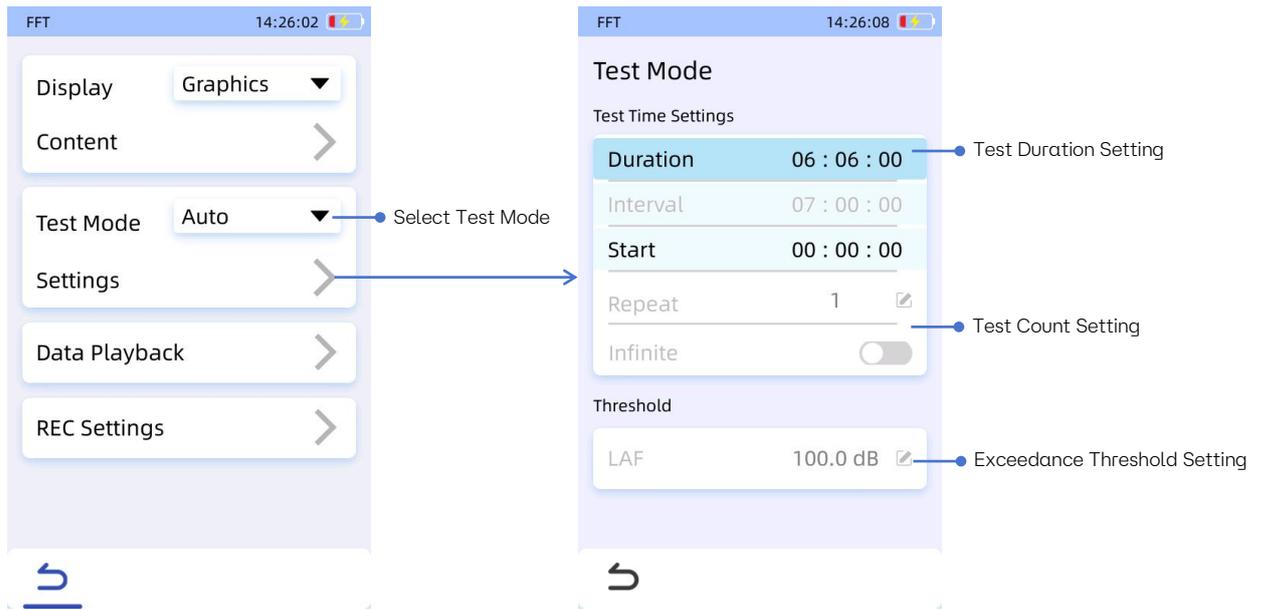
Fig 6.57 Test Mode Settings

a. Manual Mode: Manually start and stop measurements in the main interface's button area. Figure 6.58 shows that in Manual Mode, the test can only be controlled manually by the user to start, pause, and end; thus, the test time settings in Test Mode Settings are ineffective and cannot be edited.
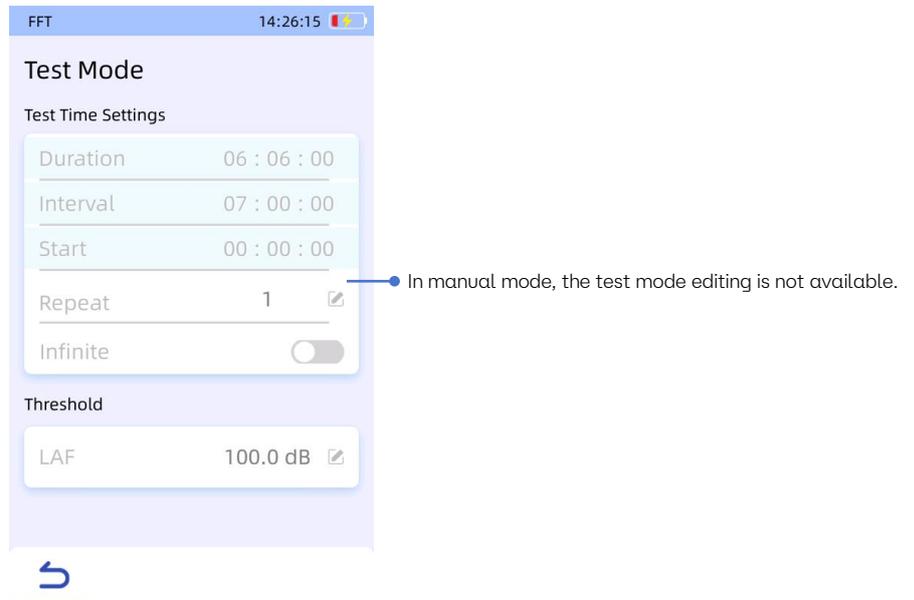
Fig 6.58 Manual Mode Parameter Settings

b. Automatic Mode： When the user clicks the start test button on the

main interface, the application will automatically conduct the first test according to the duration set by the user. After the first test ends, a second round of testing will occur after the user-defined interval, and this process will repeat. The number of repetitions indicates how many times the test is conducted and is also set by the user. When the repeat test is set to 1, only one test (i.e., the first test) will be conducted. If the user enables the infinite repeat option, the automatic test will continue indefinitely until the user manually stops it. After selecting automatic testing, the Test Mode Settings interface will appear as shown in Figure 6.59, and the start testing time is not editable in this mode.
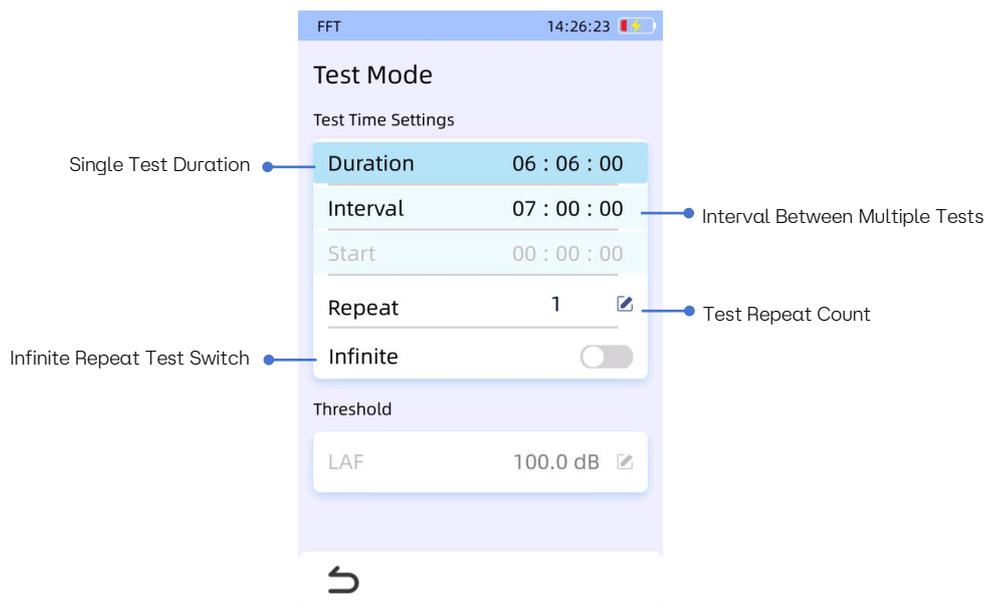
Fig 6.59 Automatic Mode Parameter Settings

