

FCC PART 15E TEST REPORT FOR CERTIFICATION  
On Behalf of

Bang & Olufsen a/s

Audio Converter Box

Model Number: BeoSound Core

FCC ID: TTUBSCORE

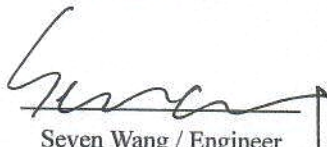
|                          |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| Applicant :              | Bang & Olufsen a/s                                                  |
| Address:                 | Peter Bangs Vej 15, 7600 Struer, Denmark                            |
|                          |                                                                     |
| Prepared By:             | EST Technology Co., Ltd.                                            |
|                          | Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China |
| Tel: 86-769-83081888-808 |                                                                     |

|                 |                       |
|-----------------|-----------------------|
| Report Number:  | ESTE-R2211045         |
| Date of Test:   | Sep. 20~Nov. 05, 2022 |
| Date of Report: | Nov. 07, 2022         |

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**EST Technology Co., Ltd.**

|                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                               |                       |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <b>Applicant:</b>                                                                                                                                                                                 | Bang & Olufsen a/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                               |                       |
| <b>Address:</b>                                                                                                                                                                                   | Peter Bangs Vej 15, 7600 Struer, Denmark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                               |                       |
| <b>Manufacturer:</b>                                                                                                                                                                              | Bang & Olufsen a/s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                               |                       |
| <b>Address:</b>                                                                                                                                                                                   | Peter Bangs Vej 15, 7600 Struer, Denmark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                               |                       |
| <b>E.U.T:</b>                                                                                                                                                                                     | Audio Converter Box                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                               |                       |
| <b>Model Number:</b>                                                                                                                                                                              | BeoSound Core                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                               |                       |
| <b>Power Supply:</b>                                                                                                                                                                              | DC 5V From USB Type C Adapter Input AC 100~240V 50/60Hz                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                               |                       |
| <b>Trade Name:</b>                                                                                                                                                                                | Bang & Olufsen                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Serial No.:</b>                                                                                                            | -----                 |
| <b>Date of Receipt:</b>                                                                                                                                                                           | Sep. 20, 2022                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <b>Date of Test:</b>                                                                                                          | Sep. 20~Nov. 05, 2022 |
| <b>Test Specification:</b>                                                                                                                                                                        | FCC Part 15 Subpart E 15.407<br>ANSI C63.10:2013<br>FCC KDB 789033 D02 General UNII Test Procedures New Rules v02r01<br>FCC KDB 662911 D01 Multiple Transmitter Output v02r01                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                               |                       |
| <b>Test Result:</b>                                                                                                                                                                               | <p>The device described above is tested by EST Technology Co., Ltd. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart E requirements.</p> <p>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p> |                                                                                                                               |                       |
| <b>Prepared by:</b>                                                                                                                                                                               | <b>Reviewed by:</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>Date:</b> Nov. 07, 2022                                                                                                    |                       |
| <br>Ring Yang / Assistant                                                                                      | <br>Seven Wang / Engineer                                                                                                                                                                                                                                                                                                                                                                                                                                  | <br>Approved by:<br>Ice-man Hu / Manager |                       |
| <b>Other Aspects:</b>                                                                                                                                                                             | This report base on the previous report with report number: C170503Z04-RP1-1, Change the power supply management IC and circuit of the RF module, and change the module model to stream810H3, So only need re-tested spurious emissions (30MHz-1GHz)、conducted emissions, other test item needn't re-tested.                                                                                                                                                                                                                                  |                                                                                                                               |                       |
| Abbreviations: OK/P=passed    fail/F=failed    n.a/N=not applicable    E.U.T=equipment under tested                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                               |                       |
| This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                               |                       |

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

|                     |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|---------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FCC ID              | : | TTUBSCORE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Product Name        | : | Audio Converter Box                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Model Number        | : | BeoSound Core                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Software Version    | : | v4.0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Hardware Version    | : | v4.0.1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Operation frequency | : | U-NII-1: 5150 MHz~5250 MHz<br>U-NII-2A: 5250 MHz~5350 MHz<br>U-NII-2C: 5470 MHz~5600 MHz & 5650 MHz~5725 MHz<br>U-NII-3: 5725 MHz~5850 MHz                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Number of channel   | : | U-NII-1:<br>IEEE 802.11a / n HT20 / ac VHT20: 4 Channels;<br>IEEE 802.11n HT40 / ac VHT40: 2 Channels;<br>IEEE 802.11ac VHT80: 1 Channel.<br>U-NII-2A:<br>IEEE 802.11a / n HT20 / ac VHT20: 4 Channels;<br>IEEE 802.11n HT40 / ac VHT40: 2 Channels;<br>IEEE 802.11ac VHT80: 1 Channel.<br>U-NII-2C:<br>IEEE 802.11a / n HT20 / ac VHT20: 8 Channels;<br>IEEE 802.11n HT40 / ac VHT40: 3 Channels;<br>IEEE 802.11ac VHT80: 1 Channel.<br>U-NII-3:<br>IEEE 802.11a / n HT20 / ac VHT20: 5 Channels;<br>IEEE 802.11n HT40 / ac VHT40: 2 Channels;<br>IEEE 802.11ac VHT80: 1 Channel. |
| Modulation          | : | OFDM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Transmit Data Rate  | : | IEEE 802.11a: 54, 48, 36, 24, 18, 12, 9, 6Mbps;<br>IEEE 802.11n: up to 150Mbps;<br>IEEE 802.11ac: up to 433.3Mbps;                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Channels Spacing    | : | IEEE 802.11a: 20MHz;<br>IEEE 802.11n HT20: 20MHz;<br>IEEE 802.11n HT40: 40MHz;<br>IEEE 802.11ac VHT20: 20MHz;<br>IEEE 802.11ac VHT40: 40MHz;<br>IEEE 802.11ac VHT80: 80MHz;                                                                                                                                                                                                                                                                                                                                                                                                        |
| Transmit Power      | : | Prototype production                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

## 1.2. The antenna information for EUT

| Ant No. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) |
|---------|-------|------------|--------------|-----------|------------|
| 0       | -     | -          | Integral     | -         | 5.4        |
| 1       | -     | -          | Integral     | -         | 5.8        |

Remark:

- (1) After pre-test all antenna configurations, the worst case configuration as list below.  
 (2) This information is provided by the applicant.

| ANT No.<br>TX Mode  | SISO Configuration | MIMO Configuration |
|---------------------|--------------------|--------------------|
| IEEE 802.11a        | ANT 0 and Ant 1    | /                  |
| IEEE 802.11n HT20   | /                  | ANT0+ANT1          |
| IEEE 802.11n HT40   | /                  | ANT0+ANT1          |
| IEEE 802.11ac VHT20 | /                  | ANT0+ANT1          |
| IEEE 802.11ac VHT40 | /                  | ANT0+ANT1          |
| IEEE 802.11ac VHT80 | /                  | ANT0+ANT1          |

## 2. SUMMARY OF TEST

### 2.1. Summary of test result

| No. | Description of Test Item                                | FCC Standard Section          | Results |
|-----|---------------------------------------------------------|-------------------------------|---------|
| 1   | 6dB Bandwidth & 26dB Bandwidth & 99% Occupied Bandwidth | 15.407(a)<br>15.407(e)        | N/A     |
| 2   | Maximum Conducted Output Power                          | 15.407(a)                     | N/A     |
| 3   | Peak Power Spectral Density                             | 15.407(a)                     | N/A     |
| 4   | Unwanted Emissions and Band Edge                        | 15.205<br>15.209<br>15.407(b) | PASS    |
| 5   | Frequency Stability                                     | 15.407(g)                     | N/A     |
| 6   | AC Power Line Conducted Emissions                       | 15.207<br>15.407(b)(9)        | PASS    |
| 7   | Antenna Requirement                                     | 15.203                        | N/A     |

Note: "N/A" denotes test is not applicable in this test report.

## 2.2. Test Facilities

EMC Lab : Certificated by CNAS, CHINA  
Registration No.: L5288  
This Certificate is valid until: November 12, 2023

Certificated by FCC, USA  
Designation Number: CN1215  
This Certificate is valid until: January 31, 2024

Certificated by A2LA, USA  
Registration No.: 4366.01  
This Certificate is valid until: January 31, 2024

Certificated by Industry Canada  
CAB identifier No.: CN0035  
This Certificate is valid until: January 31, 2024

Certificated by VCCI, Japan  
Registration No.: C-14103; T-20073; R-13663;  
R-20103; G-20097  
Date of registration: Apr. 20, 2020  
This Certificate is valid until: Apr. 19, 2023

Certificated by TUV Rheinland, Germany  
Registration No.: UA 50413872 0001  
Date of registration: July 31, 2018

Certificated by Intertek  
Registration No.: 2011-RTL-L2-64  
Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,  
Guangdong, China



### 2.3. Measurement uncertainty for EST Technology Co., Ltd.

| Test Item                                                   | Uncertainty |
|-------------------------------------------------------------|-------------|
| Uncertainty for Conduction emission test                    | 2.54dB      |
| Uncertainty for spurious emissions test<br>(Below 30MHz)    | ±1.62 dB    |
| Uncertainty for Radiation Emission test<br>(30MHz-1GHz)     | 3.62        |
| Uncertainty for Radiation Emission test<br>(1GHz to 18GHz)  | 4.86        |
| Uncertainty for spurious emissions test<br>(18GHz to 40GHz) | 4.67        |
| Uncertainty for radio frequency                             | 7×10-8      |
| Uncertainty for conducted RF Power                          | 1.08dB      |
| Uncertainty for Power density test                          | 0.26dB      |
| Temperature                                                 | ±0.6°C      |
| Humidity                                                    | ±4.0 %      |
| Volatage DC                                                 | ±1.0%       |
| Volatage (AC, <10KHz)                                       | ±1.5%       |

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

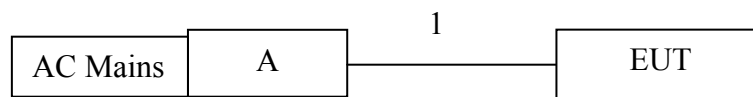
### 2.4. Assistant equipment used for test

| Item | Equipment | Brand | Model Name/Type No. | FCC ID | Series No. |
|------|-----------|-------|---------------------|--------|------------|
| A    | Adapter   | -     | DSA-45PDH           | -      | -          |

| Item | Shielded Type | Ferrite Core | Length | Note      |
|------|---------------|--------------|--------|-----------|
| 1    | -             | -            | 1.2m   | USB Cable |

### 2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground.



(EUT: Audio Converter Box)



## 2.6. Test Mode

Pre-scan has been combined all possible modulations and data rates to determine the worst case test mode, the worst case test mode was selected for the final test as listed below.

| Test Item                         | Test Mode         | Channel | Modulation | Data rate |
|-----------------------------------|-------------------|---------|------------|-----------|
| Unwanted Emissions Below 1GHz     | IEEE 802.11n HT20 | 100     | OFDM       | MCS0      |
| AC Power Line Conducted Emissions | IEEE 802.11n HT20 | 100     | OFDM       | MCS0      |

