iOS Audio Connect User Manual

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Realtek Semiconductor Corp.
No.2, Innovation Road II, Hsinchu Science Park, Hsinchu 300, Taiwan
Tel.: +886-3-578-0211. Fax: +886-3-577-6047
www.realtek.com

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USING THIS DOCUMENT

This document is intended for the software engineer's reference and provides detailed programming information. Though every effort has been made to ensure that this document is current and accurate, more information may have become available subsequent to the production of this guide.

ELECTROSTATIC DISCHARGE (ESD) WARNING

This product can be damaged by Electrostatic Discharge (ESD). When handling, care must be taken. Damage due to inappropriate handling is not covered by warranty.

Do not open the protective conductive packaging until you have read the following, and are at an approved anti-static workstation.

- Use an approved anti-static mat to cover your work surface
- Use a conductive wrist strap attached to a good earth ground
- Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD-sensitive electronic component
- If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe
- Always disconnect the microcontroller from the prototyping board when it is being worked on

Revision History

Date	Version	Comments	Author	Reviewer
2017/11/2	V 1.0	Initial	Thomson	Annie
2017/12/29	V 1.1	Compatible with the latest OTA Spec	Thomson	
2018/09/25	V 1.2	New GUI	Thomson	
2020/07/07	V 1.3	Update	Irene	
2021/09/01	V 1.4	Add RHE Add Gaming Mode Add Key Mapping Add VP/Ringtone Volume	Irene	
2021/11/29	V1.5	Update Battery UI	Irene	
2022/08/05	V1.6	Update to the latest UI	Irene	Jerome
2023/3/13	V1.7	Add HA configuration setting; Add Hearing Lose test;	Jerome	
2023/11/15	V1.8	Add Voice EQ Add Data Capture Add Burn/Apply ANC	Irene	

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Glossary

Terms	Definitions
OTA	Over The Air. It is a technology for remote management of SIM card data and applications through the air interface of mobile communications. Application of OTA makes mobile communication can not only provide voice and data services, as well as providing new business download.
MFI	Made for iPhone/iPod/iPad. It is a logo license for external accessories produced by Apple's authorized accessory manufacturers.
TTS	Text to Speech. It is a cutting-edge technology in the field of Chinese information processing, which can transform any text into natural and smooth speech output.
BLE	Bluetooth Low Energy. Compared with classic Bluetooth, BLE aims to maintain the same communication range while significantly reducing power consumption and cost.
APT	Audio Pass Through. APT mode can amplify the external sound, and users can clearly hear the external sound without taking off the headphones.
ANC	Active Noise Cancellation. ANC mode can help users block out noise in noisy environments without raising the volume to get a clearer hearing effect.
RHE	Real Hearing Enhancement. HE provides users with better hearing experience. Users could switch the appropriate listening mode (ANC/APT/OFF) according to different scenes.

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1 Overview

Audio Connect is an application for controlling Realtek Bluetooth earphones/headsets, which supports OTA, RHE function, Equalizer function, TTS and other configurations(change name/ language/ channel...).

Supported operating system: iOS 8.0 & later.

2 Connect via BLE

As shown in Figure 2-1, users can connect to the device and view the current APP version.

1. Click "About" to view the version information, as shown in Figure 2-2.

Figure 2-1 Home page

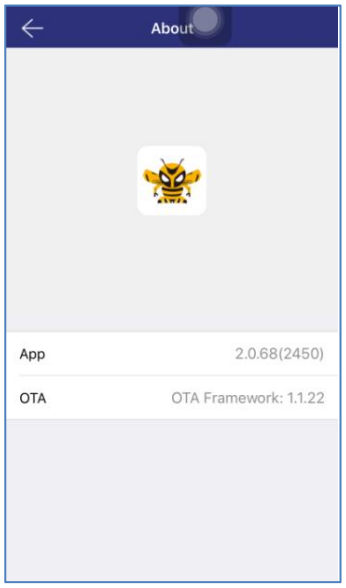

Figure 2-2 Version information

2. Click "Connect a device", then select the target device from the "NEARBY PERIPHERALS" on "Device" page(As shown in Figure 2-3 Figure 2-4 Figure 2-5).

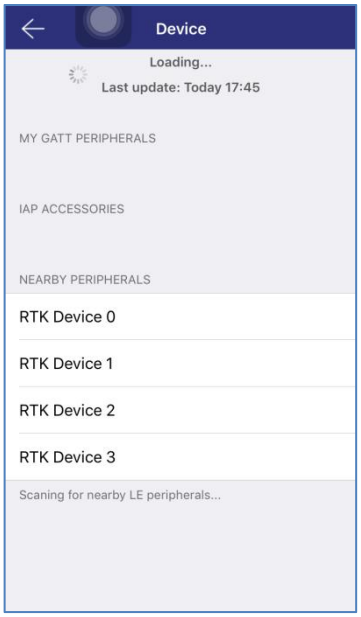

Figure 2-3 Device List

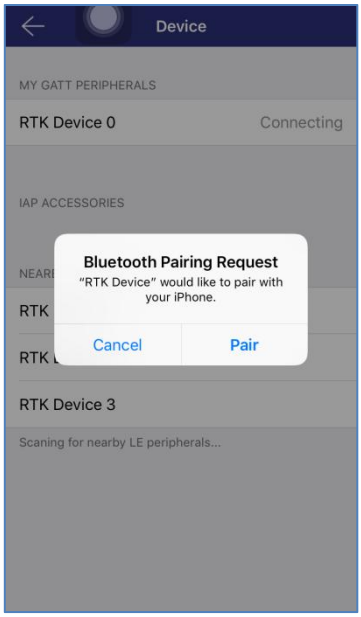

Figure 2-4 Pairing

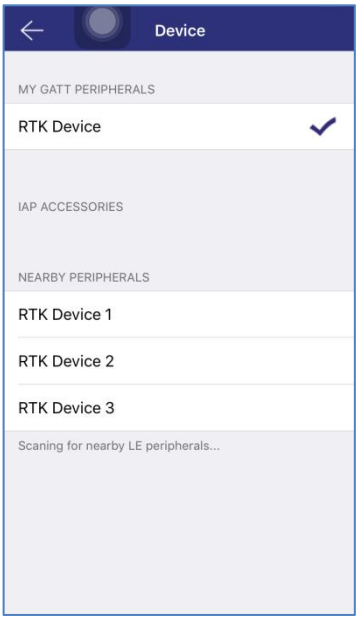

Figure 2-5 Connected

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3. If connect successfully, click the row then app will show the connection status and battery power(C-case battery, L-left battery, R-right battery, as shown in Figure 2-6).