c. Timed Mode: The application will automatically start testing at the user-defined start time, with the test duration set to the value specified in the test settings interface. As shown below, in Timed Mode, the options for test interval, repeat testing, and infinite repeat in the test settings interface will be unavailable due to their irrelevance.
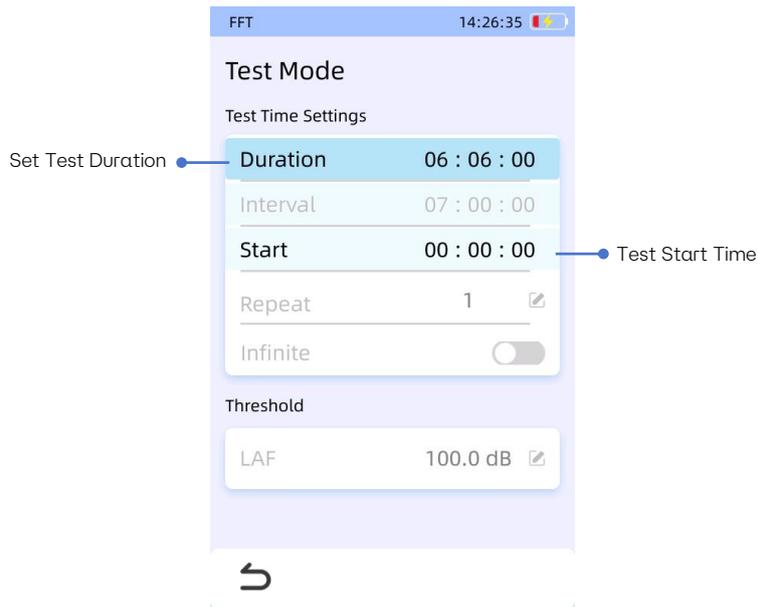
Fig 6.60 Timed Mode Parameter Settings

d. Triggered Mode: You can set the test duration and threshold in the settings interface. When the LAF reaches the set threshold, testing will automatically begin, and the test duration will be the value set by the user.
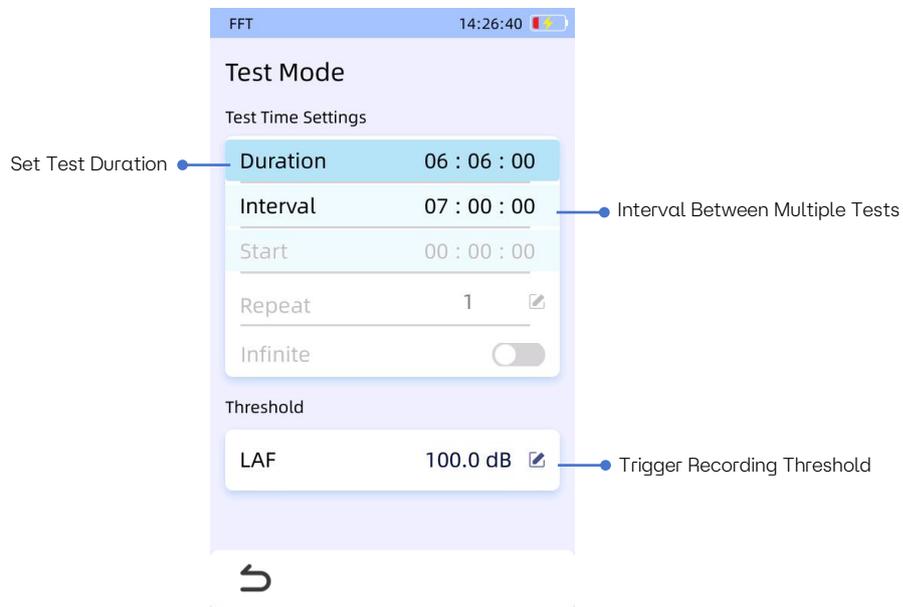
Fig 6.61 Triggered Mode Parameter Settings

9. Data Playback Settings

Function Bar:Edit,Select,All,Delete,Print

Time Filter for Historical Data

Historical Test Data

Pagination Button
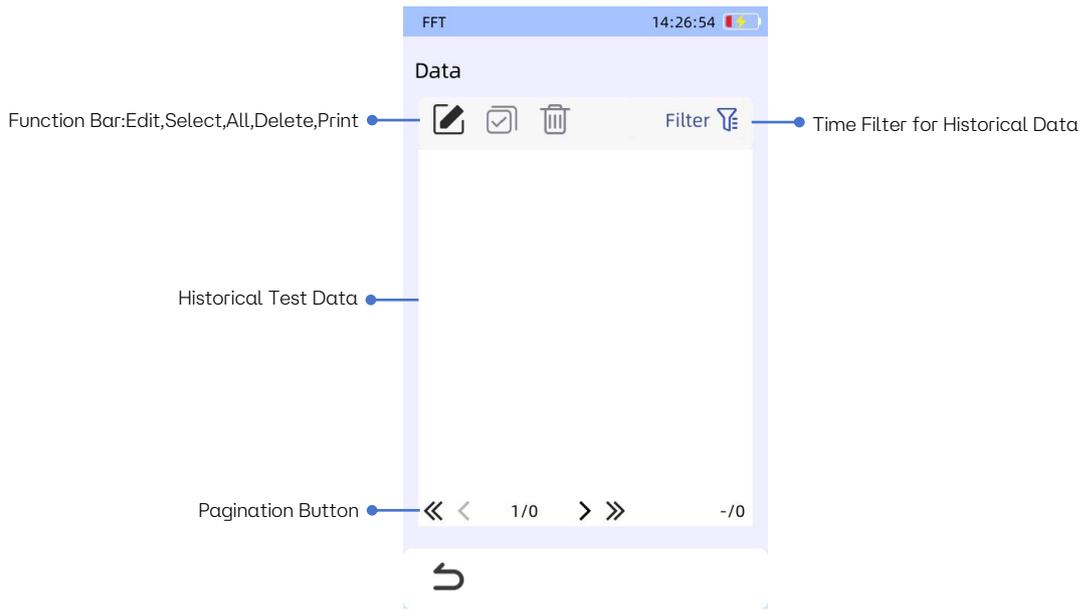
Fig 6.62 Data Playback List

Clicking "Data Playback" will lead to the interface shown in Figure 6.62. In this mode, users can filter the required data by time range, and clicking on the corresponding data allows for preview operations. The function buttons above include: Select, Select All, and Delete, which can be used to manipulate the data. Additionally, the data playback interface allows for printing operations, as detailed in the appendix "Printer Usage."

10. Recording Settings

As shown in Figure 6.63, this is the interface that appears after clicking the "Recording Settings" button. In this interface, you can choose whether to enable recording, set the recording mode, and specify the recording duration.
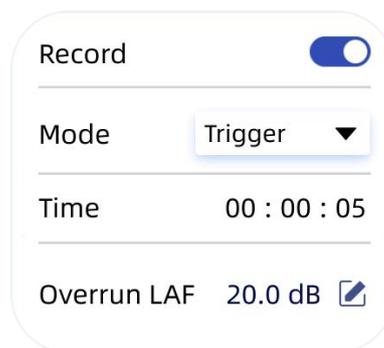
Fig 6.63 Recording Mode Settings

a. Automatic Mode: Recording starts as soon as the test begins, without needing to set the recording duration.

b. Triggered Mode: You can set the recording duration as needed. When

the LAF reaches the designated threshold, recording will start automatically, and the test duration will be the recording duration set by the user.

6.4.7. Monitoring

The monitoring version of the spectrum analysis APP integrates a sound level meter, statistical analysis, and octave band functions, and supports data transmission (Modbus protocol). Additionally, the monitoring APP features static excitation self-check and CIC calibration functions, commonly used for long-term outdoor monitoring scenarios or third-party customer integration development.

