



FCC TEST REPORT

Report No: STS1504064F02

Issued for

Shenzhen Cannice Technology Co., Ltd.

5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
Bantian Town, Longgang District, Shenzhen, Guangdong, China

| | |
|----------------|-------------------|
| Product Name: | Bluetooth speaker |
| Brand Name: | cannice |
| Model No.: | S1 |
| FCC ID: | 2ADTV-S1 |
| Test Standard: | FCC Part 15.247 |

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TEST RESULT CERTIFICATION

Applicant's name Shenzhen Cannice Technology Co., Ltd.
 Address 5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
 Bantian Town, Longgang District, Shenzhen, Guangdong, China
Manufacture's Name..... Shenzhen Cannice Technology Co., Ltd.
 Address 5F, B Building, Weiyulong Industrial Park, 16# North Xuegang Rd.,
 Bantian Town, Longgang District, Shenzhen, Guangdong, China

Product description

Product name Bluetooth speaker
 Band name cannice
 Model and/or type reference S1
 Ratings DC 7.4V
Standards FCC Part15.247
 Test procedure ANSI C63.4-2009


This device described above has been tested by STS, 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 .. Apr.17,2015 to Apr.20,2015
 Date of Issue..... Apr.21,2015
 Test Result..... **Pass**

Testing Engineer : 

 (Tony Liu)

Technical Manager : 

 (Vita Li)

Authorized Signatory : 

 (Bovey Yang)





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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 (15.247) , Subpart C | | | |
|--|-----------------------------|----------|--------|
| Standard Section | Test Item | Judgment | Remark |
| 15.207 | Conducted Emission | PASS | |
| 15.247(a)(1) | Hopping Channel Separation | PASS | |
| 15.247(b)(1) | Peak Output Power | PASS | |
| 15.247(c) | Radiated Spurious Emission | PASS | |
| 15.247(d) | Conducted Spurious Emission | PASS | |
| 15.247(a)(iii) | Number of Hopping Frequency | PASS | |
| 15.247(a)(iii) | Dwell Time | PASS | |
| 15.247(a)(1) | Bandwidth | PASS | |
| 15.205 | Band Edge Emission | PASS | |
| 15.203 | Antenna Requirement | PASS | |



1.1 TEST FACILITY

Shenzhen STS Test Services Co., Ltd.

Add. : 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China.

FCC Registration No.: 842334; IC Registration No.: 12108A-1

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 | $\pm 3.18\text{dB}$ |
| 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) | $\pm 4.71\text{dB}$ |
| 6 | Temperature | $\pm 0.5^{\circ}\text{C}$ |
| 7 | Humidity | $\pm 2\%$ |



2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

| | |
|---------------------------|---|
| Equipment | Bluetooth speaker |
| Trade Name | cannice |
| Model Name | S1 |
| Channel List | Please refer to the Note 2. |
| Bluetooth | Frequency:2402 – 2480 MHz GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps),8-DPSK(3Mbps) |
| Battery | Rated Voltage: 7.4V Charge Limit: 8.4V |
| Hardware version number | V0A |
| Software versioningnumber | V0A |
| Connecting I/O Port(s) | Please refer to the User's Manual |

Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.



2.

| Channel List | | | | | |
|--------------|-----------------|---------|-----------------|---------|-----------------|
| Channel | Frequency (MHz) | Channel | Frequency (MHz) | Channel | Frequency (MHz) |
| 00 | 2402 | 27 | 2429 | 54 | 2456 |
| 01 | 2403 | 28 | 2430 | 55 | 2457 |
| 02 | 2404 | 29 | 2431 | 56 | 2458 |
| 03 | 2405 | 30 | 2432 | 57 | 2459 |
| 04 | 2406 | 31 | 2433 | 58 | 2460 |
| 05 | 2407 | 32 | 2434 | 59 | 2461 |
| 06 | 2408 | 33 | 2435 | 60 | 2462 |
| 07 | 2409 | 34 | 2436 | 61 | 2463 |
| 08 | 2410 | 35 | 2437 | 62 | 2464 |
| 09 | 2411 | 36 | 2438 | 63 | 2465 |
| 10 | 2412 | 37 | 2439 | 64 | 2466 |
| 11 | 2413 | 38 | 2440 | 65 | 2467 |
| 12 | 2414 | 39 | 2441 | 66 | 2468 |
| 13 | 2415 | 40 | 2442 | 67 | 2469 |
| 14 | 2416 | 41 | 2443 | 68 | 2470 |
| 15 | 2417 | 42 | 2444 | 69 | 2471 |
| 16 | 2418 | 43 | 2445 | 70 | 2472 |
| 17 | 2419 | 44 | 2446 | 71 | 2473 |
| 18 | 2420 | 45 | 2447 | 72 | 2474 |
| 19 | 2421 | 46 | 2448 | 73 | 2475 |
| 20 | 2422 | 47 | 2449 | 74 | 2476 |
| 21 | 2423 | 48 | 2450 | 75 | 2477 |
| 22 | 2424 | 49 | 2451 | 76 | 2478 |
| 23 | 2425 | 50 | 2452 | 77 | 2479 |
| 24 | 2426 | 51 | 2453 | 78 | 2480 |
| 25 | 2427 | 52 | 2454 | | |
| 26 | 2428 | 53 | 2455 | | |

3. Table for Filed Antenna

| Ant | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | NOTE |
|-----|-------|------------|--------------|-----------|------------|------------|
| 1 | N/A | N/A | PCB Antenna | NA | 2 | BT Antenna |

The EUT antenna is PCB Antenna. no antenna other than that furnished by the responsible party shall be used with the device.



2.1 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 | Low channel TX |
| Mode 2 | Middle channel TX |
| Mode 3 | High channel TX |
| Mode 4 | Hopping on |

| For Conducted Emission | |
|------------------------|-------------|
| Final Test Mode | Description |
| Mode 4 | keeping TX |

| For Radiated Emission | |
|-----------------------|-------------------|
| Final Test Mode | Description |
| Mode 1 | Low channel TX |
| Mode 2 | Middle channel TX |
| Mode 3 | High channel TX |
| Mode 4 | Hopping on |

Note:

(1)The measurements are performed at the highest, middle, lowest available channels.

2.2 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

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

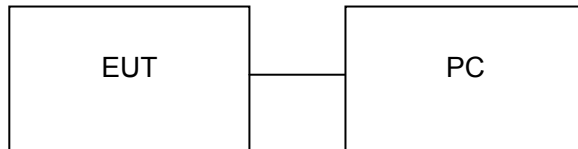
| Test software Version | Test program: N/A | | |
|-----------------------|-------------------|----------|----------|
| Frequency | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters(1Mbps) | DEF | DEF | DEF |
| Parameters(2Mbps) | DEF | DEF | DEF |
| Parameters(3Mbps) | DEF | DEF | DEF |

2.3 BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

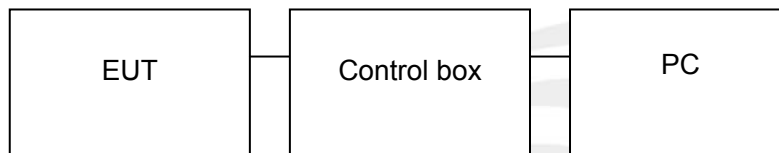
During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final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

Radiated Spurious Emission Test

Configure 1: (Normal hopping)



Configure 2: (Control continuous TX)



Conducted Emission Test





2.4 DESCRIPTION OF SUPPORT UNITS

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 |
|------|-------------------|-----------|----------------|------------|------------------|
| 1 | Bluetooth speaker | cannice | S1 | N/A | EUT |
| 2 | PC | FOXXN | N/A | N/A | FCC DOC approval |
| 3 | Control box | N/A | N/A | N/A | A.E |
| | | | | | |
| | | | | | |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

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.
- (3) “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.
- (4) N/A means not applicable.



2.5EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|--------------------|--------------|------------|------------|------------------|------------------|
| Spectrum Analyzer | Agilent | E4407B | MY50140340 | 2014.10.25 | 2015.10.24 |
| Test Receiver | R&S | ESCI | 101427 | 2014.10.25 | 2015.10.24 |
| Bilog Antenna | TESEQ | CBL6111D | 34678 | 2014.10.27 | 2015.10.26 |
| 50Ω Coaxial Switch | Anritsu | MP59B | 6200264416 | 2014.06.06 | 2015.06.06 |
| Horn Antenna | R&S | 9120D | 152265 | 2014.10.27 | 2015.10.26 |
| Horn Ant | Schwarzbeck | BBHA 9170 | 9170-181 | 2014.07.06 | 2015.07.05 |
| Amplifier | EM | EM-30180 | 060538 | 2014.12.22 | 2015.12.21 |
| Loop Antenna | ARA | PLA-1030/B | 1029 | 2014.06.08 | 2015.06.07 |
| Power Meter | Anritsu | ML2495A | 1204003 | 2014.10.25 | 2015.10.24 |
| Power Sensor | Anritsu | MA2411B | 100309 | 2014.10.25 | 2015.10.24 |

Conduction Test equipment

| Kind of Equipment | Manufacturer | Type No. | Serial No. | Last calibration | Calibrated until |
|-----------------------|--------------|----------|------------|------------------|------------------|
| Test Receiver | R&S | 102086 | 102086 | 2014.10.25 | 2015.10.24 |
| LISN | R&S | ENV216 | 101242 | 2014.10.25 | 2015.10.24 |
| LISN | EMCO | 3810/2NM | 000-23625 | 2014.10.25 | 2015.10.24 |
| 50Ω Coaxial Switch | Anritsu | MP59B | 6200264417 | 2014.06.06 | 2015.06.06 |
| Passive Voltage Probe | R&S | ESH2-Z3 | 100196 | 2014.06.06 | 2015.06.06 |
| Absorbing clamp | R&S | MDS-21 | 100668 | 2014.10.27 | 2015.10.26 |



3.EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION LIMITS

Operating frequency band. In case the emission fall within the restricted band specified on Part 15.247&207(a) limit in the table below has to be followed.

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

| | | | |
|-----------|-----------|-----------|-----|
| 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.

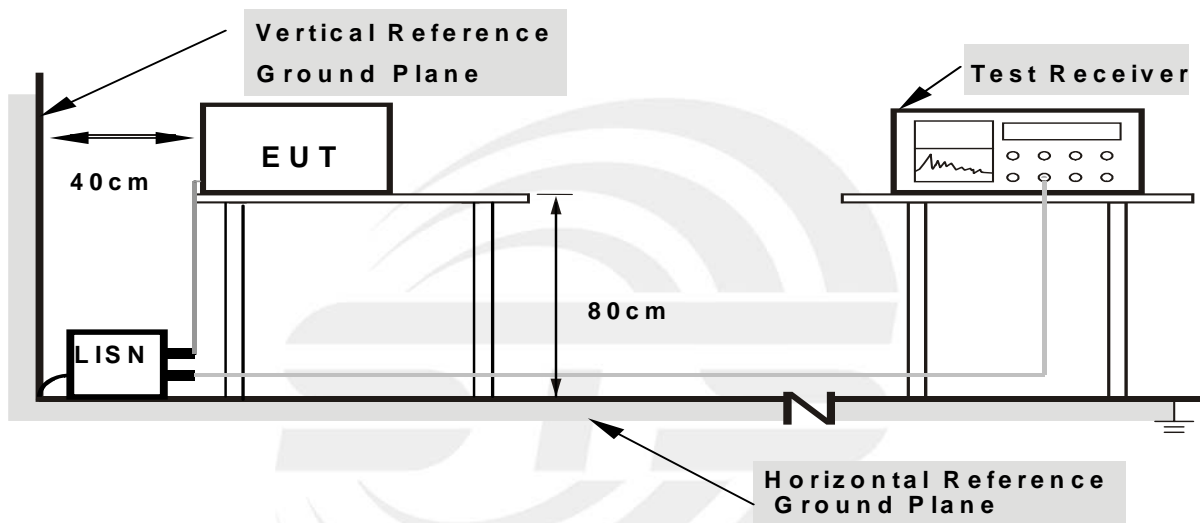
The following table is the setting of the receiver

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

3.1.2 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.

3.1.3 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

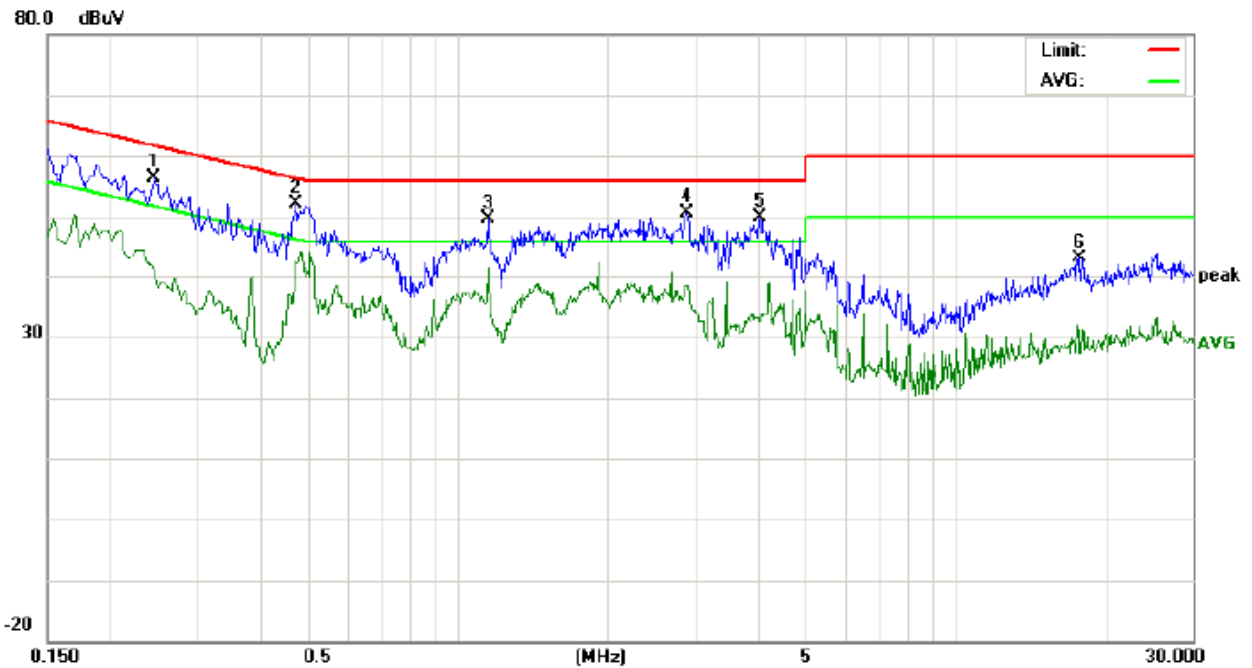
3.1.4 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



3.1.5 TEST RESULTS

| | | | |
|----------------|-------------------|---------------------|------------|
| EUT : | Bluetooth speaker | Model Name. : | S1 |
| Temperature : | 23°C | Relative Humidity : | 50% |
| Pressure : | 1010hPa | Phase : | L |
| Test Voltage : | DC7.4V | Test Mode : | keeping TX |



Site: Conduction Phase: **L1** Temperature: 26
 Limit: FCC Class B Conduction(QP) Power: Humidity: 60 %
 EUT: Bluetooth Speaker
 M/N: S1
 Mode: keeping TX
 Note:

| No. | Freq. (MHz) | Reading_Level (dBuV) | | | Correct Factor dB | Measurement (dBuV) | | | Limit (dBuV) | | Margin (dB) | | P/F | Comment |
|-----|-------------|----------------------|----|-------|-------------------|--------------------|-------|-------|--------------|--------|-------------|-----|-----|---------|
| | | Peak | QP | AVG | | Peak | QP | AVG | QP | AVG | QP | AVG | | |
| 1 | 0.2459 | 46.06 | | 30.10 | 10.27 | 56.33 | 40.37 | 61.89 | 51.89 | -5.56 | -11.52 | P | | |
| 2 | 0.4739 | 41.64 | | 32.14 | 10.38 | 52.02 | 42.52 | 56.45 | 46.45 | -4.43 | -3.93 | P | | |
| 3 | 1.1499 | 39.16 | | 30.82 | 10.37 | 49.53 | 41.19 | 56.00 | 46.00 | -6.47 | -4.81 | P | | |
| 4 | 2.8900 | 39.99 | | 27.80 | 10.52 | 50.51 | 38.32 | 56.00 | 46.00 | -5.49 | -7.68 | P | | |
| 5 | 4.0579 | 39.40 | | 22.30 | 10.40 | 49.80 | 32.70 | 56.00 | 46.00 | -6.20 | -13.30 | P | | |
| 6 | 17.6779 | 32.99 | | 20.51 | 10.12 | 43.11 | 30.63 | 60.00 | 50.00 | -16.89 | -19.37 | P | | |



3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on Part 15247&205(a), then the Part 15 247&209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (30MHz - 1000MHz)

| 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 |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Class B (dBuV/m) (at 3M) | |
|-----------------|--------------------------|---------|
| | PEAK | AVERAGE |
| Above 1000 | 74 | 54 |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

FREQUENCY RANGE OF RADIATED MEASUREMENT (For unintentional radiators)

| Highest frequency generated or Upper frequency of measurement used in the device or on which the device operates or tunes (MHz) | Range (MHz) |
|---|---|
| Below 1.705 | 30 |
| 1.705 – 108 | 1000 |
| 108 – 500 | 2000 |
| 500 – 1000 | 5000 |
| Above 1000 | 5 th harmonic of the highest frequency or 40 GHz, whichever is lower |



| Spectrum Parameter | Setting |
|---------------------------------------|--|
| Attenuation | Auto |
| Detector | Peak |
| Start Frequency | 1000 MHz(Peak/AV) |
| Stop Frequency | 10th carrier harmonic(Peak/AV) |
| RB / VB (emission in restricted band) | RBW 1MHz / VBW 1MHz Peak detector for Pk value RBW 1MHz / VBW 10Hz Peak detector for AV value |

| 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 |

3.2.2 TEST PROCEDURE

- The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then QuasiPeak detector mode re-measured.
- If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

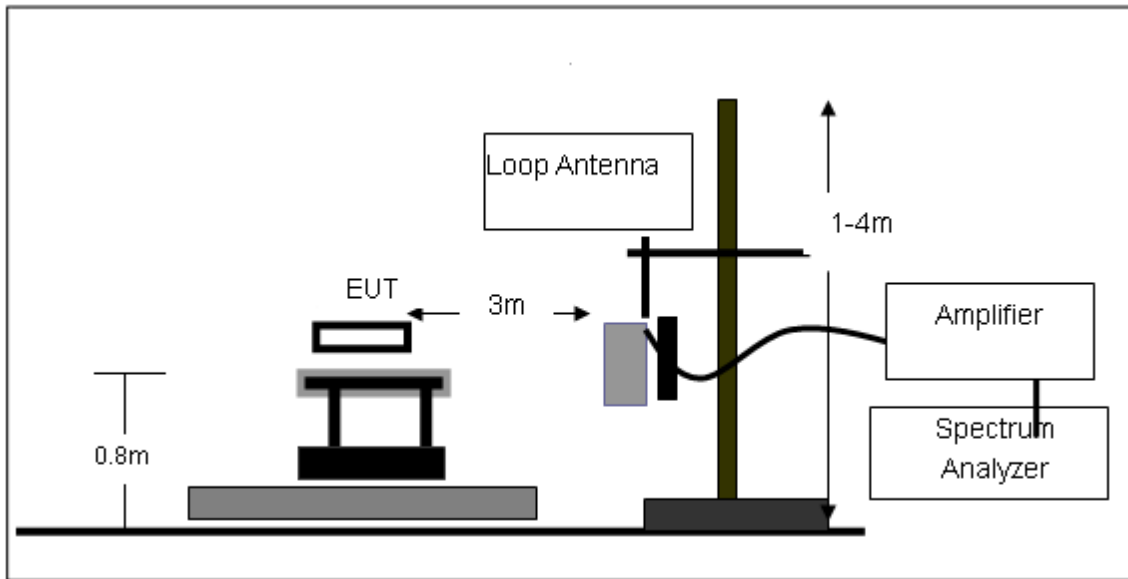
Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

