



Shenzhen Asia Test Technology Co., Ltd.

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FCC RADIO TEST REPORT

FCC ID: 2AML6BB1

Product : BLUETOOTH SPEAKER

Trade Name : KINGRAY

Model Name : BB1

Addition Model : BB141, BB142, BB730, G0479, G0478,
BK688, BK169

Prepared for

KINGRAY ELECTRONICS Co., LTD

Building B, Ge Tailong Industrial Park , No.445, Bulong Rd , BanTian ,
LongGang , Shenzhen , China

Prepared by

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Shenzhen, China



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TEST RESULT CERTIFICATION

Manufacturer's Name..... : KINGRAY ELECTRONICS Co., LTD

Address : Address :Building B, Ge Tailong Industrial Park , No.445, Bulong Rd , BanTian , LongGang , Shenzhen , China

Product description

Product name : BLUETOOTH SPEAKER

Model and/or type reference : BB1, BB141, BB142, BB730, G0479, G0478, BK688, BK169

Rating(s)..... : DC 3.7V

Standards : FCC Part15.249

Test procedure ANSI C63.10-2013

This device described above has been tested by ATT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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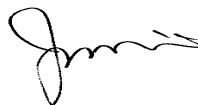
Date of Test..... :

Date (s) of performance of tests : Jul. 02 2017 ~ Jul. 12 2017

Date of Issue..... : Jul.12 2017

Test Result..... : **Pass**

Reviewed by: Seal-Chen

Approved by: 



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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| Test | Test Requirement | Standard Paragraph | Result |
|--|--|---|--------|
| Field Strength of Fundamental | FCC PART 15 C section 15.249 (a) | ANSI C63.10: Clause 6.6 | PASS |
| Field Strength of Unwanted Emissions | FCC PART 15 C section 15.249 (a) section 15.249 (d) | ANSI C63.10: Clause 6.4, 6.6 and 6.7 | PASS |
| Band Edges | FCC PART 15 C section 15.249 (d) | ANSI C63.10: Clause 6.9.2 | PASS |
| Occupied Bandwidth | FCC PART 15 C section 15.215(c) | ANSI C63.10: Clause 6.9.1 | PASS |
| Conducted Emissions at Mains Terminals | FCC PART 15 C section 15.207 | ANSI C63.10: Clause 6.2 | PASS |
| Antenna Requirement | FCC PART 15 C section 15.203 | FCC PART 15 C section 15.203 | PASS |



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1.1 TEST FACILITY

The test facility is recognized, certified or accredited by the following organizations:

.CNAS- Registration No: L6177

Dongguan Yaxu (AiT) technology Limited is accredited to ISO/IEC 17025:2005 general Requirements for the competence of testing and calibration laboratories (CNAS-CL01 Accreditation Criteria for the competence of testing and calibration laboratories) on Apr. 18, 2013

.FCC- Registration No: 248337

The 3m Semi-Anechoic Chamber, 3m/10m Open Area Test Site and Shielding Room of Dongguan Yaxu (AiT) Technology Limited have been registered by Federal Communications Commission (FCC) on Aug.29, 2014.

.Industry Canada(IC)-Registration No: IC6819A-1

The 3m Semi-Anechoic Chamber and 3m of Dongguan Yaxu (AiT) Technology Limited have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing on Oct. 01, 2014.

.VCCI- Registration No: 2705

The 3m/10m Open Area Test Site, Shielding Room and 3m Chamber of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on Nov. 21, 2012. The Telecommunication Ports Conducted Disturbance Measurement of Dongguan Yaxu (AiT) Technology Limited have been registered by Voluntary Control Council for Interference on May. 13, 2013.

.TUV NORD

Dongguan Yaxu (AiT) Technology Limited has been assessed on Jun. 13, 2013 that it can carry out EMC tests by order and under supervision of TUV NORD.

.ITS- Registration No: TMPSHA031

Dongguan Yaxu (AiT) Technology Limited has been assessed and included in Intertek Shanghai TMP Program regarding Laboratory facilities and test equipment on Jul.22, 2012.

1.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

| No. | Item | Uncertainty |
|-----|------------------------------|---------------------------|
| 1 | Conducted Emission Test | $\pm 1.38\text{dB}$ |
| 2 | RF power,conducted | $\pm 0.16\text{dB}$ |
| 3 | Spurious emissions,conducted | $\pm 0.21\text{dB}$ |
| 4 | All emissions,radiated(<1G) | $\pm 4.68\text{dB}$ |
| 5 | All emissions,radiated(>1G) | $\pm 4.89\text{dB}$ |
| 6 | Temperature | $\pm 0.5^{\circ}\text{C}$ |
| 7 | Humidity | $\pm 2\%$ |



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2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | |
|-----------------------------------|--|
| EUT Name: | BLUETOOTH SPEAKER |
| Model No.: | BB1 |
| Addition Model: | BB141, BB142, BB730, G0479, G0478, BK688, BK169 |
| Model Differences: | All models are identical except model name and colors. |
| Operation frequency: | 2402 MHz to 2480 MHz |
| Bluetooth Version | BT 2.1 |
| Number of channel: | 79 channels |
| Modulation Type and Antenna Type: | GFSK PCB antenna |
| H/W No.: | V3.0 |
| S/W No.: | V4.2 |
| Antenna Gain: | 0 dBi |
| Brand Name: | KINGRAY |
| Derivative model No.: | N/A |
| Power Supply Range: | DC 3.7V by battery |
| Power Cord: | N/A |
| Signal Cable: | N/A |

| Description of Channel: | | | | | |
|-------------------------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 01 | 2402 | 39 | 2440 | 77 | 2478 |
| 02 | 2403 | 40 | 2441 | 78 | 2479 |
| 03 | 2404 | 41 | 2442 | 79 | 2480 |
| 04 | ... | 42 | ... | | |
| 05 | ... | 43 | ... | | |
| 06 | ... | 44 | ... | | |



2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1 | CH1 |
| Mode 2 | CH39 |
| Mode 3 | CH79 |
| Mode 4 | Link |

| For Conducted Emission | |
|------------------------|-------------|
| Final Test Mode | Description |
| Mode 4 | Link |

| For Radiated Emission | |
|-----------------------|-------------|
| Final Test Mode | Description |
| Mode 1 | CH1 |
| Mode 2 | CH39 |
| Mode 3 | CH79 |
| Mode 4 | Link |

Note:

- (1) The measurements are performed at the highest, middle, lowest available channels. The EUT use full-charge battery.
- (2) Measurements are performed according to C63.10.
- (3) The relevant RF Conducted Measurement is performed by a temporary antenna connector, please refer to the Equipment List for the detail
- (4) Test perform on all mode, only records worse cases in the test report.
- (5) The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitter signals.

Example:

Frequency used:2402 - 2480 MHz

79 Channels (Ch 1 - Ch 79)

Hopping Sequence in Data Mode

55,48,26,33,52,35,50,65,54,67,15,08,64,49,66,53,22,25,63,04,41,05,24,43,73,07,75,28,56,37,60,39,58,69,16,40,21,44,23,42,13,17,46,02,51,03,11,29,77,47,62,27,71,10,68,32,57,12,59,72,30,76,31,18,74,61,14,70,36,06,09,45,19,20,34,38,78,00,01



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2.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

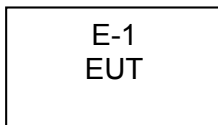
The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. There are 79 channels of EUT, and the test carried out at the lowest channel, middle channel and highest channel .

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of FHSS

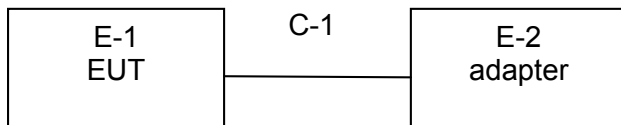
| | | | |
|-----------------------|----------------------------|----------|----------|
| Test software Version | Test program: CW6611D_V4.2 | | |
| Frequency | 2402 MHz | 2440 MHz | 2480 MHz |
| Parameters | Default | Default | Default |

2.4 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.5 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-------------------|-----------|----------------|------------|------|
| E-1 | BLUETOOTH SPEAKER | N/A | BB1 | N/A | EUT |
| E-2 | adapter | N/A | KS0501000 | | |
| | | | | | |
| | | | | | |



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| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| C-1 | NO | YES | 80 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



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2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

| Equipment No. | Instrument | Manufacturer | Model Name | Serial Number | Specification | Cal. Data |
|---------------|-------------------------|-------------------|------------|---------------|----------------|------------|
| 1 | Semi-anechoic chamber | Changzhou Chengyu | EC3088 | N/A | 9*6*6m | 10/25/2016 |
| 2 | Loop Antenna | TESEQ | HLA6120 | 35779 | 9kHz-30MHz | 06/05/2017 |
| 3 | Broadband antenna | R&S | VULB 9160 | VULB91 60-516 | 30MHz-1500 MHz | 10/25/2016 |
| 4 | Horn antenna | R&S | BBHA 9120D | 10087 | 1GHz-18GH z | 06/05/2017 |
| 5 | Horn Ant | Schwarzbeck | BBHA 9170 | 9170-181 | 15GHz-26.5GH z | 06/05/2017 |
| 6 | Test receiver | R&S | ESCI | 101686 | 9KHz-3GHz | 10/25/2016 |
| 7 | EMI Measuring Receiver | R&S | ESR | 101660 | 9KHz-40GHz | 10/25/2016 |
| 8 | Multi-device controller | MF | MF-7868 | MF78680 8762 | N/A | 10/25/2016 |
| 9 | Amplifier | EM | EM-30180 | 060538 | 1GHz-18GH z | 10/25/2016 |
| 10 | Amplifier | Schwarzbeck | BBV 9719 | BBV 9719-663 | 18GHz-26.5GH z | 06/05/2017 |
| 11 | Spectrum Analyzer | agilent | E4440B | US44300368 | 1GHz-26.5GH z | 06/05/2017 |
| 12 | Test receiver | R&S | ESCI | 101689 | 9KHz-3GHz | 10/25/2016 |
| 13 | LISN | R&S | NSLK81 26 | 8126466 | 9k-30MHz | 10/25/2016 |
| 14 | LISN | Narda | L2-16B | 5589756 | 9k-30MHz | 10/25/2016 |
| 15 | Radiated Cable 1# | FUJIKURA | 5D-2W | 01 | 30MHz-1GHz | 10/25/2016 |
| 16 | Radiated Cable 2# | FUJIKURA | 10D2W | 02 | 1GHz -25GHz | 10/25/2016 |
| 17 | Conducted Cable 1# | FUJIKURA | 1D-2W | 01 | 9KHz-30MHz | 10/25/2016 |



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| | | | | | | |
|---|-----------------------|-------|-----------|-----|-----|------------|
| 18 | SMA Antenna connector | Dosin | Dosin-SMA | N/A | N/A | 10/25/2016 |
| Note: The SMA antenna connector is soldered on the PCB board in order to perform conducted tests and this SMA antenna connector is listed in the equipment list. The Cal.Interval was one year | | | | | | |

3. ANTENNA REQUIREMENT

3.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 15.203: an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

3.2 EUT ANTENNA

The EUT antenna is PCB Antenna with 0dBi gain. It comply with the standard requirement.



