



■ Report No.: DDT-R18093005-5E5 Rev.02

■ Issued Date: Nov. 11, 2020

## FCC AND IC CERTIFICATION TEST REPORT FOR

|                             |   |   |
|-----------------------------|---|---|
| <b>Applicant</b>            | : | Harman International Industries, Inc.                         |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329,<br>UNITED STATES |
| <b>Equipment under Test</b> | : | Portable Bluetooth Speaker                                    |
| <b>Model No.</b>            | : | CHARGE4Q  |
| <b>Trade Mark</b>           | : | JBL   |
| <b>FCC ID</b>               | : | APIJBLCHARGE4Q  |
| <b>IC</b>                   | : | 6132A-JBLCHARGE4Q   |
| <b>Manufacturer</b>         | : | Harman International Industries, Inc.                         |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329,<br>UNITED STATES |

**Issued By: Dongguan Dongdian Testing Service Co., Ltd.**

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# REPORT

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## TEST REPORT DECLARE

|                             |   |  |
|-----------------------------|---|--|
| <b>Applicant</b>            | : | Harman International Industries, Inc.                      |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |
| <b>Equipment under Test</b> | : | Portable Bluetooth Speaker                                 |
| <b>Model No.</b>            | : | CHARGE4Q   |
| <b>Trade mark</b>           | : | JBL  |
| <b>Manufacturer</b>         | : | Harman International Industries, Inc.                      |
| <b>Address</b>              | : | 8500 Balboa Boulevard, Northridge, CA 91329, UNITED STATES |

**Test Standard Used:**

FCC Rules and Regulations Part 15 Subpart C, RSS-247 Issue 2 February 2017.

**Test procedure used:**

ANSI C63.10:2013, RSS-Gen Issue 5, Apr. 2018

**We Declare:**

The equipment described above is tested by Dongguan Dongdian Testing Service Co., Ltd. and in the configuration tested the equipment complied with the standards specified above. The test results are contained in this test report and Dongguan Dongdian Testing Service Co., Ltd. is assumed of full responsibility for the accuracy and completeness of these tests.

**After test and evaluation, our opinion is that the equipment provided for test compliance with the requirement of the above FCC&IC standards.**

|                         |                          |                      |                               |
|-------------------------|--------------------------|----------------------|-------------------------------|
| <b>Report No:</b>       | DDT-R18093005-5E5 Rev.02 |                      |                               |
| <b>Date of Receipt:</b> | Oct. 28, 2020            | <b>Date of Test:</b> | Oct. 28, 2020 ~ Nov. 11, 2020 |

**Prepared By:**

  
Talent Zhang  
**Talent Zhang/Engineer**

**Approved By:**

  
**Damon Hu/EMC Manager**

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

## Revision history

| Rev.    | Revisions   | Issue Date    | Revised By   |
|---------|---|---------------|--------------|
| ---     | Initial issue   | Mar. 13, 2019 |              |
| Rev. 01 | Removed Microphone-related circuits, and added new batteries, this change doesn't influence the RF performance, so only power line conducted and radiated emission (below 1GHz) were tested and updated in this report.               | Jan. 02, 2020 | Ella Gong    |
| Rev. 02 | This report added battery cell (GSP-1S3P-CH4D) based on the report Rev. 01. this change doesn't influence the RF performance, so only power line conducted and radiated emission (below 1GHz) were tested and updated in this report. | Nov. 11, 2020 | Talent Zhang |

## 1. Summary of test results

| The EUT have been tested according to the applicable standards as referenced below.  |   |         |
|--|---|---------|
| Description of Test Item   | Standard  | Results |
| Radiation Emission   | FCC Part 15: 15.247<br>ANSI C63.10:2013<br>RSS-247 Issue 2<br>RSS-Gen Issue 5 | PASS    |
| Power Line Conducted Emission  | FCC Part 15: 15.207<br>ANSI C63.10: 2013<br>RSS-Gen Issue 5                   | PASS    |
| Note: This report added battery cell (GSP-1S3P-CH4D) based on the report Rev. 01. these changes don't influence the RF performance, so only radiated emission (below 1GHz) and Power Line Conducted Emissions were tested and recorded in this report, and the original test data was retained in this report. |   |         |

## 2. General test information

### 2.1. Description of EUT

|                          |   |
|--------------------------|---|
| EUT* Name                | : Portable Bluetooth Speaker  |
| Model Number             | : CHARGE4Q  |
| EUT function description | : Please reference user manual of this device                                       |
| Power supply             | : DC 5V from external AC Adapter<br>DC 3.6V 7500mAh Polymer Li-ion built-in battery |
| Radio Specification      | : Bluetooth V4.2  |
| Operation frequency      | : 2402MHz-2480MHz   |
| Modulation               | : GFSK  |
| Data rate                | : 1Mbps   |
| Antenna Type             | : Dedicated FPCB antenna, maximum PK gain: 2.24 dBi                                 |
| Sample Type              | : Series production   |

Note: EUT is the ab. of equipment under test.

| Channel information |           |         |           |         |           |
|---------------------|-----------|---------|-----------|---------|-----------|
| Channel             | Frequency | Channel | Frequency | Channel | Frequency |
| 0                   | 2402MHz   | 14      | 2430MHz   | 28      | 2458MHz   |
| 1                   | 2404MHz   | 15      | 2432MHz   | 29      | 2460MHz   |
| 2                   | 2406MHz   | 16      | 2434MHz   | 30      | 2462MHz   |
| 3                   | 2408MHz   | 17      | 2436MHz   | 31      | 2464MHz   |
| 4                   | 2410MHz   | 18      | 2438MHz   | 32      | 2466MHz   |
| 5                   | 2412MHz   | 19      | 2440MHz   | 33      | 2468MHz   |
| 6                   | 2414MHz   | 20      | 2442MHz   | 34      | 2470MHz   |
| 7                   | 2416MHz   | 21      | 2444MHz   | 35      | 2472MHz   |
| 8                   | 2418MHz   | 22      | 2446MHz   | 36      | 2474MHz   |
| 9                   | 2420MHz   | 23      | 2448MHz   | 37      | 2476MHz   |
| 10                  | 2422MHz   | 24      | 2450MHz   | 38      | 2478MHz   |
| 11                  | 2424MHz   | 25      | 2452MHz   | 39      | 2480MHz   |
| 12                  | 2426MHz   | 26      | 2454MHz   |         |           |
| 13                  | 2428MHz   | 27      | 2456MHz   |         |           |