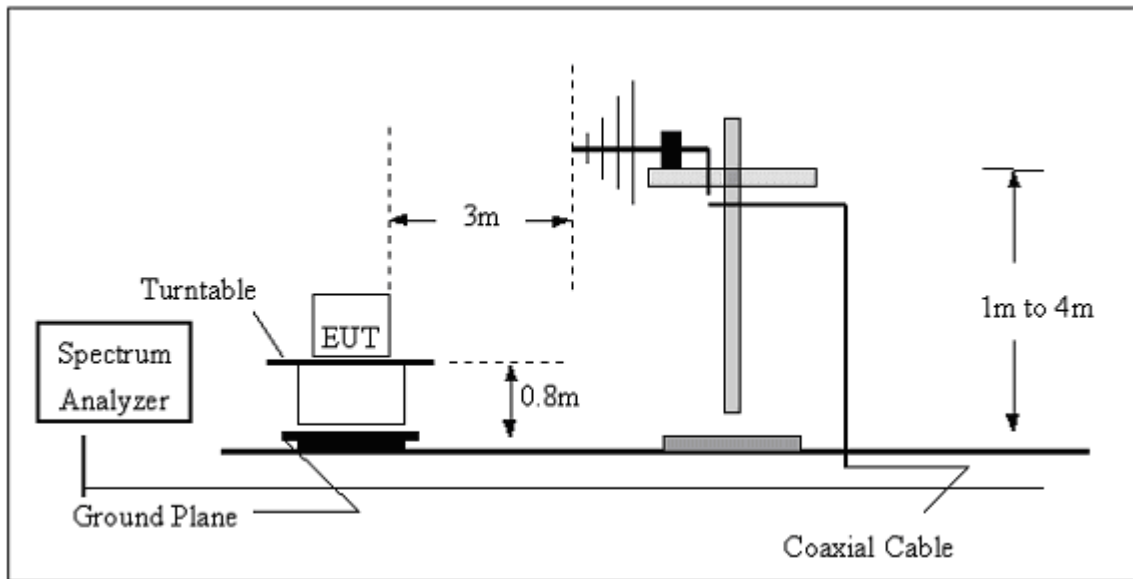
No deviation

3.2.4 TESTSETUP

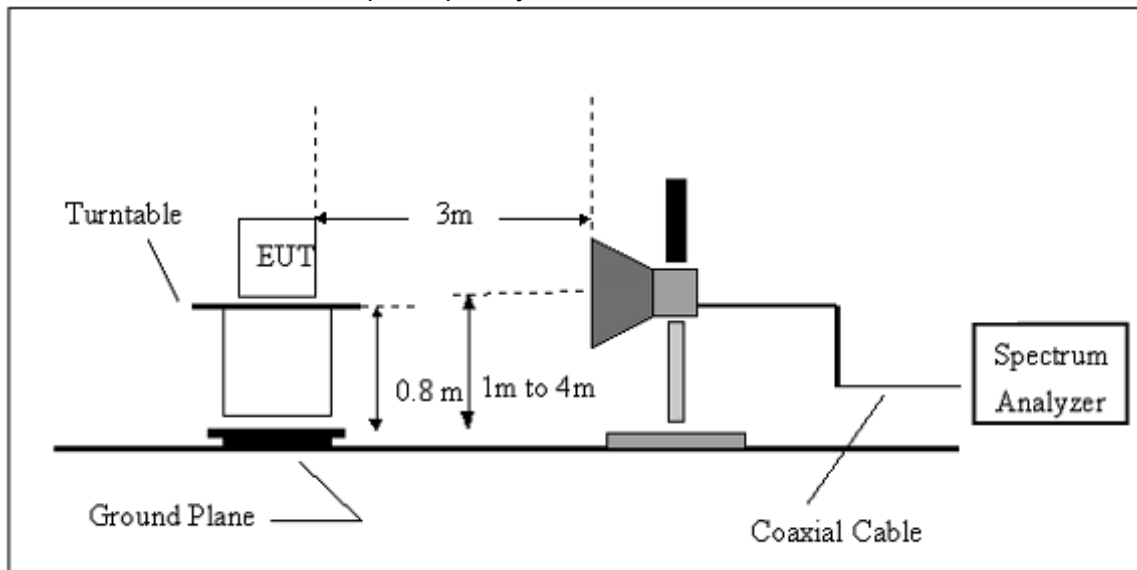
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

REMARK : GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps), 8-DPSK(3Mbps) all have been tested , GFSK(1Mbps) is found as worst case and only reported



3.2.6 TEST RESULTS (WORST CASE : GFSK)

Below 30 MHz

| | | | |
|----------------|-------------------|---------------------|-----|
| EUT : | Bluetooth speaker | Model Name. : | S1 |
| Temperature : | 23 °C | Relative Humidity : | 50% |
| Pressure : | 1010hPa | Polarization : | --- |
| Test Voltage : | DC 7.4V | | |
| Test Mode : | TX Mode | | |

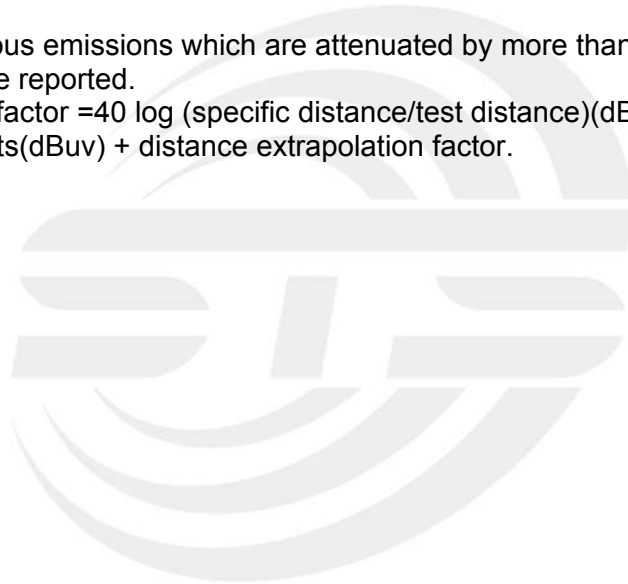
| Freq. (MHz) | Reading (dBuV/m) | Limit (dBuV/m) | Margin (dB) | State P/F |
|----------------|---------------------|-------------------|----------------|--------------|
| -- | -- | -- | -- | PASS |
| -- | -- | -- | -- | PASS |

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 = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

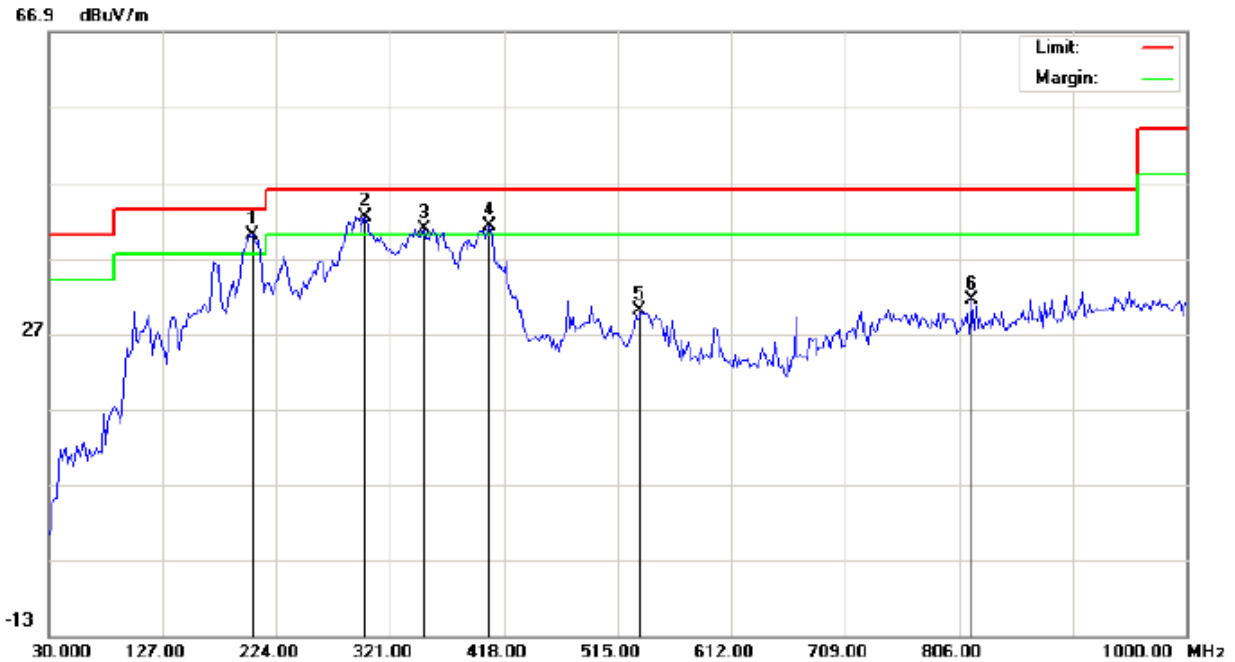
Limit line = specific limits(dBuv) + distance extrapolation factor.





Between 30MHz – 1000 MHz

RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL-HORIZONTAL



Site: site #1
 Limit: FCC Class B 3M Radiation
 EUT: Bluetooth Speaker
 M/N: S1
 Mode: Low Channel TX
 Note:

Polarization: *Horizontal*
 Power:
 Distance: 3m

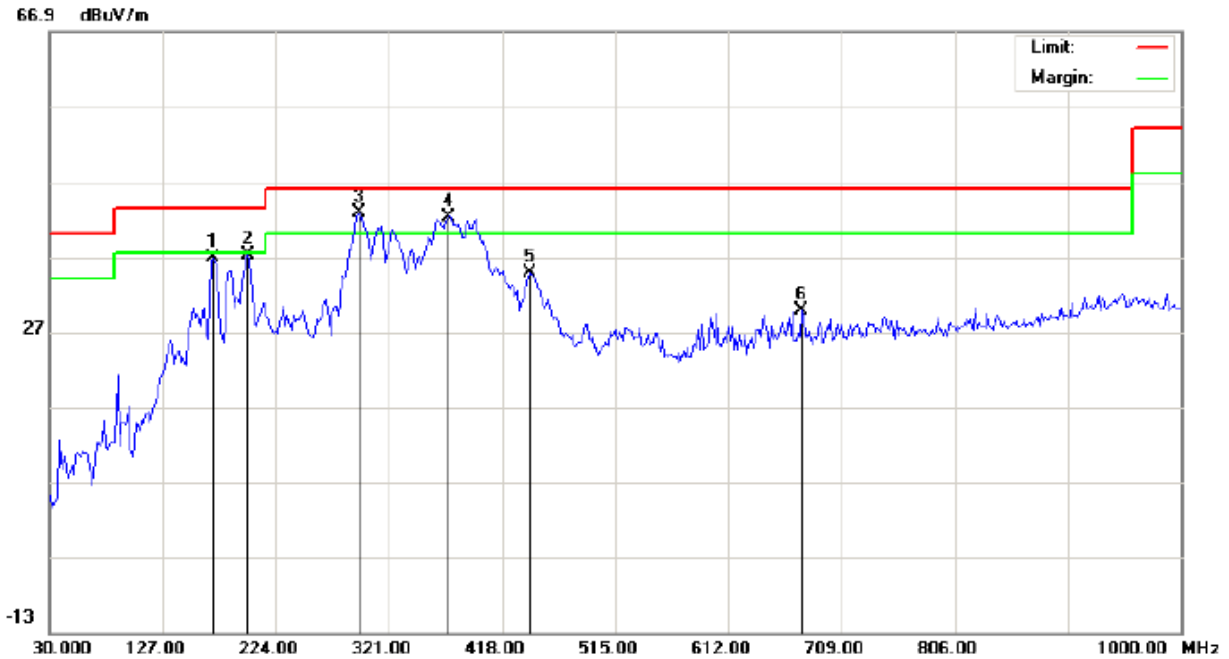
Temperature: 26
 Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 204.5997 | 27.92 | 12.17 | 40.09 | 43.50 | -3.41 | peak | | | |
| 2 | ! | 299.9832 | 27.03 | 15.41 | 42.44 | 46.00 | -3.56 | peak | | | |
| 3 | ! | 350.1000 | 22.02 | 18.74 | 40.76 | 46.00 | -5.24 | peak | | | |
| 4 | ! | 405.0667 | 21.90 | 19.22 | 41.12 | 46.00 | -4.88 | peak | | | |
| 5 | | 534.3999 | 7.99 | 22.06 | 30.05 | 46.00 | -15.95 | peak | | | |
| 6 | | 817.3165 | 4.00 | 27.32 | 31.32 | 46.00 | -14.68 | peak | | | |

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)-LOW CHANNEL -VERTICAL



Site: site #1
 Limit: FCC Class B 3M Radiation
 EUT: Bluetooth Speaker
 M/N: S1
 Mode: Low Channel TX
 Note:

Polarization: *Vertical*
 Power:
 Distance: 3m

Temperature: 26
 Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 170.6500 | 22.14 | 14.66 | 36.80 | 43.50 | -6.70 | peak | | | |
| 2 | | 199.7500 | 28.10 | 9.06 | 37.16 | 43.50 | -6.34 | peak | | | |
| 3 | * | 295.1333 | 27.57 | 15.26 | 42.83 | 46.00 | -3.17 | peak | | | |
| 4 | ! | 372.7332 | 23.41 | 18.89 | 42.30 | 46.00 | -3.70 | peak | | | |
| 5 | | 442.2500 | 14.45 | 20.35 | 34.80 | 46.00 | -11.20 | peak | | | |
| 6 | | 675.0498 | 5.38 | 24.52 | 29.90 | 46.00 | -16.10 | peak | | | |

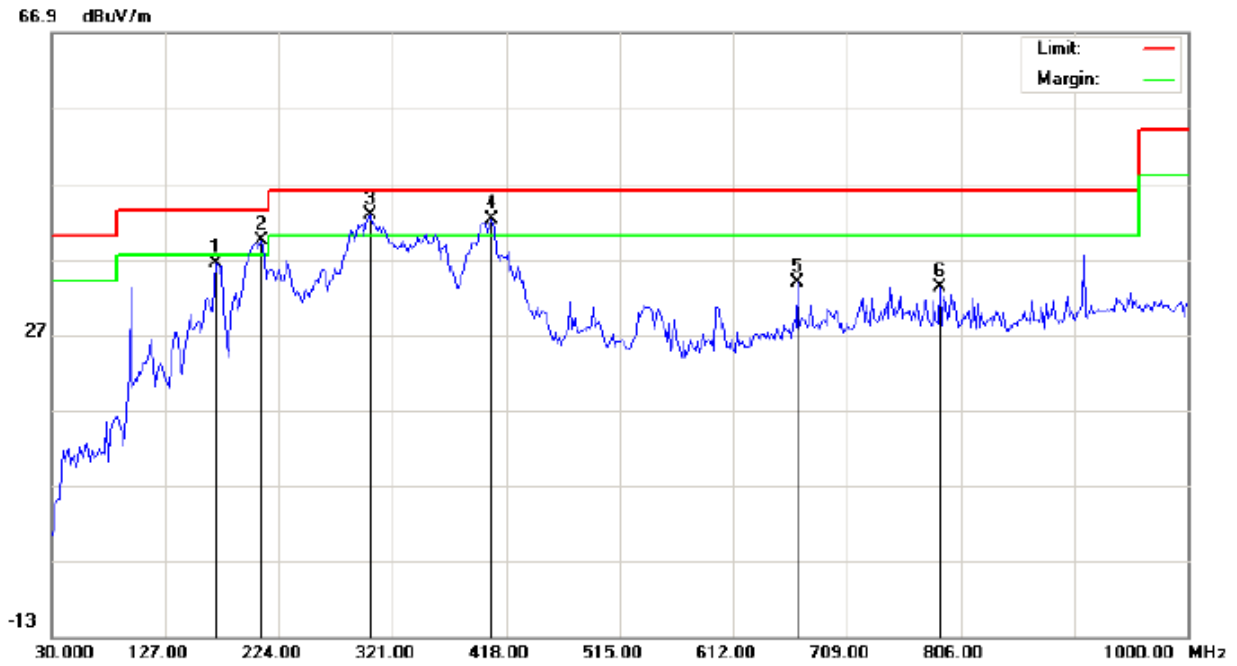
RESULT: PASS

Note: 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



RADIATED EMISSION TEST- (30MHZ-1GHZ)-MIDDLE CHANNEL-HORIZONTAL



Site: site #1
 Limit: FCC Class B 3M Radiation
 EUT: Bluetooth Speaker
 M/N: S1
 Mode: Middle Channel TX
 Note:

Polarization: *Horizontal*
 Power:
 Distance: 3m

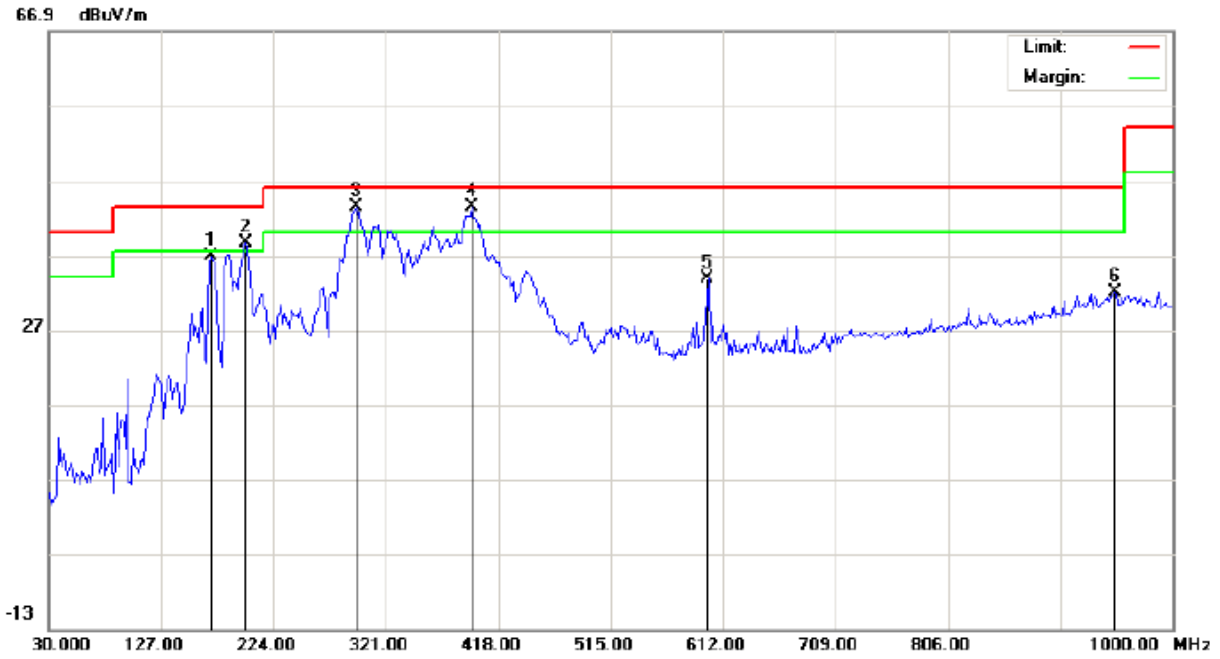
Temperature: 26
 Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | | 170.6500 | 23.39 | 13.06 | 36.45 | 43.50 | -7.05 | peak | | | |
| 2 | ! | 209.4499 | 27.13 | 12.36 | 39.49 | 43.50 | -4.01 | peak | | | |
| 3 | * | 301.6000 | 27.26 | 15.52 | 42.78 | 46.00 | -3.22 | peak | | | |
| 4 | ! | 405.0667 | 22.90 | 19.22 | 42.12 | 46.00 | -3.88 | peak | | | |
| 5 | | 666.9664 | 9.42 | 24.30 | 33.72 | 46.00 | -12.28 | peak | | | |
| 6 | | 788.2164 | 5.98 | 27.16 | 33.14 | 46.00 | -12.86 | peak | | | |

