# HAC Receive Volume Control Test Report

## For

| | |
|---|---|
| **Applicant Name:** | **FOXX Development Inc.** |
| Address: | 3480 Preston Ridge Road, Suite500, Alpharetta, GA 30005, USA |
| EUT Name: | Smart Phone |
| Brand Name: | FOXXD |
| Model Number: | AS65U |

## Issued By

| | |
|---|---|
| **Company Name:** | **BTF Testing Lab (Shenzhen) Co., Ltd.** |
| Address: | F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China |
| Report Number: | BTF240712R01303 |
| Test Standards: | ANSI C63.19:2019 FCC 47 CFR §20.19 TIA-5050:2018 |
| FCC ID: | 2AQRM-AS65U |
| Test Conclusion: | Pass |
| Test Date: | 2024-08-16 to 2024-08-19 |
| Date of Issue: | 2024-08-20 |
| Prepared By: | Zoey Zhang |
| | Zoey Zhang / Project Engineer |
| Date: | 2024-08-20 |
| Approved By: | Ryan.CJ |
| | Ryan.CJ / EMC Manager |
| Date: | 2024-08-20 |

*Note: All the test results in this report only related to the testing samples. Which can be duplicated completely for the legal use with approval of applicant; it shall not be reproduced except in full without the written approval of BTF Testing Lab (Shenzhen) Co., Ltd., All the objections should be raised within thirty days from the date of issue. To validate the report, you can contact us.*

| Revision History | | |
|---|---|---|
| Version | Issue Date | Revisions Content |
| Rev_V0 | 2024-08-20 | Original |
| | | |
| *Note:* | *Once the revision has been made, then previous versions reports are replaced by the latest version.* | |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# Table of Contents

1. Introduction ..... 4
1.1 Identification of Testing Laboratory ..... 4
1.2 Identification of the Responsible Testing Location ..... 4
1.3 Laboratory Condition ..... 4
1.4 Announcement ..... 4
2. Product Information ..... 5
2.1 Application Information ..... 5
2.2 Manufacturer Information ..... 5
2.3 Factory Information ..... 5
2.4 General Description of Equipment under Test (EUT) ..... 5
2.5 Equipment under Test Ancillary Equipment ..... 6
2.6 Technical Information ..... 6
3. Summary of Test Results ..... 7
3.1 Test Standards ..... 7
3.2 Air Interfaces / Bands Indicating Operating Modes ..... 7
4. Test Uncertainty ..... 8
5. Measurement System ..... 9
5.1 MEASUREMENT SET-UP ..... 9
6. Evaluation of Test ..... 10
6.1 RECEIVE VOLUME CONTROL PERFORMANCE ..... 10
6.2 RECEIVE DISTORTION AND NOISE PERFORMANCE ..... 11
6.3 RECEIVE ACOUSTIC FREQUENCY RESPONSE PERFORMANCE ..... 12
7. Test Equipment List ..... 14
8. Air Interfaces / Bands used for testing ..... 14
9. Test Result ..... 15
9.1 Receive volume control, distortion and noise performance ..... 15
9.2 Receive acoustic frequency response performance ..... 17
10. EUT photograph ..... 19
ANNEX A Test Data ..... 20
1.1 Receive Distortion and Noise 8N NB ..... 20
1.2 Receive Distortion and Noise 2N NB ..... 22
1.3 Receive Frequency Response ..... 25
2.1 Receive Distortion and Noise 8N NB ..... 26
2.2 Receive Distortion and Noise 2N NB ..... 28
2.3 Receive Frequency Response ..... 31
3.1 Receive Distortion and Noise 8N NB ..... 32
3.2 Receive Distortion and Noise 2N NB ..... 34
3.3 Receive Frequency Response ..... 37
4.1 Receive Distortion and Noise 8N NB ..... 38
3.2 Receive Distortion and Noise 2N NB ..... 40
3.3 Receive Frequency Response ..... 43
ANNEX B Test Setup Photo ..... 44
ANNEX C CALIBRATION REPORT ..... 44

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 1. Introduction

## 1.1 Identification of Testing Laboratory

| | |
|---|---|
| Company Name: | BTF Testing Lab (Shenzhen) Co., Ltd. |
| Address: | F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China |
| Phone Number: | +86-0755-23146130 |
| Fax Number: | +86-0755-23146130 |

## 1.2 Identification of the Responsible Testing Location

| | |
|---|---|
| Test Location: | BTF Testing Lab (Shenzhen) Co., Ltd. |
| Address: | F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China |
| Description: | All measurement facilities used to collect the measurement data are located at F101,201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China |

## 1.3 Laboratory Condition

| | |
|---|---|
| Ambient Temperature: | 18℃ to 25℃ |
| Ambient Relative Humidity: | 32% to 49% |
| Ambient Pressure: | 100 kPa to 102 kPa |

## 1.4 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

(6) The laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

# 2. Product Information

## 2.1 Application Information

| | |
|---|---|
| Company Name: | FOXX Development Inc. |
| Address: | 3480 Preston Ridge Road, Suite500, Alpharetta, GA 30005, USA |

## 2.2 Manufacturer Information

| | |
|---|---|
| Company Name: | FOXX Development Inc. |
| Address: | 3480 Preston Ridge Road, Suite500, Alpharetta, GA 30005, USA |

## 2.3 Factory Information

| | |
|---|---|
| Company Name: | FOXX Development Inc. |
| Address: | 3480 Preston Ridge Road, Suite500, Alpharetta, GA 30005, USA |

## 2.4 General Description of Equipment under Test (EUT)

| | |
|---|---|
| EUT Name | Smart Phone |
| Under Test Model Name | AS65U |
| Series Model Name | N/A |
| Description of Model name differentiation | N/A |
| Hardware Version | N/A |
| Software and Firmware Version | N/A |
| Dimensions (Approx.) | 163*74*9mm |
| Weight (Approx.) | 178g |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 2.5 Equipment under Test Ancillary Equipment

| | | |
|---|---|---|
| Ancillary Equipment 1 | Battery | |
| | Brand Name | FOXXD |
| | Model No. | AS65U |
| | Serial No. | N/A |
| | Capacity | Typical capacity: 5000mAh |
| | Rated Voltage | 3.87V |

## 2.6 Technical Information

| | |
|---|---|
| Network and Wireless connectivity | 2G Network GSM/GPRS/EGPRS 850/1900<br>3G Network WCDMA/HSDPA/HSUPA Band 2/4/5<br>4G Network FDD LTE Band 2/4/5/12/17/25/26/66/71 TDD LTE Band 41<br>2.4G WIFI 802.11b, 802.11g, 802.11n(HT20)<br>BT (EDR+BLE) |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 3. Summary of Test Results

## 3.1 Test Standards

| No. | Identity | Document Title |
|---|---|---|
| 1 | ANSI C63.19-2019 | American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids |
| 2 | FCC 47 CFR §20.19 | Hearing Aid Compatible Mobile Headsets |
| 3 | TIA-5050:2018 | Telecommunications Communications Products Receive Volume Control Requirements for Wireless (Mobile) Devices |
| 4 | KDB285076 D05v01 | HACWaiverDA23-914 |
| 5 | KDB285076 D04v02 | Volume Control |
| 6 | KDB285076 D01v06r04 | HAC Guidance |

## 3.2 Air Interfaces / Bands Indicating Operating Modes

| Air Interface | Band | Type | Simultaneous Transmitter | Name of Service |
|---|---|---|---|---|
| GSM | 850 | VO | WLAN & BT | CMRS Voice |
| | 1900 | VO | WLAN & BT | CMRS Voice |
| | GPRS/EGPRS | DT | N/A | N/A |
| WCDMA | Band II | VO | WLAN & BT | CMRS Voice |
| | Band IV | VO | WLAN & BT | CMRS Voice |
| | Band V | VO | WLAN & BT | CMRS Voice |
| | HSPA | DT | N/A | N/A |
| LTE | Band 2 | VD | WLAN & BT | VoLTE |
| | Band 4 | VD | WLAN & BT | VoLTE |
| | Band 5 | VD | WLAN & BT | VoLTE |
| | Band 12 | VD | WLAN & BT | VoLTE |
| | Band 17 | VD | WLAN & BT | VoLTE |
| | Band 25 | VD | WLAN & BT | VoLTE |
| | Band 26 part 90 | VD | WLAN & BT | VoLTE |
| | Band 26 part 22 | VD | WLAN & BT | VoLTE |
| | Band 41 | VD | WLAN & BT | VoLTE |
| | Band 66 | VD | WLAN & BT | VoLTE |
| | Band 71 | VD | WLAN & BT | VoLTE |
| WLAN | 2.4g&5g | DT | WWAN | N/A |
| BT | 2450 | DT | WWAN | N/A |

NA: Not Applicable
VO: Voice Only
VD: CMRS and IP Voice Service over Digital Transport
DT: Digital Transport Only

Note:The hearing aid compatibility mode of the prototype was turned on during testing, and all tests were performed in HAC mode.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 4. Test Uncertainty

| UNCERTAINTY EVALUATION FOR AUDIO HAC MEASUREMENT | | | | | |
|---|---|---|---|---|---|
| Uncertainty Component | Tol (+- %) | Prob. Dist. | Div. | Uncertainty (dB) | Uncertainty (%) |
| Measurement System | | | | | |
| RF reflections | 0.1 | R | √3 | 0.06 | |
| Acoustic noise | 0.1 | R | √3 | 0.06 | |
| Probe coil sensitivity | 0.49 | R | √3 | 0.28 | |
| Reference signal level | 0.25 | R | √3 | 0.14 | |
| Positioning accuracy | 0.4 | R | √3 | 0.23 | |
| Cable loss | 0.1 | N | 2 | 0.05 | |
| Frequency analyzer | 0.15 | R | √3 | 0.09 | |
| System repeatability | 0.2 | N | 1 | 0.20 | |
| Repeatability of the WD | 0.4 | N | 1 | 0.40 | |
| **Combined Standard Uncertainty** | | N | 1 | 0.61 | |
| **Expanded uncertainty (confidence level of 95%,k = 2)** | | N | K=2 | 1.22 | 15.05 |
| **REPORTED Expanded uncertainty (confidence level of 95%, k = 2)** | | N | K=2 | 1.20 | 15.00 |

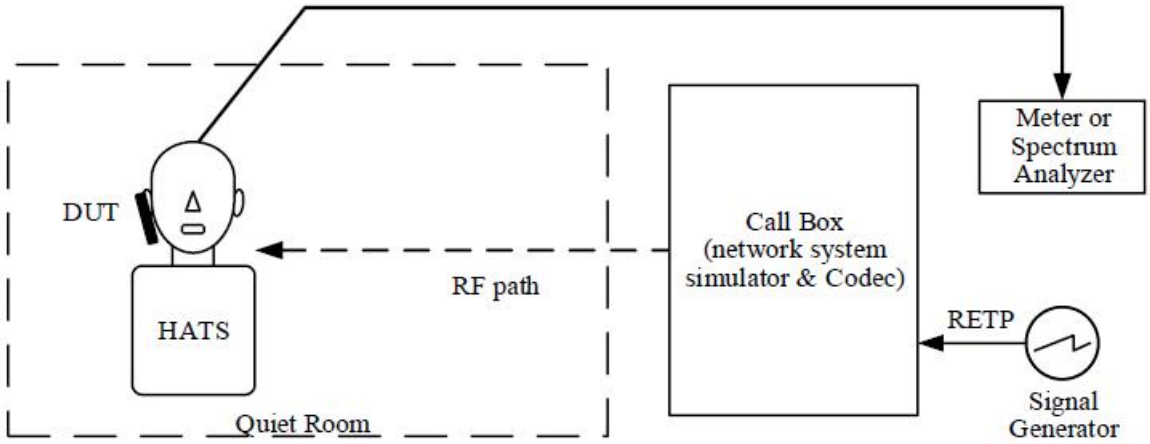
Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 5. Measurement System

## 5.1 MEASUREMENT SET-UP

The general test arrangement is shown in Figure 1. The Call Box passes the voice channel stream to the DUT without modification. There is no gain or loss in the voice channel stream due to the Call Box interface.




NOTES:
1. Additional information related to the air interface for the various RF technologies is specified in several 3GPP documents. A list of these can be found in 3GPP TS 26.132 V14.0.0 clause 4
2. Additional information related to the test setup can be found in 3GPP TS 26.132, V14.0.0 clause 5.1.
3. The RETP (receive electrical test point) is the point in the device test arrangement where signals are applied to the DUT in the receive direction.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 6. Evaluation of Test

## 6.1 RECEIVE VOLUME CONTROL PERFORMANCE

### 6.1.1 Requirement

1. With a mounting force of 8N, the DUT shall have at least one volume control setting that will produce a conversational gain of ≥ 6 dB with the output distortion and the frequency response meeting the requirements in clause 5.2.1 & 5.3.1 respectively.
2. With a mounting force of 2N, the DUT shall have at least one volume control setting that will produce a conversational gain of ≥ 6 dB with the output distortion and the frequency response meeting the requirements in clause 5.2.1 & 5.3.1 respectively.

*NOTE: Other acoustic receive features may be available such as additional amplification, tone control, automatic gain control, etc. ANSI/TIA-4953-B contains performance requirements for output levels and tone control operation for amplified devices.*

### 6.1.2 Method of Measurement

1. Configure the DUT with a mounting force of 8N and test equipment as shown in Figure 1 in an active call state with the applicable codec for the transmission mode under test.
2. Set the DUT volume control to the maximum setting.
3. If the DUT has an adjustable tone control feature, a tone control setting that meets the frequency response requirements in section 5.3.1 shall be used.
4. Apply the real speech test signal at a level of -20 dBm0 at the RETP and measure the acoustic output at the Drum Reference Point (DRP) over one complete sequence of the test signal.
5. Translate the measurement made at the DRP to the Free Field (FF) using the translation data in Annex B.
6. Over the applicable frequency band, determine the ASL in dBSPL for the resulting sound pressure level in accordance with Method B of ITU-T Recommendation P.56:
   a. Narrowband 100 Hz through 4000 Hz.
   b. Wideband 100 Hz through 7720 Hz.
7. Calculate the Conversational Gain by subtracting 70 dB from the measured dBSPL. [Conversational Gain = (Measured dBSPL Level – 70 dBSPL) dB]
8. Measure the output distortion per clause 5.2. If a distortion failure occurs at the maximum volume control setting, reduce the volume control setting and repeat the measurement to determine if a setting can be found for which the conversational gain requirement is met without a distortion failure.
9. Repeat steps 2-8 with a mounting force of 2N.

### 6.1.3 Test Result

Refer to test Annex A.

Remark: The report only reflects the test data plots of worst mode (for GSM 1900, WCDMA Band 2, LTE Band 4, 2.4G WIFI)

### 6.1.4 Test Conclusion

PASS.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 6.2 RECEIVE DISTORTION AND NOISE PERFORMANCE

### 6.2.1 Requirement

With a mounting force of 8N and 2N, the ratio of the stimulus signal power to the 100 Hz to 8000 Hz total A-weighted distortion and noise power shall be ≥ 20 dB when tested over the range of 1/3 octave band center frequencies:

1. Narrowband transmission mode: Each 1/3 octave band center frequency from 400 Hz to 3150 Hz.
2. Wideband transmission mode: Each 1/3 octave band center frequency from 250 Hz to 5000 Hz.

### 6.2.2 Method of Measurement

1. Configure the DUT with a mounting force of 8N and test equipment as shown in Figure 1 in an active call state with the applicable codec for the transmission mode under test with the volume control at the setting determined in 5.1.1.
2. Receive distortion and noise is measured using the PN-SDNR procedure as described in Annex A.
3. To ensure DUT activation, apply the real speech test signal at a level of -20 dBm0 followed immediately by the initial 1/3 octave center frequency PN test signal in Table A.1 based on the narrowband or wideband operating mode. Measure the acoustic output at the DRP over the complete sequence of the PN test signal.
4. Translate the measurement made at the DRP to the FF using the translation data in Annex B.
5. Calculate the acoustic output unweighted total signal power of the stimulus measurement band as described in A.2.
6. Calculate the notched A-weighting distortion and noise components as described in A.3.
7. Calculate the ratio of the signal power to the total A-weighted distortion and noise power using Eq A-1.
8. Repeat for each of the remaining 1/3 octave center frequencies in Table A.1 based on the narrowband or wideband operating mode.
9. Repeat steps 2-8 with a mounting force of 2N.

### 6.2.3 Test Result

Refer to test Annex A.

Remark: The report only reflects the test data plots of worst mode (for GSM 1900, WCDMA Band 2, LTE Band 4, 2.4G WIFI)

### 6.2.4 Test Conclusion

PASS.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

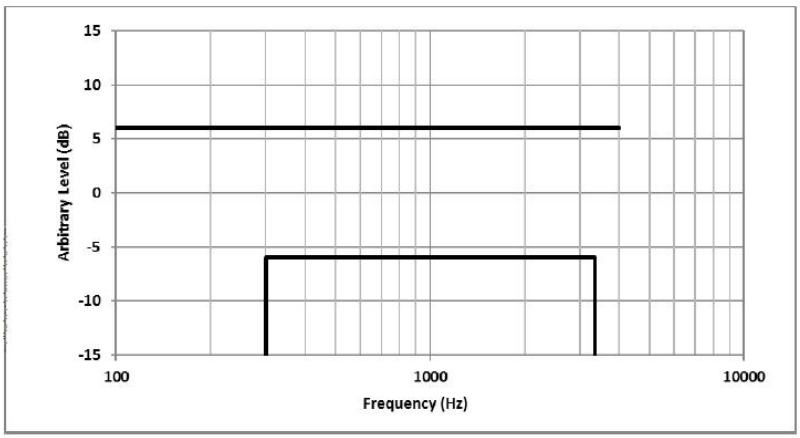
# 6.3 RECEIVE ACOUSTIC FREQUENCY RESPONSE PERFORMANCE

## 6.3.1 Requirement

1. Narrowband: The 1/12 octave band frequency response after translation to the FF or DF shall fall between the upper and lower limits given in Table 1 and shown in Figure below.

Table 1 – Narrowband Receive Frequency Response Limits

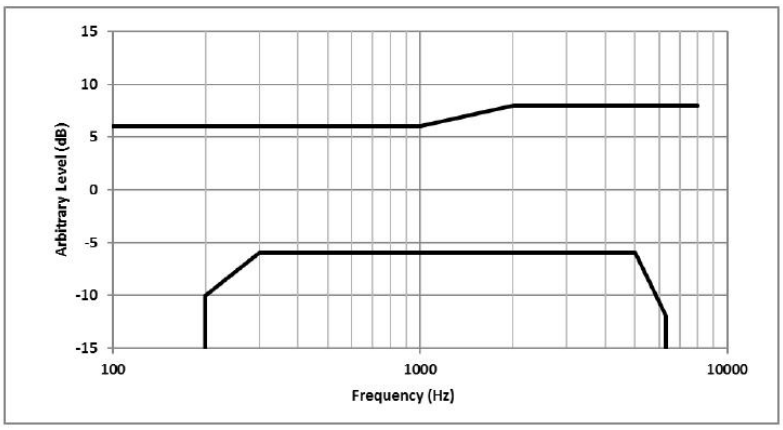
| Lower Limit Frequency (Hz) | Lower Limit (dB) | Upper Limit Frequency (Hz) | Upper Limit (dB) |
|---|---|---|---|
| 300 | -6 | 100 | +6 |
| 3400 | -6 | 4000 | +6 |




2. Wideband: The 1/12 octave band frequency response after translation to the FF or DF shall fall between the upper and lower limits given in Table 2 and shown in Figure below.

Table 2 – Wideband Receive Frequency Response Limits

| Lower Limit Frequency (Hz) | Lower Limit (dB) | Upper Limit Frequency (Hz) | Upper Limit (dB) |
|---|---|---|---|
| 200 | -10 | 100 | +6 |
| 300 | -6 | 1000 | +6 |
| 5000 | -6 | 2000 | +8 |
| 6300 | -12 | 8000 | +8 |




Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

### 6.3.2 Method of Measurement

1. Configure the DUT with a mounting force of 8N and test equipment as shown in Figure 1 in an active call state with the applicable codec for the transmission mode under test with the volume control at the setting determined in 5.1.1.
2. If the DUT has an adjustable tone control feature the initial measurement is to be performed with the default tone control setting.
3. Apply the real speech test signal with a level of -20 dBm0 at the RETP.
4. Capture the frequency spectrum at the DRP of the HATS using real-time analysis with 1/12 octave bands over the frequency range from 100 Hz to 4000 Hz for narrowband measurements, or over the frequency range from 100 Hz to 8000 Hz for wideband measurements, averaged over the entire duration of the test signal.
5. Transform the DRP frequency spectrum measurement to the FF or DF (see Annex B).
6. Divide the 1/12 octave measurement data by the 1/12 octave frequency spectrum of the test signal at the RETP and present the measurement in terms of dB(Pa/V).
7. Apply the applicable frequency response limits to determine compliance.
8. If the default tone control setting does not meet the requirement, repeat the above steps for other tone control settings to determine a tone control setting that meets the requirements.
9. Repeat with a mounting force of 2N.