3.3 CONDUCTED EMISSION MEASUREMENT

3.3.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | (dBuV) | | Standard |
|-----------------|------------|-----------|----------|
| | Quasi-peak | Average | |
| 0.15 -0.5 | 66 - 56 * | 56 - 46 * | FCC |
| 0.50 -5.0 | 56.00 | 46.00 | FCC |
| 5.0 -30.0 | 60.00 | 50.00 | FCC |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting |
|---------------------|----------|
| Attenuation | 10 dB |
| Start Frequency | 0.15 MHz |
| Stop Frequency | 30 MHz |
| IF Bandwidth | 9 kHz |



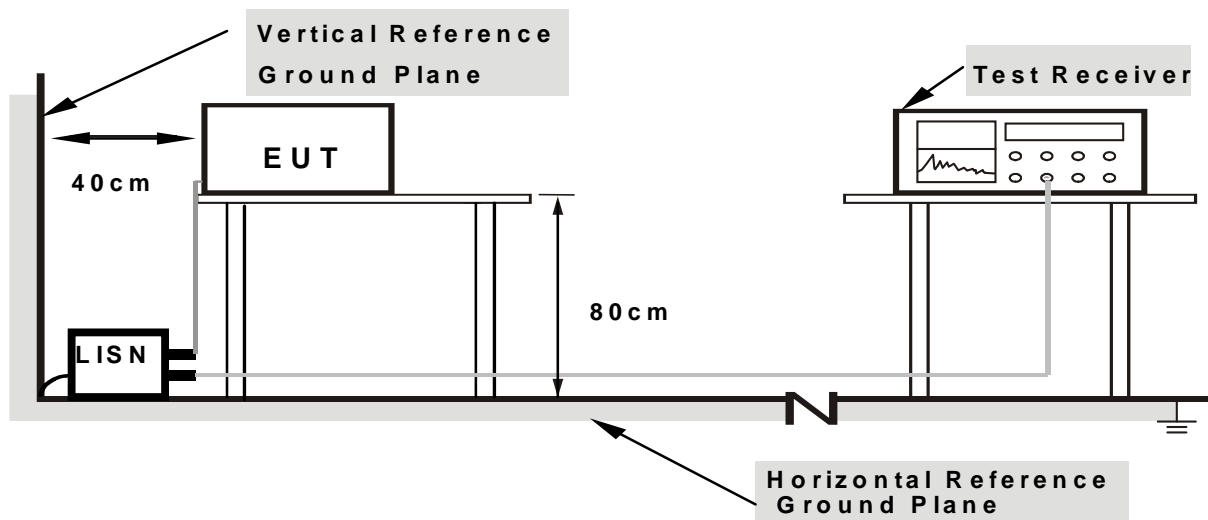
3.3.2 TEST PROCEDURE

- a. The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



Note: 1.Support units were connected to second LISN.

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes



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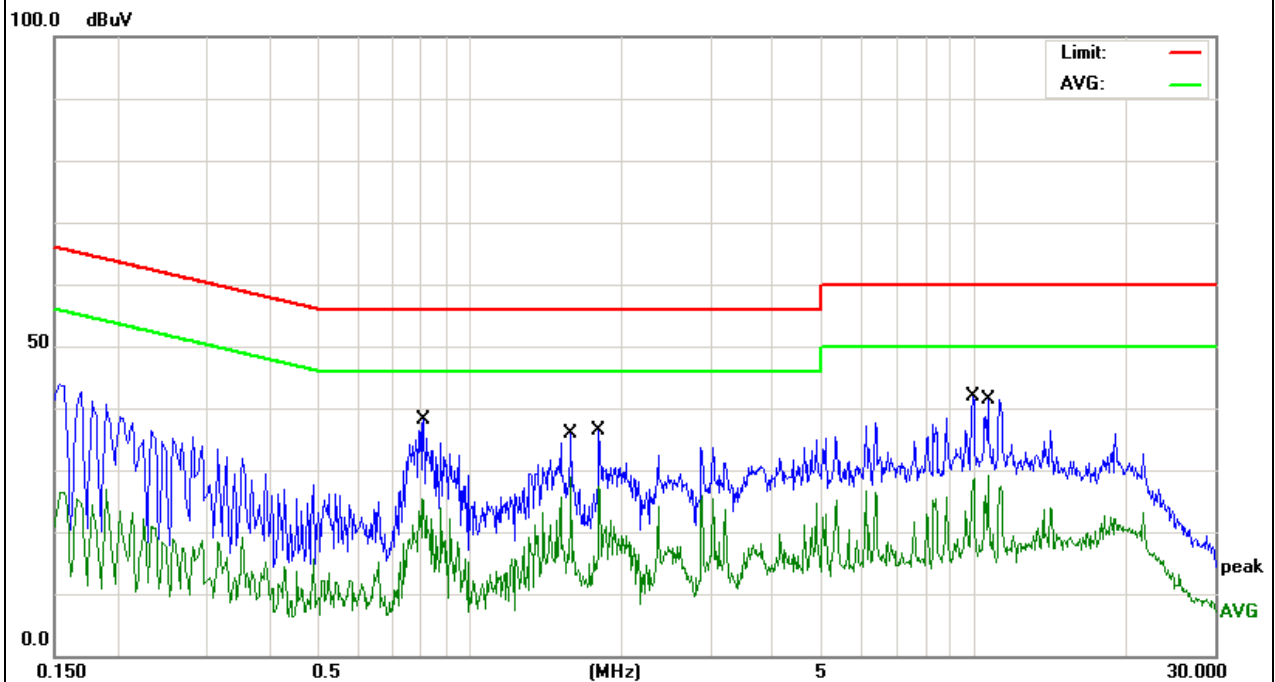
3.2.5 TEST RESULT

| | | | |
|----------------|---------------------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name. : | BB1 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Test Date : | 2017-07-10 |
| Test Mode : | Link | Phase : | L |
| Test Voltage : | DC 5V from charger AC 120V/60Hz | | |

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Detector | Comment |
|-----|-----|---------|---------------|----------------|-------------|-------|--------|----------|---------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.8059 | 15.34 | 9.92 | 25.26 | 46.00 | -20.74 | AVG | |
| 2 | | 0.8100 | 28.26 | 9.92 | 38.18 | 56.00 | -17.82 | QP | |
| 3 | * | 1.5859 | 18.86 | 9.93 | 28.79 | 46.00 | -17.21 | AVG | |
| 4 | | 1.8060 | 26.41 | 9.95 | 36.36 | 56.00 | -19.64 | QP | |
| 5 | | 9.9540 | 31.81 | 10.17 | 41.98 | 60.00 | -18.02 | QP | |
| 6 | | 10.6459 | 18.97 | 10.23 | 29.20 | 50.00 | -20.80 | AVG | |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit





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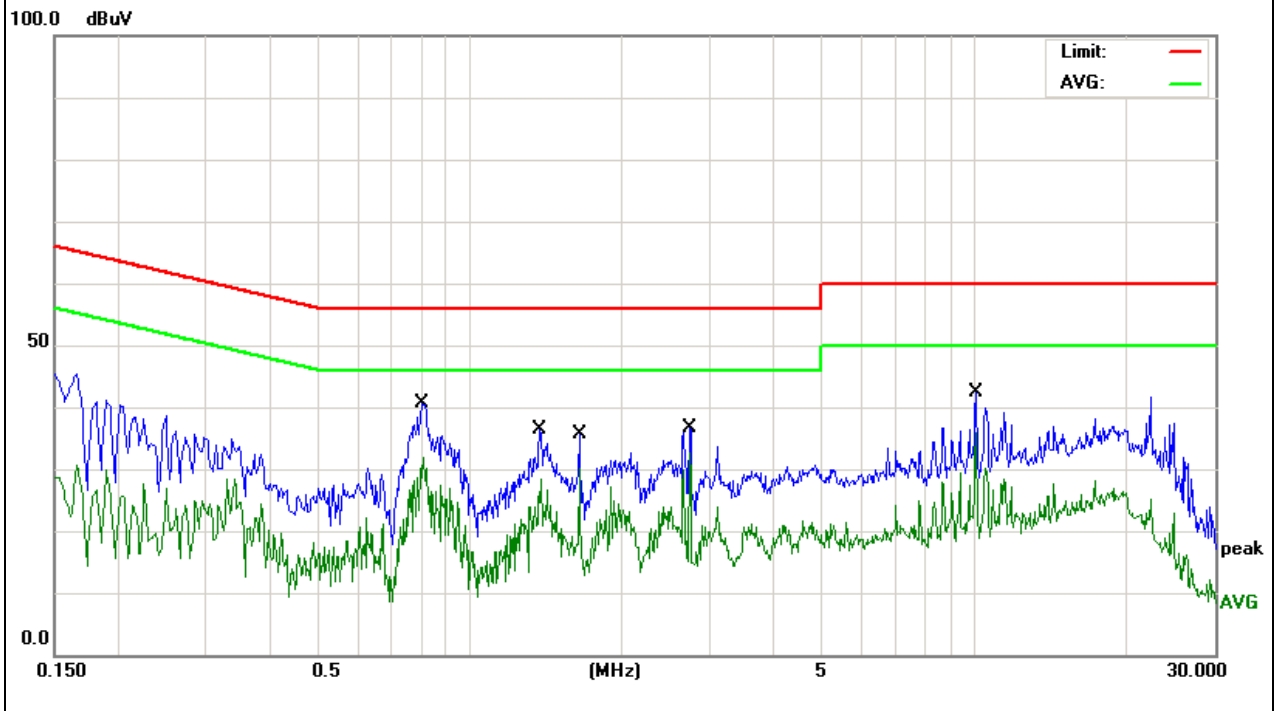
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| | | | |
|----------------|---------------------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name. : | BB1 |
| Temperature : | 26 °C | Relative Humidity : | 54% |
| Pressure : | 1010hPa | Test Date : | 2017-07-10 |
| Test Mode : | Link | Phase : | N |
| Test Voltage : | DC 5V from charger AC 120V/60Hz | | |

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Detector | Comment |
|-----|-----|---------|---------------|----------------|-------------|-------|--------|----------|---------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | | |
| 1 | | 0.8059 | 30.80 | 9.92 | 40.72 | 56.00 | -15.28 | QP | |
| 2 | | 0.8100 | 22.08 | 9.92 | 32.00 | 46.00 | -14.00 | AVG | |
| 3 | | 1.3779 | 26.39 | 9.93 | 36.32 | 56.00 | -19.68 | QP | |
| 4 | | 1.6460 | 20.07 | 9.94 | 30.01 | 46.00 | -15.99 | AVG | |
| 5 | | 2.7340 | 26.52 | 9.98 | 36.50 | 56.00 | -19.50 | QP | |
| 6 | * | 2.7340 | 22.56 | 9.98 | 32.54 | 46.00 | -13.46 | AVG | |
| 7 | | 10.0820 | 32.08 | 10.18 | 42.26 | 60.00 | -17.74 | QP | |
| 8 | | 10.0820 | 25.70 | 10.18 | 35.88 | 50.00 | -14.12 | AVG | |

Remark:

1. All readings are Quasi-Peak and Average values.
2. Factor = Insertion Loss + Cable Loss.
3. N/A means All Data have pass Limit





3.4 RADIATED EMISSION MEASUREMENT

3.4.1 Radiated Emission Limits (FCC 15.209)

| Frequencies (MHz) | Field Strength (micровolts/meter) | Measurement Distance (meters) |
|------------------------------|--|--|
| 0.009~0.490 | 2400/F(KHz) | 300 |
| 0.490~1.705 | 24000/F(KHz) | 30 |
| 1.705~30.0 | 30 | 30 |
| 30~88 | 100 | 3 |
| 88~216 | 150 | 3 |
| 216~960 | 200 | 3 |
| Above 960 | 500 | 3 |

Note:

- (1) The tighter limit applies at the band edges.
- (2) Emission level (dBuV/m)=20log Emission level (uV/m).

LIMITS OF RADIATED EMISSION MEASUREMENT (FCC 15.249)

| Frequency of Emission (MHz) | Field Strength of fundamental ((millivolts /meter) | Field Strength of Harmonics (microvolts/meter) |
|--|---|---|
| 2400 - 2483.5 | 50 | 500 |

Notes:

- (1) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

| Spectrum Parameter | Setting |
|---------------------------------------|-----------------------|
| Attenuation | Auto |
| Start Frequency | 1000 MHz |
| Stop Frequency | 10th carrier harmonic |
| RB / VB (emission in restricted band) | 1MHz / 1MHz for Peak |

| Receiver Parameter | Setting |
|---------------------------|----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |



3.4.2 TEST PROCEDURE

1) 9 kHz to 30 MHz emissions:

For testing performed with the loop antenna, testing was performed in accordance to ANSI C63.10. The centre of the loop was positioned 1 m above the ground and positioned with its plane vertical at the specified distance from the EUT, During testing the loop was rotated about its vertical axis for maximum response at each azimuth and also investigated with the loop positioned in the horizontal plane.