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)- MIDDLE CHANNEL -VERTICAL



Site: site #1 Polarization: *Vertical* Temperature: 26
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance: 3m
 M/N: S1
 Mode: Middle Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| | | | | | | | | | cm | degree | |
| 1 | | 170.6500 | 22.14 | 14.66 | 36.80 | 43.50 | -6.70 | peak | | | |
| 2 | ! | 199.7500 | 29.60 | 9.06 | 38.66 | 43.50 | -4.84 | peak | | | |
| 3 | ! | 295.1333 | 28.07 | 15.26 | 43.33 | 46.00 | -2.67 | peak | | | |
| 4 | * | 395.3666 | 24.41 | 19.04 | 43.45 | 46.00 | -2.55 | peak | | | |
| 5 | | 599.0665 | 11.11 | 22.73 | 33.84 | 46.00 | -12.16 | peak | | | |
| 6 | | 949.8831 | 2.06 | 30.00 | 32.06 | 46.00 | -13.94 | peak | | | |

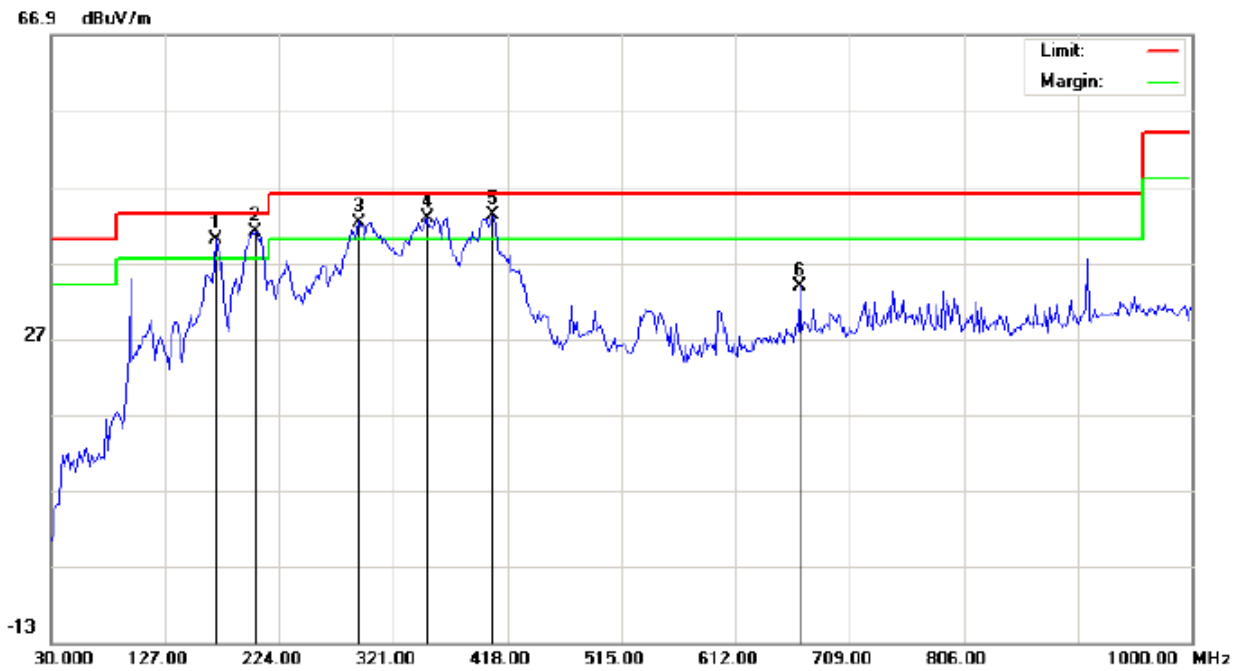
RESULT: PASS

Note: 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL-HORIZONTAL



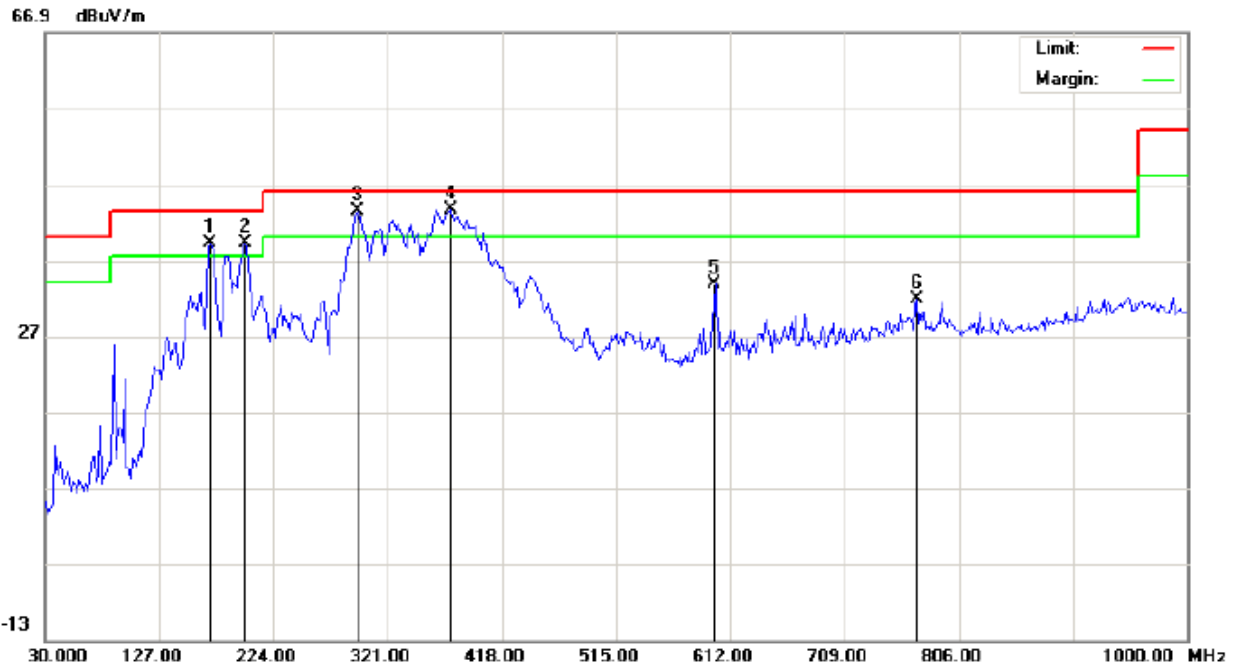
Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance: 3m
 M/N: S1
 Mode: High Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | ! | 170.6500 | 26.89 | 13.06 | 39.95 | 43.50 | -3.55 | peak | | | |
| 2 | * | 204.5999 | 28.92 | 12.17 | 41.09 | 43.50 | -2.41 | peak | | | |
| 3 | ! | 291.8999 | 27.13 | 15.17 | 42.30 | 46.00 | -3.70 | peak | | | |
| 4 | ! | 350.1000 | 24.02 | 18.74 | 42.76 | 46.00 | -3.24 | peak | | | |
| 5 | ! | 405.0667 | 23.90 | 19.22 | 43.12 | 46.00 | -2.88 | peak | | | |
| 6 | | 666.9665 | 9.42 | 24.30 | 33.72 | 46.00 | -12.28 | peak | | | |

RESULT: PASS



RADIATED EMISSION TEST- (30MHZ-1GHZ)-HIGH CHANNEL -VERTICAL



Site: site #1 Polarization: *Vertical* Temperature: 26
 Limit: FCC Class B 3M Radiation Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance: 3m
 M/N: S1
 Mode: High Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| | | | | | | | | | cm | degree | |
| 1 | ! | 170.6500 | 24.64 | 14.66 | 39.30 | 43.50 | -4.20 | peak | | | |
| 2 | ! | 199.7500 | 30.10 | 9.06 | 39.16 | 43.50 | -4.34 | peak | | | |
| 3 | ! | 295.1333 | 28.07 | 15.26 | 43.33 | 46.00 | -2.67 | peak | | | |
| 4 | * | 374.3500 | 24.74 | 18.90 | 43.64 | 46.00 | -2.36 | peak | | | |
| 5 | | 599.0666 | 11.11 | 22.73 | 33.84 | 46.00 | -12.16 | peak | | | |
| 6 | | 770.4333 | 4.88 | 26.91 | 31.79 | 46.00 | -14.21 | peak | | | |

RESULT: PASS

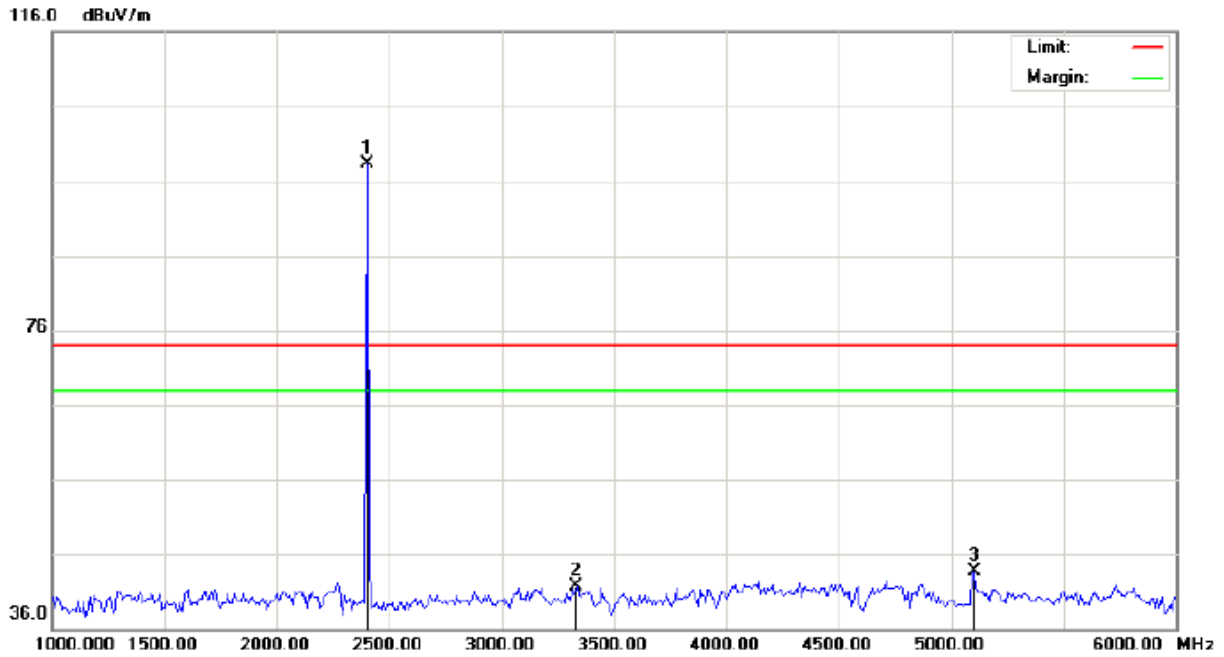
Note: 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.



Above 1000 MHz

RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL-HORIZONTAL



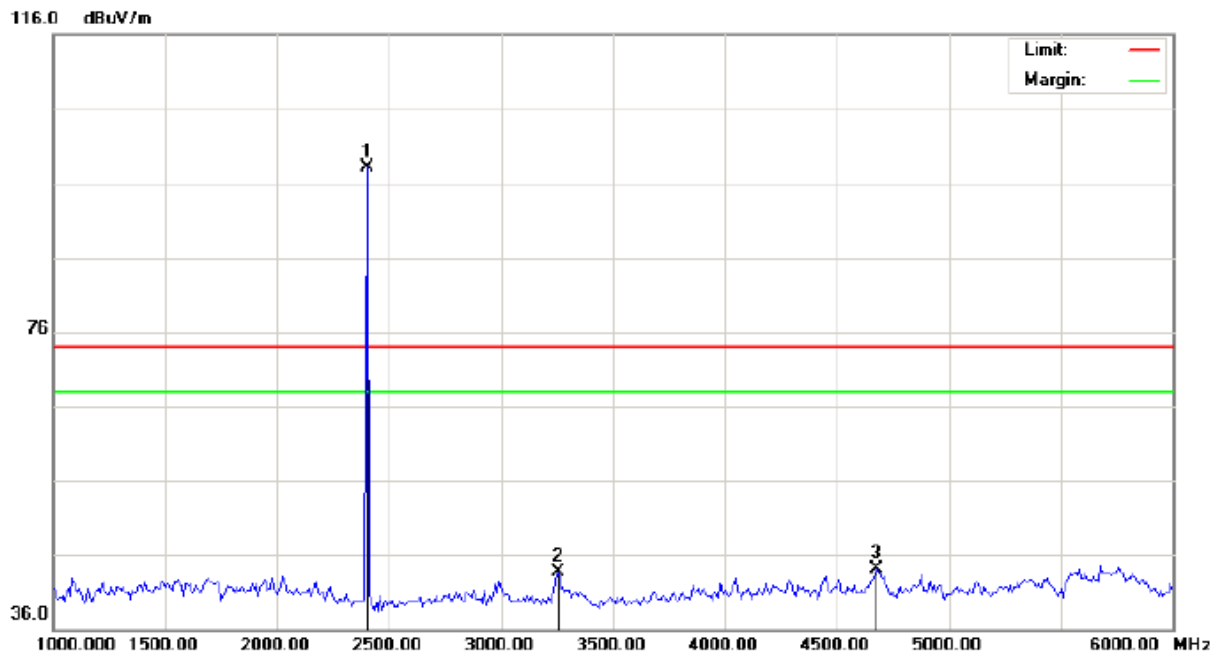
Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: S1
 Mode: Low Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| | | | | | | | | | cm | degree | |
| 1 | * | 2402.000 | 88.07 | 10.32 | 98.39 | 74.00 | 24.39 | peak | | | |
| 2 | | 3333.333 | 29.80 | 11.95 | 41.75 | 74.00 | -32.25 | peak | | | |
| 3 | | 5100.000 | 37.56 | 6.20 | 43.76 | 74.00 | -30.24 | peak | | | |

RESULT: PASS



RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-LOW CHANNEL –VERTICAL



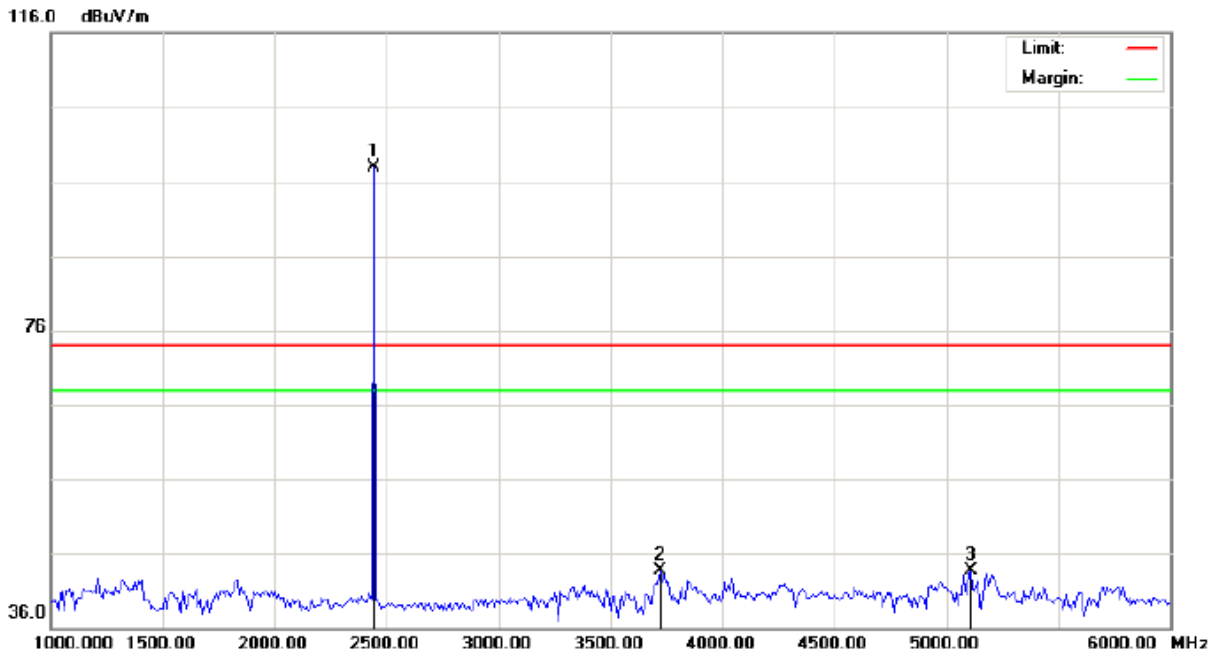
| | | |
|--|-------------------------------|-----------------|
| Site: site #1 | Polarization: <i>Vertical</i> | Temperature: 26 |
| Limit: FCC Class B 3M Radiation above 1GHZ(PK) | Power: | Humidity: 60 % |
| EUT: Bluetooth Speaker | Distance: | |
| M/N: S1 | | |
| Mode: Low Channel TX | | |
| Note: | | |

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2402.000 | 87.70 | 10.32 | 98.02 | 74.00 | 24.02 | peak | | | |
| 2 | | 3258.333 | 31.84 | 11.88 | 43.72 | 74.00 | -30.28 | peak | | | |
| 3 | | 4675.000 | 36.83 | 7.35 | 44.18 | 74.00 | -29.82 | peak | | | |

RESULT: PASS



RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-MIDDLE CHANNEL-HORIZONTAL



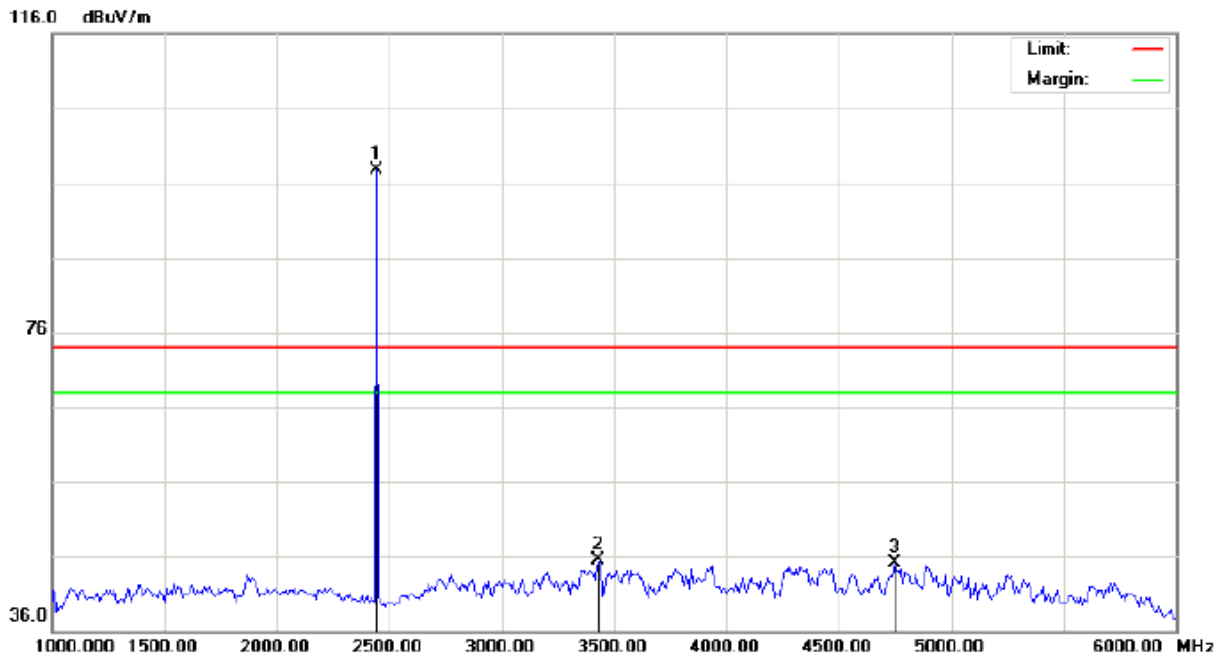
Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: S1
 Mode: Middle Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2441.000 | 87.61 | 10.36 | 97.97 | 74.00 | 23.97 | peak | | | |
| 2 | | 3725.000 | 30.29 | 13.50 | 43.79 | 74.00 | -30.21 | peak | | | |
| 3 | | 5108.333 | 37.69 | 6.03 | 43.72 | 74.00 | -30.28 | peak | | | |