   1) Slide the device name cell to left, users could disconnect the device.

   2) Click ≡ on the top right for more settings. If the font color is gray, it means the function is not supported(As shown in Figure 2-7 and Figure 2-8).

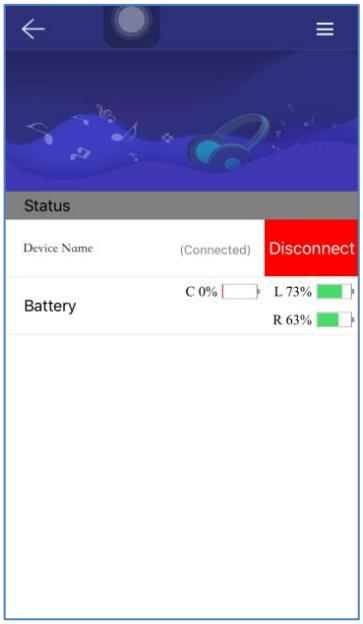

Figure 2-6 Status

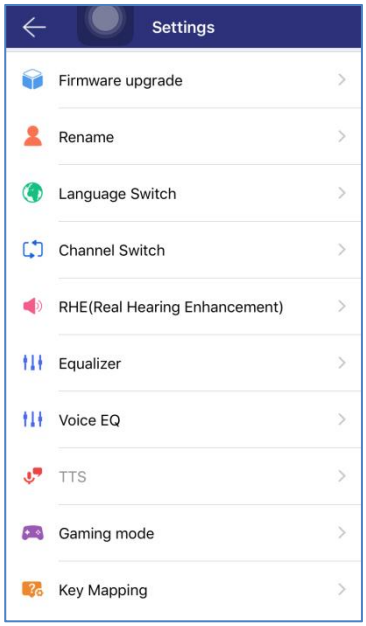

Figure 2-7 Settings 1

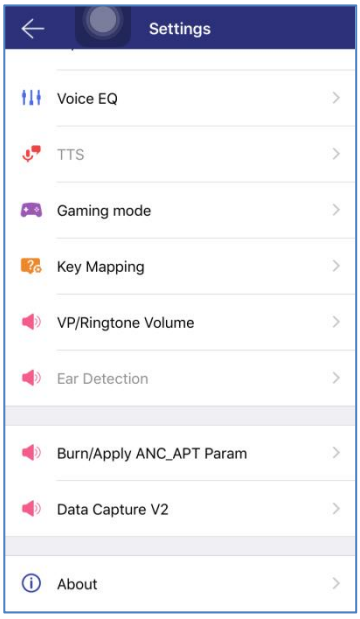

Figure 2-8 Setting 2

3 OTA

This module helps users upgrade device firmware to keep the device running the latest version.

1. Select "Firmware upgrade" to enter the "OTA" page. It will show the current firmware information(As shown in Figure 3-1).
2. Click "Select File" to choose firmware file on "Firmware" page to upgrade(As shown in Figure 3-2. If the file list is empty, click ⓘ on the top right for the tip, then refer to How to copy firmware file to this App?).

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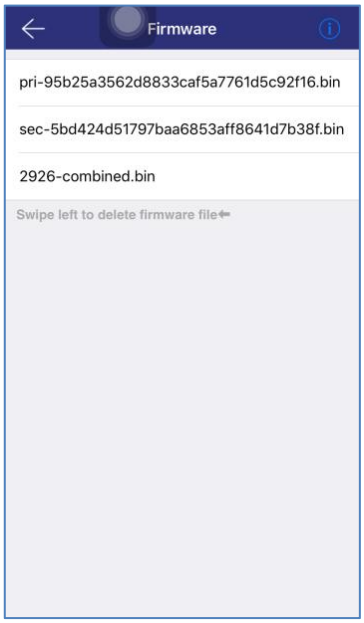

Figure 3-1 OTA

Figure 3-2 Firmware file list

3. After selecting the firmware, the upgrade option will be displayed(As shown in Figure 3-3). Click "Upgrade", APP will show the upgrade progress(As shown in Figure 3-4). After the upgrade, the device will restart and the APP will reconnect to the device(The connection status can be confirmed on the "Status" page).

Figure 3-3 Start OTA

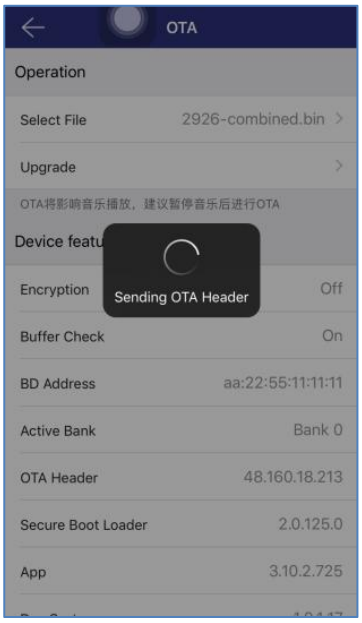

Figure 3-4 Upgrade progress

4 Rename

This module helps users modify device name. In the pop-up menu, enter a new device name into the name field(As shown in Figure 4-1).

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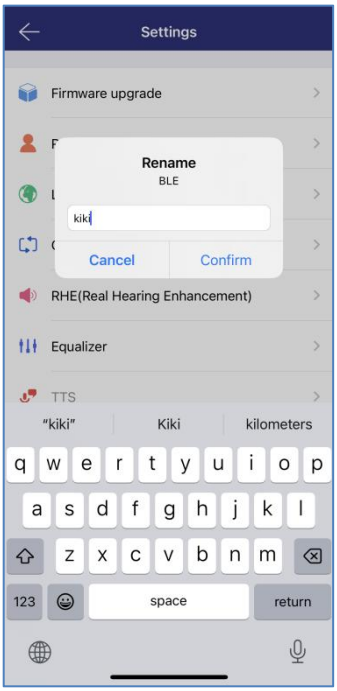

Figure 4-1 Rename

5 Language Switch

This module helps users change the voice language of the device. Currently supports Chinese and English(As shown in Figure 5-1).

