# APPLICATION CERTIFICATION
On Behalf of
ATake Digital Technology Shenzhen Co., Ltd

Wireless Floating Speaker
Model No.: ASP-689

FCC ID: WWLASP-689

| | | |
|---|---|---|
| Prepared for | : | ATake Digital Technology Shenzhen Co., Ltd |
| Address | : | 13th Building, The 4th Industry Park, Han Shui Ko, Ko, ShenZhen, China |
| Prepared by | : | ACCURATE TECHNOLOGY CO. LTD |
| Address | : | F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China<br><br>Tel: (0755) 26503290<br>Fax: (0755) 26503396 |

| | | |
|---|---|---|
| Report Number | : | ATE20131947 |
| Date of Test | : | September 10-11, 2013 |
| Date of Report | : | September 16, 2013 |

# TABLE OF CONTENTS

Description Page

# Test Report Certification

| | | |
|---|---|---|
| Applicant | : | ATake Digital Technology Shenzhen Co., Ltd |
| Manufacturer | : | ATake Digital Technology Shenzhen Co., Ltd |
| EUT Description | : | Wireless Floating Speaker |

(A) MODEL NO.: ASP-689

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 3.7V (Li-polymer battery) or DC 5V (Power by USB port)

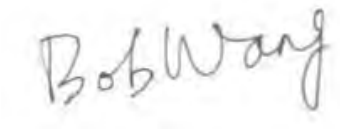
(D) Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.4- 2009

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C Section 15.247 limits. The measurement results are contained in this test report and ACCURATE TECHNOLOGY CO. LTD is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : September 10-11, 2013

Prepared by : 

(Engineer)

Approved & Authorized Signer : 

(Manager)

# 1. GENERAL INFORMATION

## 1.1.Description of Device (EUT)

| | | |
|---|---|---|
| EUT | : | Wireless Floating Speaker |
| Model Number | : | ASP-689 |
| Frequency Band | : | 2402MHz-2480MHz |
| Number of Channels | : | 79 |
| Modulation type | : | GFSK, Π/4-DQPSK, 8DPSK |
| Antenna Gain | : | 0dBi |
| Antenna type | : | PCB Antenna |
| Power Supply | : | DC 3.7V (Li-polymer battery) or DC 5V (Power by USB port) |
| Applicant | : | ATake Digital Technology Shenzhen Co., Ltd |
| Address | : | 13th Building, The 4th Industry Park, Han Shui Ko, Ko, ShenZhen, China |
| Manufacturer | : | ATake Digital Technology Shenzhen Co., Ltd |
| Address | : | 13th Building, The 4th Industry Park, Han Shui Ko, Ko, ShenZhen, China |
| Date of sample received | : | September 6, 2013 |
| Date of Test | : | September 10-11, 2013 |

## 1.2.Description of Test Facility

| | | |
|---|---|---|
| EMC Lab | : | Accredited by TUV Rheinland Shenzhen<br><br>Listed by FCC<br>The Registration Number is 752051<br><br>Listed by Industry Canada<br>The Registration Number is 5077A-2<br><br>Accredited by China National Accreditation Committee for Laboratories<br>The Certificate Registration Number is L3193 |
| Name of Firm | : | ACCURATE TECHNOLOGY CO. LTD |
| Site Location | : | F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China |

## 1.3.Measurement Uncertainty

| | | |
|---|---|---|
| Conducted Emission Expanded Uncertainty | = | 2.23dB, k=2 |
| Radiated emission expanded uncertainty (9kHz-30MHz) | = | 3.08dB, k=2 |
| Radiated emission expanded uncertainty (30MHz-1000MHz) | = | 4.42dB, k=2 |
| Radiated emission expanded uncertainty (Above 1GHz) | = | 4.06dB, k=2 |