RESULT: PASS



RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)- MIDDLE CHANNEL –VERTICAL



Site: site #1
 Limit: FCC Class B 3M Radiation above 1GHZ(PK)
 EUT: Bluetooth Speaker
 M/N: S1
 Mode: Middle Channel TX
 Note:

Polarization: *Vertical*
 Power:
 Distance:

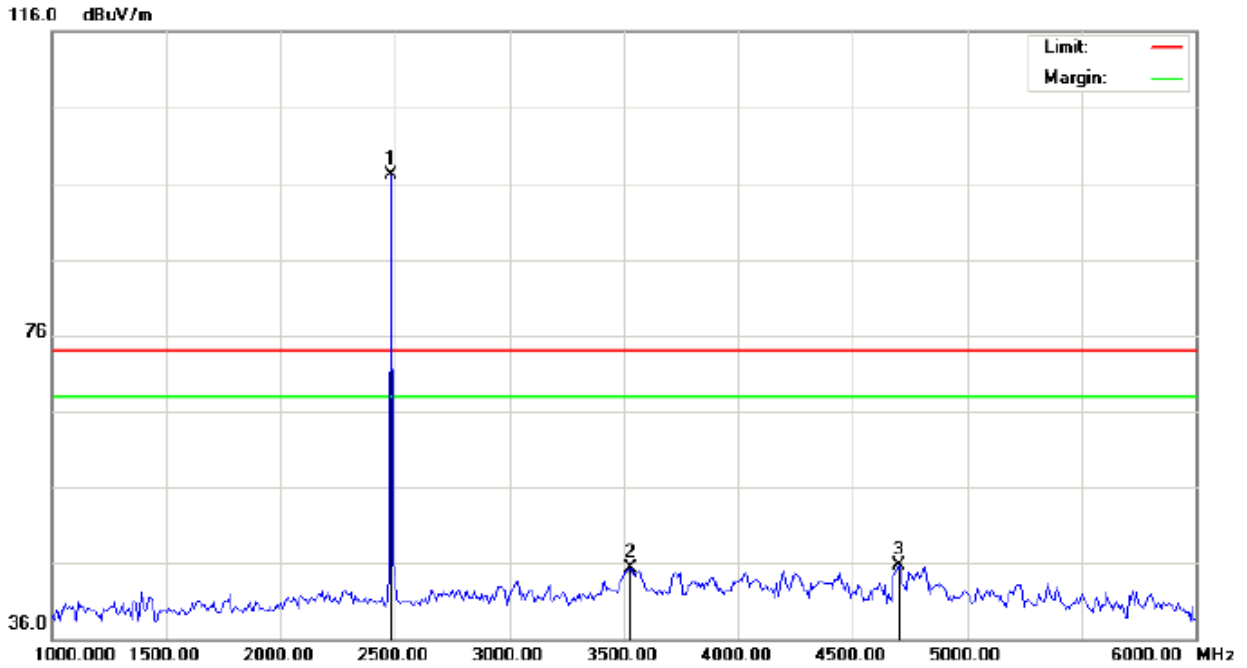
Temperature: 26
 Humidity: 60 %

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2441.000 | 87.41 | 10.36 | 97.77 | 74.00 | 23.77 | peak | | | |
| 2 | | 3433.333 | 33.46 | 12.05 | 45.51 | 74.00 | -28.49 | peak | | | |
| 3 | | 4750.000 | 37.56 | 7.54 | 45.10 | 74.00 | -28.90 | peak | | | |

RESULT: PASS



RADIATED EMISSION ABOVE 1GHZ (1-10th Harmonics)-HIGH CHANNEL –VERTICAL



Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: S1
 Mode: High Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2480.000 | 86.76 | 10.41 | 97.17 | 74.00 | 23.17 | peak | | | |
| 2 | | 3533.333 | 33.06 | 12.32 | 45.38 | 74.00 | -28.62 | peak | | | |
| 3 | | 4700.000 | 38.22 | 7.41 | 45.63 | 74.00 | -28.37 | peak | | | |

RESULT: PASS

Note: 6~25GHz at least have 20dB margin. No recording in the test report.

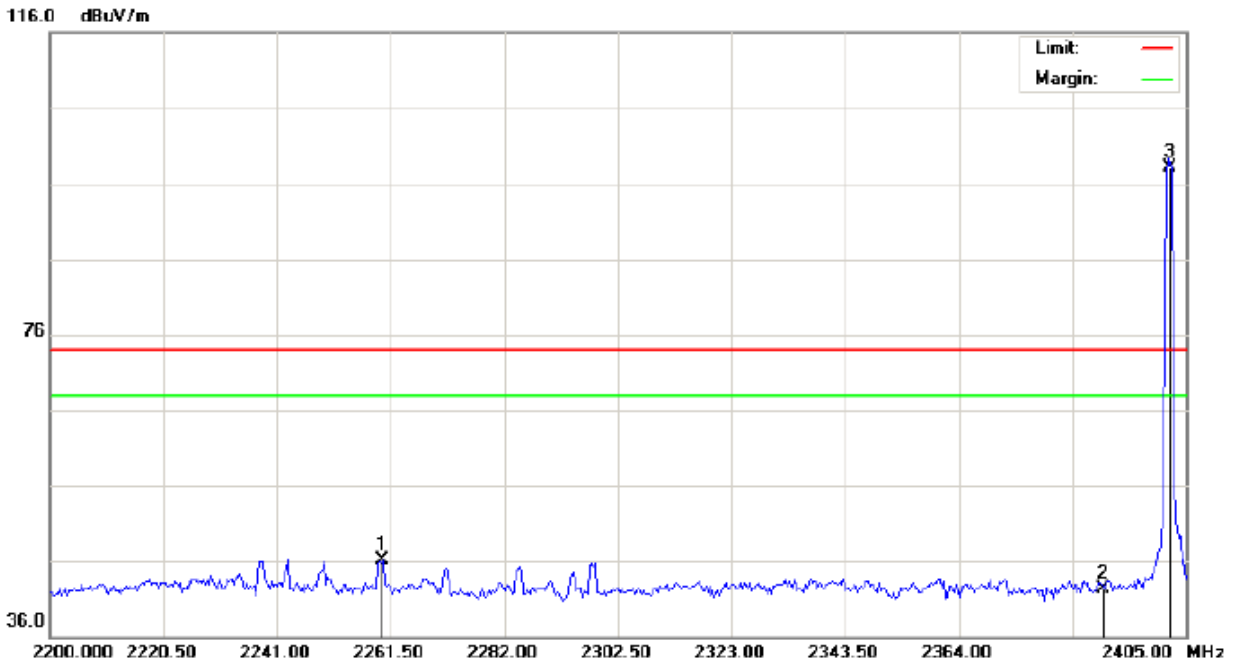
Factor=Antenna Factor+ Cable loss-Amplifier gain, Margin=Measurement-Limit.

The "Factor" value can be calculated automatically by software of measurement system.



BAND EDGE TEST(WORST CASE:GFSK)

TEST PLOT OF BAND EDGE FOR LOW CHANNEL(1Mbps) -Horizontal

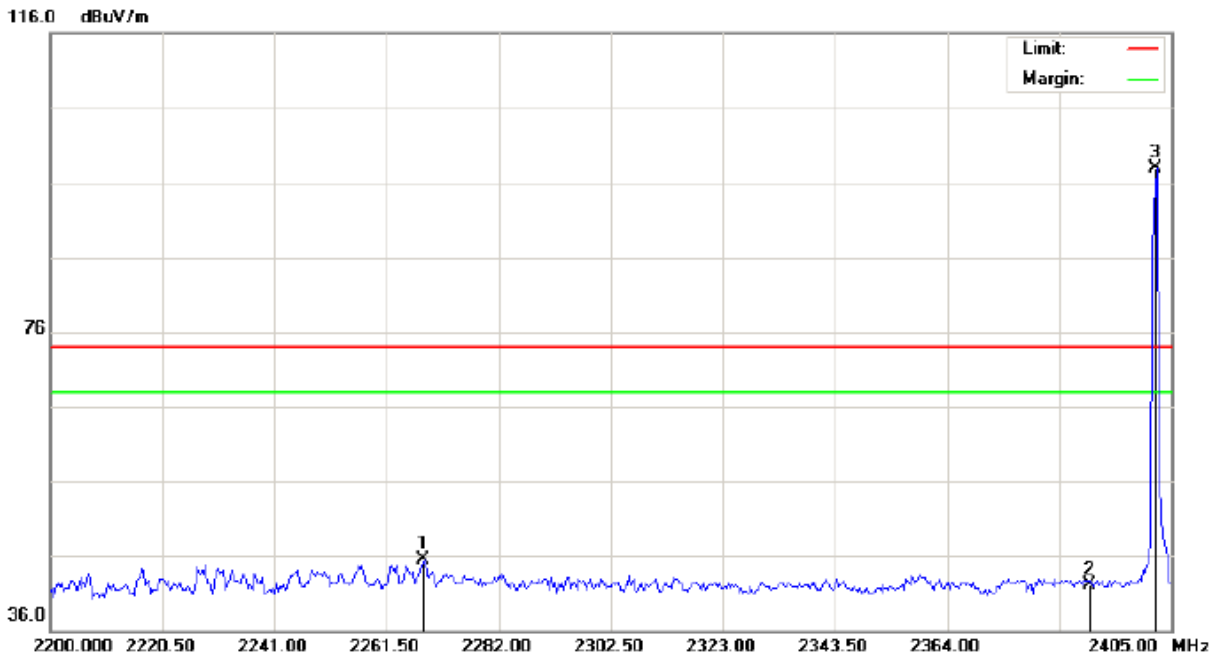


Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: SL-Z2450C-M001
 Mode: Low Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| | | | | | | | | | cm | degree | |
| 1 | | 2260.133 | 35.86 | 10.17 | 46.03 | 74.00 | -27.97 | peak | | | |
| 2 | | 2390.000 | 32.00 | 10.31 | 42.31 | 74.00 | -31.69 | peak | | | |
| 3 | * | 2402.000 | 87.72 | 10.32 | 98.04 | 74.00 | 24.04 | peak | | | |



TEST PLOT OF BAND EDGE FOR LOW CHANNEL(1Mbps) -Vertical

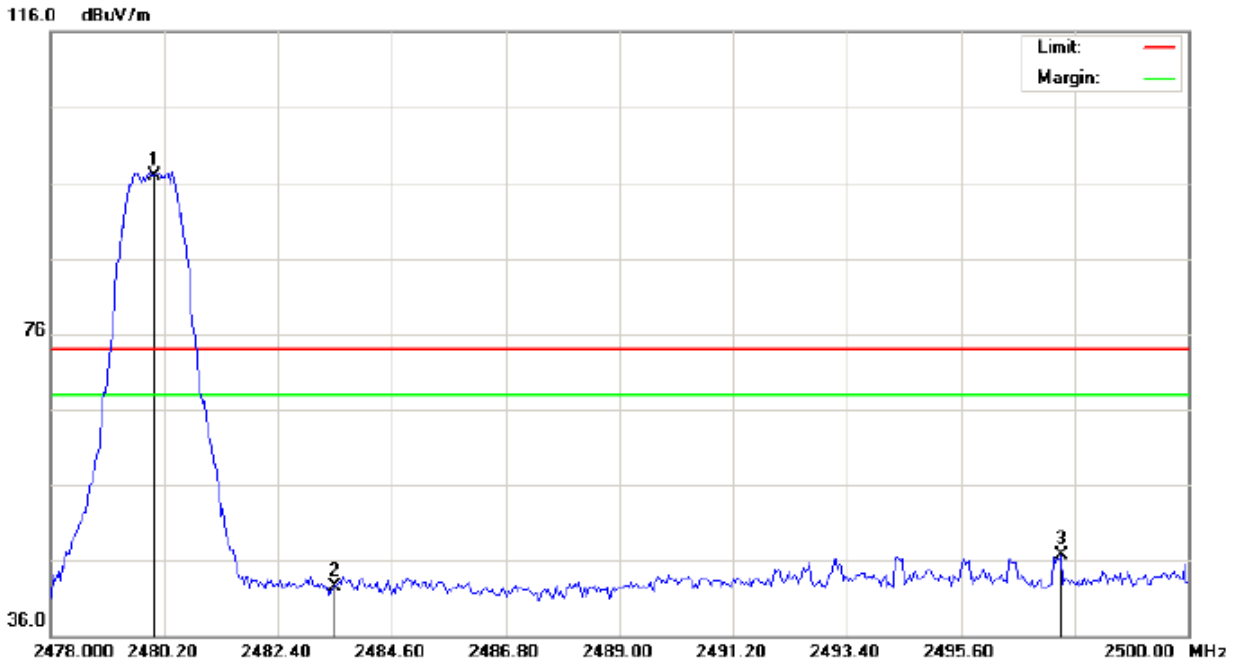


Site: site #1 Polarization: *Vertical* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: S1
 Mode: Low Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna | Table | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|---------|--------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | Height | Degree | |
| 1 | | 2268.333 | 35.25 | 10.18 | 45.43 | 74.00 | -28.57 | peak | | | |
| 2 | | 2390.000 | 31.71 | 10.31 | 42.02 | 74.00 | -31.98 | peak | | | |
| 3 | * | 2402.000 | 87.61 | 10.32 | 97.93 | 74.00 | 23.93 | peak | | | |



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL(1Mbps) -Horizontal

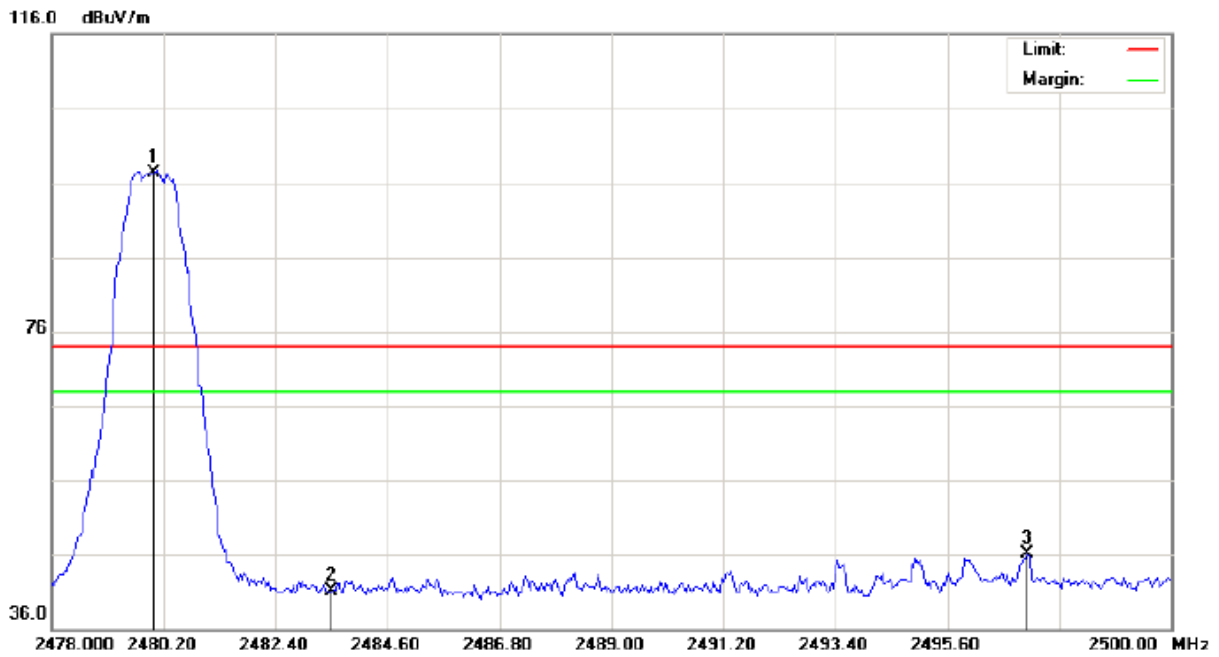


Site: site #1 Polarization: *Horizontal* Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: S1
 Mode: High Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2480.000 | 86.55 | 10.41 | 96.96 | 74.00 | 22.96 | peak | | | |
| 2 | | 2483.500 | 32.19 | 10.41 | 42.60 | 74.00 | -31.40 | peak | | | |
| 3 | | 2497.543 | 36.26 | 10.43 | 46.69 | 74.00 | -27.31 | peak | | | |



TEST PLOT OF BAND EDGE FOR HIGH CHANNEL(1Mbps) -Vertical



Site: site #1 Polarization: **Vertical** Temperature: 26
 Limit: FCC Class B 3M Radiation above 1GHZ(PK) Power: Humidity: 60 %
 EUT: Bluetooth Speaker Distance:
 M/N: SL-Z2450C-M001
 Mode: High Channel TX
 Note:

| No. | Mk | Freq. | Reading | Factor | Measurement | Limit | Over | Detector | Antenna Height | Table Degree | Comment |
|-----|----|----------|---------|--------|-------------|--------|--------|----------|----------------|--------------|---------|
| | | MHz | dBuV | dB/m | dBuV/m | dBuV/m | dB | | cm | degree | |
| 1 | * | 2480.000 | 86.82 | 10.41 | 97.23 | 74.00 | 23.23 | peak | | | |
| 2 | | 2483.500 | 30.76 | 10.41 | 41.17 | 74.00 | -32.83 | peak | | | |
| 3 | | 2497.177 | 35.65 | 10.43 | 46.08 | 74.00 | -27.92 | peak | | | |

RESULT: PASS

Note: 1. Factor=Antenna Factor+ Cable loss, Margin=Measurement-Limit.