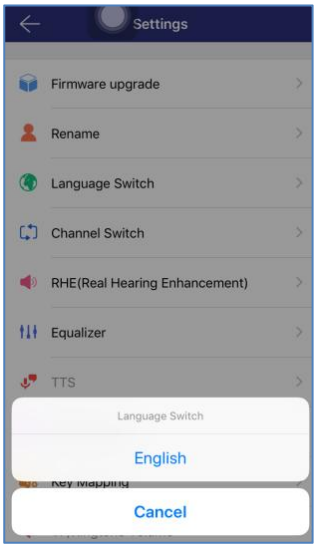

Figure 5-1 Language Switch

6 Channel Switch

This module provides three modes for users to switch: Left-Left Channel Right-Right Channel, Left-Right Channel Right-Left Channel, Left-Mix Right-Mix(As shown in Figure 6-1).

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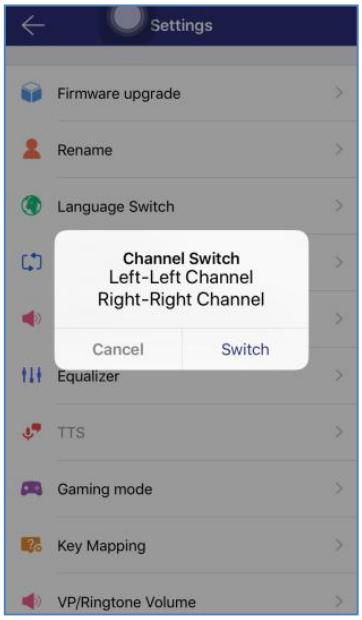

Figure 6-1 Channel Switch

7 RHE

This module helps users adjust hearing effect by switching the listening mode and adjusting the configuration in each mode.

1. Click the row of "LISTENING MODE CYCLE" to select one cycle sequence in which users could switch by keys(As shown in Figure 7-1).
2. Click the row of "LISTENING MODE" to select the current listening mode(As shown in Figure 7-2).

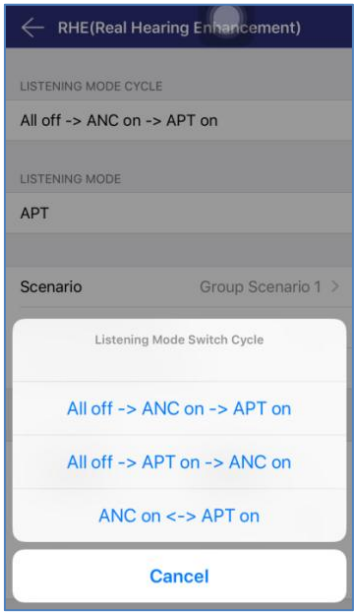

Figure 7-1 Listening Mode Cycle

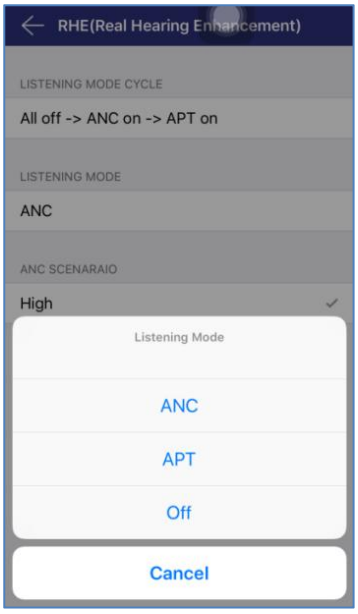

Figure 7-2 Listening Mode

3. If in ANC mode, users could select the ANC scenario(As shown in Figure 7-3).

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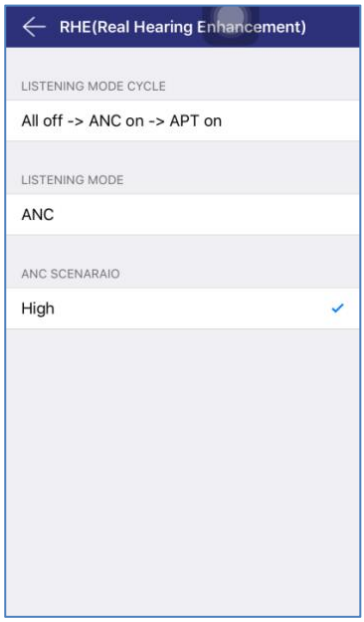

Figure 7-3 ANC Scenario

4. If in APT mode, the adjustable features include Scenario, Scenario Groups Setting, Power-On Delay Time, EQ, Noise Reduction, Volume and Brightness(As shown in Figure 7-4 Figure 7-5 and Figure 7-6. The items that could be configured on different devices are inconsistent).

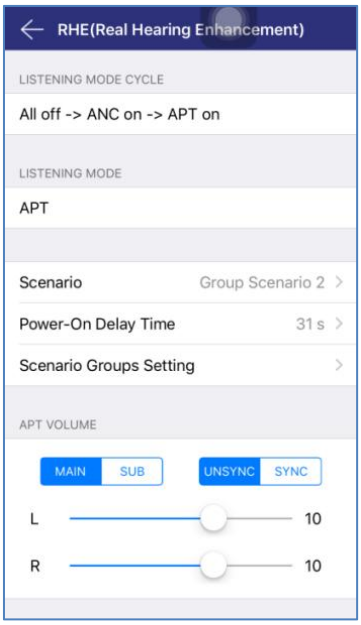

Figure 7-4 APT Mode 1

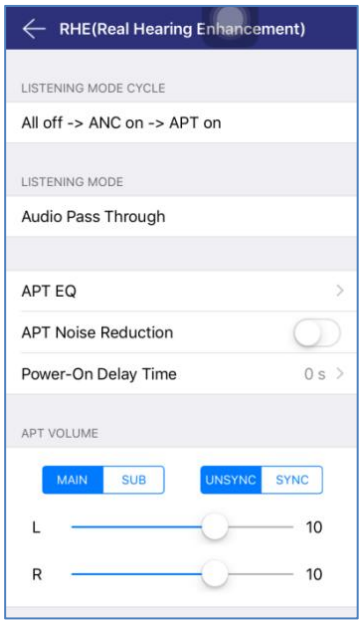

Figure 7-5 APT Mode 2

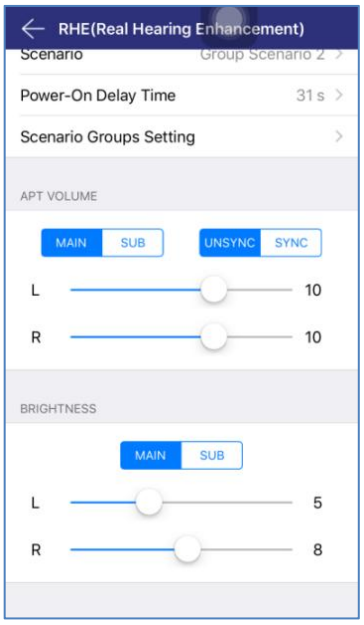

Figure 7-6 APT Mode 3

1) "Scenario": List supported group scenarios for users to choose(As shown in Figure 7-7).