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

## 2.7. Channel List

| Band     | Mode                             | Channel | Frequency (MHz) |
|----------|----------------------------------|---------|-----------------|
| U-NII-1  | IEEE 802.11a & n HT20 & ac VHT20 | 36      | 5180            |
|          |                                  | 40      | 5200            |
|          |                                  | 44      | 5220            |
|          |                                  | 48      | 5240            |
|          | IEEE 802.11n HT40 & ac VHT40     | 38      | 5190            |
|          |                                  | 46      | 5230            |
|          | IEEE 802.11ac VHT80              | 42      | 5210            |
| U-NII-2A | IEEE 802.11a & n HT20 & ac VHT20 | 52      | 5260            |
|          |                                  | 56      | 5280            |
|          |                                  | 60      | 5300            |
|          |                                  | 64      | 5320            |
|          | IEEE 802.11n HT40 & ac VHT40     | 54      | 5270            |
|          |                                  | 62      | 5310            |
|          | IEEE 802.11ac VHT80              | 58      | 5290            |
| U-NII-2C | IEEE 802.11a & n HT20 & ac VHT20 | 100     | 5500            |
|          |                                  | 104     | 5520            |
|          |                                  | 108     | 5540            |
|          |                                  | 112     | 5560            |
|          |                                  | 116     | 5580            |
|          |                                  | 132     | 5660            |
|          |                                  | 136     | 5680            |
|          |                                  | 140     | 5700            |
|          | IEEE 802.11n HT40 & ac VHT40     | 102     | 5510            |
|          |                                  | 110     | 5550            |
|          |                                  | 134     | 5670            |
|          | IEEE 802.11ac VHT80              | 106     | 5530            |
| U-NII-3  | IEEE 802.11a & n HT20 & ac VHT20 | 149     | 5745            |
|          |                                  | 153     | 5765            |
|          |                                  | 157     | 5785            |
|          |                                  | 161     | 5805            |
|          |                                  | 165     | 5825            |
|          | IEEE 802.11n HT40 & ac VHT40     | 151     | 5755            |
|          |                                  | 159     | 5795            |
|          | IEEE 802.11ac VHT80              | 155     | 5775            |

## 2.8. Test Equipment List

| For AC power conducted emissions test |                 |              |            |                  |            |           |
|---------------------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment                             | Manufacturer    | Model No.    | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| EMI Test Receiver                     | Rohde & Schwarz | ESHS30       | EST-E001   | LISAI            | June 13,22 | 1 Year    |
| Artificial Mains Network              | Rohde & Schwarz | ENV216       | EST-E002   | LISAI            | June 13,22 | 1 Year    |
| Pulse Limiter                         | Rohde & Schwarz | ESH3-Z2      | EST-E078   | LISAI            | June 13,22 | 1 Year    |
| Test Software                         | Audix           | e3-6.111221a | N/A        | N/A              | N/A        | N/A       |

| For radiated emissions test(9KHz-30MHz) |                 |              |            |                  |            |           |
|-----------------------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment                               | Manufacturer    | Model No.    | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| EMI Test Receiver                       | Rohde & Schwarz | ESR7         | EST-E047   | LISAI            | June 13,22 | 1 Year    |
| Active Loop Antenna                     | SCHWABE ECK     | FMZB 1519B   | EST-E054   | LISAI            | June 13,22 | 1 Year    |
| Test Software                           | Audix           | e3-6.111221a | N/A        | N/A              | N/A        | N/A       |
| 9kHz-30MHz Cable                        | N/A             | EST-001      | N/A        | N/A              | N/A        | N/A       |

| For radiated emissions test(30MHz-1000MHz) |                 |              |            |                  |            |           |
|--------------------------------------------|-----------------|--------------|------------|------------------|------------|-----------|
| Equipment                                  | Manufacturer    | Model No.    | Serial No. | Calibration Body | Last Cal.  | Next Cal. |
| EMI Test Receiver                          | Rohde & Schwarz | ESR7         | EST-E047   | LISAI            | June 13,22 | 1 Year    |
| Bilog Antenna                              | Teseq           | CBL 6111D    | EST-E034   | LISAI            | June 13,22 | 1 Year    |
| Test Software                              | Audix           | e3-6.111221a | N/A        | N/A              | N/A        | N/A       |
| 30-1000MHz Cable                           | N/A             | EST-002      | N/A        | N/A              | N/A        | N/A       |

### 3. UNWANTED EMISSIONS AND BAND EDGE

#### 3.1. Limit

The maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of  $-27$  dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of  $-27$  dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

The unwanted emissions which fall in Restricted bands shall not exceed the field strength levels specified in the following table:

15.209 Radiated emission limits

| Frequency (MHz) | Field Strength( $\mu$ V/m) | Distance(m) |
|-----------------|----------------------------|-------------|
| 0.009-0.490     | 2400/F(kHz)                | 300         |
| 0.490-1.705     | 24000/F(kHz)               | 30          |
| 1.705-30        | 30                         | 30          |
| 30-88           | 100                        | 3           |
| 88-216          | 150                        | 3           |
| 216-960         | 200                        | 3           |
| Above 960       | 500                        | 3           |

15.205 Restricted frequency band

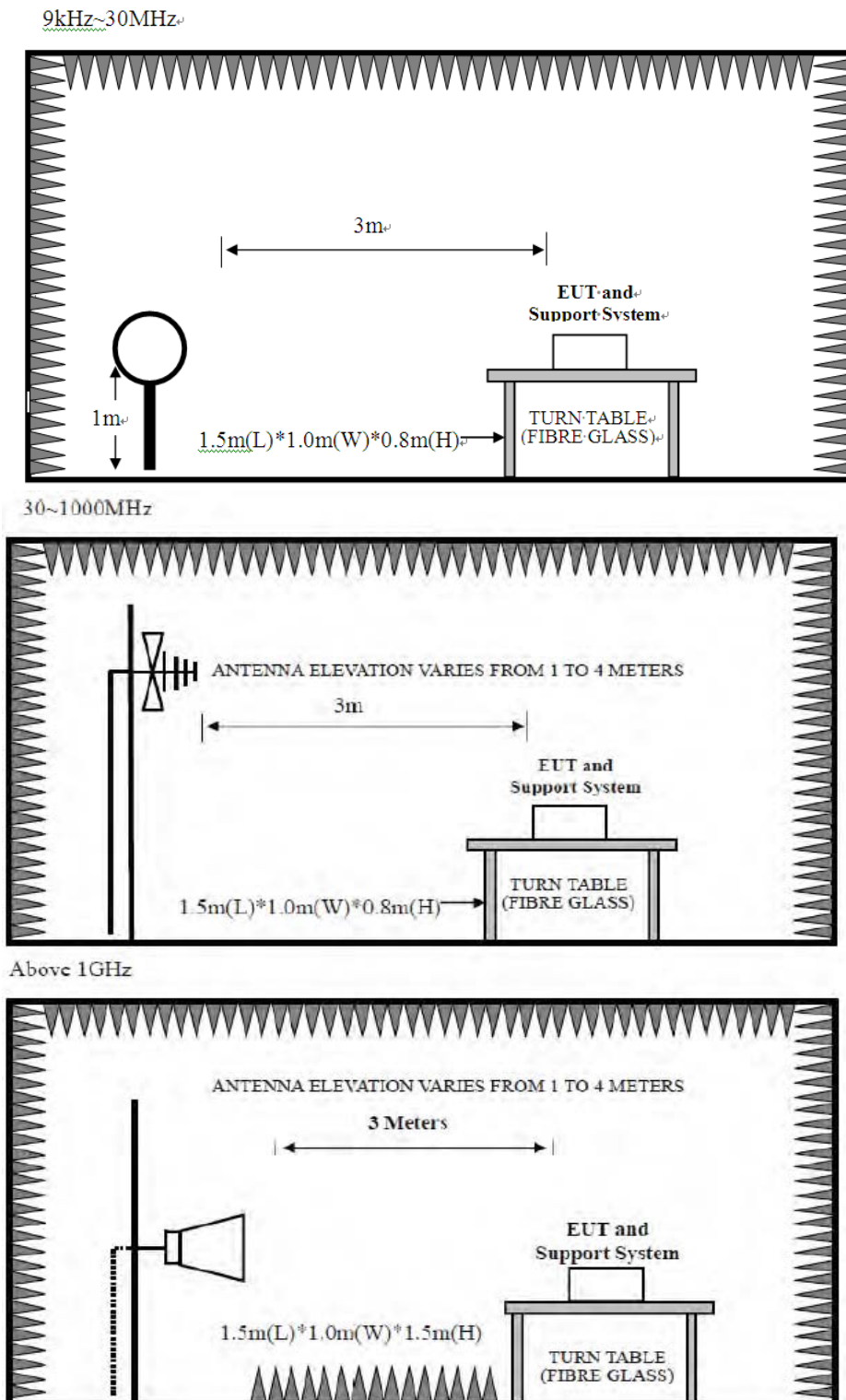
| MHz                        | MHz                   | MHz             | GHz              |
|----------------------------|-----------------------|-----------------|------------------|
| 0.090 - 0.110              | 16.42 - 16.423        | 399.9 - 410     | 4.5 - 5.15       |
| <sup>1</sup> 0.495 - 0.505 | 16.69475 - 16.69525   | 608 - 614       | 5.35 - 5.46      |
| 2.1735 - 2.1905            | 16.80425 - 16.80475   | 960 - 1240      | 7.25 - 7.75      |
| 4.125 - 4.128              | 25.5 - 25.67          | 1300 - 1427     | 8.025 - 8.5      |
| 4.17725 - 4.17775          | 37.5 - 38.25          | 1435 - 1626.5   | 9.0 - 9.2        |
| 4.20725 - 4.20775          | 73 - 74.6             | 1645.5 - 1646.5 | 9.3 - 9.5        |
| 6.215 - 6.218              | 74.8 - 75.2           | 1660 - 1710     | 10.6 - 12.7      |
| 6.26775 - 6.26825          | 108 - 121.94          | 1718.8 - 1722.2 | 13.25 - 13.4     |
| 6.31175 - 6.31225          | 123 - 138             | 2200 - 2300     | 14.47 - 14.5     |
| 8.291 - 8.294              | 149.9 - 150.05        | 2310 - 2390     | 15.35 - 16.2     |
| 8.362 - 8.366              | 156.52475 - 156.52525 | 2483.5 - 2500   | 17.7 - 21.4      |
| 8.37625 - 8.38675          | 156.7 - 156.9         | 2690 - 2900     | 22.01 - 23.12    |
| 8.41425 - 8.41475          | 162.0125 - 167.17     | 3260 - 3267     | 23.6 - 24.0      |
| 12.29 - 12.293             | 167.72 - 173.2        | 3332 - 3339     | 31.2 - 31.8      |
| 12.51975 - 12.52025        | 240 - 285             | 3345.8 - 3358   | 36.43 - 36.5     |
| 12.57675 - 12.57725        | 322 - 335.4           | 3600 - 4400     | ( <sup>2</sup> ) |

Note:

1.  $\text{dB}\mu\text{V/m} = 20 \log(\mu\text{V/m})$
2. Above 1GHz the formula is used to convert the EIRP to field strength  

$$E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] - 20 \log(d[\text{m}]) + 104.77,$$
 where E is field strength and d is distance at which the field strength limit is specified in the applicable requirements.  
 for example, 3m field strength( $\text{dB}\mu\text{V/m}$ )= $\text{EIRP} - 20 \log(3) + 104.77 = \text{EIRP} + 95.2$

### 3.2. Test Setup



### 3.3. Spectrum Analyzer Setting

#### For 9KHz-150KHz

| Spectrum Parameters | Setting                                 |
|---------------------|-----------------------------------------|
| RBW                 | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| VBW                 | 300Hz(for Peak&AVG)/CISPR 200Hz(for QP) |
| Start frequency     | 9KHz                                    |
| Stop frequency      | 150KHz                                  |
| Sweep Time          | Auto                                    |
| Detector            | PEAK/QP/AVG                             |
| Trace Mode          | Max Hold                                |

Note : For 9KHz-90KHz&110KHz-150KHz,the detector is average,other frequency is CISPR QP detector.

#### For 150KHz-30MHz

| Spectrum Parameters | Setting  |
|---------------------|----------|
| RBW                 | 9KHz     |
| VBW                 | 9KHz     |
| Start frequency     | 150KHz   |
| Stop frequency      | 30MHz    |
| Sweep Time          | Auto     |
| Detector            | QP       |
| Trace Mode          | Max Hold |

Note : For 150KHz-490KHz,the detector is average,other frequency is CISPR QP detector.