6.4.7.1. Monitoring Test Interface
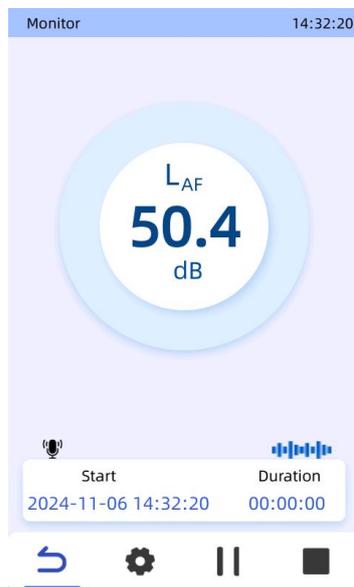
Fig 6.64 Single Data Mode

Fig 6.65 Multiple Data Mode
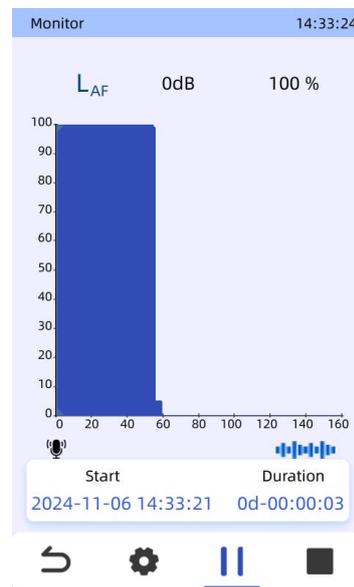
Fig 6.66 LN Distribution
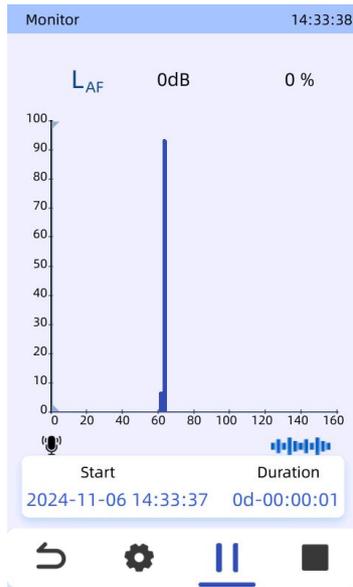
| Fig 6.67 Sound Pressure Level Distribution | Fig 6.68 1/1 Octave Band | Fig 6.69 1/3 Octave Band |
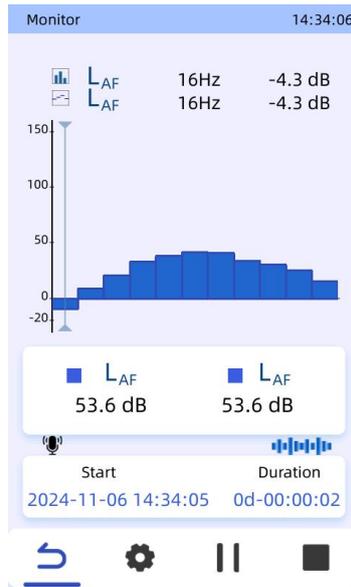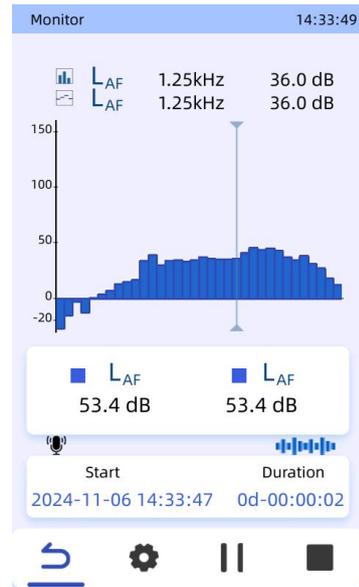
The monitoring APP homepage can switch between five display modes: Data Mode (Single Data/Multiple Data), LN Distribution, Sound Pressure Level Distribution, 1/1 Octave Band, and 1/3 Octave Band. For detailed display content, refer to the descriptions in each APP.

6.4.7.2. Monitoring APP Settings
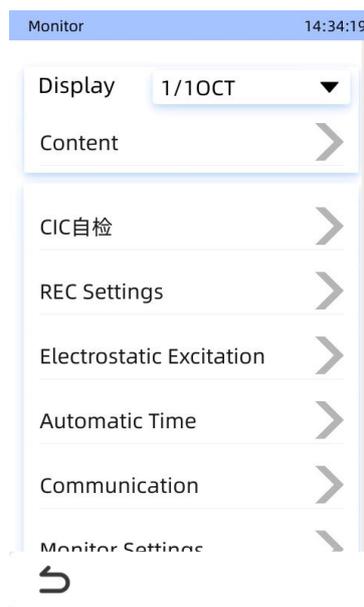
Fig 6.70 Monitoring APP Settings Interface

After clicking the "Settings" button in the operation button area, you will enter the settings interface, as shown in Figure 6.70.

11. Display Settings:

On this page, you can configure display settings and content, selecting the desired measurement targets and display modes. The monitoring APP offers selectable modes including Data, LN Distribution, Sound Pressure Level Distribution, 1/1 Octave Band, and 1/3 Octave Band.

12. Display Content Settings

a. Data Mode: The selectable data types are as follows:

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum Value	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak
Statistics	LAF 1-99, LAS 1-99, LCF 1-99, LCS 1-99, LZF 1-99, LZS 1-99, SD
Sound Exposure	LAE, EA

b. LN Distribution: Allows switching the time and frequency weighting type for testing sound pressure;

c. Sound Pressure Distribution: Allows switching the time and frequency weighting type for testing sound pressure;

d. 1/1 and 1/3 Octave Bands:

The selectable data types are as follows:

SPL	LAF, LAS, LCF, LCS, LZF, LZS
Maximum	LAFMax, LASMax, LCFMax, LCSMax, LZFMax, LZSMax

Value	
Minimum Value	LAFMin, LASMin, LCFMin, LCSMin, LZFMin, LZSMin
Leq	LAeq, LCeq, LZeq
Peak SPL	LApeak, LCpeak, LZpeak

13. CIC Self-Check

CIC self-check is used for status detection of the sound level meter system sensor, with a calibration standard sound pressure of 82.7 dB. Click to start the self-check, and if the verification result deviation is less than ±2 dB, it indicates a successful self-check; otherwise, it fails, and further inspection of the microphone status is required.

14. Recording Settings

By clicking on the recording settings, you can enable or disable recording. To adapt to environmental noise detection, recording is only available in overload mode, with options for recording duration, pre-recording duration overload threshold, and recording interval settings, which can be configured according to actual usage scenarios.
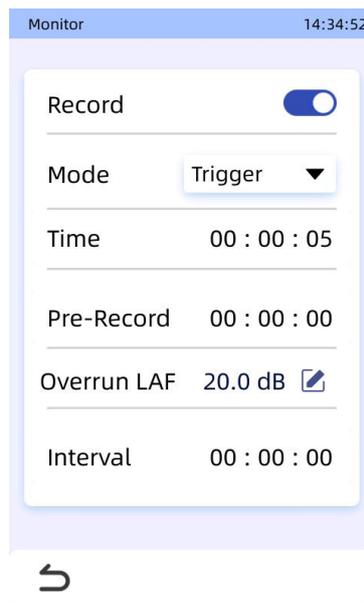
Fig 6.71 Recording Settings

a. Recording: Open/close recording function. Default is open, used to save audio files of excessive noise;

b. Recording Mode: Only supports overload mode;

c. Recording Duration: Duration of recording starting from the overload threshold;

d. Pre-recording Duration: The most recent duration before the recording is triggered by the overload threshold; this duration will be stored in the total duration of the final audio file;

e. Overload LAF Threshold: The LAF threshold that triggers recording;

f. Recording Interval: Time interval for continuous recording;

Note: The total duration of the stored audio file = recording duration + pre-recording duration.

