

# BT Test Report

**Application Purpose** : Original grant

**Applicant Name:** Shenzhen FDY Digital Electronics Co., Ltd.

**FCC ID** : 2AFMRW3A

**Equipment Type** : Wall-Mounted Smart Home Speaker

**Model Name** : FW3A, FW3B, FW3C, FW3D, FW3E, FW3F, FW3G, FW3H, FW3I, FW3J

**Report Number** : FCC16013420-1

**Standard(S)** : FCC Part 15 Subpart C

**Date Of Receipt** : March 5, 2016

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**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date    | Valid Version | Notes           |
|----------------|-------------|----------------|---------------|-----------------|
| V1.0           | /           | March 12, 2016 | Valid         | Original Report |

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## 1. GENERAL INFORMATION

### GENERAL DESCRIPTION OF EUT

|                          |   |
|--------------------------|---|
| Test Model               | FW3A  |
| Derivative Model Name    | FW3B, FW3C, FW3D, FW3E, FW3F, FW3G, FW3H, FW3I, FW3J  |
| Model difference         | All models are identical in circuitry and electrical, mechanical and physical construction, only different on model name. All tests are carried out on FW3A |
| Applicant                | Shenzhen FDY Digital Electronics Co., Ltd.  |
| Address                  | 3 RD Floor, Building 1, Fuhong Industrial Zone, Tangwei Village, Fuyong Town, Baoan District, Shenzhen City, Guangdong Province, China.                     |
| Manufacturer             | Shenzhen FDY Digital Electronics Co., Ltd.  |
| Address                  | 3 RD Floor, Building 1, Fuhong Industrial Zone, Tangwei Village, Fuyong Town, Baoan District, Shenzhen City, Guangdong Province, China.                     |
| Equipment Type           | Wall-Mounted Smart Home Speaker   |
| Brand Name               | <b>FDY</b>  |
| Hardware version:        | N/A   |
| Software version:        | N/A   |
| Extreme Temp. Tolerance  | -10°C to +50°C  |
| Battery information:     | N/A   |
| Adapter Information:     | Adapter: QX18W060250FG<br>Input: AC100-240V 50/60Hz 0.5A<br>Output: DC 6V 2.5A  |
| Operating Frequency      | 2402-2480MHz  |
| Channels                 | 79  |
| Channel Spacing          | 1MHz  |
| Modulation Type          | GFSK, π/4-DQPSK, 8-DPSK   |
| Version                  | 3.0   |
| Antenna Type:            | PCB Antenna   |
| Antenna gain:            | 0 dBi   |
| Data of receipt          | March 5, 2016   |
| Date of test             | March 5, 2016 to March 11, 2016   |
| Deviation                | None  |
| Condition of Test Sample | Normal  |

**We hereby certify that:**

The above equipment was tested by Shenzhen WST Testing Technology Co., Ltd.  
1F, No.9 Building, TGK Science & Technology Park, Yangtian Rd., NO.72 Bao'an Dist., GuangDong, China  
Registration Number: 939433

The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2014. The sample tested as described in this report is in compliance with the FCC Rules Part15 Subpart C.

The test results of this report relate only to the tested sample identified in this report.

## 2. TEST DESCRIPTION

### 2.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$  , where expended 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       | $\pm 3.2\text{dB}$      |
| 2   | RF power, conducted           | $\pm 0.16\text{dB}$     |
| 3   | Spurious emissions, conducted | $\pm 0.21\text{dB}$     |
| 4   | All emissions, radiated(<1G)  | $\pm 4.7\text{dB}$      |
| 5   | All emissions, radiated(>1G)  | $\pm 4.7\text{dB}$      |
| 6   | Temperature                   | $\pm 0.5^\circ\text{C}$ |
| 7   | Humidity                      | $\pm 2\%$               |

## 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       | CH00           |
| Mode 2       | CH39           |
| Mode 3       | CH78           |
| Mode 4       | Normal Hopping |

| For Conducted Emission |                |
|------------------------|----------------|
| Final Test Mode        | Description    |
| Mode 4                 | Normal Hopping |

| For Radiated Emission |             |
|-----------------------|-------------|
| Final Test Mode       | Description |
| Mode 1                | CH00        |
| Mode 2                | CH39        |
| Mode 3                | CH78        |

Note:

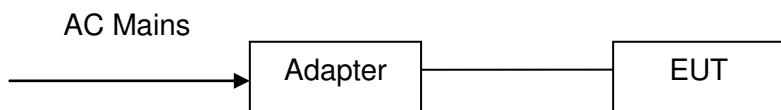
- (1) *The measurements are performed at the highest, middle, lowest available channels.*
- (2) *The data rate was set in 1Mbps, 2 Mbps, 3 Mbps for radiated emission due to the highest RF output power.*
- (3) *Record the worst case of each test item in this report.*

### 2.3 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 | N/A      |          |          |
|-----------------------|----------|----------|----------|
| Frequency             | 2402 MHz | 2441 MHz | 2480 MHz |
| Parameters(1Mbps)     | DEF      | DEF      | DEF      |
| Parameters(2Mbps)     | DEF      | DEF      | DEF      |
| Parameters(3Mbps)     | DEF      | DEF      | DEF      |

### 2.4 CONFIGURATION OF SYSTEM UNDER TEST



(EUT: Wall-Mounted Smart Home Speaker)

**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 |
|------|-----------|-----------|----------------|------------|------|
| 1    | /         | /         | /              | /          | /    |

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".

### 3. 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(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     |        |

NOTE:

(1)" N/A" denotes test is not applicable in this test report.

**4. MEASUREMENT INSTRUMENTS**

| NAME OF EQUIPMENT                    | MANUFACTURER           | MODEL        | SERIAL NUMBER | Calibration Date | Calibration Due. |
|--------------------------------------|------------------------|--------------|---------------|------------------|------------------|
| EMI Test Receiver                    | R&S                    | ESCI         | 100005        | 08/19/2015       | 08/18/2016       |
| ESPI Test Receiver                   | ROHDE&SCHWARZ          | ESPI         | 101139        | 08/19/2015       | 08/18/2015       |
| LISN                                 | AFJ                    | LS16         | 16010222119   | 08/19/2015       | 08/18/2016       |
| LISN(EUT)                            | Mestec                 | AN3016       | 04/10040      | 08/19/2015       | 08/18/2016       |
| Universal Radio Communication Tester | R&S                    | CMU 200      | 1100.0008.02  | 08/19/2015       | 08/18/2016       |
| Coaxial cable                        | Megalon                | LMR400       | N/A           | 08/12/2015       | 08/11/2016       |
| GPIB cable                           | Megalon                | GPIB         | N/A           | 08/12/2015       | 08/11/2016       |
| Spectrum Analyzer                    | R&S                    | FSU          | 100114        | 08/19/2015       | 08/18/2016       |
| Pre Amplifier                        | H.P.                   | HP8447E      | 2945A02715    | 10/13/2015       | 10/12/2016       |
| Pre-Amplifier                        | CDSI                   | PAP-1G18-38  | --            | 10/13/2015       | 10/12/2016       |
| Bi-log Antenna                       | SUNOL Sciences         | JB3          | A021907       | 09/13/2015       | 09/12/2016       |
| 9*6*6 Anechoic                       | --                     | --           | --            | 08/21/2015       | 08/20/2016       |
| Horn Antenna                         | COMPLIANCE ENGINEERING | CE18000      | --            | 09/13/2015       | 09/12/2016       |
| Horn Antenna                         | SCHWARZBECK            | BBHA9120D    | 9120D-631     | 08/23/2015       | 08/22/2016       |
| Cable                                | TIME MICROWAVE         | LMR-400      | N-TYPE04      | 04/25/2015       | 04/24/2016       |
| System-Controller                    | CCS                    | N/A          | N/A           | N.C.R            | N.C.R            |
| Turn Table                           | CCS                    | N/A          | N/A           | N.C.R            | N.C.R            |
| Antenna Tower                        | CCS                    | N/A          | N/A           | N.C.R            | N.C.R            |
| RF cable                             | Murata                 | MXHQ87WA3000 | -             | 08/21/2015       | 08/20/2016       |
| Loop Antenna                         | EMCO                   | 6502         | 00042960      | 08/22/2015       | 08/21/2016       |
| Horn Antenna                         | SCHWARZBECK            | BBHA 9170    | 1123          | 08/19/2015       | 08/18/2016       |
| Power meter                          | Anritsu                | ML2487A      | 6K00003613    | 08/23/2015       | 08/22/2016       |
| Power sensor                         | Anritsu                | MX248XD      | --            | 08/19/2015       | 08/18/2016       |

## 5. EMC EMISSION TEST

### 5.1 CONDUCTED EMISSION MEASUREMENT

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

| FREQUENCY (MHz) | Class A (dBuV) |         | Class B (dBuV) |           | Standard |
|-----------------|----------------|---------|----------------|-----------|----------|
|                 | Quasi-peak     | Average | Quasi-peak     | Average   |          |
| 0.15 -0.5       | 79.00          | 66.00   | 66 - 56 *      | 56 - 46 * | FCC      |
| 0.50 -5.0       | 73.00          | 60.00   | 56.00          | 46.00     | FCC      |
| 5.0 -30.0       | 73.00          | 60.00   | 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    |

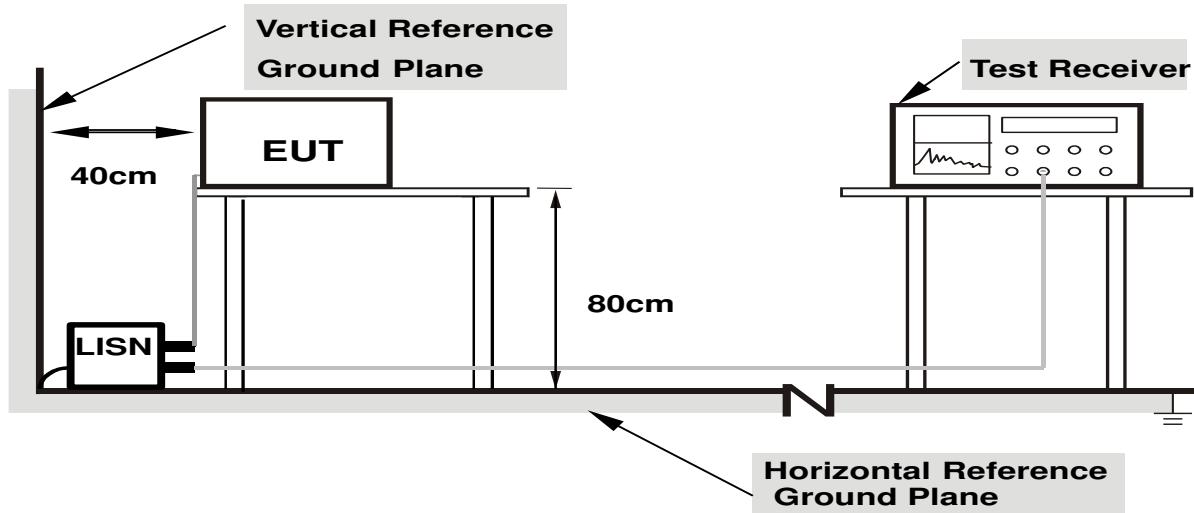
### 5.1.2 TEST PROCEDURE

- 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.

### 5.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.4 TEST SETUP

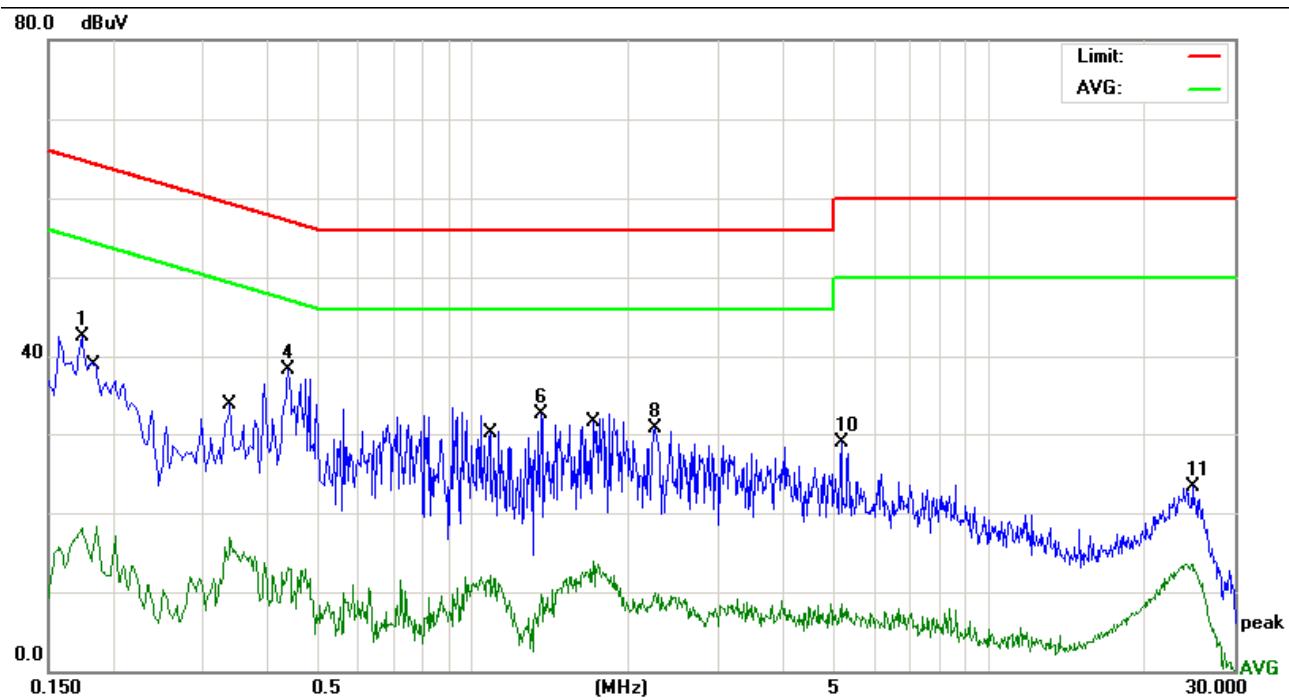


### 5.1.5 EUT OPERATING CONDITIONS

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.

### 5.1.6 TEST RESULTS

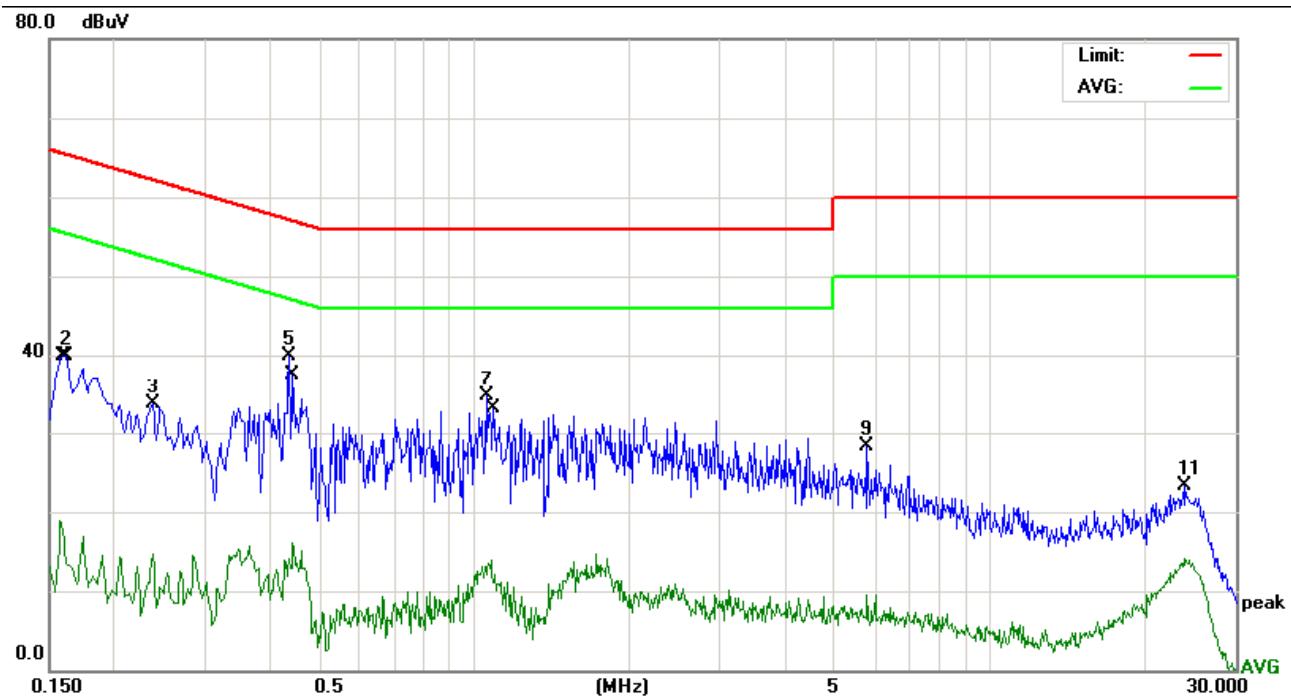
|             |                                 |                   |        |
|-------------|---------------------------------|-------------------|--------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A   |
| Temperature | 26 °C                           | Relative Humidity | 54%    |
| Pressure    | 1010hPa                         | Phase             | L      |
| Test Date   | March 6, 2016                   | Test Mode         | Mode 4 |
| Voltage     | 120V/60Hz                       |                   |        |



| No. | Mk. | Freq.   | Reading | Correct | Measure- | Limit | Over   | Detector |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|
|     |     |         | Level   | Factor  | ment     |       |        |          |
|     |     | MHz     | dBuV    | dB      | dBuV     | dBuV  | dB     |          |
| 1   |     | 0.1740  | 42.56   | 0.00    | 42.56    | 64.76 | -22.20 | peak     |
| 2   |     | 0.1860  | 18.36   | 0.00    | 18.36    | 54.21 | -35.85 | AVG      |
| 3   |     | 0.3379  | 16.84   | 0.00    | 16.84    | 49.25 | -32.41 | AVG      |
| 4   | *   | 0.4380  | 38.27   | 0.00    | 38.27    | 57.10 | -18.83 | peak     |
| 5   |     | 1.0780  | 12.19   | 0.00    | 12.19    | 46.00 | -33.81 | AVG      |
| 6   |     | 1.3540  | 32.56   | 0.00    | 32.56    | 56.00 | -23.44 | peak     |
| 7   |     | 1.7140  | 13.96   | 0.00    | 13.96    | 46.00 | -32.04 | AVG      |
| 8   |     | 2.2500  | 30.68   | 0.00    | 30.68    | 56.00 | -25.32 | peak     |
| 9   |     | 2.2500  | 9.86    | 0.00    | 9.86     | 46.00 | -36.14 | AVG      |
| 10  |     | 5.1740  | 28.82   | 0.00    | 28.82    | 60.00 | -31.18 | peak     |
| 11  |     | 24.9020 | 23.31   | 0.00    | 23.31    | 60.00 | -36.69 | peak     |
| 12  |     | 24.9020 | 13.52   | 0.00    | 13.52    | 50.00 | -36.48 | AVG      |

Remark: All the modes have been investigated, and only worst mode is presented in this report.

|             |                                 |                   |        |
|-------------|---------------------------------|-------------------|--------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A   |
| Temperature | 26 °C                           | Relative Humidity | 54%    |
| Pressure    | 1010hPa                         | Phase             | N      |
| Test Date   | March 6, 2016                   | Test Mode         | Mode 4 |
| Voltage     | 120V/60Hz                       |                   |        |



| No. | Mk. | Freq.   | Reading | Correct | Measure- | Limit | Over   | Detector |
|-----|-----|---------|---------|---------|----------|-------|--------|----------|
|     |     |         | Level   | Factor  | ment     |       |        |          |
|     |     | MHz     | dBuV    | dB      | dBuV     | dBuV  | dB     |          |
| 1   |     | 0.1580  | 18.93   | 0.00    | 18.93    | 55.56 | -36.63 | AVG      |
| 2   |     | 0.1620  | 39.95   | 0.00    | 39.95    | 65.36 | -25.41 | peak     |
| 3   |     | 0.2380  | 33.67   | 0.00    | 33.67    | 62.16 | -28.49 | peak     |
| 4   |     | 0.2380  | 14.72   | 0.00    | 14.72    | 52.16 | -37.44 | AVG      |
| 5   | *   | 0.4380  | 39.81   | 0.00    | 39.81    | 57.10 | -17.29 | peak     |
| 6   |     | 0.4460  | 16.15   | 0.00    | 16.15    | 46.95 | -30.80 | AVG      |
| 7   |     | 1.0580  | 34.76   | 0.00    | 34.76    | 56.00 | -21.24 | peak     |
| 8   |     | 1.0820  | 14.00   | 0.00    | 14.00    | 46.00 | -32.00 | AVG      |
| 9   |     | 5.7780  | 28.26   | 0.00    | 28.26    | 60.00 | -31.74 | peak     |
| 10  |     | 5.7780  | 9.58    | 0.00    | 9.58     | 50.00 | -40.42 | AVG      |
| 11  |     | 23.8180 | 23.23   | 0.00    | 23.23    | 60.00 | -36.77 | peak     |
| 12  |     | 23.8180 | 14.17   | 0.00    | 14.17    | 50.00 | -35.83 | AVG      |

Remark: All the modes have been investigated, and only worst mode is presented in this report.

## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/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) | Limit (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).