2) 30 MHz to 1 GHz emissions:

For testing performed with the bi-log type antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scanned between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

3) 1 GHz to 25 GHz emissions:

Test site with RF absorbing material covering the ground plane that met the site validation criterion called out in CISPR 16-1-4:2007 was used to perform radiated emission test above 1 GHz.

For testing performed with the horn antenna, testing was performed in accordance to ANSI C63.10. The measurement is performed with the EUT rotated 360°, the antenna height scan between 1m and 4m, and the antenna rotated to repeat the measurement for both the horizontal and vertical antenna polarizations.

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported.

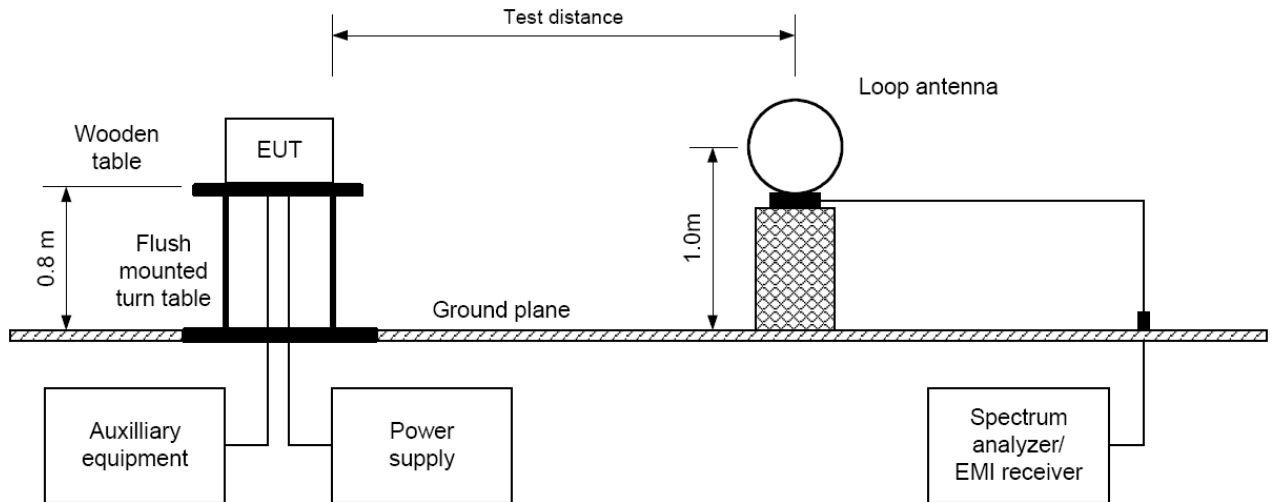
3.4.3 DEVIATION FROM TEST STANDARD

No deviation

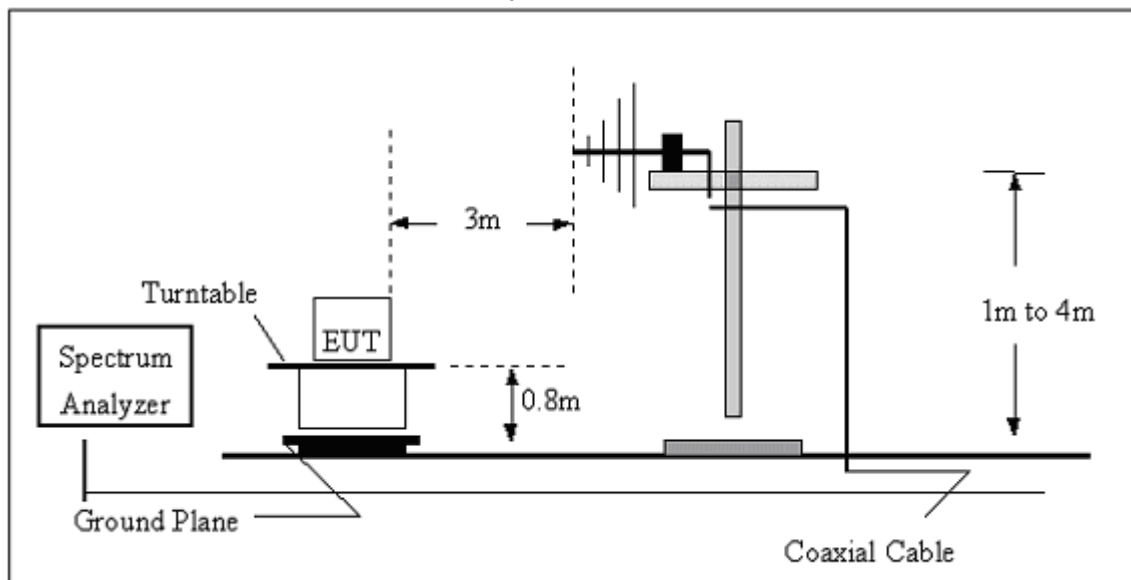


3.4.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



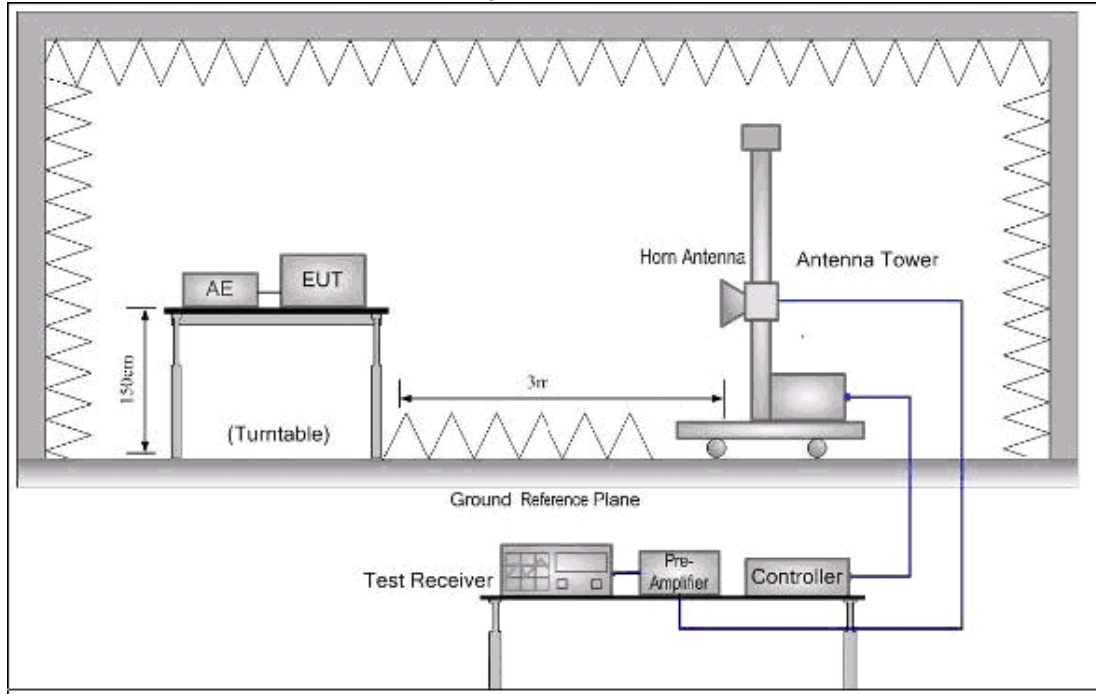


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(C) Radiated Emission Test-Up Frequency Above 1GHz





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3.4.5 TEST RESULTS (BELOW 30MHz)

| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | BLUETOOTH SPEAKER | Model Name. : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX | Polarization : | -- |

| Freq. (MHz) | Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | State P/F |
|----------------|---------------------|-------------------|----------------|--------------|
| -- | -- | -- | -- | PASS |
| -- | -- | -- | -- | PASS |

NOTE:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $20 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits(dBuv) + distance extrapolation factor.



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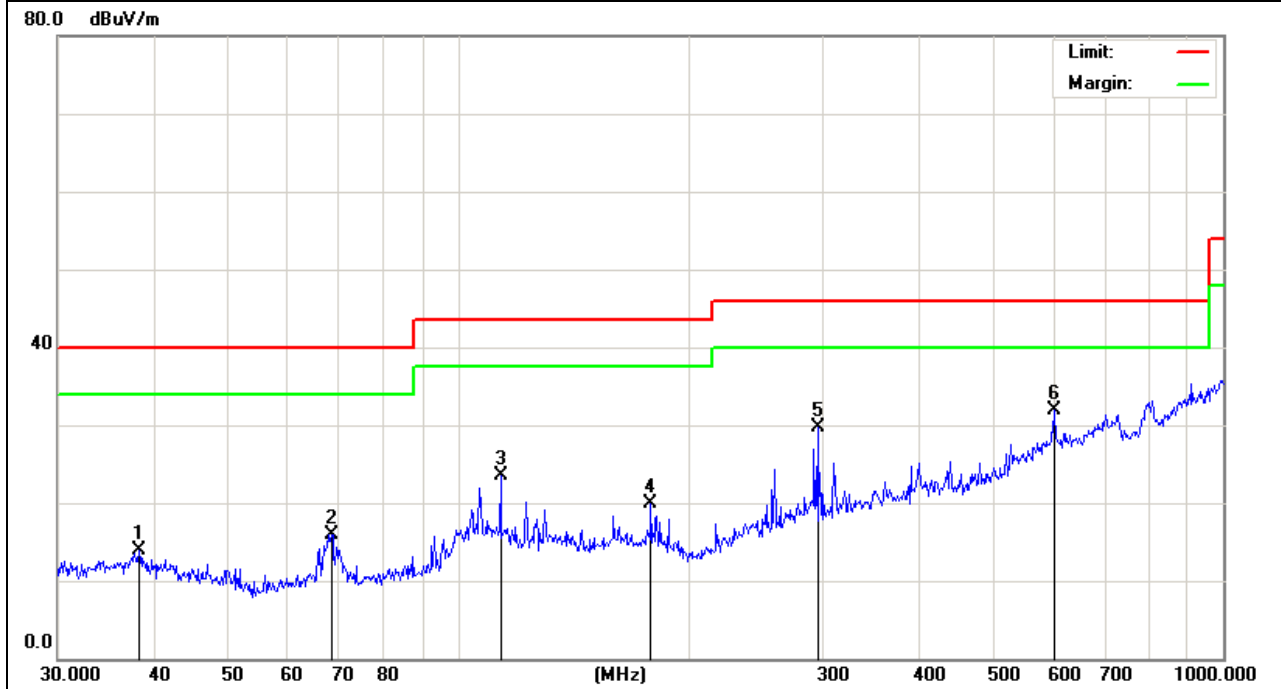
3.4.6 TEST RESULTS (BETWEEN 30 – 1000 MHZ)

| | | | |
|---------------|-------------------|---------------------|----------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH1 | Polarization : | Vertical |

| No. Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measurement dBuV/m | Limit dBuV/m | Over dB | Detector | Antenna Height cm | Table Degree degree | Comment |
|---------|-----------|--------------------|-------------------|--------------------|--------------|---------|----------|-------------------|---------------------|---------|
| 1 | 38.3462 | 30.57 | -16.66 | 13.91 | 40.00 | -26.09 | QP | | | |
| 2 | 68.3907 | 34.99 | -19.06 | 15.93 | 40.00 | -24.07 | QP | | | |
| 3 | 113.7142 | 37.47 | -13.95 | 23.52 | 43.50 | -19.98 | QP | | | |
| 4 | 178.7583 | 35.09 | -15.27 | 19.82 | 43.50 | -23.68 | QP | | | |
| 5 | 295.1469 | 39.88 | -10.27 | 29.61 | 46.00 | -16.39 | QP | | | |
| 6 * | 601.4265 | 32.82 | -0.89 | 31.93 | 46.00 | -14.07 | QP | | | |

Remark:

Factor = Antenna Factor + Cable Loss.