15. Static Excitation Calibration

The sound level meter, when paired with the NA43 outdoor protective cover and CRY585 static excitation power supply, can be calibrated. The calibration process should include the microphone, front-end stage, and detection host. If the calibration result deviates more than 0.5 dB from the standard of 94 dB, an automatic prompt will be generated.

Sound Level Reading: Current data value measured by the noise sensor, including the weighting method display.

Fig 6.72 Static Excitation

a. Custom Settings: Enable the static excitation calibration function. When turned off, only the "View Records" button is available. By default, this function is off to prevent accidental activation;

b. Sensitivity: The sensitivity obtained from the most recent calibration of the noise sensor;

c. Static Exciter: Click to turn on the static exciter; release to turn it off. This verifies whether the static exciter is properly connected;

d. Static Excitation Calibration: Switch for the static excitation calibration function;

e. Static Exciter Self-Check: Click to open the static exciter, input a stable calibration signal. If the humidity sensor and heater are available, the heater will activate to reduce humidity when it is too high. Once the signal is stable, if the deviation from the calibration value is too large, a prompt stating "Deviation from Calibration Value Too Large, Please Calibrate" will appear. When the static excitation calibration function is enabled, if the deviation is too large during self-check, calibration will occur, updating the sensitivity; otherwise, no calibration will be performed (i.e., sensitivity will not be updated);

f. Calibrate Static Exciter: After each use of the sound calibrator for sensor calibration, you must click "Calibrate" to ensure the input signal size is consistent with the sound calibrator during static exciter calibration, improving the accuracy of subsequent calibrations;

g. Heater: If available, you can control its operation to lower the humidity on the microphone surface.

16. Automatic Time Calibration

The automatic time calibration function is used for calibrating the time of the sound level meter. In the automatic time calibration settings, you can enable

the calibration switch and set the time points for calibration.
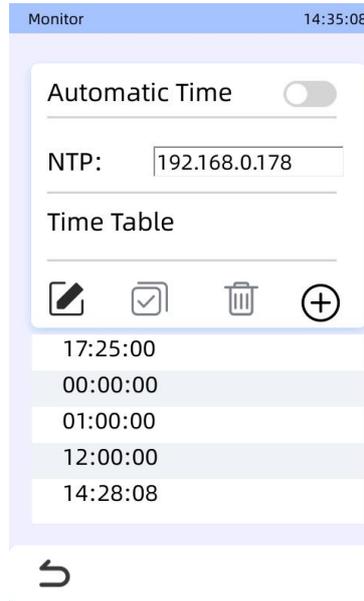
Fig 6.73 Automatic Time Calibration Parameter Settings

a. Automatic Time Calibration Function Switch: If the sound level meter is properly connected to the network, it will prioritize network time calibration (default is Alibaba Cloud service); if the network is unavailable, it will check if the GPS function is available, and if so, it will use GPS for time calibration;

b. Calibration Time Point: Set the time points for the device to automatically calibrate, allowing multiple calibration time points to be set.

17. Communication Method (Not Available)

18. Monitoring Settings

Monitoring settings are used to configure monitoring APP, calculate periods for Ld and Ln, and set the data storage mode for the monitoring APP.
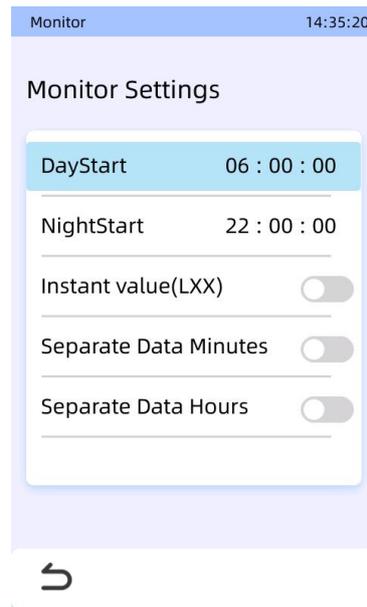
Fig 6.74 Monitoring Settings

a. Daytime Start Time: The time when daytime calculations begin (i.e., when nighttime calculations end);

b. Nighttime Start Time: The time when nighttime calculations begin (i.e., when daytime calculations end);

c. Instantaneous Data (LXX) takes immediate values (not available);

d. Individually Store Minute Data: Store data in CSV files with one group of data per minute; (Storage Path: SD Card/DATA/Monitor/yyyy-mm-dd-minutes.csv)

e. Individually Store Hourly Data: Store data in CSV files with one group of data per hour; (Storage Path: SD Card/DATA/Monitor/yyyy-mm-dd-hours.csv)

19. Display Refresh Settings

Configure the refresh settings for the data collected by the sound level meter.

Fig 6.75 Refresh Settings

a. Data Refresh Time: Data refresh frequency;

b. Spectrum Refresh Time: If a spectrum graph is displayed in the "Main Interface - Measurement Data Area," this refresh frequency applies;

c. Sampling Interval: Set the data collection frequency.

20. Over-limit Audio Upload Settings

This function is for setting the upload address for over-limit audio during third-party development.
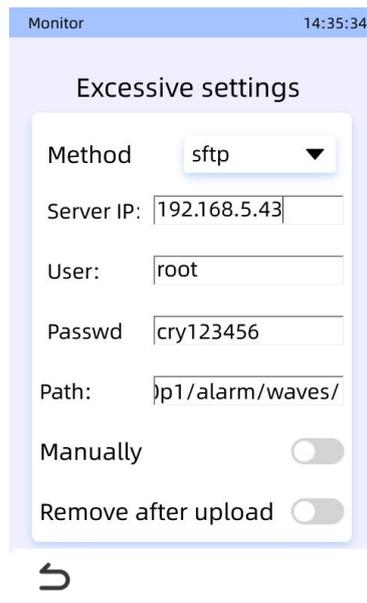
Fig 6.76 Over-limit Audio Upload Settings

a. tcp

Server IP: Industrial gateway IP address (default 192.168.5.43)

TCP Port: Data communication port (default 510)

Size of each audio data packet: in bytes

b. sftp

Server IP: Upper computer IP address (default 192.168.5.43)

Username: Upper computer login username (default root)

Password: Upper computer login password (cry123456)

Upload Path: Path where audio files are stored after being uploaded to the upper computer