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

| 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 |

### 5.2.2 TEST PROCEDURE

- a. 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.
- b. 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.
- c. 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.
- d. 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 Quasi Peak detector mode re-measured.
- e. 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.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

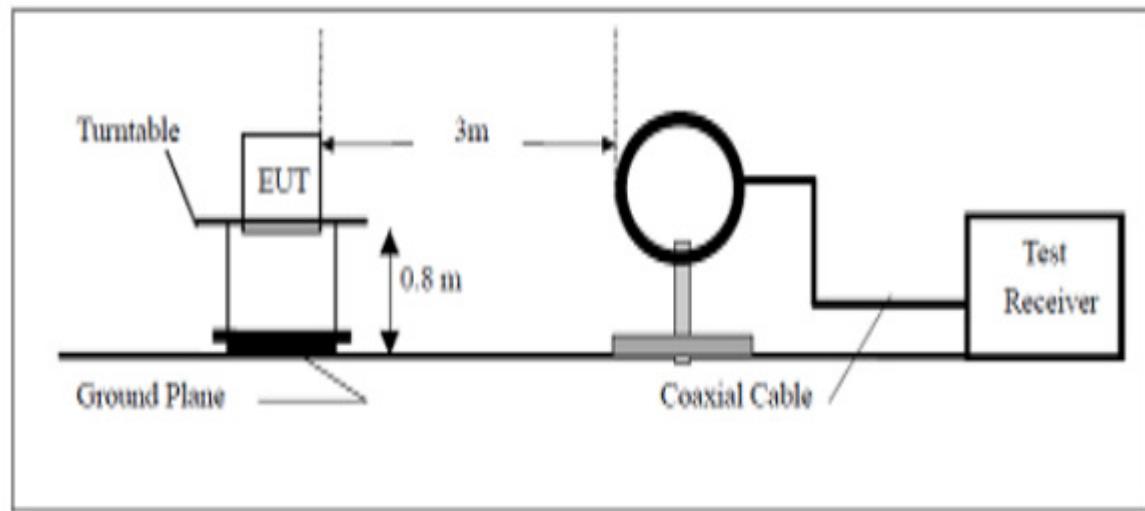
*Both horizontal and vertical antenna polarities were tested  
and performed pretest to three orthogonal axis. The worst case emissions were reported*

### 5.2.3 DEVIATION FROM TEST STANDARD

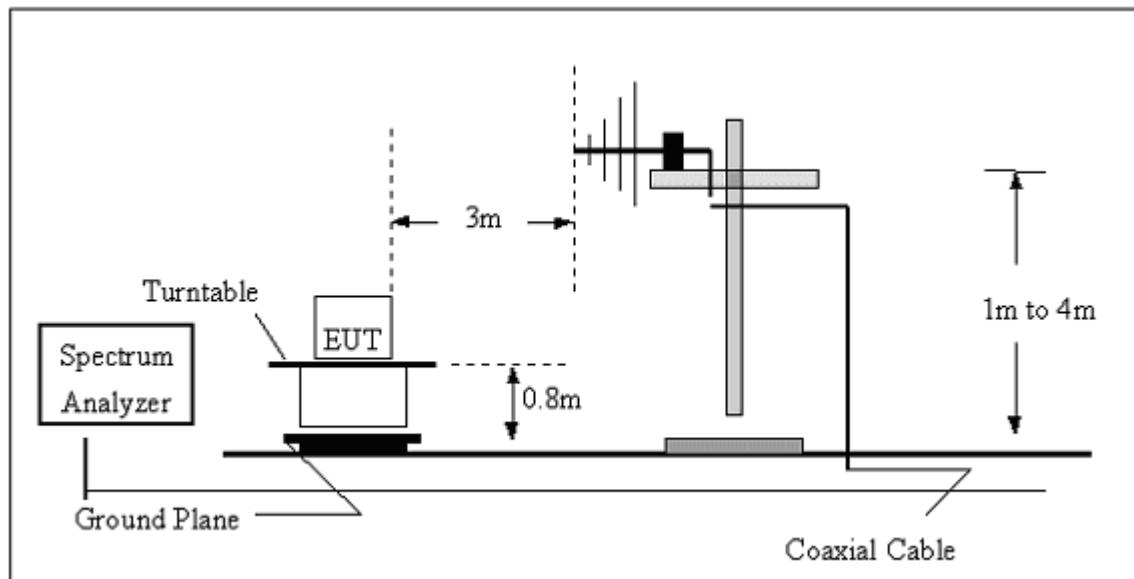
No deviation

#### 5.2.4 TEST SETUP

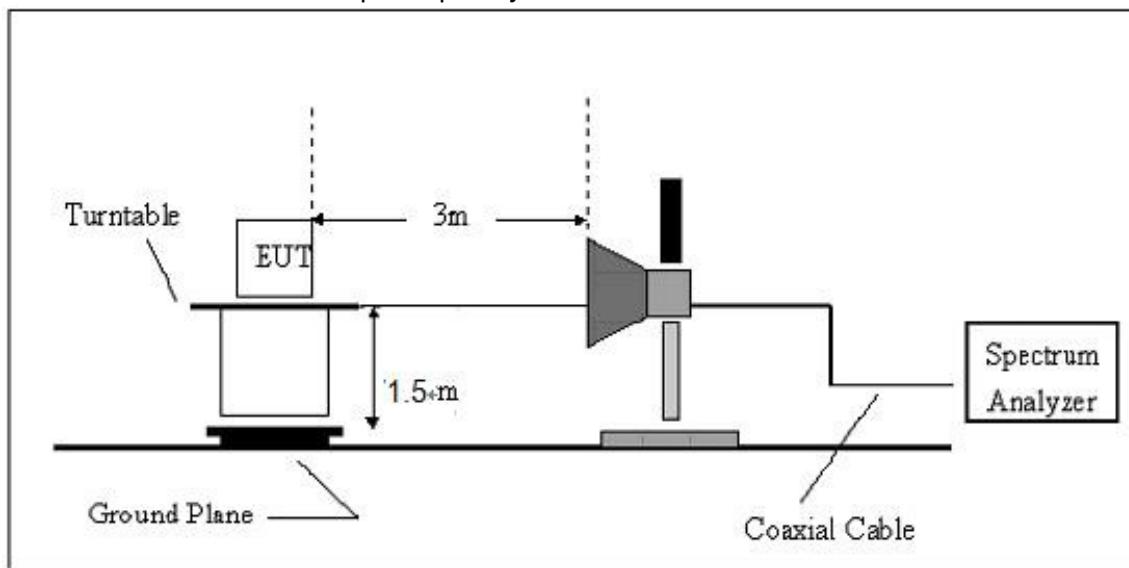
(A) Radiated Emission Test-Up Frequency Below 30MHz



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



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

**5.2.5 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.

### 5.2.5.1 RESULTS (BELOW 30 MHZ)

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Polarization      | ---           |
| Test Mode   | Mode 1/ Mode 2/ Mode 3          | Test Date         | March 6, 2016 |

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

**NOTE:**

No result in this part for margin above 20dB.

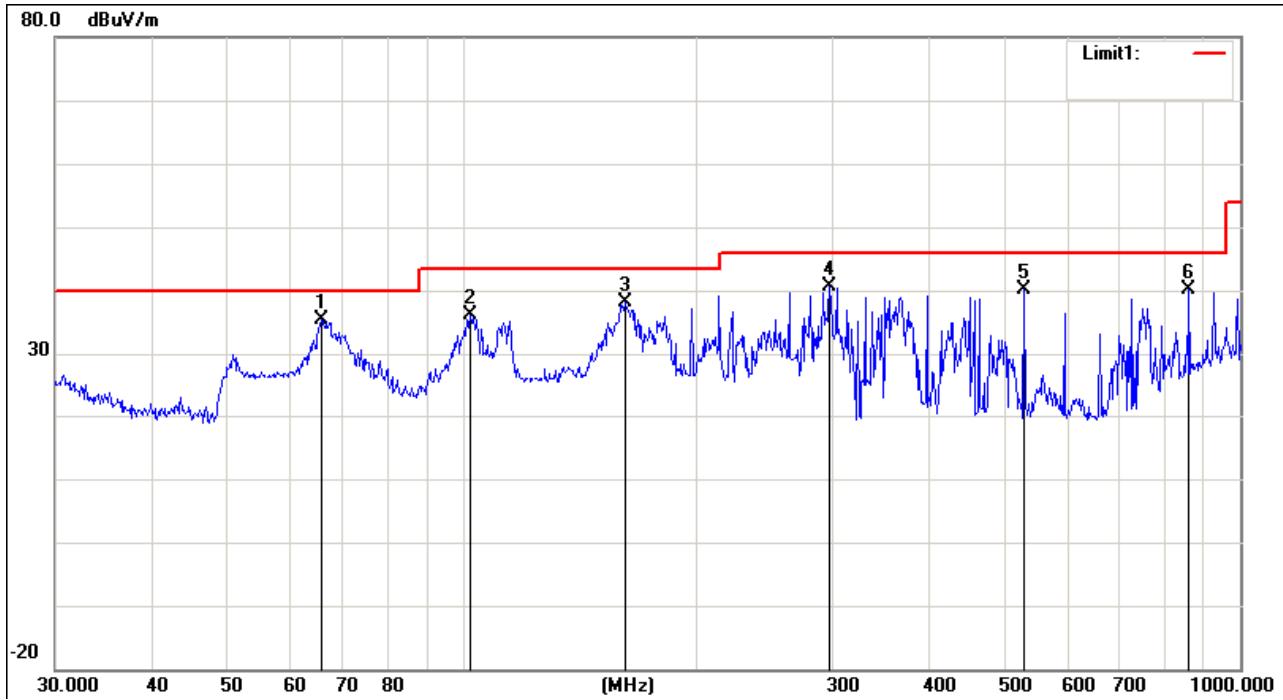
Distance extrapolation factor = $20 \log(\text{specific distance}/\text{test distance})$ (dB);

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

### 5.2.5.2 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

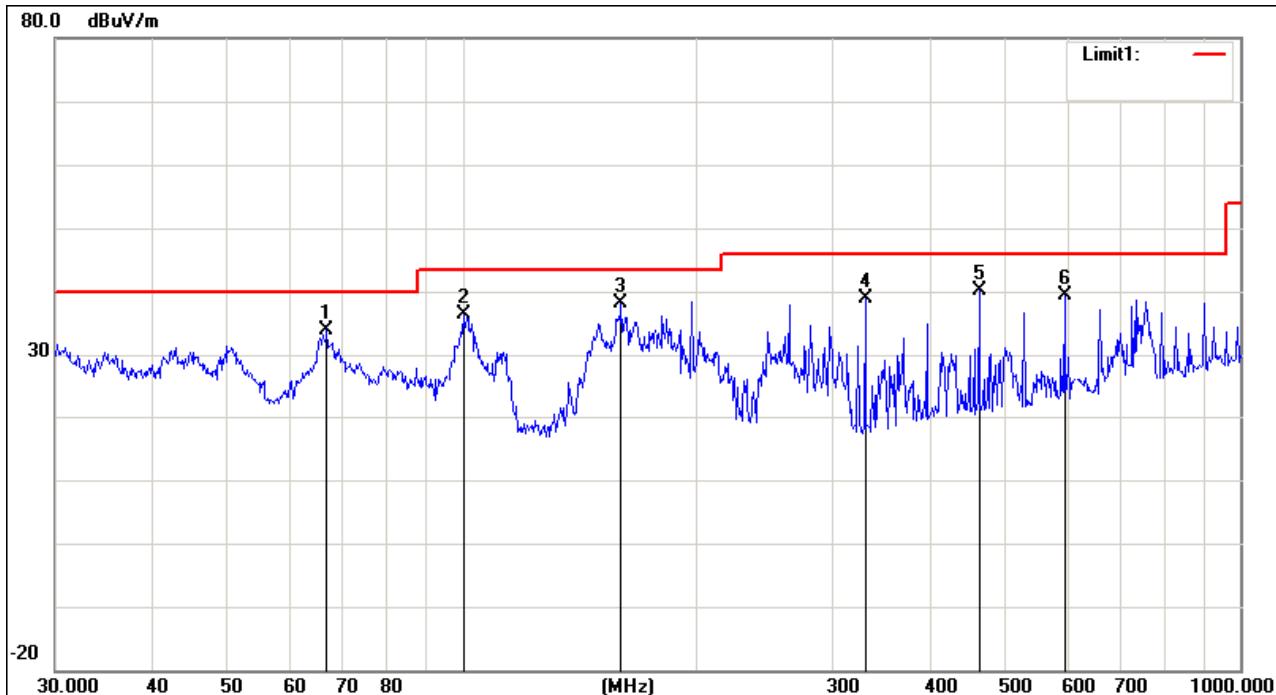
|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Polarization :    | Horizontal    |
| Test Mode   | Mode 1 with GFSK modulation     | Test Date         | March 6, 2016 |



| No. | Mk. | Freq.    | Reading Level | Correct Factor | Measure-<br>ment | Limit  | Over  |          |
|-----|-----|----------|---------------|----------------|------------------|--------|-------|----------|
|     |     | MHz      | dBuV          | dB             | dBuV/m           | dBuV/m | dB    | Detector |
| 1   | *   | 65.8031  | 44.05         | -8.63          | 35.42            | 40.00  | -4.58 | peak     |
| 2   |     | 102.3597 | 41.88         | -5.66          | 36.22            | 43.50  | -7.28 | peak     |
| 3   |     | 161.4740 | 42.48         | -4.40          | 38.08            | 43.50  | -5.42 | peak     |
| 4   |     | 297.2241 | 46.50         | -5.79          | 40.71            | 46.00  | -5.29 | peak     |
| 5   |     | 528.2458 | 40.47         | -0.37          | 40.10            | 46.00  | -5.90 | peak     |
| 6   |     | 860.0352 | 35.19         | 4.85           | 40.04            | 46.00  | -5.96 | peak     |

Remark: All the modes have been investigated, and only worst mode is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Polarization :    | Vertical      |
| Test Mode   | Mode 1 with GFSK modulation     | Test Date         | March 6, 2016 |



| No. | Mk. | Freq.    | Reading | Correct | Measure- | Limit  | Over  | Detector |
|-----|-----|----------|---------|---------|----------|--------|-------|----------|
|     |     |          | Level   | Factor  | ment     |        |       |          |
|     |     | MHz      | dBuV    | dB      | dBuV/m   | dBuV/m | dB    |          |
| 1   |     | 66.9668  | 42.37   | -8.41   | 33.96    | 40.00  | -6.04 | peak     |
| 2   |     | 100.2286 | 42.53   | -6.23   | 36.30    | 43.50  | -7.20 | peak     |
| 3   | *   | 159.7844 | 42.37   | -4.34   | 38.03    | 43.50  | -5.47 | peak     |
| 4   |     | 330.1949 | 43.66   | -4.77   | 38.89    | 46.00  | -7.11 | peak     |
| 5   |     | 462.3455 | 41.81   | -1.67   | 40.14    | 46.00  | -5.86 | peak     |
| 6   |     | 595.1327 | 38.42   | 0.95    | 39.37    | 46.00  | -6.63 | peak     |

Remark: All the modes have been investigated, and only worst mode is presented in this report.

### 5.2.5.3 TEST RESULTS(1GHZ TO 25GHZ)

Note: *the worst case is 1Mbps(GFSK)mode as result in this part.*

|             |                                 |  |  |                   |                  |  |
|-------------|---------------------------------|--|--|-------------------|------------------|--|
| EUT         | Wall-Mounted Smart Home Speaker |  |  | Model Name        | FW3A             |  |
| Temperature | 20 °C                           |  |  | Relative Humidity | 48%              |  |
| Pressure    | 1010 hPa                        |  |  | Test Mode         | Mode 1 TX(1Mbps) |  |

| Freq.<br>(MHz) | Ant.<br>Pol. | Emission<br>Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|--------------|-------------------------|-------|---------------------|----|----------|--------|
|                |              | PK                      | AV    | PK                  | AV | PK       | AV     |
| 4804           | V            | 58.81                   | 40.70 | 74                  | 54 | -15.19   | -13.30 |
| 7206           | V            | 59.60                   | 39.32 | 74                  | 54 | -14.40   | -14.68 |
| 4804           | H            | 58.27                   | 40.39 | 74                  | 54 | -15.73   | -13.61 |
| 7206           | H            | 59.56                   | 40.56 | 74                  | 54 | -14.44   | -13.44 |

Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |                  |
|-------------|---------------------------------|-------------------|------------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A             |
| Temperature | 20 °C                           | Relative Humidity | 48%              |
| Pressure    | 1010 hPa                        | Test Mode         | Mode 2 TX(1Mbps) |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | H/V                  | PK    | AV                  | PK | AV       | PK     |
| 4882           | V        | 58.24                | 39.13 | 74                  | 54 | -15.76   | -14.87 |
| 7323           | V        | 58.48                | 40.74 | 74                  | 54 | -15.52   | -13.26 |
| 4882           | H        | 59.95                | 40.27 | 74                  | 54 | -14.05   | -13.73 |
| 7323           | H        | 59.43                | 40.43 | 74                  | 54 | -14.57   | -13.57 |

## Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |                  |
|-------------|---------------------------------|-------------------|------------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A             |
| Temperature | 20 °C                           | Relative Humidity | 48%              |
| Pressure    | 1010 hPa                        | Test Mode         | Mode 3 TX(1Mbps) |

| Freq.<br>(MHz) | Ant.Pol. | Emission Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|----------|----------------------|-------|---------------------|----|----------|--------|
|                |          | H/V                  | PK    | AV                  | PK | AV       | PK     |
| 4960           | V        | 60.63                | 39.56 | 74                  | 54 | -13.37   | -14.44 |
| 7440           | V        | 59.13                | 39.75 | 74                  | 54 | -14.87   | -14.25 |
| 4960           | H        | 58.76                | 39.02 | 74                  | 54 | -15.24   | -14.98 |
| 7440           | H        | 58.03                | 39.03 | 74                  | 54 | -15.97   | -14.97 |

## Remark:

All emissions not reported were more than 20dB below the specified limit or in the noise floor.  
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

#### 5.2.5.4 TEST RESULTS (Restricted Bands Requirements)

##### Test result for 1Mbps Mode:

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /Mode1-1Mbps                 | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector<br>Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|------------------|
| 2382               | 62.98                            | -8.76          | 54.22                               | 74                       | 19.78          | peak             |
| 2382               | 55.13                            | -8.76          | 46.37                               | 54                       | 7.63           | AVG              |
| 2390               | 60.28                            | -8.73          | 51.55                               | 74                       | 22.45          | peak             |
| 2390               | 55.27                            | -8.73          | 46.54                               | 54                       | 7.46           | AVG              |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /Mode1-1Mbps                 | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|---------------|
| 2376               | 64.22                            | -8.76          | 55.46                               | 74                       | 18.54          | peak          |
| 2376               | 55.38                            | -8.76          | 46.62                               | 54                       | 7.38           | AVG           |
| 2390               | 63.05                            | -8.73          | 54.32                               | 74                       | 19.68          | peak          |
| 2390               | 54.76                            | -8.73          | 46.03                               | 54                       | 7.97           | AVG           |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /Mode1-1Mbps                 | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 62.78                            | -8.17          | 54.61                               | 74                       | 19.39          | peak          |
| 2483.5             | 54.68                            | -8.17          | 46.51                               | 54                       | 7.49           | AVG           |
|                    |                                  |                |                                     |                          |                |               |
|                    |                                  |                |                                     |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /Mode1-1Mbps                 | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 63.93                            | -8.17          | 55.76                               | 74                       | 18.24          | peak          |
| 2483.5             | 54.01                            | -8.17          | 45.84                               | 54                       | 8.16           | AVG           |
|                    |                                  |                |                                     |                          |                |               |
|                    |                                  |                |                                     |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

**Test result for 3Mbps Mode:**

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /2402MHz-3Mbps               | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits | Margin<br>(dB) | Detector<br>Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------|----------------|------------------|
|                    |                                  |                |                                     |        |                |                  |
| 2387               | 63.51                            | -8.76          | 54.75                               | 74     | 19.25          | peak             |
| 2387               | 56.03                            | -8.76          | 47.27                               | 54     | 6.73           | AVG              |
| 2390               | 61.03                            | -8.73          | 52.30                               | 74     | 21.70          | peak             |
| 2390               | 54.52                            | -8.73          | 45.79                               | 54     | 8.21           | AVG              |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /2402MHz-3Mbps               | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits | Margin<br>(dB) | Detector<br>Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------|----------------|------------------|
|                    |                                  |                |                                     |        |                |                  |
| 2384               | 61.91                            | -8.76          | 53.15                               | 74     | 20.85          | peak             |
| 2384               | 55.97                            | -8.76          | 47.21                               | 54     | 6.79           | AVG              |
| 2390               | 61.35                            | -8.73          | 52.62                               | 74     | 21.38          | peak             |
| 2390               | 54.83                            | -8.73          | 46.10                               | 54     | 7.90           | AVG              |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /2480MHz-3Mbps               | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 60.52                         | -8.17          | 52.35                            | 74                       | 21.65          | peak          |
| 2483.5             | 53.81                         | -8.17          | 45.64                            | 54                       | 8.36           | AVG           |
|                    |                               |                |                                  |                          |                |               |
|                    |                               |                |                                  |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | TX /2480MHz-3Mbps               | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 60.67                         | -8.17          | 52.50                            | 74                       | 21.50          | peak          |
| 2483.5             | 54.15                         | -8.17          | 45.98                            | 54                       | 8.02           | AVG           |
|                    |                               |                |                                  |                          |                |               |
|                    |                               |                |                                  |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

**Test result for hopping mode:**

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | hopping mode-1Mbps              | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------|----------------|---------------|
|                    |                               |                |                                  |        |                | peak          |
| 2381               | 61.42                         | -8.76          | 52.66                            | 74     | 21.34          | peak          |
| 2381               | 54.21                         | -8.76          | 45.45                            | 54     | 8.55           | AVG           |
| 2390               | 62.61                         | -8.73          | 53.88                            | 74     | 20.12          | peak          |
| 2390               | 54.77                         | -8.73          | 46.04                            | 54     | 7.96           | AVG           |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | Hopping mode-1Mbps              | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission Level<br>(dB $\mu$ V/m) | Limits | Margin<br>(dB) | Detector Type |
|--------------------|-------------------------------|----------------|----------------------------------|--------|----------------|---------------|
|                    |                               |                |                                  |        |                | peak          |
| 2378               | 62.40                         | -8.76          | 53.64                            | 74     | 20.36          | peak          |
| 2378               | 56.22                         | -8.76          | 47.46                            | 54     | 6.54           | AVG           |
| 2390               | 62.64                         | -8.73          | 53.91                            | 74     | 20.09          | peak          |
| 2390               | 57.57                         | -8.73          | 48.84                            | 54     | 5.16           | AVG           |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | Hopping mode-1Mbps              | Polarization      | Vertical      |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 61.82                            | -8.17          | 53.65                               | 74                       | 20.35          | peak          |
| 2483.5             | 53.49                            | -8.17          | 45.32                               | 54                       | 8.68           | AVG           |
|                    |                                  |                |                                     |                          |                |               |
|                    |                                  |                |                                     |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 20 °C                           | Relative Humidity | 48%           |
| Pressure    | 1010 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | Hopping mode-1Mbps              | Polarization      | Horizontal    |

| Frequency<br>(MHz) | Meter<br>Reading<br>(dB $\mu$ V) | Factor<br>(dB) | Emission<br>Level<br>(dB $\mu$ V/m) | Limits<br>(dB $\mu$ V/m) | Margin<br>(dB) | Detector Type |
|--------------------|----------------------------------|----------------|-------------------------------------|--------------------------|----------------|---------------|
| 2483.5             | 62.35                            | -8.17          | 54.18                               | 74                       | 19.82          | peak          |
| 2483.5             | 53.47                            | -8.17          | 45.30                               | 54                       | 8.70           | AVG           |
|                    |                                  |                |                                     |                          |                |               |
|                    |                                  |                |                                     |                          |                |               |

Remark:

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

All the x/y/z orientation has been investigated, and only worst case is presented in this report.