### 2.2. Accessories of EUT

| Description of Accessories | Manufacturer                            | Model number | Parameter                | Remark                |
|----------------------------|---|--------------|--------------------------|-----------------------|
| Built-in Battery           | ICON ENERGY SYSTEM (SHENZHEN) CO., LTD. | ID998        | DC 3.6V, 7500mAh, 27.0Wh | Factory 1 Alternative |
| Built-in Battery           | ICON ENERGY SYSTEM (SHENZHEN) CO., LTD. | ID998-B      | DC 3.6V, 7500mAh, 27.0Wh |                       |
| Built-in Battery           | ICON ENERGY SYSTEM (SHENZHEN) CO., LTD. | IY1068       | DC 3.6V, 7500mAh, 27.0Wh |                       |
| Built-in                   | ICON ENERGY                             | IAA011NA     | 3.6V, 7500mAh,           |                       |

|                  |                              |               |                       |                          |
|------------------|------------------------------|---------------|-----------------------|--------------------------|
| Battery          | SYSTEM (SHENZHEN) CO., LTD.  |               | 27.0Wh                |                          |
| Built-in Battery | SUNWODA Electronic Co.,Ltd   | SUN-INTE-118  | 3.6V, 7500mAh, 27.0Wh | Factory 2 Alternative    |
| Built-in Battery | SUNWODA Electronic Co., Ltd  | SUN-INTE-156  | 3.6V, 7500mAh, 27.0Wh |                          |
| Built-in Battery | GREAT POWER BATTERY CO., LTD | GSP-1S3P-CH4A | 3.6V, 7500mAh, 27.0Wh |                          |
| USB cable        | Harman                       | N/A           | N/A                   | Length: 1.2m, unshielded |

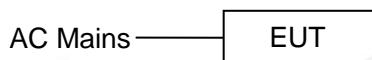
New Battery information:

| Description of Accessories | Manufacturer                 | Model number  | Description           | Remark |
|----------------------------|------------------------------|---------------|-----------------------|--------|
| Built-in Battery           | GREAT POWER BATTERY CO., LTD | GSP-1S3P-CH4D | 3.6V, 7500mAh, 27.0Wh | N/A    |

### 2.3. Assistant equipment used for test

| Assistant equipment | Manufacturer | Model number     | EMC Compliance | Other   |
|---------------------|--------------|------------------|----------------|---|
| Notebook            | DELL         | Latitude D610    | FCC DOC        | 00045-534-136-300                                       |
| AC Adapter          | Tencent      | A215-050210U-CN1 | N/A            | Input: AC 100-240V -50/60Hz, 0.35A; Output: DC 5V, 2.1A |

### 2.4. Block diagram of EUT configuration for test



Test software: BlueTest3.EXE

The test software was used to control EUT work in Continuous Tx mode, and select test channel, wireless mode as below table:

| Tested mode, channel, information |         |                 |
|-----------------------------------|---------|-----------------|
| Mode                              | Channel | Frequency (MHz) |
| GFSK                              | CH0     | 2402            |
|                                   | CH19    | 2440            |
|                                   | CH39    | 2480            |

### 2.5. Test environment conditions

During the measurement the environmental conditions were within the listed ranges:

|                    |           |
|--------------------|-----------|
| Temperature range: | 21-25°C   |
| Humidity range:    | 40-75%    |
| Pressure range:    | 86-106kPa |

## 2.6. Deviations of test standard

No Deviation.

## 2.7. Test laboratory

Dongguan Dongdian Testing Service Co., Ltd

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808

Tel: +86-0769-38826678, <http://www.dgddt.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com)

CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

FCC Designation Number: CN1182; FCC Test Firm Registration Number: 540522

Industry Canada site registration number: 10288A-1

## 2.8. Measurement uncertainty

| Test Item  | Uncertainty   |
|--|---|
| Bandwidth  | 1.1%  |
| Peak Output Power (Conducted) (Spectrum analyzer)    | 0.86dB (10MHz ≤ f < 3.6GHz);<br>1.38dB (3.6GHz ≤ f < 8GHz)                              |
| Peak Output Power (Conducted) (Power Sensor)         | 0.74dB  |
| Power Spectral Density                               | 0.74dB (10MHz ≤ f < 3.6GHz);<br>1.38dB (3.6GHz ≤ f < 8GHz)                              |
| Frequencies Stability                                | $6.7 \times 10^{-8}$ (Antenna couple method)<br>$5.5 \times 10^{-8}$ (Conducted method) |
| Conducted spurious emissions                         | 0.86dB (1 MHz ≤ f < 3.6GHz);<br>1.40dB (3.6GHz ≤ f < 8GHz)<br>1.66dB (8GHz ≤ f < 22GHz) |
| Uncertainty for radio frequency (RBW<20kHz)          | $3 \times 10^{-8}$  |
| Temperature  | 0.4 °C  |
| Humidity   | 2%  |
| Uncertainty for Radiation Emission test (30MHz-1GHz) | 4.70dB (Antenna Polarize: V)<br>4.84dB (Antenna Polarize: H)<br>4.10dB (1-6GHz)         |
| Uncertainty for Radiation Emission test (1GHz-40GHz) | 4.40dB (6GHz-18GHz)<br>3.54dB (18GHz-26GHz)<br>4.30dB (26GHz-40GHz)                     |
| Uncertainty for Power line conduction emission test  | 3.32dB (150kHz-30MHz)   |