Active Upload: When enabled, it will actively upload audio files

6.4.8. Data Export Instructions

Monitoring data from the sound level meter can be exported to a PC via an SD card. To do this, open the DATA folder on the SD card, which contains the following files; each folder corresponds to a specific function APP.
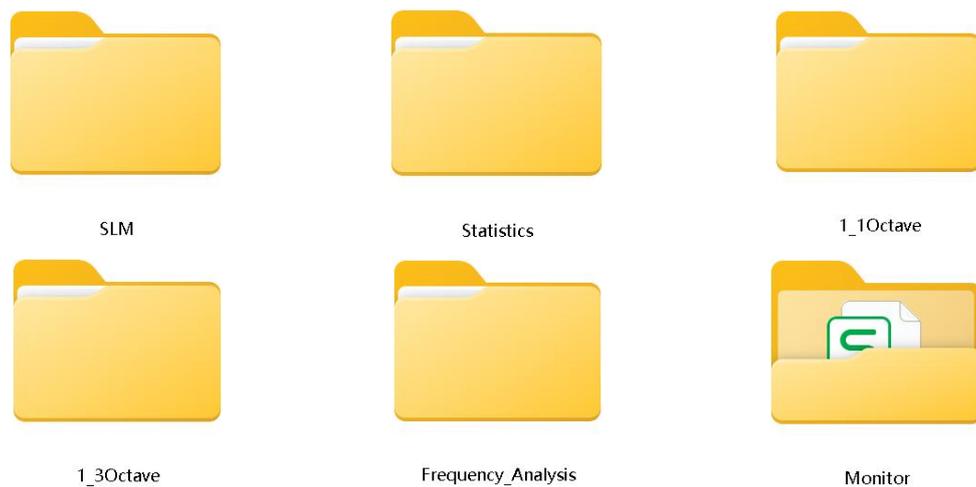
Fig 6.77 Data from Various Sound Level Meter APPs

6.4.8.1. Storage Logical Structure

Connect the SD card to the computer and open the DATA folder in the root directory of the SD card. Enter the relevant function folder (SLM Sound Level Meter, Statistics, 1_1Octave, 1_3Octave, Frequency_Analysis, Monitor). Subsequent files are stored in a hierarchical order of year → month → day. Within the daily folder, specific test data is saved in folders named with the format of year-month-day + serial number. The folders contain noise data in TSV format and a folder with recorded .WAV files.

Fig 6.78 APP Storage Structure Diagram

6.4.8.2. Data Save Items

SLM APP	Lxy,LxyMax,LxyMin,Lxeq,Lxpeak
Statistical Analysis APP	Lxy,LxyMax,LxyMin,Lxeq,Lxpeak,EA,LAE,SD
1/1 Octave APP	Lxy,LxyMax,LxyMin,Lxeq,Lxpeak,spectrum data
1/3 Octave APP	Lxy,LxyMax,LxyMin,Lxeq,Lxpeak,spectrum data
Spectrum Analyzer APP	Lxy,LxyMax,LxyMin,Lxeq,Lxpeak
Monitoring APP	Minute/Hour:Leq,L5,L10,L50,L90,L95,LMax,LMin,SD General:L5,L10,L50,L90,L95,Lxy,LxyMax,LxyMin,Lxyeq,SD

Here, x denotes the frequency weighting (A, C, Z), and y denotes the time weighting (F, S, I).

6.5. Instrument Settings

The settings APP provides functions such as wireless network connection,

Ethernet settings, GPS positioning, and Bluetooth connection. Users can modify system display settings, system time and date, switch system languages, and view hardware information, storage information, and software version information. It also supports software installation and authorization, as well as software and system upgrades.

6.5.1. Wireless Network
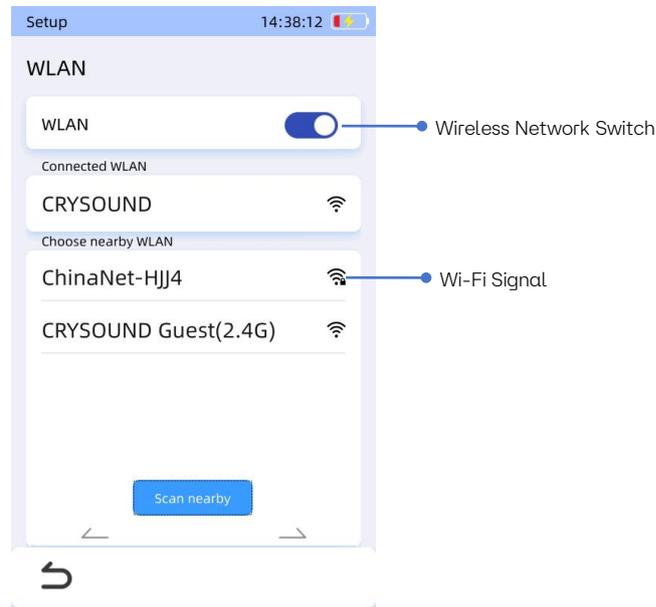
Fig 6.79 Wi-Fi Connection Interface

Toggle the switch to automatically search for nearby available Wi-Fi networks, which will be displayed in a list below. Select the desired Wi-Fi item from the list and enter the correct password in the pop-up window to connect. Successfully connected Wi-Fi will show under "Connected WLAN" (only the most recently connected Wi-Fi name is retained).

6.5.2. Bluetooth
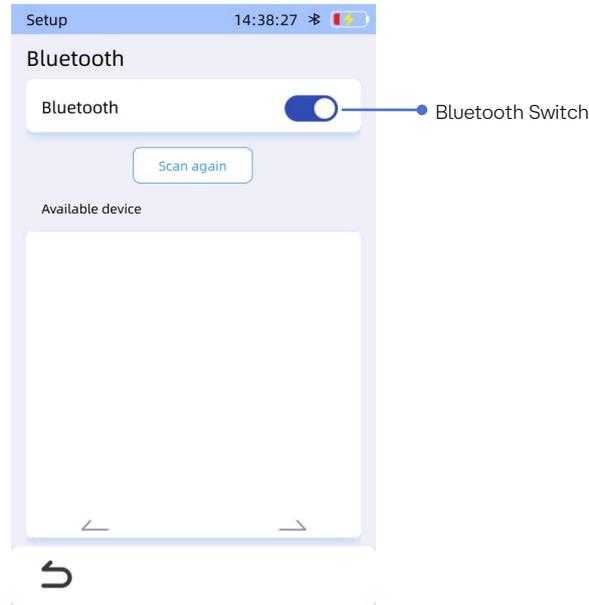
Fig 6.80 Bluetooth Connection Interface

Enter the Bluetooth settings, toggle the Bluetooth switch on, and the device will automatically begin scanning. Click the corresponding device to pair (currently, Bluetooth only supports Bluetooth printing functionality).

6.5.3. GPS
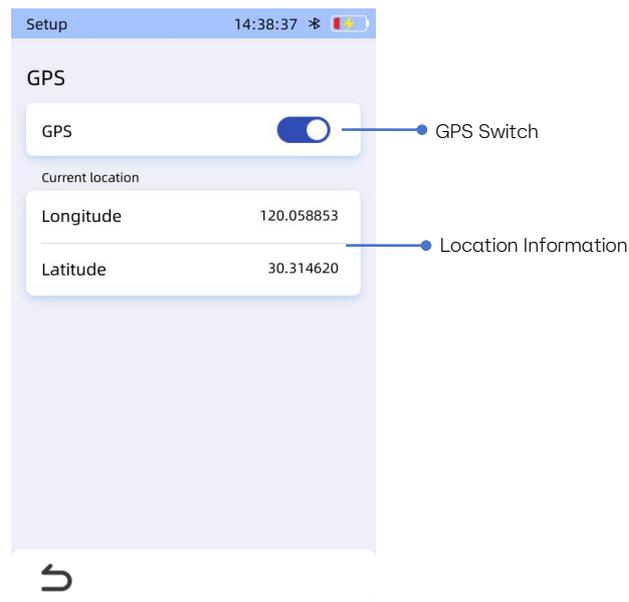
Fig 6.81 GPS Positioning Interface

In the GPS settings, toggle the GPS switch on, and the device will start reading the current location information. If the GPS has acquired location data, the latitude and longitude will be displayed normally; if not, the device will show N/A. If the device does not refresh latitude and longitude information for a long time, it may be due to weak signals, and the device should be moved to an open outdoor location.