Note: test perform on all mode, "BT 2402" mode is the worst mode and has been reported.



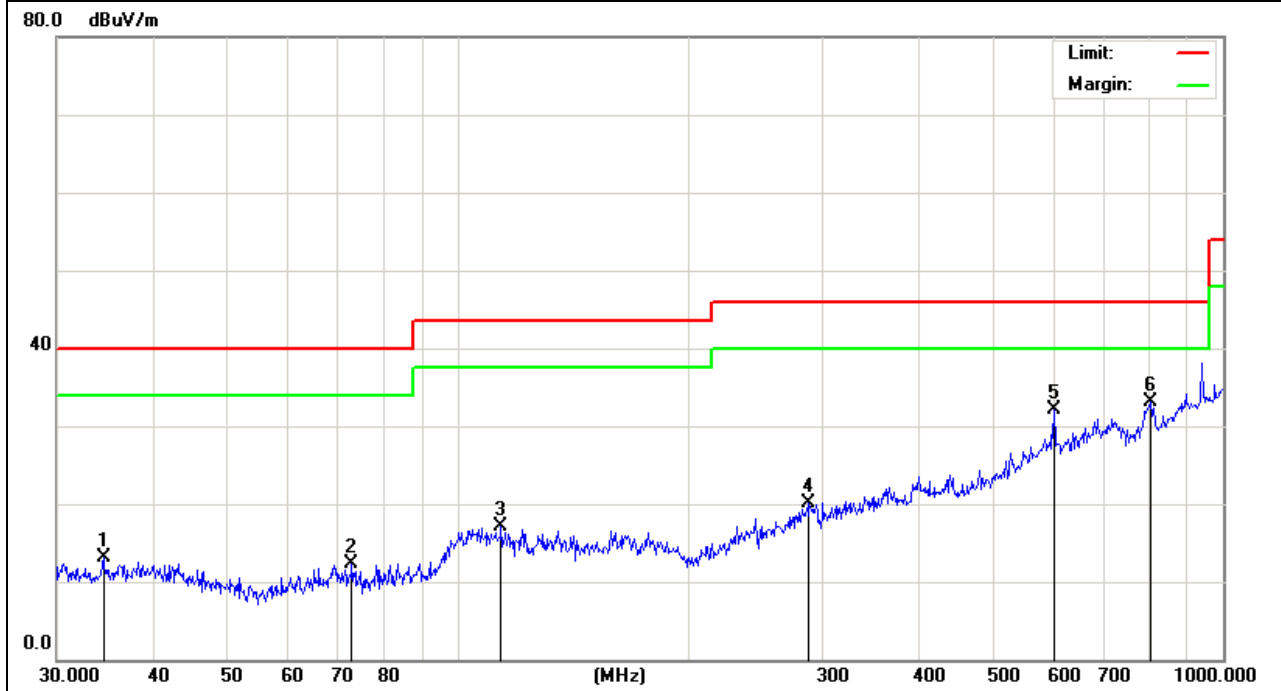
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| | | | |
|---------------|-------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH1 | Polarization : | Horizontal |

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Antenna Height | Table Degree | |
|-----|-----|----------|---------------|----------------|-------------|--------|--------|----------------|--------------|---------|
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | cm | degree | Comment |
| 1 | | 34.5173 | 29.97 | -16.87 | 13.10 | 40.00 | -26.90 | QP | | |
| 2 | | 72.8466 | 31.37 | -19.11 | 12.26 | 40.00 | -27.74 | QP | | |
| 3 | | 114.1138 | 31.19 | -14.02 | 17.17 | 43.50 | -26.33 | QP | | |
| 4 | | 287.9904 | 30.47 | -10.45 | 20.02 | 46.00 | -25.98 | QP | | |
| 5 | | 601.4265 | 32.93 | -0.89 | 32.04 | 46.00 | -13.96 | QP | | |
| 6 | * | 804.6028 | 30.25 | 2.82 | 33.07 | 46.00 | -12.93 | QP | | |

Remark:
 Factor = Antenna Factor + Cable Loss.



Note: test perform on all mode, "BT 2402" mode is the worst mode and has been reported.



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3.4.7 TEST RESULTS (ABOVE 1000 MHZ)

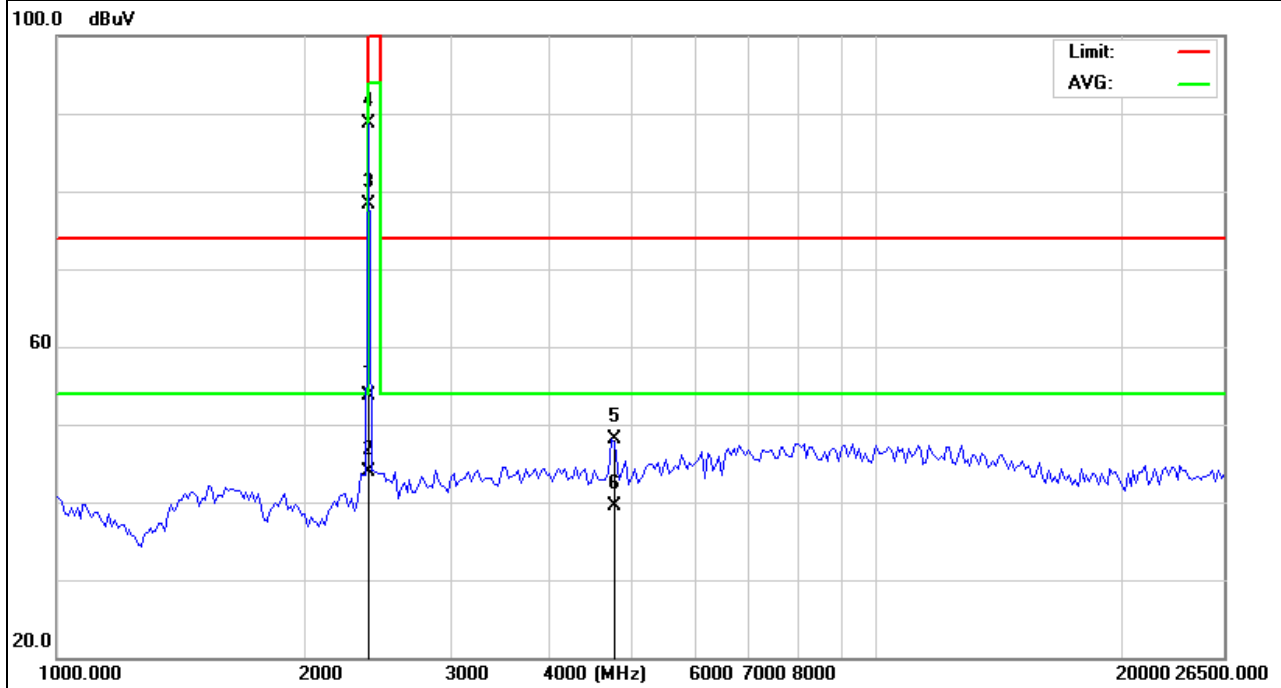
GFSK

| | | | |
|---------------|-------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH1 | Polarization : | Horizontal |

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Antenna Height cm | Table Degree degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|-------------------------|---------------------------|---------|
| 1 | | 2400.000 | 56.68 | -3.04 | 53.64 | 74.00 | -20.36 | peak | | | |
| 2 | * | 2400.000 | 46.91 | -3.04 | 43.87 | 54.00 | -10.13 | AVG | | | |
| 3 | | 2402.000 | 81.40 | -3.02 | 78.38 | 94.00 | -15.62 | AVG | | | |
| 4 | | 2402.803 | 91.78 | -3.02 | 88.76 | 114.0 | -25.24 | peak | | | |
| 5 | | 4804.110 | 39.94 | 8.12 | 48.06 | 74.00 | -25.94 | peak | | | |
| 6 | | 4804.110 | 31.30 | 8.12 | 39.42 | 54.00 | -14.58 | AVG | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.





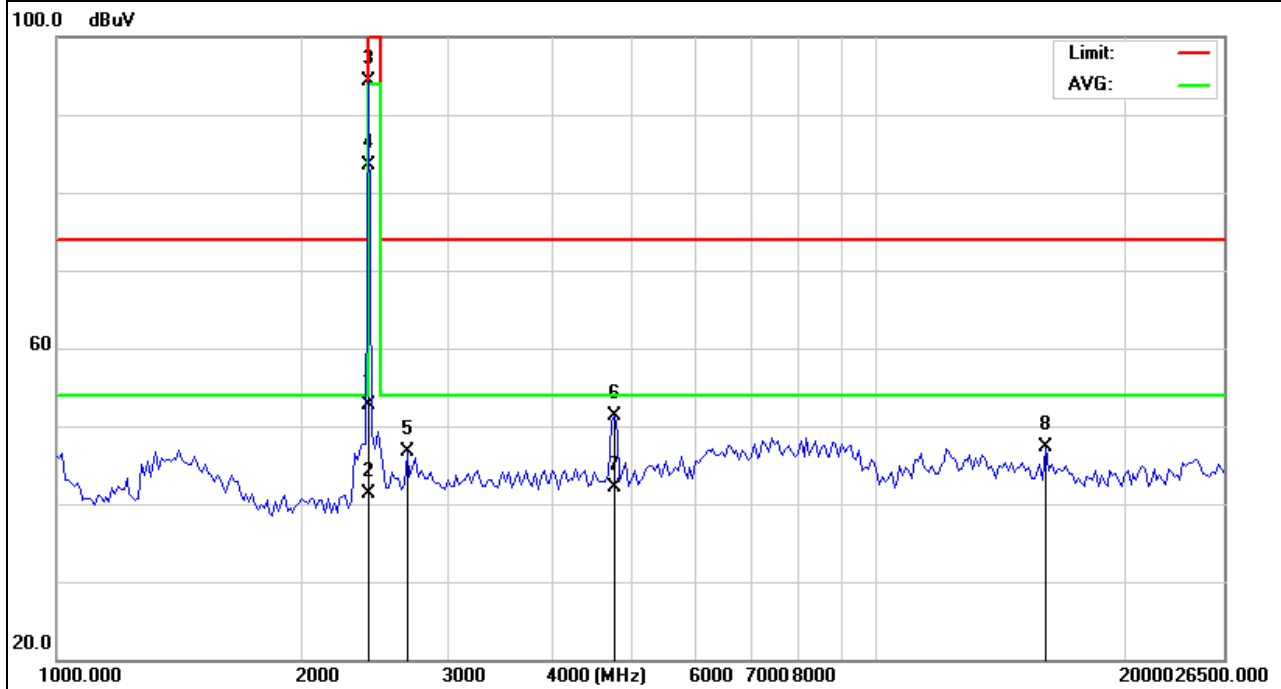
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| | | | |
|---------------|-------------------|---------------------|----------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH1 | Polarization : | Vertical |

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Antenna Height cm | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|-------------------------|-----------------|---------|
| 1 | | 2400.000 | 55.78 | -3.04 | 52.74 | 74.00 | -21.26 | peak | | | |
| 2 | | 2400.000 | 44.27 | -3.04 | 41.23 | 54.00 | -12.77 | AVG | | | |
| 3 | | 2402.804 | 97.35 | -3.02 | 94.33 | 114.0 | -19.67 | peak | | | |
| 4 | * | 2402.804 | 86.45 | -3.02 | 83.43 | 94.00 | -10.57 | AVG | | | |
| 5 | | 2672.845 | 47.83 | -1.20 | 46.63 | 74.00 | -27.37 | peak | | | |
| 6 | | 4804.210 | 43.21 | 8.12 | 51.33 | 74.00 | -22.67 | peak | | | |
| 7 | | 4804.210 | 33.90 | 8.12 | 42.02 | 54.00 | -11.98 | AVG | | | |
| 8 | | 16076.84 | 22.44 | 24.79 | 47.23 | 74.00 | -26.77 | peak | | | |

Remark:
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.