## 6. NUMBER OF HOPPING CHANNEL

### 6.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |                           |           |                       |        |
|---------------------------------|---------------------------|-----------|-----------------------|--------|
| Section                         | Test Item                 | Limit     | Frequency Range (MHz) | Result |
| 15.247 (a)(1)(iii)              | Number of Hopping Channel | $\geq 15$ | 2400-2483.5           | PASS   |

| Spectrum Parameters | Setting                     |
|---------------------|-----------------------------|
| Attenuation         | Auto                        |
| Span Frequency      | > Operating Frequency Range |
| RB                  | 1MHz                        |
| VB                  | 3MHz                        |
| Detector            | Peak                        |
| Trace               | Max Hold                    |
| Sweep Time          | Auto                        |

### 6.2 TEST PROCEDURE

- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- Spectrum Setting: RBW= 1MHz, VBW=3MHz, Sweep time = Auto.

### 6.3 DEVIATION FROM STANDARD

No deviation.

### 6.4 TEST SETUP

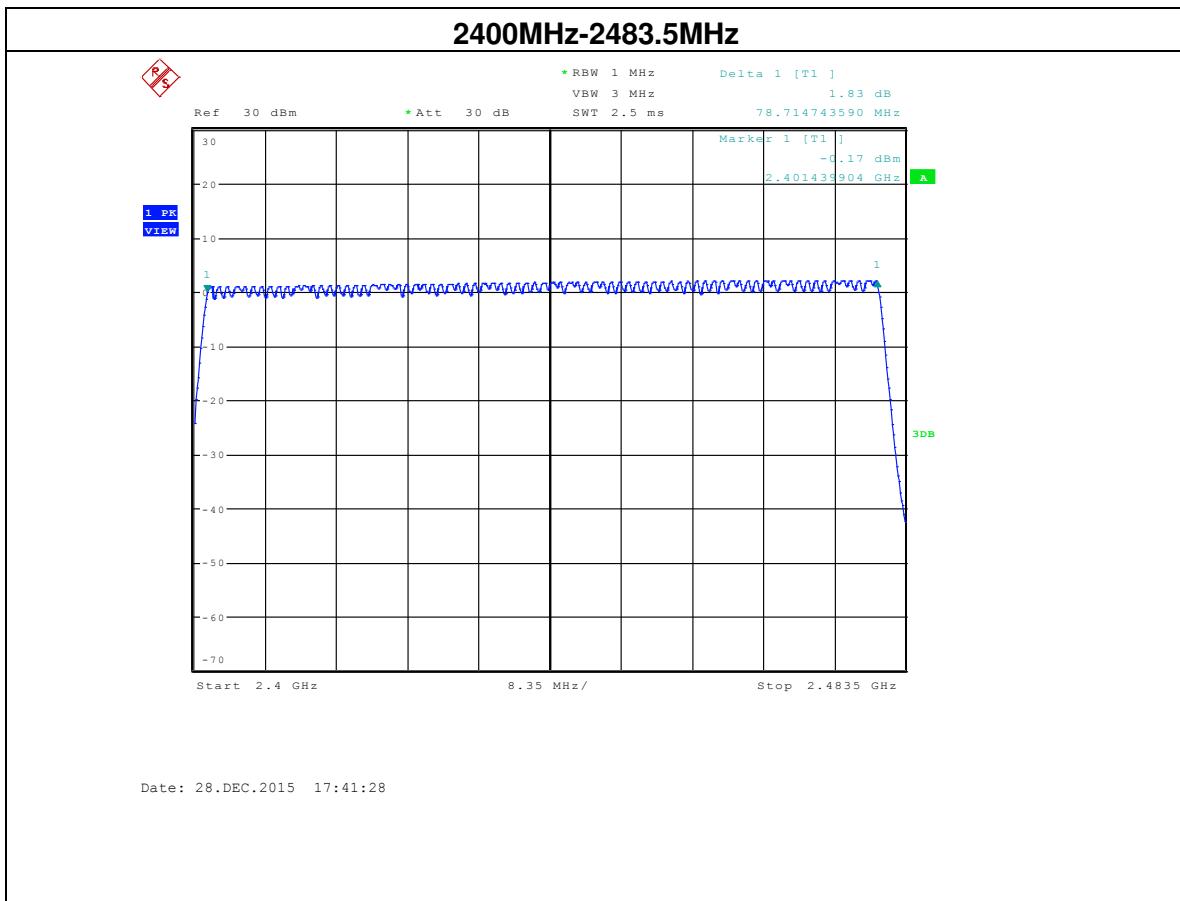


### 6.5 EUT OPERATION CONDITIONS

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.

## 6.6 TEST RESULTS

|             |                                 |                           |               |
|-------------|---------------------------------|---------------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name                | FW3A          |
| Temperature | 25 °C                           | Relative Humidity         | 60%           |
| Pressure    | 1015 hPa                        | Test Date                 | March 7, 2016 |
| Test Mode   | Hopping Mode                    | Number of Hopping Channel | 79            |



## 7. AVERAGE TIME OF OCCUPANCY

### 7.1 APPLIED PROCEDURES / LIMIT

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

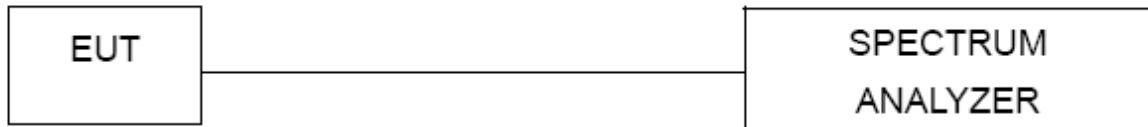
### 7.2 TEST PROCEDURE

- a. The EUT test port was connected to the spectrum analyzer with RF cable and antenna connector.
- 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. DH1 Dwell time = Pulse time\*(1600/2/79)\*31.6S  
 DH3 Dwell time = Pulse time\*(1600/4/79)\*31.6S  
 DH5 Dwell time = Pulse time\*(1600/6/79)\*31.6S

### 7.3 DEVIATION FROM STANDARD

No deviation.

#### 7.4 TEST SETUP



#### 7.5 EUT OPERATION CONDITIONS

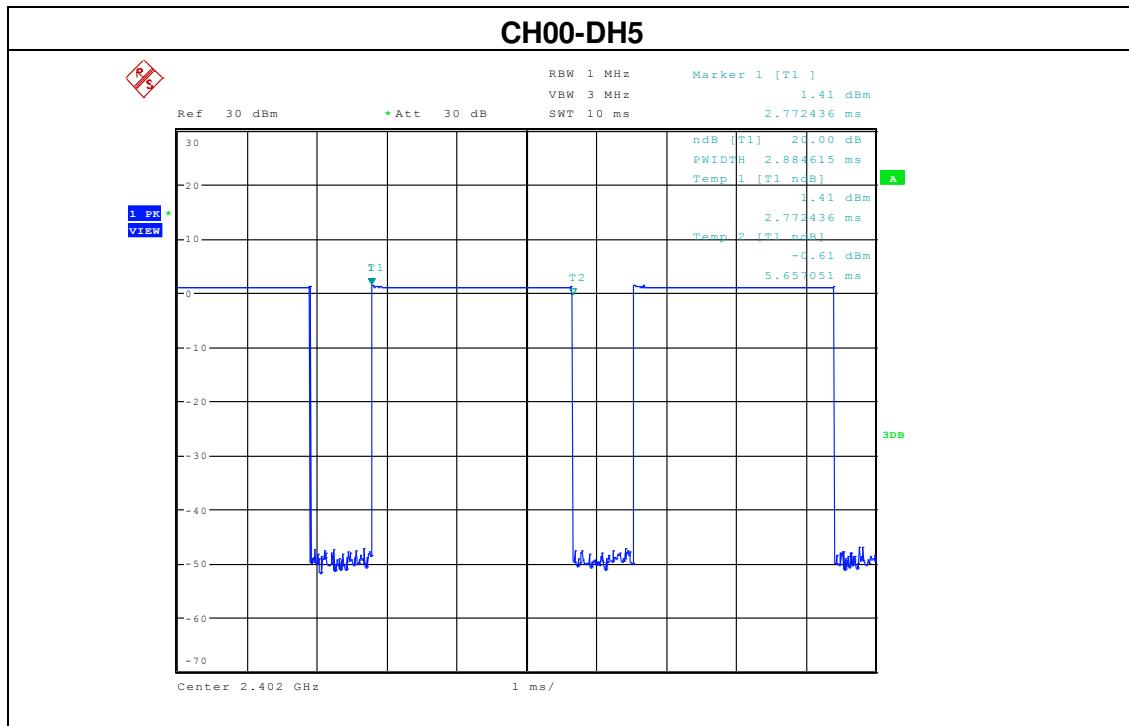
The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

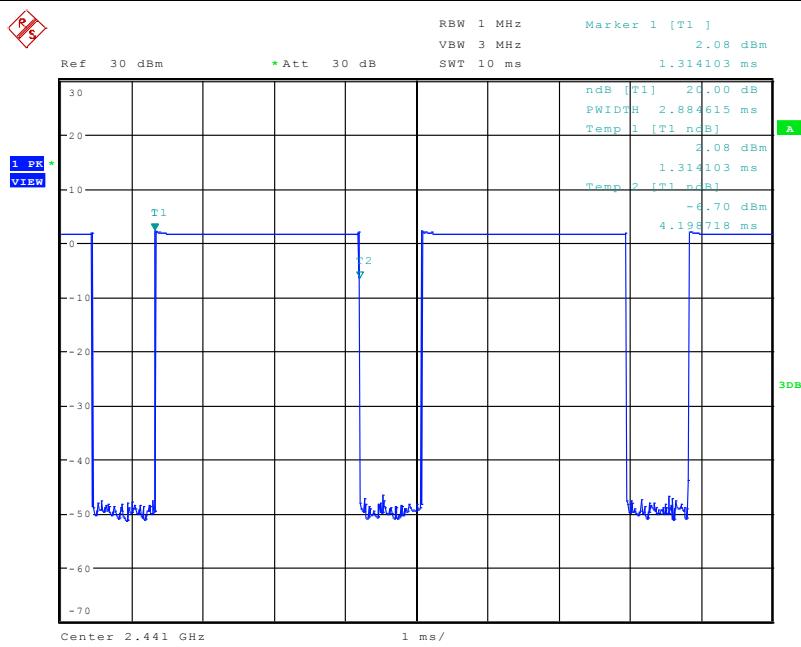
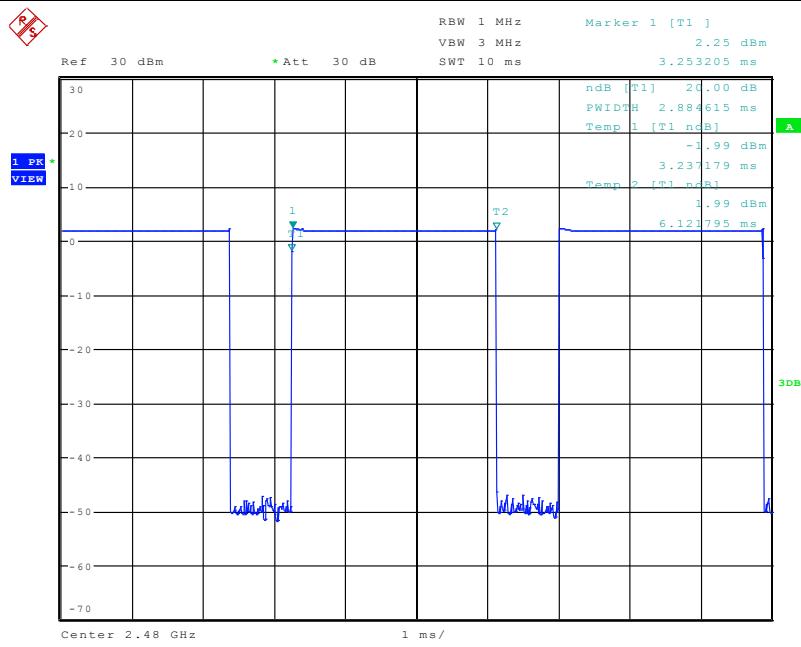
## 7.6 TEST RESULTS

Note: *the worst case is DH5-1Mbps as result in this part.*

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | DH5-1Mbps                       |                   |               |

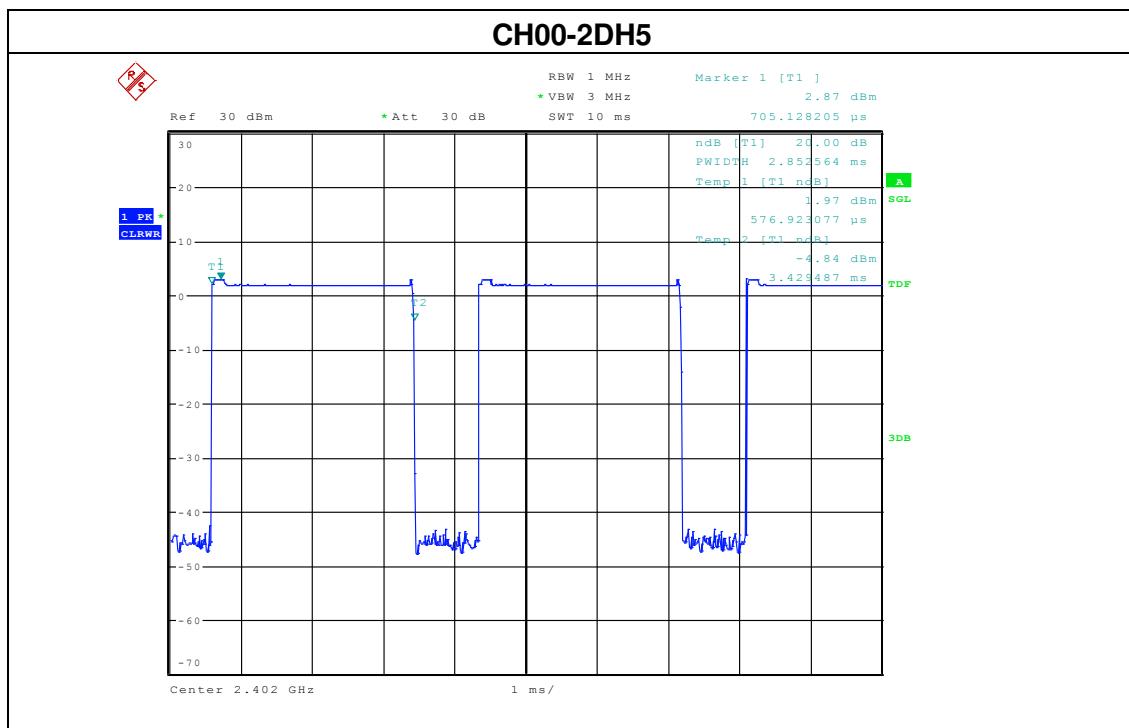
| Data Packet | Frequency | Pulse time(ms) | Dwell Time(S) | Limits (S) |
|-------------|-----------|----------------|---------------|------------|
| DH5         | 2402MHz   | 2.885          | 0.308         | 0.4        |
| DH5         | 2441MHz   | 2.885          | 0.308         | 0.4        |
| DH5         | 2480MHz   | 2.885          | 0.308         | 0.4        |

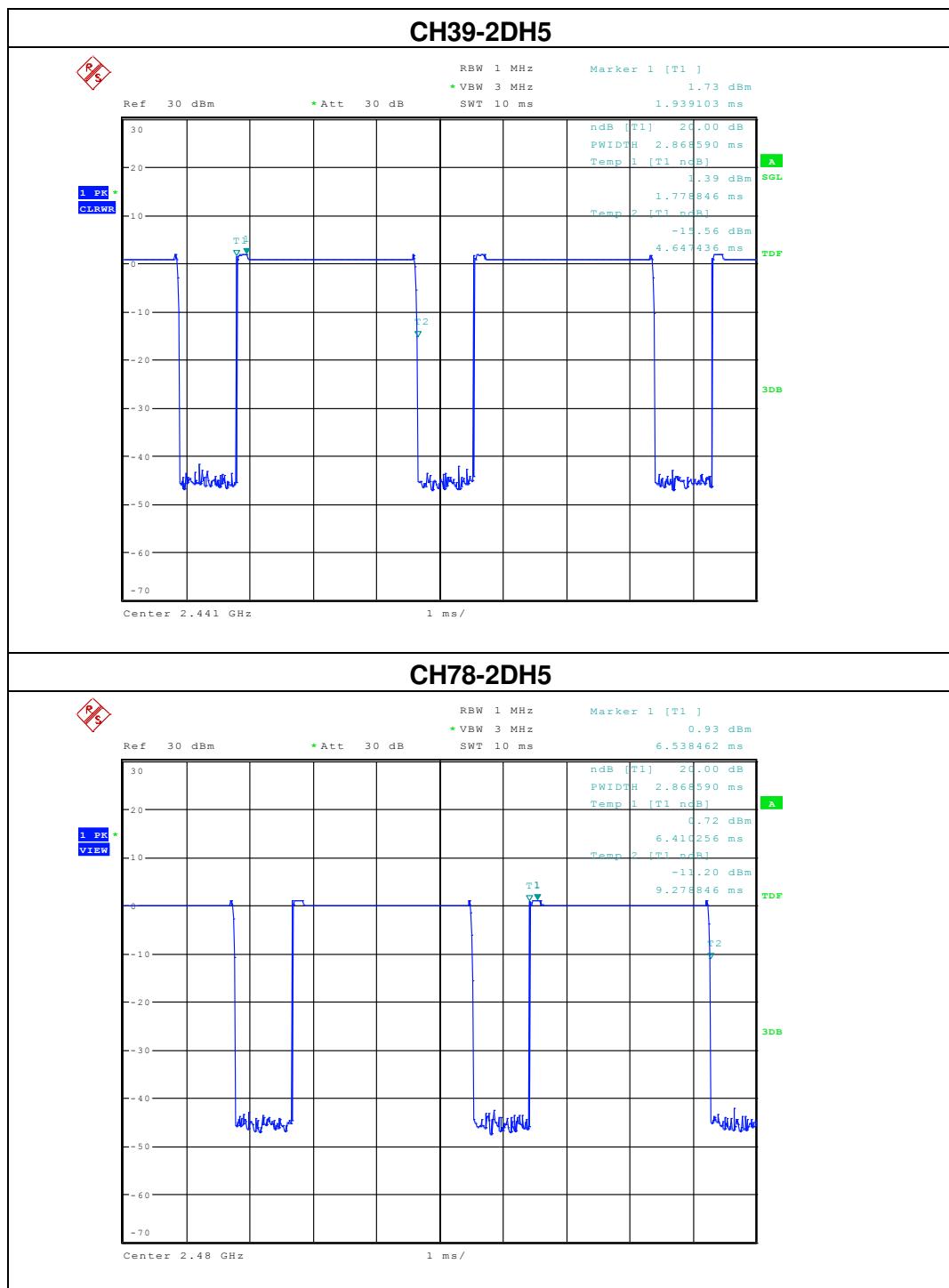


**CH39-DH5****CH78-DH5**

|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | DH5-2Mbps                       |                   |               |

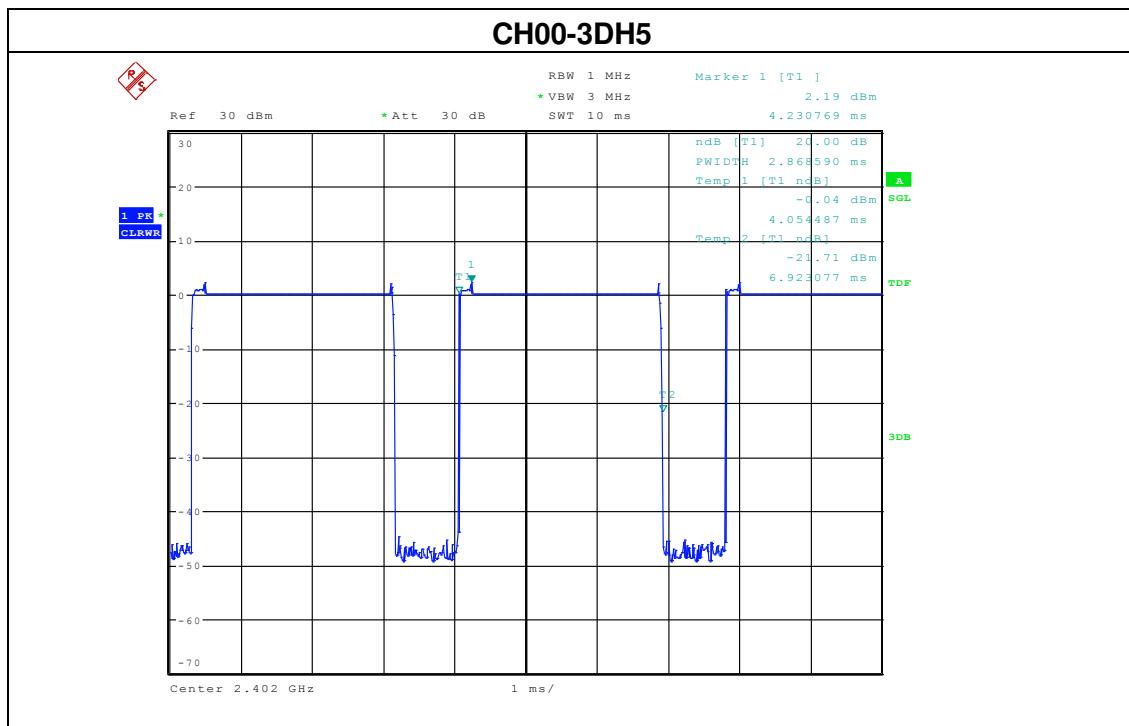
| Data Packet | Frequency | Pulse time(ms) | Dwell Time(S) | Limits (S) |
|-------------|-----------|----------------|---------------|------------|
| DH5         | 2402MHz   | 2.853          | 0.300         | 0.4        |
| DH5         | 2441MHz   | 2.869          | 0.303         | 0.4        |
| DH5         | 2480MHz   | 2.869          | 0.303         | 0.4        |