6.5.4. Ethernet Settings
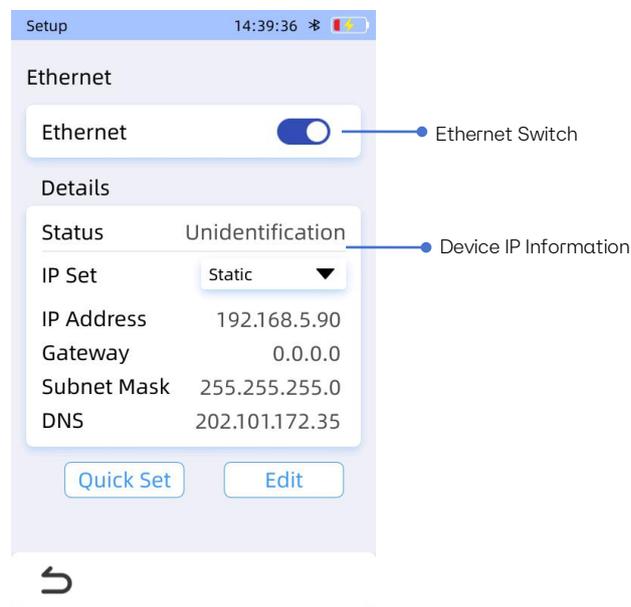
Fig 6.82 Ethernet Settings Interface

Open the Ethernet settings; the device will connect according to the current configuration and display the current network details. It supports "Dynamic Acquisition" and "Static IP" options. The default setting in this system is a static IP (192.168.5.40).

1. Dynamic Acquisition: After opening the Ethernet, when the device is connected to a valid network cable, it will automatically acquire an IP and refresh the displayed information, showing the status as "Connected."

2. Static IP: After opening the Ethernet, click "Edit" to enter the network

editing interface. After editing, click "OK" to return; click "One-Click Setup" to complete the static IP settings.

6.5.5. Display Settings
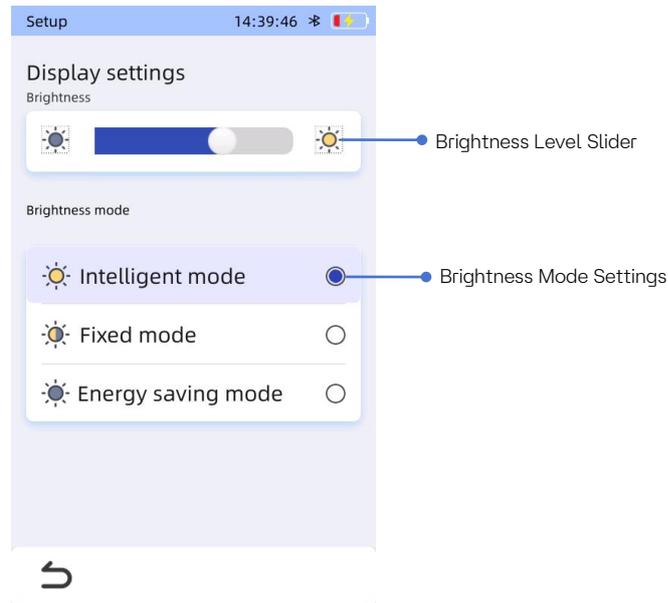
Fig 6.83 Device Display Settings Interface

1. Brightness: Customizable brightness with a total of 8 levels.

2. Brightness Modes:

a. Normal Mode: Displays at user-defined brightness.

b. Smart Mode (default): Automatically reduces screen brightness after 3 minutes of inactivity; user can restore brightness by tapping the screen.

c. Fixed Mode: The device displays at a user-defined brightness continuously.

d. Energy Saving Mode: The device will turn off the screen after 3 minutes of inactivity; tapping the screen will turn it back on.

6.5.6. Time & Date
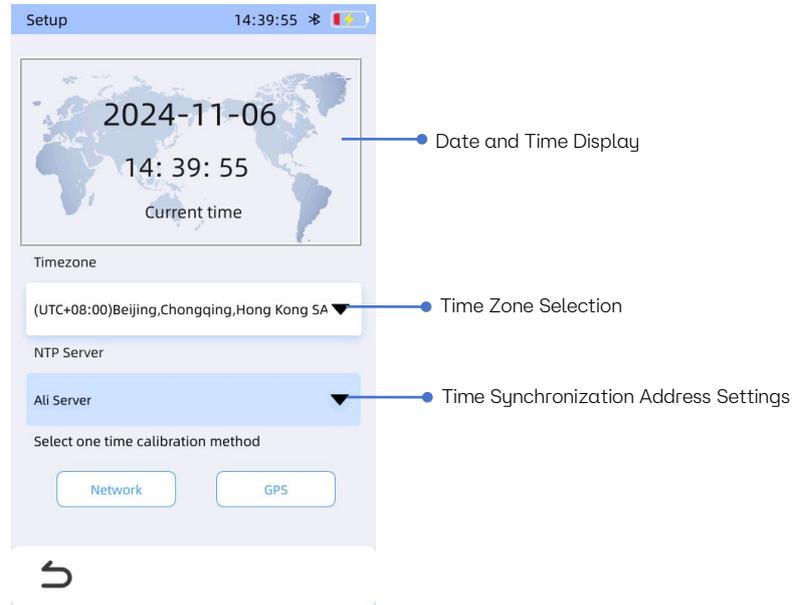
Fig 6.84 Time and Date Settings Interface

1. Time Zone: The time zone corresponding to the current system time.

2. Network Time Service: The server object used to obtain time for network time calibration.

3. Calibration Method: Successful calibration updates the system time settings.

Network Time: Ensure the device is connected to a network (non-static) to obtain current time information from the selected server.

GPS Time: Ensure that the GPS function is successfully enabled and available, then click the button to start calibration.

6.5.7. Language

Fig 6.85 Sound Level Meter Language Switch

This setting allows users to change the display language of the system APP software, supporting a switch between Chinese and English.

6.5.8. Storage Space
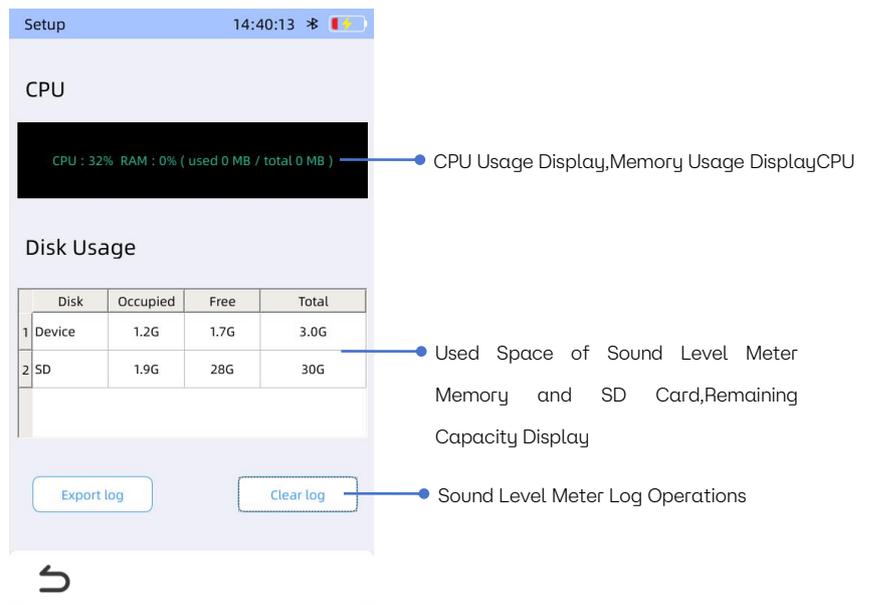
Fig 6.86 Sound Level Meter Storage Overview and Log Operations

Users can check the current usage of the device's CPU and RAM, as well as the storage capacity of both local storage and the SD card. When the device storage exceeds 95% capacity, a prompt will appear advising users to clear space by deleting relevant logs.