### 6.3.3 Test Result

Refer to test Annex A.

Remark: The report only reflects the test data plots of worst mode (for GSM 1900, WCDMA Band 2, LTE Band 4, 2.4G WIFI)

### 6.3.4 Test Conclusion

PASS.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 7. Test Equipment List

| Description | Manufacturer | Model | Internal number | Cal. Date | Cal. Due |
|---|---|---|---|---|---|
| WIDEBAND RADIO COMMUNICATION TESTER | ROHDE&SCHWARZ | CMW500 | BTF-EM-023 | 2023/11/16 | 2024/11/15 |
| Conditioning Amplifier | Brule&Kjaer | Type -2690--030 | BTF-EM-146 | 2024/1/30 | 2025/1/29 |
| Head and Torso Simulator | Brule&Kjaer | Type 4128C | BTF-EM-148 | 2024/1/30 | 2025/1/29 |
| Sound Calibration | Brule&Kjaer | Type 4231 | BTF-EM-149 | 2024/1/30 | 2025/1/29 |
| Anechoic Test Chamber | MEC | Type 115 | BTF-EM-150 | N/A | N/A |

# 8. Air Interfaces / Bands used for testing

| Air-interface | Band | Tested Codec | Tested Rate(kbps) |
|---|---|---|---|
| GSM | 850/1900 | EFR | / |
| WCDMA(UMTS) | Band 2/4/5 | AMR-NB | 4.75/12.2 |
| | | AMR-WB | 6.6/23.85 |
| VoLTE | Band 2/4/5/12/17/25/26/41/66/71 | AMR-NB | 4.75/12.2 |
| | | AMR-WB | 6.6/23.85 |
| VoWIFI | 2.4G | AMR-NB | 4.75/12.2 |
| | | AMR-WB | 6.6/23.85 |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 9. Test Result

## 9.1 Receive volume control, distortion and noise performance

| Plot No. | Mode | Channel/Freq. | BW | Codec Bitrate | Volume Level | Codec Type | Codec Bandwidth | Mounting Force (N) | Frequency(HZ) | Min PN-SDNR(dB) | PN-SDNR Limb (dB) | Signal Quality (dB) | Conversational Gain | FCC CG Limit (dB) | CG Margin (dB) | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | GSM850 | 128/824.2MHz | / | / | Max | EFR | NB | 8N | 3150 | 21.59 | 20.00 | 94.05 | 24.05 | 6.00 | 18.05 | Pass |
| | | | / | / | Max | EFR | NB | 2N | 3150 | 22.12 | 20.00 | 92.56 | 22.56 | 6.00 | 16.56 | |
| 2 | PCS1900 | 512/1850.2MHz | / | / | Max | EFR | NB | 8N | 3150 | **21.24** | 20.00 | 93.82 | **23.82** | 6.00 | 17.82 | Pass |
| | | | / | / | Max | EFR | NB | 2N | 3150 | **22.00** | 20.00 | 92.03 | **22.03** | 6.00 | 16.03 | |
| 3 | WCDMA Band II | 9538/1907.6MHz | / | 12.20 | Max | AMR | NB | 8N | 3150 | **20.47** | 20.00 | 88.84 | **18.84** | 6.00 | 12.84 | Pass |
| | | | / | 12.20 | Max | AMR | NB | 2N | 3150 | **21.38** | 20.00 | 88.31 | **18.31** | 6.00 | 12.31 | |
| | | | / | 23.85 | Max | AMR | WB | 8N | 3150 | 20.65 | 20.00 | 88.97 | 18.97 | 6.00 | 12.97 | |
| | | | / | 23.85 | Max | AMR | WB | 2N | 3150 | 21.52 | 20.00 | 88.49 | 18.49 | 6.00 | 12.49 | |
| 4 | WCDMA Band IV | 1312/1712.4MHz | / | 12.20 | Max | AMR | NB | 8N | 3150 | 20.71 | 20.00 | 89.13 | 19.13 | 6.00 | 13.13 | Pass |
| | | | / | 12.20 | Max | AMR | NB | 2N | 3150 | 21.63 | 20.00 | 89.36 | 19.36 | 6.00 | 13.36 | |
| | | | / | 23.85 | Max | AMR | WB | 8N | 3150 | 20.79 | 20.00 | 89.36 | 19.36 | 6.00 | 13.36 | |
| | | | / | 23.85 | Max | AMR | WB | 2N | 3150 | 21.83 | 20.00 | 89.59 | 19.59 | 6.00 | 13.59 | |
| 5 | WCDMA Band V | 4132/826.4MHz | / | 12.20 | Max | AMR | NB | 8N | 3150 | 20.66 | 20.00 | 90.03 | 20.03 | 6.00 | 14.03 | Pass |
| | | | / | 12.20 | Max | AMR | NB | 2N | 3150 | 21.54 | 20.00 | 90.28 | 20.28 | 6.00 | 14.28 | |
| | | | / | 23.85 | Max | AMR | WB | 8N | 3150 | 20.78 | 20.00 | 90.29 | 20.29 | 6.00 | 14.29 | |
| | | | / | 23.85 | Max | AMR | WB | 2N | 3150 | 21.70 | 20.00 | 90.42 | 20.42 | 6.00 | 14.42 | |
| 6 | LTE FDD Band 2 | 18700/1860.0MHz | 20MHz_QPSK_1_0 | 12.20 | Max | AMR | NB | 8N | 2000 | 22.03 | 20.00 | 92.76 | 22.76 | 6.00 | 16.76 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 1250 | 22.25 | 20.00 | 91.85 | 21.85 | 6.00 | 15.85 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 2000 | 22.27 | 20.00 | 92.93 | 22.93 | 6.00 | 16.93 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 1250 | 22.33 | 20.00 | 92.02 | 22.02 | 6.00 | 16.02 | |
| 7 | LTE FDD Band 4 | 20300/1745.0MHz | 20MHz_QPSK_1_99 | 12.20 | Max | AMR | NB | 8N | 3150 | **21.60** | 20.00 | 92.53 | **22.53** | 6.00 | 16.53 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | **21.82** | 20.00 | 91.41 | **21.41** | 6.00 | 15.41 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 21.89 | 20.00 | 92.71 | 22.71 | 6.00 | 16.71 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 21.95 | 20.00 | 91.87 | 21.87 | 6.00 | 15.87 | |
| 8 | LTE FDD Band 5 | 20600/844.0MHz | 10MHz_QPSK_1_49 | 12.20 | Max | AMR | NB | 8N | 3150 | 21.85 | 20.00 | 92.65 | 22.65 | 6.00 | 16.65 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 21.99 | 20.00 | 91.58 | 21.58 | 6.00 | 15.58 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 21.94 | 20.00 | 92.89 | 22.89 | 6.00 | 16.89 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 22.08 | 20.00 | 91.78 | 21.78 | 6.00 | 15.78 | |
| 9 | LTE FDD Band 12 | 23095/707.5MHz | 10MHz_QPSK_1_49 | 12.20 | Max | AMR | NB | 8N | 1250 | 21.69 | 20.00 | 93.05 | 23.05 | 6.00 | 17.05 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 2500 | 21.91 | 20.00 | 92.11 | 22.11 | 6.00 | 16.11 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 1250 | 21.88 | 20.00 | 93.26 | 23.26 | 6.00 | 17.26 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 2500 | 21.98 | 20.00 | 92.41 | 22.41 | 6.00 | 16.41 | |
| 10 | LTE FDD Band 17 | 23800/711.0MHz | 10MHz_QPSK_1_25 | 12.20 | Max | AMR | NB | 8N | 1250 | 21.87 | 20.00 | 92.84 | 22.84 | 6.00 | 16.84 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 2500 | 22.01 | 20.00 | 91.96 | 21.96 | 6.00 | 15.96 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 1250 | 22.05 | 20.00 | 93.16 | 23.16 | 6.00 | 17.16 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 2500 | 22.16 | 20.00 | 92.53 | 22.53 | 6.00 | 16.53 | |
| 11 | LTE FDD Band 25 | 26590/1905.0MHz | 20MHz_QPSK_1_99 | 12.20 | Max | AMR | NB | 8N | 2500 | 22.11 | 20.00 | 92.97 | 22.97 | 6.00 | 16.97 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 22.34 | 20.00 | 91.82 | 21.82 | 6.00 | 15.82 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 2500 | 22.28 | 20.00 | 93.08 | 23.08 | 6.00 | 17.08 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 22.39 | 20.00 | 91.99 | 21.99 | 6.00 | 15.99 | |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

| Plot No. | Mode | Channel/Freq. | BW | Codec Bitrate | Volume Level | Codec Type | Codec Bandwidth | Mounting Force (N) | Frequency(HZ) | Min PN-SDNR(dB) | PN-SDNR Limb (dB) | Signal Quality (dB) | Conversational Gain | FCC CG Limit (dB) | CG Margin (dB) | Verdict |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | LTE FDD Band 26 Part90 | 26740/819.0MHz | 10MHz_QPSK_1_25 | 12.20 | Max | AMR | NB | 8N | 2000 | 21.90 | 20.00 | 93.13 | 23.13 | 6.00 | 17.13 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 22.07 | 20.00 | 92.04 | 22.04 | 6.00 | 16.04 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 2500 | 22.06 | 20.00 | 93.45 | 23.45 | 6.00 | 17.45 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 22.18 | 20.00 | 92.61 | 22.61 | 6.00 | 16.61 | |
| 13 | LTE FDD Band 26 Part22 | 26865/831.5MHz | 15MHz_QPSK_1_38 | 12.20 | Max | AMR | NB | 8N | 1250 | 21.85 | 20.00 | 93.24 | 23.24 | 6.00 | 17.24 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 2000 | 21.98 | 20.00 | 92.38 | 22.38 | 6.00 | 16.38 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 1250 | 22.10 | 20.00 | 93.68 | 23.68 | 6.00 | 17.68 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 2000 | 22.19 | 20.00 | 92.89 | 22.89 | 6.00 | 16.89 | |
| 14 | LTE TDD Band 41 | 41490/2680.0MHz | 20MHz_QPSK_1_99 | 12.20 | Max | AMR | NB | 8N | 3150 | 21.68 | 20.00 | 92.74 | 22.74 | 6.00 | 16.74 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 21.92 | 20.00 | 91.90 | 21.90 | 6.00 | 15.90 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 21.77 | 20.00 | 93.01 | 23.01 | 6.00 | 17.01 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 21.98 | 20.00 | 92.14 | 22.14 | 6.00 | 16.14 | |
| 15 | LTE FDD Band 66 | 132322/1745.0MHz | 20MHz_QPSK_1_99 | 12.20 | Max | AMR | NB | 8N | 3150 | 21.93 | 20.00 | 93.17 | 23.17 | 6.00 | 17.17 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 22.11 | 20.00 | 91.99 | 21.99 | 6.00 | 15.99 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 22.15 | 20.00 | 93.36 | 23.36 | 6.00 | 17.36 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 22.26 | 20.00 | 92.31 | 22.31 | 6.00 | 16.31 | |
| 16 | LTE FDD Band 71 | 133222/673.0MHz | 20MHz_QPSK_1_50 | 12.20 | Max | AMR | NB | 8N | 3150 | 21.89 | 20.00 | 92.80 | 22.80 | 6.00 | 16.80 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | 21.97 | 20.00 | 91.65 | 21.65 | 6.00 | 15.65 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 22.00 | 20.00 | 92.98 | 22.98 | 6.00 | 16.98 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 22.13 | 20.00 | 91.81 | 21.81 | 6.00 | 15.81 | |
| 17 | 2.4G WIFI 802.11g | 1/2412.0MHz | / | 12.20 | Max | AMR | NB | 8N | 3150 | **21.05** | 20.00 | 93.85 | **23.85** | 6.00 | 17.85 | Pass |
| | | | | 12.20 | Max | AMR | NB | 2N | 3150 | **20.06** | 20.00 | 92.77 | **22.77** | 6.00 | 16.77 | |
| | | | | 23.85 | Max | AMR | WB | 8N | 3150 | 21.23 | 20.00 | 94.02 | 24.02 | 6.00 | 18.02 | |
| | | | | 23.85 | Max | AMR | WB | 2N | 3150 | 20.27 | 20.00 | 93.15 | 23.15 | 6.00 | 17.15 | |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 9.2 Receive acoustic frequency response performance

| Plot No. | Mode | Channel/Freq. | BW | Volume Level | Codec Type | Codec Bandwidth | Mounting Force (N) | RFR Test Result |
|---|---|---|---|---|---|---|---|---|
| 1 | GSM850 | 128/824.2MHz | / | Max | EFR | NB | 2N | Pass |
| | | | | Max | EFR | NB | 8N | |
| 2 | PCS1900 | 512/1850.2MHz | / | Max | EFR | NB | 2N | Pass |
| | | | | Max | EFR | NB | 8N | |
| 3 | WCDMA Band II | 9538/1907.6MHz | / | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 4 | WCDMA Band IV | 1312/1712.4MHz | / | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 5 | WCDMA Band V | 4132/826.4MHz | / | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 6 | LTE FDD Band 2 | 18700/1860.0MHz | 20MHz_QPSK_1_0 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 7 | LTE FDD Band 4 | 20300/1745.0MHz | 20MHz_QPSK_1_99 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 8 | LTE FDD Band 5 | 20600/844.0MHz | 10MHz_QPSK_1_49 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 9 | LTE FDD Band 12 | 23095/707.5MHz | 10MHz_QPSK_1_49 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 10 | LTE FDD Band 17 | 23800/711.0MHz | 10MHz_QPSK_1_25 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 11 | LTE FDD Band 25 | 26590/1905.0MHz | 20MHz_QPSK_1_99 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

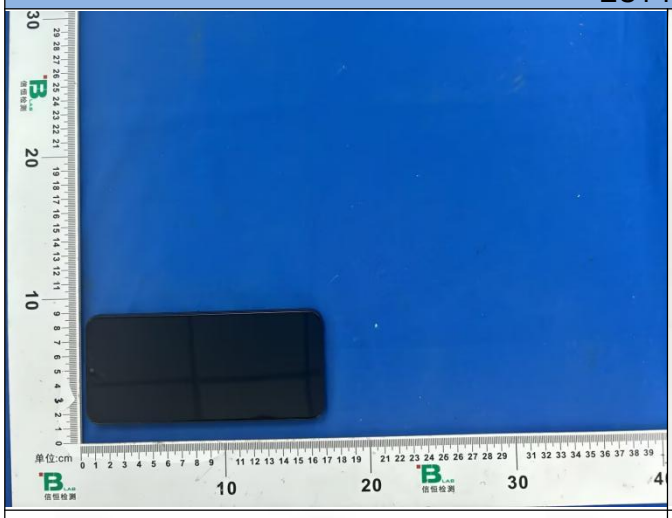
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

| Plot No. | Mode | Channel/Freq. | BW | Volume Level | Codec Type | Codec Bandwidth | Mounting Force (N) | RFR Test Result |
|---|---|---|---|---|---|---|---|---|
| 12 | LTE FDD Band 26Part 90 | 26740/819.0MHz | 10MHz_QPSK_1_25 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 13 | LTE FDD Band 26Part 22 | 26865/831.5MHz | 15MHz_QPSK_1_38 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 14 | LTE TDD Band 41 | 41490/2680.0MHz | 20MHz_QPSK_1_99 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 15 | LTE FDD Band 66 | 132322/1745.0MHz | 20MHz_QPSK_1_99 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 16 | LTE FDD Band 71 | 133222/673.0MHz | 20MHz_QPSK_1_50 | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |
| 17 | 2.4G WIFI 802.11g | 1/2412.0MHz | / | Max | AMR | NB | 2N | Pass |
| | | | | Max | AMR | NB | 8N | |
| | | | | Max | AMR | WB | 2N | |
| | | | | Max | AMR | WB | 8N | |

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 10. EUT photograph

| EUT Photos | |
|---|---|
|  | |
| Front | Back |

# Volume Control Verification Test Results

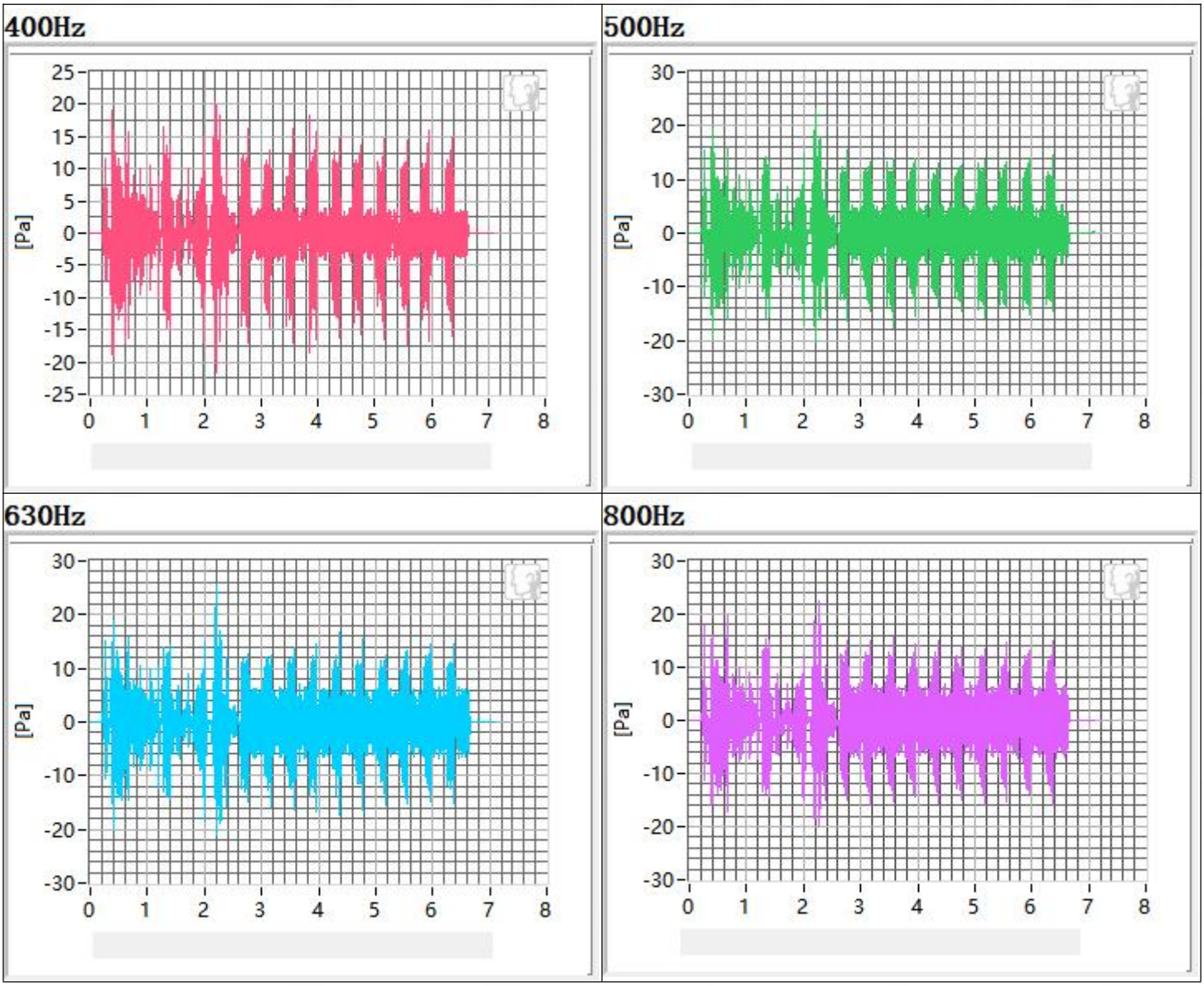
| Date of Testing | Test Location | Air Interface Equipment | Acoustical Calibrator | HATS Sens.(dB) | Ambient Noise(dBA) |
|---|---|---|---|---|---|
| 16/8/2024 | Whisper 1 | CMW 500 | Type 4182C | 97.11 | 32.74 |
| 16/8/2024 | Whisper 1 | CMW 500 | Type 4182C | 97.35 | 32.23 |
| 16/8/2024 | Whisper 1 | CMW 500 | Type 4182C | 97.42 | 32.54 |