#### For 30MHz-1GHz

| Spectrum Parameters | Setting  |
|---------------------|----------|
| RBW                 | 120KHz   |
| VBW                 | 300KHz   |
| Start frequency     | 30MHz    |
| Stop frequency      | 1GHz     |
| Sweep Time          | Auto     |
| Detector            | QP       |
| Trace Mode          | Max Hold |

#### For Above 1GHz

| Spectrum Parameters | Setting          |                                                                                                                            |
|---------------------|------------------|----------------------------------------------------------------------------------------------------------------------------|
| RBW                 | 1MHz             |                                                                                                                            |
| VBW                 | PEAK Measurement | AVG Measurement                                                                                                            |
|                     | 3MHz             | Duty cycle $\geq 98\%$ , VBW=10Hz<br>Duty cycle $< 98\%$ , VBW $\geq 1/T$<br>Video bandwidth mode=RMS<br>(power averaging) |
| Start frequency     | 1GHz             |                                                                                                                            |
| Stop frequency      | 40GHz            |                                                                                                                            |
| Sweep Time          | Auto             |                                                                                                                            |
| Detector            | PEAK             |                                                                                                                            |
| Trace Mode          | Max Hold         |                                                                                                                            |

### 3.4. Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 3.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

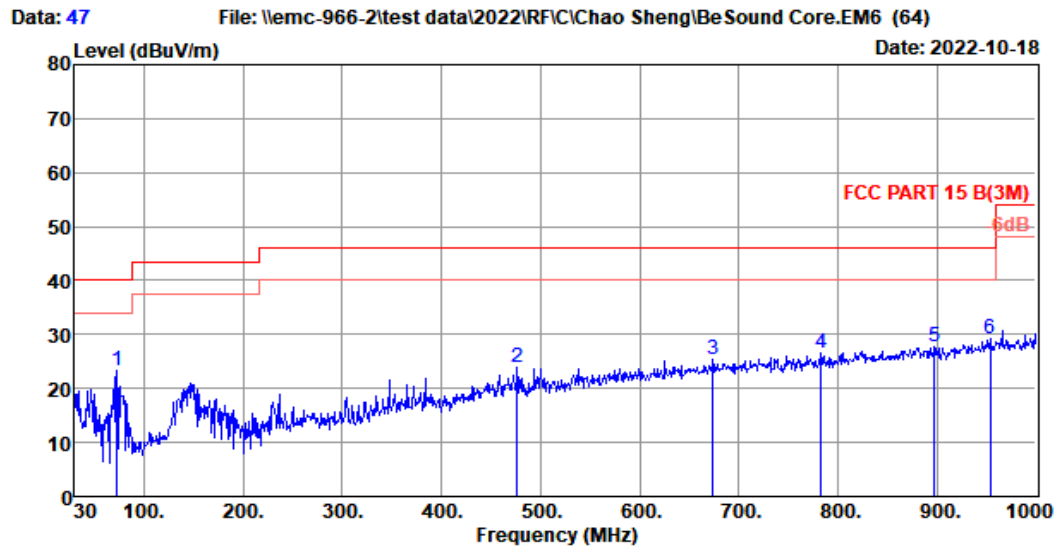


## 3.5. Test Result

## Radiated Emissions Below 1GHz

EST Technology

Chilingxiang, Qishantou, Santun,  
Houjie, Dongguan, Guangdong, China  
Tel: +86-769-83081888  
Fax: +86-769-83081878



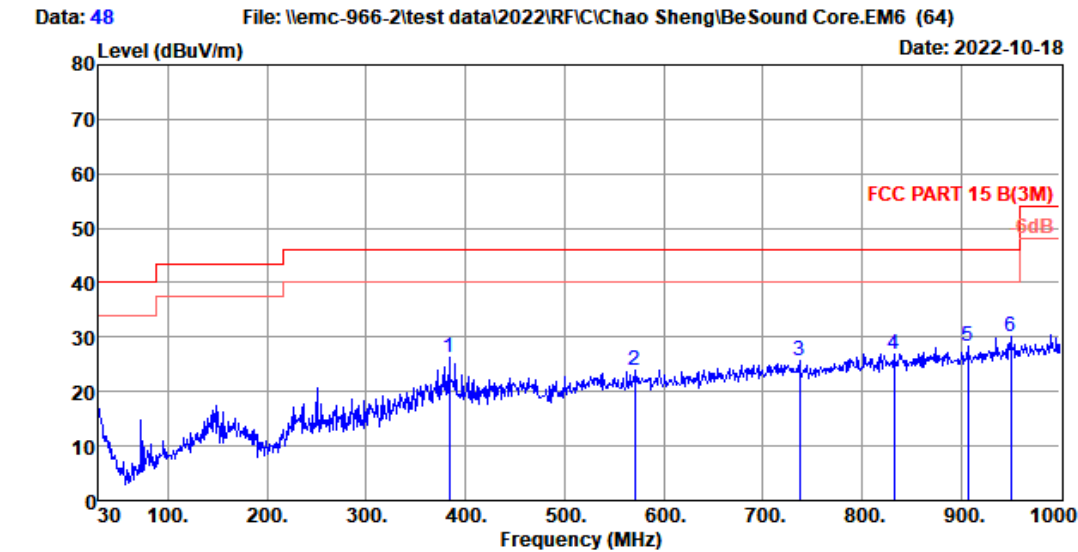
Site no. : 2# 966 chamber Data no. : 47  
Dis. / Ant. : 3m 47018 Ant. pol. : VERTICAL  
Limit : FCC PART 15 B(3M)  
Env. / Ins. : Temp:20.6°C;Humi:42%;Press:101.52kPa  
Engineer : Frank  
EUT : Audio Converter Box  
Power : DC 5V From Adapter Input AC 120V/60Hz  
M/N : BeoSound Core  
Test Mode : TX Mode

|   | Freq.<br>(MHz) | ANT<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 72.68          | 6.62                    | 0.52                  | 16.04             | 23.18                         | 40.00             | 16.82          | QP     |
| 2 | 476.20         | 17.14                   | 2.25                  | 4.65              | 24.04                         | 46.00             | 21.96          | QP     |
| 3 | 674.08         | 21.50                   | 2.76                  | 1.05              | 25.31                         | 46.00             | 20.69          | QP     |
| 4 | 782.72         | 22.90                   | 2.92                  | 0.61              | 26.43                         | 46.00             | 19.57          | QP     |
| 5 | 897.18         | 23.84                   | 3.31                  | 0.63              | 27.78                         | 46.00             | 18.22          | QP     |
| 6 | 953.44         | 24.84                   | 3.90                  | 0.49              | 29.23                         | 46.00             | 16.77          | QP     |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

EST Technology

Chilingxiang, Qishantou, Santun,  
Houjie, Dongguan, Guangdong, China  
Tel: +86-769-83081888  
Fax: +86-769-83081878



Site no. : 2# 966 chamber Data no. : 48  
Dis. / Ant. : 3m 47018 Ant. pol. : HORIZONTAL  
Limit : FCC PART 15 B(3M)  
Env. / Ins. : Temp:20.6°C;Humi:42%;Press:101.52kPa  
Engineer : Frank  
EUT : Audio Converter Box  
Power : DC 5V From Adapter Input AC 120V/60Hz  
M/N : BeoSound Core  
Test Mode : TX Mode

|   | Freq.<br>(MHz) | ANT<br>Factor<br>(dB/m) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Remark |
|---|----------------|-------------------------|-----------------------|-------------------|-------------------------------|-------------------|----------------|--------|
| 1 | 384.05         | 15.98                   | 1.84                  | 8.51              | 26.33                         | 46.00             | 19.67          | QP     |
| 2 | 571.26         | 19.91                   | 2.49                  | 1.52              | 23.92                         | 46.00             | 22.08          | QP     |
| 3 | 737.13         | 21.87                   | 3.07                  | 0.78              | 25.72                         | 46.00             | 20.28          | QP     |
| 4 | 832.19         | 23.52                   | 3.16                  | 0.25              | 26.93                         | 46.00             | 19.07          | QP     |
| 5 | 906.88         | 24.04                   | 3.28                  | 0.97              | 28.29                         | 46.00             | 17.71          | QP     |
| 6 | 950.53         | 24.81                   | 3.84                  | 1.54              | 30.19                         | 46.00             | 15.81          | QP     |

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
2. Margin= Limit - Emission Level.  
3. The emission levels that are 20dB below the official limit are not reported.

- Note:
- 1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
  - 2. All channels had been pre-test,only the worst case was reported.



## 4. AC POWER LINE CONDUCTED EMISSIONS

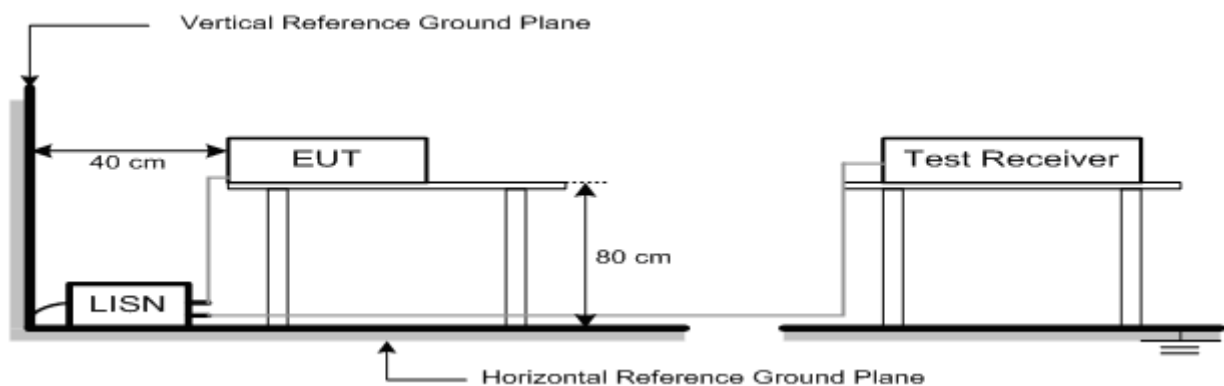
### 4.1. Limit

| Frequency |   |        | Maximum RF Line Voltage          |                               |
|-----------|---|--------|----------------------------------|-------------------------------|
|           |   |        | Quasi-Peak Level<br>dB( $\mu$ V) | Average Level<br>dB( $\mu$ V) |
| 150kHz    | ~ | 500kHz | 66 ~ 56*                         | 56 ~ 46*                      |
| 500kHz    | ~ | 5MHz   | 56                               | 46                            |
| 5MHz      | ~ | 30MHz  | 60                               | 50                            |

Notes:

1. \* Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

### 4.2. Test Setup



### 4.3. Spectrum Analyzer Setting

| Spectrum Parameters | Setting  |
|---------------------|----------|
| RBW                 | 9KHz     |
| VBW                 | 9KHz     |
| Start frequency     | 150KHz   |
| Stop frequency      | 30MHz    |
| Sweep Time          | Auto     |
| Detector            | QP/AVG   |
| Trace Mode          | Max Hold |

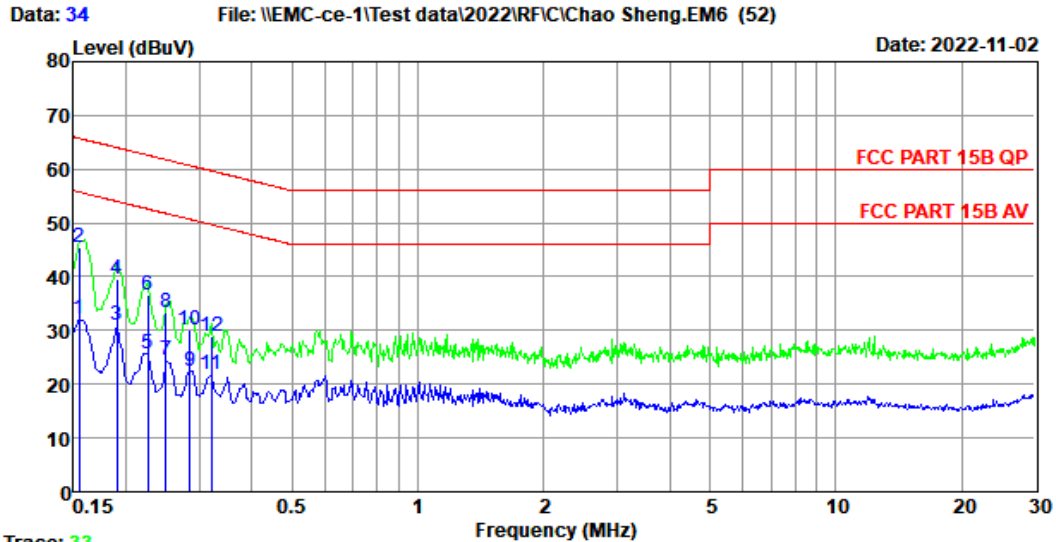
### 4.4. Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 4.3.
- f. The AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.