1. Export Logs: Exports all log files from the system APP.

2. Clear Logs: Clears all log files stored locally by the system.

6.5.9. Installation & Authorization
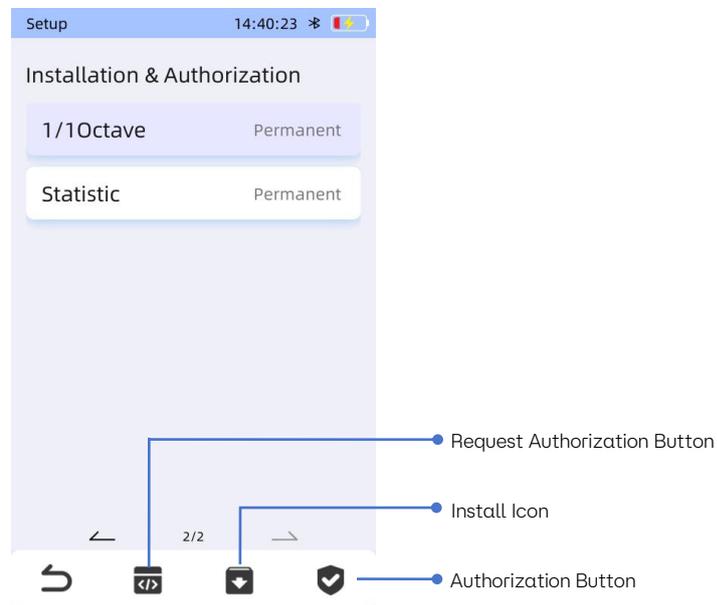
Fig 6.87 Sound Level Meter Version Management

This section displays a list of installed APPs and their authorization information. It supports upgrades and authorization operations. Clicking on a software item allows users to check the currently used version of that software.

1. Request Authorization: Click this button to generate a file named license.lic in the SD card. Send this file to our technical personnel.

2. Install: Upgrade the APP version by storing the installation package in the root directory of the SD card, then click the install button and select the desired upgrade package.

3. Apply Authorization: Place the license.auth file sent by our personnel in the root directory of the SD card. Click the authorization button to update the APP authorization status.

6.5.10. Device Mode

Users can switch between Online Monitoring Mode and Handheld Mode. In Online Monitoring Mode, the battery level is hidden, and the device automatically returns to the monitoring APP logic after switching.

6.5.11. About
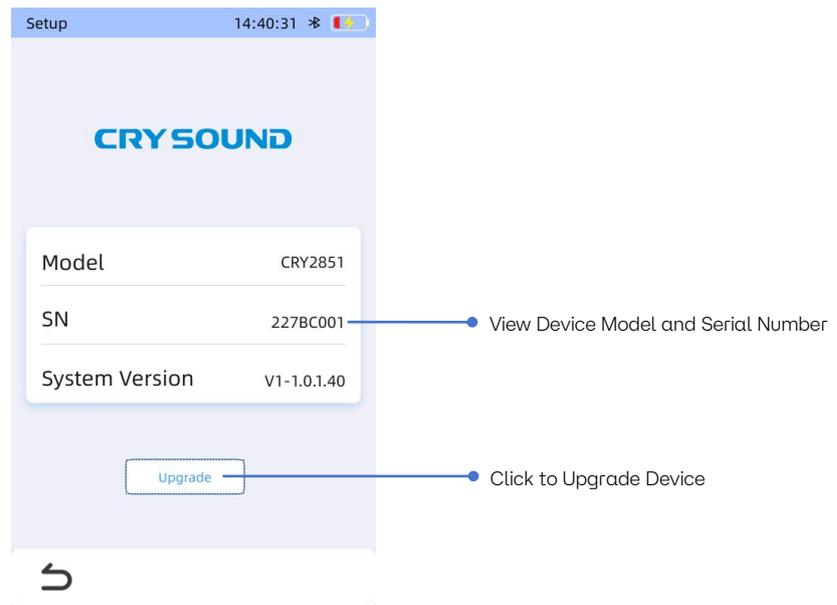
Fig 6.88 Sound Level Meter System Information Overview

Users can view the model, serial number, and version of the noise collection and analysis unit, as well as perform system version upgrades:

System Upgrade Method:

1. Save the system upgrade package provided by the manufacturer into the root directory of the SD card and insert it into the CRY2851.

2. Enter the "About" interface, click "System Upgrade," and select the

appropriate upgrade package to proceed. The device will automatically restart after the upgrade.

6.6. Peripheral Introduction and Use

6.6.1. Printer Usage

Fig 6.89 Bluetooth Printer

1.   Bluetooth Printer

Power On: Press and hold the power button for 3 seconds to turn on the printer. The working status indicator will light up; if the power button is not pressed for 3 seconds, the printer will not turn on.

Power Off: While in the powered-on state, press and hold the power button for 3 seconds to turn off the printer; the working status indicator will go out.

Paper Feed: Press and hold the paper feed button to automatically feed the paper.

Fig 6.90 Print Data

2.   Sound Level Meter Operation

Connection: Go to "Settings" → "Bluetooth" to connect, selecting the target prefixed with "printer."

Printer Usage Precautions:

a. Ensure all cables are properly connected before powering on the printer.

b. Always use the original charger and connection cables to avoid malfunctions.

c. Regularly charge batteries that are not frequently used to extend their lifespan.

d. Use compliant paper rolls to prolong the life of the printer's heating element.

e. Do not print without paper, as this can severely damage the thermal print head.

6.6.2. NA43 Outdoor Protection Device Usage

6.6.2.1. Device Introduction

Fig 6.91 CRY585 Static Excitation Power Supply

The CRY585 static exciter can be used for calibrating the microphone's static excitation. The device features one input interface and two output interfaces, with input via a standard BNC interface on the front panel. The gain is approximately 39.5 dB, capable of outputting a peak DC signal of 800V and a peak AC signal of 90V.

Fig 6.92 NA43 Outdoor Protection Device

The NA43 outdoor protection device effectively shields the CRY series microphone set from rain and dust, reduces wind noise, prevents birds from nesting, and enables outdoor noise monitoring capabilities.