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

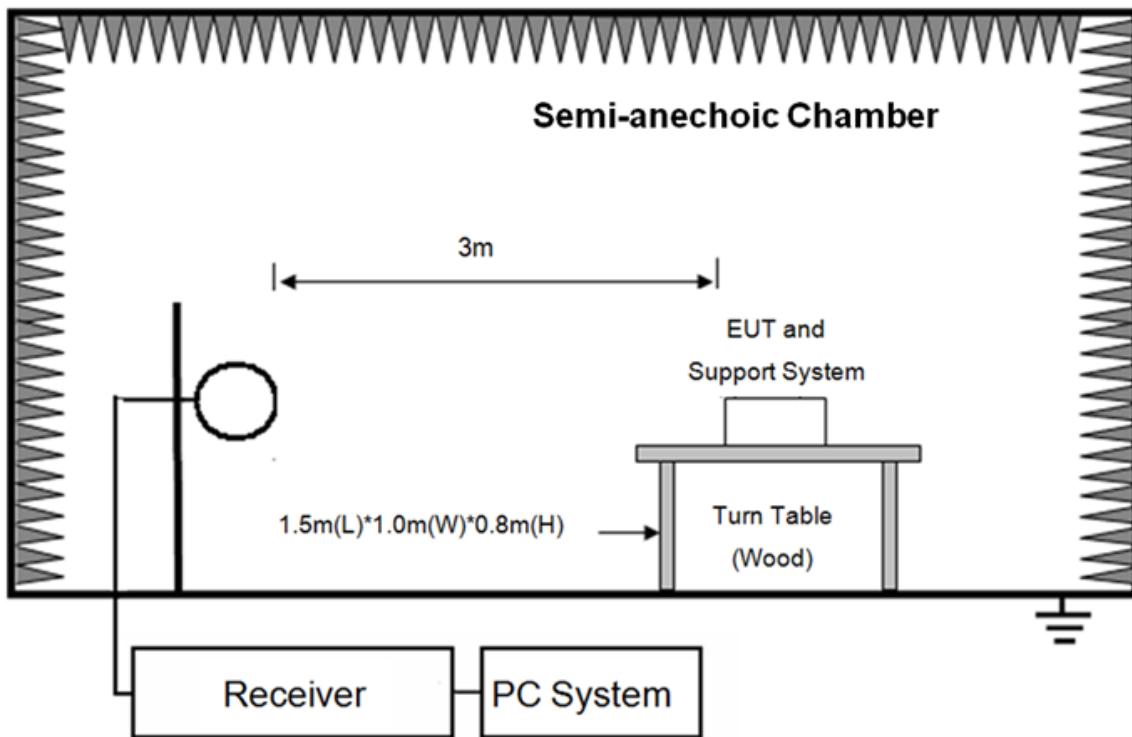
### 3. Equipment used during test

| Equipment   | Manufacturer | Model No.        | Serial No.           | Last Cal.     | Cal. Interval |
|---|--------------|------------------|----------------------|---------------|---------------|
| <input checked="" type="checkbox"/> <b>Radiation 1#chamber</b>                    |              |                  |                      |               |               |
| EMI Test Receiver   | R&S          | ESU8             | 100316               | Sep. 24, 2020 | 1 Year        |
| Spectrum analyzer   | Agilent      | E4447A           | MY50180031           | Jul. 01, 2020 | 1 Year        |
| Trilog Broadband Antenna  | Schwarzbeck  | VULB9163         | 9163-462             | Nov. 15, 2019 | 1 Year        |
| Active Loop antenna   | Schwarzbeck  | FMZB-1519        | 1519-038             | Nov. 15, 2019 | 1 Year        |
| Double Ridged Horn Antenna  | R&S          | HF907            | 100276               | Nov. 15, 2019 | 1 Year        |
| Broad Band Horn Antenna   | Schwarzbeck  | BBHA 9170        | 790                  | Apr. 11, 2020 | 1 Year        |
| Pre-amplifier   | A.H.         | PAM-0118         | 360                  | Sep. 28, 2020 | 1 Year        |
| RF Cable  | HUBSER       | CP-X2+<br>CP-X1  | W11.03+<br>W12.02    | Sep. 24, 2020 | 1 Year        |
| RF Cable  | N/A          | 5m+6m+1m         | 06270619             | Sep. 30, 2020 | 1 Year        |
| MI Cable  | HUBSER       | C10-01-01-1<br>M | 1091629              | Sep. 30, 2020 | 1 Year        |
| Test software   | Audix        | E3               | V 6.11111b           | N/A           | N/A           |
| <input type="checkbox"/> <b>Radiation 2#chamber</b>                               |              |                  |                      |               |               |
| EMI Test Receiver   | R&S          | ESCI             | 101364               | Sep. 28, 2020 | 1 Year        |
| Spectrum analyzer   | Agilent      | E4447A           | MY50180031           | Jul. 01, 2020 | 1 Year        |
| Trilog Broadband Antenna  | Schwarzbeck  | VULB 9163        | 9163-994             | Nov. 15, 2019 | 1 Year        |
| Active Loop antenna   | Schwarzbeck  | FMZB-1519        | 1519-038             | Nov. 15, 2019 | 1 Year        |
| Double Ridged Horn Antenna  | Schwarzbeck  | BBHA9120         | 02108                | Jul. 11, 2020 | 1 Year        |
| Broad Band Horn Antenna   | Schwarzbeck  | BBHA 9170        | 790                  | Apr. 11, 2020 | 1 Year        |
| Pre-amplifier   | TERA-MW      | TRLA-0040<br>G35 | 1013<br>03           | Sep. 28, 2020 | 1 Year        |
| RF Cable  | N/A          | 14+1.5m          | 06270619             | Sep. 28, 2020 | 1 Year        |
| Test software   | Audix        | E3               | V 6.11111b           | N/A           | N/A           |
| <input checked="" type="checkbox"/> <b>Power Line Conducted Emissions Test 1#</b> |              |                  |                      |               |               |
| EMI Test Receiver   | R&S          | ESU8             | 100316               | Sep. 24, 2020 | 1 Year        |
| LISN 1  | R&S          | ENV216           | 101109               | Sep. 28, 2020 | 1 Year        |
| LISN 2  | R&S          | ESH2-Z5          | 100309               | Sep. 28, 2020 | 1 Year        |
| Pulse Limiter   | R&S          | ESH3-Z2          | 101242               | Sep. 24, 2020 | 1 Year        |
| CE Cable 1  | HUBSER       | N/A              | W10.01               | Sep. 24, 2020 | 1 Year        |
| Test software   | Audix        | E3               | V 6.11111b           | N/A           | N/A           |
| <input type="checkbox"/> <b>Power Line Conducted Emissions Test 2#</b>            |              |                  |                      |               |               |
| Test Receiver   | R&S          | ESPI             | 101761               | Sep. 24, 2020 | 1 Year        |
| LISN 1  | R&S          | ENV216           | 101170               | Sep. 28, 2019 | 1 Year        |
| LISN 2  | R&S          | ESH2-Z5          | 100309               | Sep. 29, 2019 | 1 Year        |
| Pulse Limiter   | R&S          | KH43101          | 43101180156<br>8-12# | Jul. 01, 2020 | 1 Year        |
| CE Cable 2  | HUBSER       | N/A              | W11.02               | Sep. 24, 2020 | 1 Year        |
| Test software   | Audix        | E3               | V 6.11111b           | N/A           | N/A           |