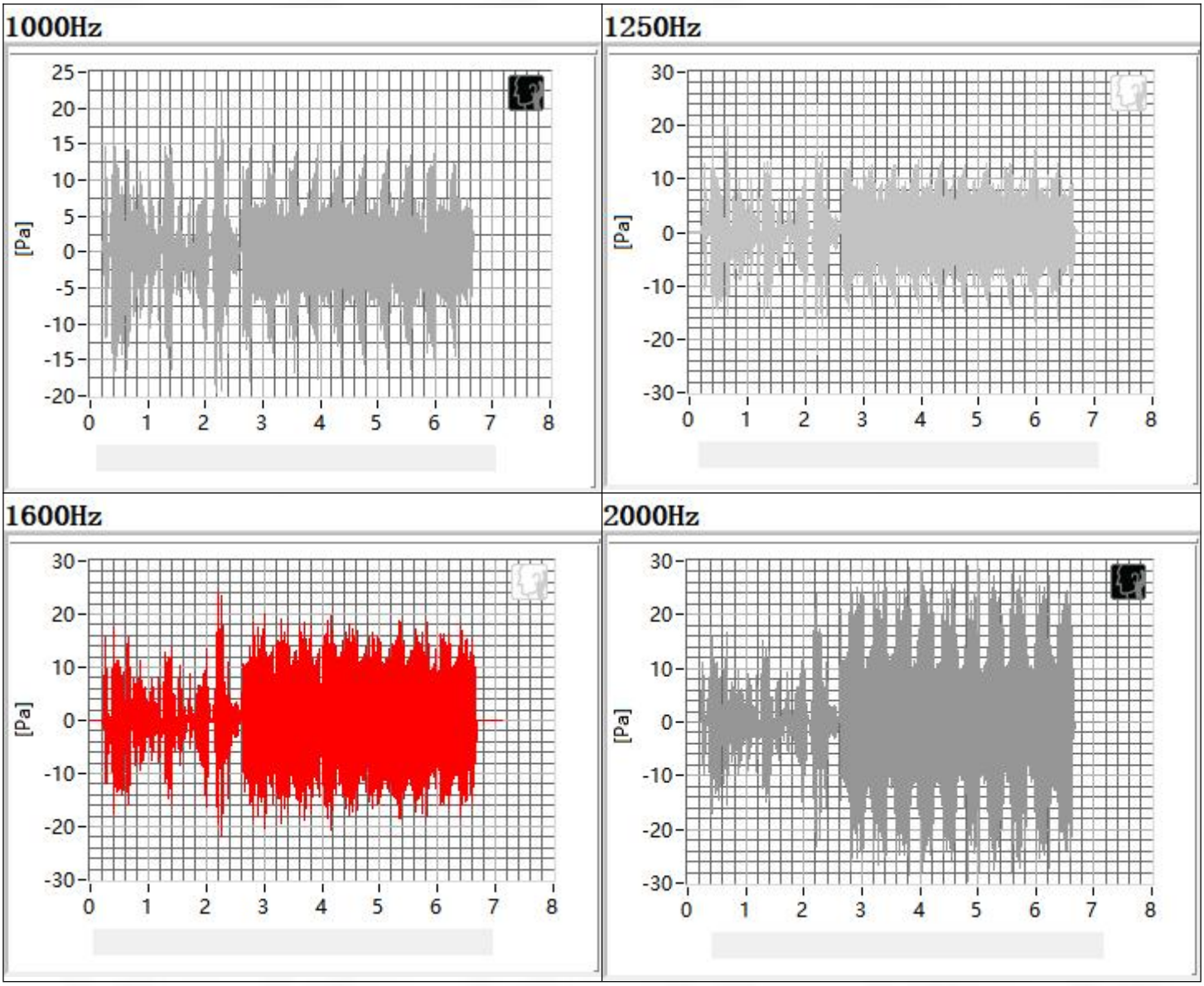
Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# ANNEX A Test Data
# 1. GSM 1900 in channel 512

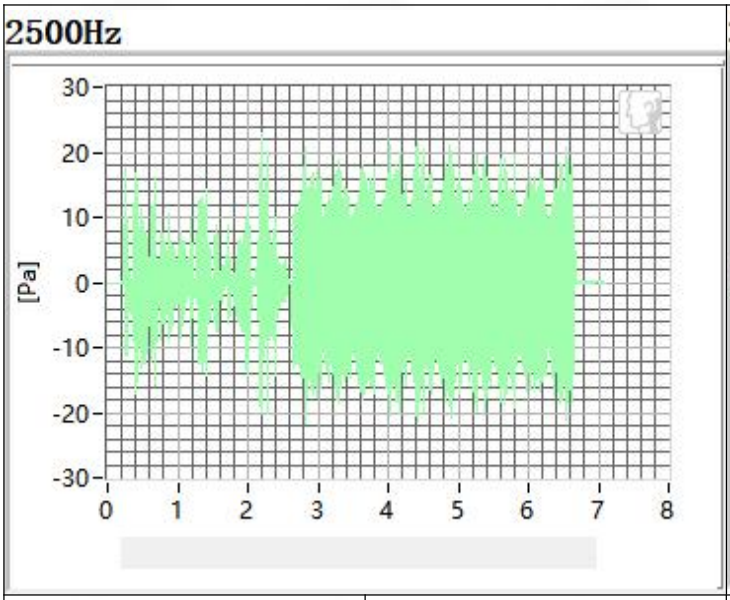
## 1.1 Receive Distortion and Noise 8N NB

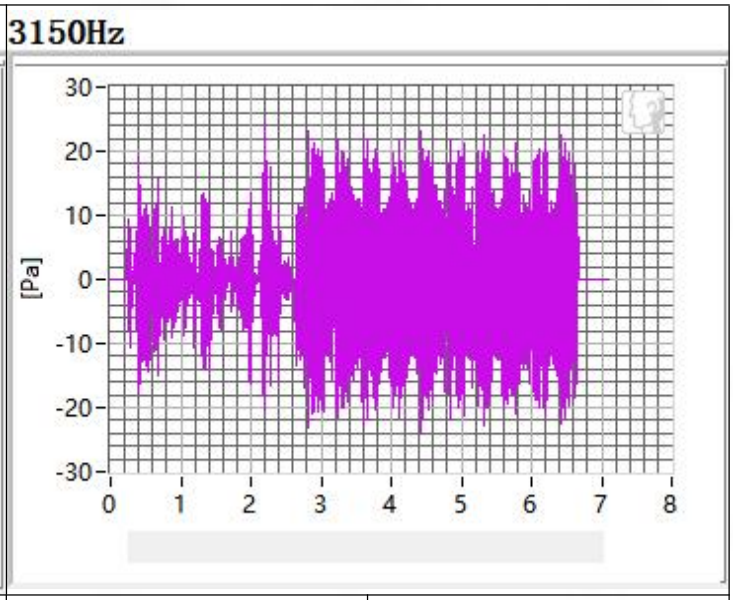





Total or partial reproduction of this document without permission of the Laboratory is not allowed.

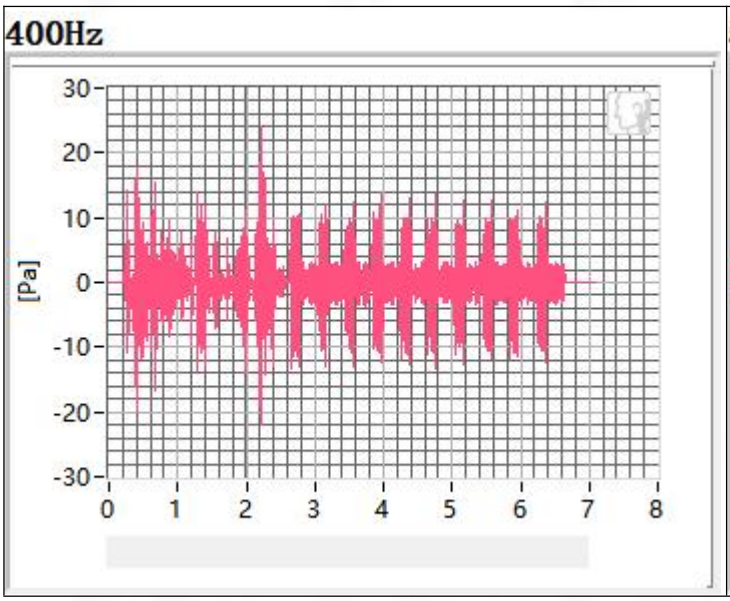
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

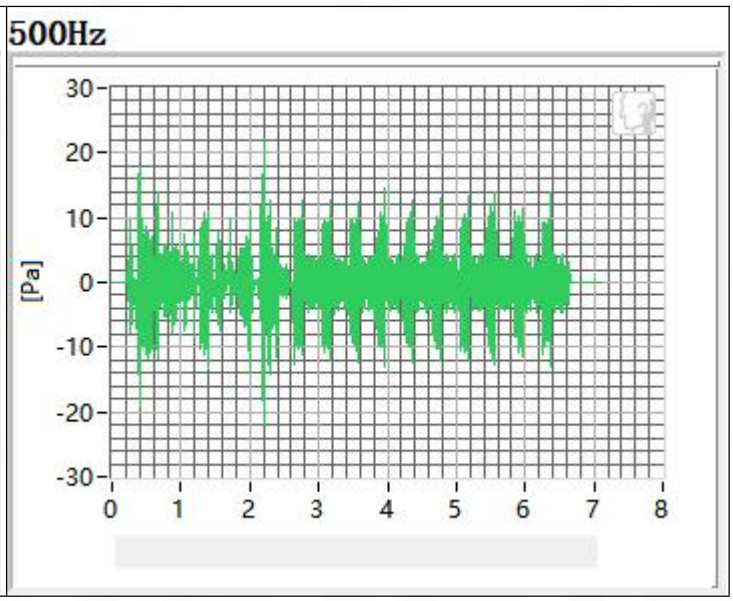



| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 29.44 dB | 1250Hz | 26.00 dB |
| 500Hz | 28.17 dB | 1600Hz | 27.03 dB |
| 630Hz | 26.90 dB | 2000Hz | 29.55 dB |
| 800Hz | 27.76 dB | 2500Hz | 23.40 dB |
| 1000Hz | 28.37 dB | 3150Hz | 21.24 dB |
| All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 21.24dB at 3150Hz. | | | |

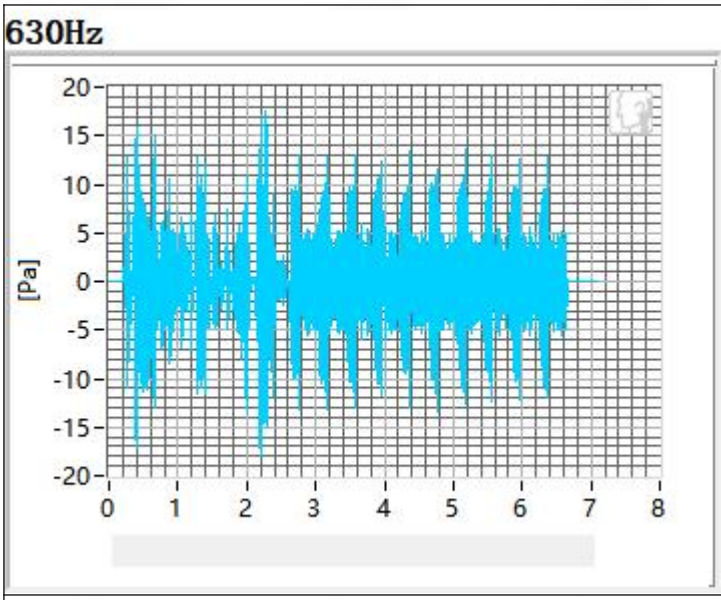
## 1.2 Receive Distortion and Noise 2N NB