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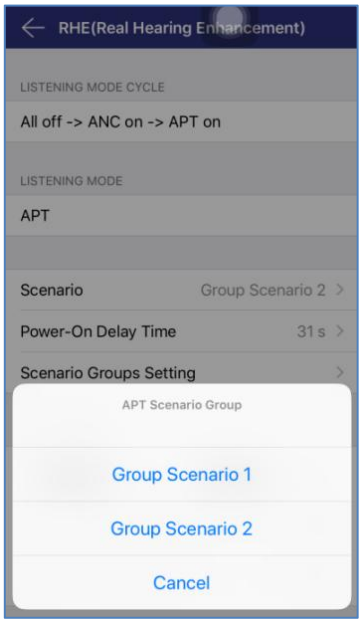

Figure 7-7 APT Scenario

2) "Scenario Groups Setting":

(1) List all scenarios(As shown in Figure 7-8).

(2) Click the row to select scenarios(As shown in Figure 7-9).

(3) Users could switch the button to listen the effect(As shown in Figure 7-10).

(4) Click "Save", then the selection will take effect(Listening mode will turn to off. Turn on APT, scenario list will update).

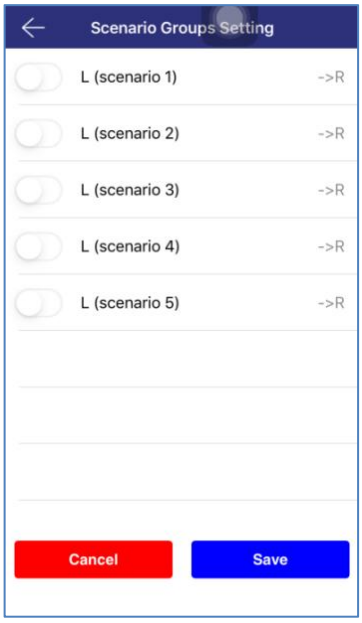

Figure 7-8 Group Setting 1

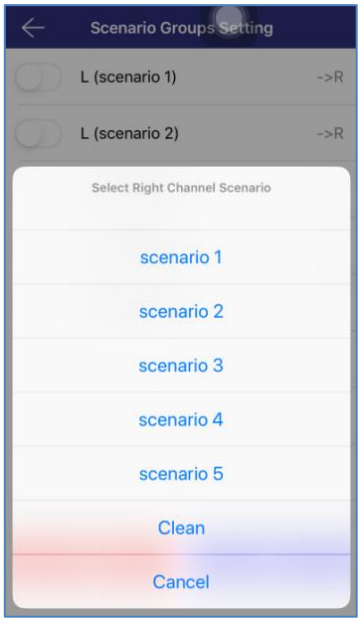

Figure 7-9 Group Setting 2

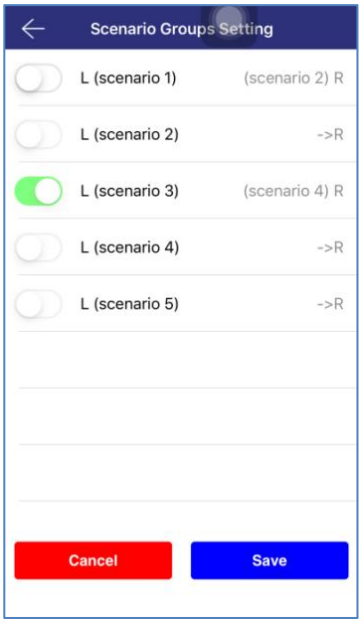

Figure 7-10 Group Setting 3

3) "Power-on Delay Time": Users could set APT delay time after power-on(As shown in Figure 7-11).

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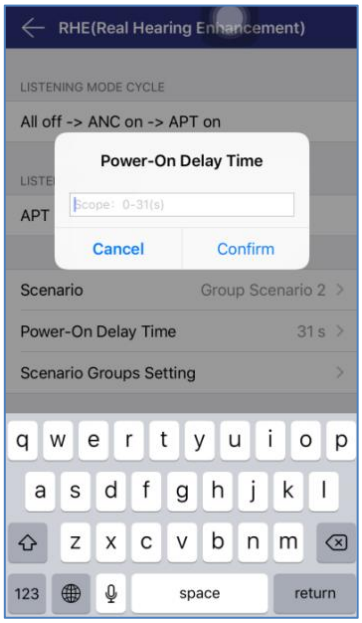

Figure 7-11 Power-On Delay Time

4) "APT EQ": Users could select different preset EQ sound effects, or set custom sound effects through the slide bars(As shown in Figure 7-12).

   (1) Click "Save", the custom sound effects can be effective.

   (2) Clicking "Reset", the custom sound effects can be restored to factory settings.

   (3) Users could choose left or right to set EQ index and parameters(As shown in Figure 7-13). If there is no segment, it does not support adjusting separately.