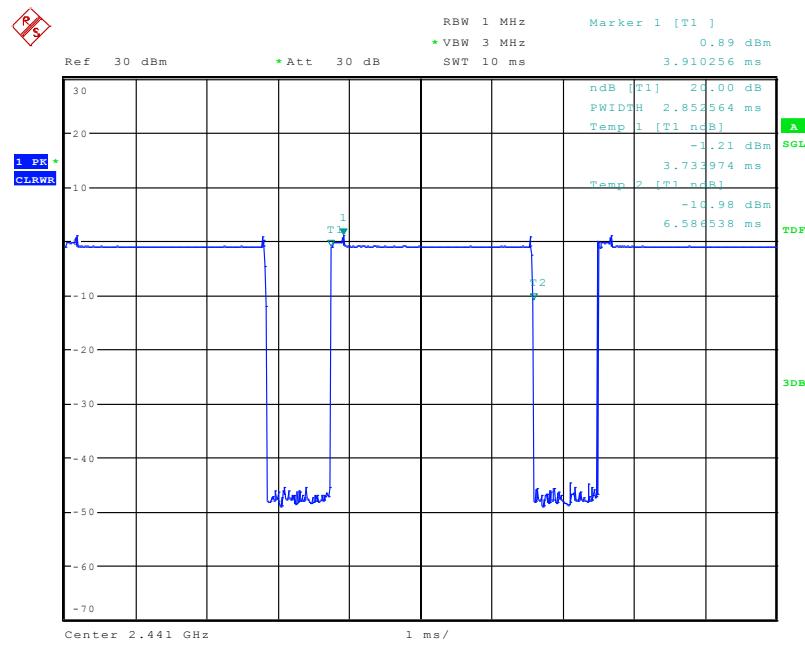


|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Date         | March 7, 2016 |
| Test Mode   | DH5-3Mbps                       |                   |               |

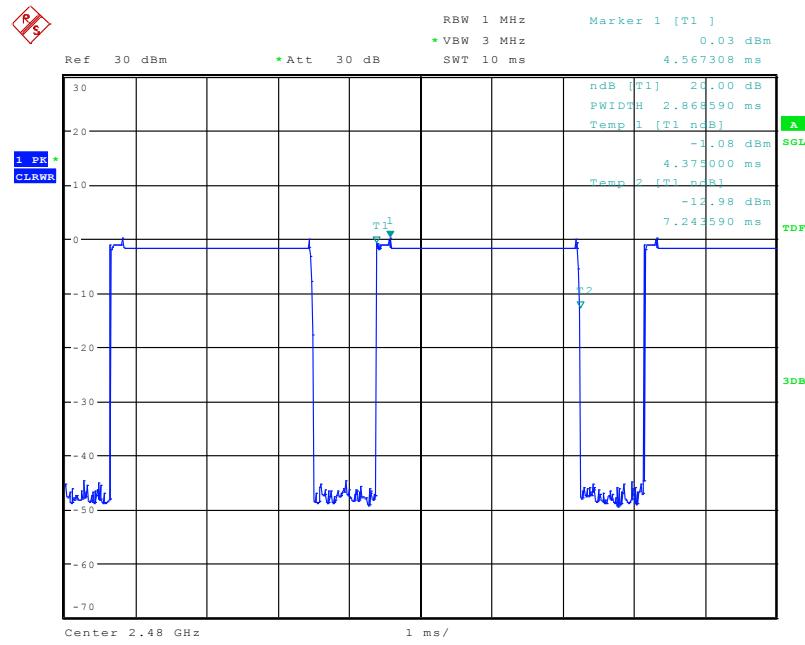
| Data Packet | Frequency | Pulse time(ms) | Dwell Time(S) | Limits (S) |
|-------------|-----------|----------------|---------------|------------|
| DH5         | 2402MHz   | 2.869          | 0.300         | 0.4        |
| DH5         | 2441MHz   | 2.853          | 0.303         | 0.4        |
| DH5         | 2480MHz   | 2.869          | 0.306         | 0.4        |



## CH39-3DH5



## CH78-3DH5



## 8. HOPPING CHANNEL SEPARATION MEASUREMENT

### 8.1 APPLIED PROCEDURES / LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

| Spectrum Parameter | Setting   |
|--------------------|---|
| Attenuation        | Auto  |
| Span Frequency     | > Measurement Bandwidth or Channel Separation             |
| RB                 | Resolution (or IF) Bandwidth (RBW) $\geq 1\%$ of the span |
| VB                 | Video (or Average) Bandwidth (VBW) $\geq$ RBW             |
| Detector           | Peak  |
| Trace              | Max hold  |
| Sweep Time         | Auto  |

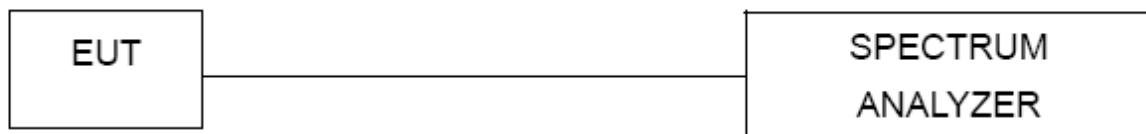
### 8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: Span = wide enough to capture the peaks of two adjacent channels; Resolution (or IF) Bandwidth (RBW)  $\geq 1\%$  of the span; Video (or Average) Bandwidth (VBW)  $\geq$  RBW; Sweep = auto; Detector function = peak; Trace = max hold
3. Measure the separation between the peaks of the adjacent channels using the marker-delta function.
4. Repeat above procedures until all frequencies measured were complete.

### 8.3 DEVIATION FROM STANDARD

No deviation.

### 8.4 TEST SETUP



### 8.5 EUT OPERATION CONDITIONS

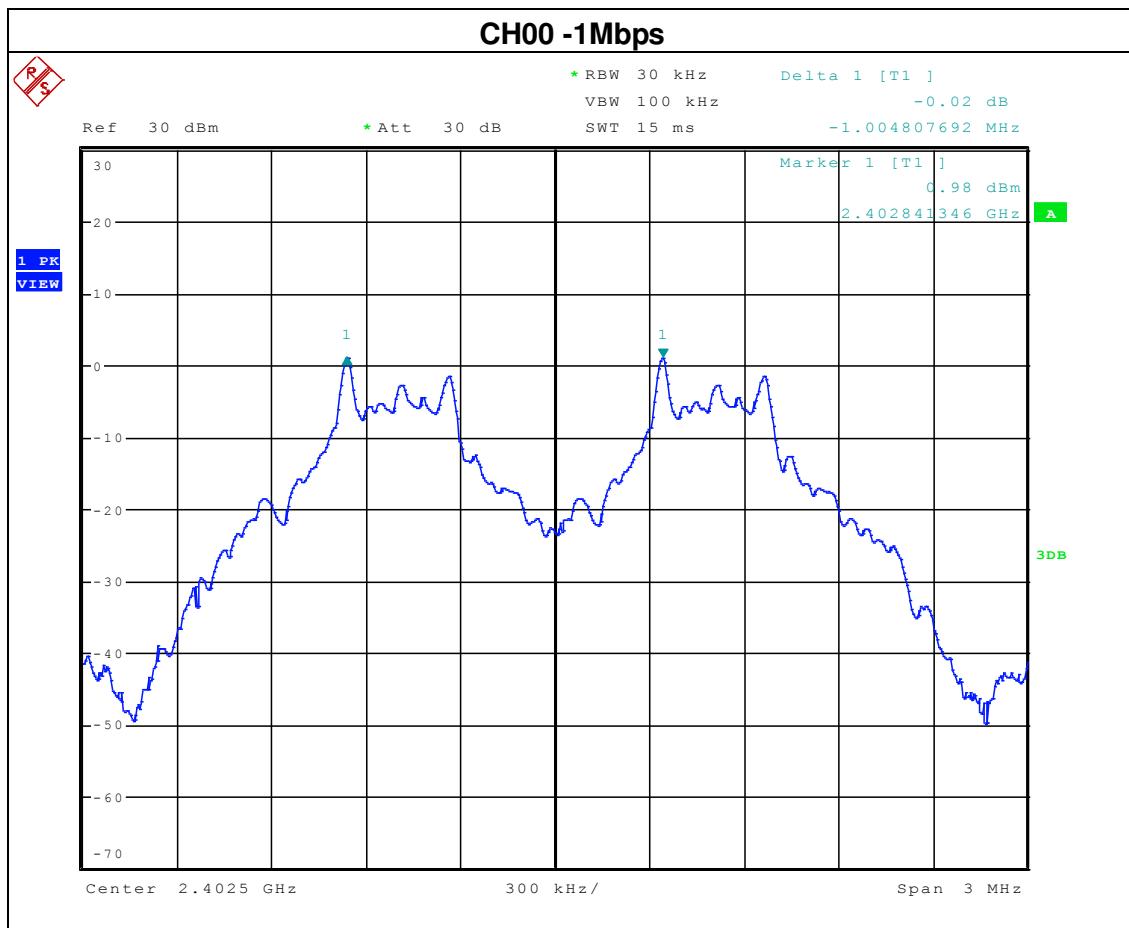
The EUT was programmed to be in continuously transmitting mode.

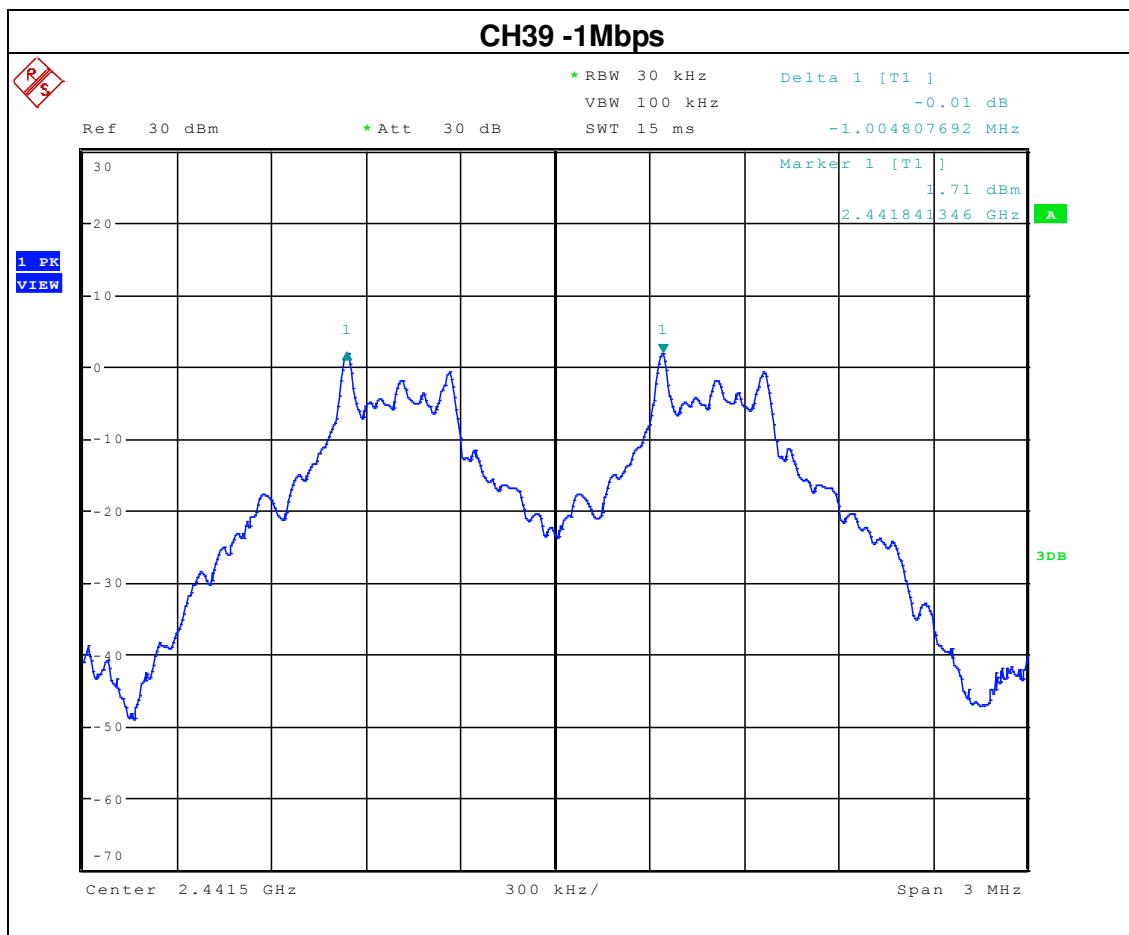
## 8.6 TEST RESULTS

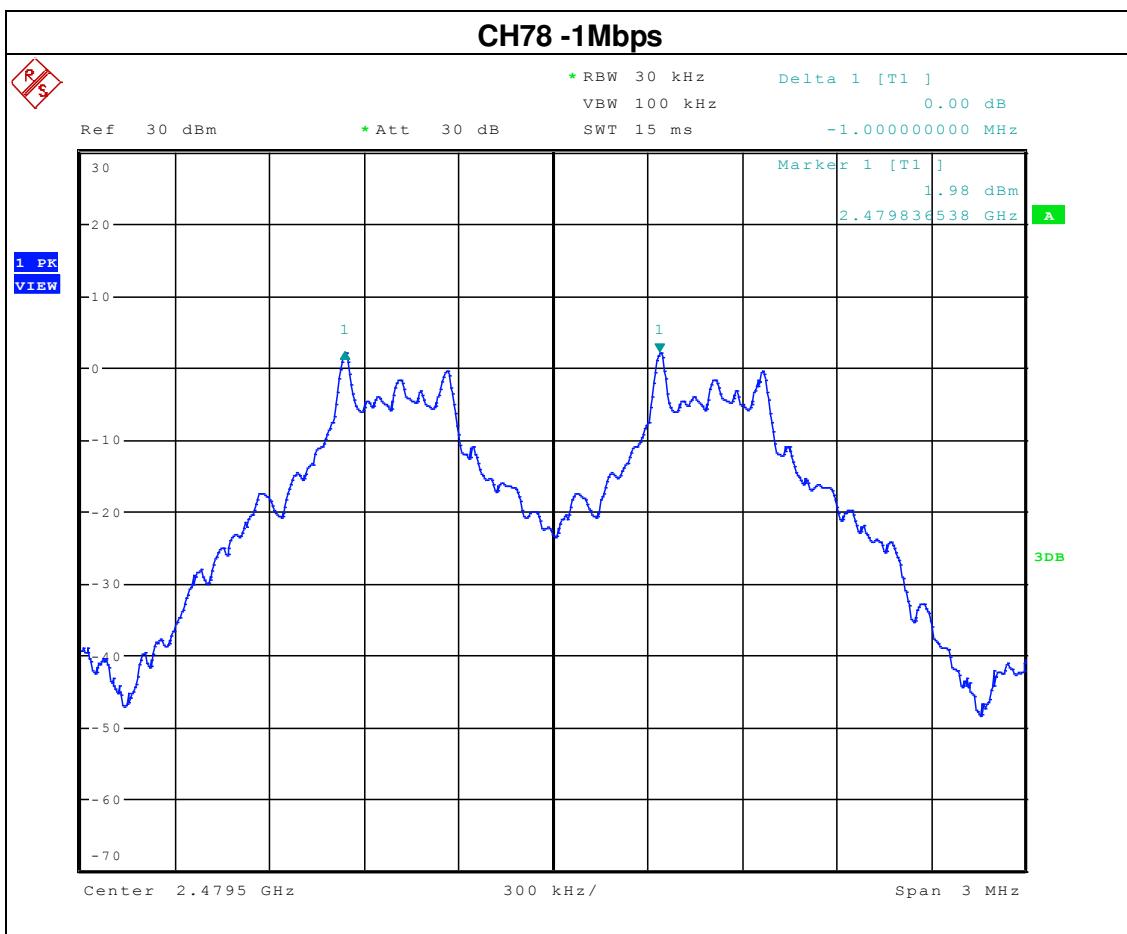
|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Result       | Pass          |
| Test Mode   | CH00 / CH39 /CH78 (1Mbps Mode)  | Test Date         | March 7, 2016 |

| Channel number | Channel frequency (MHz) | Separation Read value (KHz) | Separation limit 2/3 20db down BW(KHz) |
|----------------|-------------------------|-----------------------------|--|
| 00             | 2402                    | 1005                        | 541                                    |
| 39             | 2441                    | 1005                        | 570                                    |
| 78             | 2480                    | 1000                        | 509                                    |