## 4.5. Test Result

EST Technology

Chilingxiang, Qishantou, Santun,  
Houjie, Dongguan, Guangdong, China  
Tel: +86-769-83081888  
Fax: +86-769-83081878



Site no. : 1#CE Shield Room Data no. : 34  
 Env. / Ins. : Temp:24.3°C Humi:51.6% Press:101.50kPa: NEUTRAL  
 Limit : FCC PART 15B QP  
 Engineer : CXQ  
 EUT : Audio Converter Box  
 Power : DC 5V From Adapter Input AC 120V/60Hz  
 M/N : BeoSound Core  
 Test Mode : TX Mode

|    | Freq.<br>(MHz) | LISN<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV) | Limits<br>(dBuV) | Margin<br>(dB) | Remark  |
|----|----------------|------------------------|-----------------------|-------------------|-----------------------------|------------------|----------------|---------|
| 1  | 0.15           | 10.14                  | 9.69                  | 12.28             | 32.11                       | 55.74            | 23.63          | Average |
| 2  | 0.15           | 10.14                  | 9.69                  | 25.69             | 45.52                       | 65.74            | 20.22          | QP      |
| 3  | 0.19           | 10.37                  | 9.77                  | 10.84             | 30.98                       | 54.02            | 23.04          | Average |
| 4  | 0.19           | 10.37                  | 9.77                  | 19.55             | 39.69                       | 64.02            | 24.33          | QP      |
| 5  | 0.23           | 10.31                  | 9.84                  | 5.56              | 25.71                       | 52.61            | 26.90          | Average |
| 6  | 0.23           | 10.31                  | 9.84                  | 16.38             | 36.53                       | 62.61            | 26.08          | QP      |
| 7  | 0.25           | 10.24                  | 9.92                  | 4.29              | 24.45                       | 51.78            | 27.33          | Average |
| 8  | 0.25           | 10.24                  | 9.92                  | 13.20             | 33.36                       | 61.78            | 28.42          | QP      |
| 9  | 0.28           | 10.21                  | 9.92                  | 2.40              | 22.53                       | 50.68            | 28.15          | Average |
| 10 | 0.28           | 10.21                  | 9.92                  | 10.08             | 30.21                       | 60.68            | 30.47          | QP      |
| 11 | 0.32           | 10.18                  | 9.92                  | 1.67              | 21.77                       | 49.71            | 27.94          | Average |
| 12 | 0.32           | 10.18                  | 9.92                  | 8.73              | 28.83                       | 59.71            | 30.88          | QP      |

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.  
 2. Margin= Limit - Emission Level.  
 3. If the average limit is met when using a quasi-peak detector,  
 the EUT shall be deemed to meet both limits and measurement  
 with average detector is unnecessary.

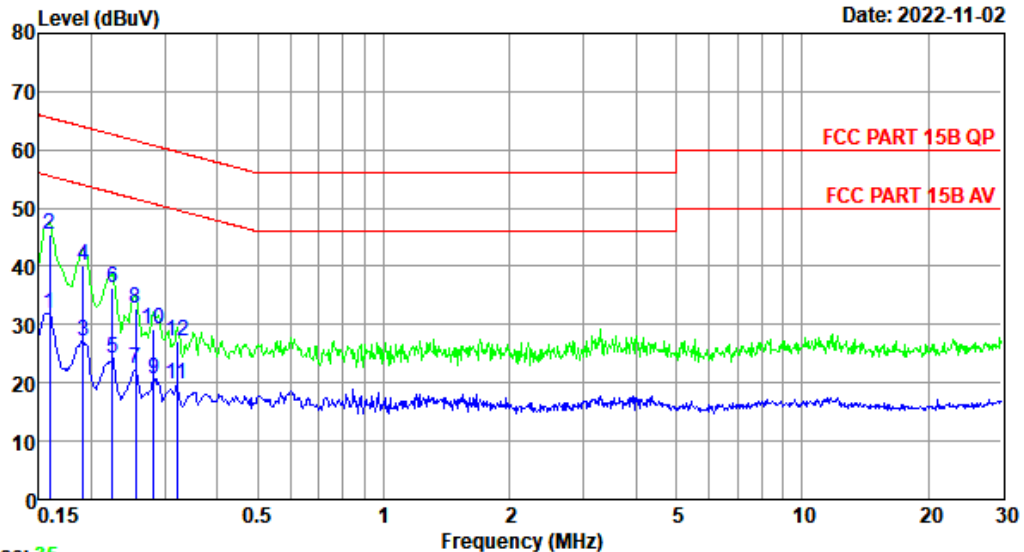
EST Technology

Chilingxiang, Qishantou, Santun,  
Houjie, Dongguan, Guangdong, China  
Tel: +86-769-83081888  
Fax: +86-769-83081878

Data: 36

File: \\EMC-ce-1\Test data\2022\RFIC\Chao Sheng.EM6 (52)

Date: 2022-11-02



Trace: 35

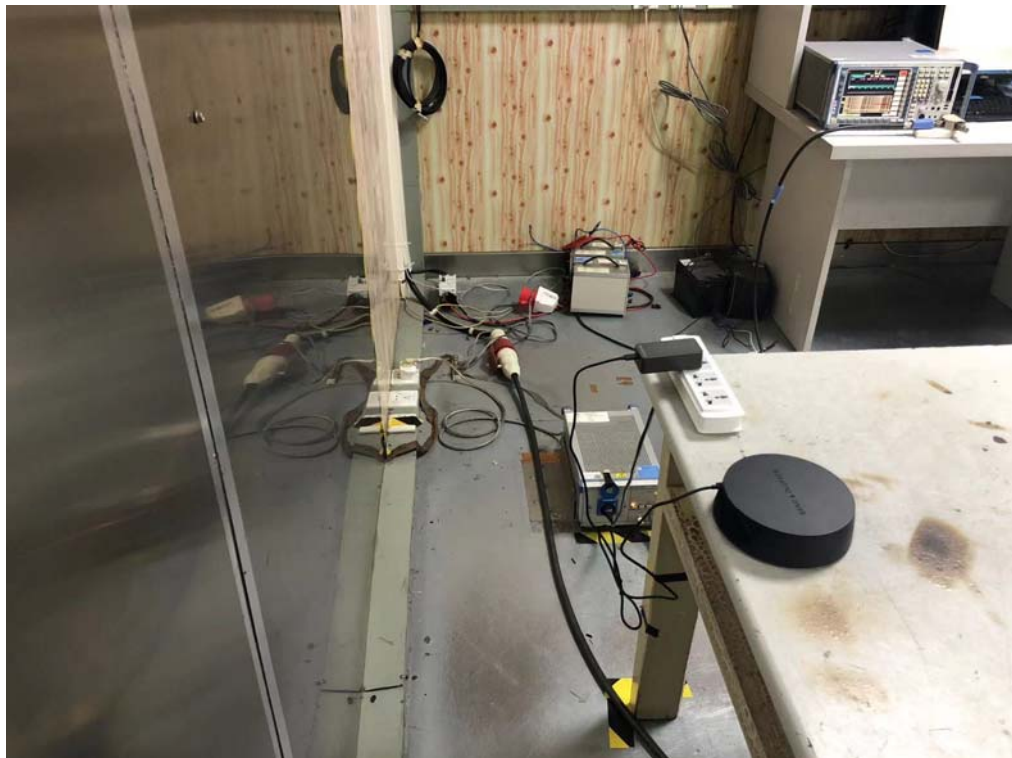
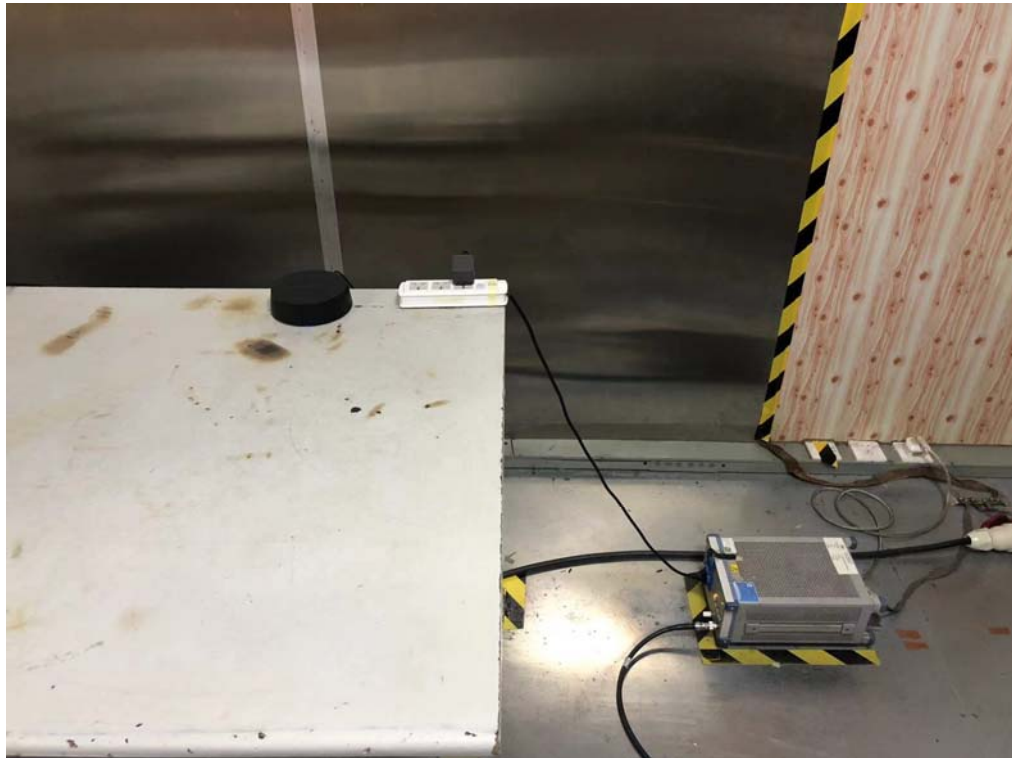
Site no. : 1#CE Shield Room Data no. : 36  
 Env. / Ins. : Temp:24.3'C Humi:51.6% Press:101.50kPa: LINE  
 Limit : FCC PART 15B QP  
 Engineer : CXQ  
 EUT : Audio Converter Box  
 Power : DC 5V From Adapter Input AC 120V/60Hz  
 M/N : BeoSound Core  
 Test Mode : TX Mode

|    | Freq.<br>(MHz) | LISN<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Reading<br>(dBuV) | Emission<br>Level<br>(dBuV) | Limits<br>(dBuV) | Margin<br>(dB) | Remark  |
|----|----------------|------------------------|-----------------------|-------------------|-----------------------------|------------------|----------------|---------|
| 1  | 0.16           | 9.98                   | 9.69                  | 12.28             | 31.95                       | 55.52            | 23.57          | Average |
| 2  | 0.16           | 9.98                   | 9.69                  | 25.72             | 45.39                       | 65.52            | 20.13          | QP      |
| 3  | 0.19           | 9.89                   | 9.77                  | 7.39              | 27.05                       | 53.98            | 26.93          | Average |
| 4  | 0.19           | 9.89                   | 9.77                  | 20.51             | 40.17                       | 63.98            | 23.81          | QP      |
| 5  | 0.22           | 9.91                   | 9.84                  | 4.36              | 24.11                       | 52.66            | 28.55          | Average |
| 6  | 0.22           | 9.91                   | 9.84                  | 16.42             | 36.17                       | 62.66            | 26.49          | QP      |
| 7  | 0.25           | 9.94                   | 9.92                  | 2.70              | 22.56                       | 51.60            | 29.04          | Average |
| 8  | 0.25           | 9.94                   | 9.92                  | 12.79             | 32.65                       | 61.60            | 28.95          | QP      |
| 9  | 0.28           | 9.91                   | 9.92                  | 0.90              | 20.73                       | 50.76            | 30.03          | Average |
| 10 | 0.28           | 9.91                   | 9.92                  | 9.49              | 29.32                       | 60.76            | 31.44          | QP      |
| 11 | 0.32           | 9.89                   | 9.92                  | 0.03              | 19.84                       | 49.71            | 29.87          | Average |
| 12 | 0.32           | 9.89                   | 9.92                  | 7.32              | 27.13                       | 59.71            | 32.58          | QP      |

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.  
 2. Margin= Limit - Emission Level.  
 3. If the average limit is met when using a quasi-peak detector,  
 the EUT shall be deemed to meet both limits and measurement  
 with average detector is unnecessary.