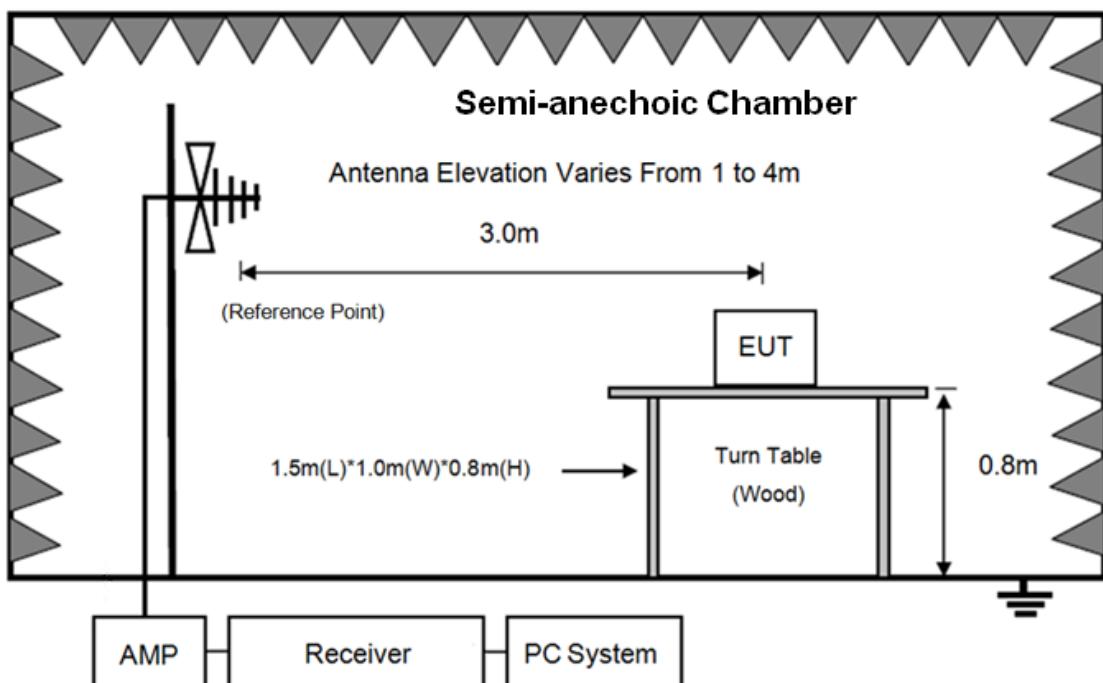
## 4. Radiated emission

### 4.1. Block diagram of test setup

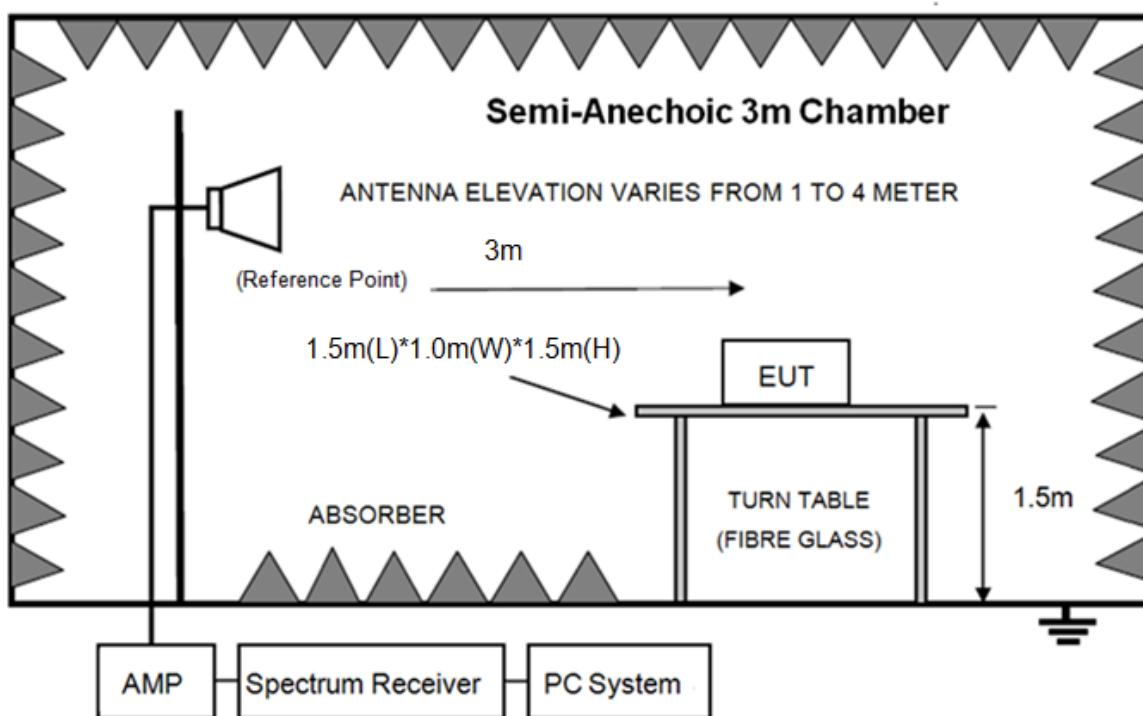
In 3m Anechoic Chamber Test Setup Diagram for 9kHz-30MHz



In 3m Anechoic Chamber Test Setup Diagram for 30MHz-1GHz



In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test an appropriate high pass filter was inserted in the input port of AMP.