For the band-edge test, both hopping-on mode and hopping-off mode had been pre-tested, and only the worst case was recorded in the test report.



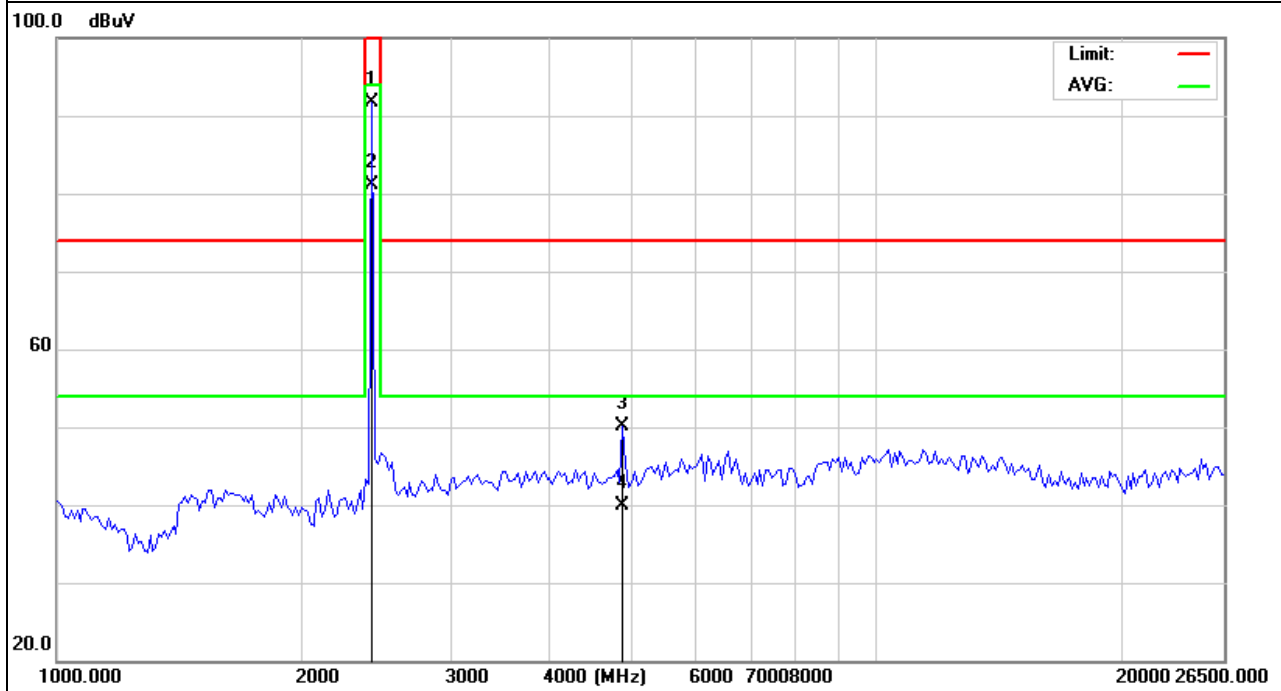
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| | | | |
|---------------|-------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH40 | Polarization : | Horizontal |

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Antenna Height cm | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|-------------------------|-----------------|---------|
| 1 | | 2441.000 | 94.45 | -2.76 | 91.69 | 114.0 | -22.31 | peak | | | |
| 2 | * | 2441.000 | 83.88 | -2.76 | 81.12 | 94.00 | -12.88 | AVG | | | |
| 3 | | 4882.100 | 42.02 | 8.17 | 50.19 | 74.00 | -23.81 | peak | | | |
| 4 | | 4882.100 | 31.70 | 8.17 | 39.87 | 54.00 | -14.13 | AVG | | | |

Remark:
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.





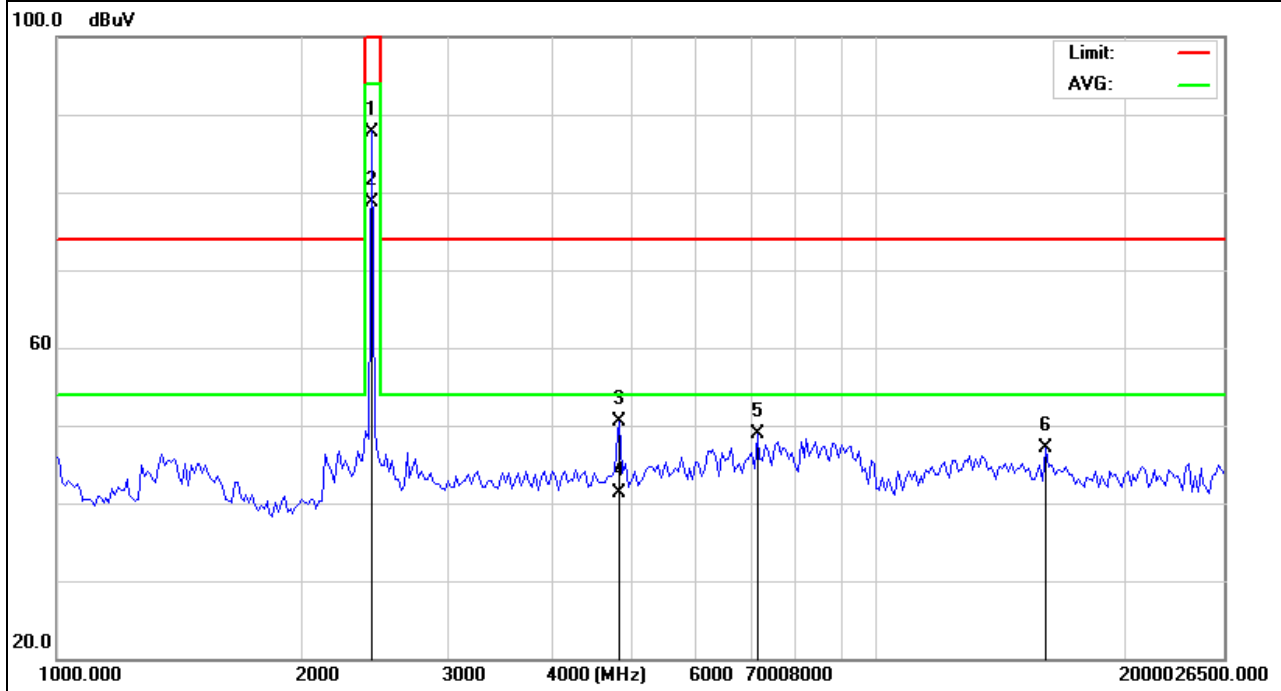
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| | | | |
|---------------|-------------------|---------------------|----------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH40 | Polarization : | Vertical |

| No. | Mk. | Freq. | Reading Level | Correct Factor | Measurement | Limit | Over | Antenna Height | Table Degree | |
|-----|-----|----------|---------------|----------------|-------------|-------|--------|----------------|--------------|---------|
| | | MHz | dBuV | dB | dBuV | dBuV | dB | cm | degree | Comment |
| 1 | | 2441.000 | 90.56 | -2.76 | 87.80 | 114.0 | -26.20 | | | peak |
| 2 | | 2441.000 | 81.49 | -2.76 | 78.73 | 94.00 | -15.27 | | | AVG |
| 3 | | 4882.000 | 42.24 | 8.17 | 50.41 | 74.00 | -23.59 | | | peak |
| 4 | * | 4882.000 | 33.19 | 8.17 | 41.36 | 54.00 | -12.64 | | | AVG |
| 5 | | 7144.100 | 37.60 | 11.31 | 48.91 | 74.00 | -25.09 | | | peak |
| 6 | | 16076.84 | 22.22 | 24.79 | 47.01 | 74.00 | -26.99 | | | peak |

Remark:
 Factor = Antenna Factor + Cable Loss – Pre-amplifier.





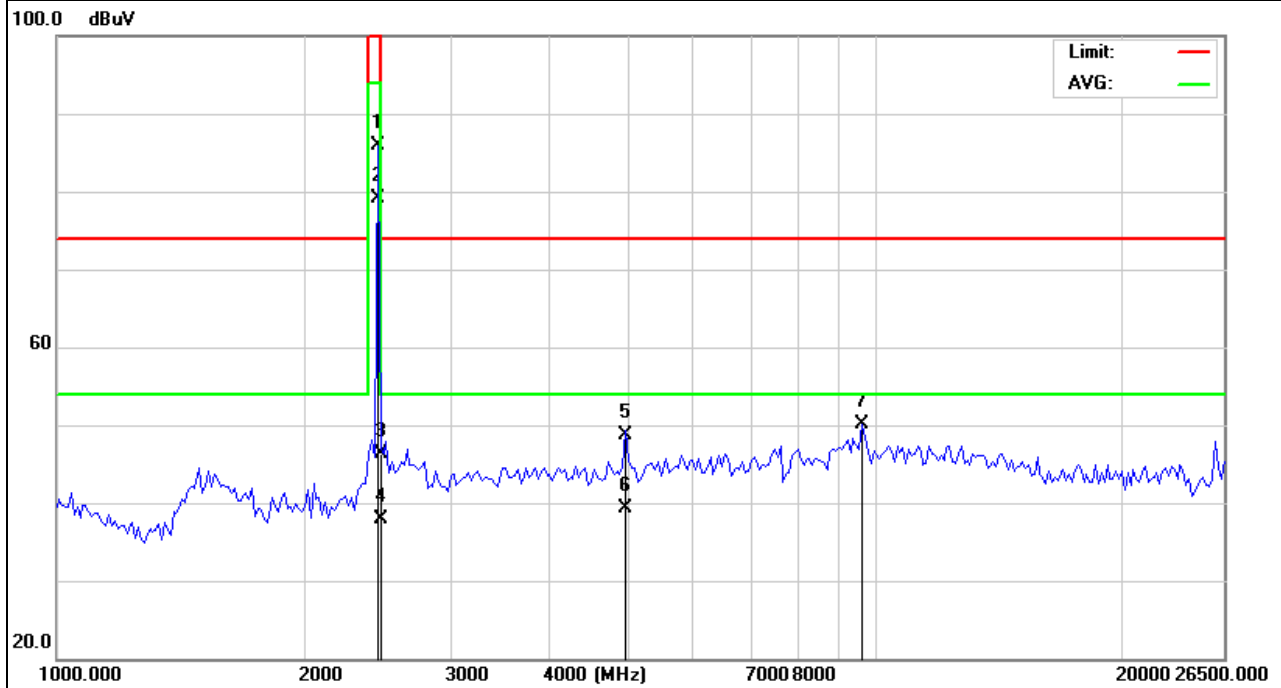
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| | | | |
|---------------|-------------------|---------------------|------------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH79 | Polarization : | Horizontal |

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Antenna Height cm | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|-------------------------|-----------------|---------|
| 1 | | 2480.000 | 88.43 | -2.48 | 85.95 | 114.0 | -28.05 | peak | | | |
| 2 | | 2480.000 | 81.50 | -2.48 | 79.02 | 94.00 | -14.98 | AVG | | | |
| 3 | | 2483.500 | 48.80 | -2.45 | 46.35 | 74.00 | -27.65 | peak | | | |
| 4 | | 2483.500 | 40.30 | -2.45 | 37.85 | 54.00 | -16.15 | AVG | | | |
| 5 | | 4960.000 | 40.54 | 8.21 | 48.75 | 74.00 | -25.25 | peak | | | |
| 6 | * | 4960.000 | 31.17 | 8.21 | 39.38 | 54.00 | -14.62 | AVG | | | |
| 7 | | 9594.882 | 32.74 | 17.41 | 50.15 | 74.00 | -23.85 | peak | | | |

Remark:
Factor = Antenna Factor + Cable Loss – Pre-amplifier.