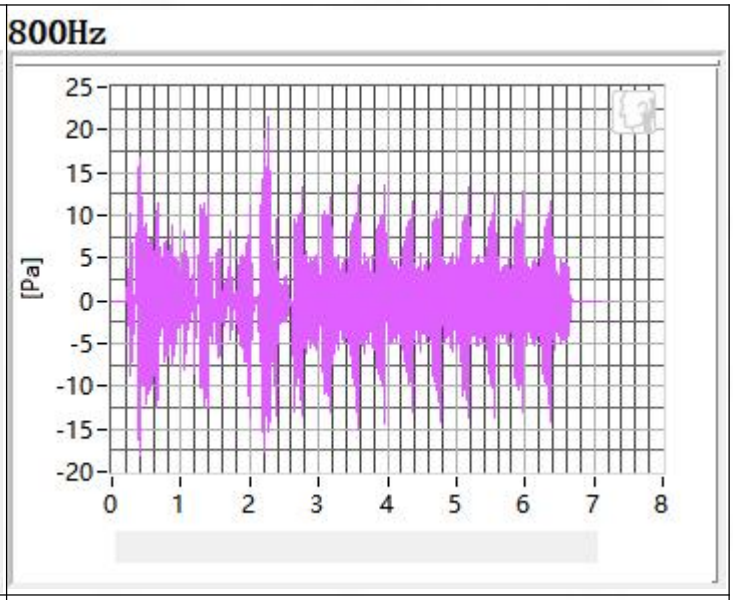


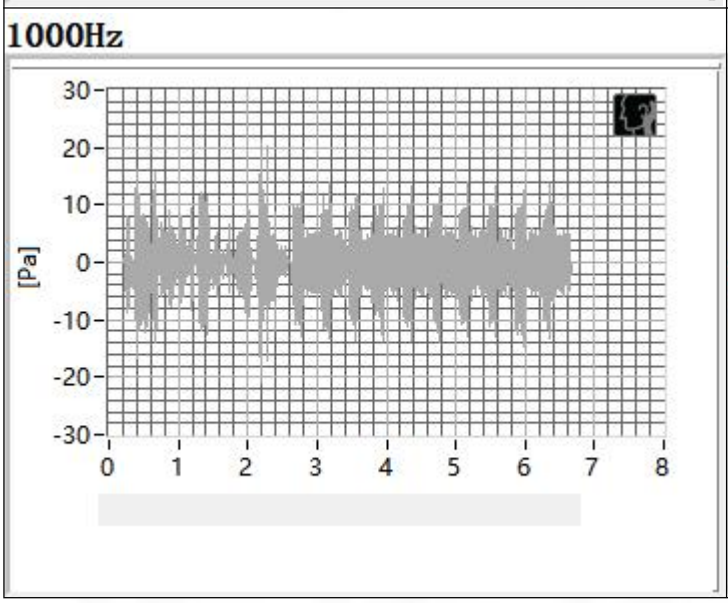



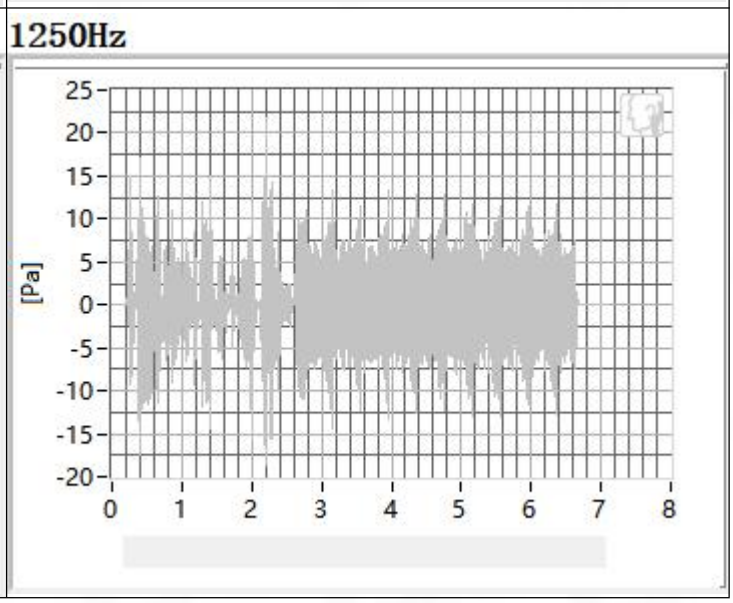

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



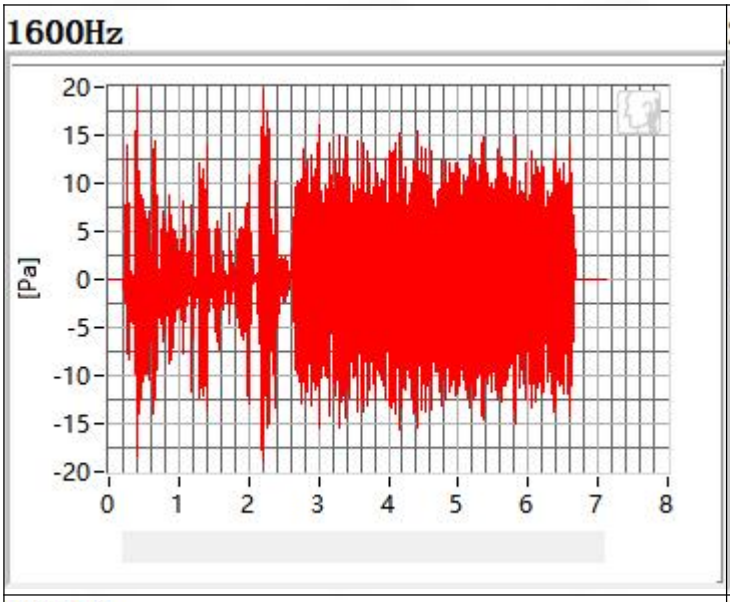



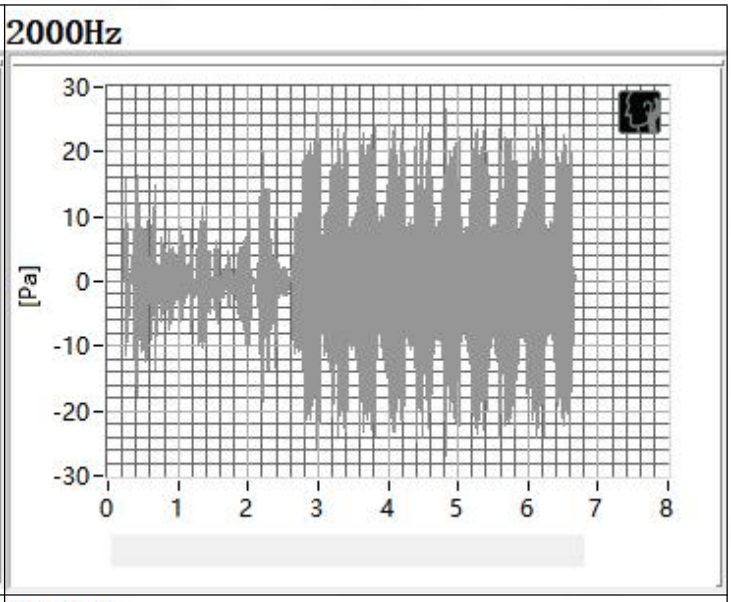



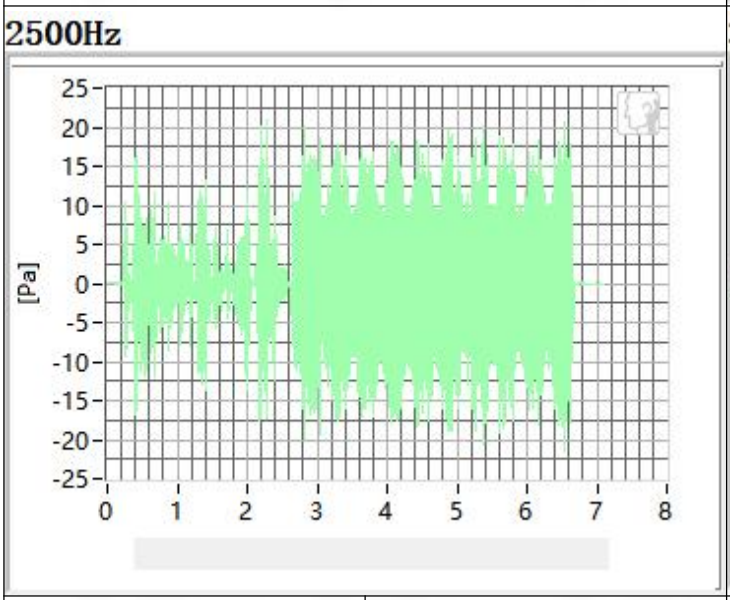



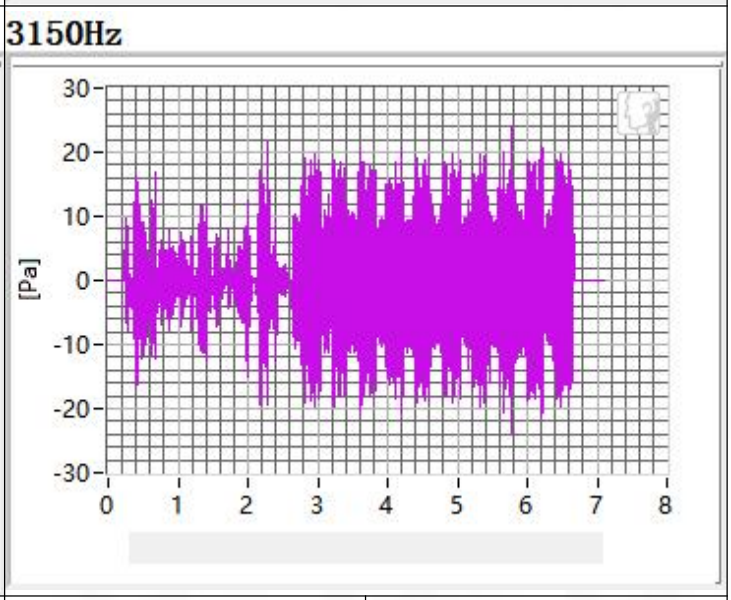

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



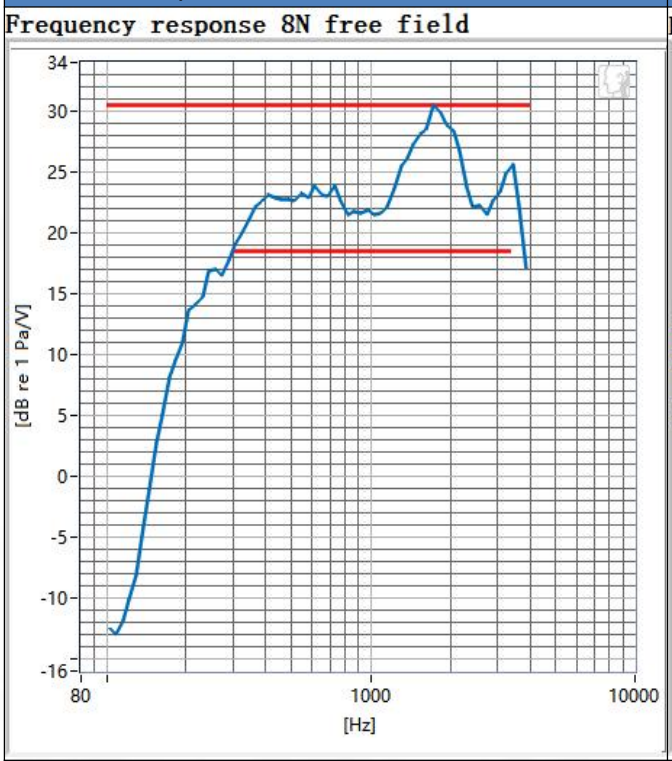
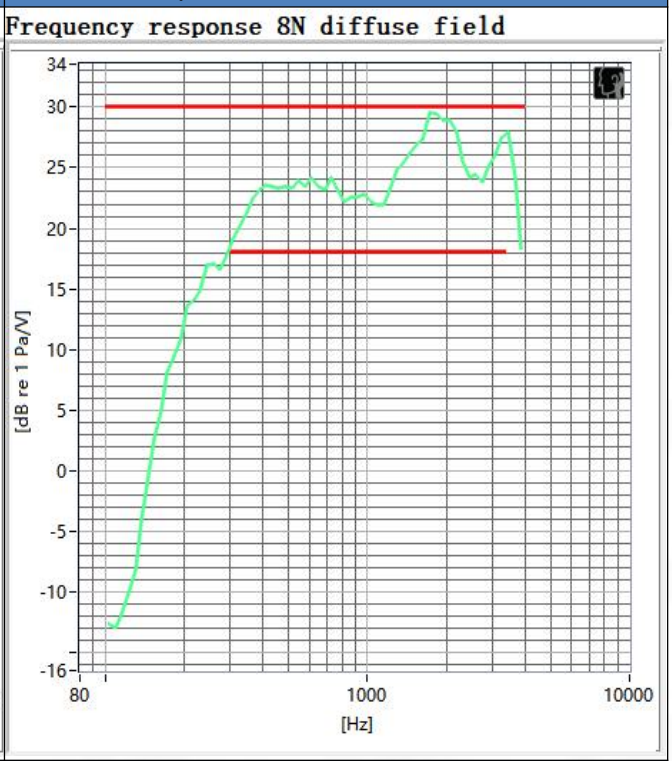

| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 29.27 dB | 1250Hz | 28.30 dB |
| 500Hz | 28.38 dB | 1600Hz | 27.59 dB |
| 630Hz | 28.25 dB | 2000Hz | 28.92 dB |
| 800Hz | 25.77 dB | 2500Hz | 22.74 dB |
| 1000Hz | 28.44 dB | 3150Hz | 22.00 dB |

All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 22.00dB at 3150Hz.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

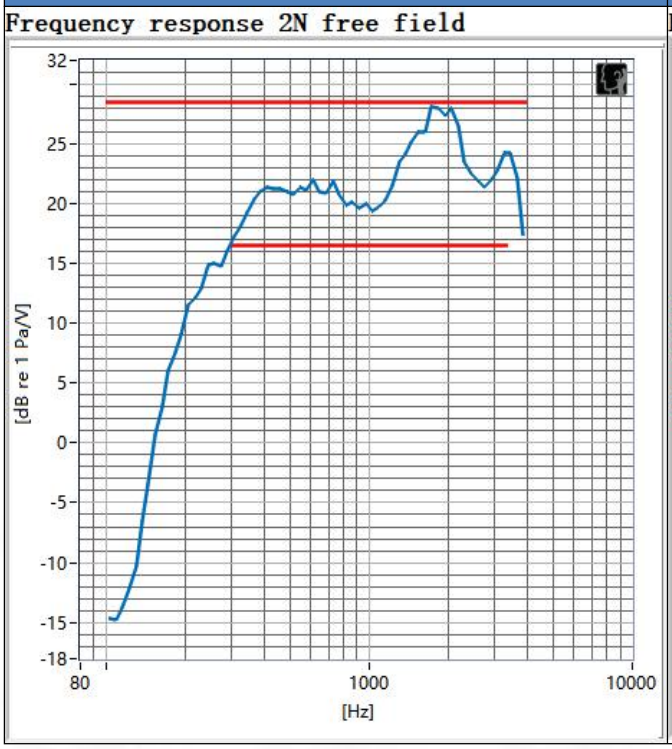
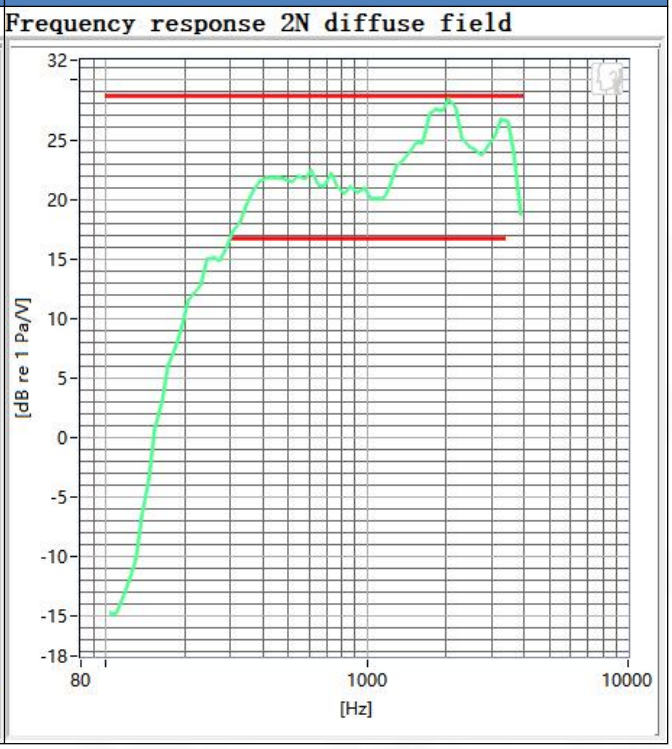
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 1.3 Receive Frequency Response

| Receive Resp FF 8N | Receive Resp DF 8N |
|---|---|
|  |  |





| Receive Resp FF 2N | Receive Resp DF 2N |
|---|---|
|  |  |



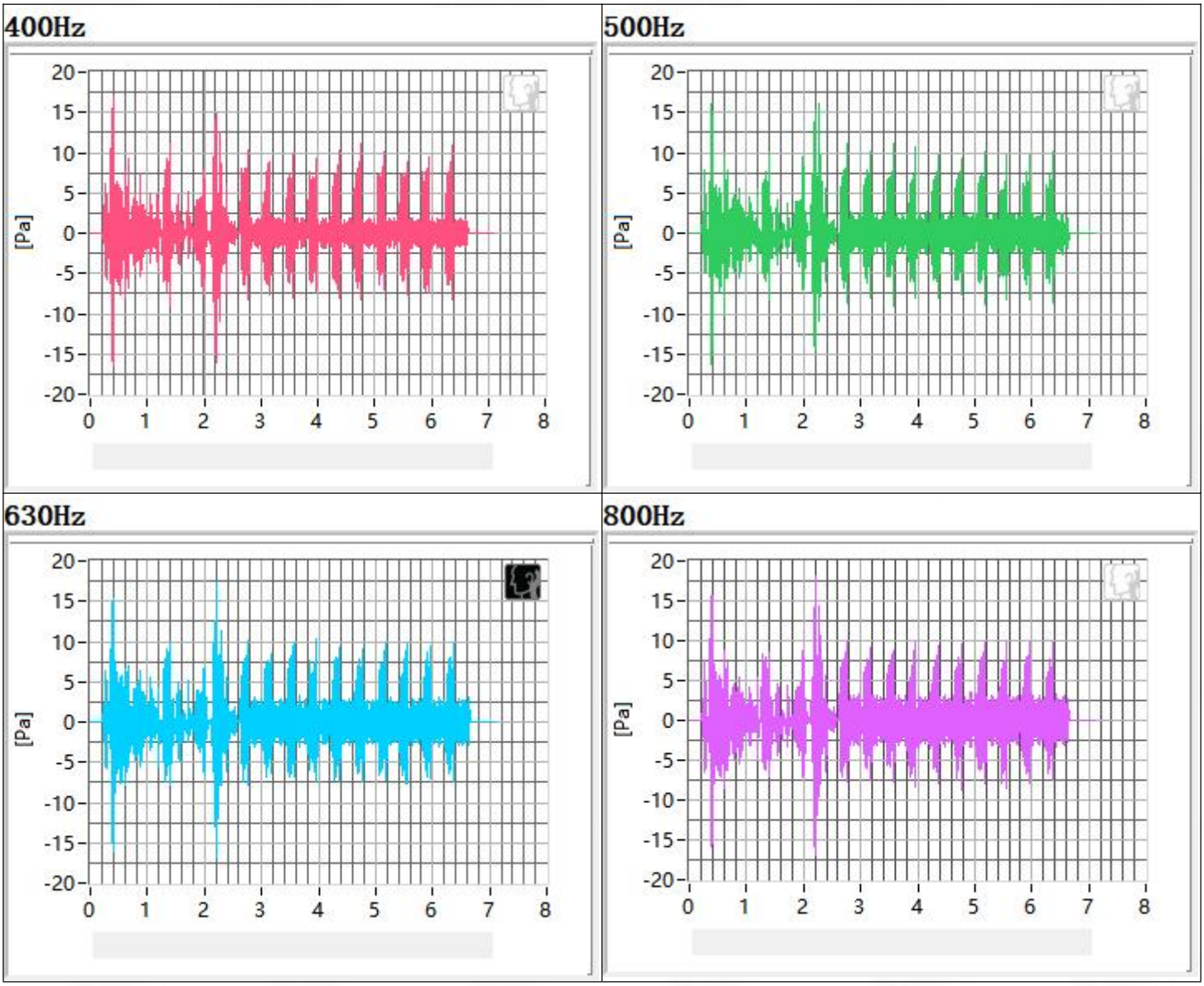


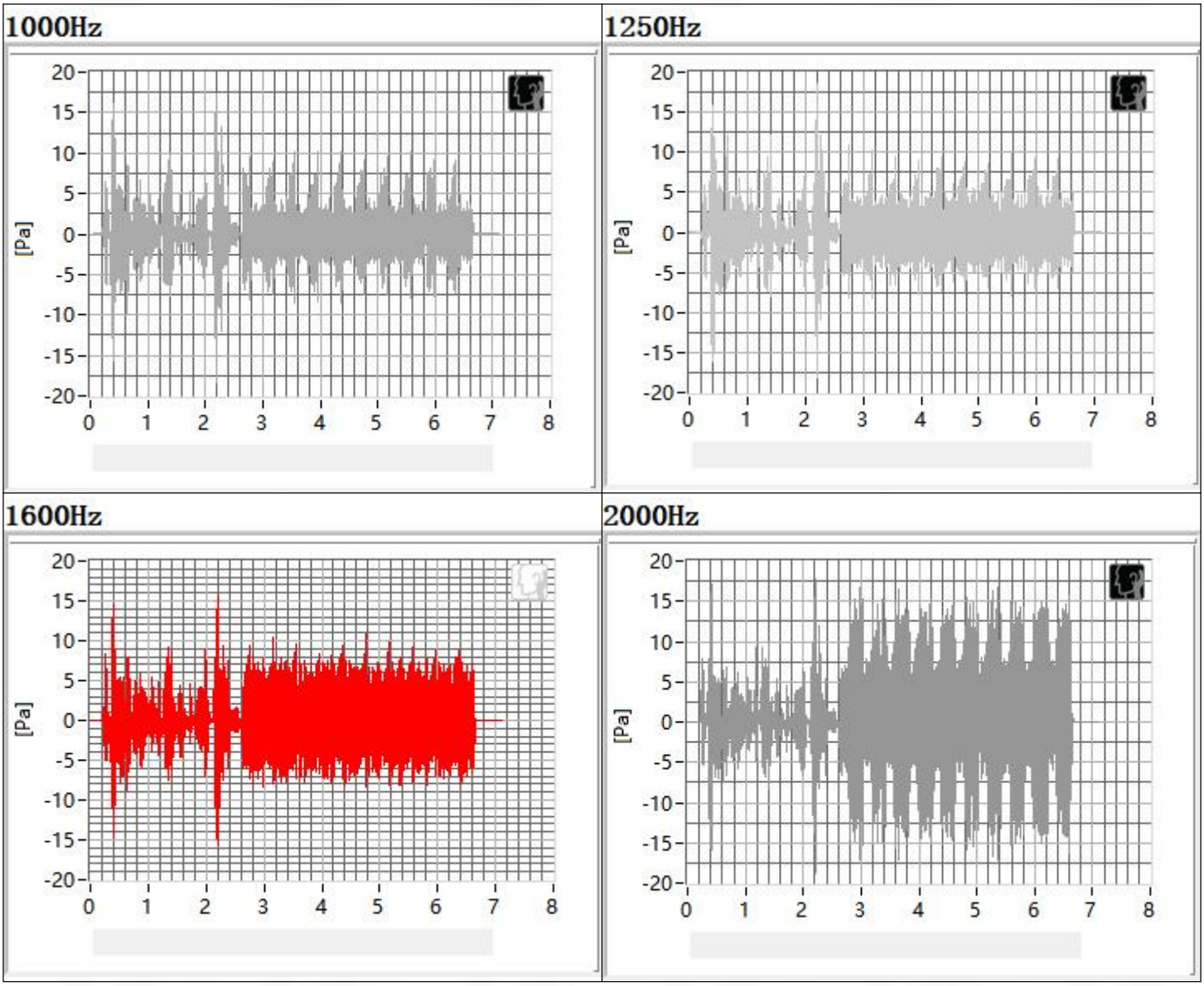
Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 2. WCDMA band 2 in channel 9538

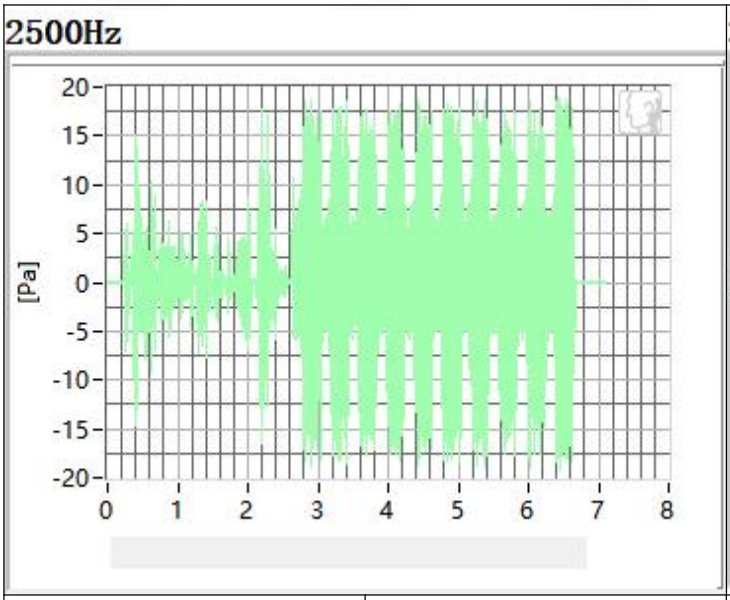
## 2.1 Receive Distortion and Noise 8N NB

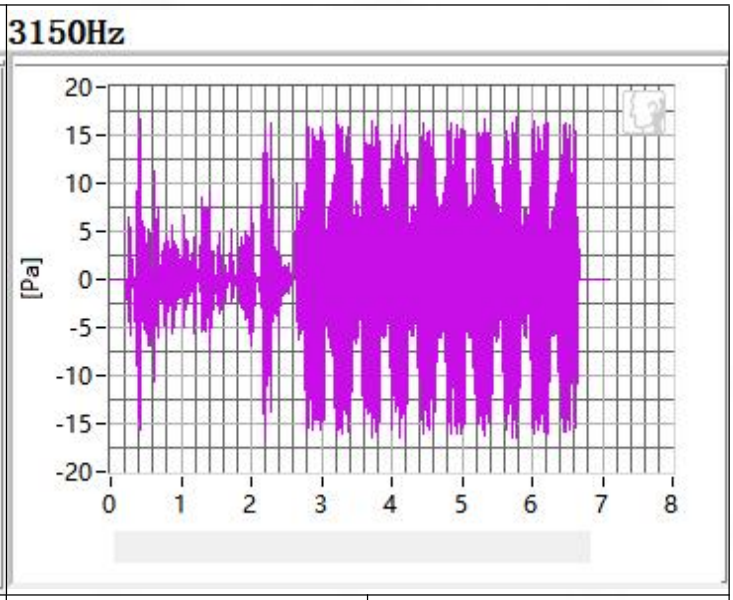





Total or partial reproduction of this document without permission of the Laboratory is not allowed.

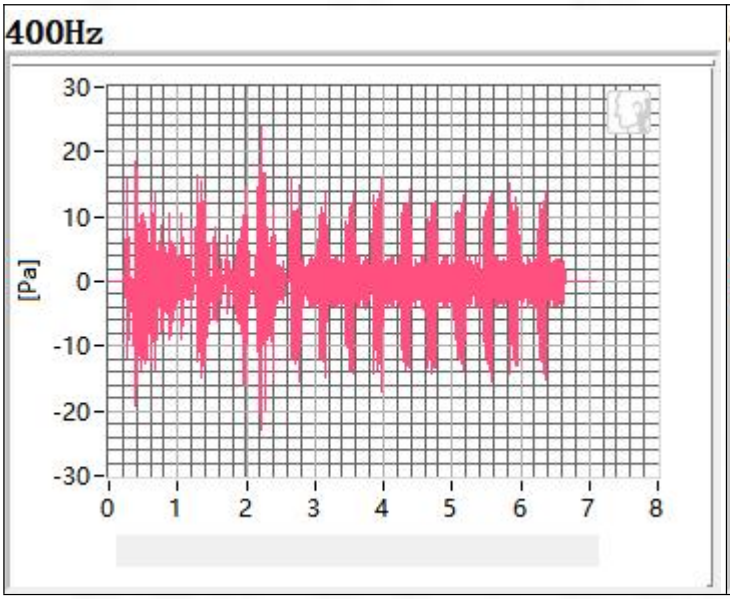
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

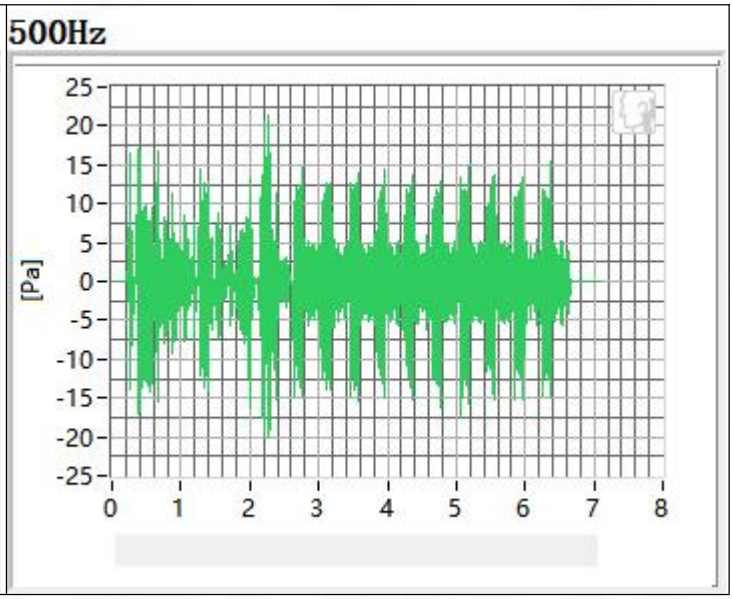



| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 31.05 dB | 1250Hz | 27.47 dB |
| 500Hz | 28.38 dB | 1600Hz | 27.60 dB |
| 630Hz | 28.31 dB | 2000Hz | 28.90 dB |
| 800Hz | 26.73 dB | 2500Hz | 26.31 dB |
| 1000Hz | 28.24 dB | 3150Hz | 20.47 dB |
| All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 20.47 dB at 3150Hz. | | | |