2. The "Factor" value can be calculated automatically by software of measurement system.

4. CONDUCTED SPURIOUS EMISSIONS

4.1 REQUIREMENT

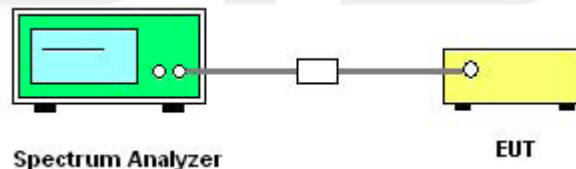
According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

4.2 TEST PROCEDURE

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

| Spectrum Parameter | Setting |
|---------------------------------------|---------------------------------|
| Detector | Peak |
| Start/Stop Frequency | 30 MHz to 10th carrier harmonic |
| RB / VB (emission in restricted band) | 100 KHz/100 KHz |
| Trace-Mode: | Max hold |

4.3 TEST SETUP



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. Make the measurement with the spectrum analyzer's resolution bandwidth(RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

4.4 EUT OPERATION CONDITIONS

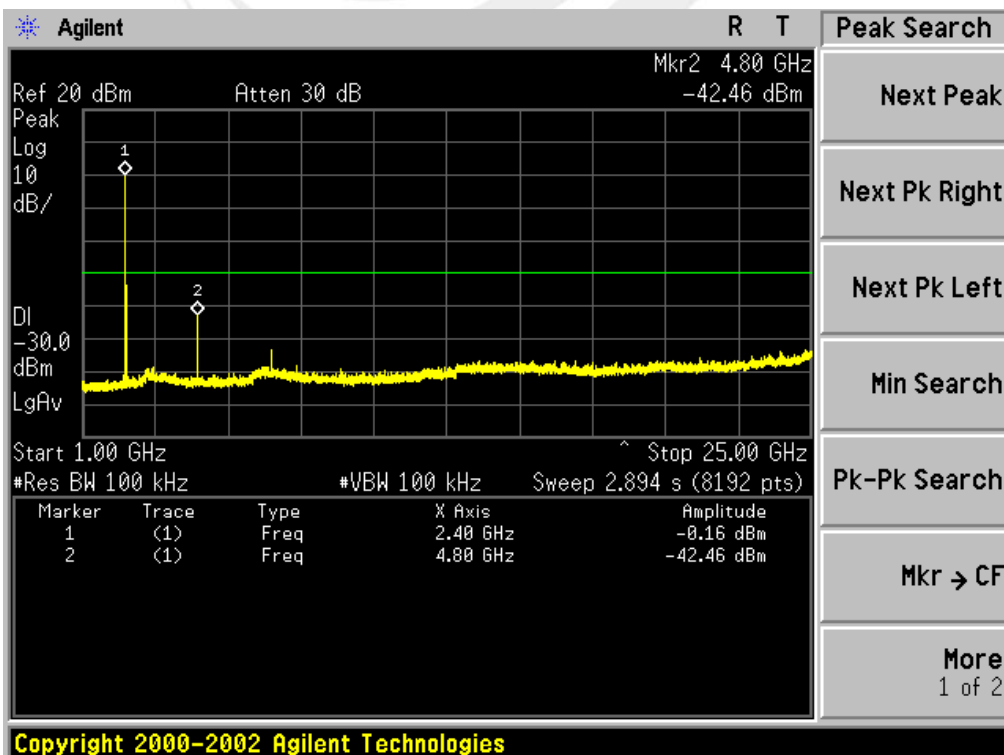
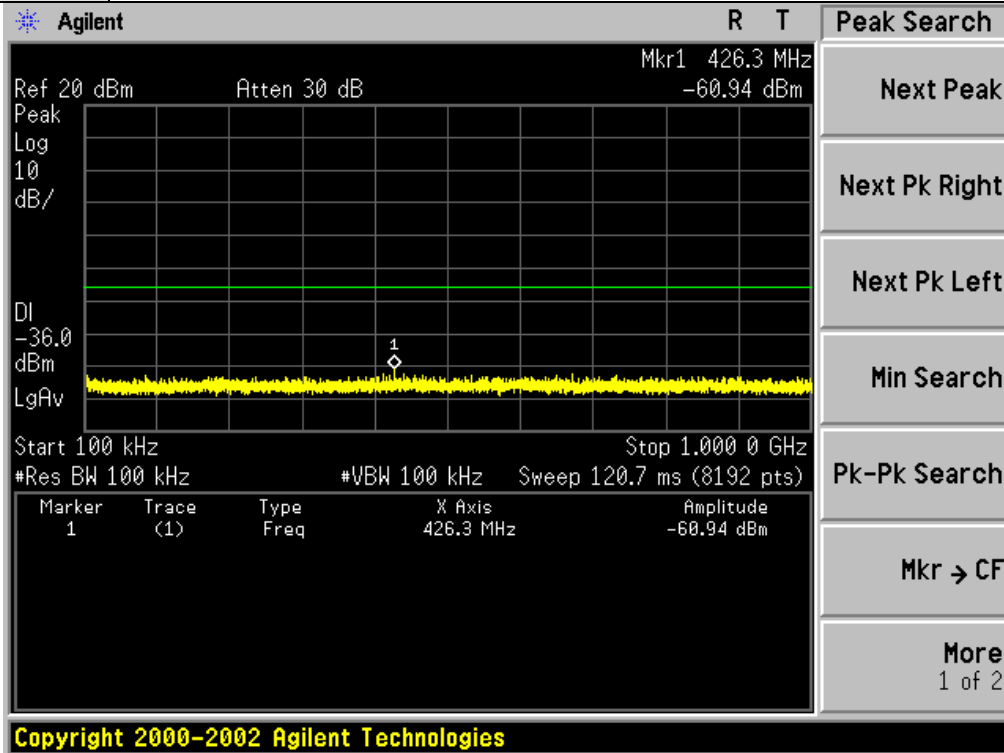
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

REMARK: GFSK(1Mbps), $\pi/4$ -DQPSK(2Mbps),8-DPSK(3Mbps) all have been tested , GFSK(1Mbps) is found as worst case and only reported



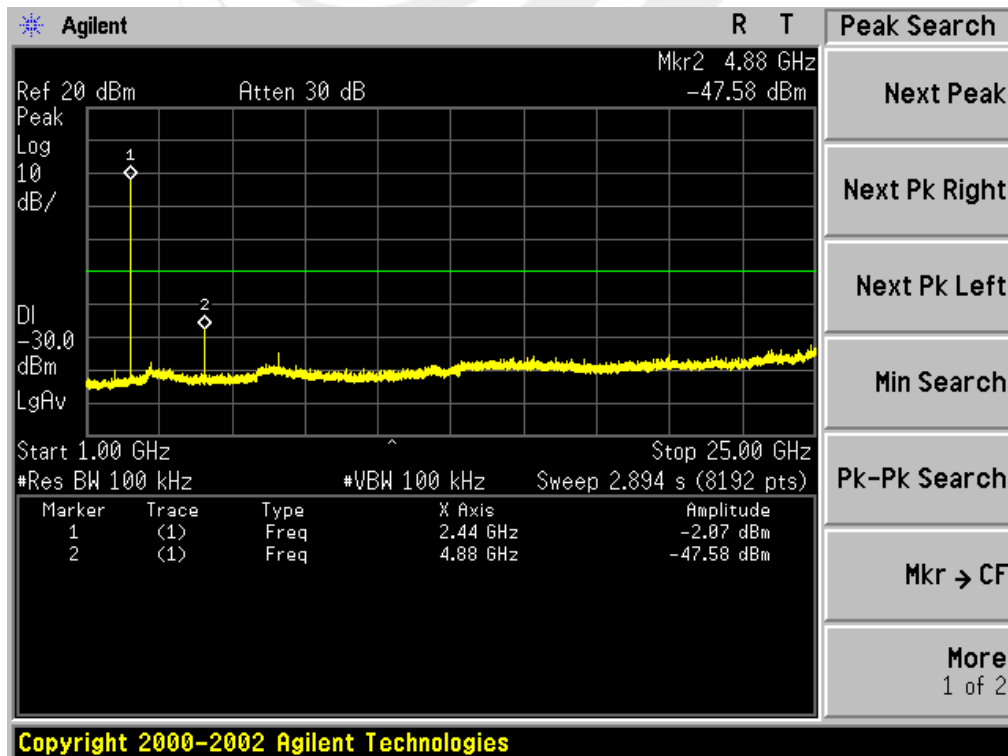
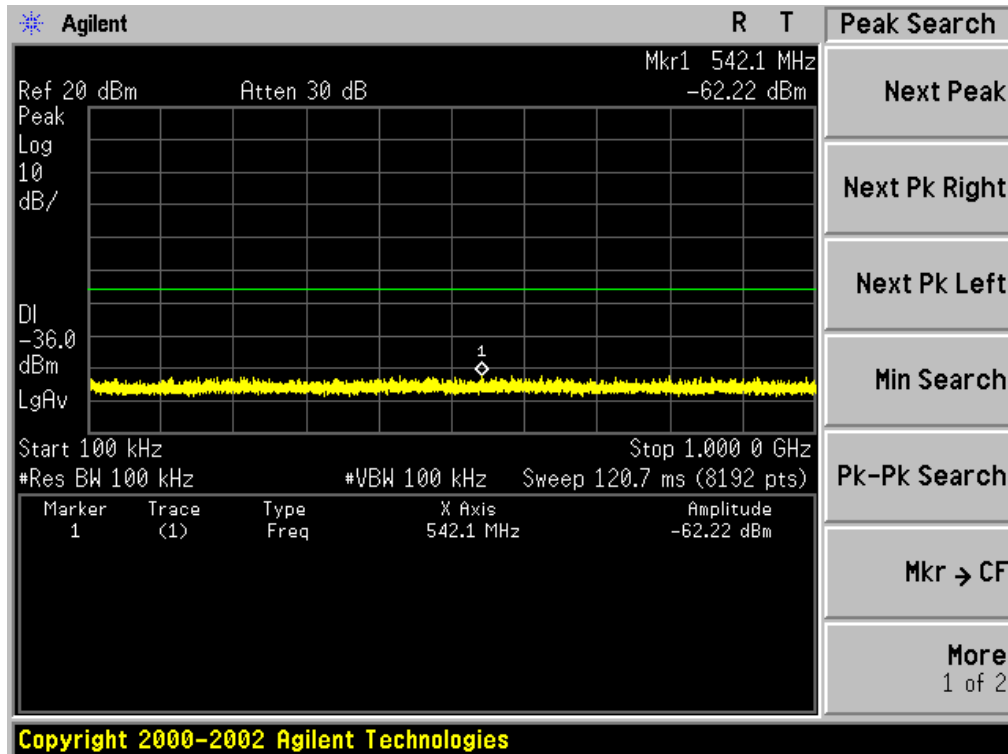
4.5 TEST RESULTS

| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 50% |
| Pressure : | 1012 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | Low Channel(GFSK) | | |



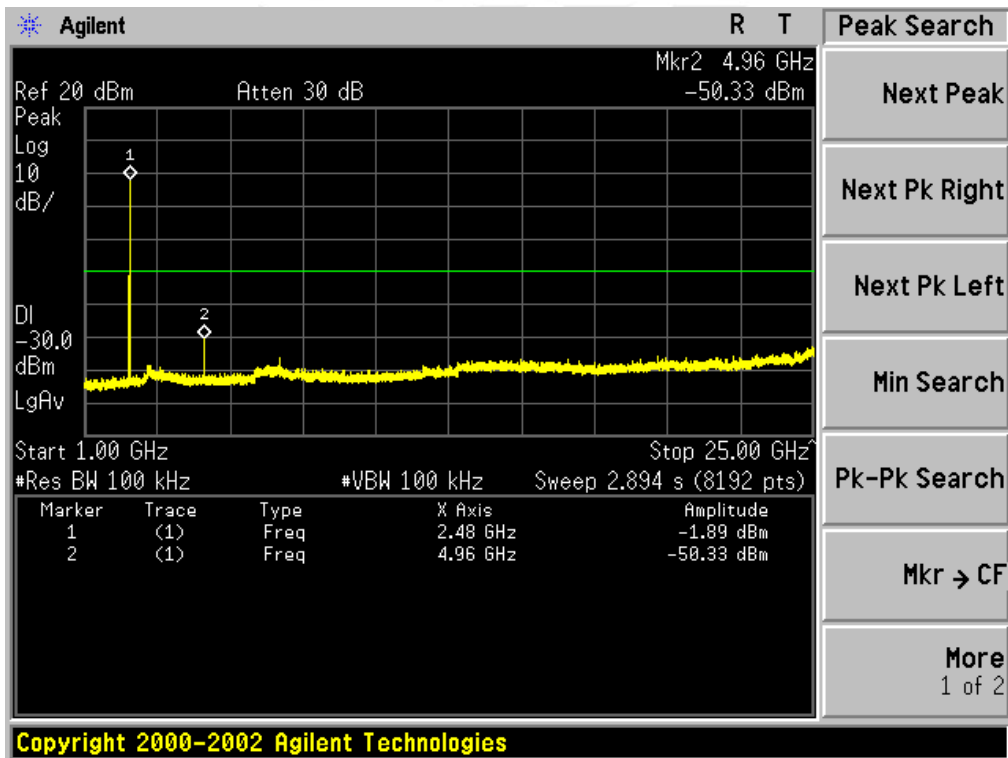
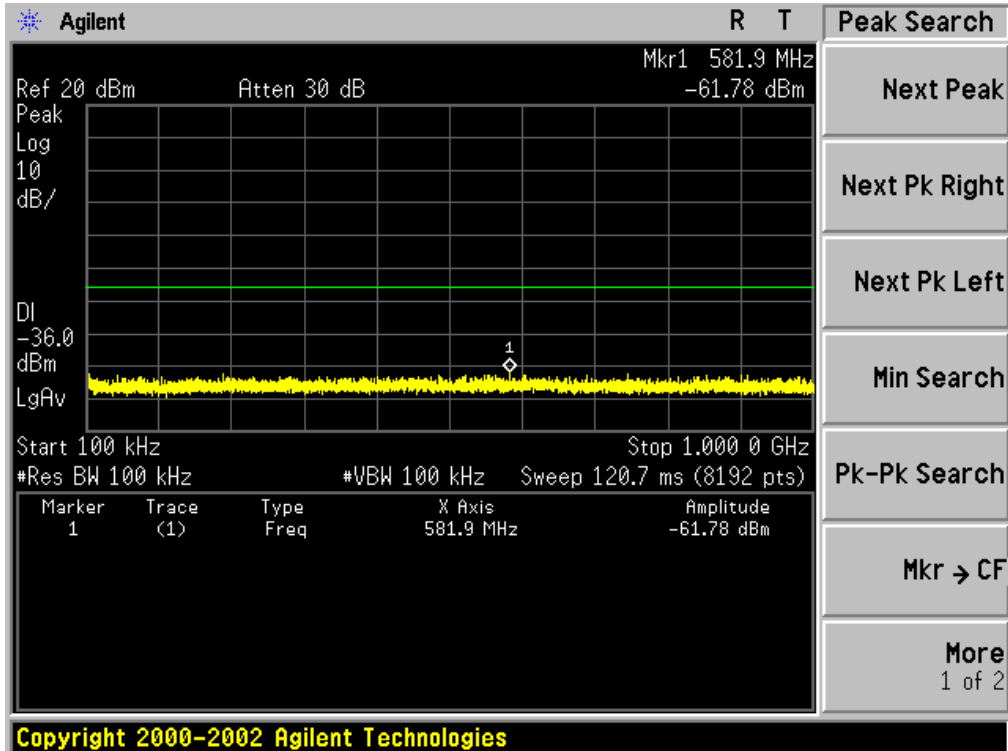


| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 50% |
| Pressure : | 1012 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | Middle(GFSK) | | |





| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 50% |
| Pressure : | 1012 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | High(GFSK) | | |



5. NUMBER OF HOPPING CHANNEL

5.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|---------------------------|-------|----------------------|--------|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result |
| 15.247 (a)(1)(iii) | Number of Hopping Channel | ≥15 | 2400-2483.5 | PASS |

| Spectrum Parameters | Setting |
|---------------------|----------------------------|
| Attenuation | Auto |
| Span Frequency | > Operating FrequencyRange |
| RB | 100KHz |
| VB | 300KHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

5.2 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= 100K, VBW=300K, Sweep time = Auto.

5.3 TEST SETUP



5.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

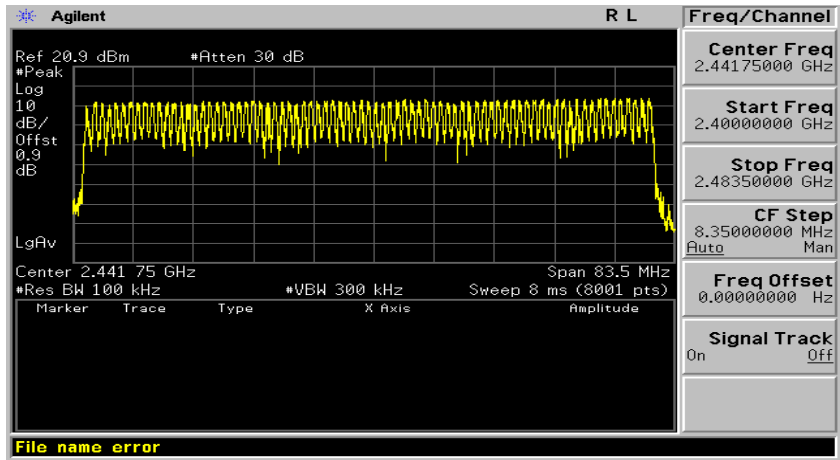


5.5TEST RESULTS

| | | | |
|---------------|-------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 60% |
| Pressure : | 1015 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | Hopping Mode | | |

| | |
|---------------------------|----|
| Number of Hopping Channel | 79 |
|---------------------------|----|

Hopping channel



Note: All modes (GFSK, $\pi/4$ DQPSK, 8DPSK) were tested, test result was passed.

6. AVERAGE TIME OF OCCUPANCY

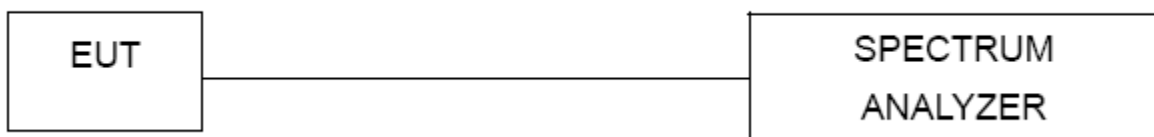
6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|---------------------------|--------|----------------------|--------|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result |
| 15.247 (a)(1)(iii) | Average Time of Occupancy | 0.4sec | 2400-2483.5 | PASS |

6.2 TEST PROCEDURE

- a. The transmitter output (antenna port) was connected to the spectrum analyzer
- b. Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz.
- c. Use a video trigger with the trigger level set to enable triggering only on full pulses.
- d. Sweep Time is more than once pulse time.
- e. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- f. Measure the maximum time duration of one single pulse.
- g. Set the EUT for DH5, DH3 and DH1 packet transmitting.
- h. Measure the maximum time duration of one single pulse.
- i. DH5 Packet permit maximum $1600 / 79 / 6 = 3.37$ hops per second in each channel (5 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $3.37 \times 31.6 = 106.6$ within 31.6 seconds.
- j. DH3 Packet permit maximum $1600 / 79 / 4 = 5.06$ hops per second in each channel (3 time slots RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $5.06 \times 31.6 = 160$ within 31.6 seconds.
- k. DH1 Packet permit maximum $1600 / 79 / 2 = 10.12$ hops per second in each channel (1 time slot RX, 1 time slot TX). So, the dwell time is the time duration of the pulse times $10.12 \times 31.6 = 320$ within 31.6 seconds.