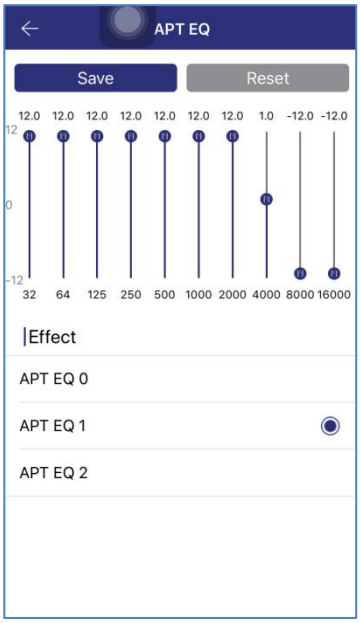

Figure 7-12 APT EQ 1

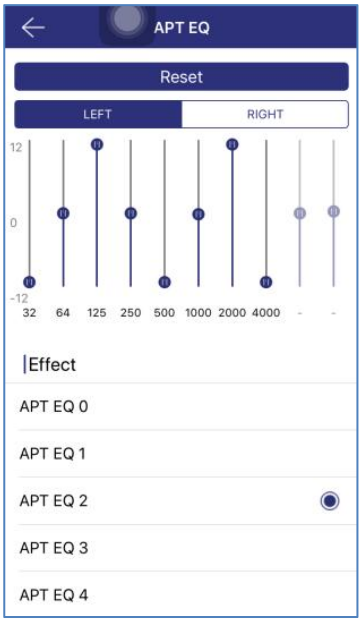

Figure 7-13 APT EQ 2

8 Hearing Aid Adjustment

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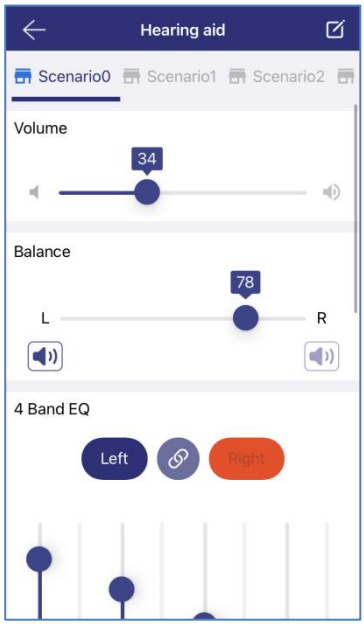

Figure 8-1 Hearing Aid Adjustment

If you set the Listening Mode to Audio Pass Through, **Hearing Aid** is available which you click to adjust Hearing Aid configuration settings. You could,

1. Switch between several Scenarios;

On top of this page shows a horizontal bar, within which is several scenario names, a highlighted name indicates the scenario that is used currently. A scenario contains a group of configuration settings in it, which are applied to the earbud if the scenario is selected. You can slide the bar to see more scenario names that are off screen.

2. Control APT volume and balance;

Use the corresponding sliders to adjust APT volume or balance of the connected earbuds.

3. Adjust gain according frequency;

You can set the gain level at different frequencies. Currently, 500Hz, 1000Hz, 2000Hz and 4000Hz are supported.

4. Control noise reduction;

There are several Noise Reduction features the connected earbud may supports. If a Noise Reduction feature is supported, you may could control this feature, such as turn on and off.

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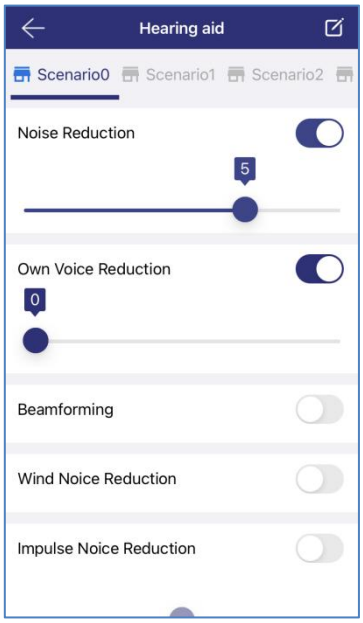

Figure 8-2 Noise Reduction Controlling

9 Hearing Assessment Test

In order to apply configuration settings suited to user, app provides a simple and easy used Hearing Assessment test to have a knowledge of the user's hearing condition. When you perform this test, you would

1. Ensure the area is quite enough;

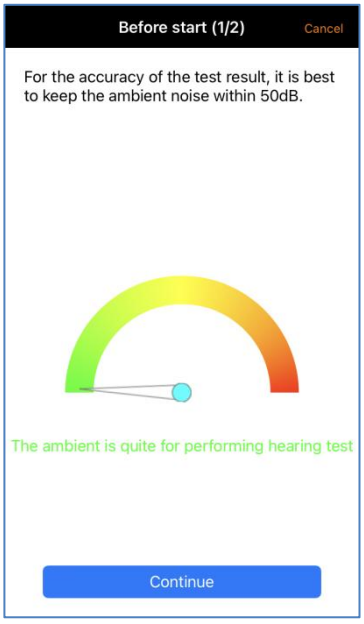

Figure 9-1 Ambient sound

2. Set the system output volume level to the reference value;

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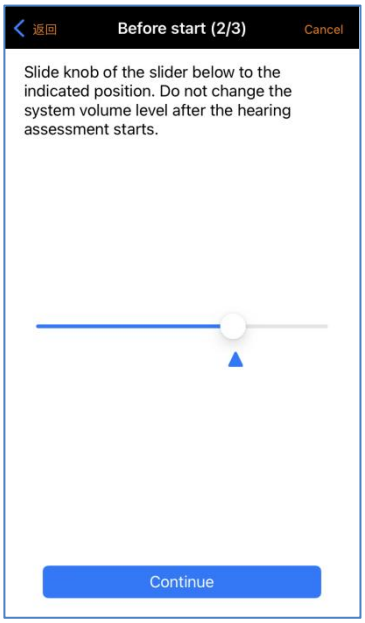

Figure 9-2 System output volume

3. Choose the ear to test;

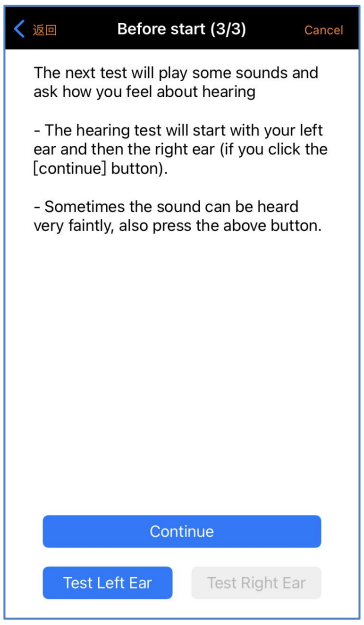

Figure 9-3 Choose the ear

4. Listen to the pure tone intently. Press and hold the ‘I can hear beeps’ button while you are having heard and release while you can’t hear it.

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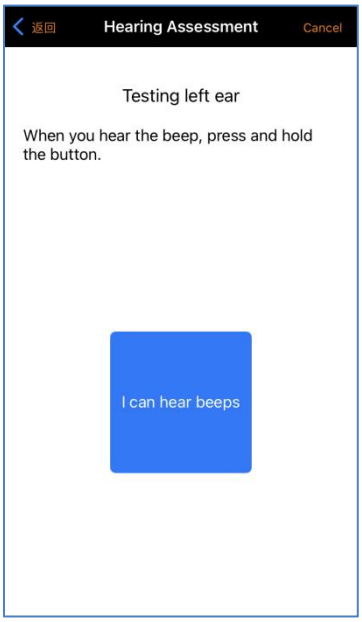

Figure 9-4 Performing test

5. Check the test result, and apply compensation to the earbud if there is any hearing lose.

Figure 9-5 Test result

10 Equalizer

This module helps users adjust the built-in sound effect of music(As shown in Figure 10-1 Figure 10-2).