## 4.2. Limit

### 8.2.1 FCC 15.205 Restricted frequency band

| MHz               | MHz                 | MHz           | GHz              |
|-------------------|---------------------|---------------|------------------|
| 0.090-0.110       | 16.42-16.423        | 399.9-410     | 4.5-5.15         |
| 10.495-0.505      | 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        |
| 4.1772&4.17775    | 37.5-38.25          | 1435-1626.5   | 9.0-9.2          |
| 4.2072&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> ) |
| 13.36-13.41       |                     |               |                  |

### 8.2.2 FCC 15.209 Limit.

| FREQUENCY<br>MHz | DISTANCE<br>Meters | FIELD STRENGTHS LIMIT                                       |                |
|------------------|--------------------|---|----------------|
|                  |                    | $\mu$ V/m   | dB( $\mu$ V)/m |
| 0.009 ~ 0.490    | 300                | 2400/F(kHz)   | 67.6-20log(F)  |
| 0.490 ~ 1.705    | 30                 | 24000/F(kHz)  | 87.6-20log(F)  |
| 1.705 ~ 30.0     | 30                 | 30  | 29.54          |
| 30 ~ 88          | 3                  | 100   | 40.0           |
| 88 ~ 216         | 3                  | 150   | 43.5           |
| 216 ~ 960        | 3                  | 200   | 46.0           |
| 960 ~ 1000       | 3                  | 500   | 54.0           |
| Above 1000       | 3                  | 74.0 dB( $\mu$ V)/m (Peak)<br>54.0 dB( $\mu$ V)/m (Average) |                |

Note: (1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3m}(\text{dBuV}/\text{m}) = \text{Limit}_{30m}(\text{dBuV}/\text{m}) + 40\text{Log}(30m/3m)$$

### 8.2.3 Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

### 4.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber for below 1G and 150 cm above the ground plane inside a semi-anechoic chamber for above 1G.
- (2) Test antenna was located 3m from the EUT on an adjustable mast, and the antenna used as below table.

| Test frequency range | Test antenna used                      | Test antenna distance |
|----------------------|--|-----------------------|
| 9kHz-30MHz           | Active Loop antenna                    | 3m                    |
| 30MHz-1GHz           | Trilog Broadband Antenna               | 3m                    |
| 1GHz-18GHz           | Double Ridged Horn Antenna(1GHz-18GHz) | 3m                    |
| 18GHz-40GHz          | Horn Antenna(18GHz-40GHz)              | 1m                    |

According ANSI C63.10:2013 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also

be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

(3) Below pre-scan procedure was first performed in order to find prominent frequency spectrum radiated emissions from 9kHz to 25GHz:

(a) Scanning the peak frequency spectrum with the antenna specified in step (3), and the EUT was rotated 360 degree, the antenna height was varied from 1m to 4m (Except loop antenna, it's fixed 1m above ground.)

(b) Change work frequency or channel of device if practicable.

(c) Change modulation type of device if practicable.

(d) Change power supply range from 85% to 115% of the rated supply voltage

(e) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions.

Spectrum frequency from 9kHz to 25GHz (tenth harmonic of fundamental frequency) was investigated, and no any obvious emission were detected from 9kHz to 30MHz and 18GHz to 25GHz, so below final test was performed with frequency range from 30MHz to 18GHz.

(4) For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013 on Radiated Emission test.

(5) The emissions from 9kHz to 1GHz were measured based on CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz, for emissions from 9kHz-90kHz,110kHz-490kHz and above 1GHz were measured based on average detector, for emissions above 1GHz, peak emissions also be measured and need comply with Peak limit.

(6) The emissions from 9kHz to 1GHz, QP or average values were measured with EMI receiver with below RBW

| Frequency band | RBW    |
|----------------|--------|
| 9kHz-150kHz    | 200Hz  |
| 150kHz-30MHz   | 9kHz   |
| 30MHz-1GHz     | 120kHz |

(7) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure (according ANSI C63.10:2013 clause 4.1.4.2.2 procedure for average measure).

(8) X axis, Y axis, Z axis are tested, and worse setup X axis is reported.

#### 4.4. Test result

##### **PASS. (See below detailed test result)**

All the emissions except fundamental emission from 9kHz to 25GHz were comply with 15.209 limit.

Note1: According exploratory test no any obvious emission was detected from 9kHz to 30MHz and 18GHz to 25GHz, so the final test was performed with frequency range from 30MHz to 18GHz and recorded in below.

Note2: For emissions below 1GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1GHz, the final test was only performed with EUT working in GFSK, Tx 2480MHz mode.

Note3: For emissions above 1GHz. If peak results comply with AV limit, AV Result is deemed to comply with AV limit.

## Radiated Emission test (below 1GHz)

## TR-4-E-009 Radiated Emission Test Result

Test Site : DDT 3m Chamber 1#

D:\2020 RE 1# Report data\Q20102804-1E\FCC BELOW 1G.EM6

Test Date : 2020-10-30

Tested By : Kennys

EUT : Portable Bluetooth Speaker

Model Number : CHARGE4Q

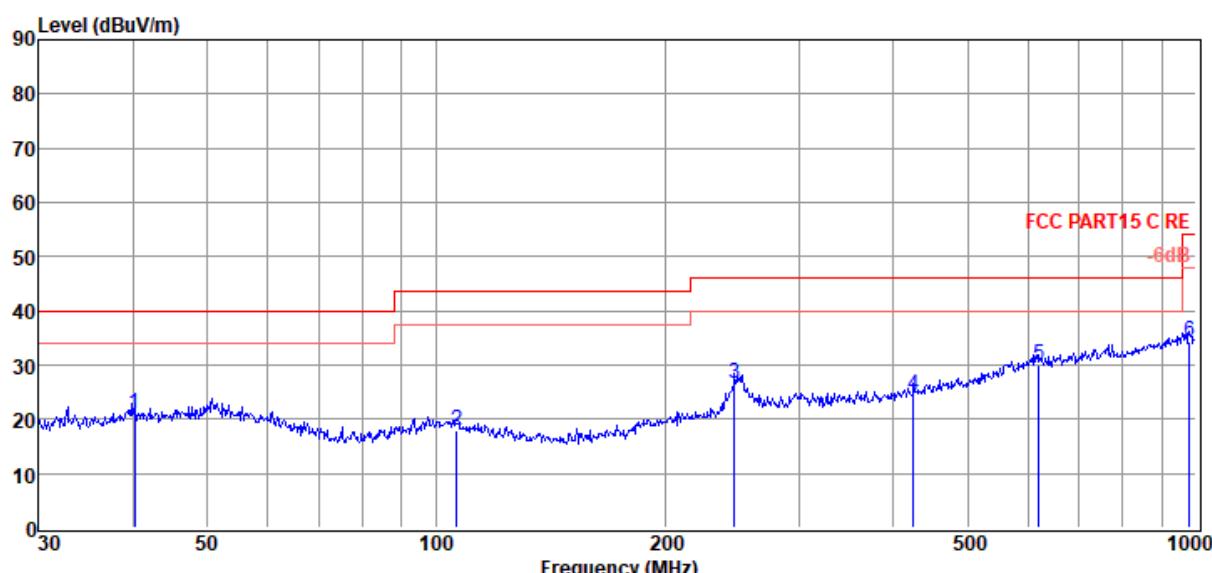
Power Supply : Battery

Test Mode : Tx mode

Condition : Temp:24.5°C,Humi:45%,Press:101.3kPa

Antenna/Distance : 2019 VULB 9163 1#/3m/HORIZONTAL

Memo :