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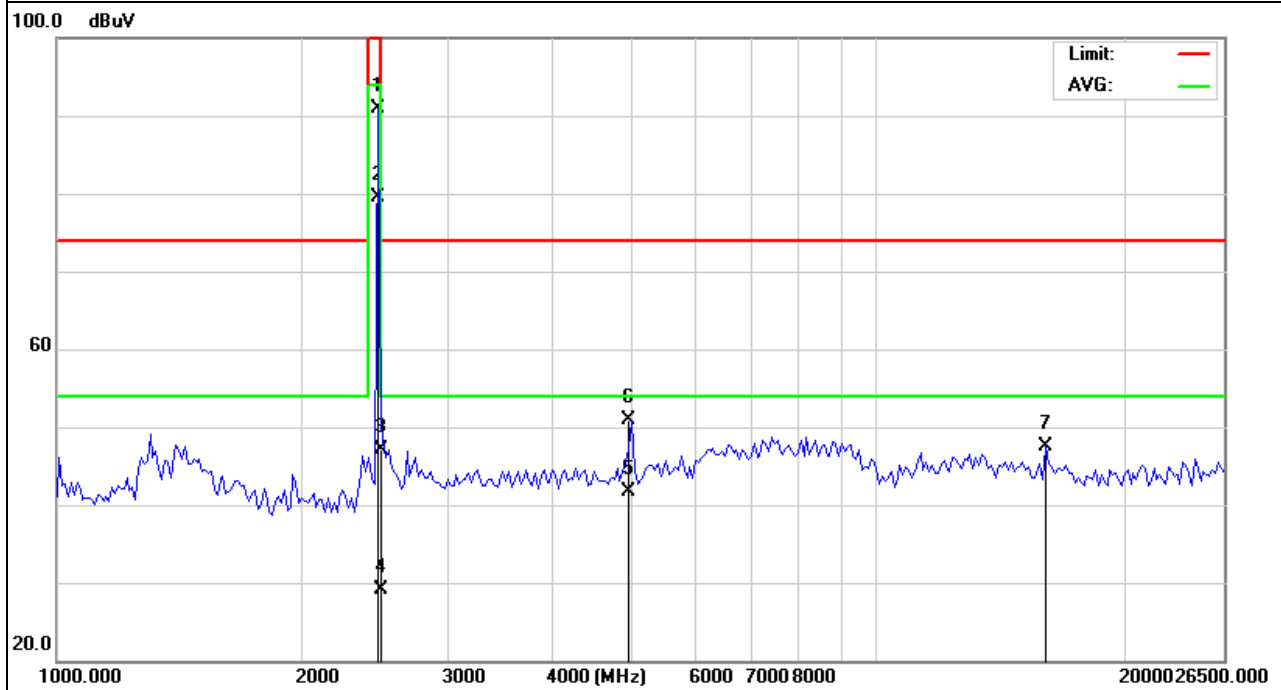
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| | | | |
|---------------|-------------------|---------------------|----------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 20 °C | Relative Humidity : | 48% |
| Pressure : | 1010 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | TX-CH79 | Polarization : | Vertical |

| No. | Mk. | Freq. MHz | Reading Level dBuV | Correct Factor dB | Measure- ment dBuV | Limit dBuV | Over dB | Detector | Antenna Height cm | Table Degree | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|-------------------------|-----------------|---------|
| 1 | | 2480.000 | 93.32 | -2.48 | 90.84 | 114.0 | -23.16 | peak | | | |
| 2 | | 2480.000 | 82.01 | -2.48 | 79.53 | 94.00 | -14.47 | AVG | | | |
| 3 | | 2483.500 | 49.59 | -2.45 | 47.14 | 74.00 | -26.86 | peak | | | |
| 4 | | 2483.500 | 31.62 | -2.45 | 29.17 | 54.00 | -24.83 | AVG | | | |
| 5 | * | 4960.000 | 33.49 | 8.21 | 41.70 | 54.00 | -12.30 | AVG | | | |
| 6 | | 4960.100 | 42.73 | 8.21 | 50.94 | 74.00 | -23.06 | peak | | | |
| 7 | | 16076.84 | 22.65 | 24.79 | 47.44 | 74.00 | -26.56 | peak | | | |

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.



For the band-edge test, both hopping-on mode and hopping-off mode had been pre-tested, and only the worst case was recorded in the test report.



4. BANDWIDTH TEST

4.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting : RBW= 100KHz, VBW \geq RBW, Sweep time = Auto.

4.2 DEVIATION FROM STANDARD

No deviation.

4.3 TEST SETUP





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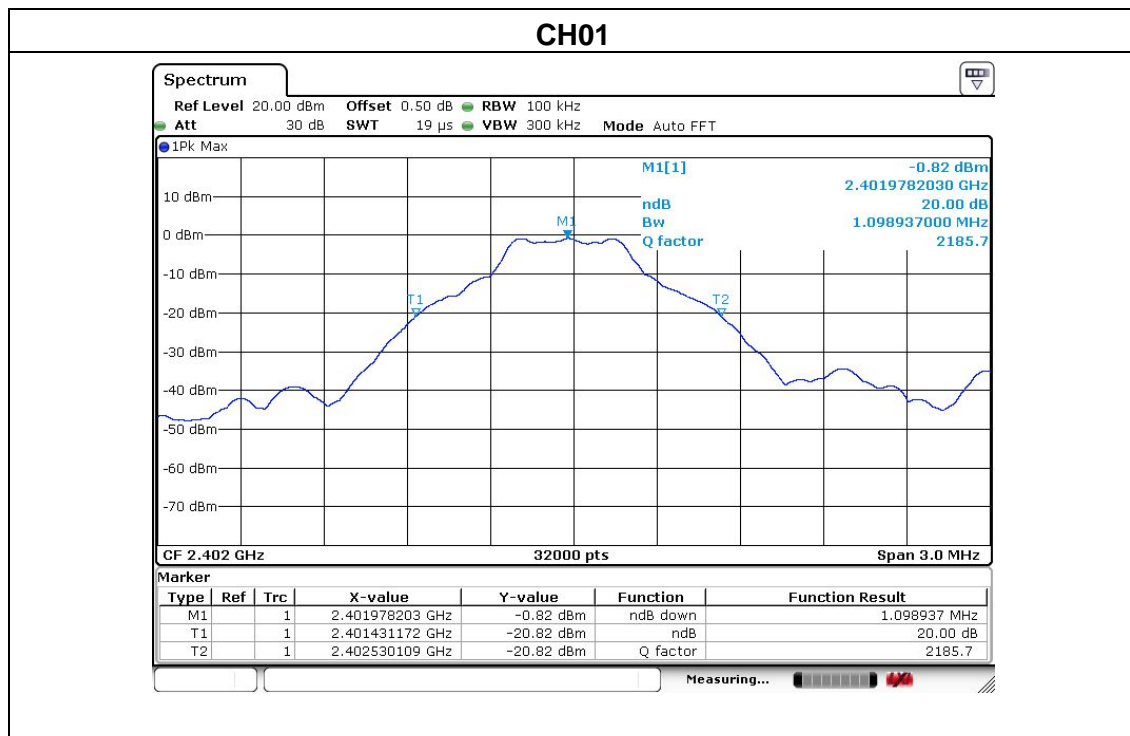
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4.4 TEST RESULTS

| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | BLUETOOTH SPEAKER | Model Name : | BB1 |
| Temperature : | 25 °C | Relative Humidity : | 60% |
| Pressure : | 1012 hPa | Test Voltage : | DC 3.7V |
| Test Mode : | CH01 / CH39 /CH79 | | |

| Frequency | 20dB Bandwidth (kHz) | Result |
|-----------|----------------------|-------------|
| 2402 MHz | 1.0989 | PASS |
| 2440 MHz | 1.0954 | PASS |
| 2480 MHz | 1.0993 | PASS |

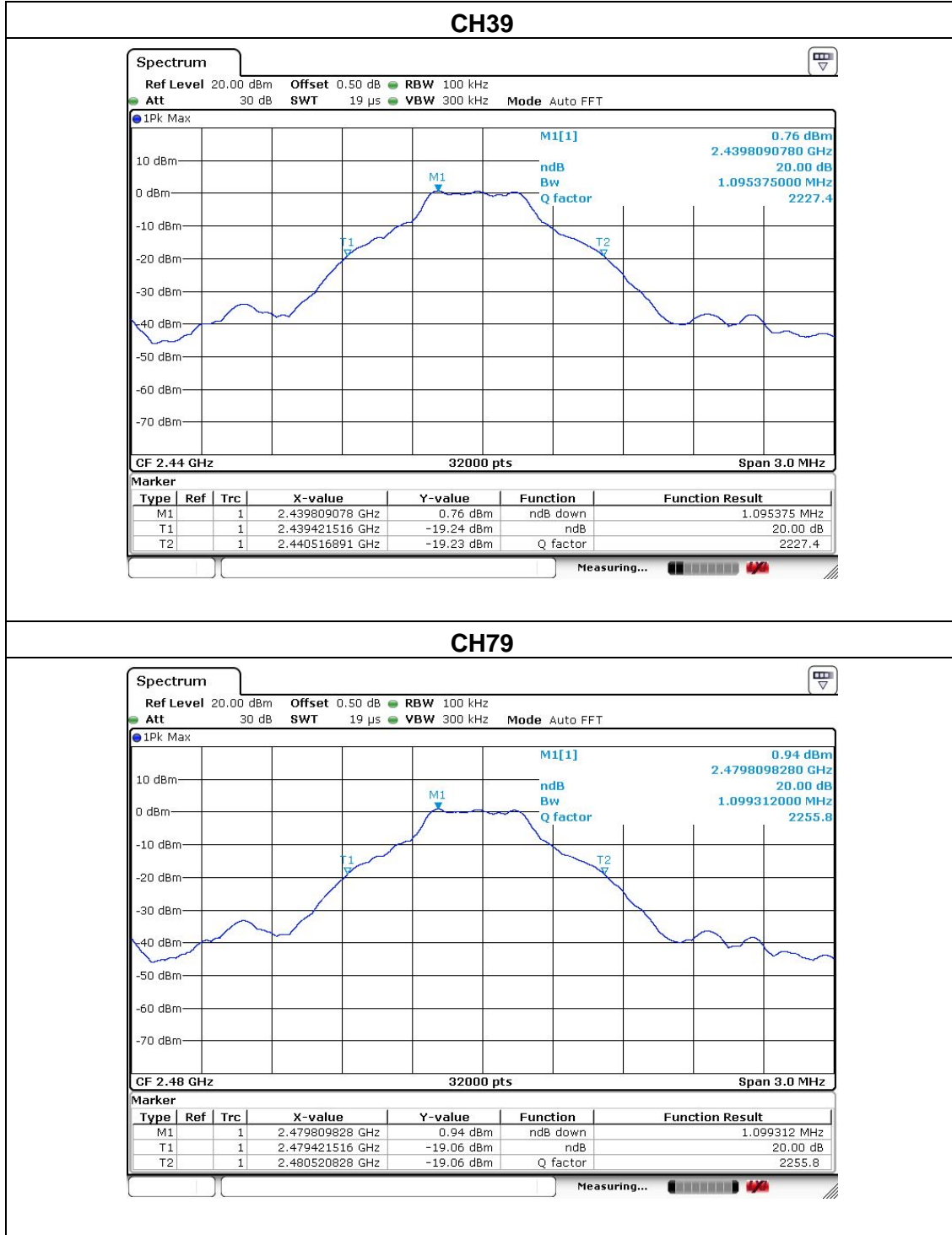




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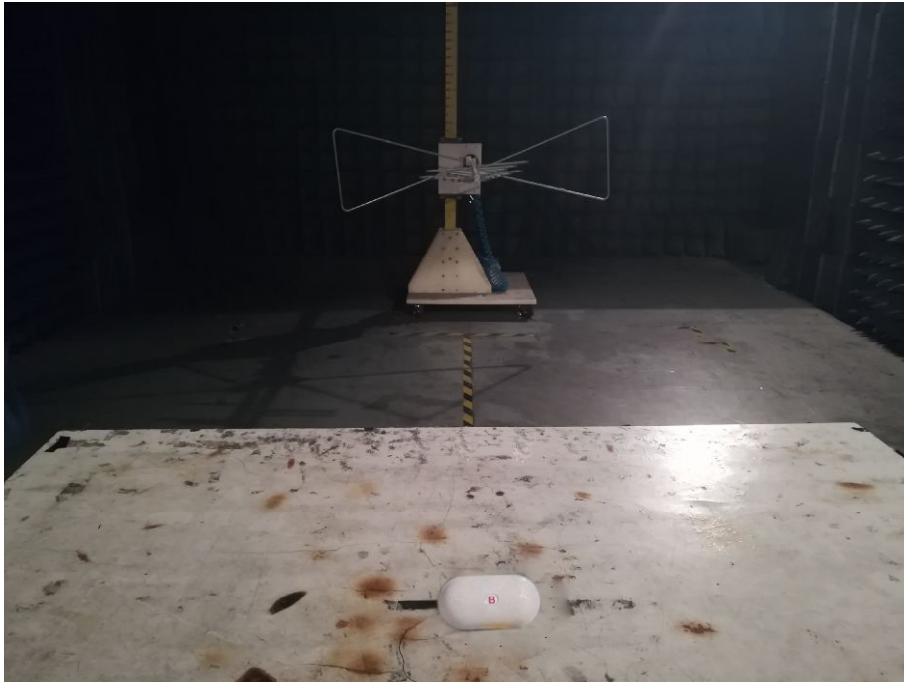
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5. EUT TEST PHOTO