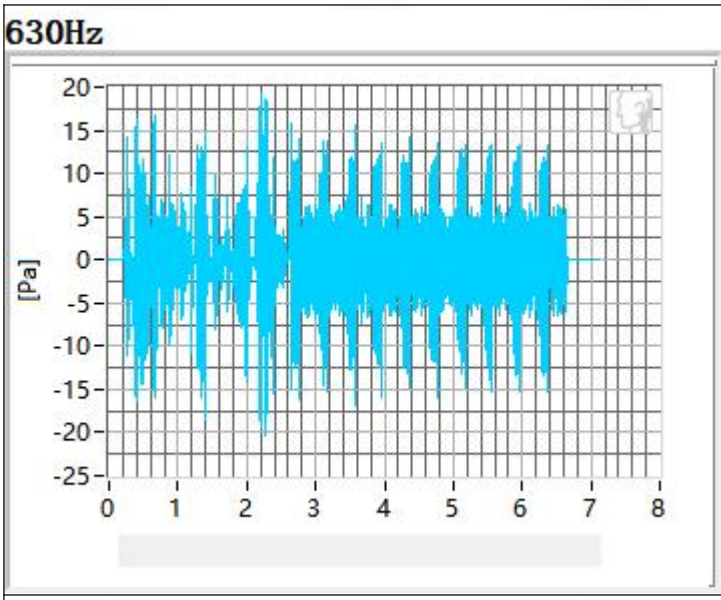
## 2.2 Receive Distortion and Noise 2N NB

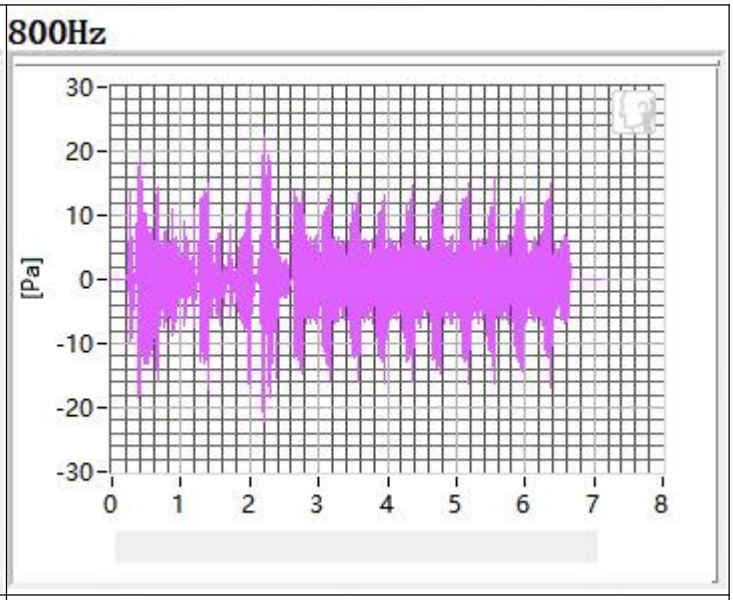


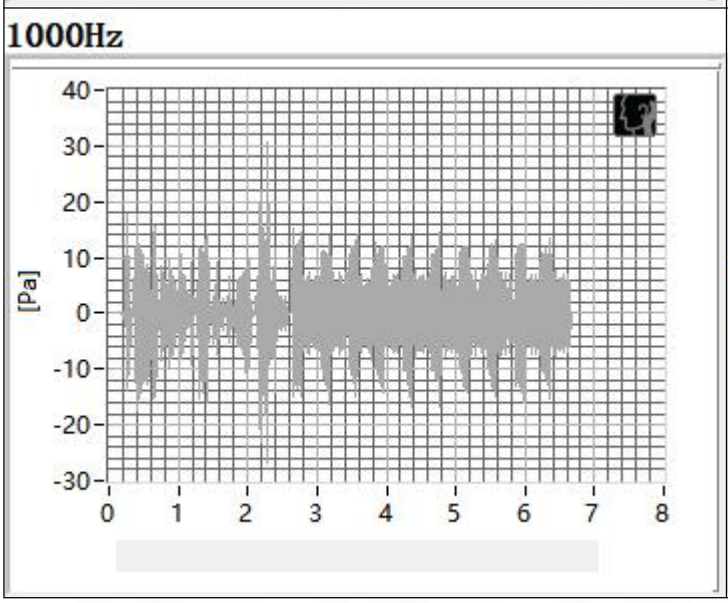



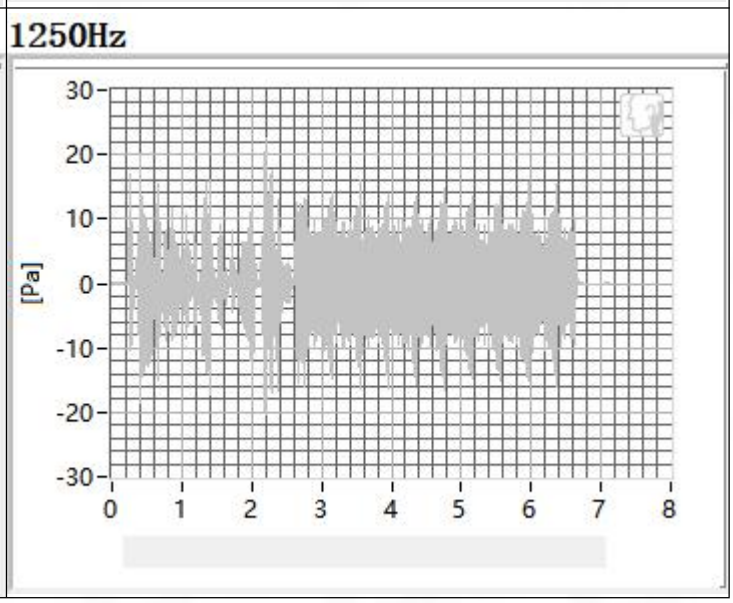

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



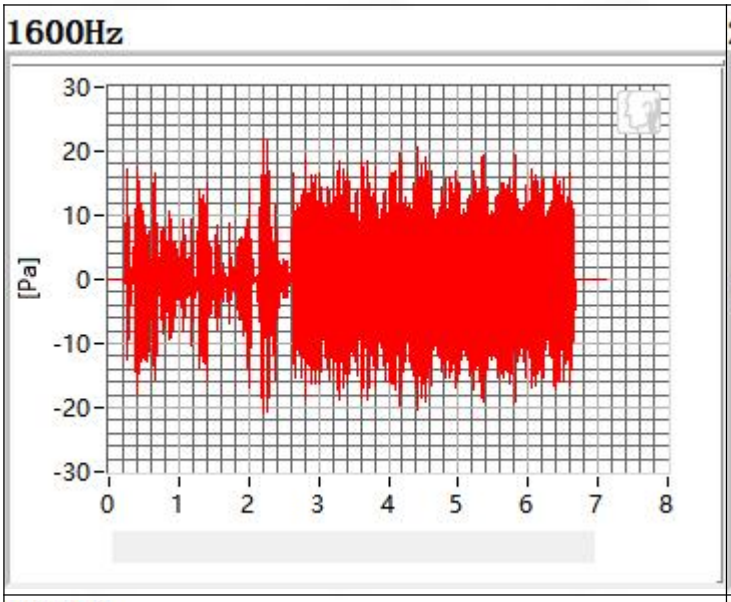



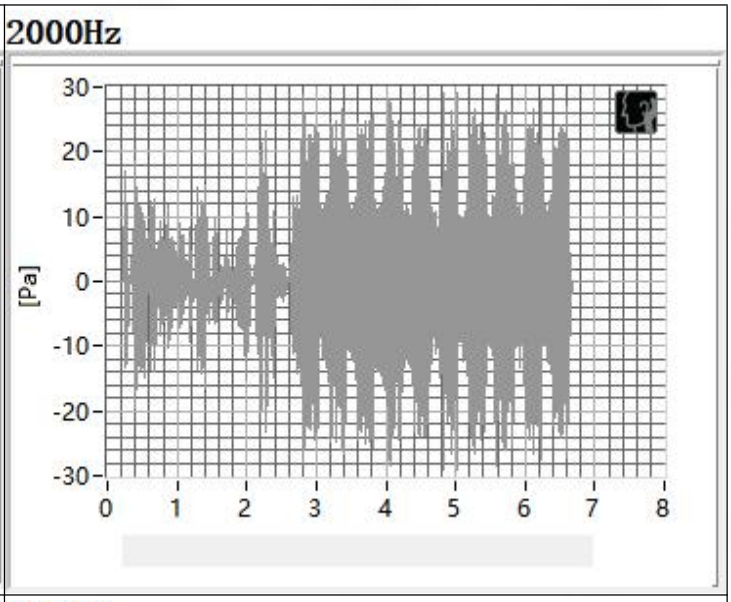



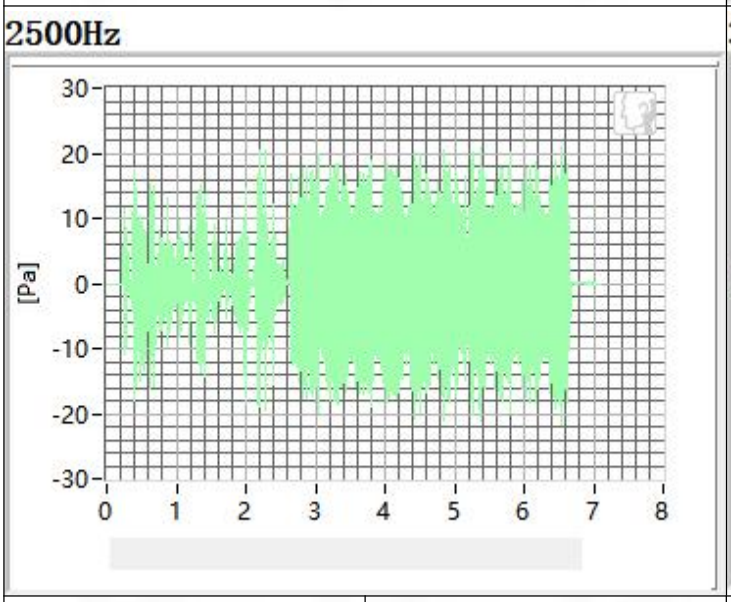



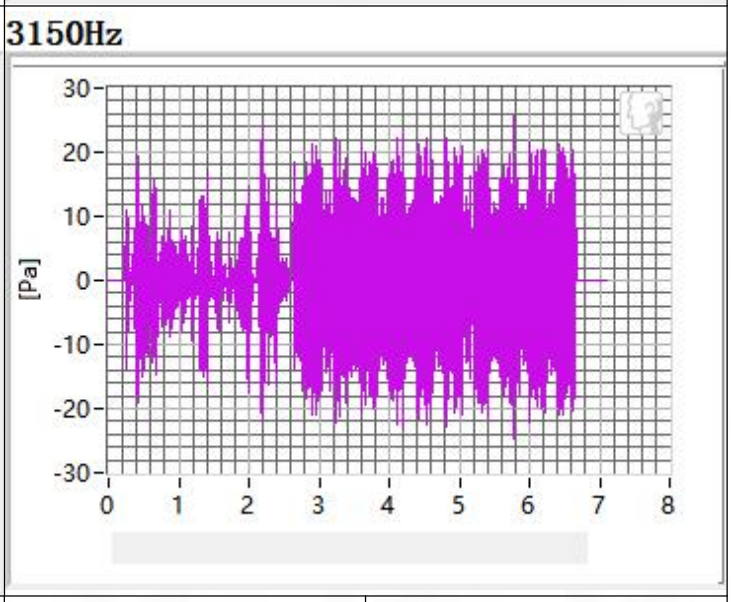

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



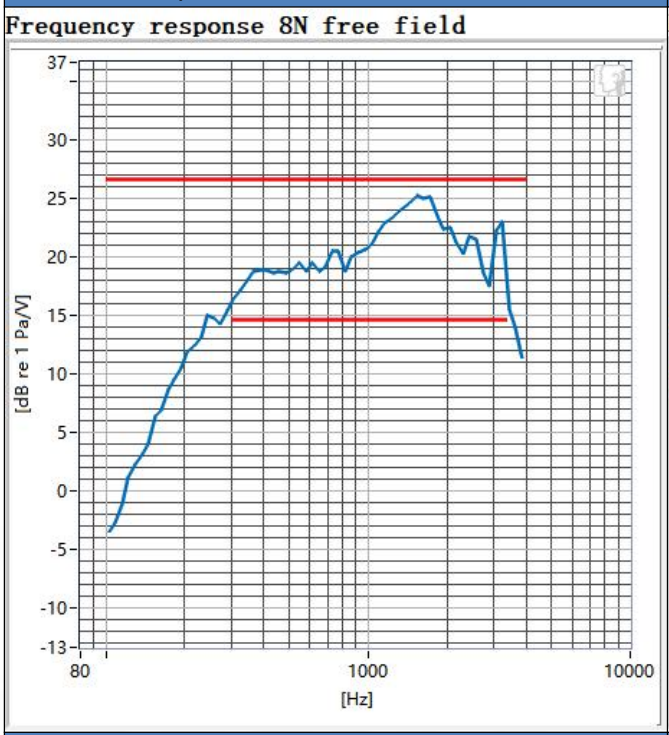
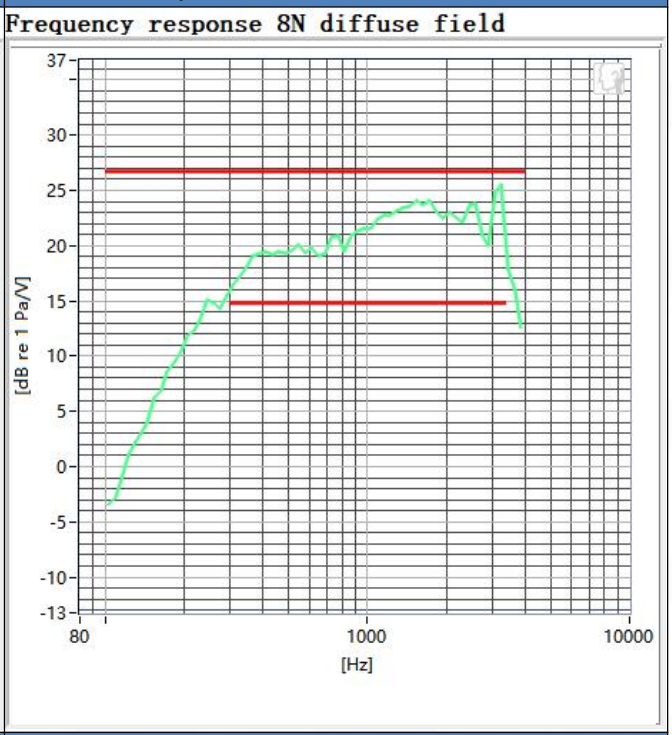
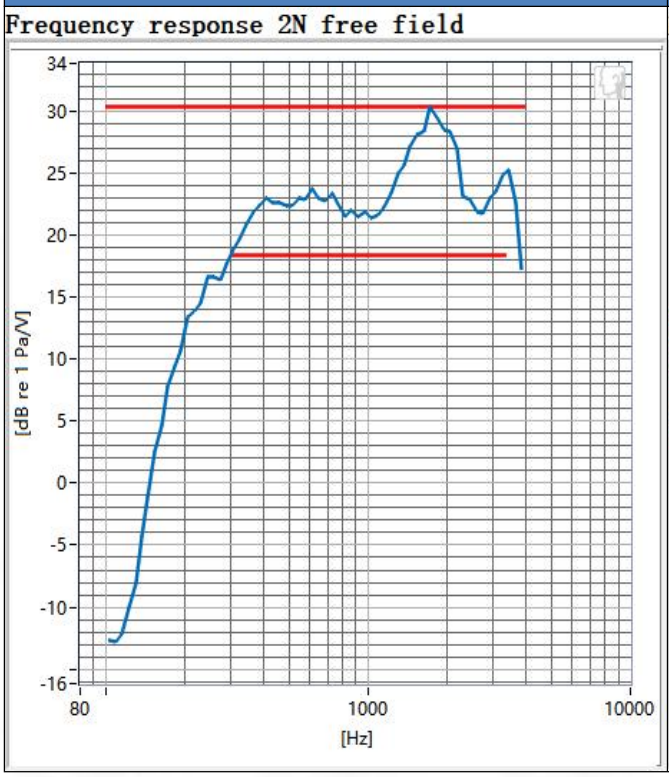
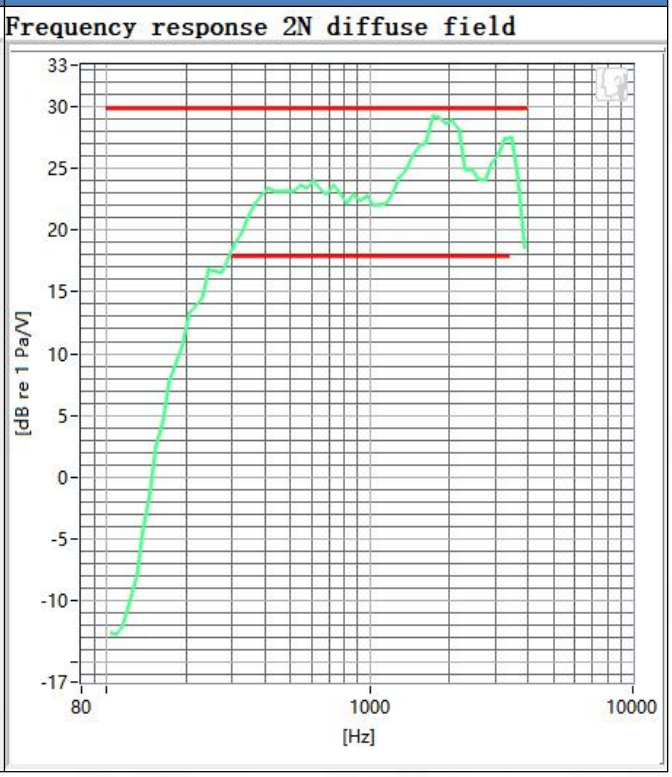

| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 29.25 dB | 1250Hz | 27.32 dB |
| 500Hz | 27.41 dB | 1600Hz | 27.60 dB |
| 630Hz | 28.04 dB | 2000Hz | 28.44 dB |
| 800Hz | 27.07 dB | 2500Hz | 22.85 dB |
| 1000Hz | 27.89 dB | 3150Hz | 21.38 dB |

All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 21.38 dB at 3150Hz.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 2.3 Receive Frequency Response

| Receive Resp FF 8N | Receive Resp DF 8N |
|---|---|
|  |  |
| **Receive Resp FF 2N** | **Receive Resp DF 2N** |
|  |  |