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dB $\mu$ V) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>dB | Result<br>Level<br>(dB $\mu$ V/m) | Limit<br>Line<br>(dB $\mu$ V/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------------|-----------------------------|---------------------|-----------------------------------|---------------------------------|-----------------------|----------|--------------|
| 1              | 40.14          | 3.36                          | 13.71                       | 3.91                | 20.98                             | 40.00                           | -19.02                | QP       | HORIZONTAL   |
| 2              | 106.39         | 1.97                          | 11.51                       | 4.46                | 17.94                             | 43.50                           | -25.56                | QP       | HORIZONTAL   |
| 3              | 246.82         | 8.51                          | 12.80                       | 5.28                | 26.59                             | 46.00                           | -19.41                | QP       | HORIZONTAL   |
| 4              | 425.03         | 2.62                          | 15.82                       | 6.06                | 24.50                             | 46.00                           | -21.50                | QP       | HORIZONTAL   |
| 5              | 620.71         | 3.85                          | 19.35                       | 6.81                | 30.01                             | 46.00                           | -15.99                | QP       | HORIZONTAL   |
| 6              | 979.18         | 3.75                          | 22.60                       | 7.91                | 34.26                             | 54.00                           | -19.74                | QP       | HORIZONTAL   |

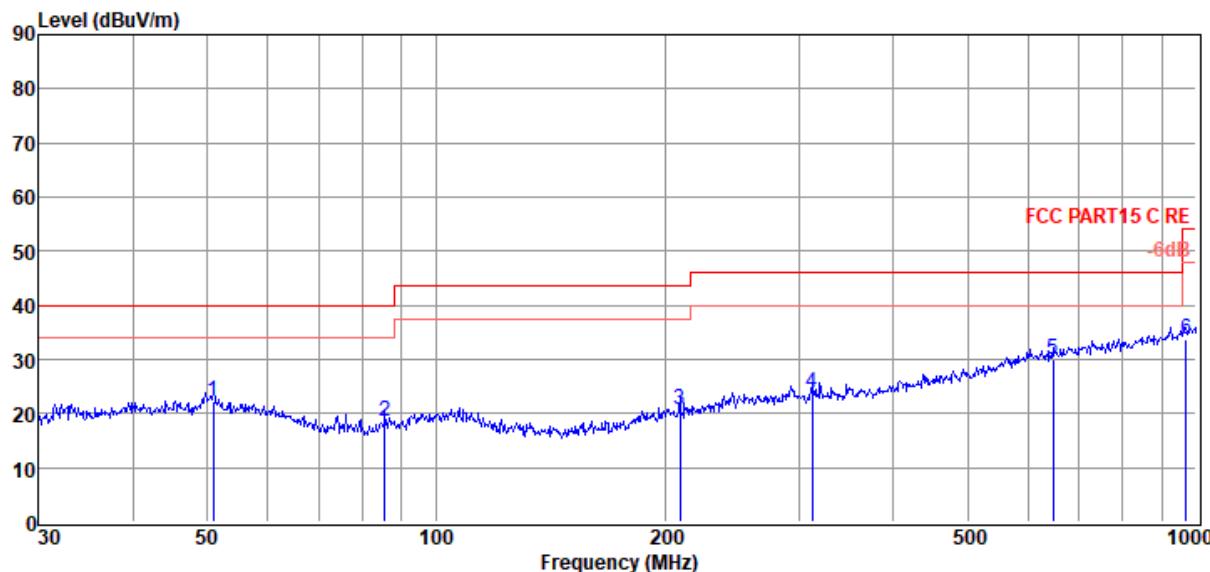
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

# TR-4-E-009 Radiated Emission Test Result

**Test Site** : DDT 3m Chamber 1# D:\2020 RE 1# Report data\Q20102804-1E\FCC BELOW  
**Test Date** : 2020-10-30 **Tested By** : Kennys  
**EUT** : Portable Bluetooth Speaker **Model Number** : CHARGE4Q  
**Power Supply** : Battery **Test Mode** : Tx mode  
**Condition** : Temp:24.5°C,Humi:45%,Press:101.3kPa **Antenna/Distance** : 2019 VULB 9163 1#/3m/VERTICAL  
**Memo** :



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dB $\mu$ V) | Antenna<br>Factor<br>(dB/m) | Cable<br>Loss<br>dB | Result<br>Level<br>(dB $\mu$ V/m) | Limit<br>Line<br>(dB $\mu$ V/m) | Over<br>Limit<br>(dB) | Detector | Polarization |
|----------------|----------------|-------------------------------|-----------------------------|---------------------|-----------------------------------|---------------------------------|-----------------------|----------|--------------|
| 1              | 50.94          | 4.17                          | 14.08                       | 4.00                | 22.25                             | 40.00                           | -17.75                | QP       | VERTICAL     |
| 2              | 85.60          | 4.14                          | 10.13                       | 4.30                | 18.57                             | 40.00                           | -21.43                | QP       | VERTICAL     |
| 3              | 209.31         | 4.02                          | 11.70                       | 5.08                | 20.80                             | 43.50                           | -22.70                | QP       | VERTICAL     |
| 4              | 312.18         | 3.85                          | 14.27                       | 5.58                | 23.70                             | 46.00                           | -22.30                | QP       | VERTICAL     |
| 5              | 647.39         | 3.60                          | 19.55                       | 6.91                | 30.06                             | 46.00                           | -15.94                | QP       | VERTICAL     |
| 6              | 968.93         | 3.46                          | 22.50                       | 7.89                | 33.85                             | 54.00                           | -20.15                | QP       | VERTICAL     |