# 2. MEASURING DEVICE AND TEST EQUIPMENT

**Table 1: List of Test and Measurement Equipment**

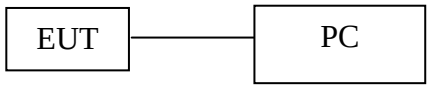
| Kind of equipment | Manufacturer | Type | S/N | Calibrated dates | Calibrated until |
|---|---|---|---|---|---|
| EMI Test Receiver | Rohde&Schwarz | ESCS30 | 100307 | Jan. 12, 2013 | Jan. 11, 2014 |
| EMI Test Receiver | Rohde&Schwarz | ESPI3 | 101526/003 | Jan. 12, 2013 | Jan. 11, 2014 |
| Spectrum Analyzer | Agilent | E7405A | MY45115511 | Jan. 12, 2013 | Jan. 11, 2014 |
| Pre-Amplifier | Rohde&Schwarz | CBLU1183540-01 | 3791 | Jan. 12, 2013 | Jan. 11, 2014 |
| Loop Antenna | Schwarzbeck | FMZB1516 | 1516131 | Feb. 06, 2013 | Feb. 05, 2014 |
| Bilog Antenna | Schwarzbeck | VULB9163 | 9163-323 | Feb. 06, 2013 | Feb. 05, 2014 |
| Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-655 | Feb. 06, 2013 | Feb. 05, 2014 |
| Horn Antenna | Schwarzbeck | BBHA9120D | 9120D-1067 | Feb. 06, 2013 | Feb. 05, 2014 |
| LISN | Rohde&Schwarz | ESH3-Z5 | 100305 | Jan. 12, 2013 | Jan. 11, 2014 |
| LISN | Schwarzbeck | NSLK8126 | 8126431 | Jan. 12, 2013 | Jan. 11, 2014 |

# 3. OPERATION OF EUT DURING TESTING

## 3.1.Operating Mode

The mode is used: Transmitting mode
Low Channel: 2402MHz
Middle Channel: 2441MHz
High Channel: 2480MHz
Hopping

## 3.2.Configuration and peripherals



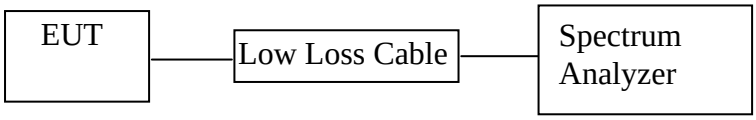

(EUT: Wireless Floating Speaker)

# 4. TEST PROCEDURES AND RESULTS

| **FCC Rules** | **Description of Test** | **Result** |
|---|---|---|
| Section 15.207 | Conducted Emission Test | Compliant |
| Section 15.247(a)(1) | 20dB Bandwidth Test | Compliant |
| Section 15.247(a)(1) | Carrier Frequency Separation Test | Compliant |
| Section 15.247(a)(1)(iii) | Number Of Hopping Frequency Test | Compliant |
| Section 15.247(a)(1)(iii) | Dwell Time Test | Compliant |
| Section 15.247(b)(1) | Maximum Peak Output Power Test | Compliant |
| Section 15.247(d)<br>Section 15.209 | Radiated Emission Test | Compliant |
| Section 15.247(d) | Band Edge Compliance Test | Compliant |
| Section 15.203 | Antenna Requirement | Compliant |

# 5. 20DB BANDWIDTH TEST

## 5.1.Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 5.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

## 5.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 5.4.Operating Condition of EUT

5.4.1.Setup the EUT and simulator as shown as Section 5.1.

5.4.2.Turn on the power of all equipment.

5.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

## 5.5.Test Procedure

5.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

5.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz.