Note: 20db bandwidth refer to section 6.1.5





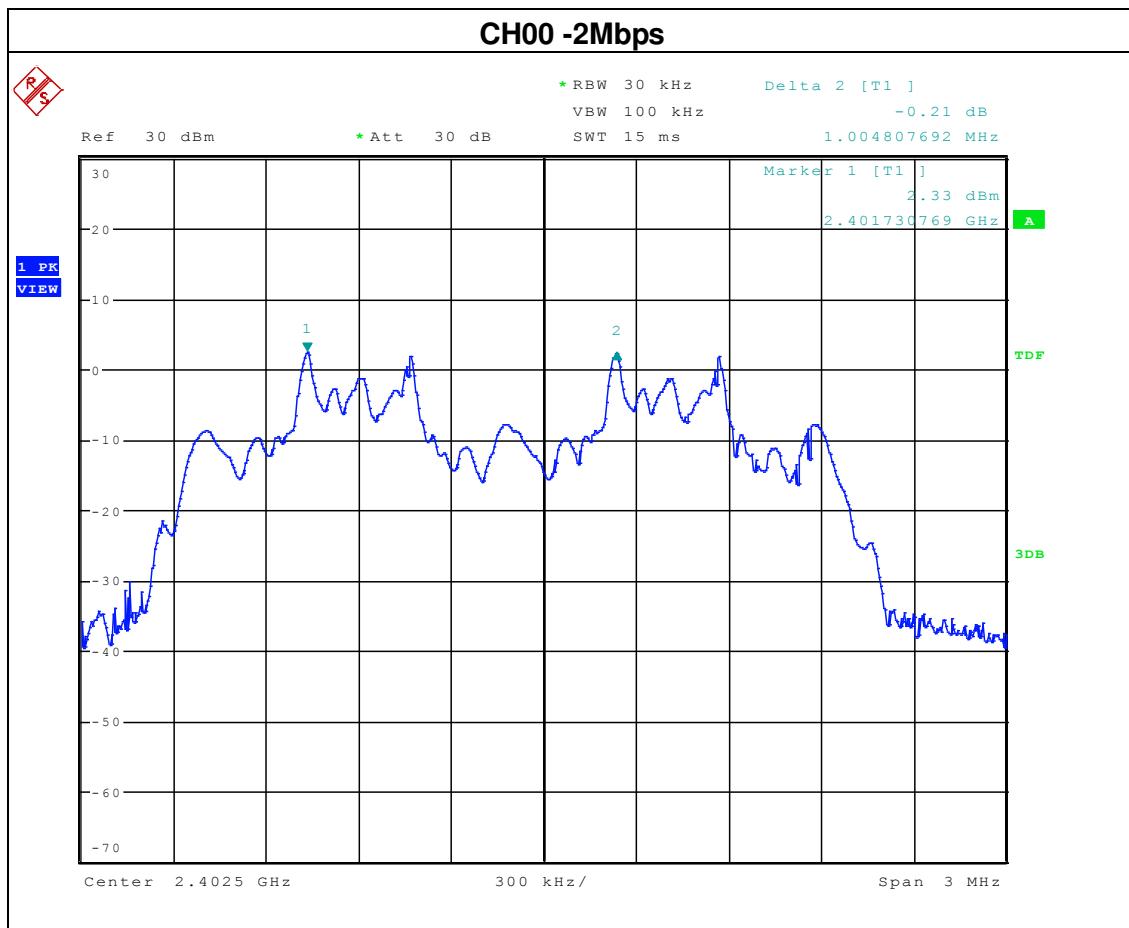


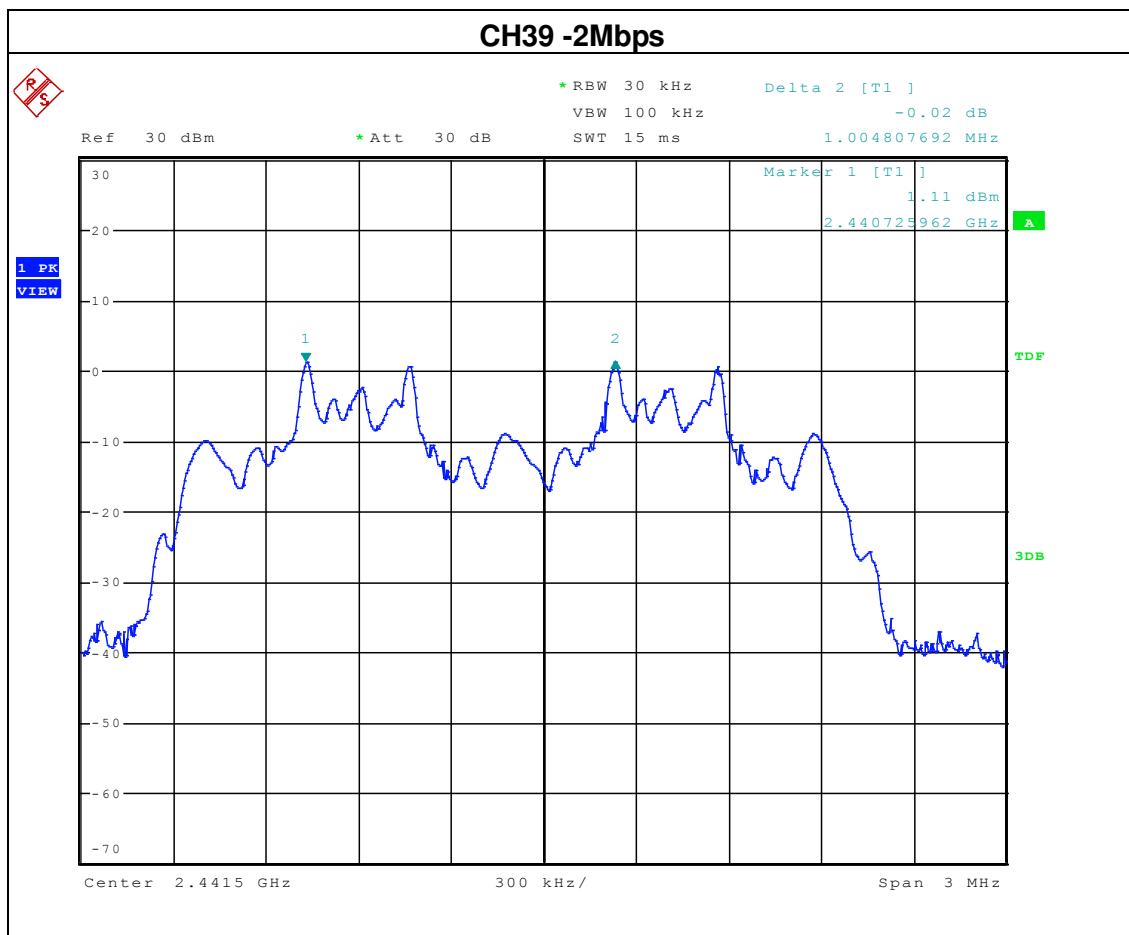
## 8.6 TEST RESULTS

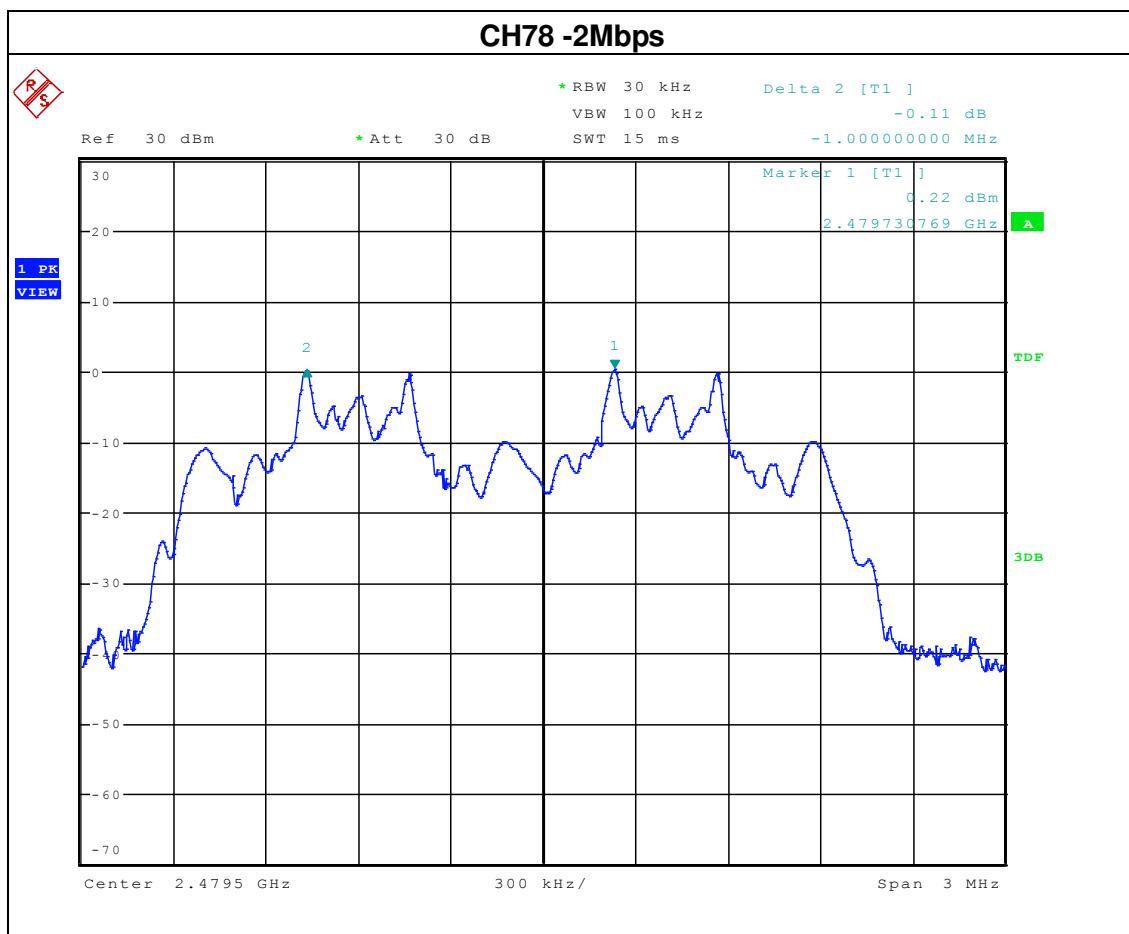
|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Result       | Pass          |
| Test Mode   | CH00 / CH39 /CH78 (2Mbps Mode)  | Test Date         | March 7, 2016 |

| Channel number | Channel frequency (MHz) | Separation Read value (KHz) | Separation limit 2/3 20db down BW(KHz) |
|----------------|-------------------------|-----------------------------|--|
| 00             | 2402                    | 1005                        | 769                                    |
| 39             | 2441                    | 1005                        | 776                                    |
| 78             | 2480                    | 1000                        | 759                                    |

Note: 20db bandwidth refer to section 6.1.5







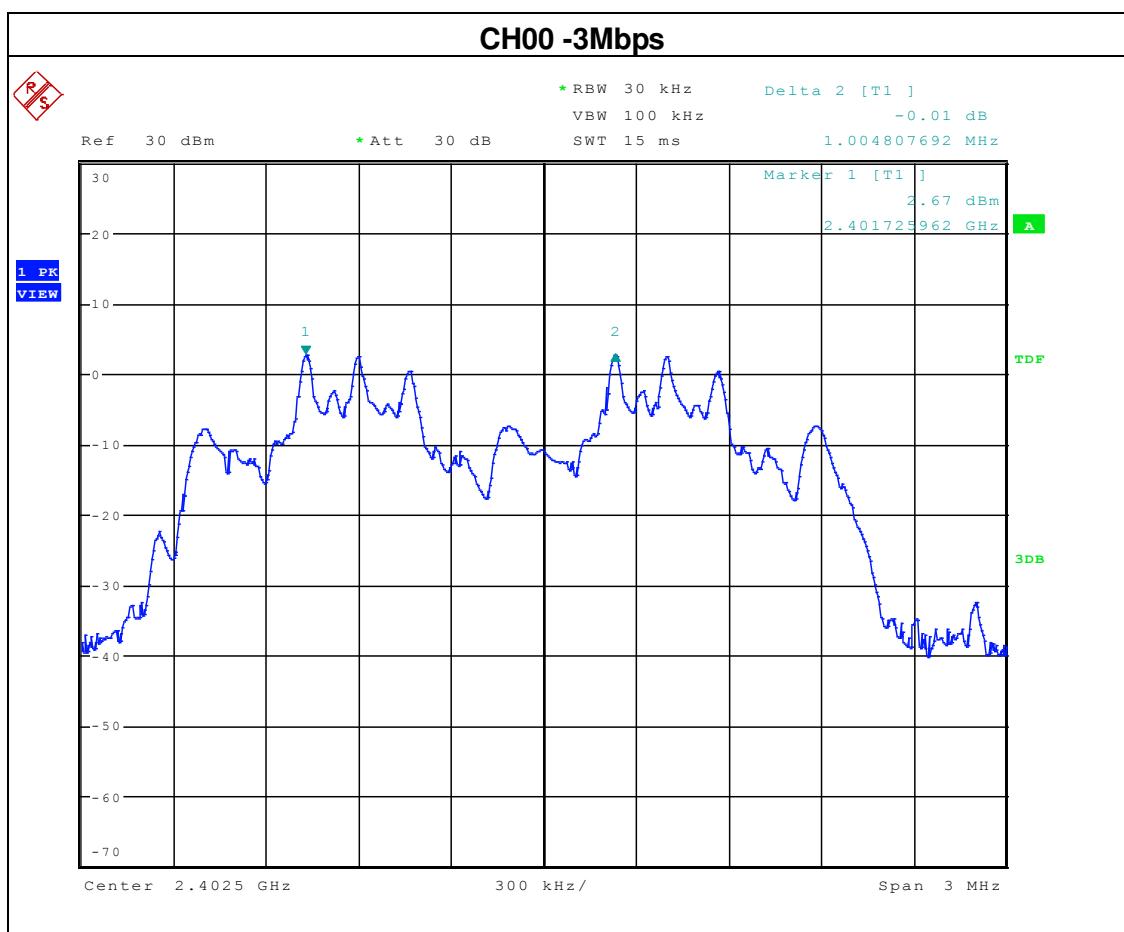
## 8.6 TEST RESULTS

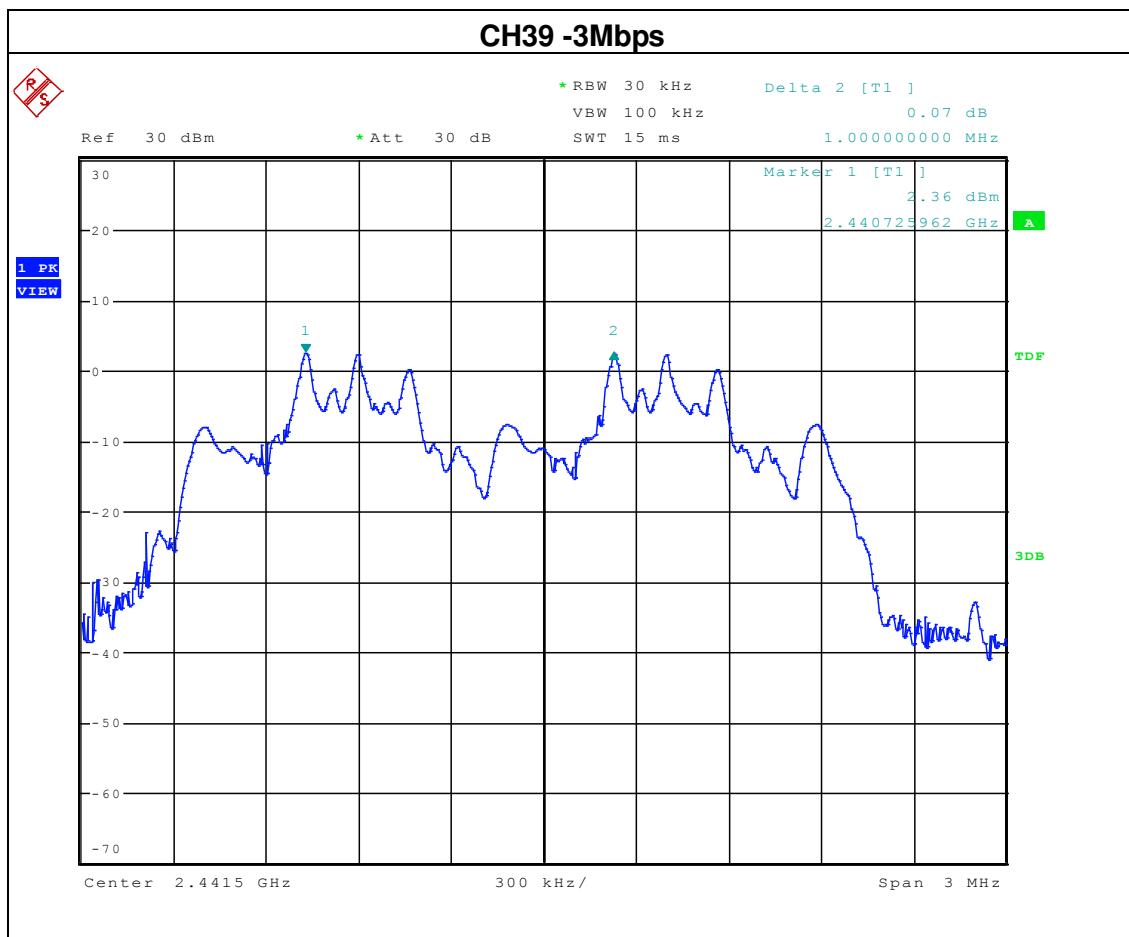
Note: *the worst case is DH5-3Mbps as result in this part.*

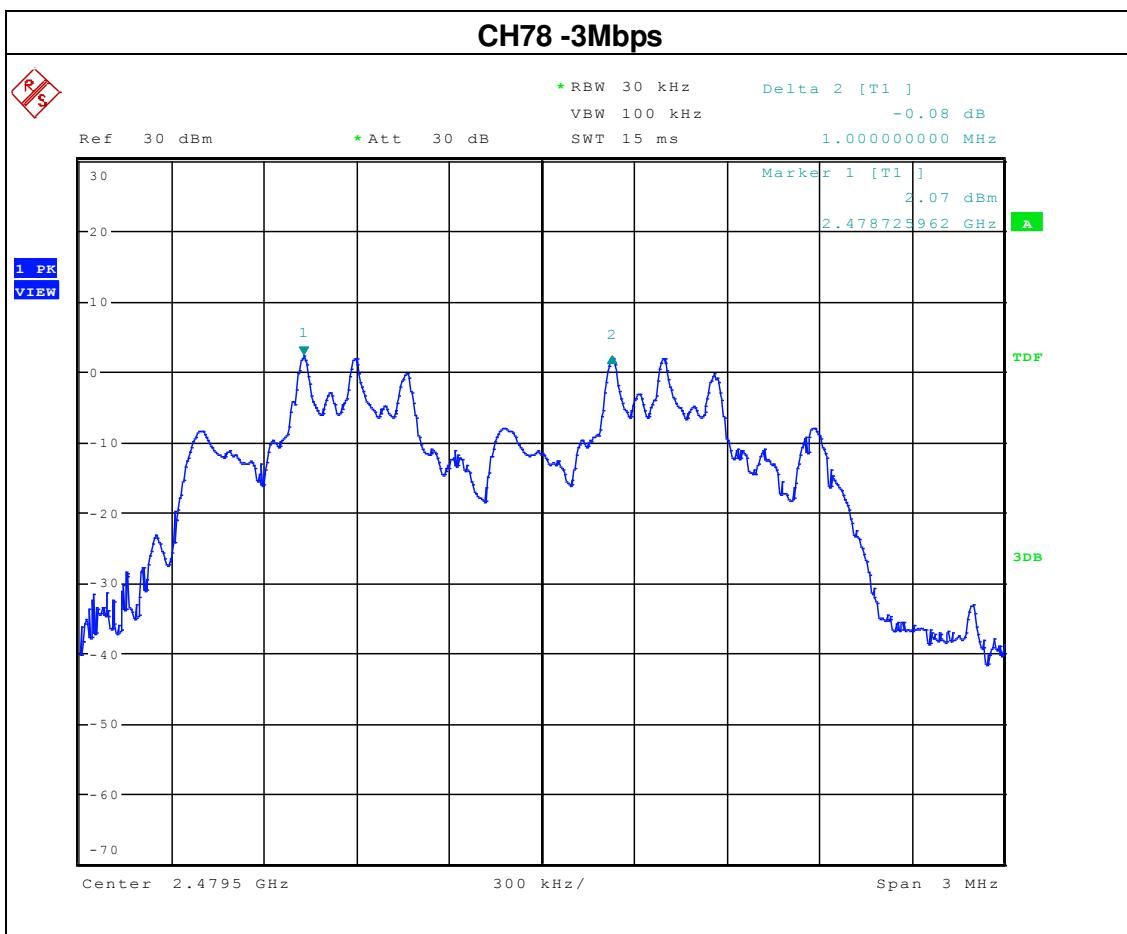
|             |                                 |                   |               |
|-------------|---------------------------------|-------------------|---------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A          |
| Temperature | 25 °C                           | Relative Humidity | 60%           |
| Pressure    | 1012 hPa                        | Test Result       | Pass          |
| Test Mode   | CH00 / CH39 /CH78 (3Mbps Mode)  | Test Date         | March 7, 2016 |

| Channel number | Channel frequency (MHz) | Separation Read value (KHz) | Separation limit 2/3 20db down BW(KHz) |
|----------------|-------------------------|-----------------------------|--|
| 00             | 2402                    | 1005                        | 766                                    |
| 39             | 2441                    | 1000                        | 775                                    |
| 78             | 2480                    | 1000                        | 773                                    |

Note: 20db bandwidth refer to section 6.1.5







## 9. BANDWIDTH TEST

### 9.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |           |                  |                       |        |
|---------------------------------|-----------|------------------|-----------------------|--------|
| Section                         | Test Item | Limit            | Frequency Range (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                 | 30kHz   |
| VB                 | 100 kHz                                       |
| Detector           | Peak  |
| Trace              | Max hold                                      |
| Sweep Time         | Auto  |

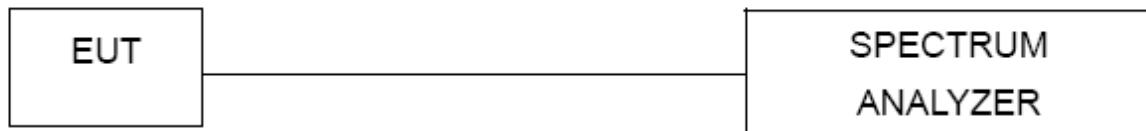
### 9.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument (spectrum analyzer) using either an internal calibrator or a known signal from an external generator.
2. Set the spectrum analyzer as follows: VBW =30kHz, RBW=100kHz, Sweep = auto Detector function = peak ,Trace = max hold
3. Measure the highest amplitude appearing on spectral display and record the level to calculate results.
4. Repeat above procedures until all frequencies measured were complete.

### 9.3 DEVIATION FROM STANDARD

No deviation.

### 9.4 TEST SETUP



### 9.5 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.

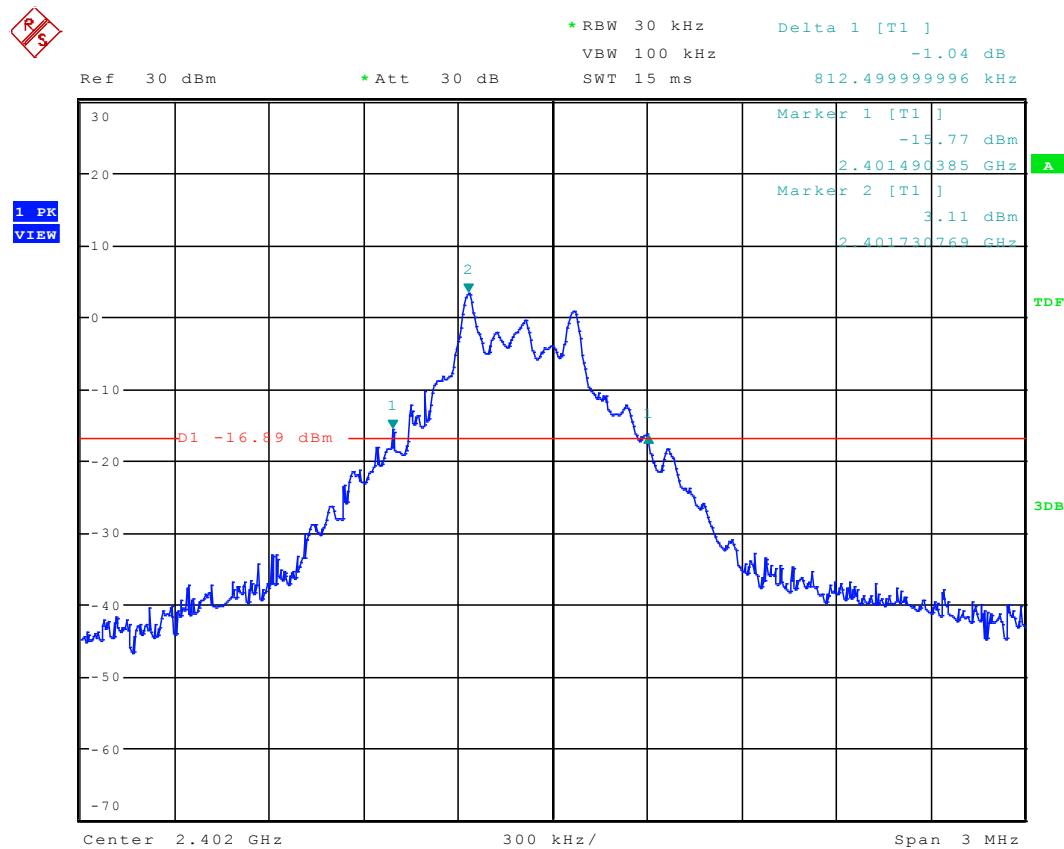
## 9.6 TEST RESULTS

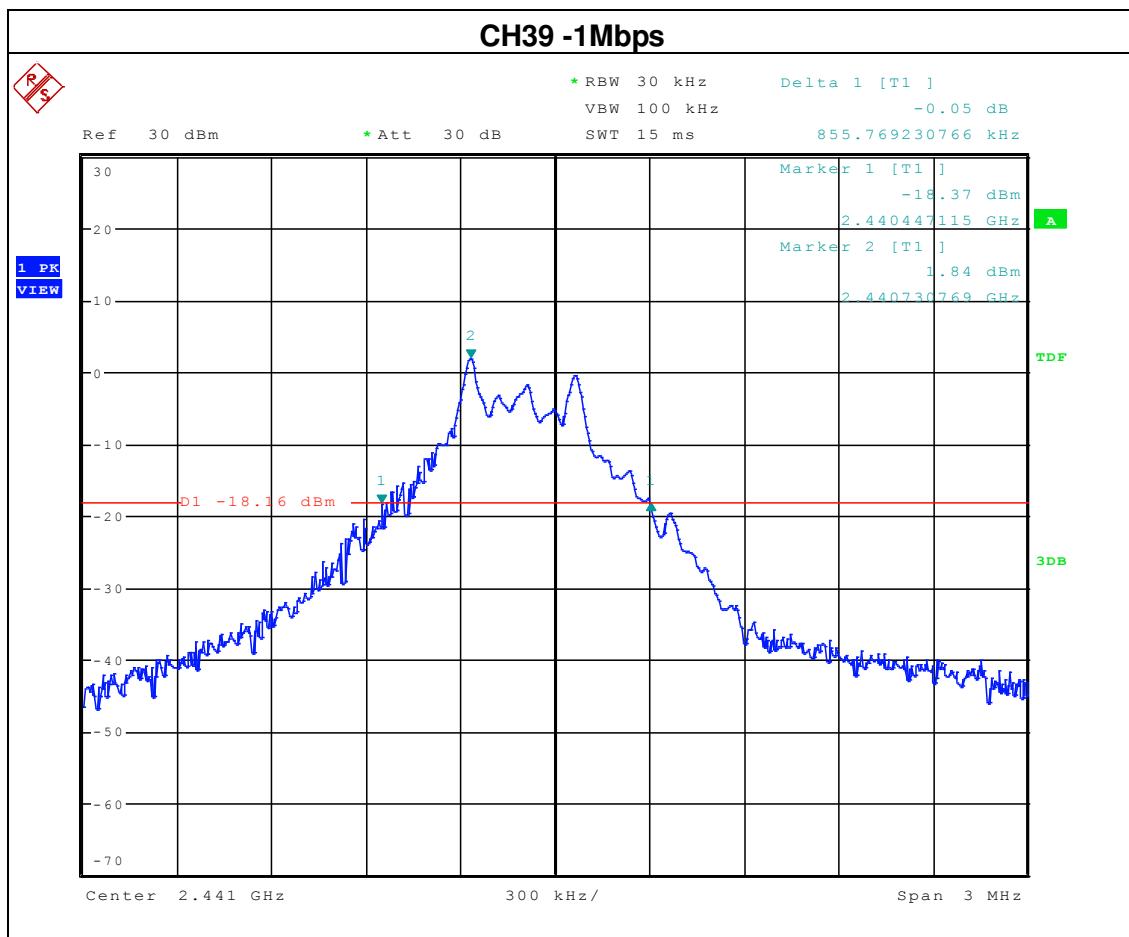
Note: *the worst case is DH5-3Mbps as result in this part.*