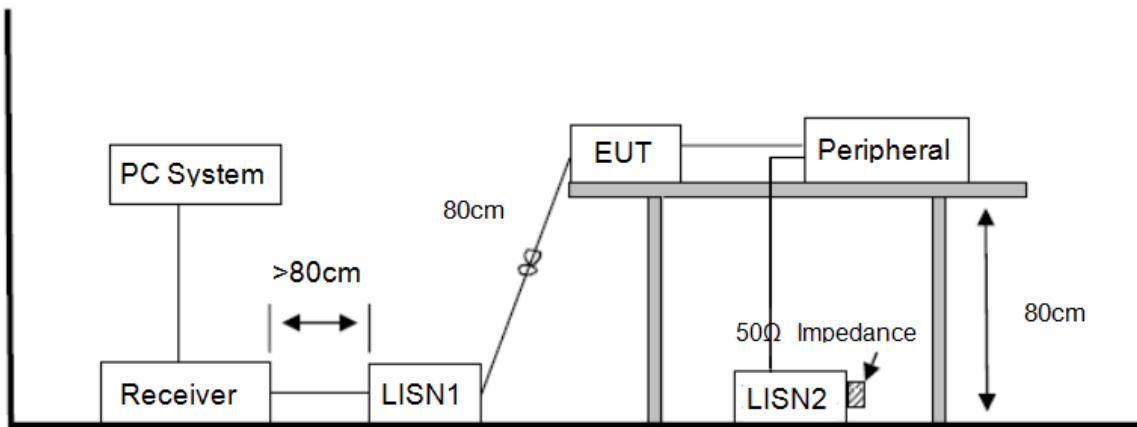
Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.

2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.

3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

## 5. Power Line Conducted Emission

### 5.1. Block diagram of test setup



### 5.2. Power Line Conducted Emission Limits

| Frequency       | 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                            |

Note 1: \* Decreasing linearly with logarithm of frequency.

Note 2: The lower limit shall apply at the transition frequencies.

### 5.3. Test Procedure

The EUT and Support equipment, if needed, were put placed on a non-metallic table, 80cm above the ground plane.

Configuration EUT to simulate typical usage as described in clause 2.4 and test equipment as described in clause 10.2 of this report.

All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.

All support equipment power received from a second LISN.

Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.

The Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

During the above scans, the emissions were maximized by cable manipulation.

The test mode(s) described in clause 2.4 were scanned during the preliminary test.

After the preliminary scan, we found the test mode producing the highest emission level.

The EUT configuration and worse cable configuration of the above highest emission levels were recorded for reference of the final test.

EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.

A scan was taken on both power lines, Neutral and Line, recording at least the six highest emissions.

Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.

The test data of the worst-case condition(s) was recorded.

The bandwidth of test receiver is set at 9 kHz.

#### 5.4. Test Result

**PASS. (See below detailed test result)**

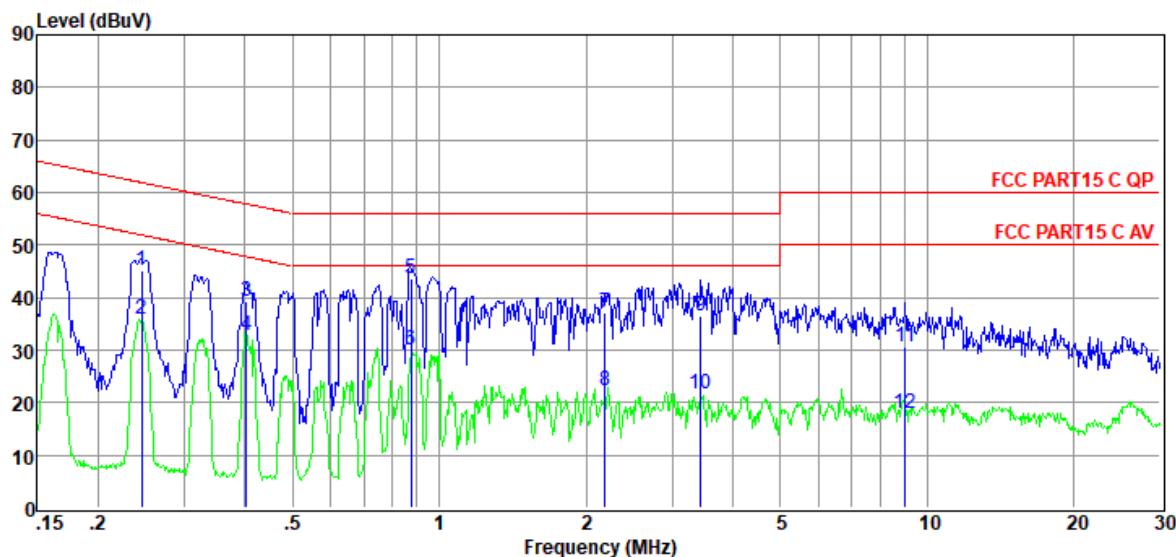
Note1: All emissions not reported below are too low against the prescribed limits.

Note2: “-----” means Peak detection; “-----” means Average detection

Note3: Pre-test AC conducted emission at both voltage AC 120V/60Hz and AC 240V/60Hz, recorded worse case (AC 120V/60Hz).

# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **Tested By** : Bote Huang  
**Test Date** : 2020-10-29 **Model Number** : CHARGE4Q  
**EUT** : Portable Bluetooth Speaker **Test Mode** : Tx mode  
**Power Supply** : AC 120V/60Hz **LISN** : 2019 ENV216 1#/LINE  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4KPa **Memo** :