6.3 TEST SETUP



6.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



6.5TEST RESULTS

| | | | |
|---------------|------------------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 50% |
| Pressure : | 1012 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | 8DPSK(3Mbps)DH5 (Worst case) | | |

The Worst Case (3Mbps)

| Channel | Time of Pulse for DH5 (ms) | Period Time (s) | Sweep Time (ms) | Limit (ms) |
|---------|----------------------------|-----------------|-----------------|------------|
| Low | 2.907 | 31.6 | 310.08 | 400 |
| Middle | 2.907 | 31.6 | 310.08 | 400 |
| High | 2.907 | 31.6 | 310.08 | 400 |

Low Channel Time

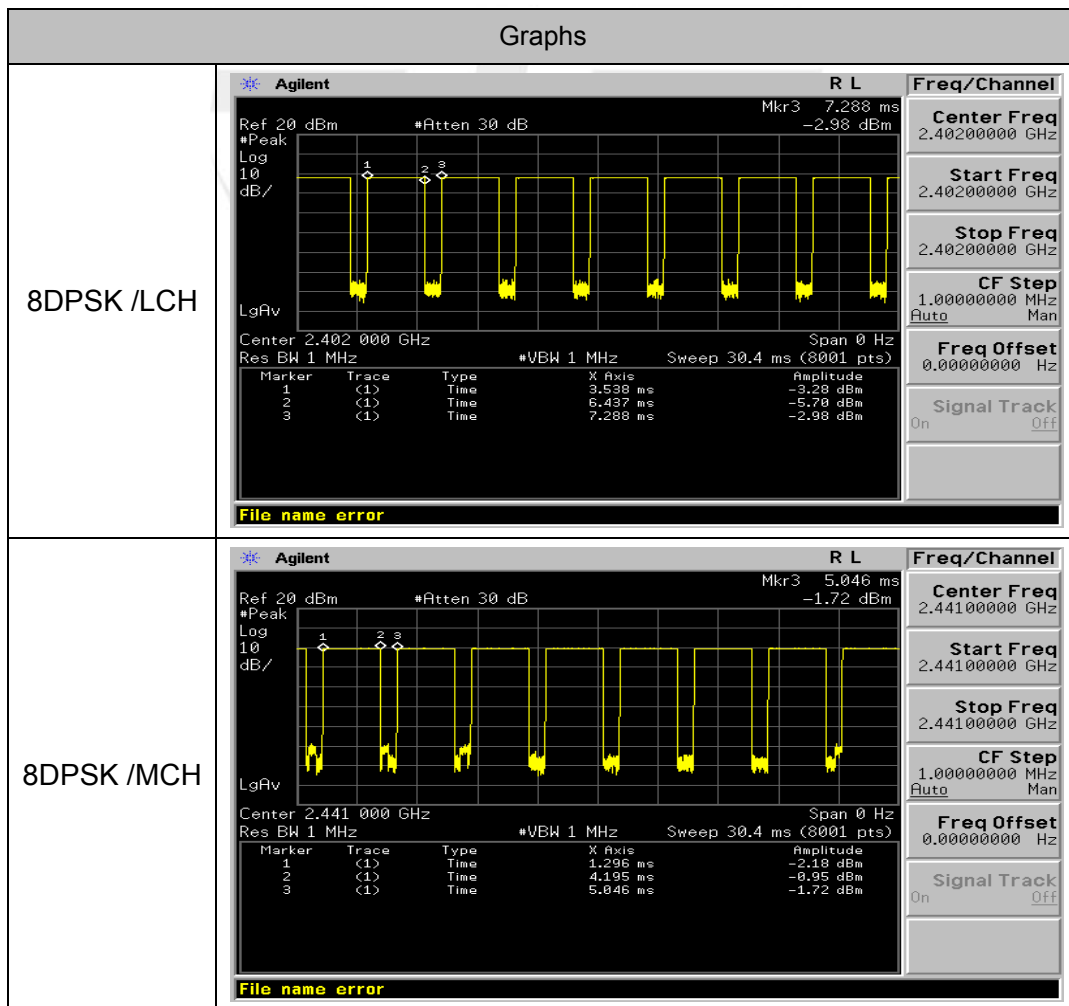
$$2.907 * (1600/6) / 79 * 31.6 = 310.08ms$$

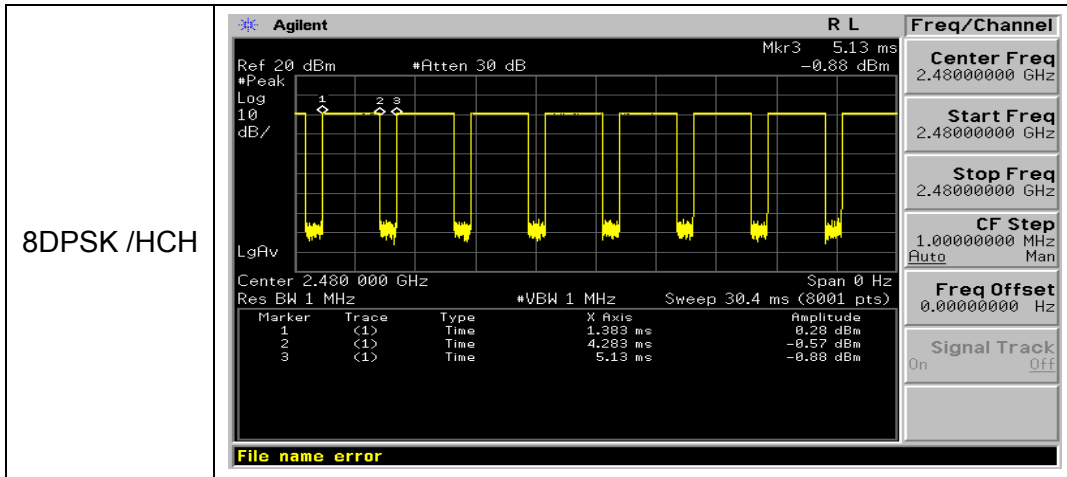
Middle Channel Time

$$2.907 * (1600/6) / 79 * 31.6 = 310.08ms$$

High Channel Time

$$2.907 * (1600/6) / 79 * 31.6 = 310.08ms$$





7. HOPPING CHANNEL SEPARATION MEASUREMENT

7.1 APPLIED PROCEDURES / LIMIT

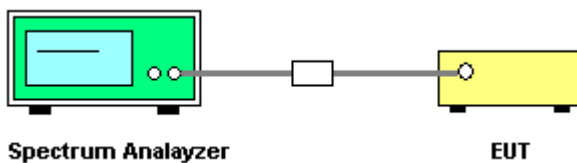
Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 20 dB bandwidth of the hopping channel, whichever is greater.

| Spectrum Parameter | Setting |
|--------------------|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 30 kHz |
| VB | 30 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

7.2 TEST PROCEDURE

- The transmitter output (antenna port) was connected to the spectrum analyser in peak hold mode.
- The resolution bandwidth of 30 kHz and the video bandwidth of 30 kHz were utilised for 20 dB bandwidth measurement.
- The resolution bandwidth of 30 kHz and the video bandwidth of 30 kHz were utilised for channel separation measurement.

7.3 TEST SETUP



7.4 EUT OPERATION CONDITIONS

The EUT was programmed to be in continuously transmitting mode.



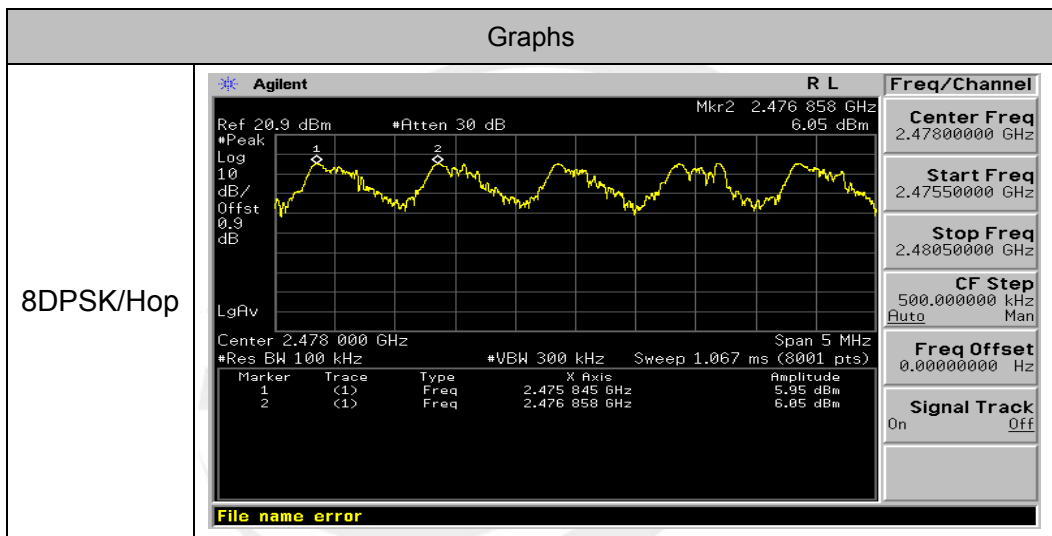
7.5 TEST RESULTS

| | | | |
|---------------|--------------------------|---------------------|---------|
| EUT : | Bluetooth speaker | Model Name : | S1 |
| Temperature : | 25°C | Relative Humidity : | 50% |
| Pressure : | 1012 hPa | Test Voltage : | DC 7.4V |
| Test Mode : | CH00 (8DPSK(3Mbps) Mode) | | |

| Mode | Channel | Carrier Frequency Separation [MHz] | Verdict |
|-------|---------|------------------------------------|---------|
| 8DPSK | Hop | 1.013 | PASS |

NOTE:

- 1.Separation Limits: separated by 25 kHz or two-thirds of the 20 dB bandwidth.
- 2.All modes were tested,only the worst case record in the report.



8. BANDWIDTH TEST

8.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-----------|------------------|----------------------|--------|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result |
| 15.247 (a)(1) | Bandwidth | (20dB bandwidth) | 2400-2483.5 | PASS |

| Spectrum Parameter | Setting |
|--------------------|---|
| Attenuation | Auto |
| Span Frequency | > Measurement Bandwidth or Channel Separation |
| RB | 30 kHz |
| VB | 30 kHz |
| Detector | Peak |
| Trace | Max Hold |
| Sweep Time | Auto |

8.2 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= 30KHz, VBW ≥ RBW, Sweep time = Auto.

8.3 TEST SETUP



8.4 EUT OPERATION CONDITIONS

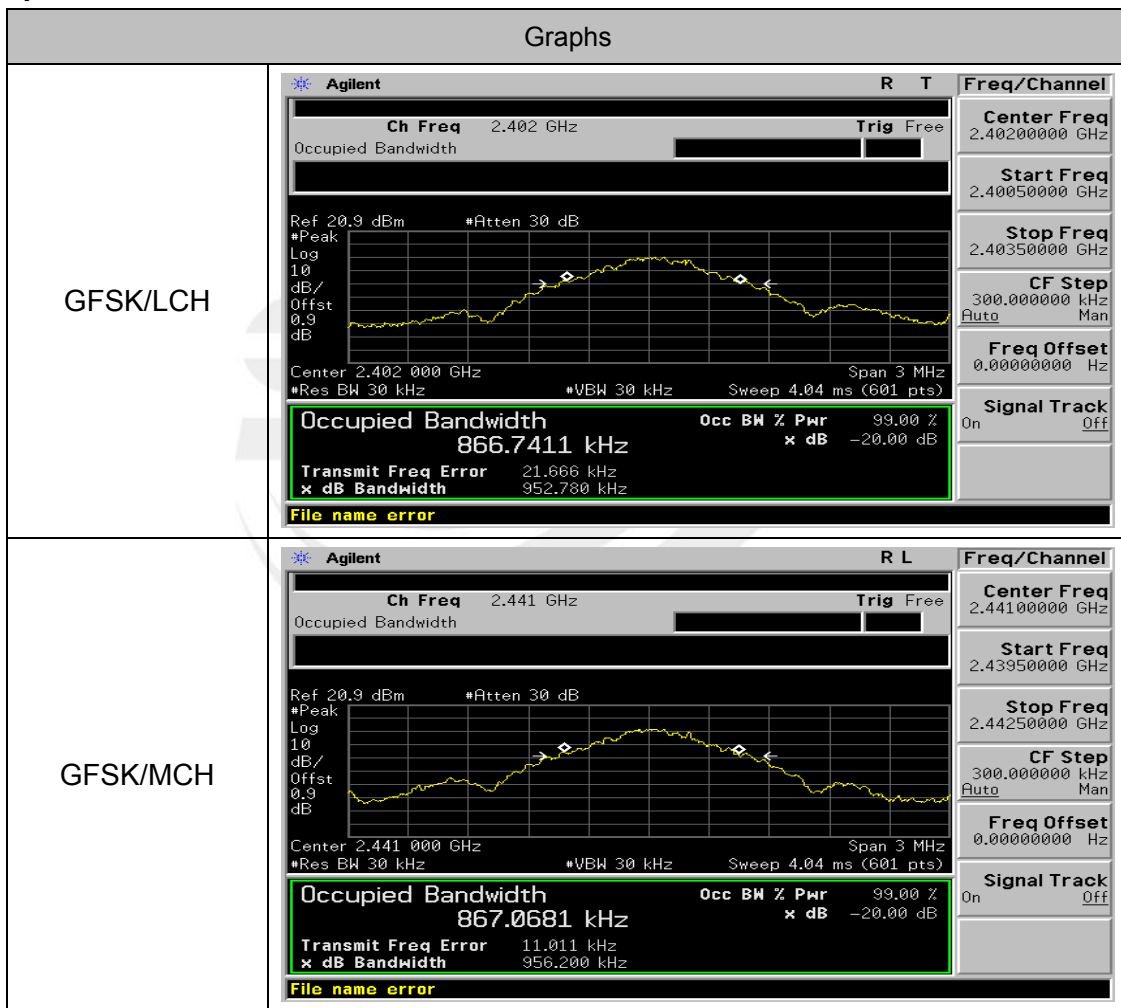
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



8.5 TEST RESULTS

| Mode | Channel. | EBW [MHz] | Verdict |
|---------------|----------|-----------|---------|
| GFSK | LCH | 0.953 | PASS |
| GFSK | MCH | 0.956 | PASS |
| GFSK | HCH | 0.957 | PASS |
| $\pi/4$ DQPSK | LCH | 1.036 | PASS |
| $\pi/4$ DQPSK | MCH | 1.184 | PASS |
| $\pi/4$ DQPSK | HCH | 1.056 | PASS |
| 8DPSK | LCH | 1.141 | PASS |
| 8DPSK | MCH | 1.114 | PASS |
| 8DPSK | HCH | 1.221 | PASS |

Test Graph





| | |
|-------------------------------------|--|
| <p>GFSK/HCH</p> | |
| <p>π /4DQPSK/LCH</p> | |
| <p>π /4DQPSK/MCH</p> | |
| <p>π /4DQPSK/HCH</p> | |



| | |
|------------------|--|
| <p>8DPSK/LCH</p> | |
| <p>8DPSK/MCH</p> | |
| <p>8DPSK/HCH</p> | |

9. OUTPUT POWER TEST

9.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C | | | | |
|---------------------------------|-------------------|--|----------------------|--------|
| Section | Test Item | Limit | FrequencyRange (MHz) | Result |
| 15.247 (b)(i) | Peak Output Power | 1 W or 0.125W | 2400-2483.5 | PASS |
| | | Or if channel separation > 2/3 bandwidth provided the system operate with an output power no greater than 125 mW(20.96dBm) | | |

9.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting :GFSK(1Mbps):RBW= 1.5MHz, VBW= 1.5MHz, Sweep time = Auto.
- Spectrum Setting : $\pi/4$ -DQPSK(2Mbps):RBW= 1.5MHz, VBW= 1.5MHz, Sweep time = Auto.
- Spectrum Setting :8-DPSK(3Mbps):RBW= 1.5MHz, VBW= 1.5MHz, Sweep time = Auto.

9.3 TEST SETUP



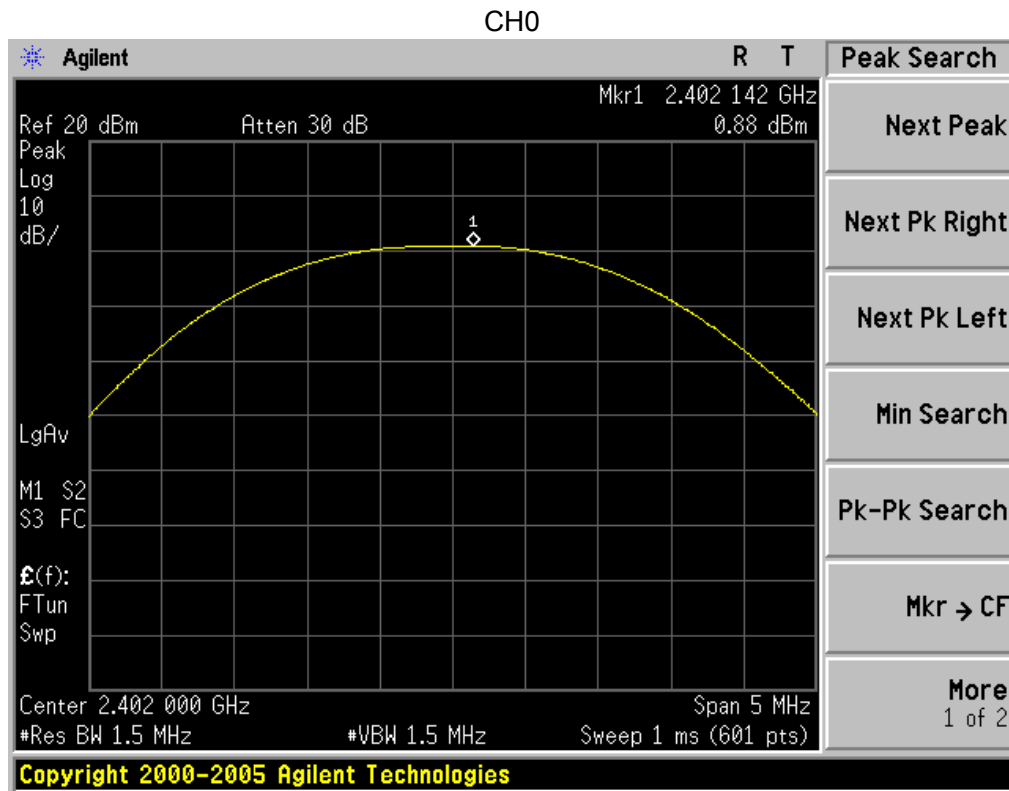
9.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.



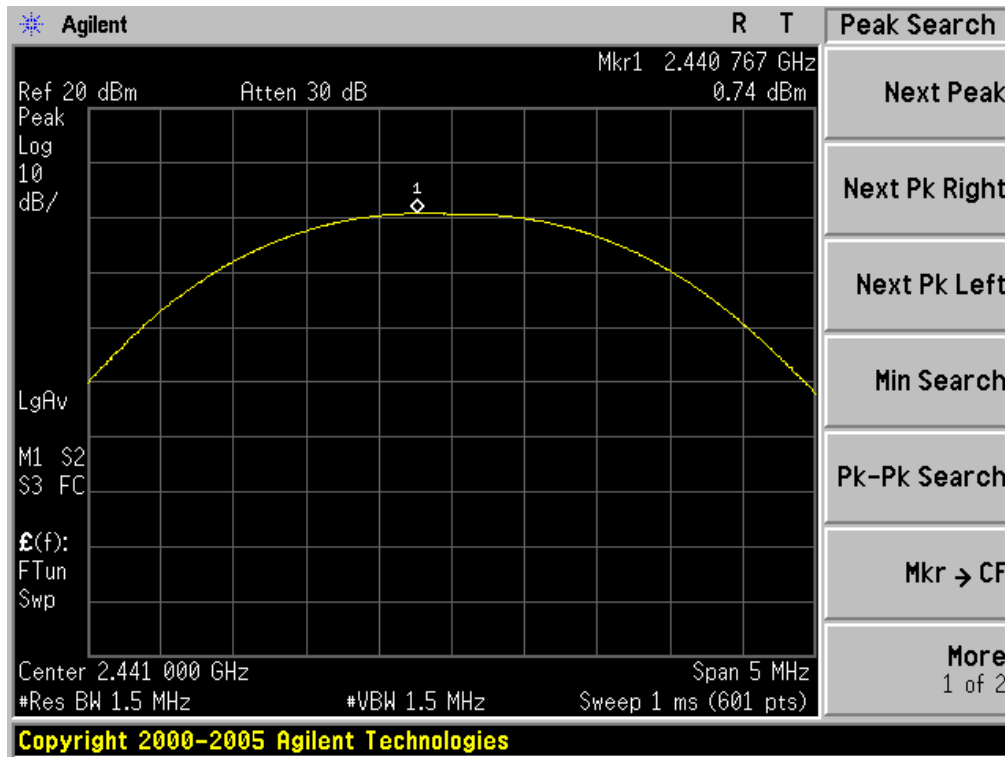
9.5TEST RESULTS

| PEAK OUTPUT POWER MEASUREMENT RESULT FOR GFSK MOUDULATION | | | |
|---|------------------|-------------------------|--------------|
| Frequency (GHz) | Peak Power (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | 0.88 | 30 | Pass |
| 2.441 | 0.74 | 30 | Pass |
| 2.480 | -0.24 | 30 | Pass |