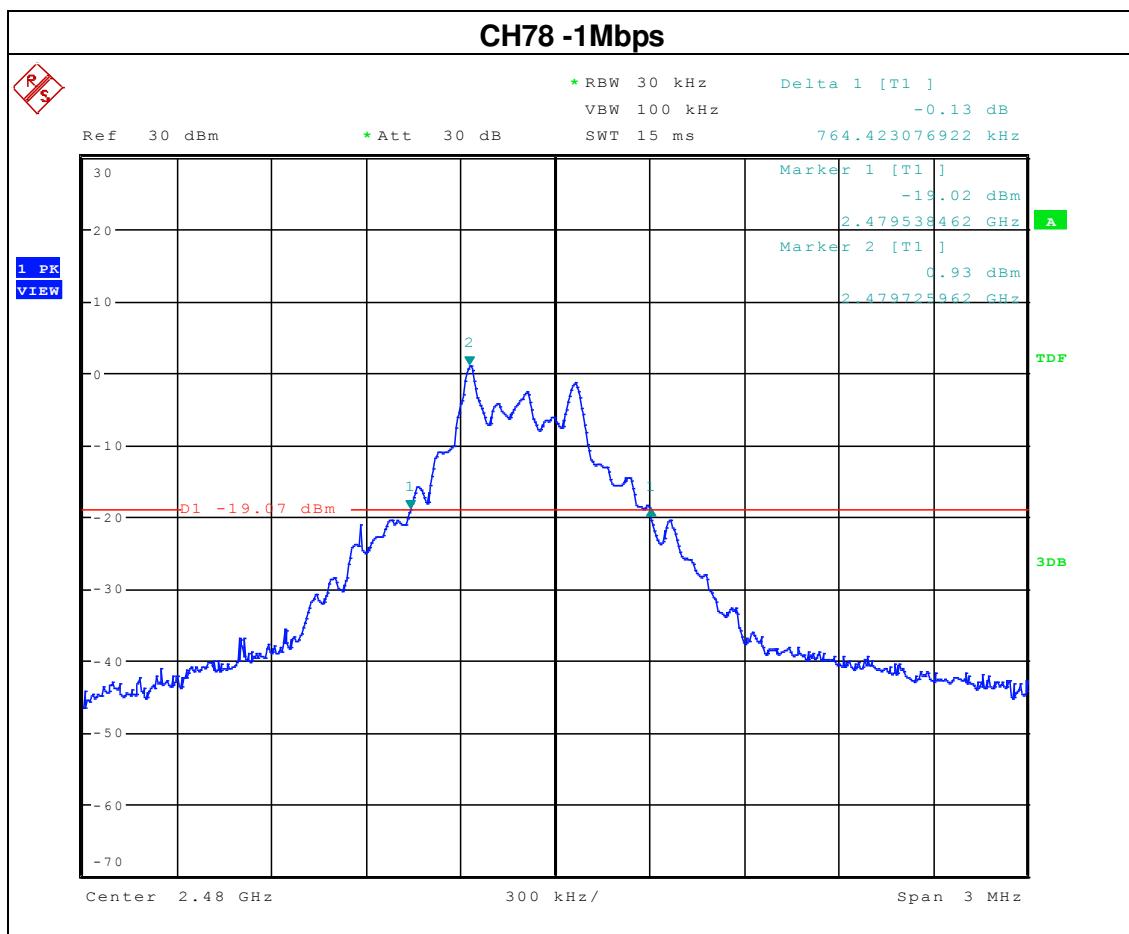
|             |                                 |                   |                      |
|-------------|---------------------------------|-------------------|----------------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A                 |
| Temperature | 25 °C                           | Relative Humidity | 60%                  |
| Pressure    | 1012 hPa                        | Test Mode         | CH00/CH39/C78(1Mbps) |
| Test Date   | March 7, 2016                   |                   |                      |

| Frequency | 20dB Bandwidth (kHz) | Result |
|-----------|----------------------|--------|
| 2402 MHz  | 812                  | PASS   |
| 2441 MHz  | 856                  | PASS   |
| 2480 MHz  | 764                  | PASS   |

### CH00 -1Mbps





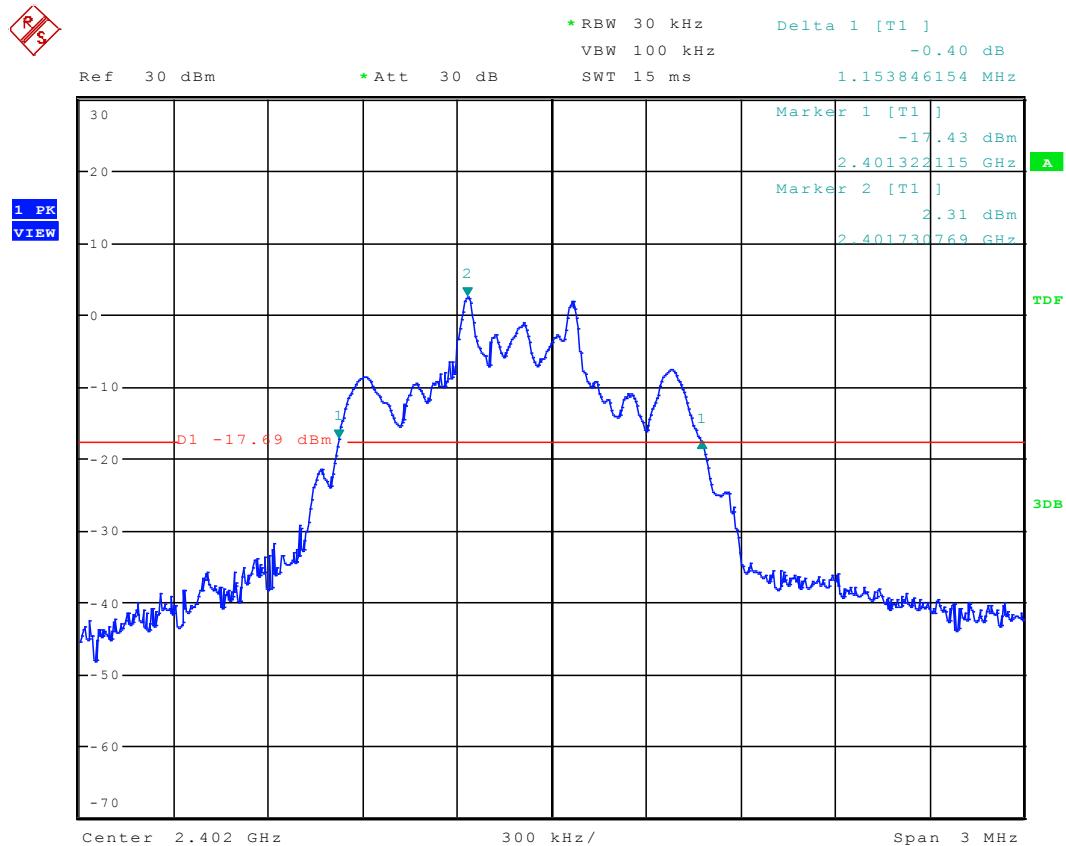


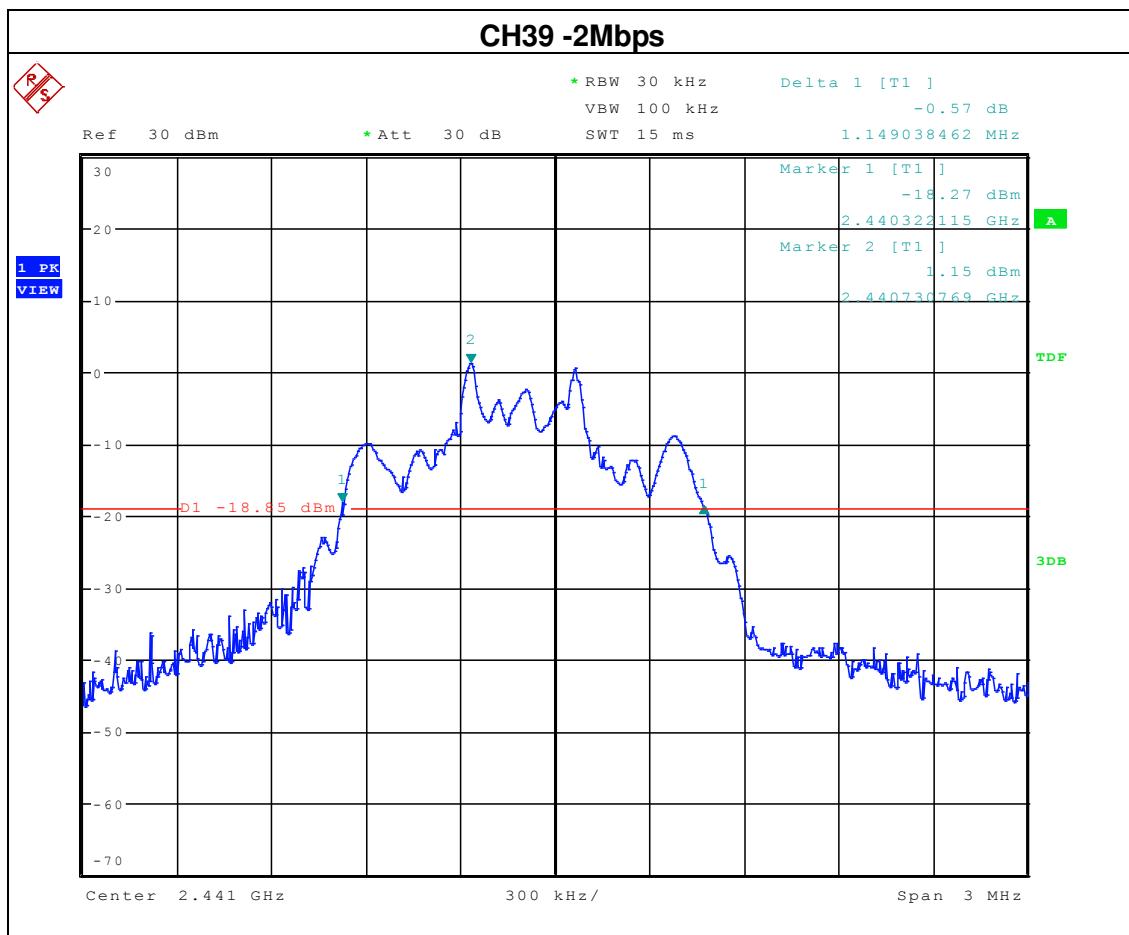
Note: **the worst case is DH5-3Mbps as result in this part.**

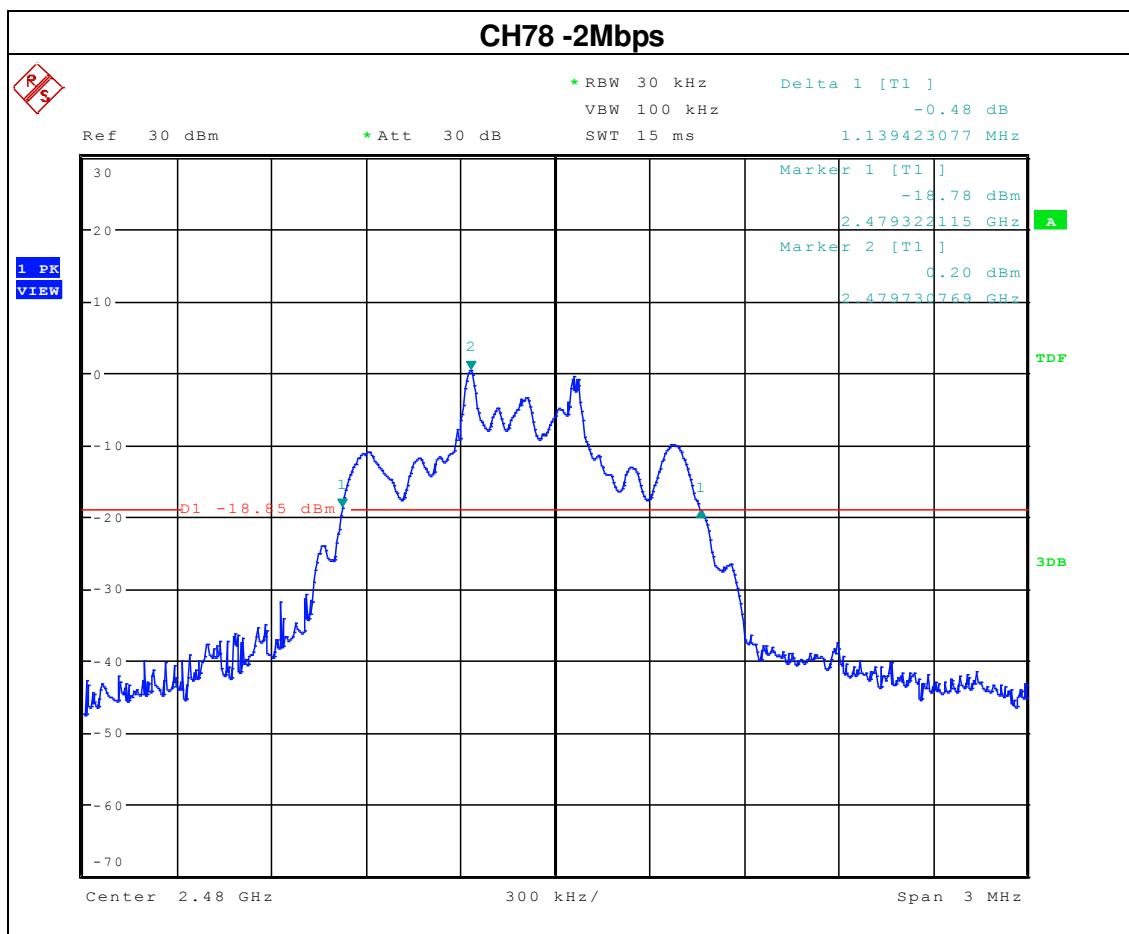
|             |                                 |                   |                      |
|-------------|---------------------------------|-------------------|----------------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A                 |
| Temperature | 25 °C                           | Relative Humidity | 60%                  |
| Pressure    | 1012 hPa                        | Test Mode         | CH00/CH39/C78(2Mbps) |
| Test Date   | March 7, 2016                   |                   |                      |

| Frequency | 20dB Bandwidth (kHz) | Result |
|-----------|----------------------|--------|
| 2402 MHz  | 1154                 | PASS   |
| 2441 MHz  | 1149                 | PASS   |
| 2480 MHz  | 1139                 | PASS   |

### CH00 -2Mbps





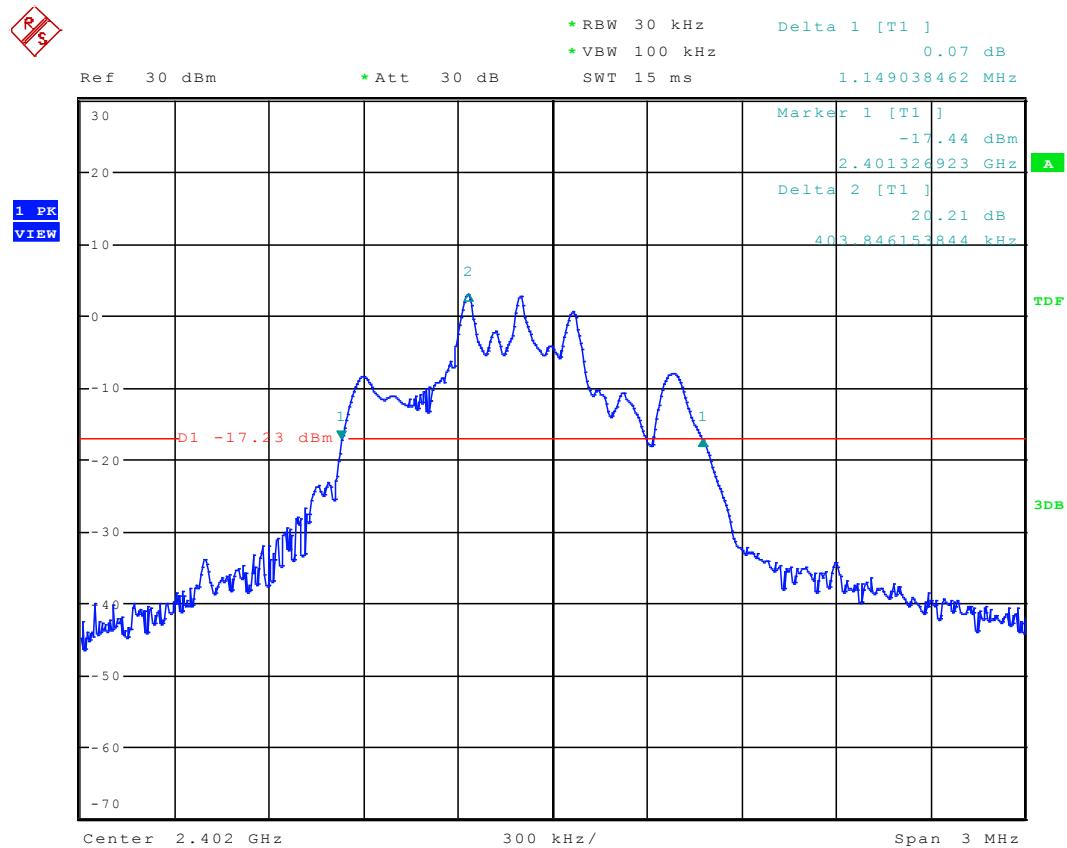


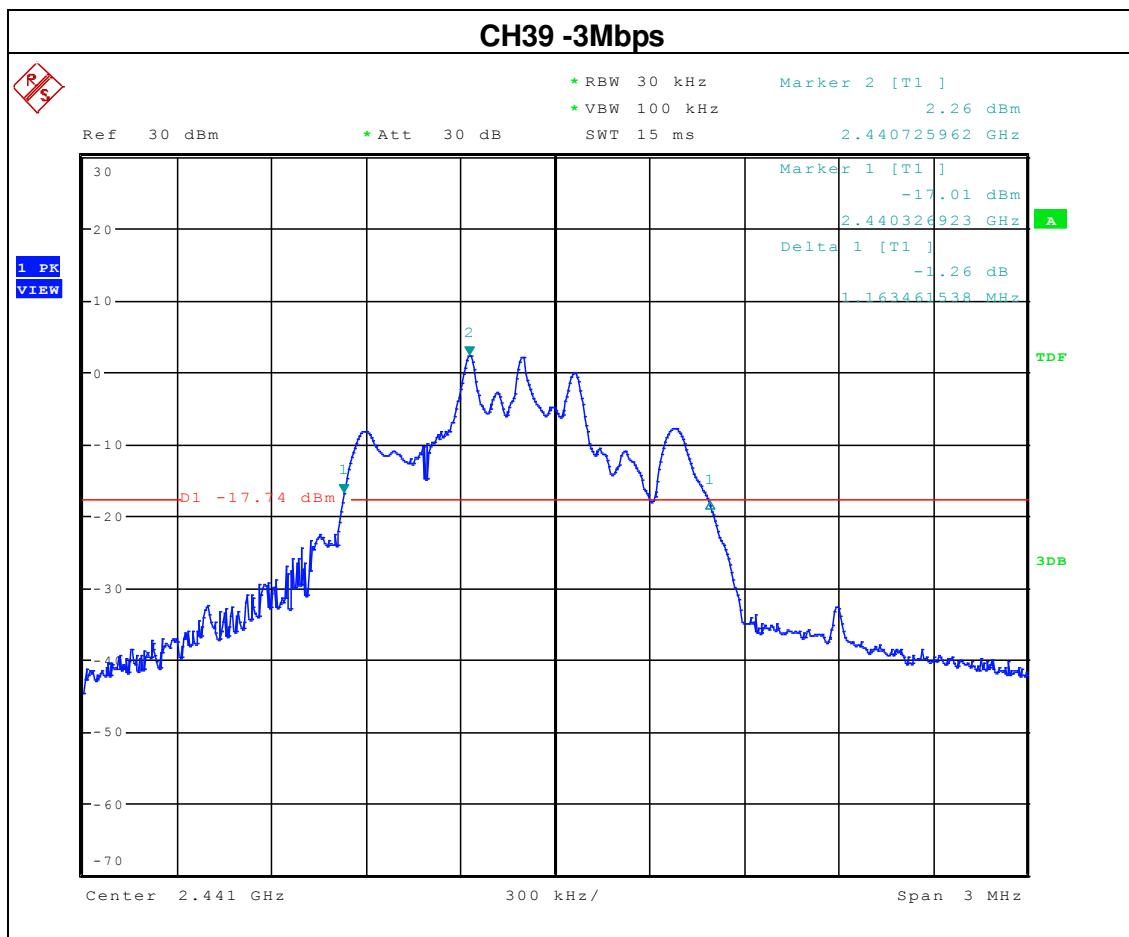
Note: **the worst case is DH5-3Mbps as result in this part.**