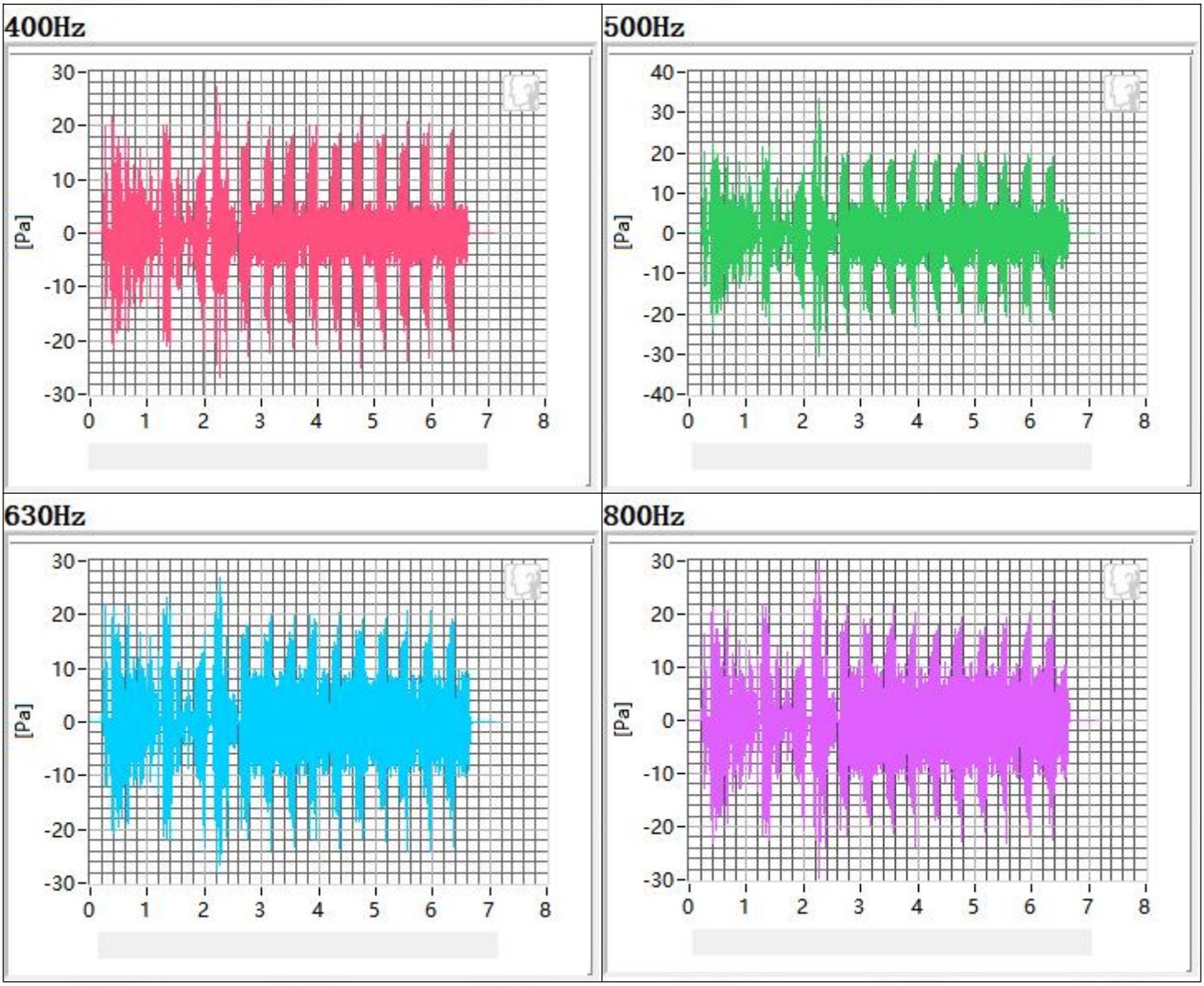


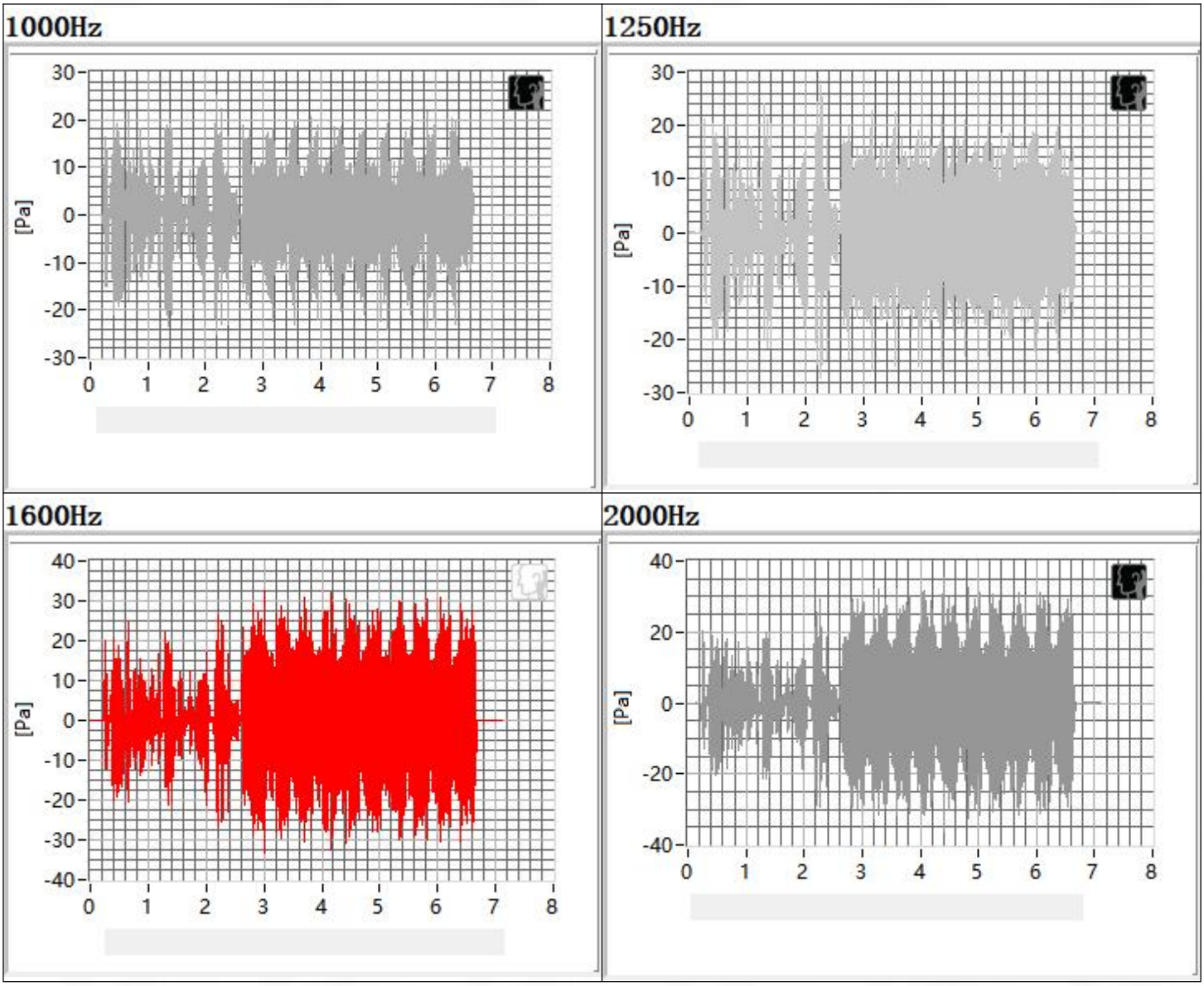
Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 3. LTE band 4 in channel 20300

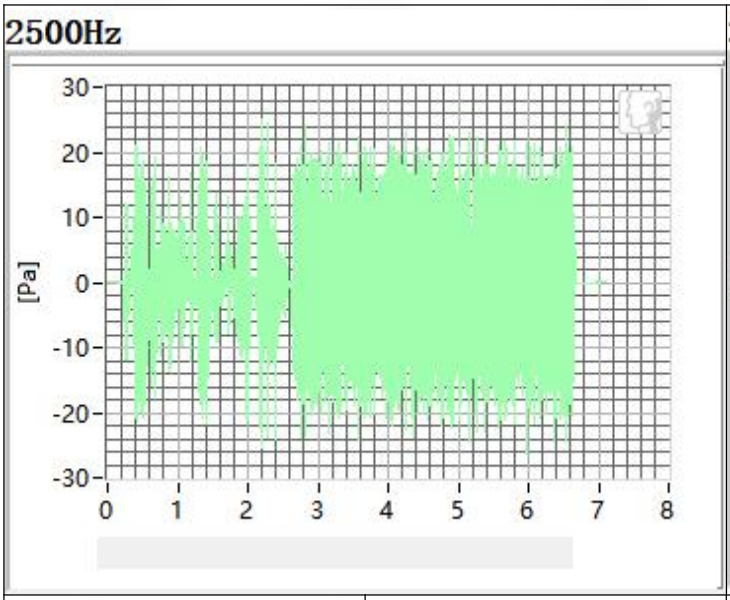
## 3.1 Receive Distortion and Noise 8N NB

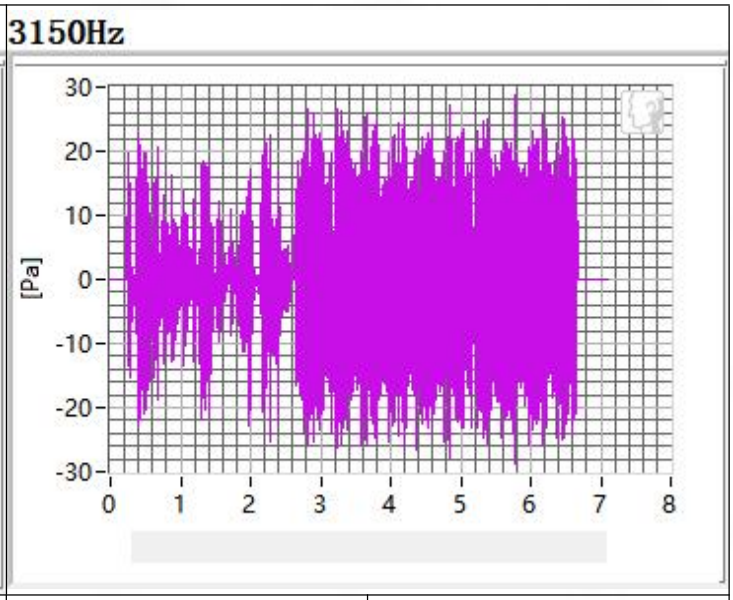





Total or partial reproduction of this document without permission of the Laboratory is not allowed.

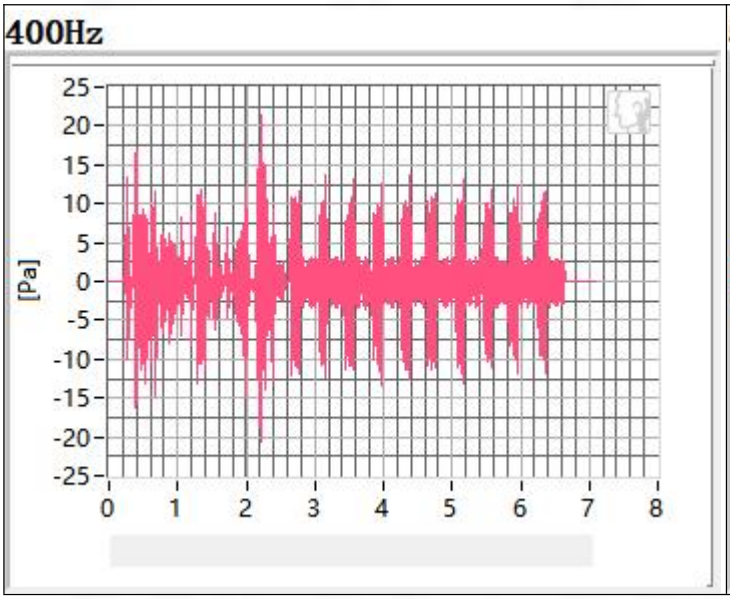
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

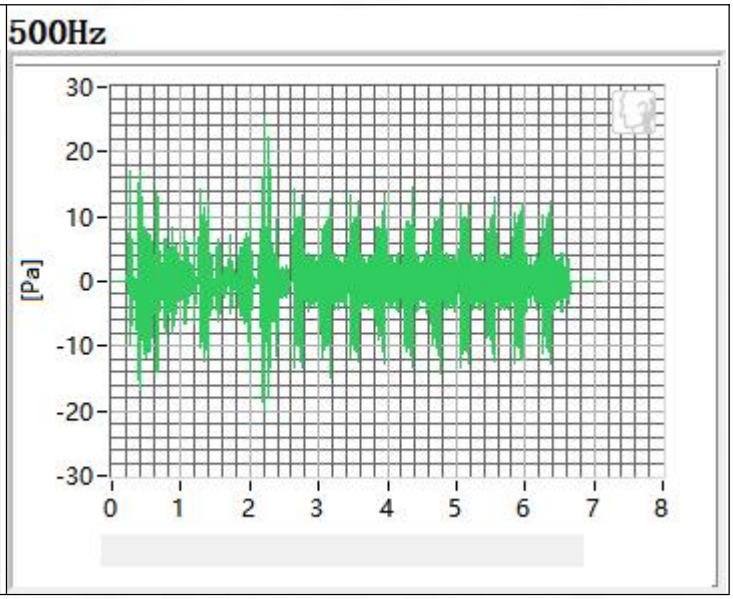



| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 28.67 dB | 1250Hz | 27.12 dB |
| 500Hz | 27.66 dB | 1600Hz | 31.20 dB |
| 630Hz | 25.78 dB | 2000Hz | 26.63 dB |
| 800Hz | 24.77 dB | 2500Hz | 22.68 dB |
| 1000Hz | 27.86 dB | 3150Hz | 21.60 dB |
| All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 21.60 dB at 3150 Hz. | | | |

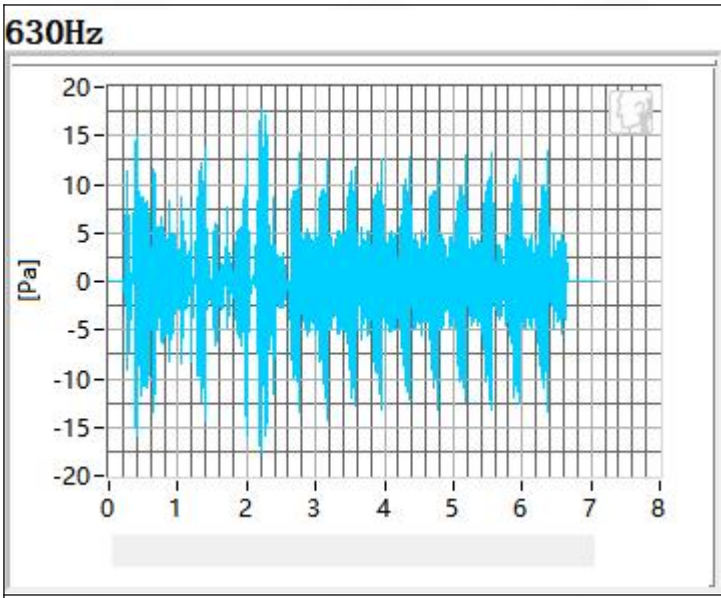
## 3.2 Receive Distortion and Noise 2N NB