1. This screen displays the EQ in the current mode (gaming mode > anc mode > normal mode).
2. Users could select a preset sound effect or custom a sound effect by sliding the sliders.
    1) Click "Save" to remember the custom effect.
    2) Click "Reset" to restore to the factory effect.

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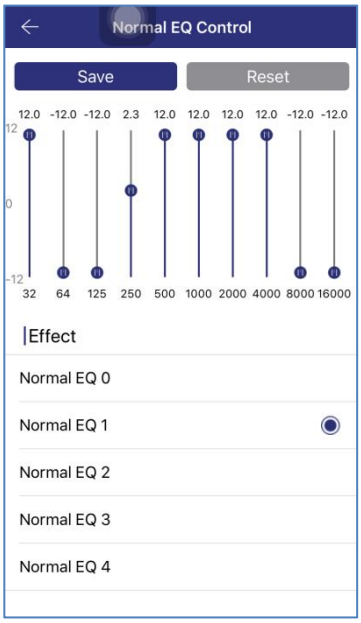

Figure 10-1 Normal EQ

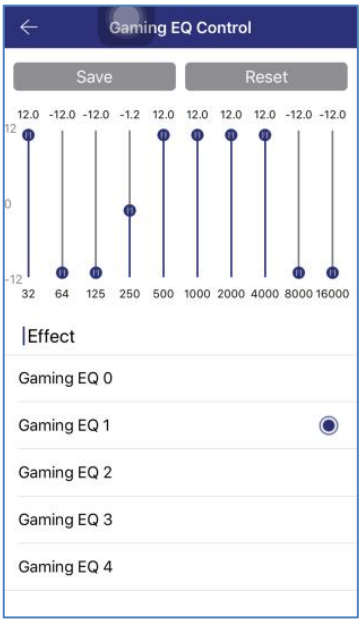

Figure 10-2 Gaming EQ

11 Voice EQ

This module can adjust the EQ parameter in the call. Currently, this operation can be performed only in the call state. The adjustment will fail in the non-call state.

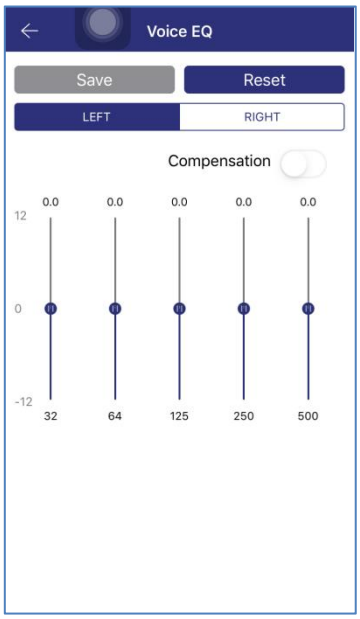

Figure 11-1 Voice EQ

12 TTS

TTS module is designed to help users obtain caller's information before answering the call. When the iPhone receives an incoming call, the application will read the call information and send them to the device. Then users will receive a voice broadcast of the caller's name or number.

Turn it on, if get a call from James, the device will broadcast "James is calling you" or "124839411 is calling

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you".

Figure 12-1 TTS

13 Gaming Mode

The module helps users control whether to open the game mode and provides five delay levels to choose(As shown in Figure 13-1).

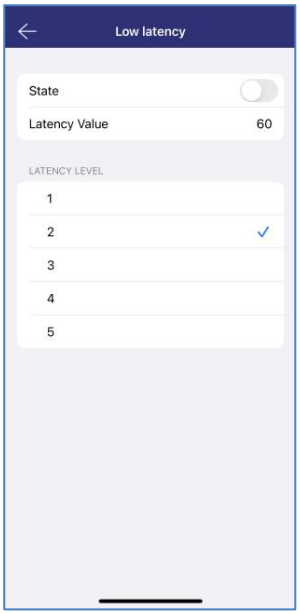

Figure 13-1 Gaming Mode

14 Key Mapping

This module shows the mapping between key actions and the functions they triggered.

1. Click the row, the pop-up menu will show the actions for users to select, as shown in Figure 14-1.
2. Users could choose left/right/both bud to reset the mapping, it will be restored to the factory settings, as

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shown in Figure 14-2.

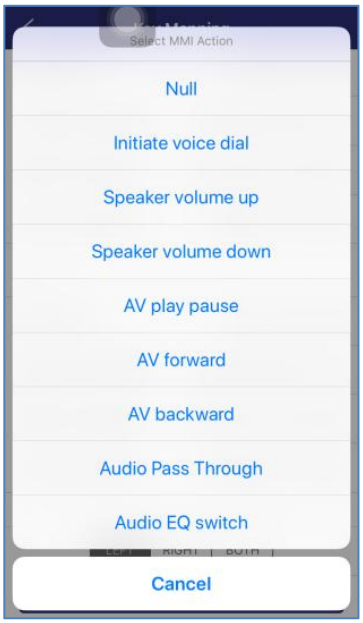

Figure 14-1 Key Mapping 1

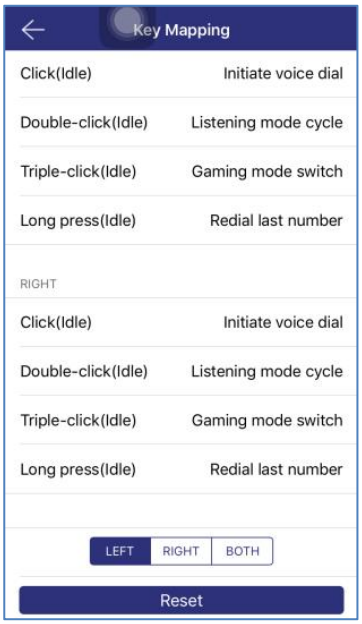

Figure 14-2 Key Mapping 2

15 VP/Ringtone Volume

This module helps users adjust Voice Talk/Ringtone Volume.

1. Turn on the sync button, users could adjust the volume of the both earbuds at the same time(As shown in Figure 15-1).
2. Turn off the sync button, the volume could be adjusted separately(As shown in Figure 15-2).