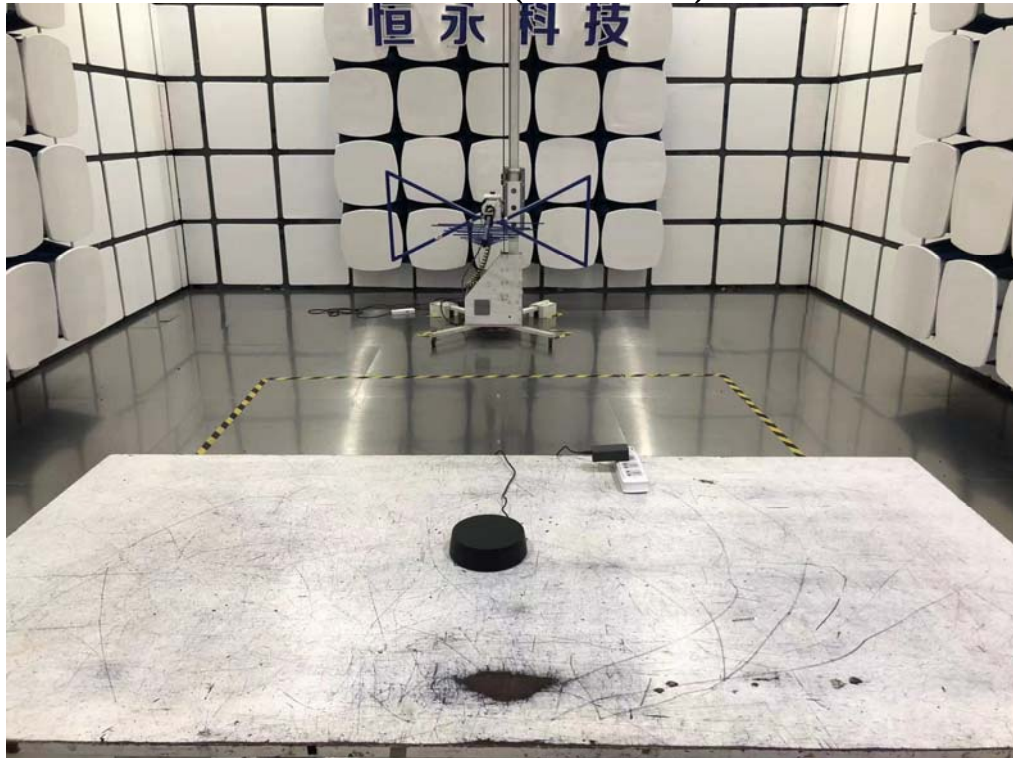
## 5. TEST SETUP PHOTO

Conducted Test



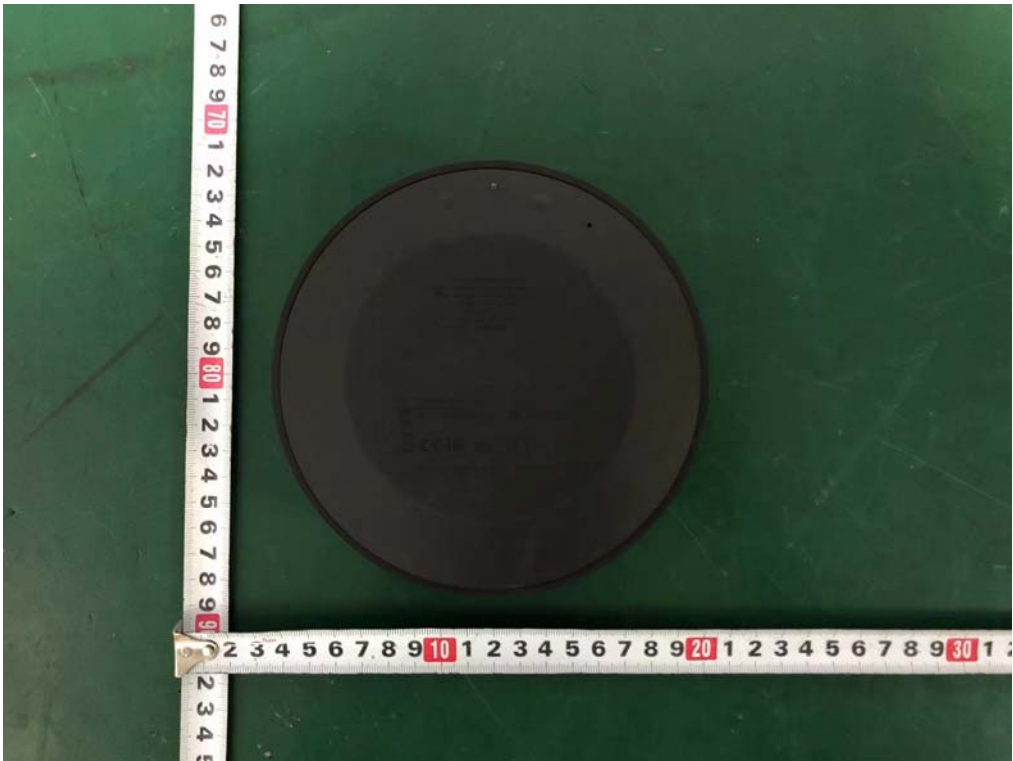
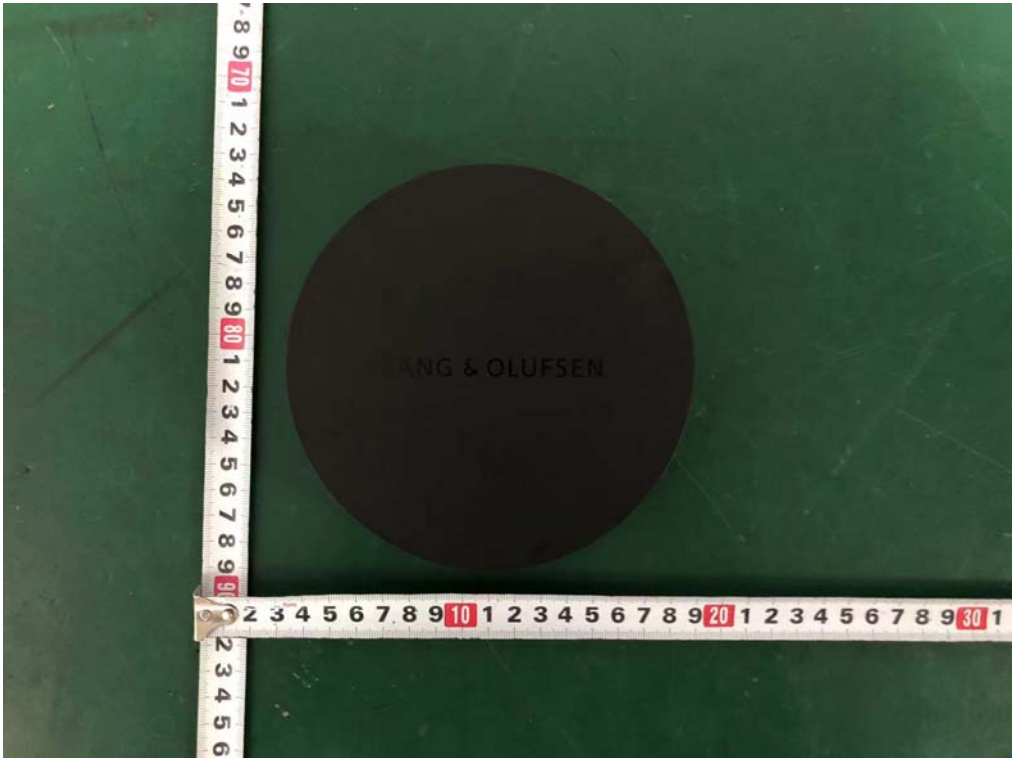