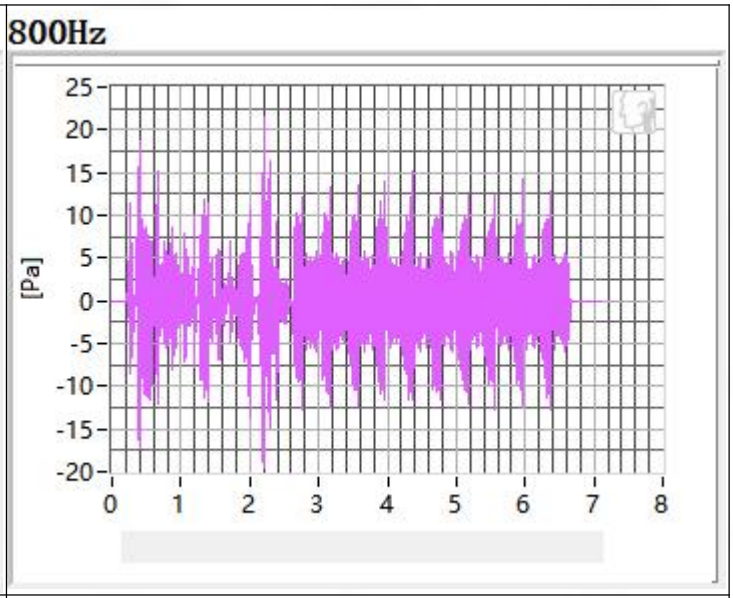


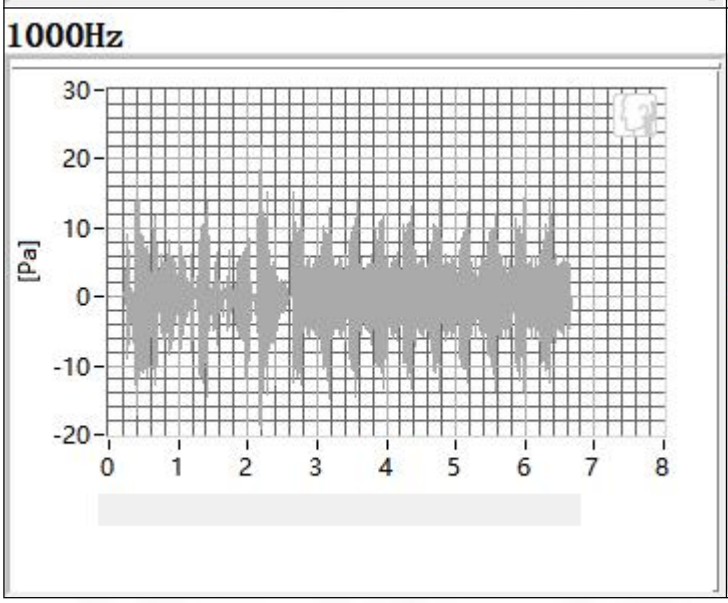



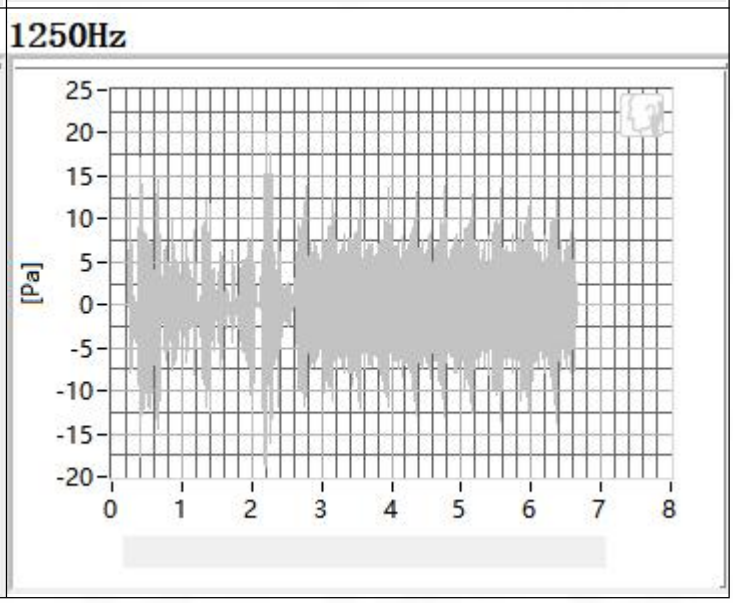

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



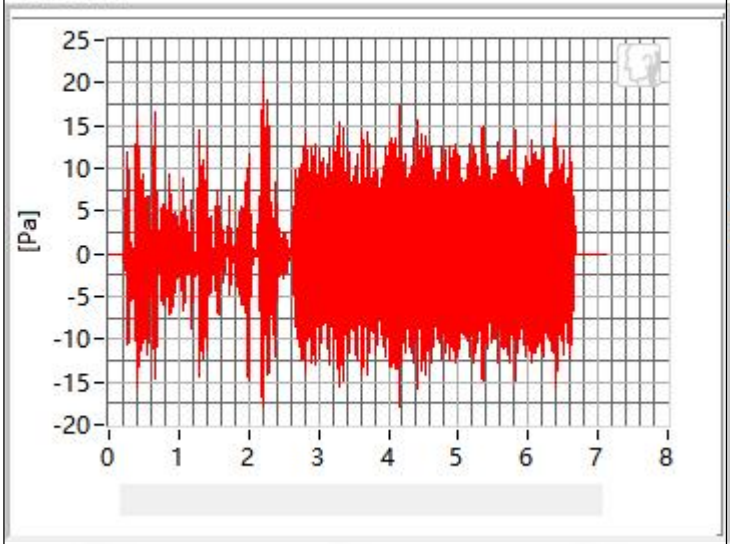



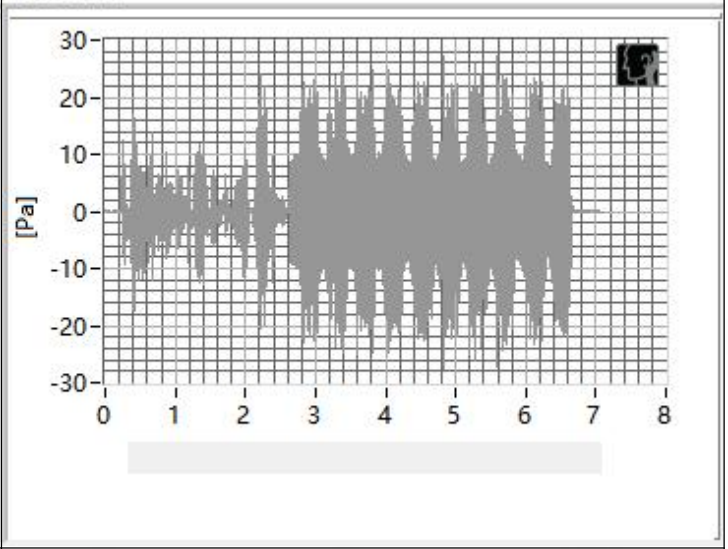

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

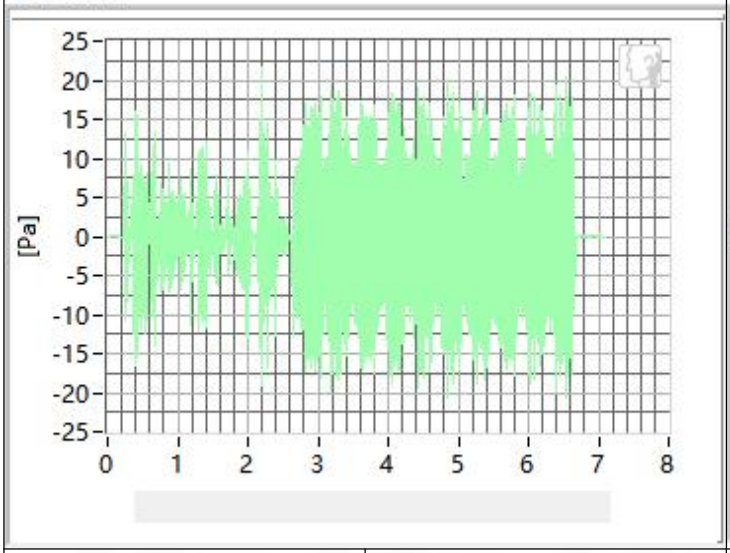
1600Hz



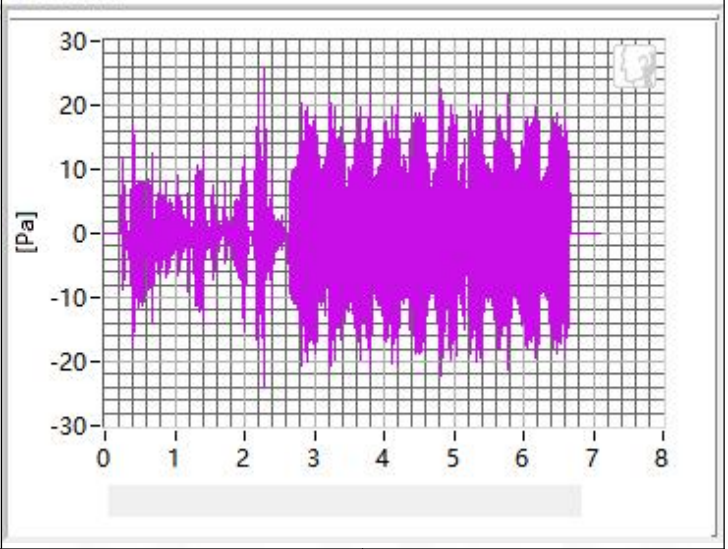

2000Hz




2500Hz




3150Hz



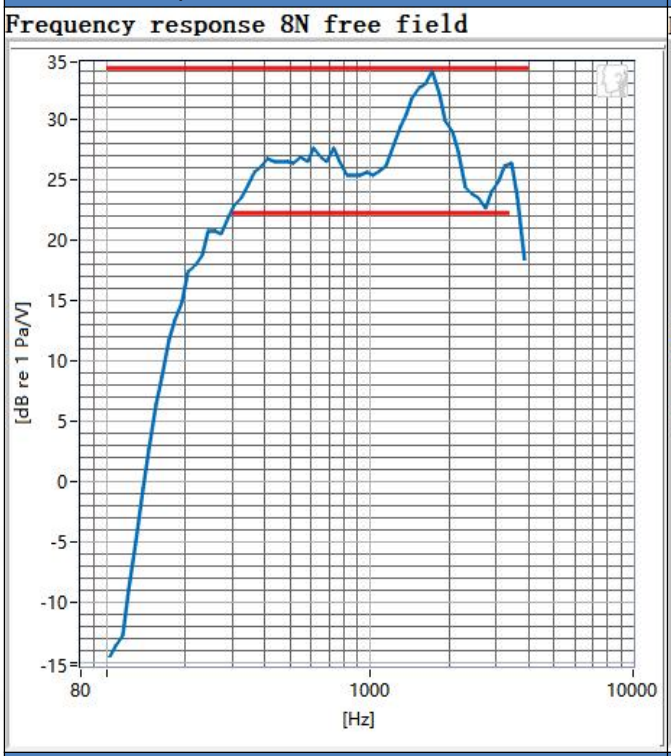
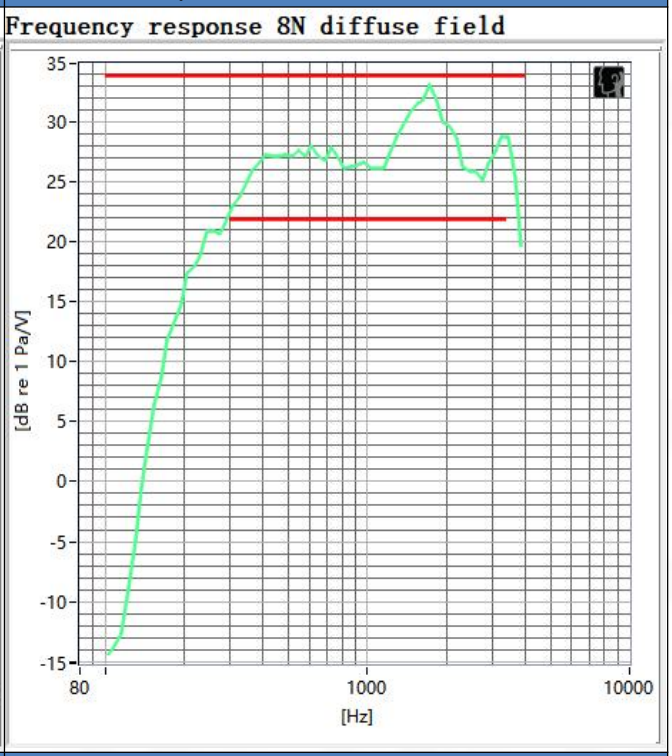

| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 29.49 dB | 1250Hz | 26.04 dB |
| 500Hz | 27.84 dB | 1600Hz | 27.90 dB |
| 630Hz | 26.69 dB | 2000Hz | 29.55 dB |
| 800Hz | 28.34 dB | 2500Hz | 22.83 dB |
| 1000Hz | 27.48 dB | 3150Hz | 21.82 dB |

All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 21.82 dB at 3150Hz.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

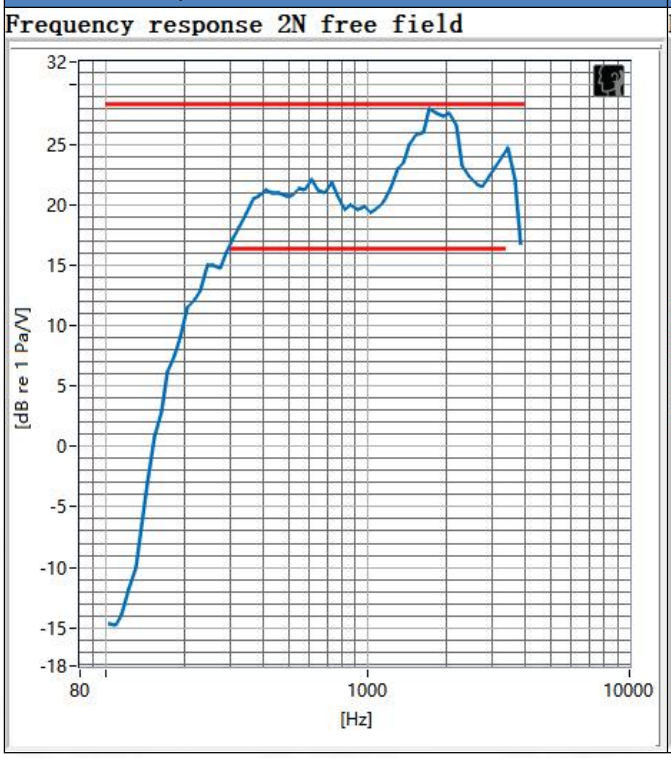
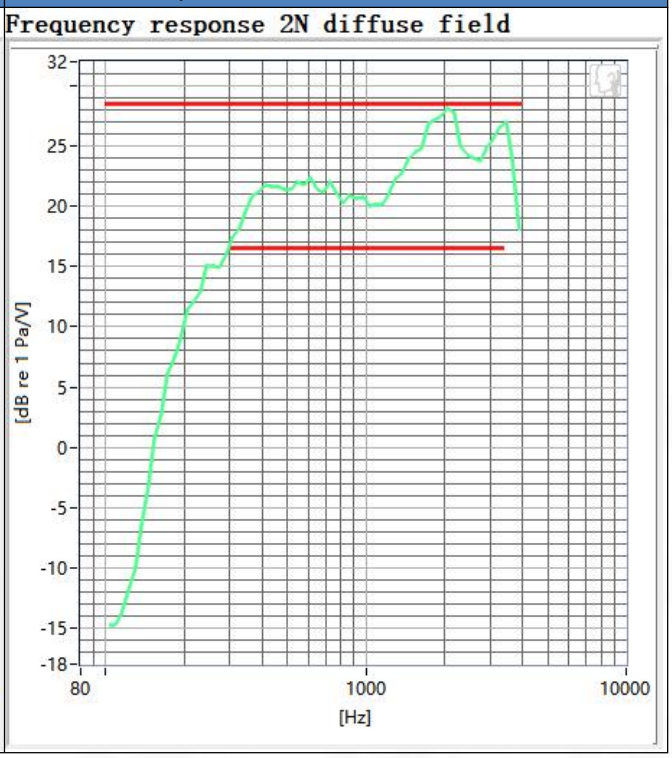
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 3.3 Receive Frequency Response

| Receive Resp FF 8N | Receive Resp DF 8N |
|---|---|
|  |  |





| Receive Resp FF 2N | Receive Resp DF 2N |
|---|---|
|  |  |



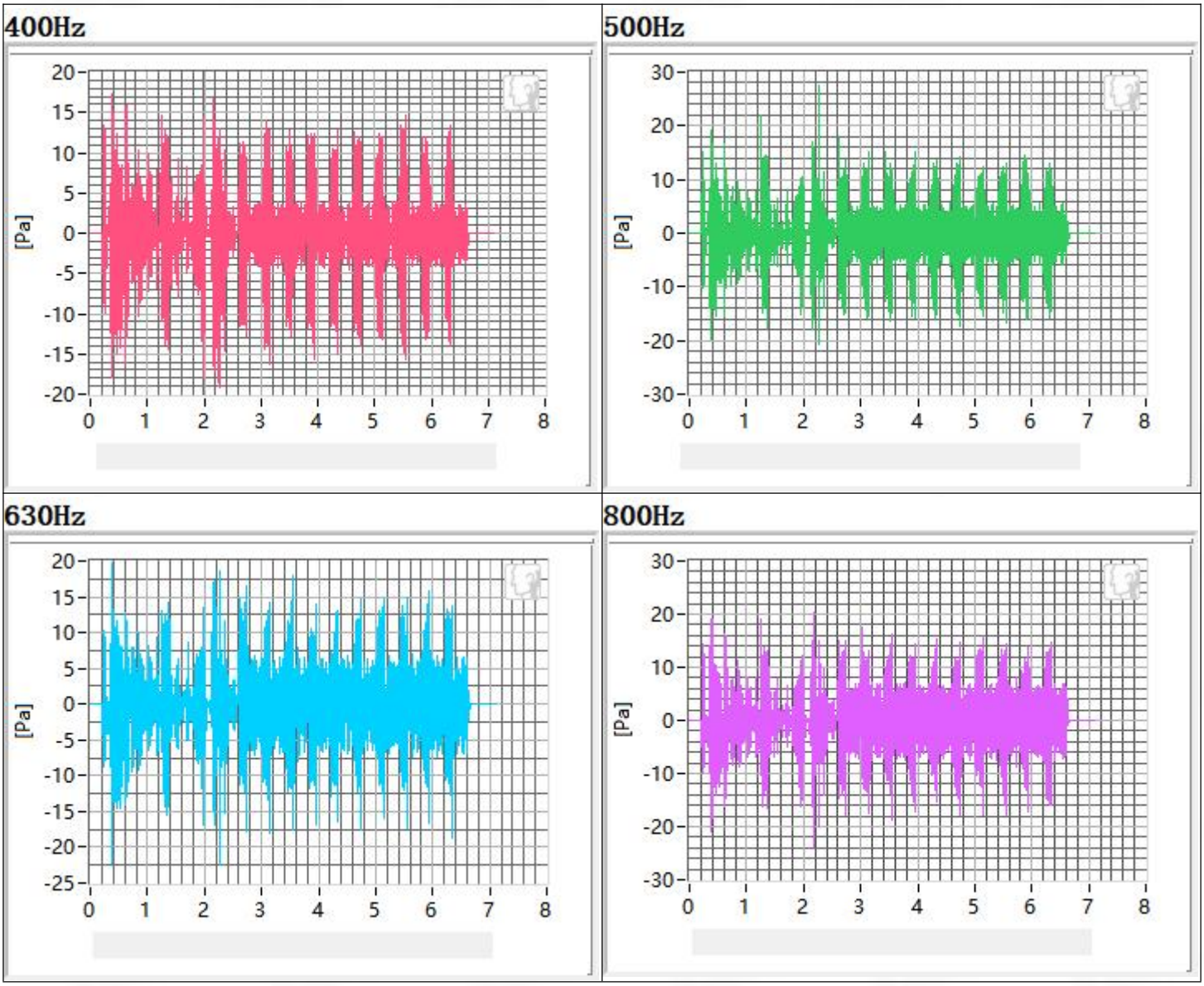


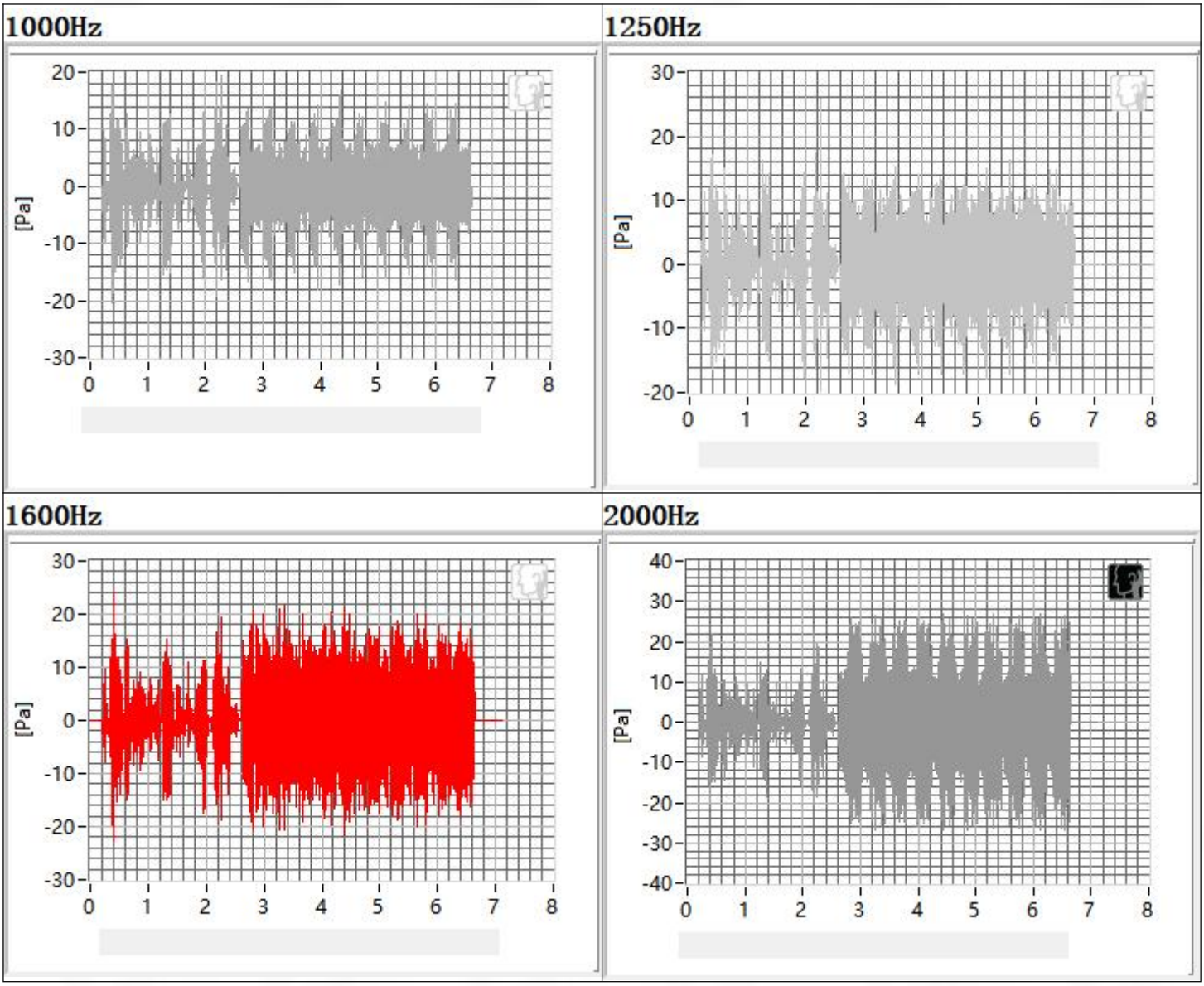
Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# 4. 2.4G WIFI in channel 1

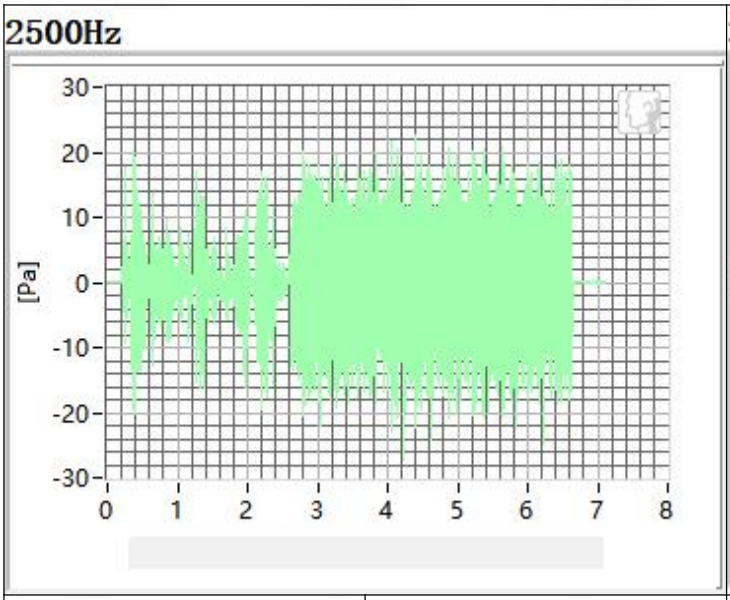
## 4.1 Receive Distortion and Noise 8N NB

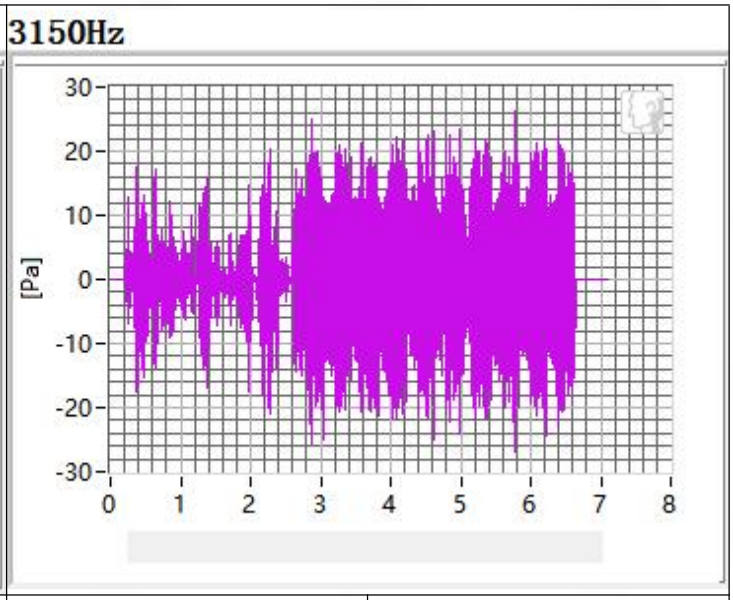





Total or partial reproduction of this document without permission of the Laboratory is not allowed.