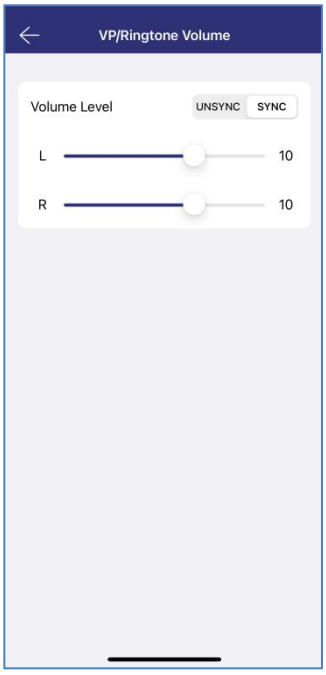

Figure 15-1 VP/Ringtone Volume(Sync)

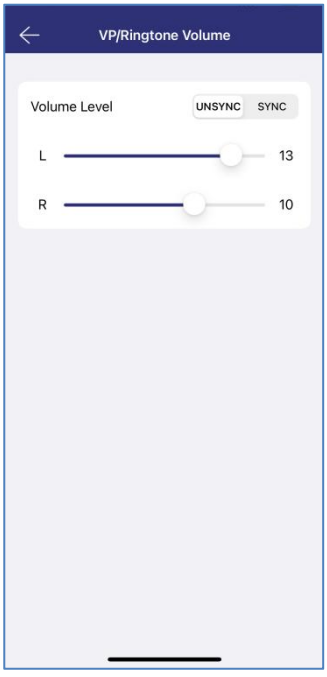

Figure 15-2 VP/Ringtone Volume(Unsync)

16 Burn/Apply ANC_LLAPT Parameters

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By writing ANC or LL-APT parameters to the device, users can perform personalized gain and compensation for an ANC or LL-APT scenario.

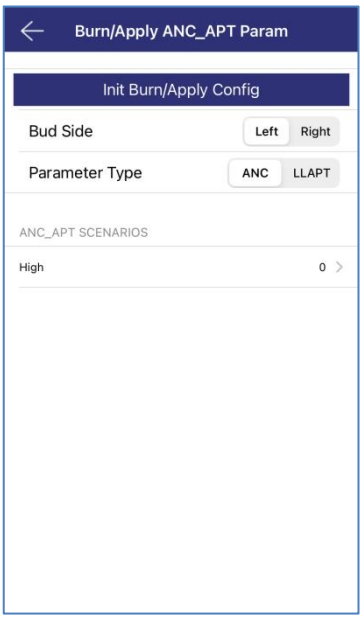

Figure 16-1 Init Burn/apply Config

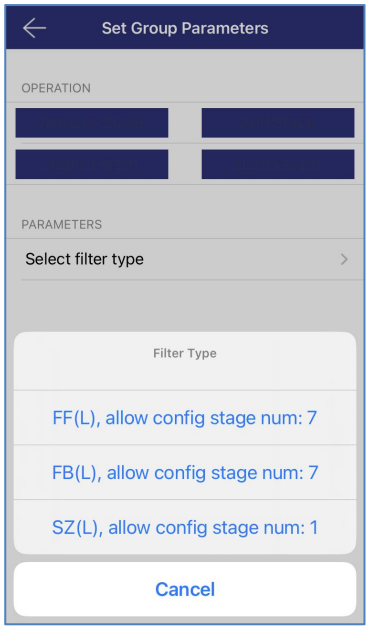

Figure 16-2 Select filter type

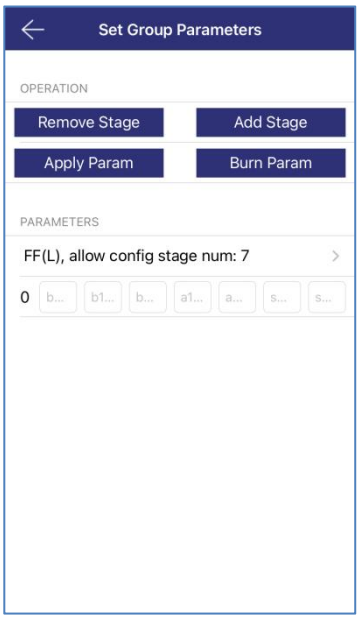

Figure 16-3 Apply/Burn Parameters

1. Initialization parameters: Select the target bud and type, then click "Init Burn/Apply Config" to obtain the current parameter settings, as shown in Figure 16-1. If switch the bud side, users need to click the button again.
2. Select the ANC/LLAPT scenario to go to the setting page.
3. Click "Select Filter Type", the configurable filter types and coefficients of each filter are displayed on the page, as shown in Figure 16-2 and Figure 16-3.
    1) "Remove Stage": Remove a set of configured coefficients;
    2) "Add Stage": Add a set of coefficients for configuration, and the total number cannot exceed stage num;
    3) "Apply Param": The currently configured parameters are applied immediately, but are not stored on the device.
    4) "Burn Param": The currently configured parameters are applied in real time and stored on the device

17 Data Capture V2

ANC/LLAPT parameters can be adjusted by referring to the data captured by this feature.

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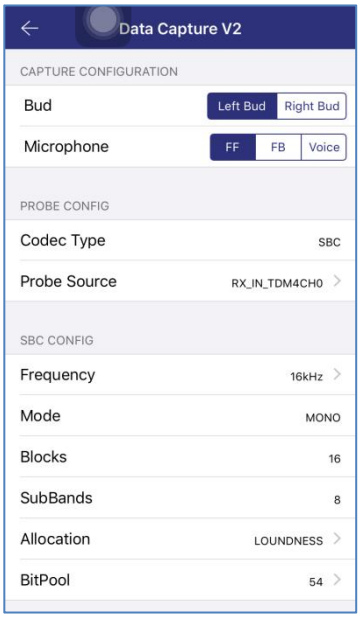

Figure 17-1 Data Capture Configuration

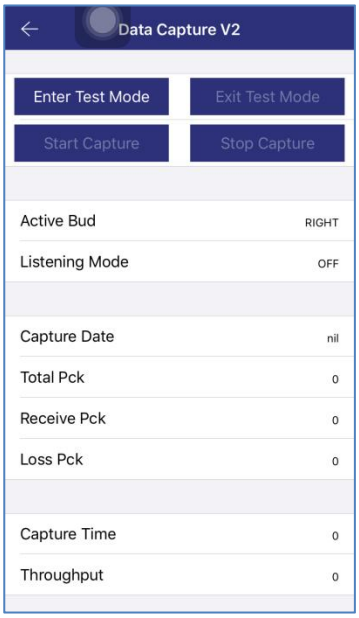

Figure 17-2 Data Capture Results

1. Parameter configuration: Select the target bud and microphone, then adjust the "Probe Source", "Frequency", "Allocation", and "BitPool" options as required, as shown in Figure 17-1.
2. "Enter Test Mode": The *Enter* operation is not allowed when in the music, call or DSP APT on. If the selected target bud is inconsistent with the active bud, *Enter* needs to be triggered twice. After the target bud and active bud are consistent, the operation can continue.
3. "Start Capture": When the "Probe Source" is TX, the *Start* operation can be performed only after playing music. After the *Start* is successful, the capture results will be recorded, as shown in Figure 17-2.
    1) "Total Pck": The total number of packets.
    2) "Receive Pck": The number of packets received by the phone.
    3) "Loss Pck": The number of packets lost.
    4) "Capture Time": The duration of the Capture operation.
    5) "Throughput": Current throughput.
4. "Stop Capture": When *Stop* is complete, the data files can be obtained from the "Audio Connect/Data Capture Files/Capture Date/...". As shown in Figure 17-3 and Table 17-1 describes the documents.