**Radiated Test (Below 1GHz)**



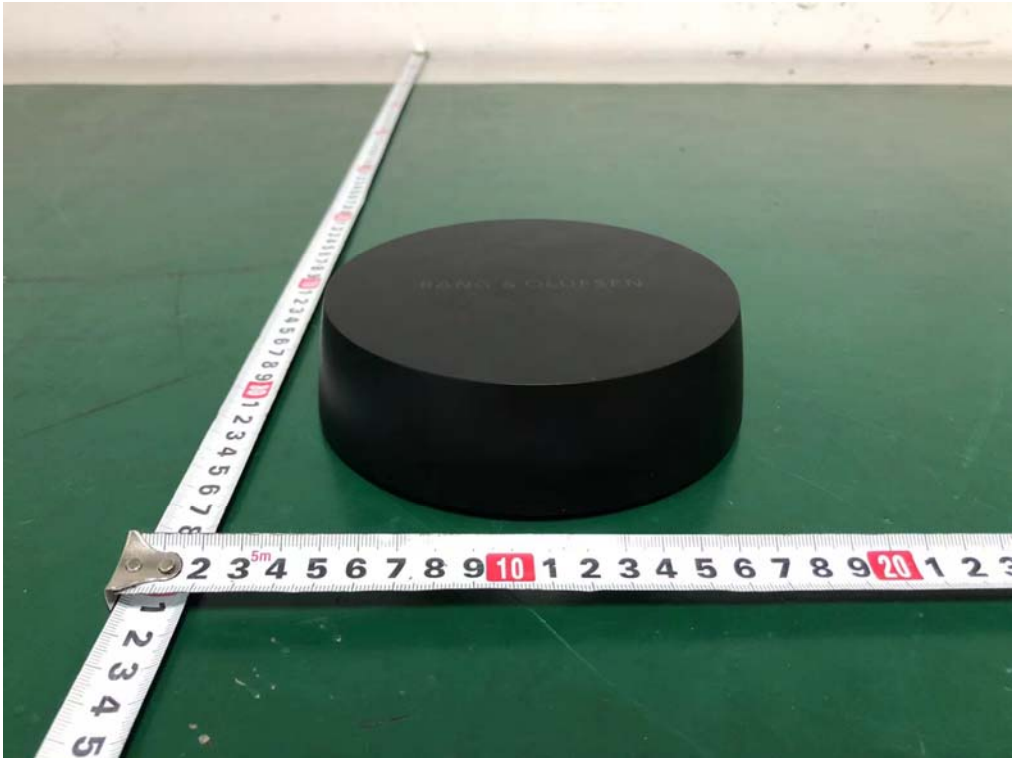
6. EUT PHOTO

External Photos  
M/N: BeoSound Core

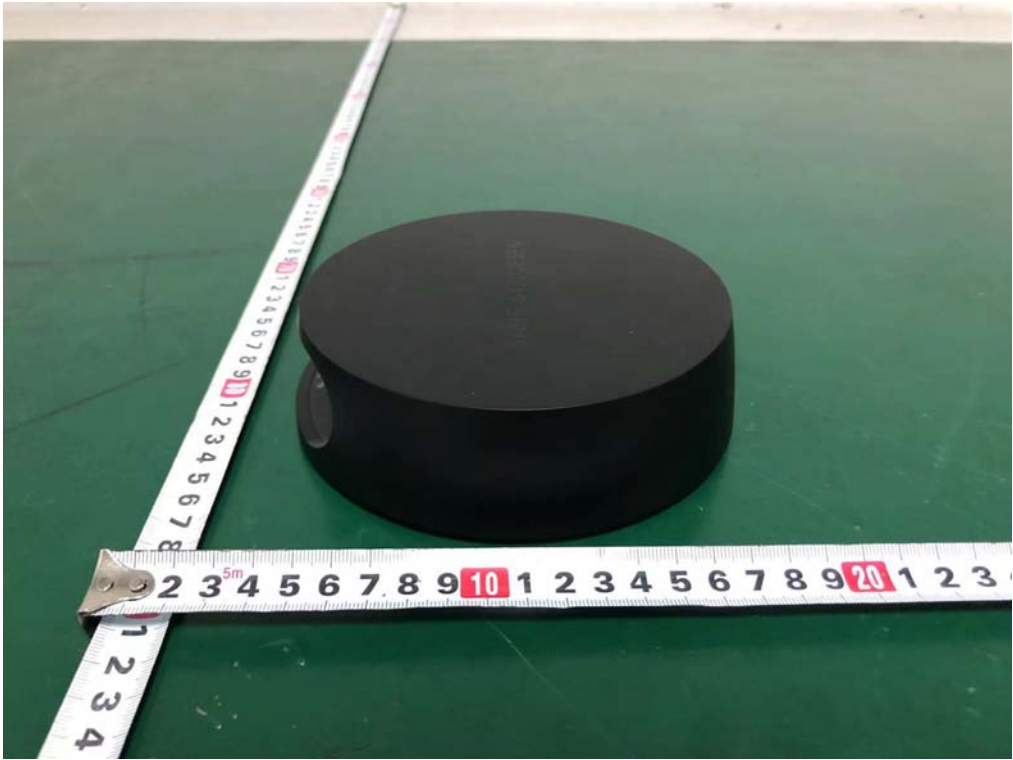




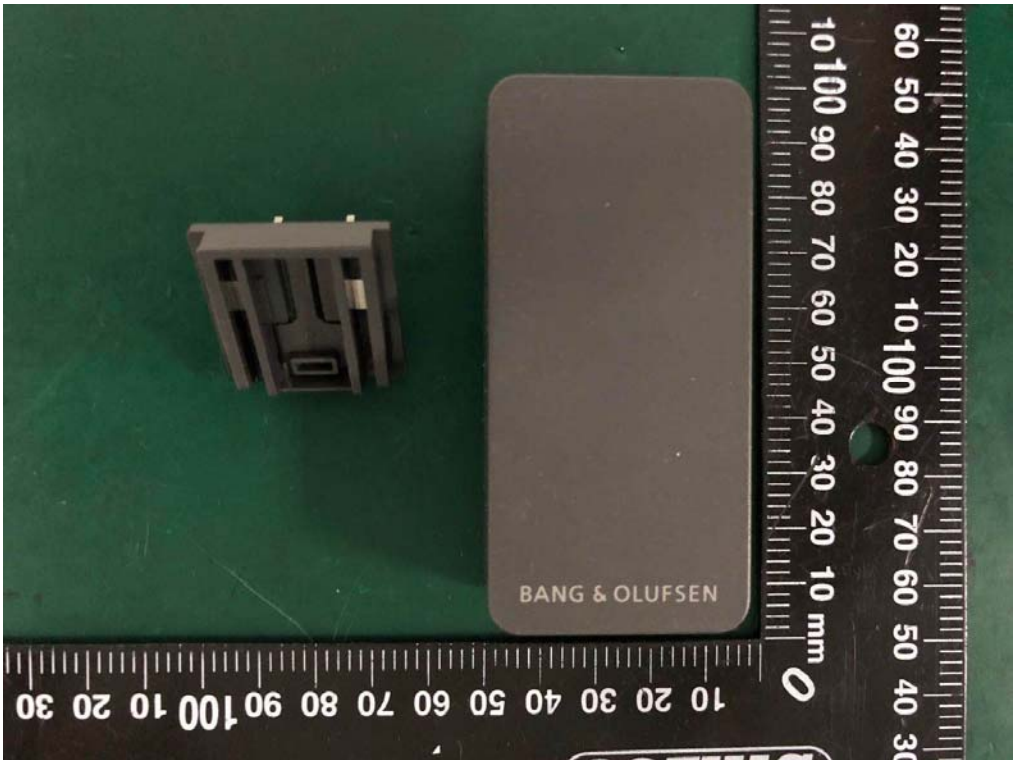
External Photos  
M/N: BeoSound Core



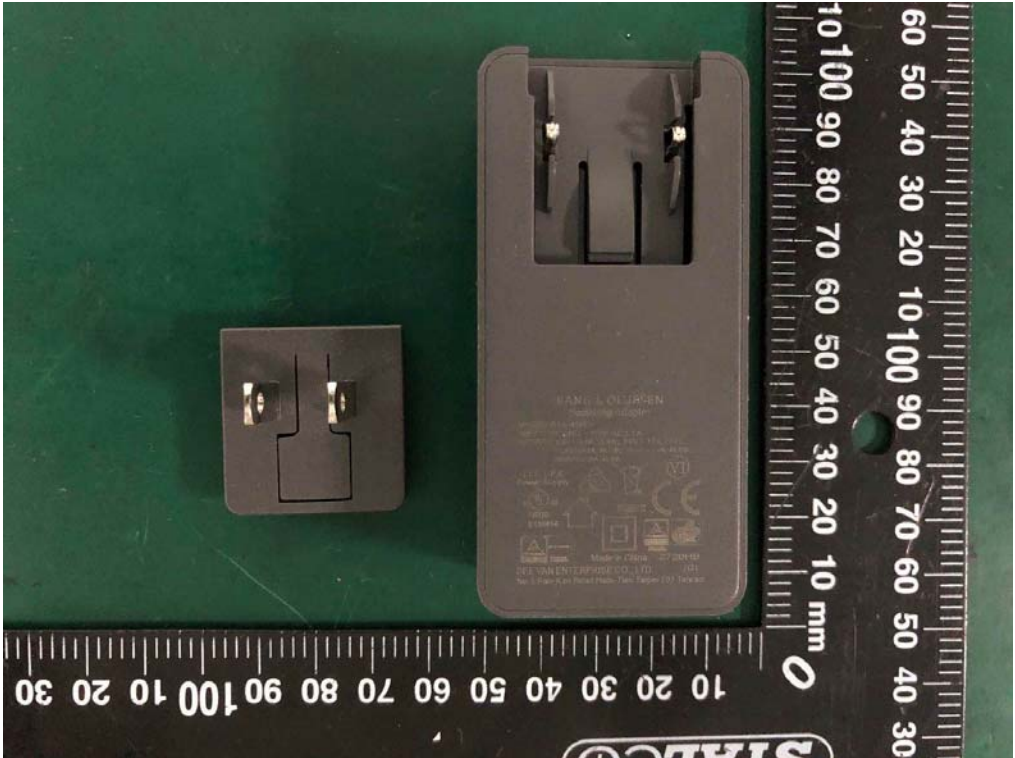
**External Photos**  
M/N: BeoSound Core