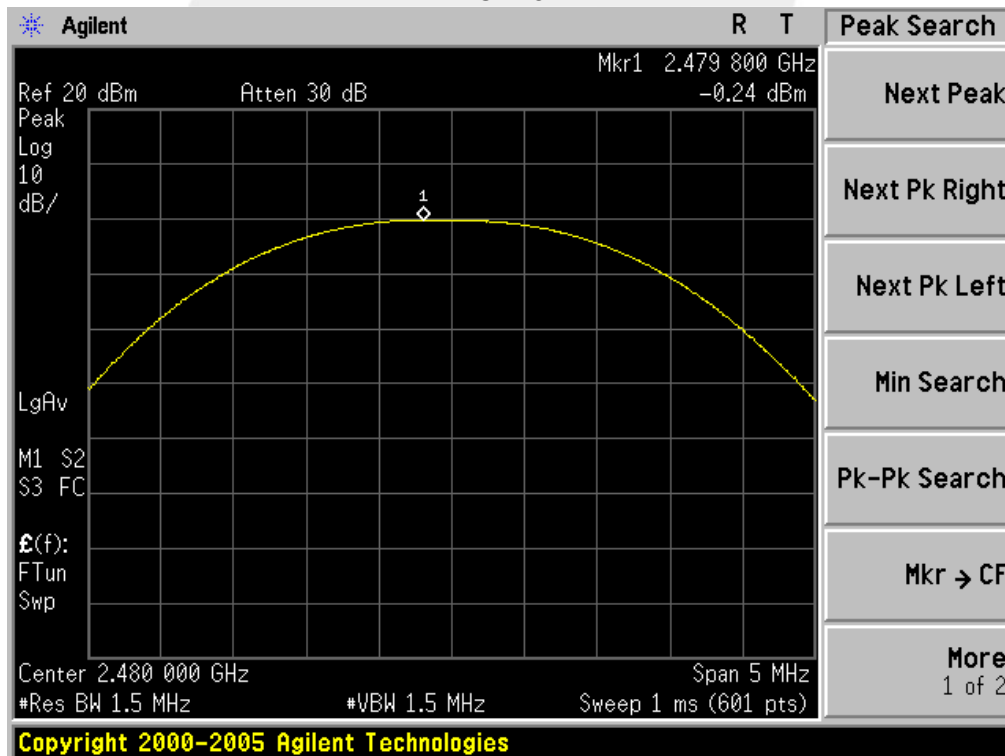




CH39

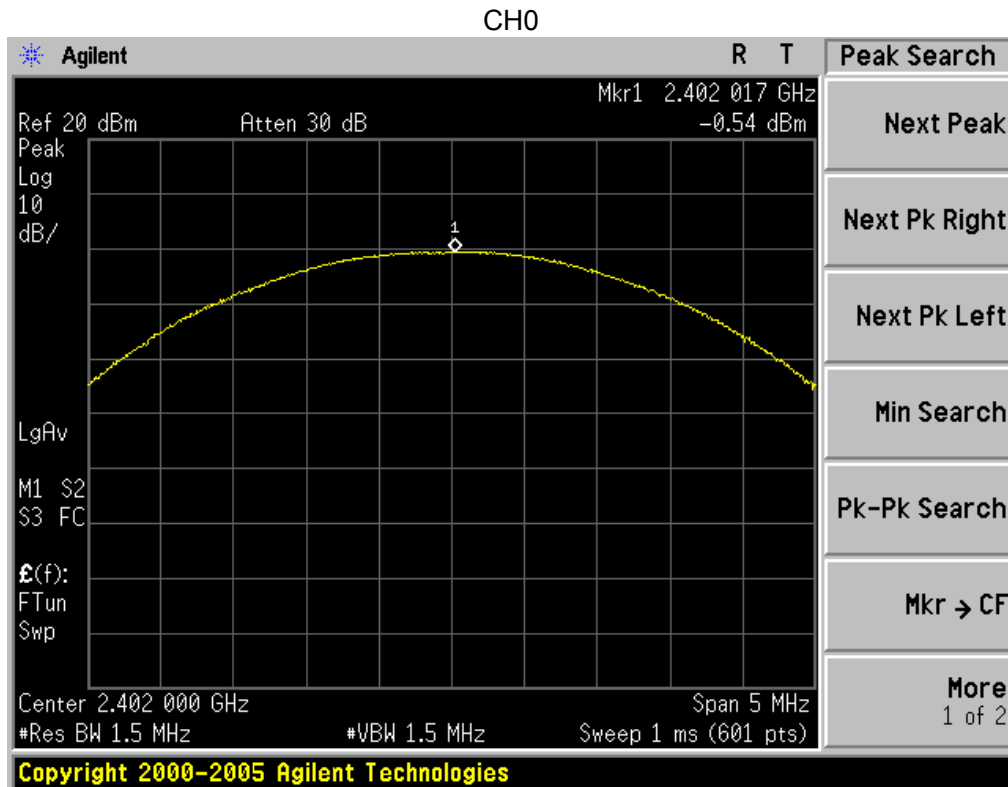


CH78



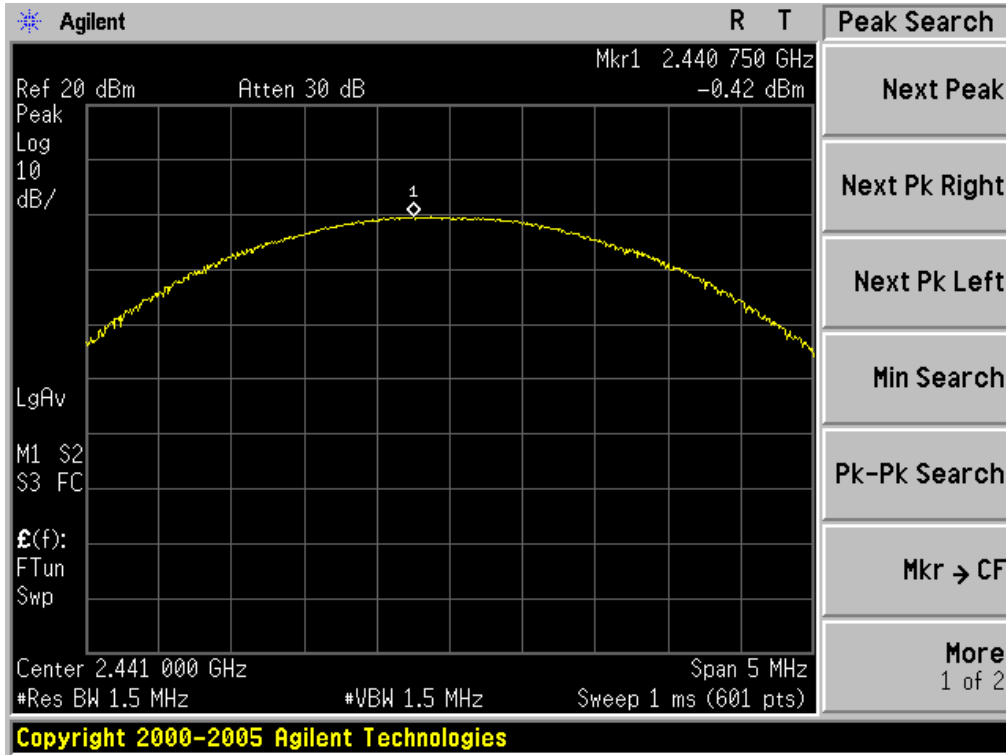


| PEAK OUTPUT POWER MEASUREMENT RESULT FOR Π /4-DQPSK MODULATION | | | |
|---|------------------|-------------------------|--------------|
| Frequency (GHz) | Peak Power (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | -0.54 | 30 | Pass |
| 2.441 | -0.42 | 30 | Pass |
| 2.480 | -1.5 | 30 | Pass |

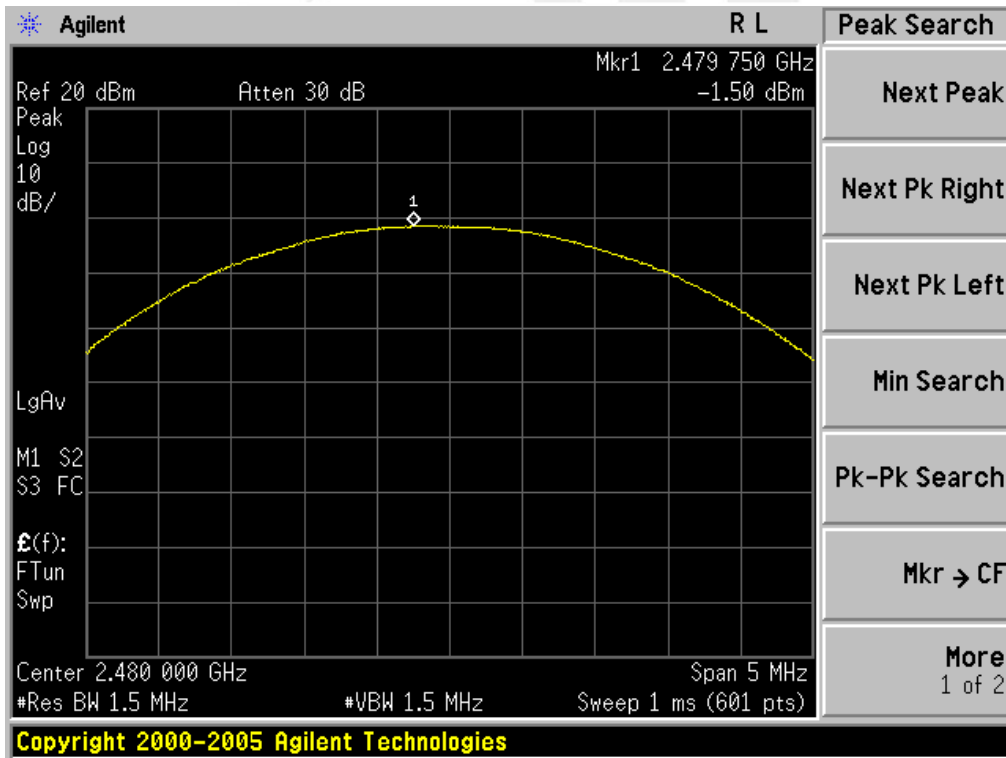




CH39



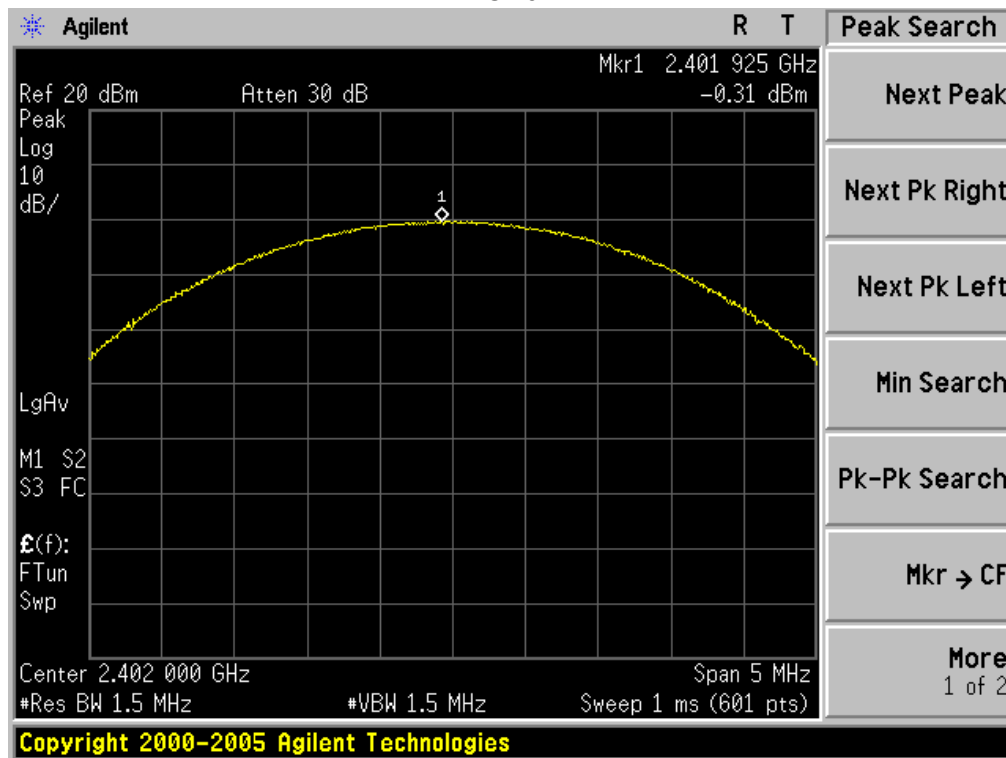
CH78





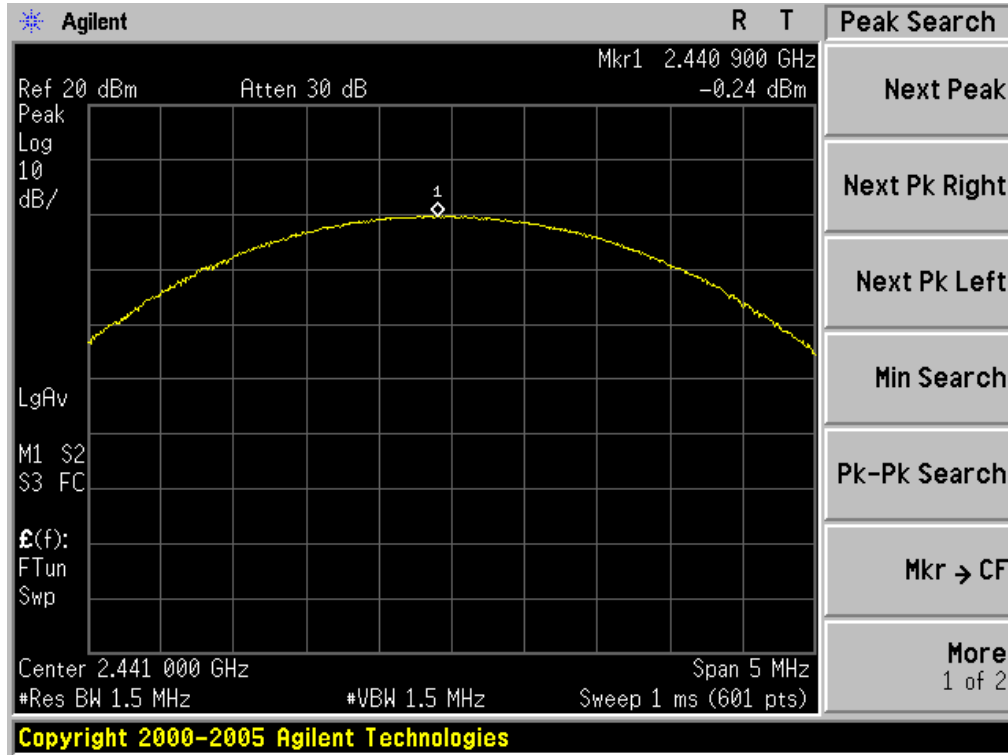
| PEAK OUTPUT POWER MEASUREMENT RESULT FOR 8-DPSK MODULATION | | | |
|---|------------------|-------------------------|--------------|
| Frequency (GHz) | Peak Power (dBm) | Applicable Limits (dBm) | Pass or Fail |
| 2.402 | -0.31 | 30 | Pass |
| 2.441 | -0.24 | 30 | Pass |
| 2.480 | -1.26 | 30 | Pass |

CH0

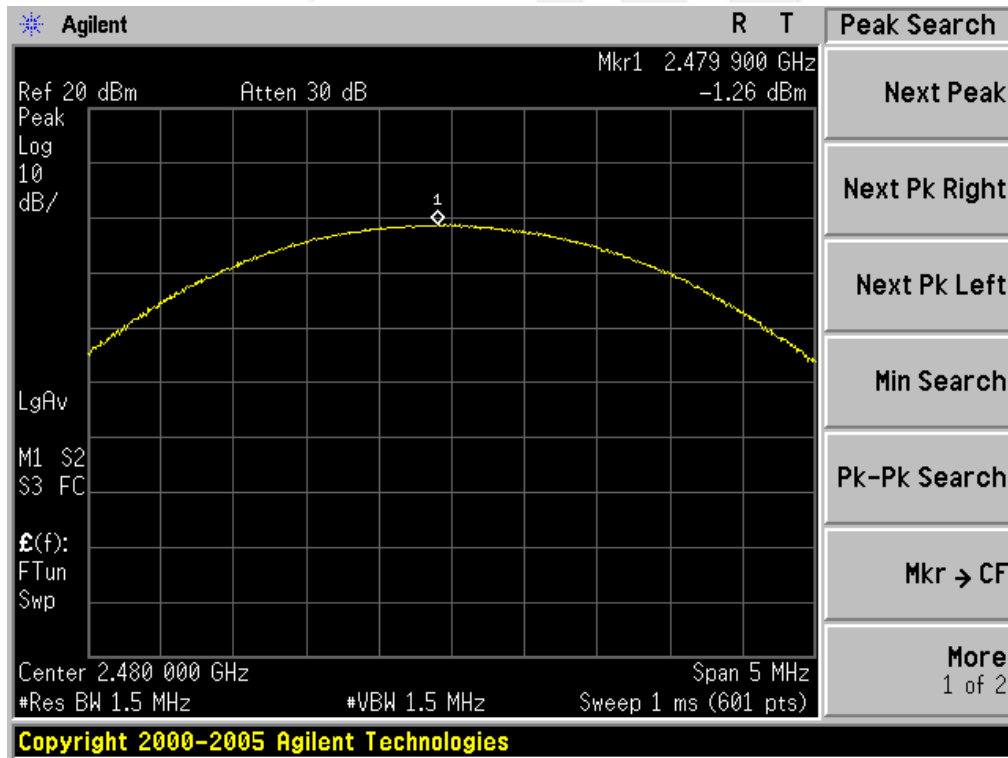




CH39



CH78





10. ANTENNA REQUIREMENT

10.1 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.

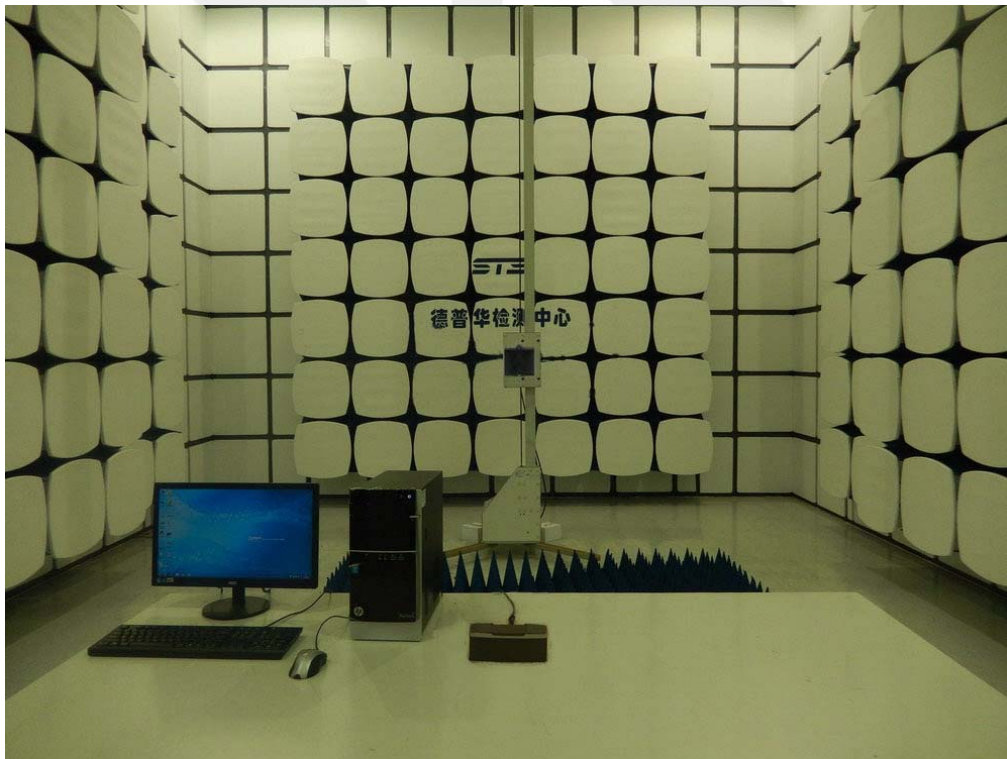
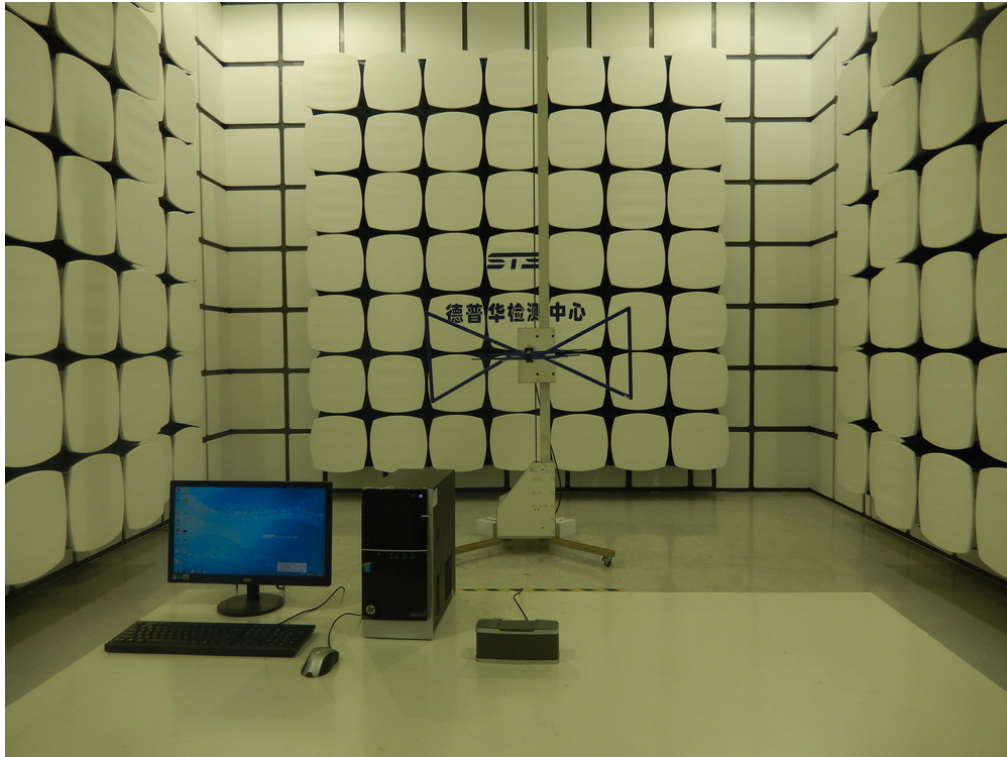
10.2 EUT ANTENNA

The EUT antenna is permanent attached antenna. It comply with the standard requirement.