6.6.2.2. Static Excitation Operation

1. Connection Cables

Fig 6.93 Static Excitation Signal Cable

Fig 6.94 Electrical Signal Output Cable

Fig 6.95 Ground Wire
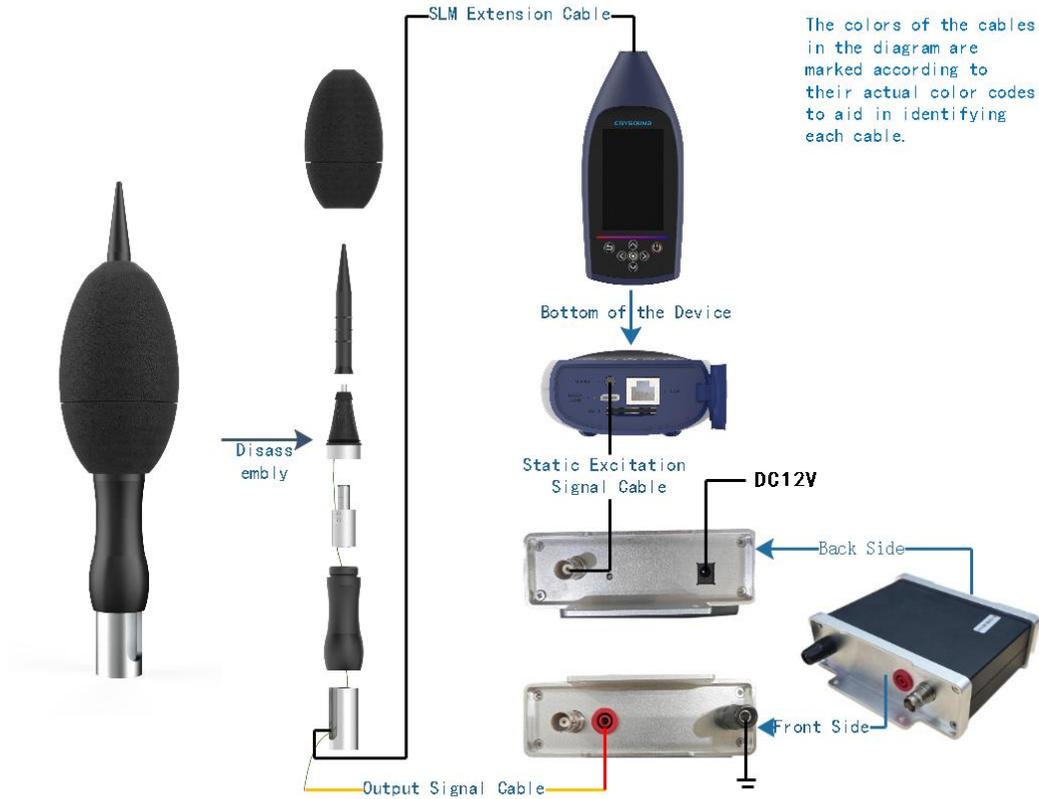
Fig 6.96 Cable Connection Diagram

2. Device Interface Operations

Correctly insert the microphone inside the NA43 outdoor protection device into the calibrator and click the "Calibration" function on the sound level meter interface to perform calibration. Return to the original interface after successful calibration.

Click the "Monitoring" APP on the sound level meter interface, find the "Static Excitation Calibration" option in the settings column, and perform the following operations:

    a. Click the "Monitoring" APP to enter the monitoring interface.

    b. Click the settings button at the bottom of the monitoring interface.

c. Choose the "Classic Excitation Calibration" option in the settings interface to enter the static excitation calibration interface, then click the button next to "Custom Settings" to enable it.

d. Click the "Calibration" button next to the static exciter; the device will begin the calibration process. During calibration, the value displayed in the upper box of the device interface will gradually change to around 94.0 dBC.

e. To turn on the static exciter for verification, press and hold the "Press to Open" button.

f. For subsequent self-tests, simply click the "Start Self-Test" button next to the static excitation self-test, and the device will begin the self-check process, which includes " Detecting Humidity " ➔ "Waiting for Readings to Stabilize" ➔ "Self-Test in Progress." If the self-test passes, a prompt box will appear indicating "Self-Test Passed." This action can also be completed remotely via a communication protocol, saving on-site calibration labor resources.

Appendix 1: Microphone Performance Parameters

Microphone Sensitivity Frequency Response:

Frequency (Hz)	20	25	31.5	40	50	63
Frequency Response (dB)	+0.1	+0.1	+0.1	+0.1	+0.1	+0.1
Frequency (Hz)	80	100	125	160	200	250
Frequency Response (dB)	+0.1	0.0	0.0	0.0	0.0	0.0
Frequency (Hz)	315	400	500	630	800	1000
Frequency Response (dB)	0.0	0.0	0.0	0.0	0.0	0.0
Frequency (Hz)	1250	1600	2000	2500	3150	4000
Frequency Response (dB)	0.0	0.0	0.0	-0.1	-0.1	-0.2
Frequency (Hz)	5000	6300	8000	10000	12500	16000
Frequency Response (dB)	-0.2	-0.3	-0.3	-0.4	-0.2	+0.2
Frequency (Hz)	20000	/	/	/	/	/
Frequency Response (dB)	0.0	/	/	/	/	/
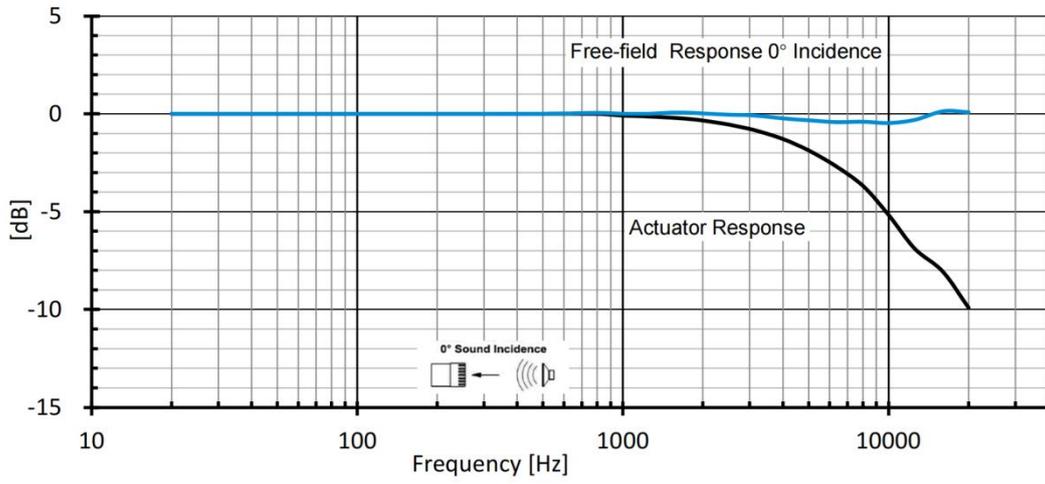
Appendix 2: Windshield Response Correction

Impact of Using a Windshield on Sound Signal Testing:

Frequency (Hz)	100	125	160	200	250	315
Z-weighting	0.3	0.1	0.1	0.1	0.2	0.1
Frequency (Hz)	400	500	630	800	1000	1250
Z-weighting	0.1	0.1	0.2	0.2	0.3	0.2
Frequency (Hz)	1600	2000	2239	2500	2818	3150
Z-weighting	0.4	0.4	0.4	0.4	0.3	0
Frequency (Hz)	3548	4000	4467	5000	5623	6300
Z-weighting	0.1	0	0	0	0.2	-0.1
Frequency (Hz)	7079	8000	8414	8912	9441	10000
Z-weighting	-0.2	0	-0.1	0	-0.2	-0.2
Frequency (Hz)	10593	11220	11885	12500	13335	14125
Z-weighting	-0.4	-0.2	-0.3	-0.5	-0.4	-0.4
Frequency (Hz)	14962	16000	16788	17783	18836	20000
Z-weighting	-0.5	-0.6	-0.8	-1.1	-1	-1

Windshield Impact Correction