External Photos  
M/N: BeoSound Core

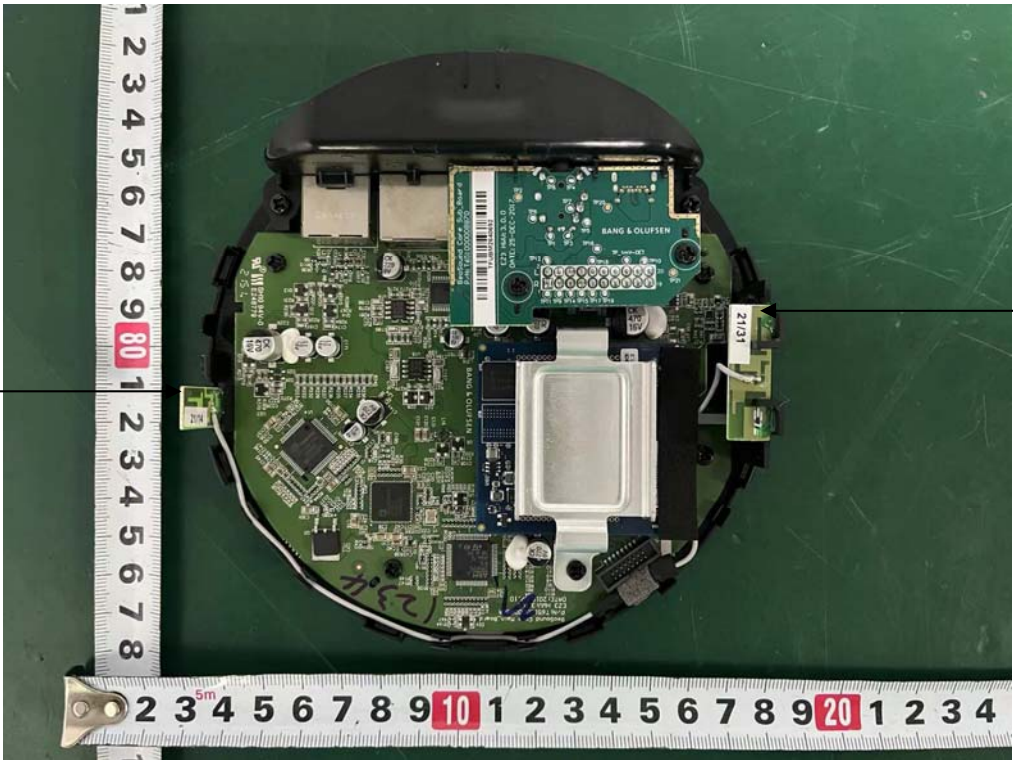


External Photos  
M/N: BeoSound Core

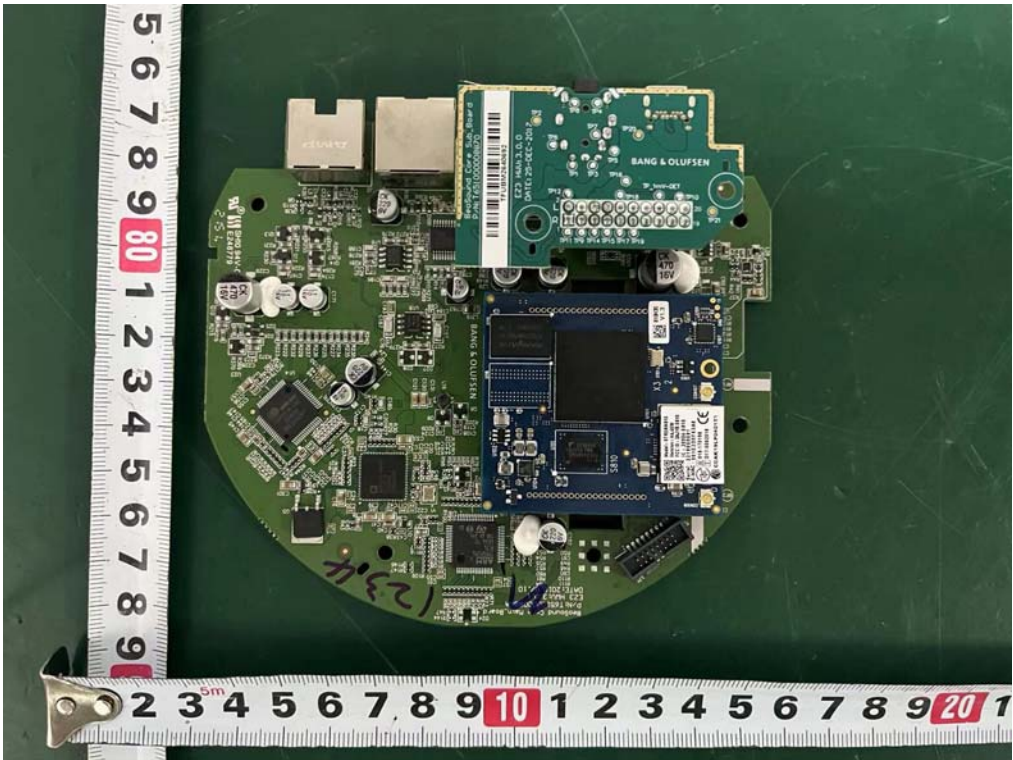
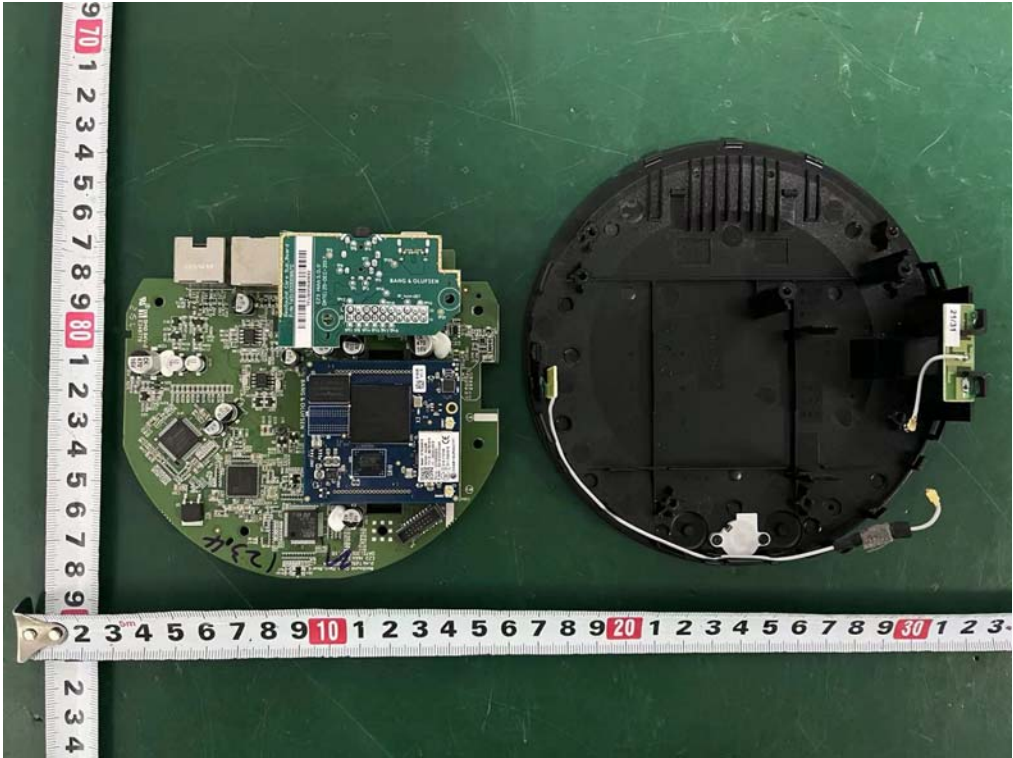




Internal Photos  
M/N: BeoSound Core

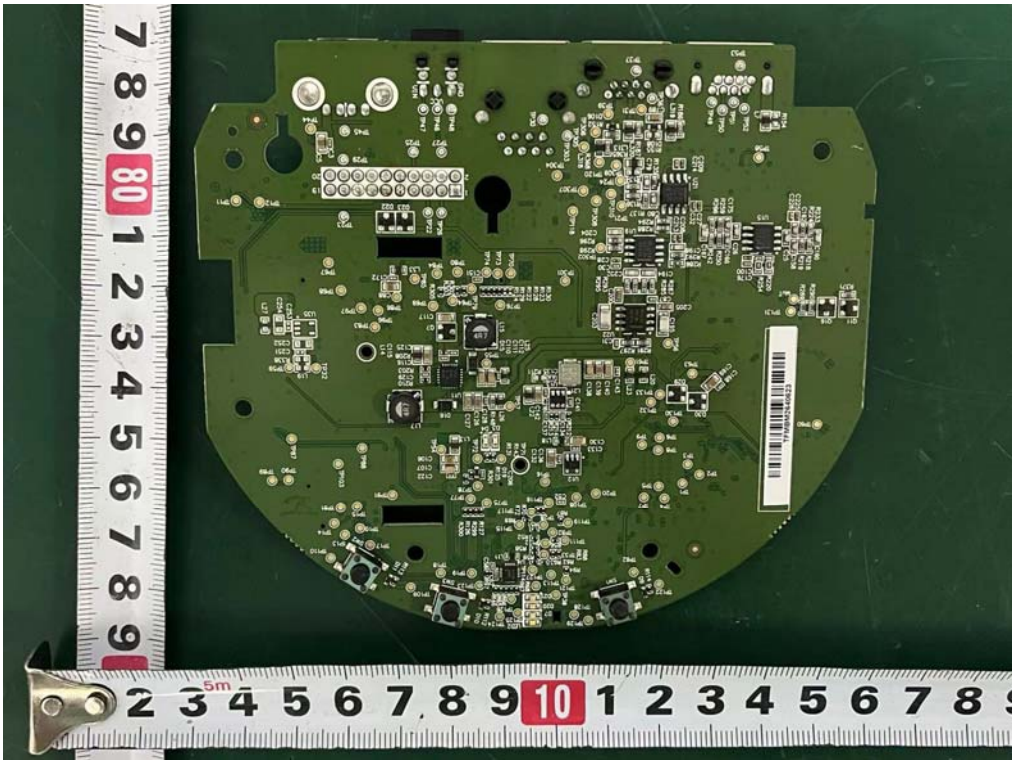
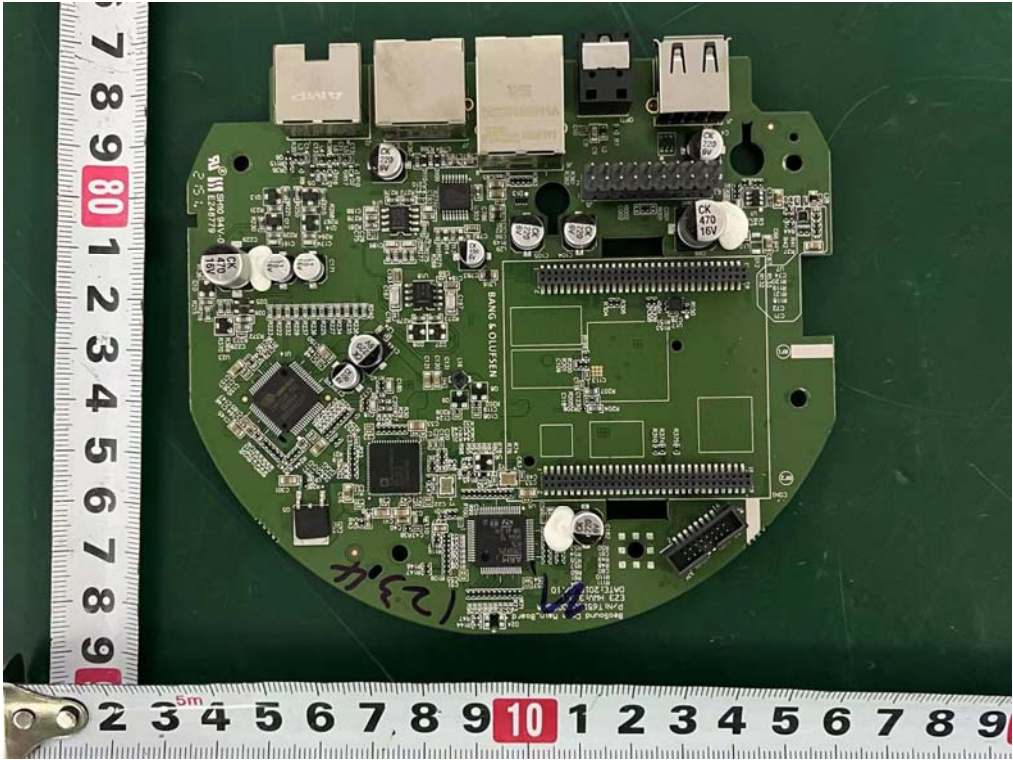


Internal Photos  
M/N: BeoSound Core



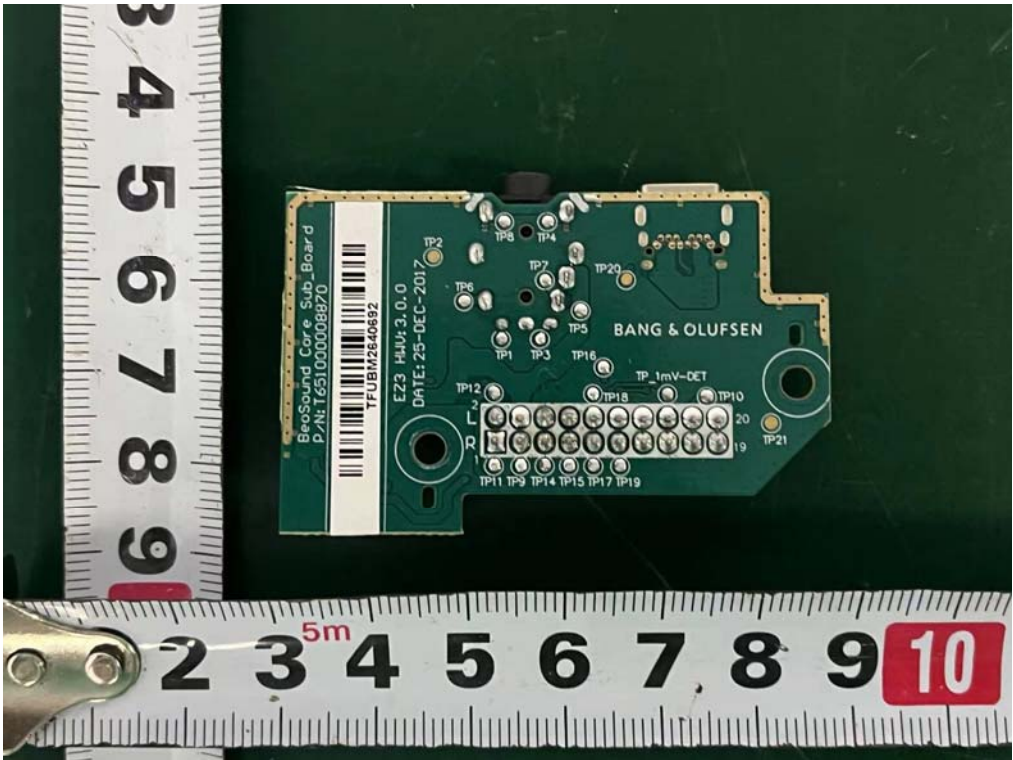
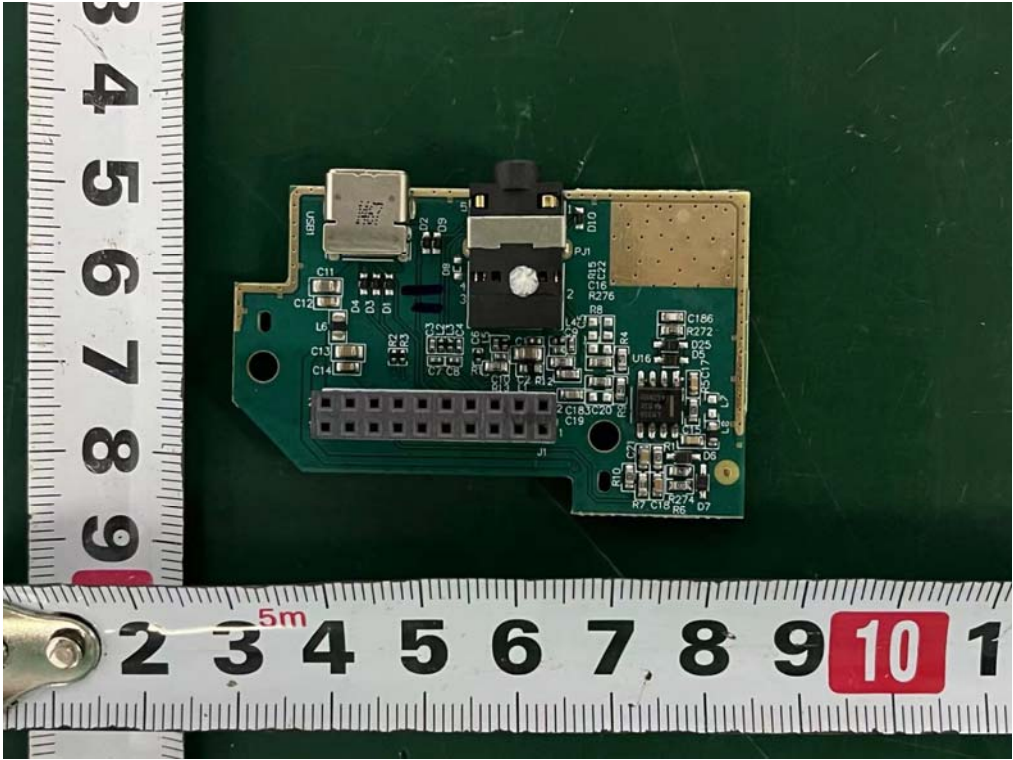