**Radiated Measurement Photos
30-1000MHz**



Above 1GHz





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Conducted Measurement Photos 0.15-30MHz





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EUT
Photo 1



Photo 2





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Photo 3



Photo 4





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Photo 5

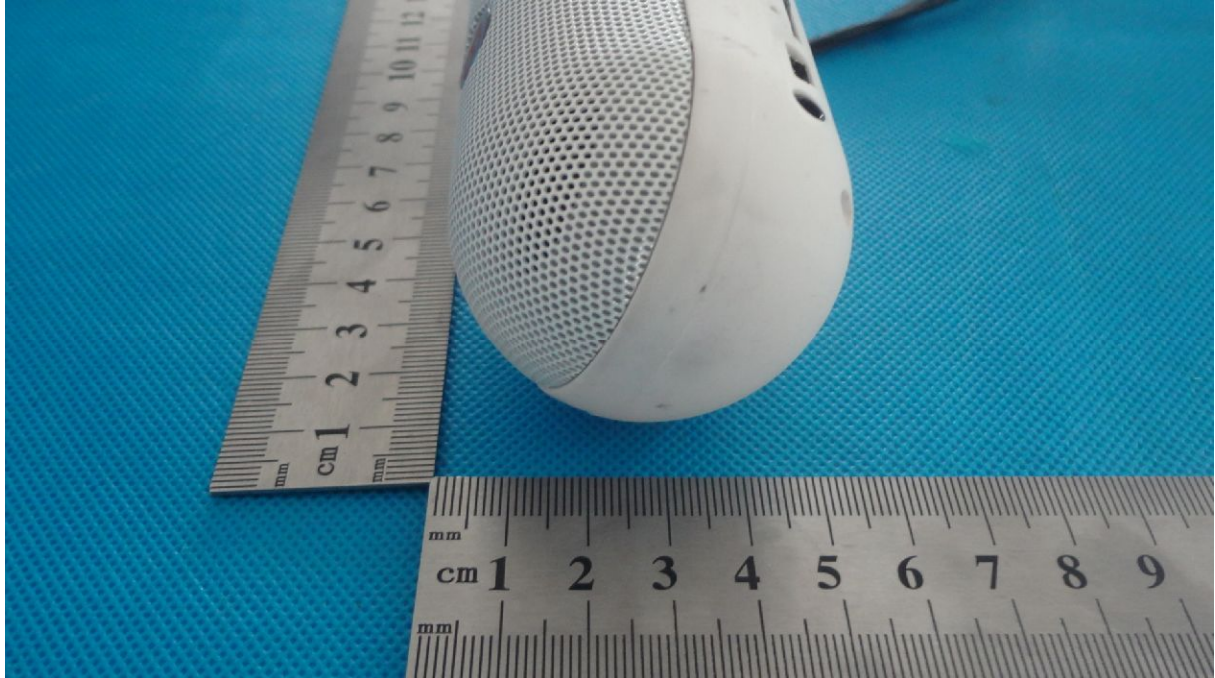
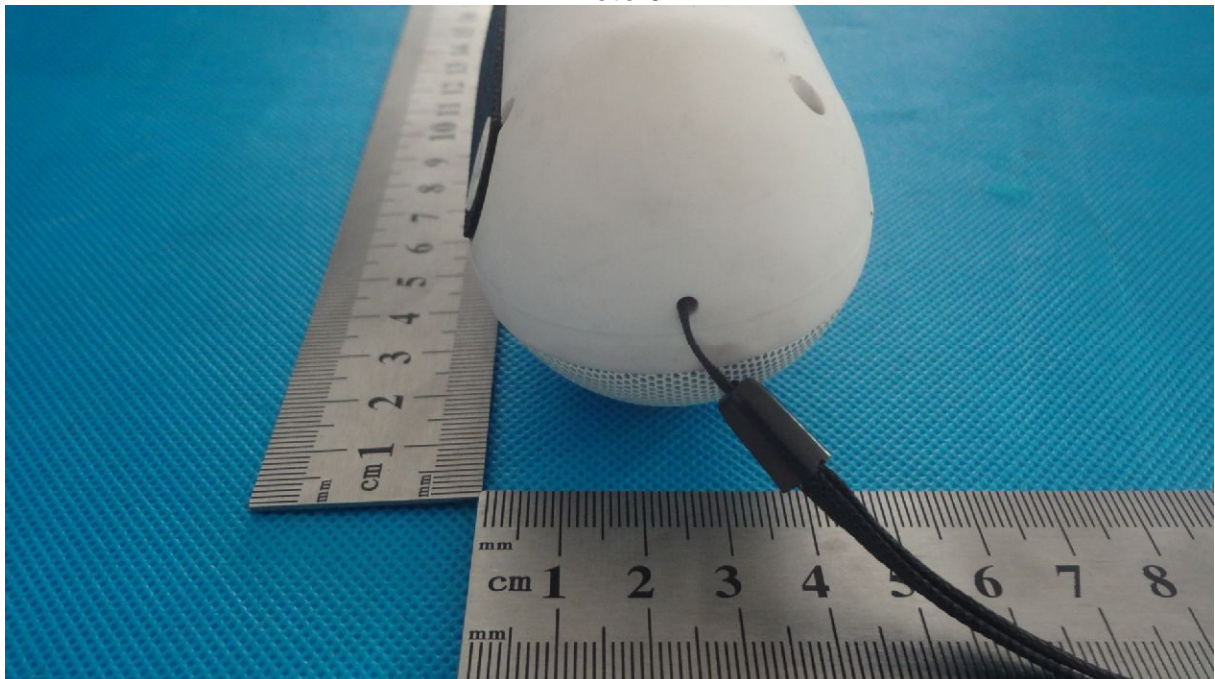


Photo 6





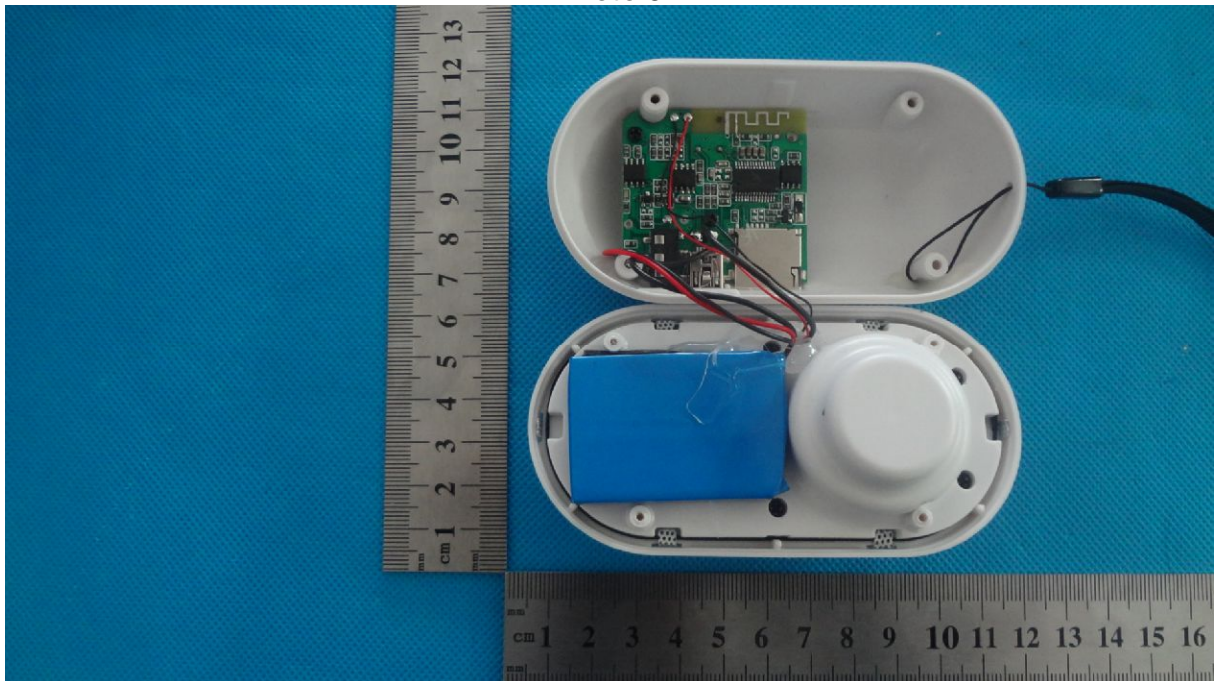
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Photo 7