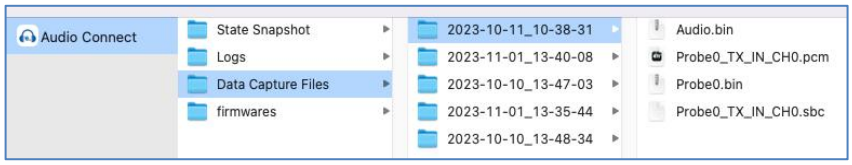

Figure 17-3 Data Capture Files Path

Table 17-1 Data Capture File Description

File Name	File Content
Audio.bin	Raw data received from the device
Probe#.bin	Data corresponding to each probe
Probe#_souce#.pcm	Pcm data in probe#.bin

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File Name	File Content
Probe#_souce#.sbc	Data parsed by SBC algorithm

5. "Exit Test Mode": When music is playing, the *Exit* operation cannot be performed.

18 FAQ

18.1 How to connect the device via MFI?

1. Pair with the device at iPhone's Setting-->Bluetooth. If the device supports iAP/iAP2 protocol, the MFI connection will be created automatically by iPhone.
2. Each time the device reconnects with the iPhone, the MFI connection will also be created automatically.

18.2 How to connect the device via BLE?

1. In the "Device" view, pull down to search devices, and then select the device you want to connect.
2. The application will automatically connect to the device via BLE.

18.3 How to copy firmware file to this App?

1. Download and install software "iFunBox"/"iTools" to PC.
2. Connect iPhone to PC with cable.
3. Run "iFunBox", switch to "My Device" view and copy firmware files to "firmwares" folder(As shown in Figure 18-1 Figure 18-2).

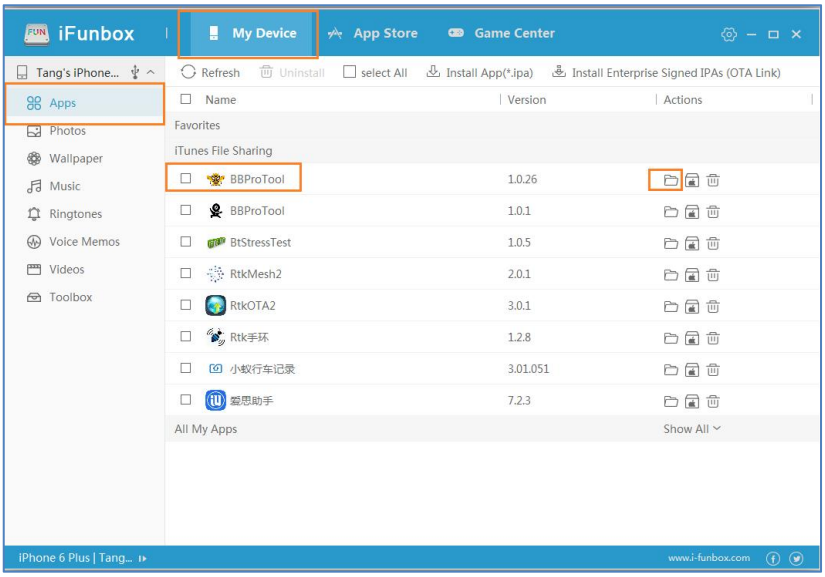

Figure 18-1 iFunBox UI

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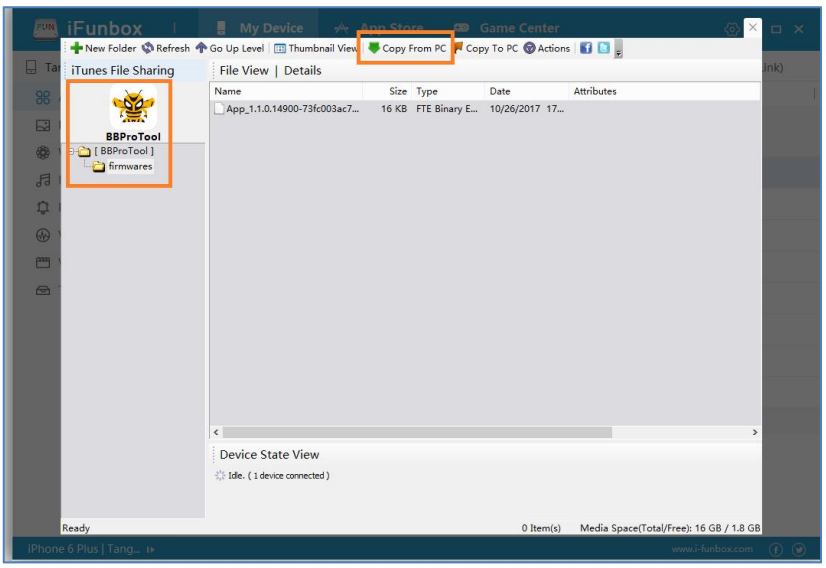

Figure 18-2 Copy file From PC

18.4 Why does firmware (OTA) fail to update?

1. Check whether the firmware file is legal.
2. Check whether the encryption settings of the application are the same as the device.

18.5 Why does the device fail to report caller's name or number when receiving a call?

1. Check whether there is a BLE/MFI connection between the application and the device.
2. The application uses Baidu TTS engine (http://yuyin.baidu.com/tts), the engine must be registered to Baidu server. Therefore, please ensure that the application runs at least once(the application will be registered to Baidu server) under good network conditions (WiFi/4G/3G). Afterward, the application can even work with TTS engine offline.

19 Contact Us

For any questions about the application, please send an email message to irene_wang@realsil.com.cn. Inquiries should include name, telephone number (including area code and extension), email address and any specific questions.

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