Internal Photos  
M/N: BeoSound Core

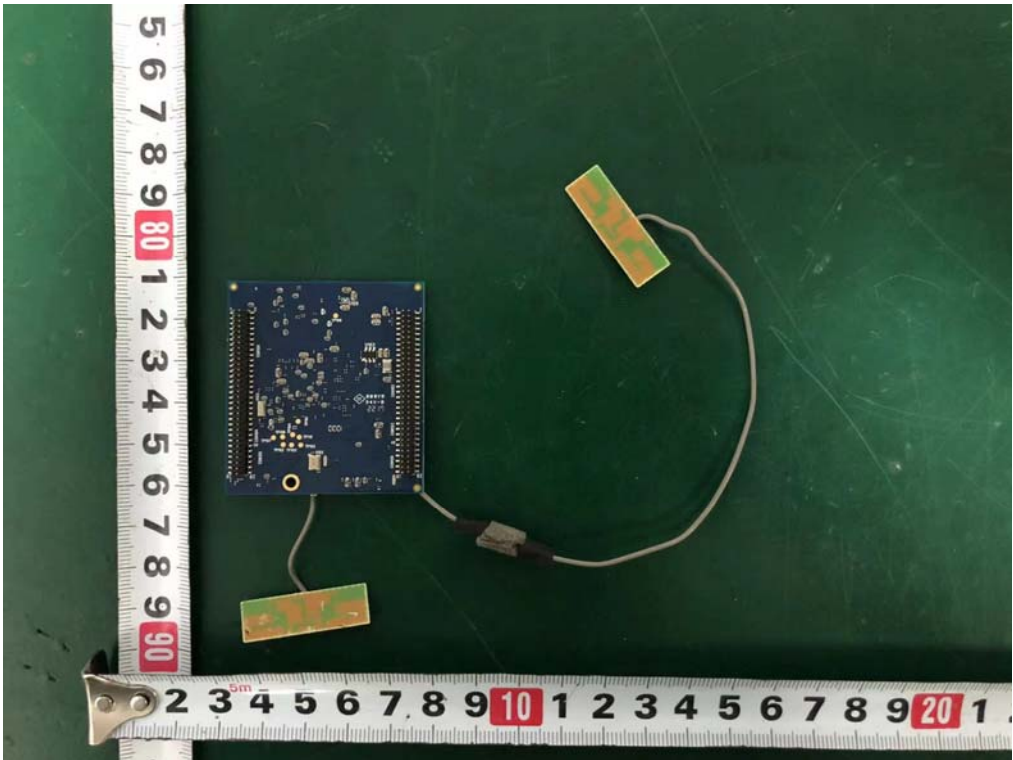
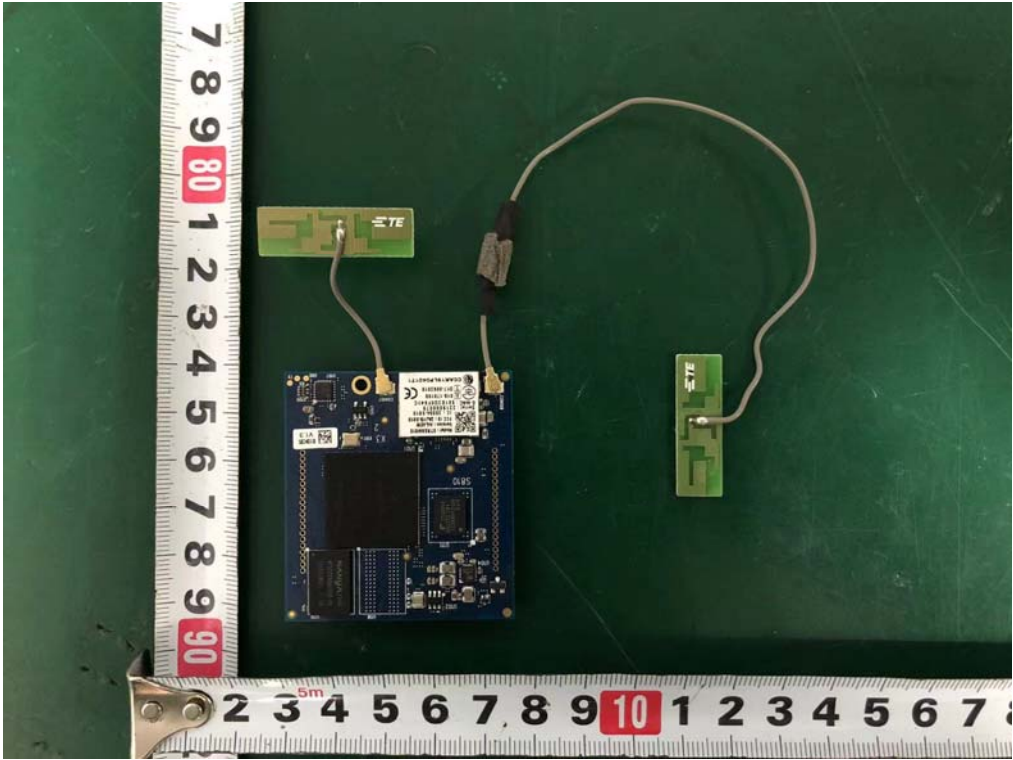




Internal Photos  
M/N: BeoSound Core



Internal Photos  
M/N: BeoSound Core

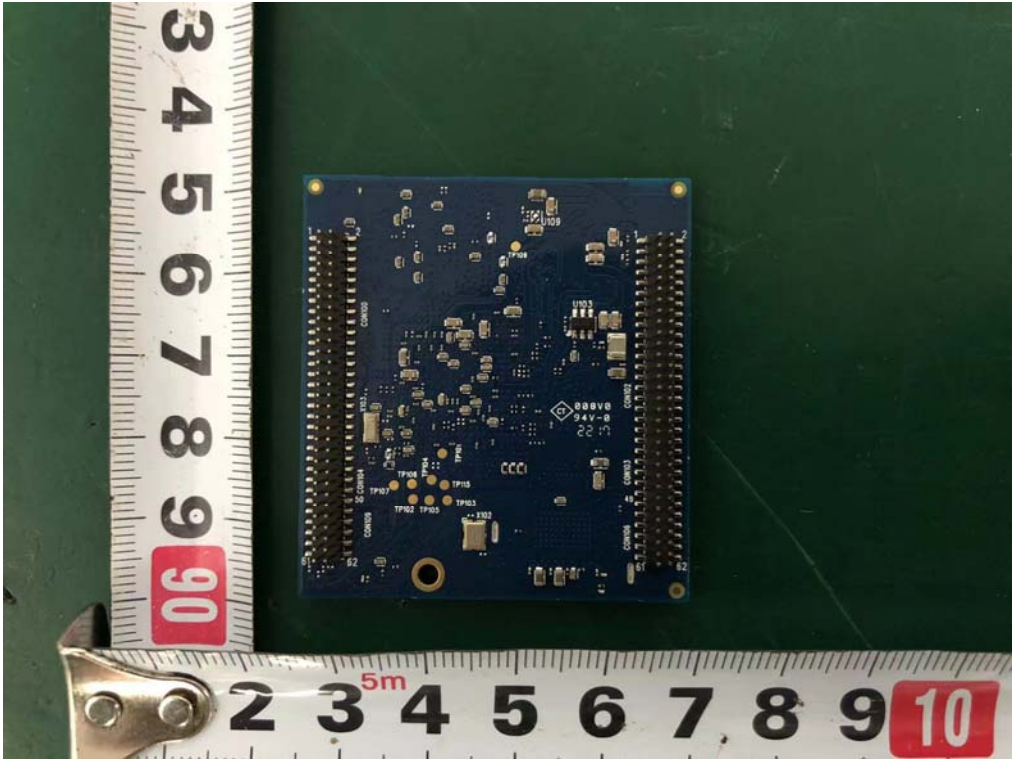


Internal Photos  
M/N: BeoSound Core



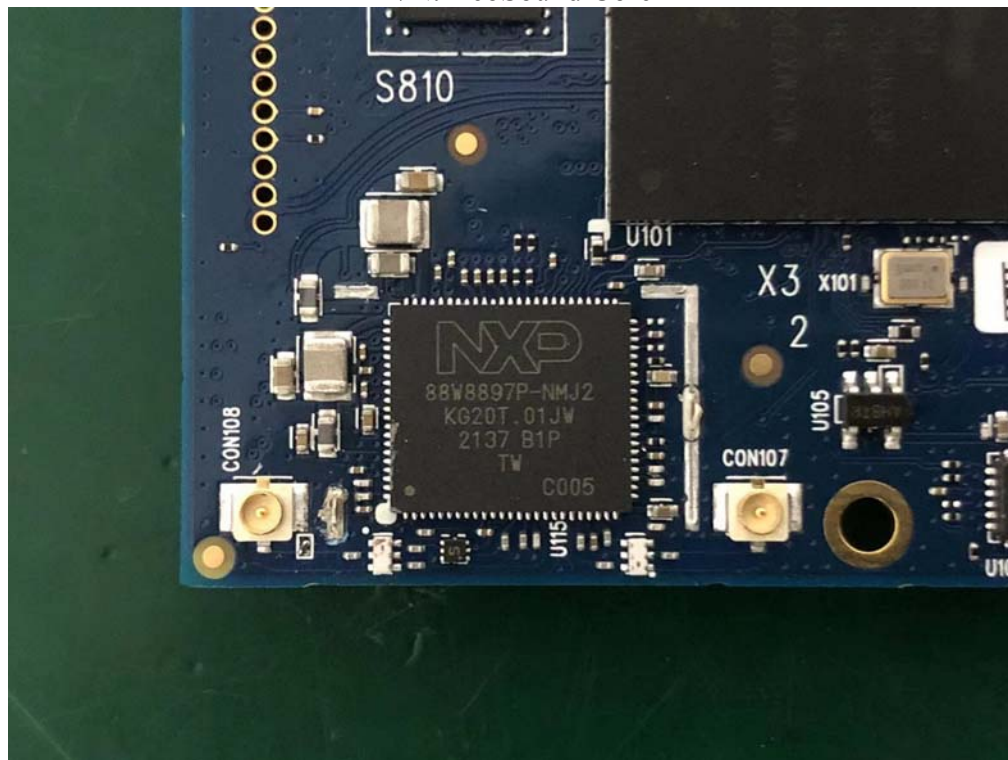
Antenna 0  
ipex  
connector

Antenna 1  
ipex  
connector





**Internal Photos**  
M/N: BeoSound Core



**End of Test Report**