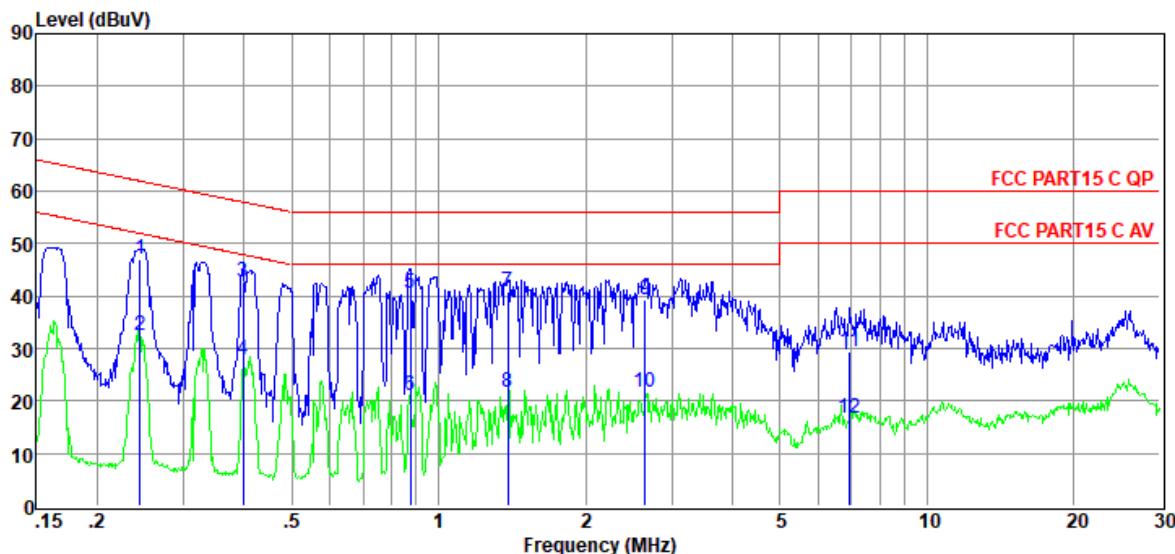
| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dB $\mu$ V) | LISN<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Pulse<br>Limiter<br>Factor<br>(dB) | Result<br>Level<br>(dB $\mu$ V) | Limit<br>Line<br>(dB $\mu$ V) | Over<br>Limit<br>(dB) | Detector | Phase |
|----------------|----------------|-------------------------------|------------------------|-----------------------|------------------------------------|---------------------------------|-------------------------------|-----------------------|----------|-------|
| 1              | 0.25           | 25.54                         | 9.60                   | 0.02                  | 9.86                               | 45.02                           | 61.91                         | -16.89                | QP       | LINE  |
| 2              | 0.25           | 16.25                         | 9.60                   | 0.02                  | 9.86                               | 35.73                           | 51.91                         | -16.18                | Average  | LINE  |
| 3              | 0.40           | 19.68                         | 9.60                   | 0.02                  | 9.86                               | 39.16                           | 57.81                         | -18.65                | QP       | LINE  |
| 4              | 0.40           | 13.25                         | 9.60                   | 0.02                  | 9.86                               | 32.73                           | 47.81                         | -15.08                | Average  | LINE  |
| 5              | 0.88           | 23.99                         | 9.60                   | 0.03                  | 9.86                               | 43.48                           | 56.00                         | -12.52                | QP       | LINE  |
| 6              | 0.88           | 10.43                         | 9.60                   | 0.03                  | 9.86                               | 29.92                           | 46.00                         | -16.08                | Average  | LINE  |
| 7              | 2.19           | 17.73                         | 9.60                   | 0.05                  | 9.86                               | 37.24                           | 56.00                         | -18.76                | QP       | LINE  |
| 8              | 2.19           | 2.63                          | 9.60                   | 0.05                  | 9.86                               | 22.14                           | 46.00                         | -23.86                | Average  | LINE  |
| 9              | 3.44           | 16.98                         | 9.60                   | 0.07                  | 9.87                               | 36.52                           | 56.00                         | -19.48                | QP       | LINE  |
| 10             | 3.44           | 2.12                          | 9.60                   | 0.07                  | 9.87                               | 21.66                           | 46.00                         | -24.34                | Average  | LINE  |
| 11             | 9.01           | 10.88                         | 9.60                   | 0.11                  | 9.89                               | 30.48                           | 60.00                         | -29.52                | QP       | LINE  |
| 12             | 9.01           | -1.57                         | 9.60                   | 0.11                  | 9.89                               | 18.03                           | 50.00                         | -31.97                | Average  | LINE  |

Note:

1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

# TR-4-E-010 Conducted Emission Test Result

**Test Site** : DDT 1# Shield Room **Tested By** : Bote Huang  
**Test Date** : 2020-10-29 **Model Number** : CHARGE4Q  
**EUT** : Portable Bluetooth Speaker **Test Mode** : Tx mode  
**Power Supply** : AC 120V/60Hz **LISN** : 2019 ENV216 1#/NEUTRAL  
**Condition** : Temp:24.5°C,Humi:55%,Press:101.4KPa **Memo** :



| Item<br>(Mark) | Freq.<br>(MHz) | Read<br>Level<br>(dB $\mu$ V) | LISN<br>Factor<br>(dB) | Cable<br>Loss<br>(dB) | Pulse<br>Limiter<br>Factor<br>(dB) | Result<br>Level<br>(dB $\mu$ V) | Limit<br>Line<br>(dB $\mu$ V) | Over<br>Limit<br>(dB) | Detector | Phase   |
|----------------|----------------|-------------------------------|------------------------|-----------------------|------------------------------------|---------------------------------|-------------------------------|-----------------------|----------|---------|
| 1              | 0.24           | 27.61                         | 9.60                   | 0.02                  | 9.86                               | 47.09                           | 61.95                         | -14.86                | QP       | NEUTRAL |
| 2              | 0.24           | 13.01                         | 9.60                   | 0.02                  | 9.86                               | 32.49                           | 51.95                         | -19.46                | Average  | NEUTRAL |
| 3              | 0.40           | 23.05                         | 9.60                   | 0.02                  | 9.86                               | 42.53                           | 57.90                         | -15.37                | QP       | NEUTRAL |
| 4              | 0.40           | 8.23                          | 9.60                   | 0.02                  | 9.86                               | 27.71                           | 47.90                         | -20.19                | Average  | NEUTRAL |
| 5              | 0.88           | 20.97                         | 9.60                   | 0.03                  | 9.86                               | 40.46                           | 56.00                         | -15.54                | QP       | NEUTRAL |
| 6              | 0.88           | 1.58                          | 9.60                   | 0.03                  | 9.86                               | 21.07                           | 46.00                         | -24.93                | Average  | NEUTRAL |
| 7              | 1.39           | 21.47                         | 9.60                   | 0.04                  | 9.86                               | 40.97                           | 56.00                         | -15.03                | QP       | NEUTRAL |
| 8              | 1.39           | 2.24                          | 9.60                   | 0.04                  | 9.86                               | 21.74                           | 46.00                         | -24.26                | Average  | NEUTRAL |
| 9              | 2.65           | 19.66                         | 9.60                   | 0.06                  | 9.86                               | 39.18                           | 56.00                         | -16.82                | QP       | NEUTRAL |
| 10             | 2.65           | 2.21                          | 9.60                   | 0.06                  | 9.86                               | 21.73                           | 46.00                         | -24.27                | Average  | NEUTRAL |
| 11             | 6.95           | 9.78                          | 9.60                   | 0.09                  | 9.88                               | 29.35                           | 60.00                         | -30.65                | QP       | NEUTRAL |
| 12             | 6.95           | -2.87                         | 9.60                   | 0.09                  | 9.88                               | 16.70                           | 50.00                         | -33.30                | Average  | NEUTRAL |

Note:

1. Result Level = Read Level +LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.

**END OF REPORT**