APPENDIX-PHOTOS OF TEST SETUP

Radiated Measurement Photos





Conducted Measurement Photos

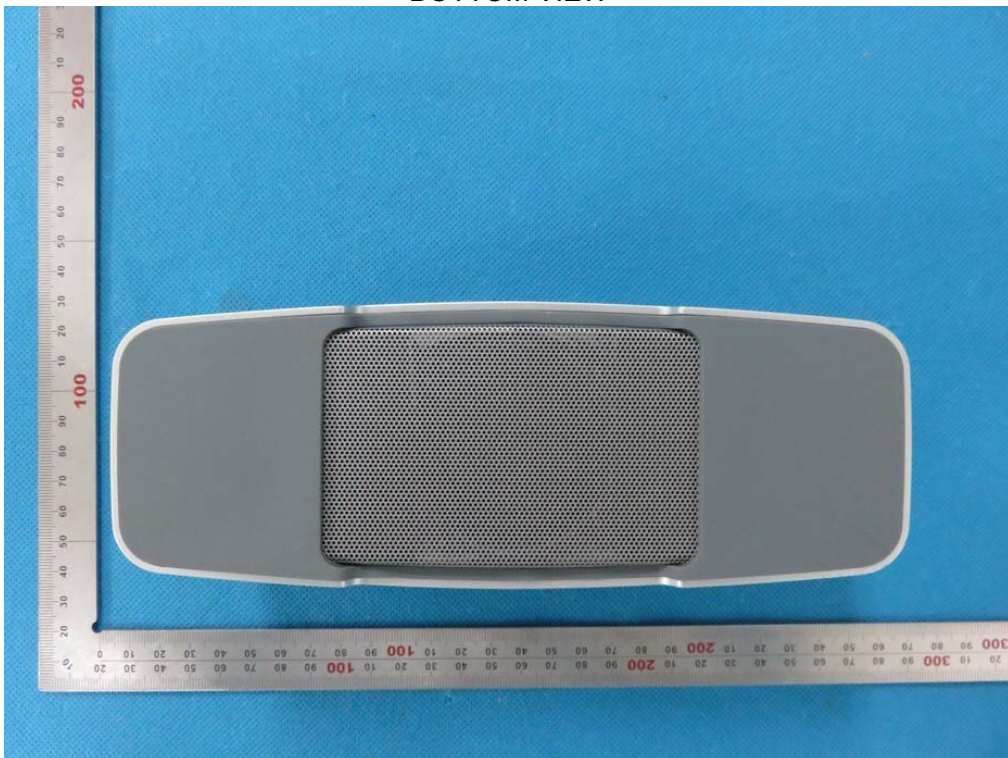


APPENDIX-PHOTOS OF EUT

TOP VIEW



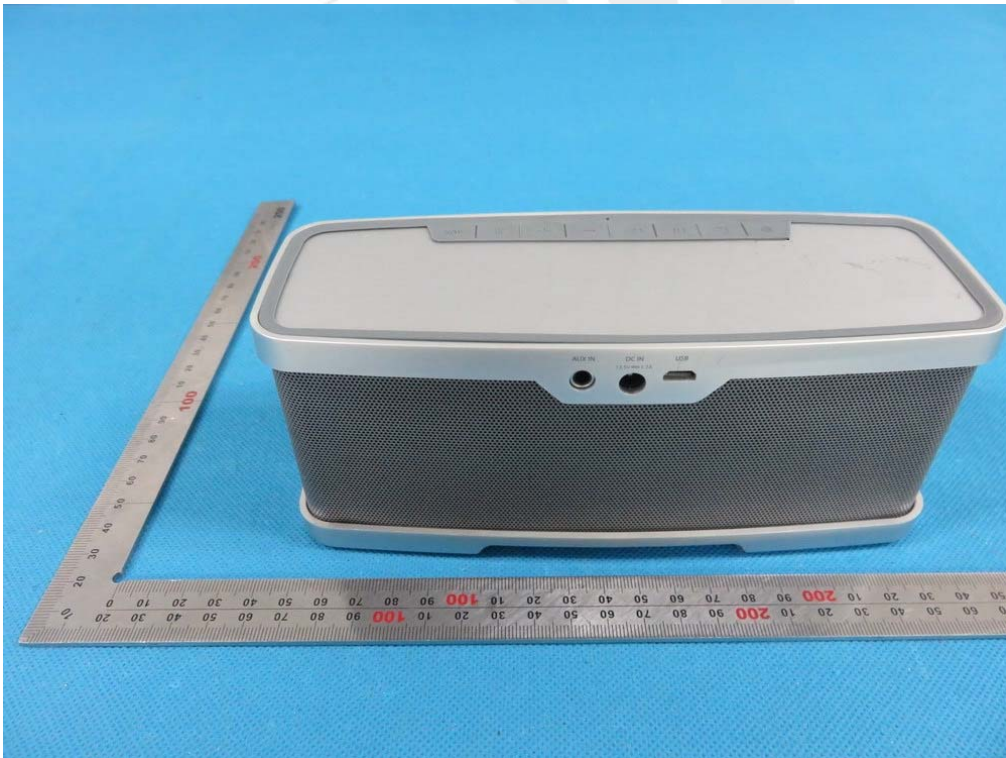
BOTTOM VIEW



FRONT VIEW



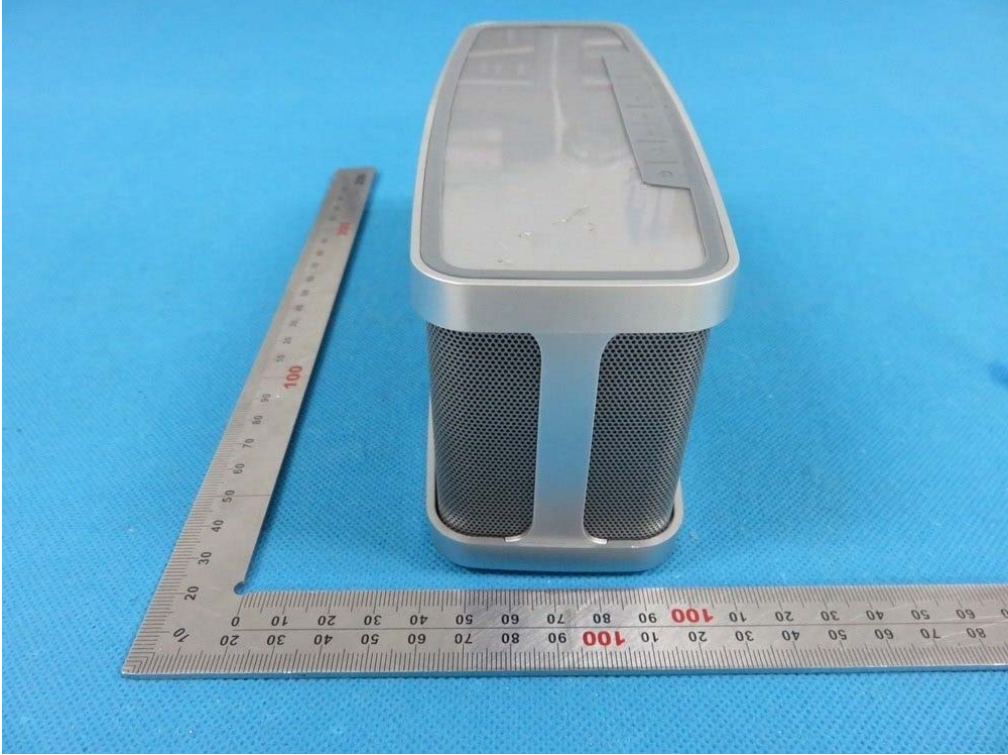
BACK VIEW



LEFT VIEW



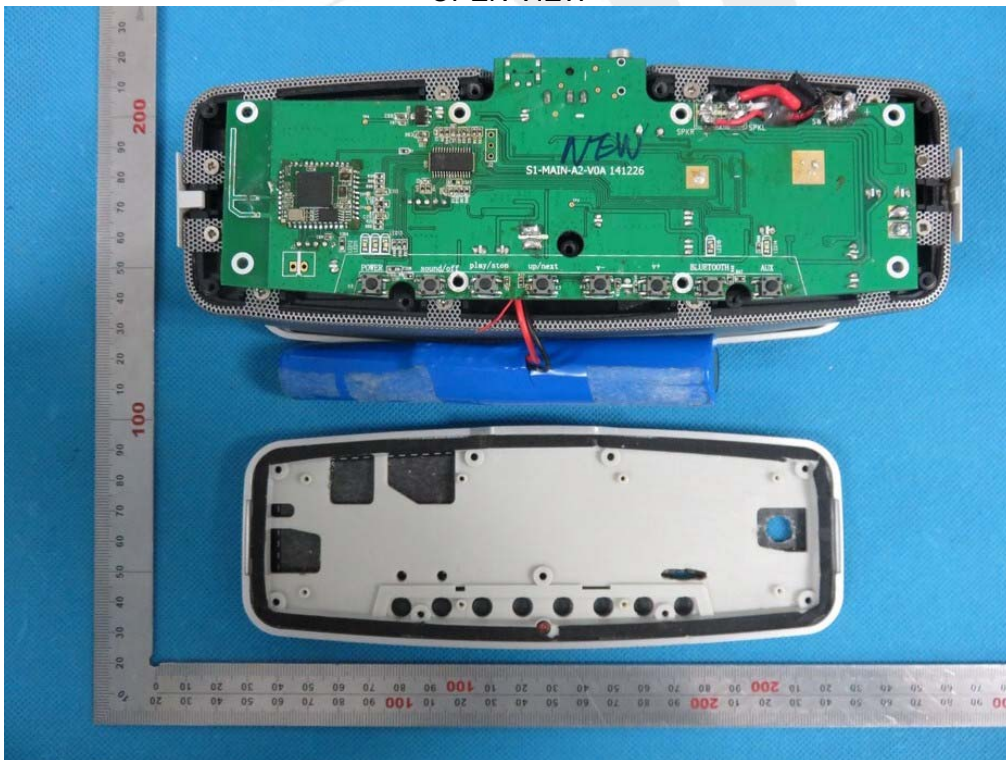
RIGHT VIEW



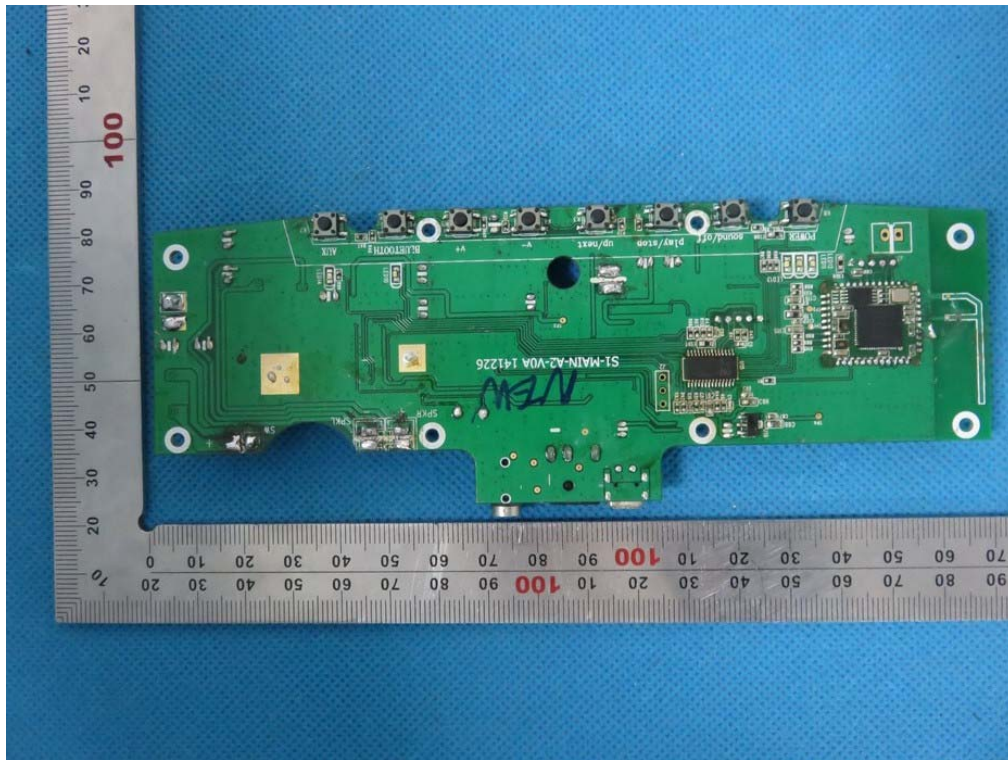
Port VIEW



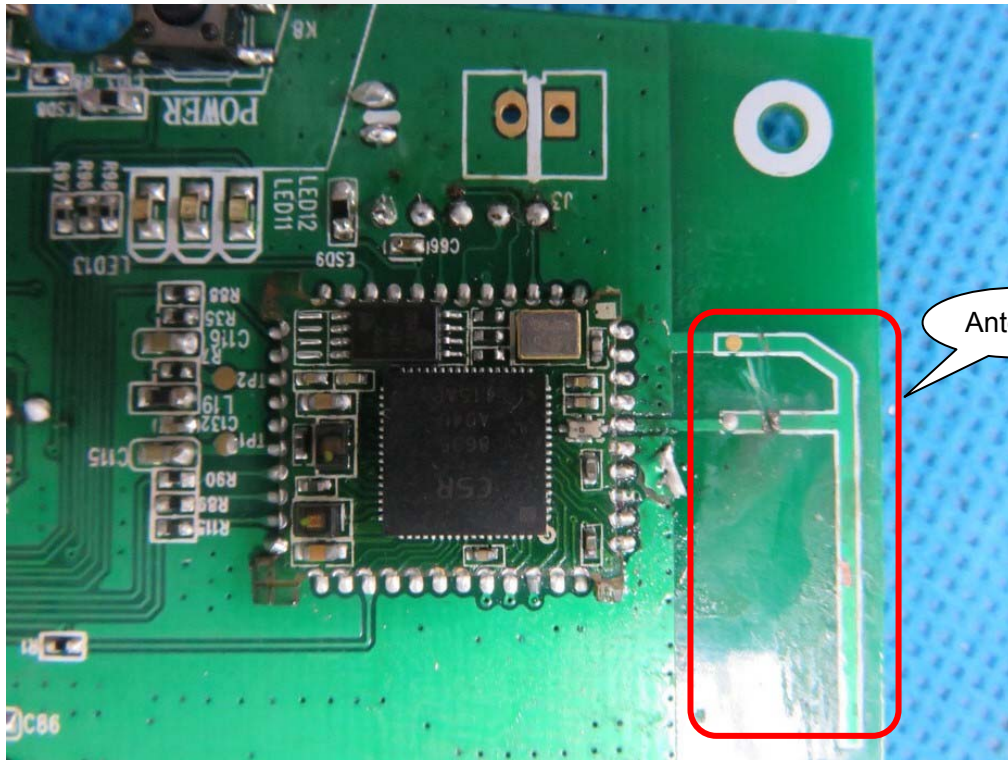
OPEN VIEW



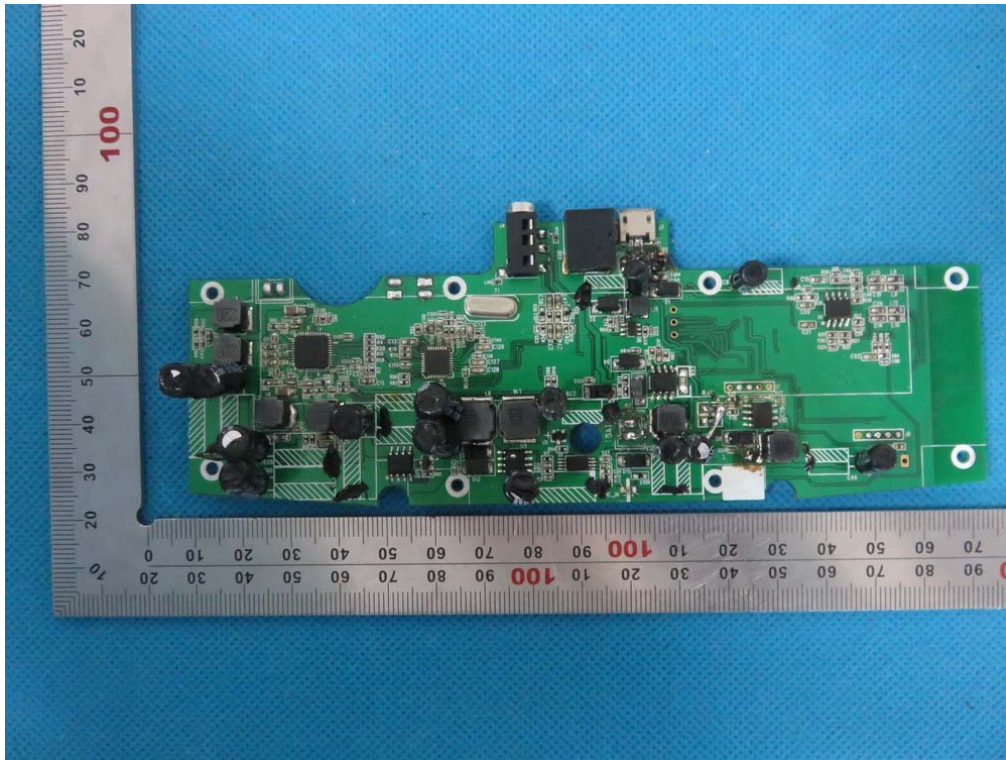
INTERNAL VIEW -1



INTERNAL VIEW-2



INTERNAL VIEW-3



----END OF REPORT----