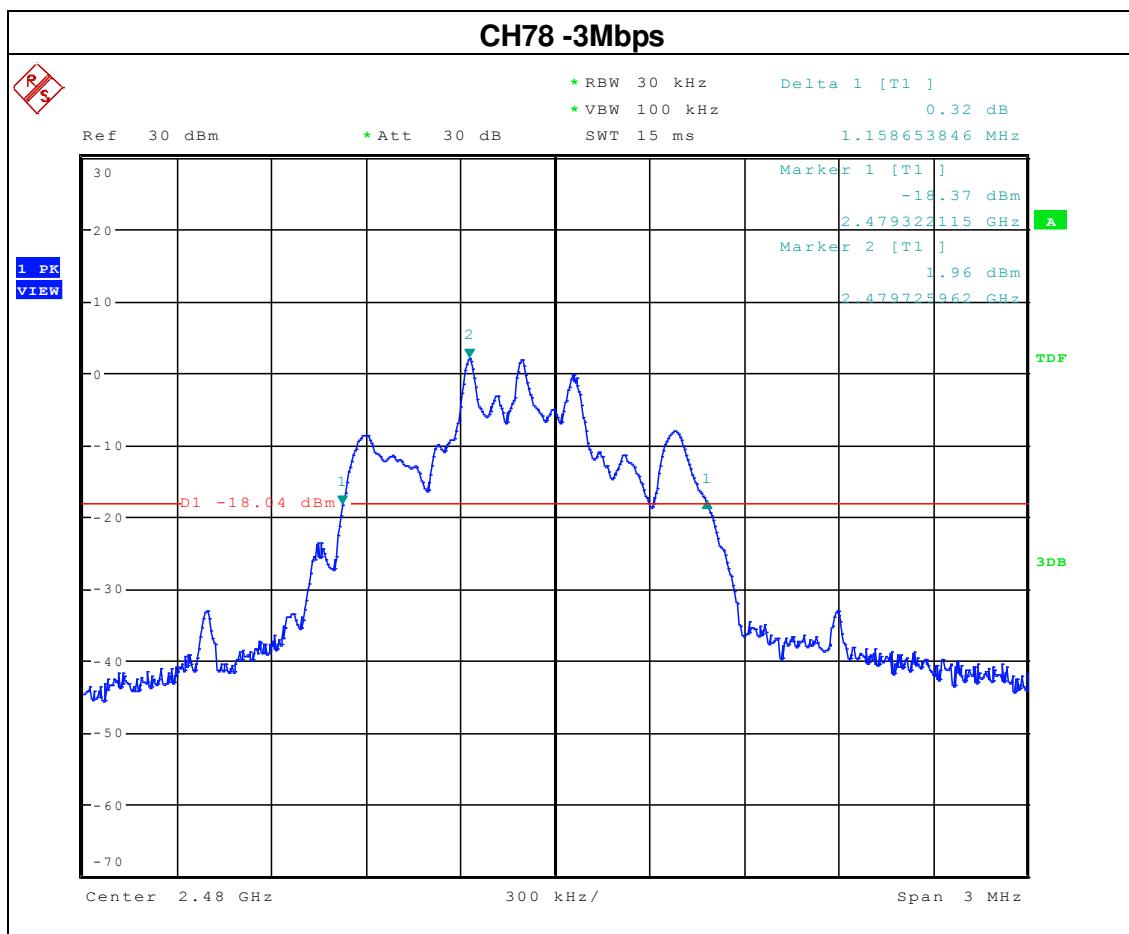
|             |                                 |                   |                      |
|-------------|---------------------------------|-------------------|----------------------|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A                 |
| Temperature | 25 °C                           | Relative Humidity | 60%                  |
| Pressure    | 1012 hPa                        | Test Mode         | CH00/CH39/C78(3Mbps) |
| Test Date   | March 7, 2016                   |                   |                      |

| Frequency | 20dB Bandwidth (kHz) | Result |
|-----------|----------------------|--------|
| 2402 MHz  | 1149                 | PASS   |
| 2441 MHz  | 1163                 | PASS   |
| 2480 MHz  | 1159                 | PASS   |

### CH00 -3Mbps







## 10. PEAK OUTPUT POWER TEST

### 10.1 APPLIED PROCEDURES / LIMIT

| FCC Part15 (15.247) , Subpart C |                   |                     |                       |        |
|---------------------------------|-------------------|---------------------|-----------------------|--------|
| Section                         | Test Item         | Limit               | Frequency Range (MHz) | Result |
| 15.247 (b)(i)                   | Peak Output Power | 0.125 w or 20.96dBm | 2400-2483.5           | PASS   |

### 10.2 TEST PROCEDURE

- The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- Setting :  $RBW \geq$  the 20 dB bandwidth of the emission being measured

Span  $\geq$  approximately 3 times the 20 dB bandwidth, centered on a hopping channel  
 $VBW \geq RBW$

Sweep = auto

Detector function = peak

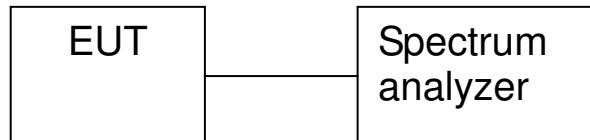
Trace = max hold

### 10.3 DEVIATION FROM STANDARD

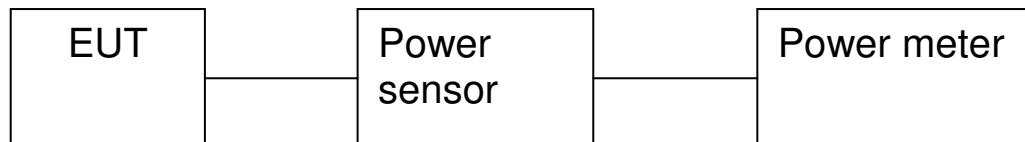
No deviation.

### 10.4 TEST SETUP

Peak power



Avg power



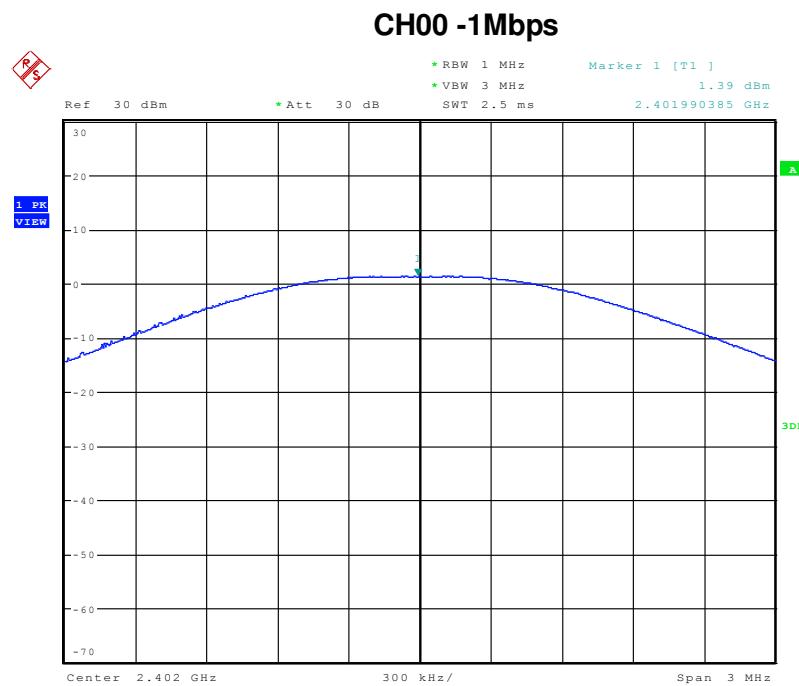
### 10.5 EUT OPERATION CONDITIONS

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.

## 10.6 TEST RESULTS

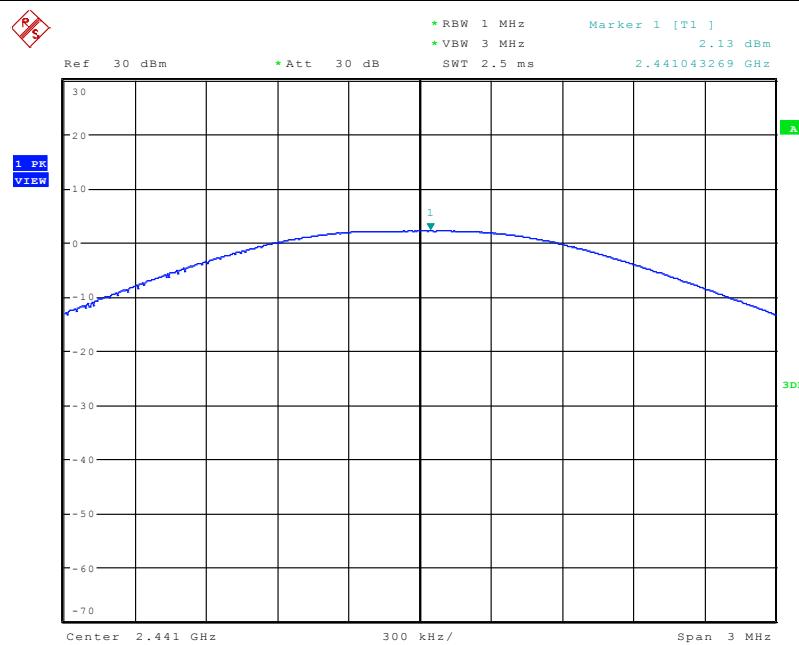
|             |                                 |                   |  |
|-------------|---------------------------------|-------------------|--|
| EUT         | Wall-Mounted Smart Home Speaker | Model Name        | FW3A                                   |
| Temperature | 25 °C                           | Relative Humidity | 60%                                    |
| Pressure    | 1012 hPa                        | Test Mode         | CH00/ CH39 /CH78<br>(1M/2M/3Mbps Mode) |
| Test Date   | December 22, 2015               |                   |  |

| Test Channel | Frequency (MHz) | Peak Output Power (dBm) | LIMIT(dBm) | Result |
|--------------|-----------------|-------------------------|------------|--------|
| <b>1Mbps</b> |                 |                         |            |        |
| CH00         | 2402            | 1.39                    | 20.96      | Pass   |
| CH39         | 2441            | 2.13                    | 20.96      | Pass   |
| CH78         | 2480            | 2.39                    | 20.96      | Pass   |
| <b>2Mbps</b> |                 |                         |            |        |
| CH00         | 2402            | -0.32                   | 20.96      | Pass   |
| CH39         | 2441            | 0.74                    | 20.96      | Pass   |
| CH78         | 2480            | 1.28                    | 20.96      | Pass   |
| <b>3Mbps</b> |                 |                         |            |        |
| CH00         | 2402            | -0.29                   | 20.96      | Pass   |
| CH39         | 2441            | 0.74                    | 20.96      | Pass   |
| CH78         | 2480            | 1.26                    | 20.96      | Pass   |

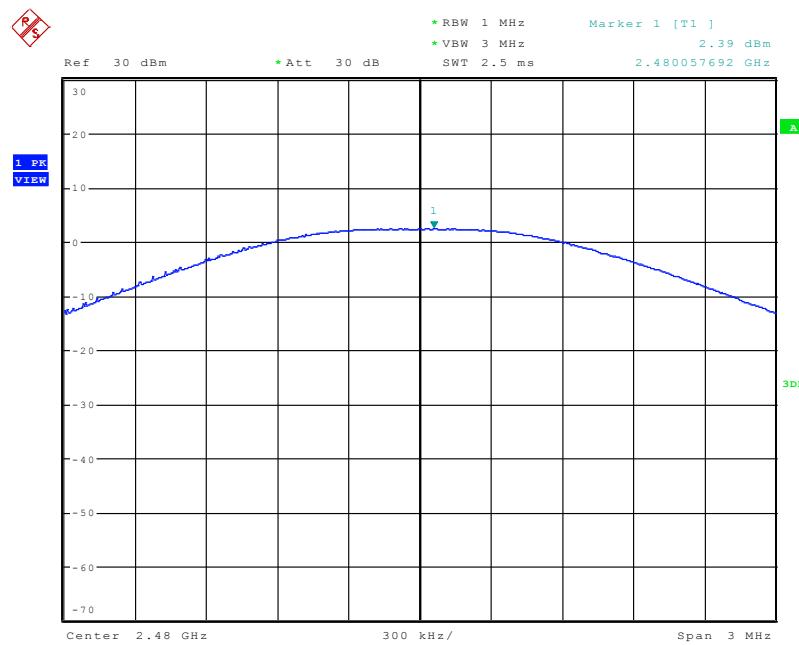


Date: 28.DEC.2015 18:37:26

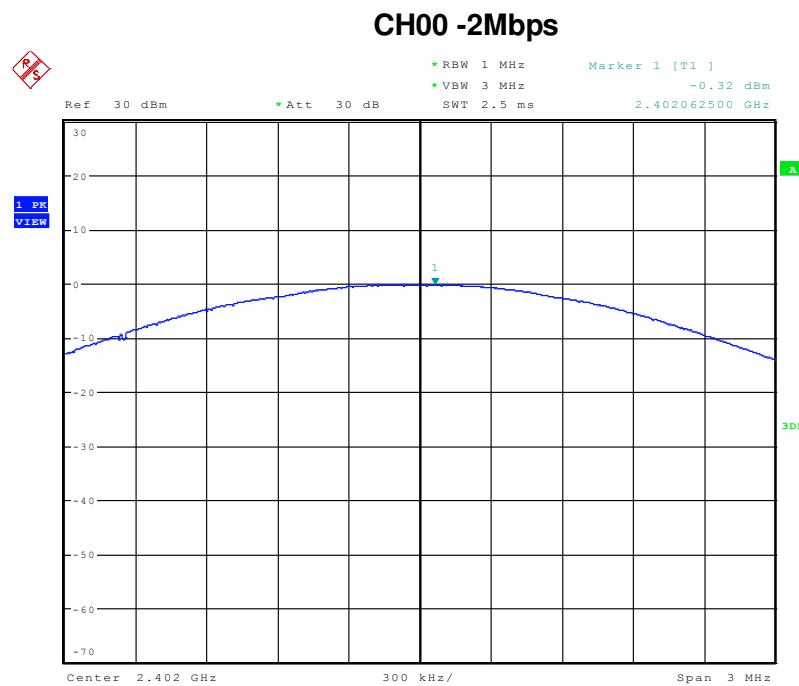
R S

**CH39 -1Mbps**

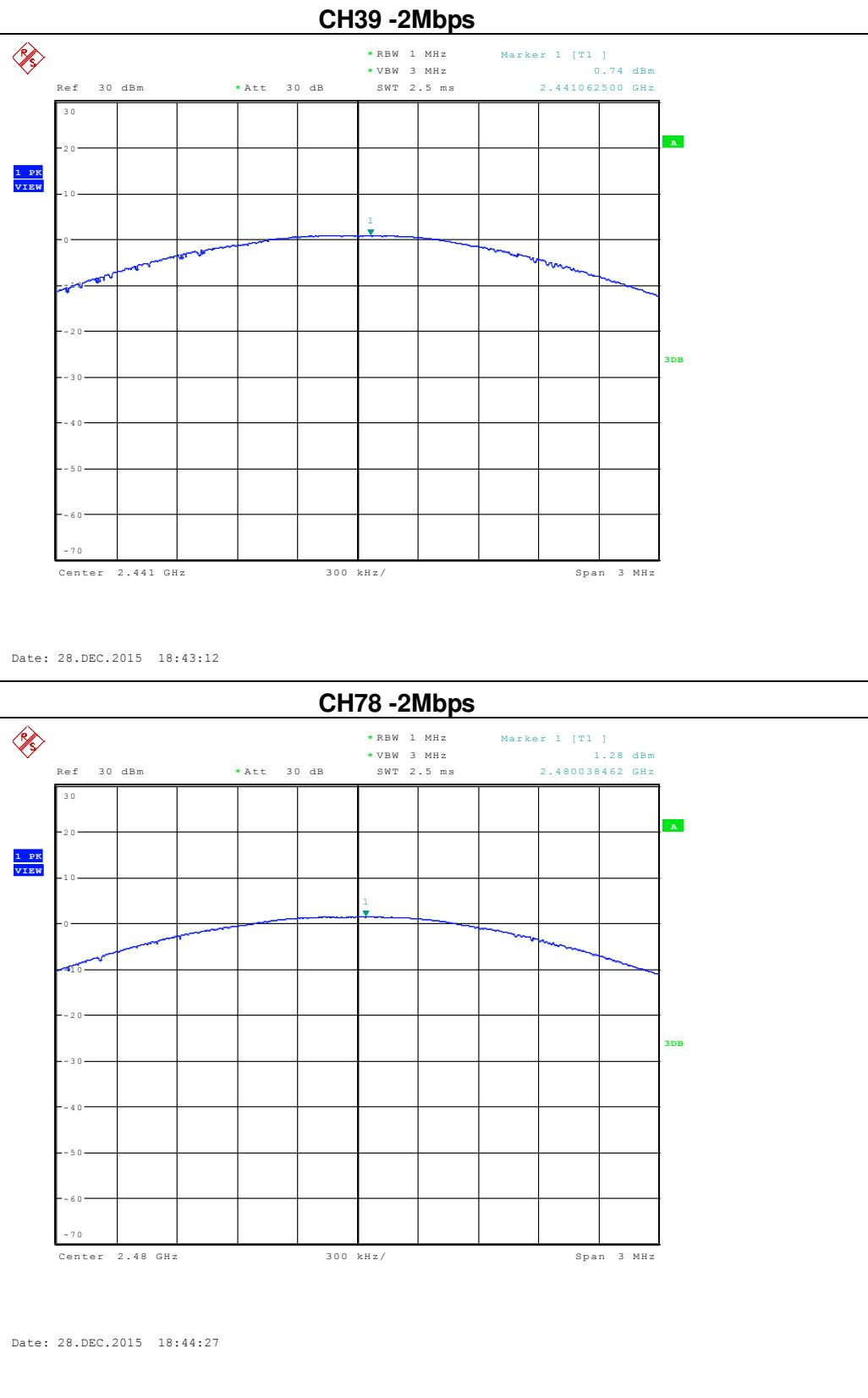
Date: 28.DEC.2015 18:35:56

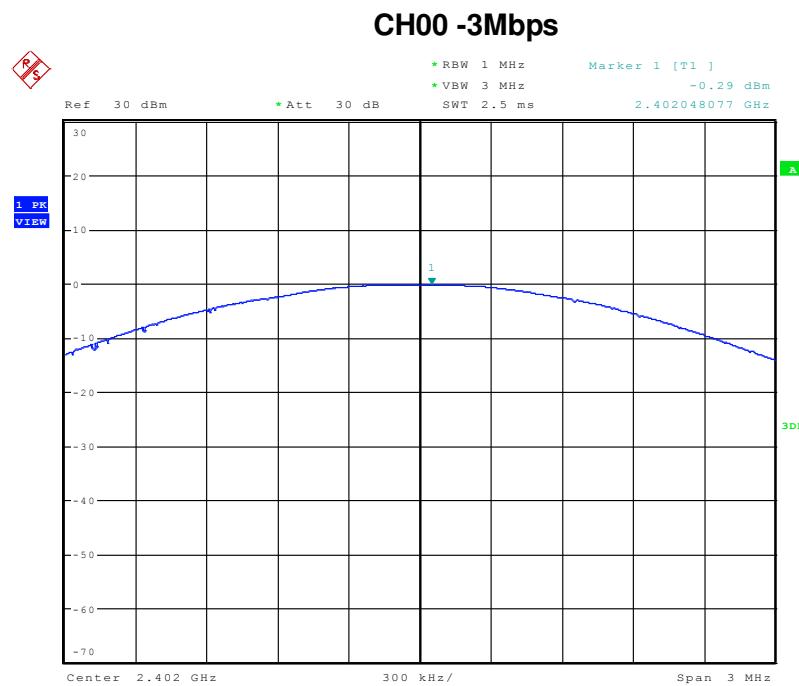
**CH78 -1Mbps**

Date: 28.DEC.2015 18:34:17

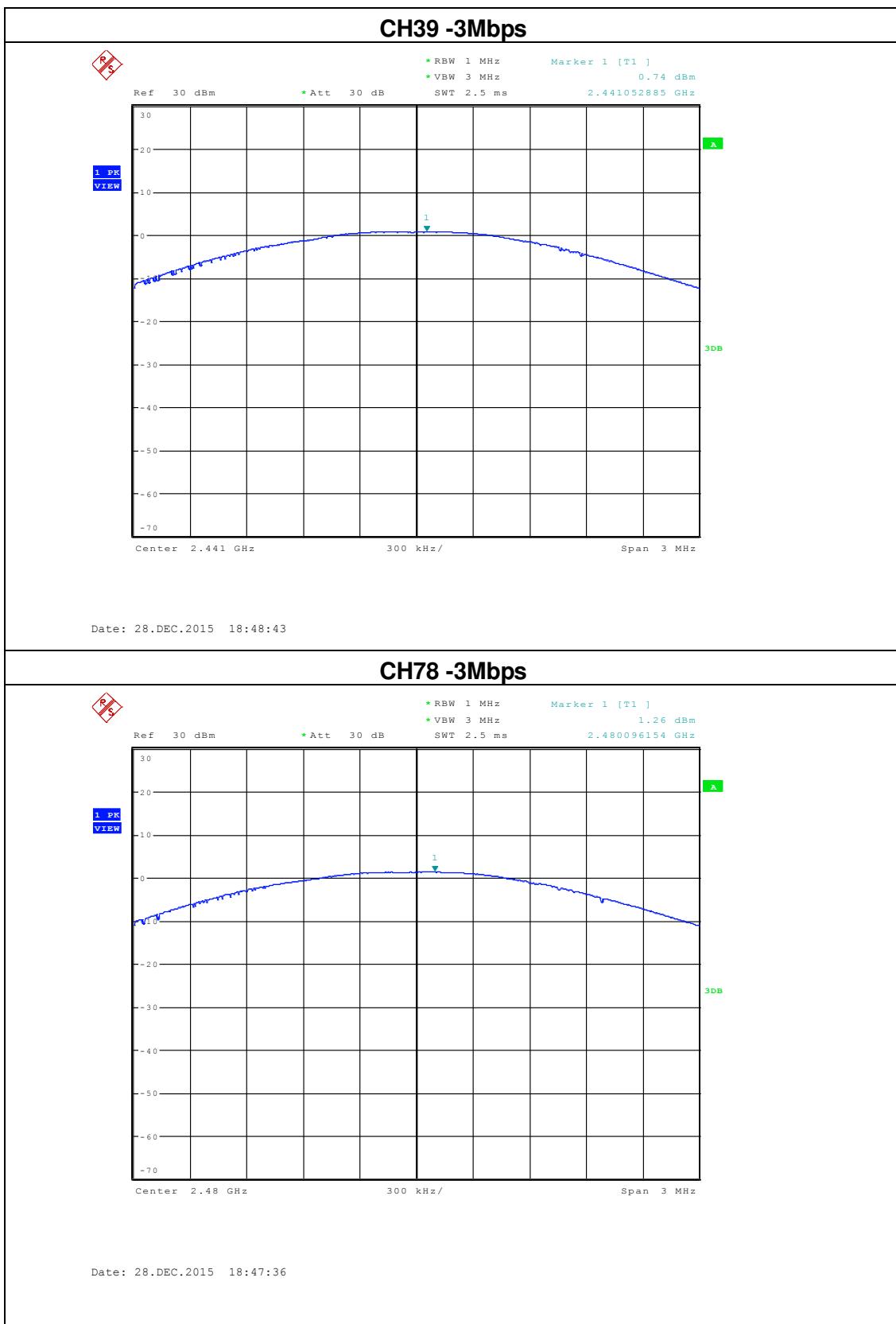


Date: 28.DEC.2015 18:39:26





Date: 28.DEC.2015 18:51:57



## 11. ANTENNA APPLICATION

### 11.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247

FCC part 15C section 15.247 requirements: Systems operating in the 2402-2480MHz band that are used exclusively for fixed.