Photo 8





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Photo 9

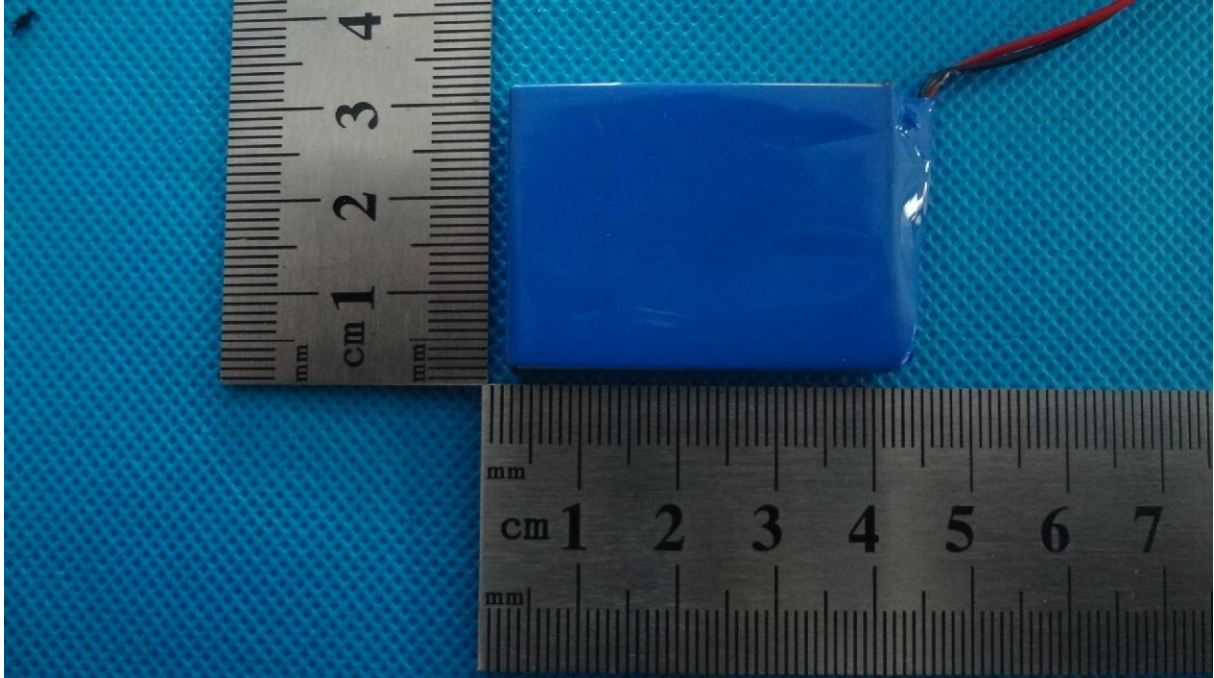
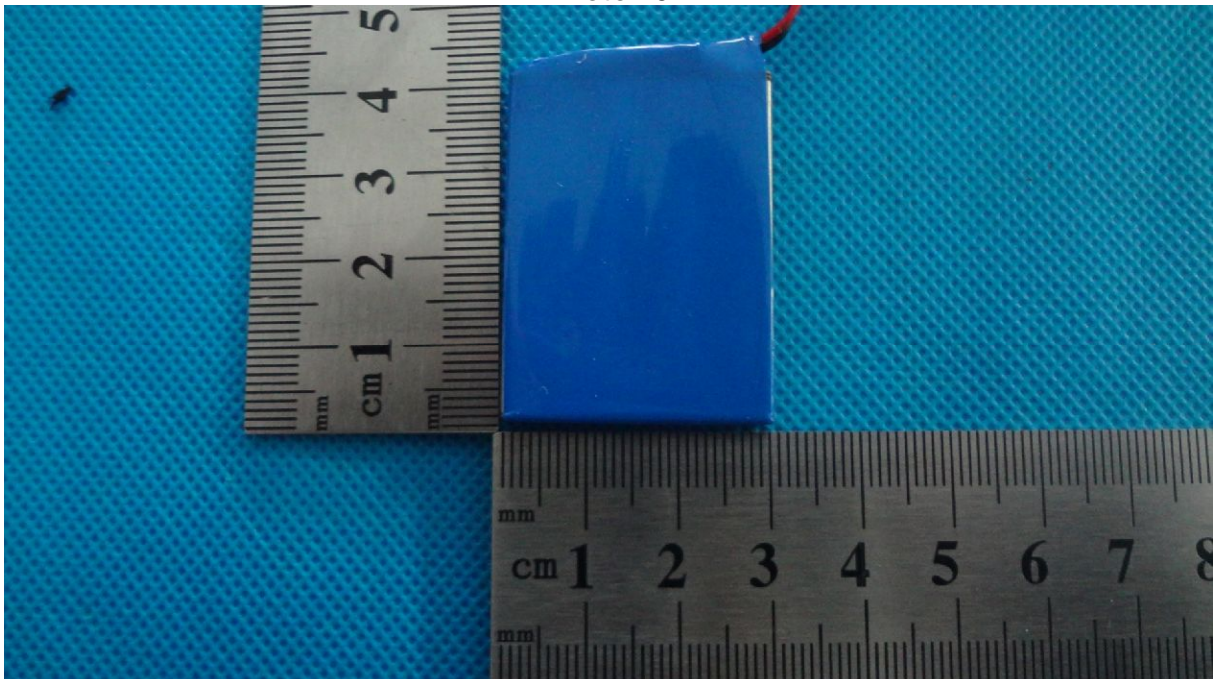


Photo 10





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Photo 11

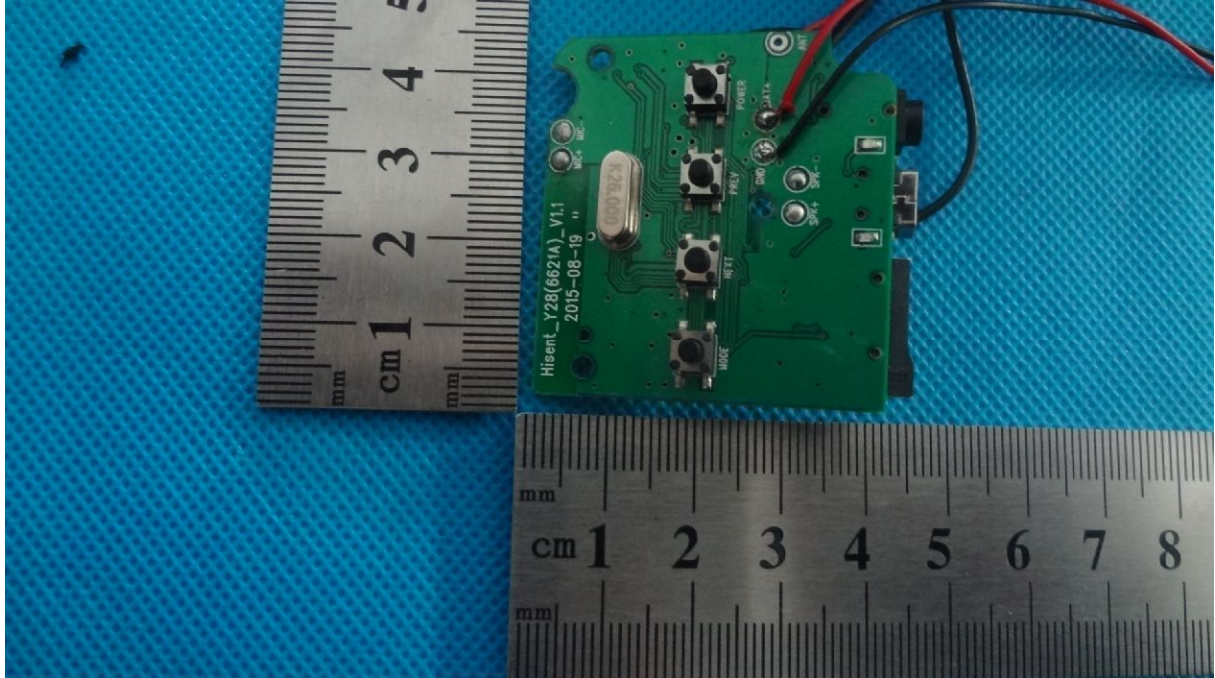


Photo 12

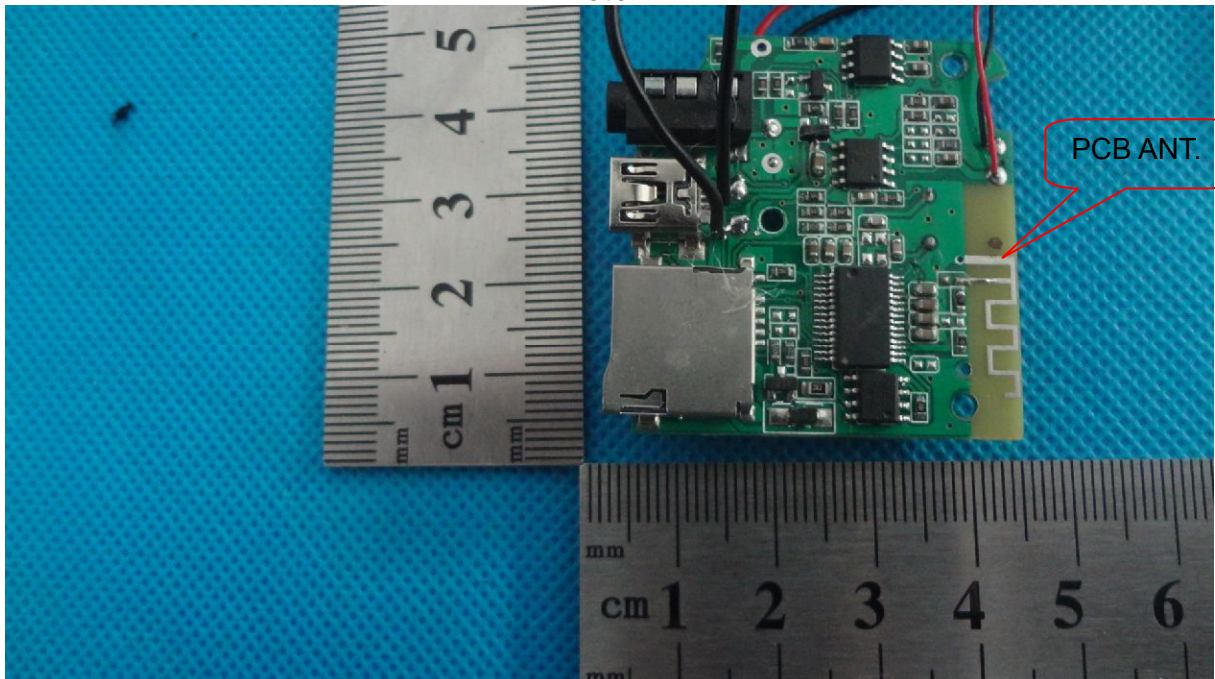




Photo 13

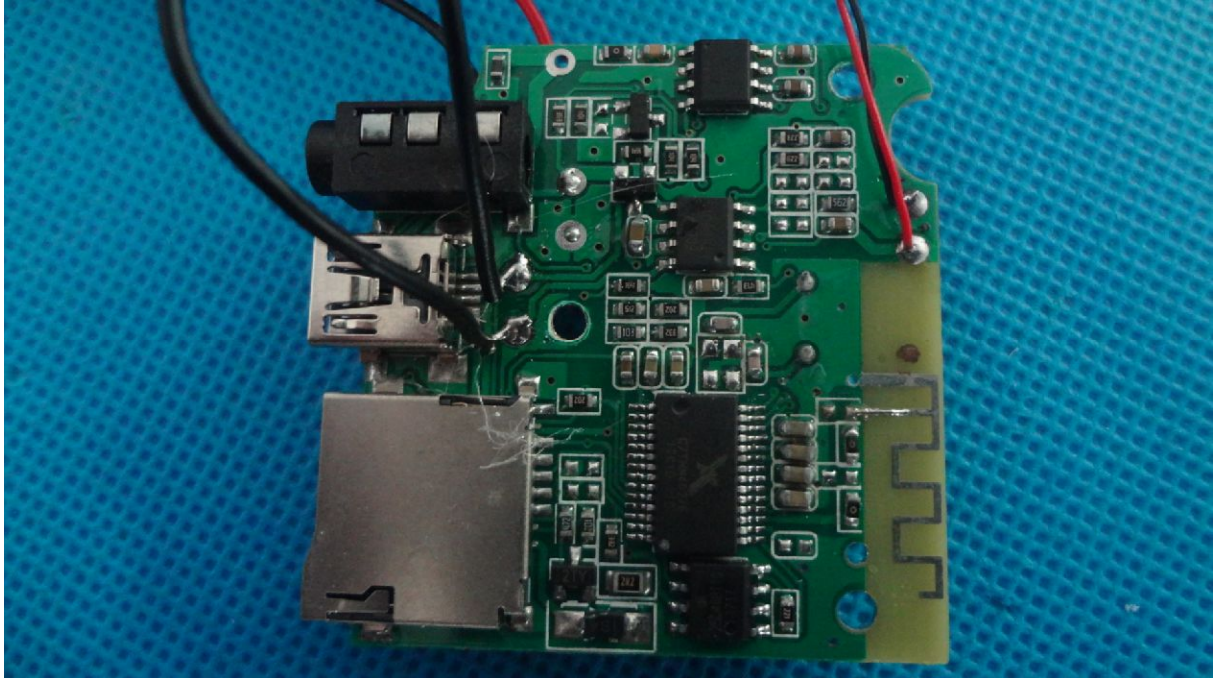


Photo 14





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Photo 15