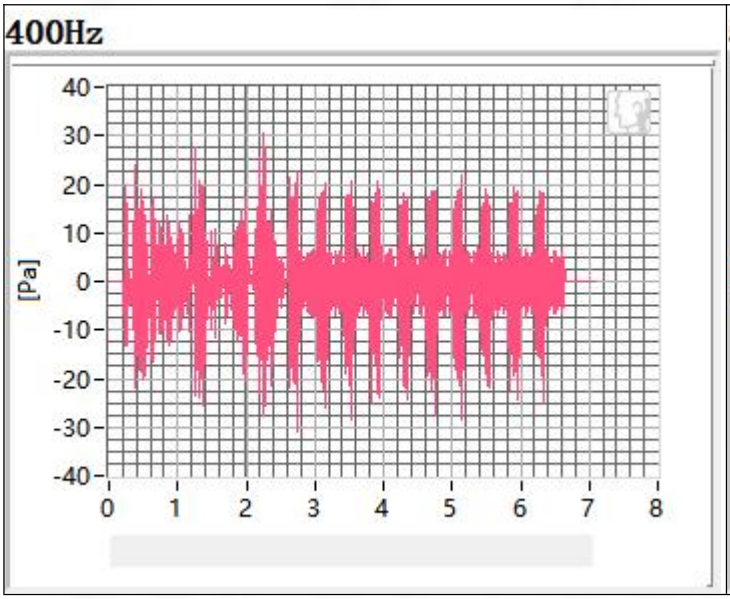
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

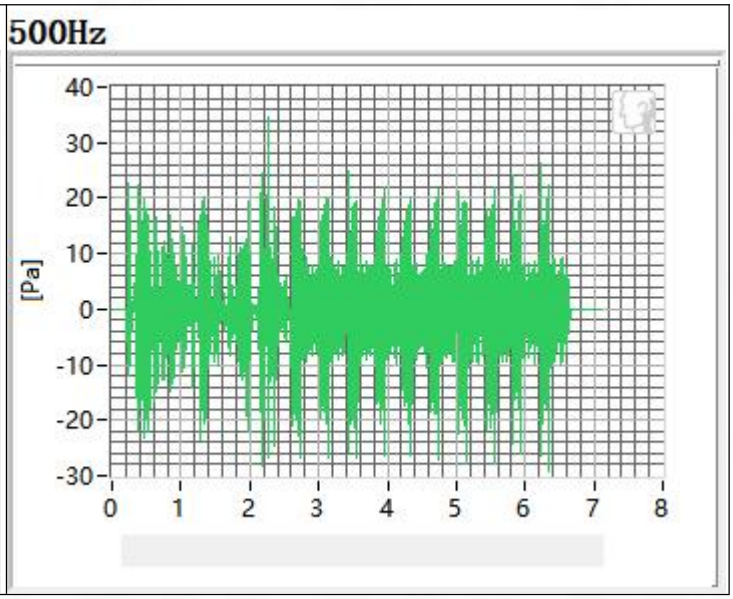



| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 26.37 dB | 1250Hz | 24.20 dB |
| 500Hz | 26.14 dB | 1600Hz | 26.33 dB |
| 630Hz | 25.46 dB | 2000Hz | 25.52 dB |
| 800Hz | 21.40 dB | 2500Hz | 22.11 dB |
| 1000Hz | 23.45 dB | 3150Hz | 21.05 dB |
| All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 21.05 dB at 3150Hz. | | | |

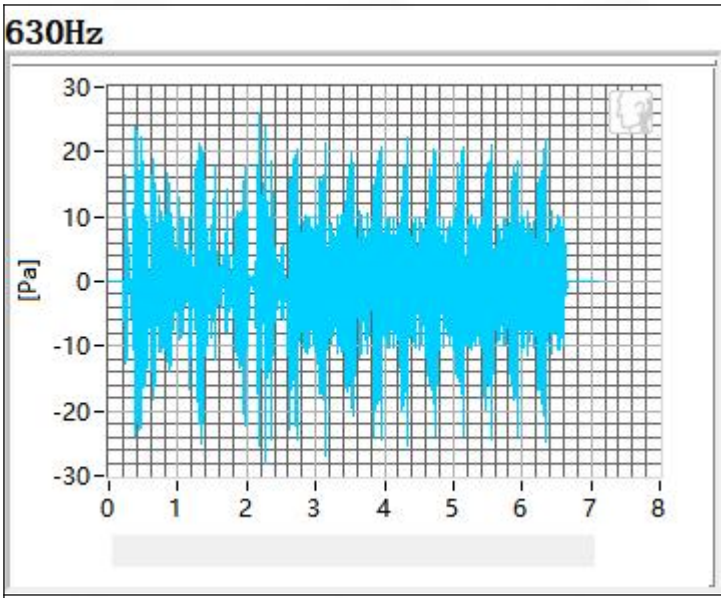
## 3.2 Receive Distortion and Noise 2N NB

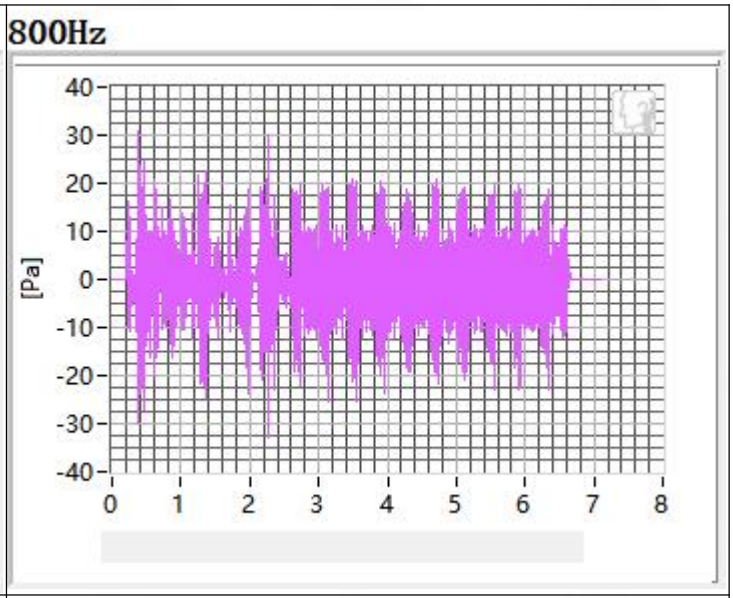


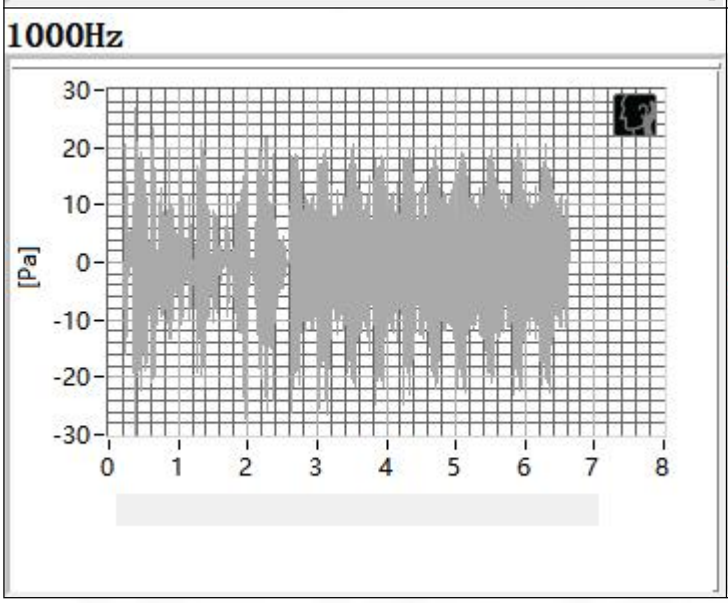



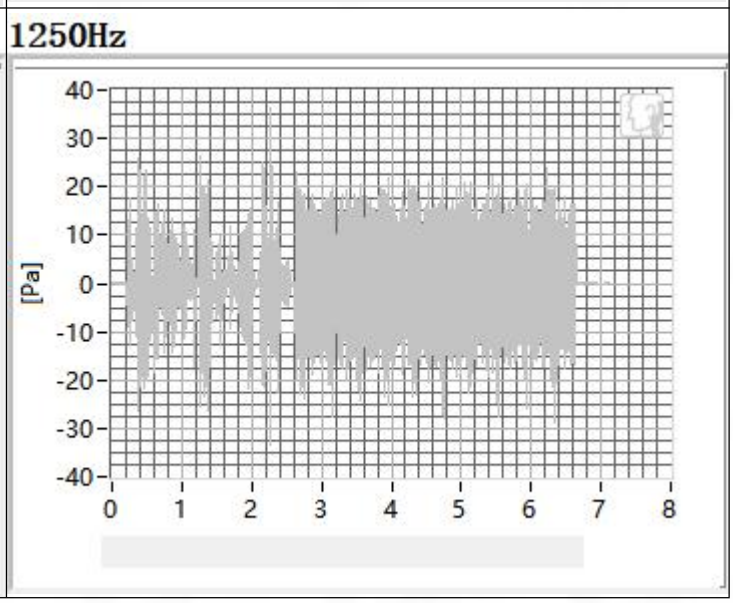

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



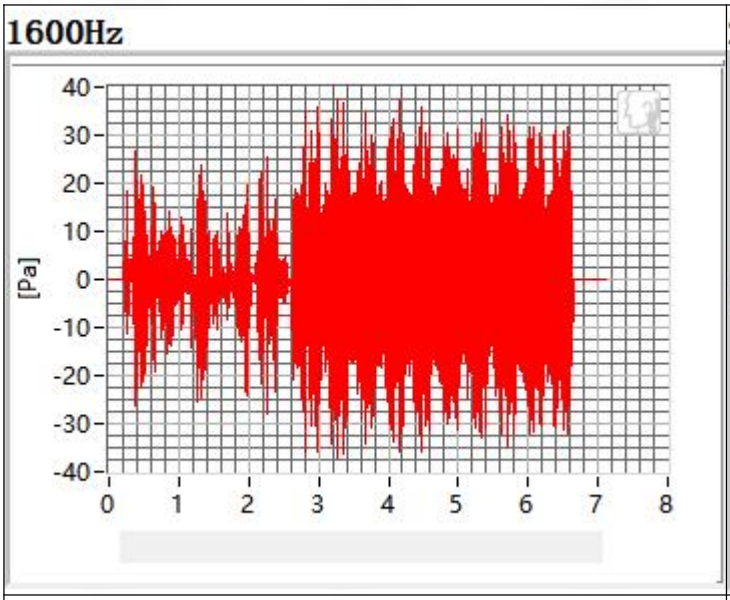



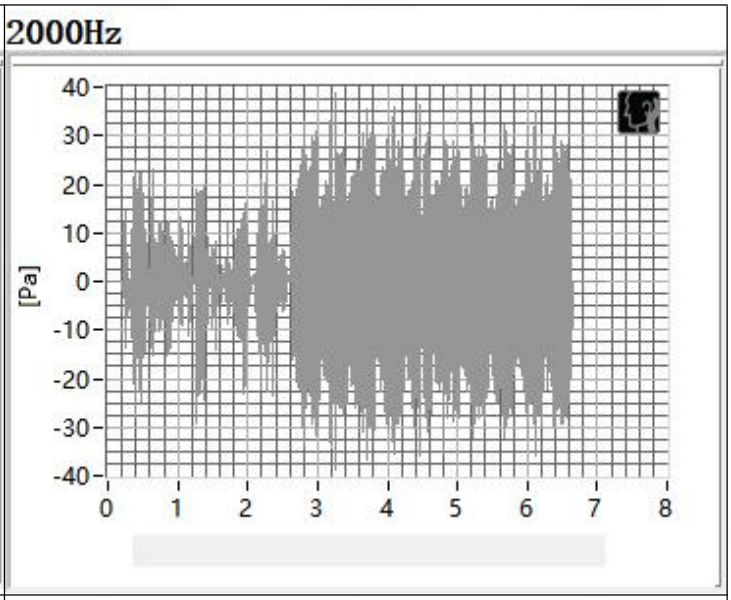



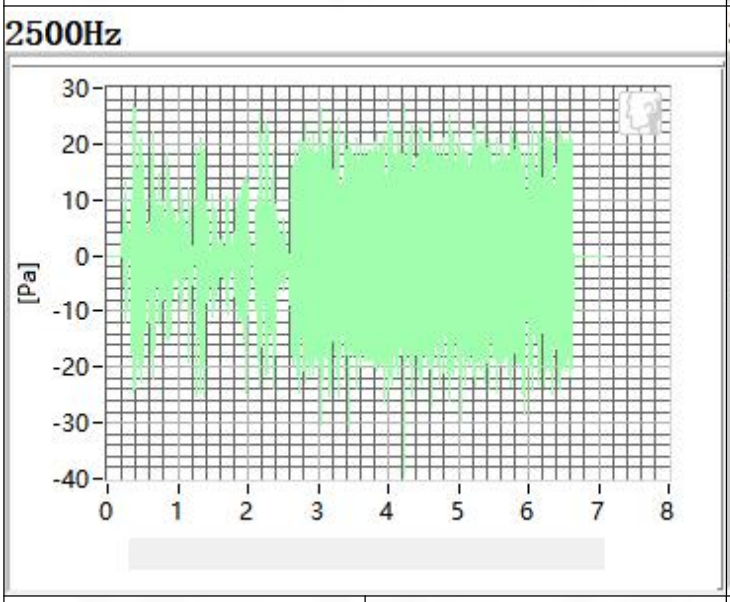



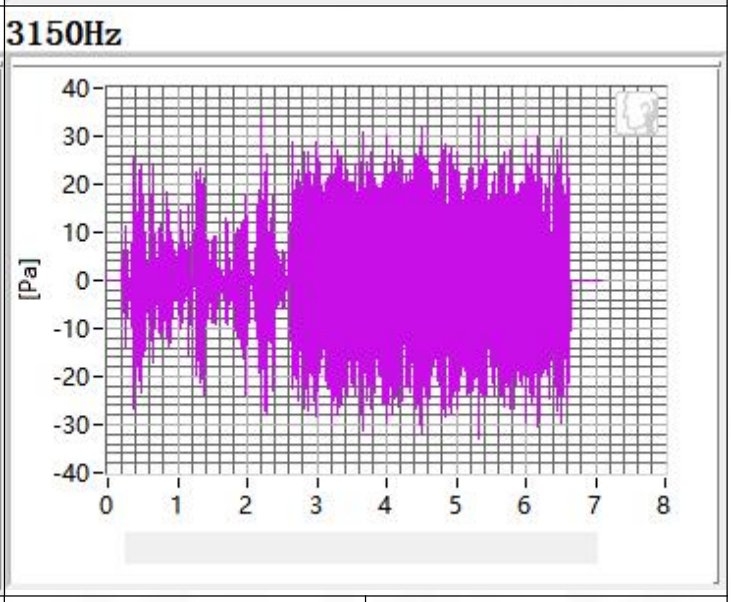

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China



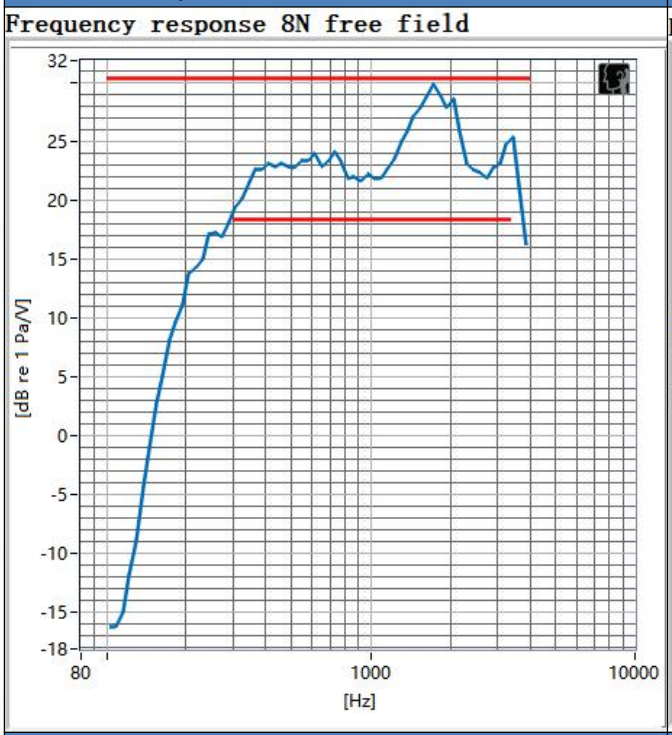
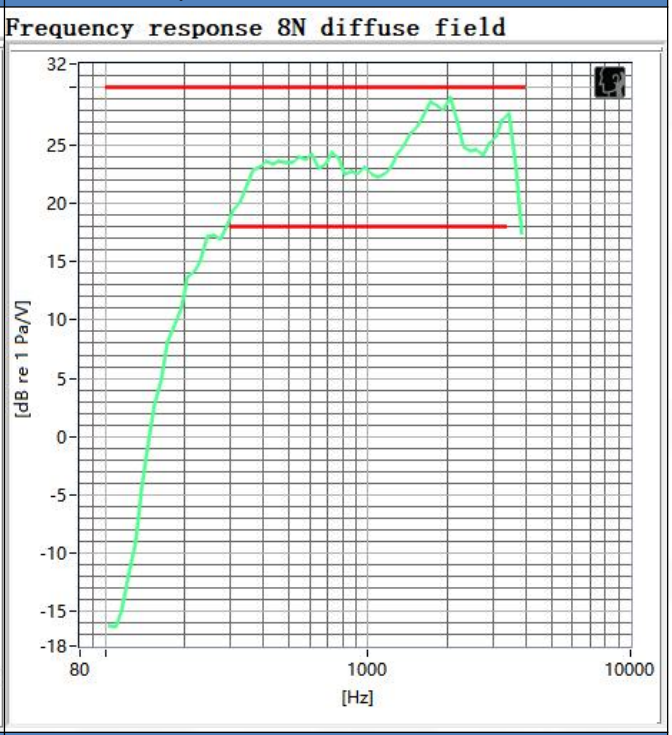

| Frequency | SDNR | Frequency | SDNR |
|---|---|---|---|
| 400Hz | 26.10 dB | 1250Hz | 24.28 dB |
| 500Hz | 24.93 dB | 1600Hz | 26.86 dB |
| 630Hz | 26.10 dB | 2000Hz | 21.79 dB |
| 800Hz | 22.21 dB | 2500Hz | 21.45 dB |
| 1000Hz | 21.78 dB | 3150Hz | 20.06 dB |

All SDNRs were greater than 20.0 dB, requirement was met. Smallest SDNR was 20.06 dB at 3150Hz.

Total or partial reproduction of this document without permission of the Laboratory is not allowed.

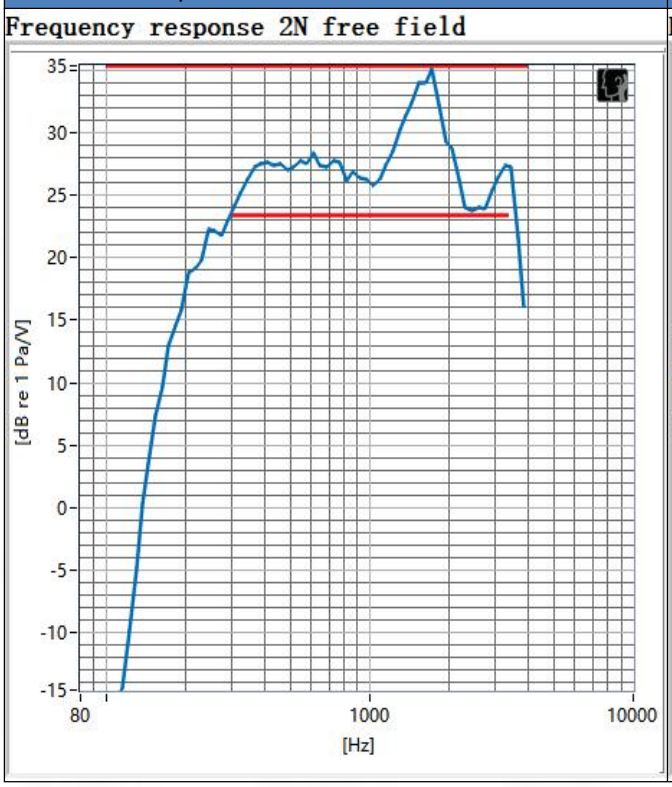
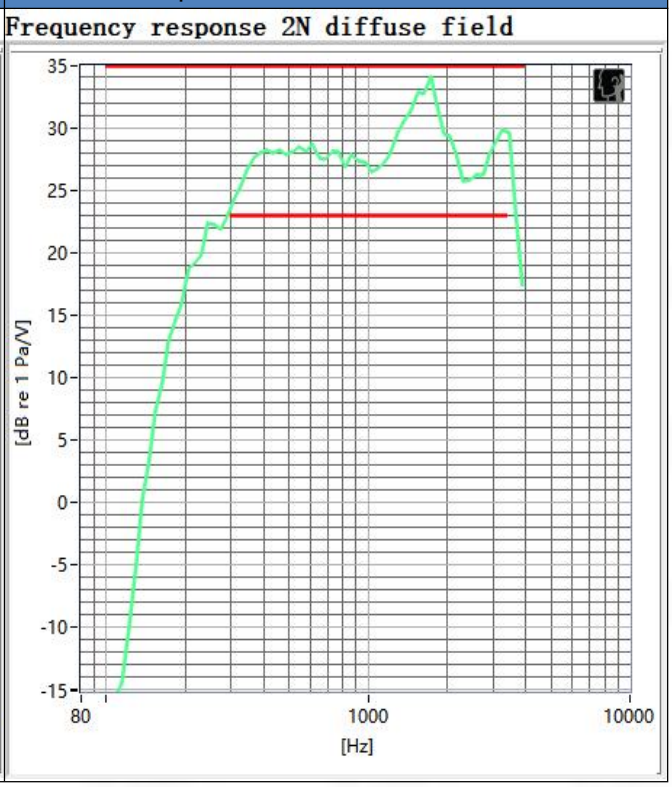
BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

## 3.3 Receive Frequency Response

| Receive Resp FF 8N | Receive Resp DF 8N |
|---|---|
|  |  |





| Receive Resp FF 2N | Receive Resp DF 2N |
|---|---|
|  |  |





Total or partial reproduction of this document without permission of the Laboratory is not allowed.

BTF Testing Lab (Shenzhen) Co., Ltd.
F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

# ANNEX B Test Setup Photo

| Reference Photo |
| --- |
| |

# ANNEX C CALIBRATION REPORT

Please refer the document “CALIBRATION REPORT.pdf”.

BTF Testing Lab (Shenzhen) Co., Ltd.

F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China

www.btf-lab.com

## --END OF REPORT--