### 11.2 Result

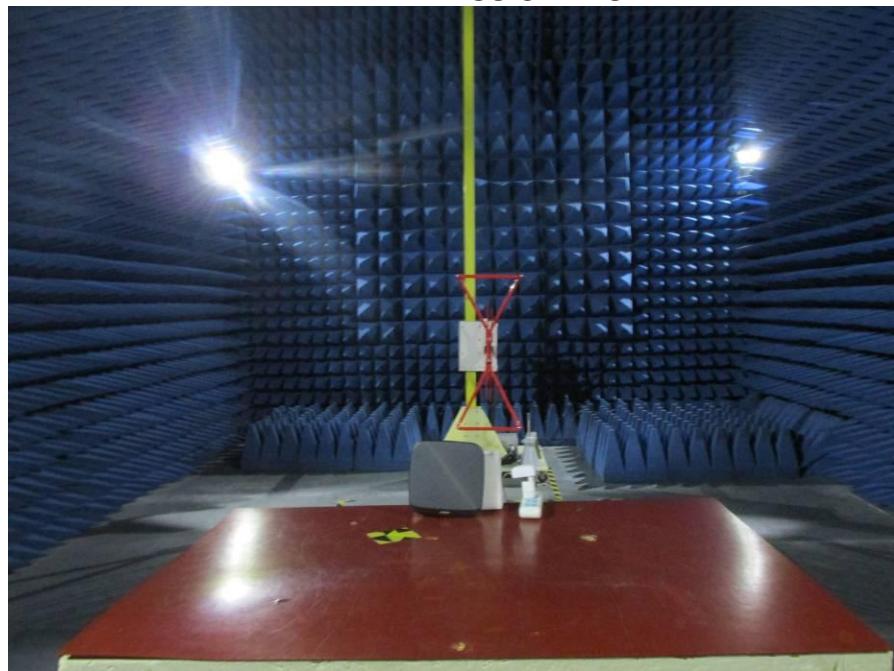
The EUT's antenna integrated on PCB, The antenna's gain is 0dBi and meets the requirement.

## 12. EUT TEST PHOTO

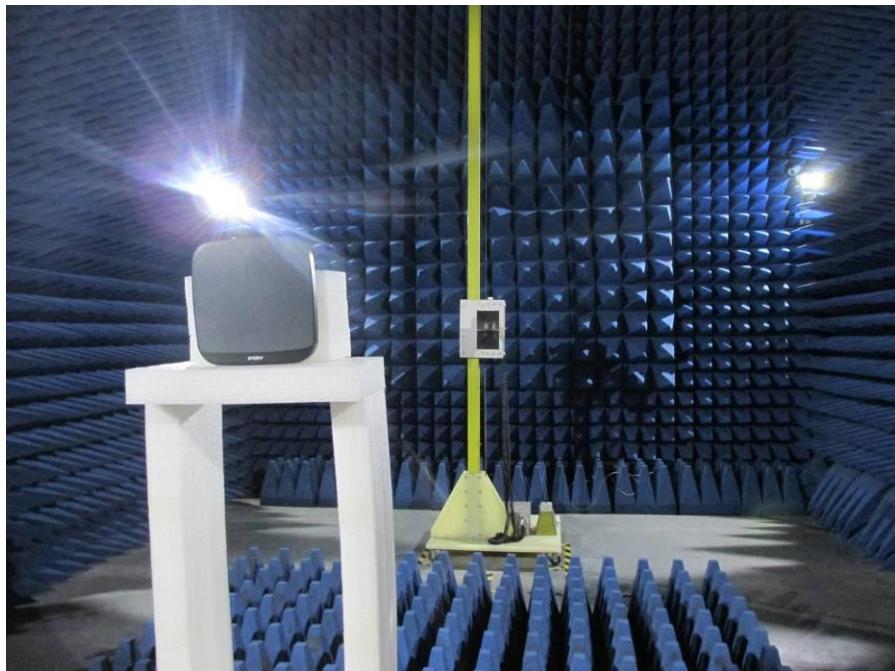
CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



RADIATED EMISSION TEST



### 13. PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



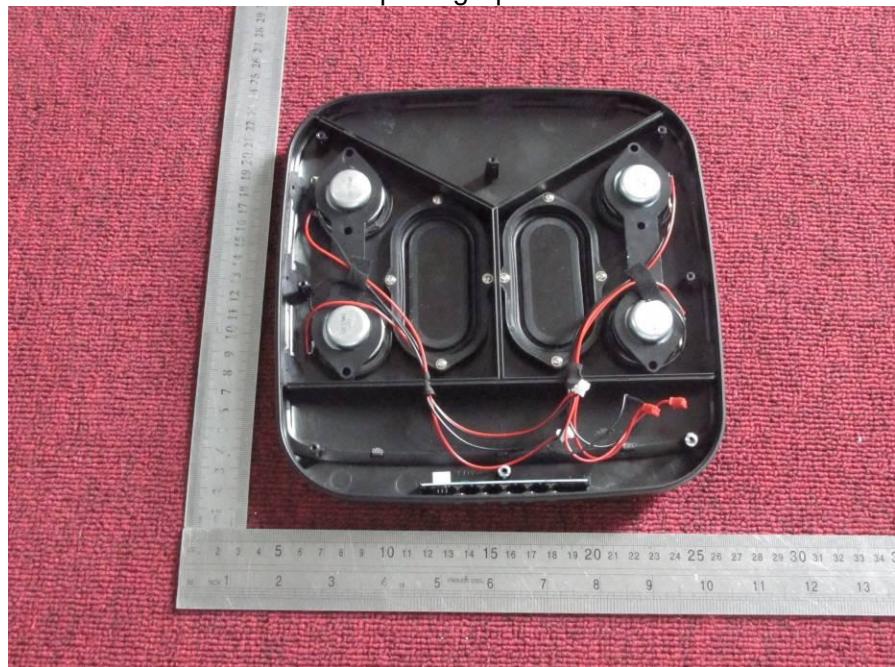
Appearance photograph of EUT



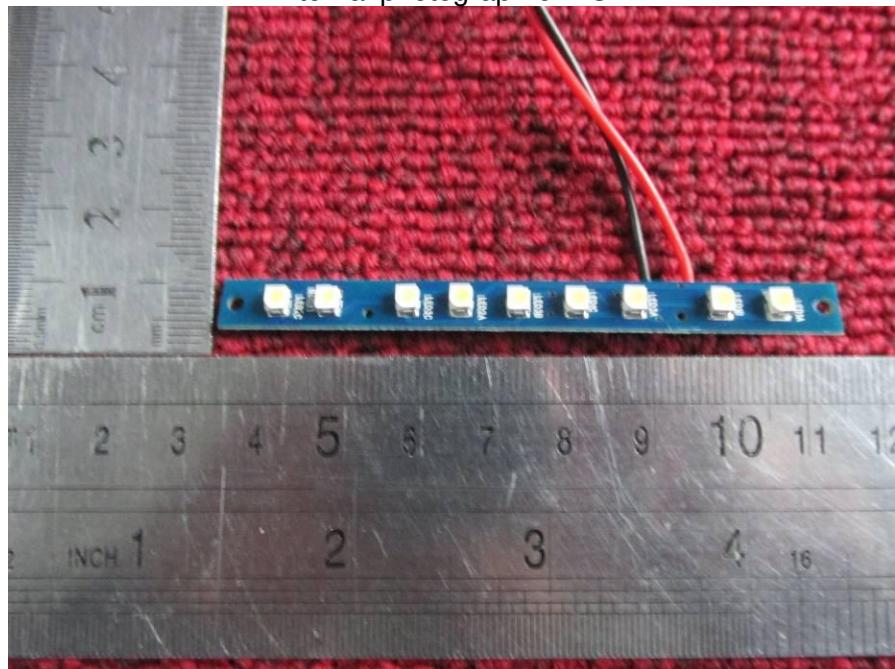
Internal photograph of EUT



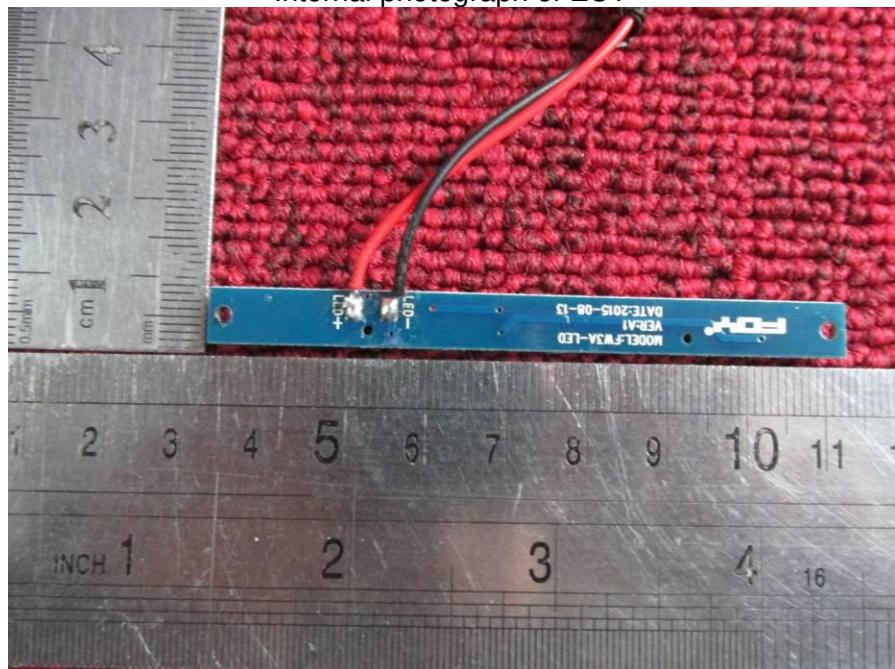
Internal photograph of EUT



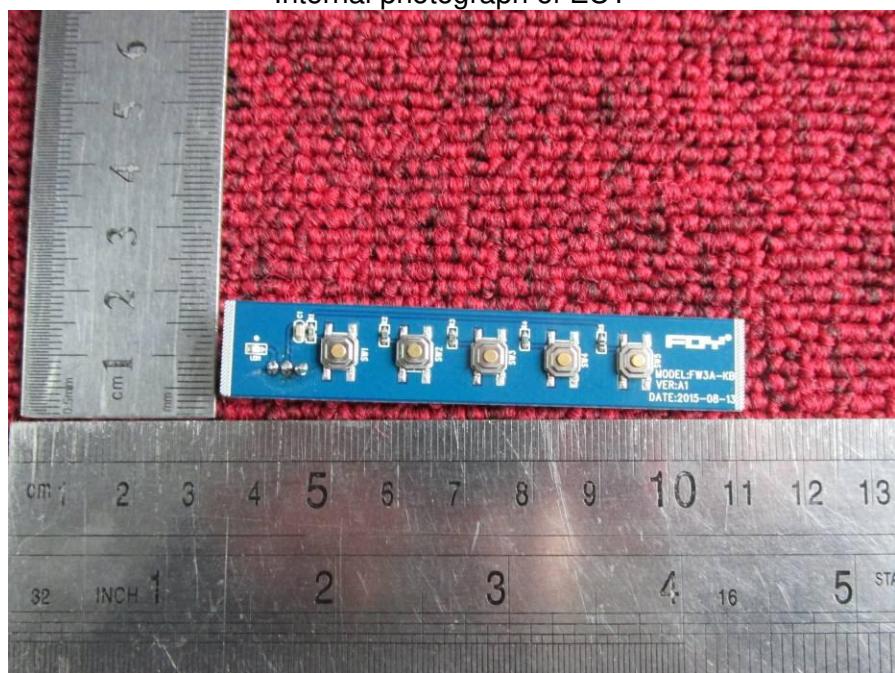
Internal photograph of EUT



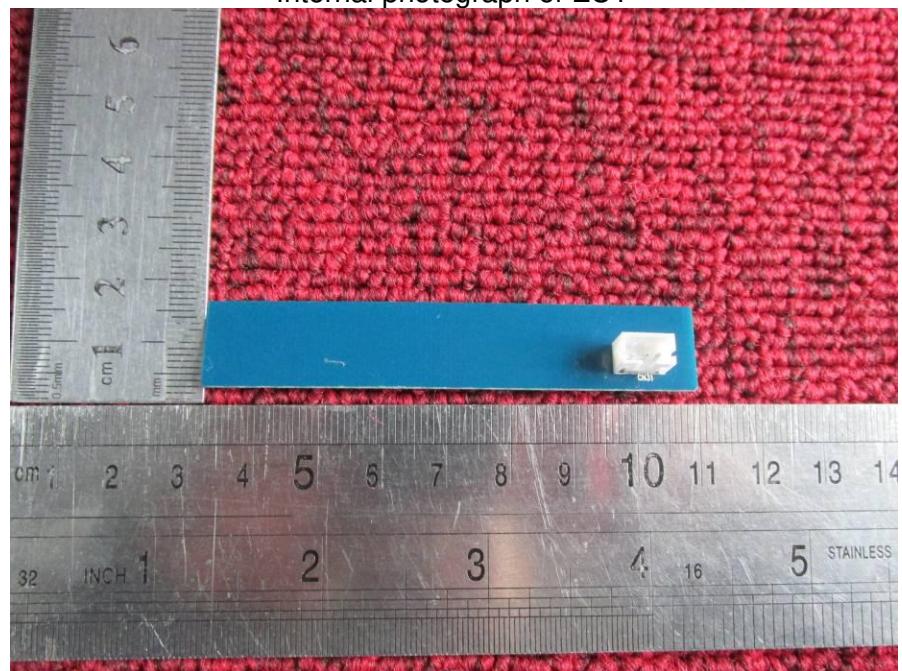
Internal photograph of EUT



Internal photograph of EUT



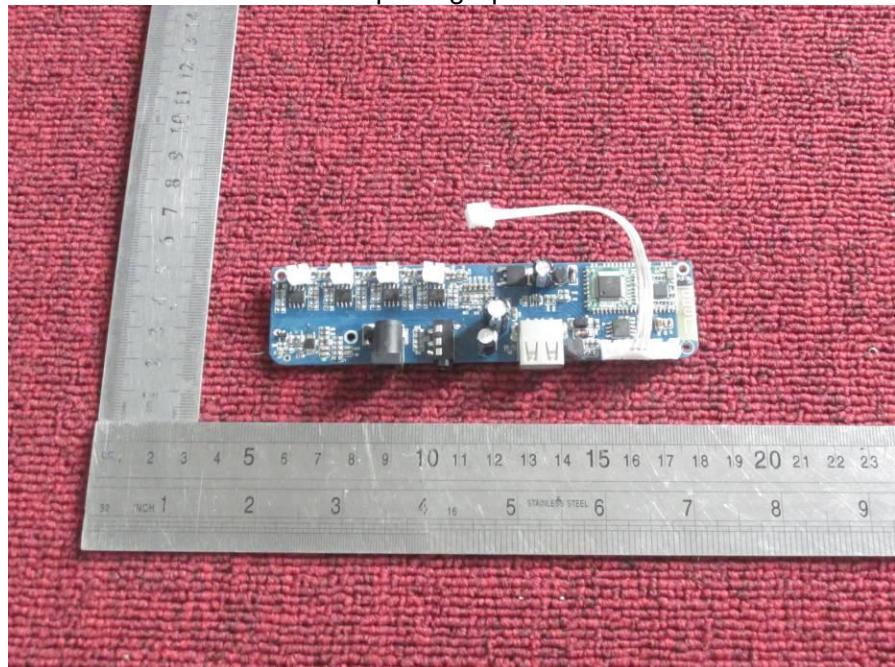
Internal photograph of EUT



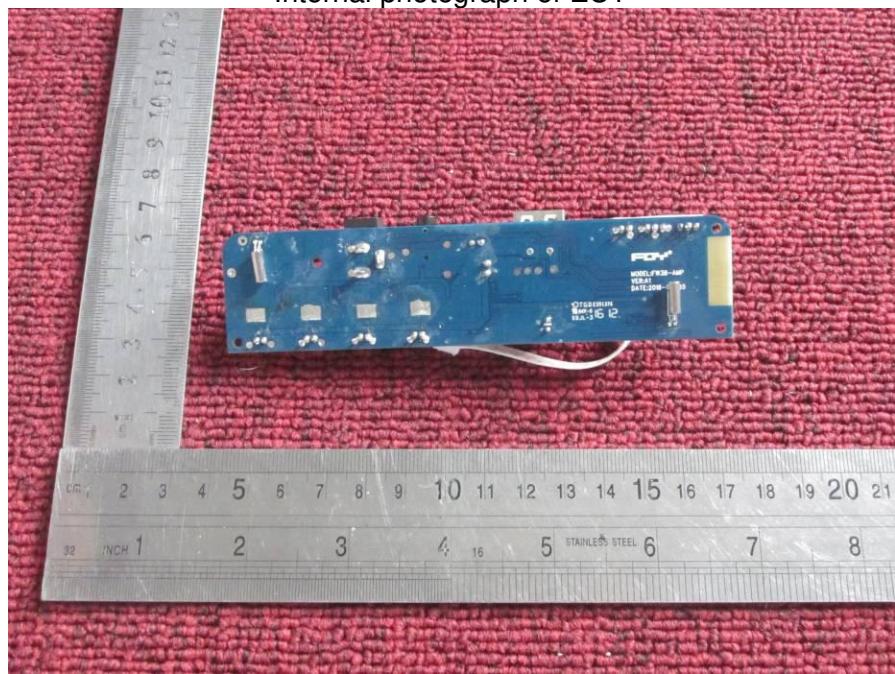
Internal photograph of EUT



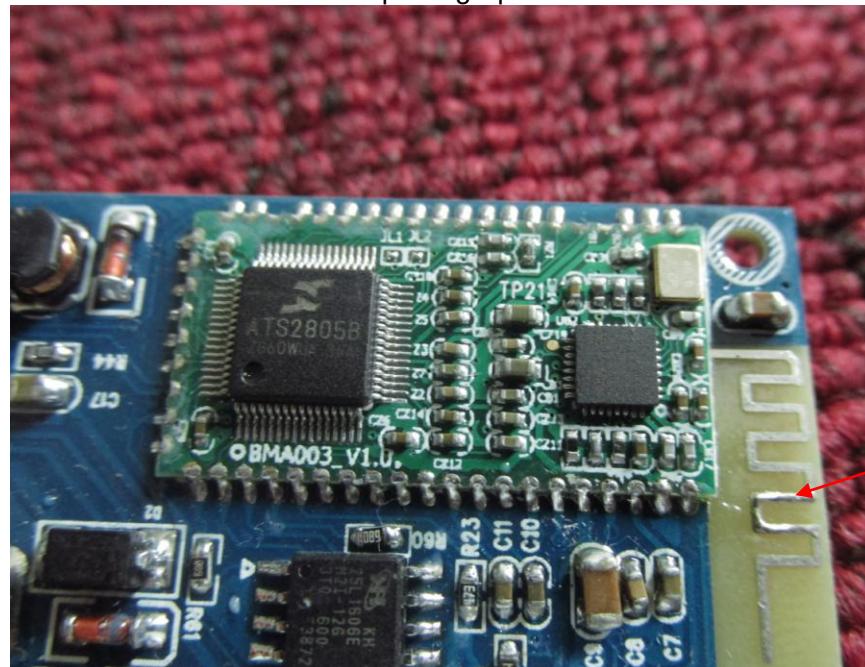
Internal photograph of EUT



Internal photograph of EUT



Internal photograph of EUT



—END OF REPORT—