5.5.3.The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

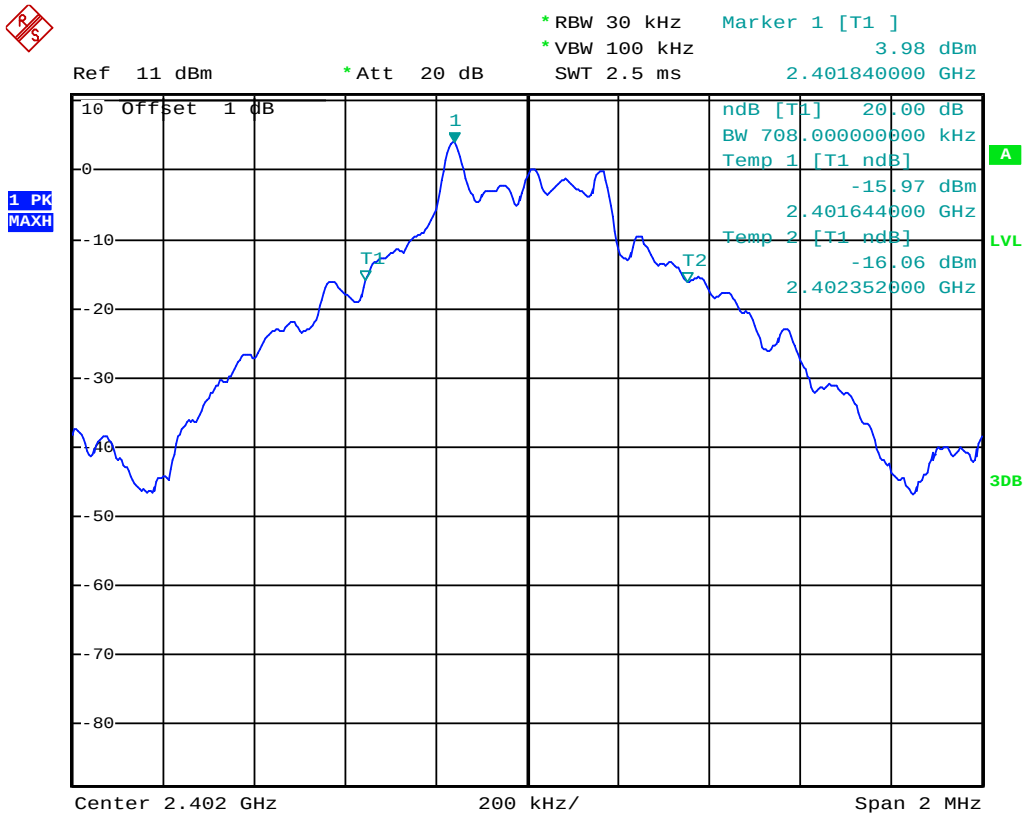
## 5.6.Test Result

| Channel | Frequency (MHz) | GFSK 20dB Bandwidth (MHz) | Π/4-DQPSK 20dB Bandwidth (MHz) | 8DPSK 20dB Bandwidth (MHz) | Result |
|---|---|---|---|---|---|
| Low | 2402 | 0.708 | 1.116 | 1.160 | Pass |
| Middle | 2441 | 0.704 | 1.116 | 1.164 | Pass |
| High | 2480 | 0.704 | 1.112 | 1.164 | Pass |

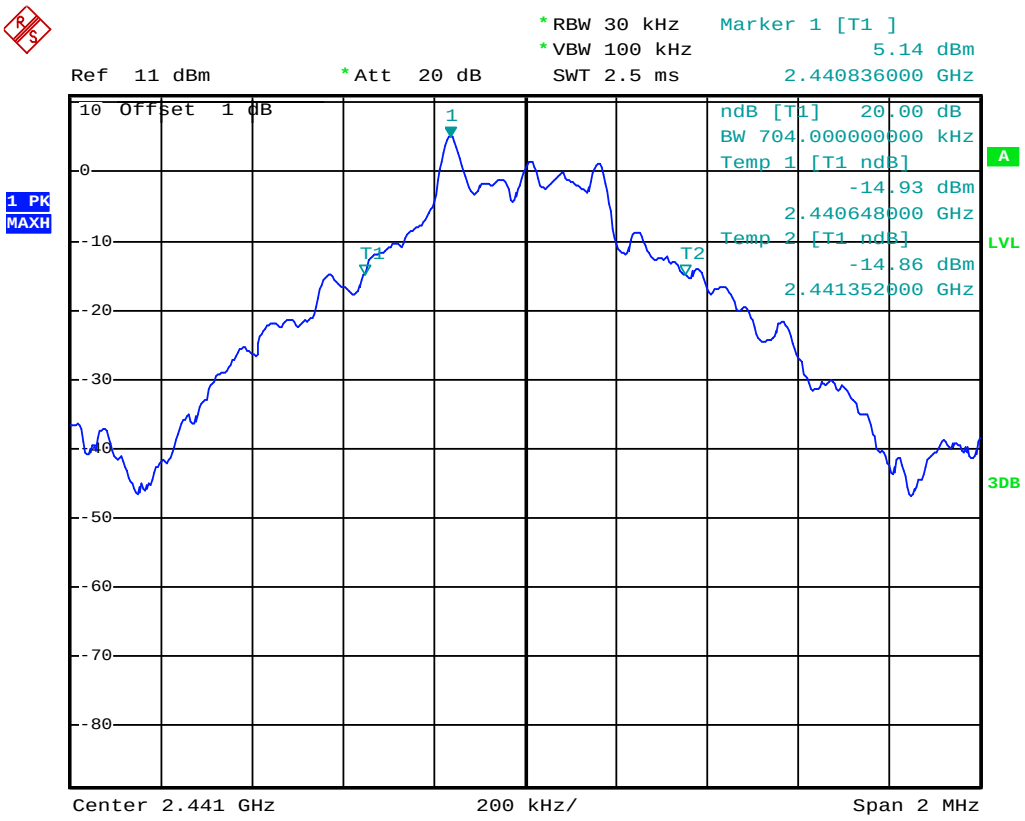
The spectrum analyzer plots are attached as below.

GFSK Mode

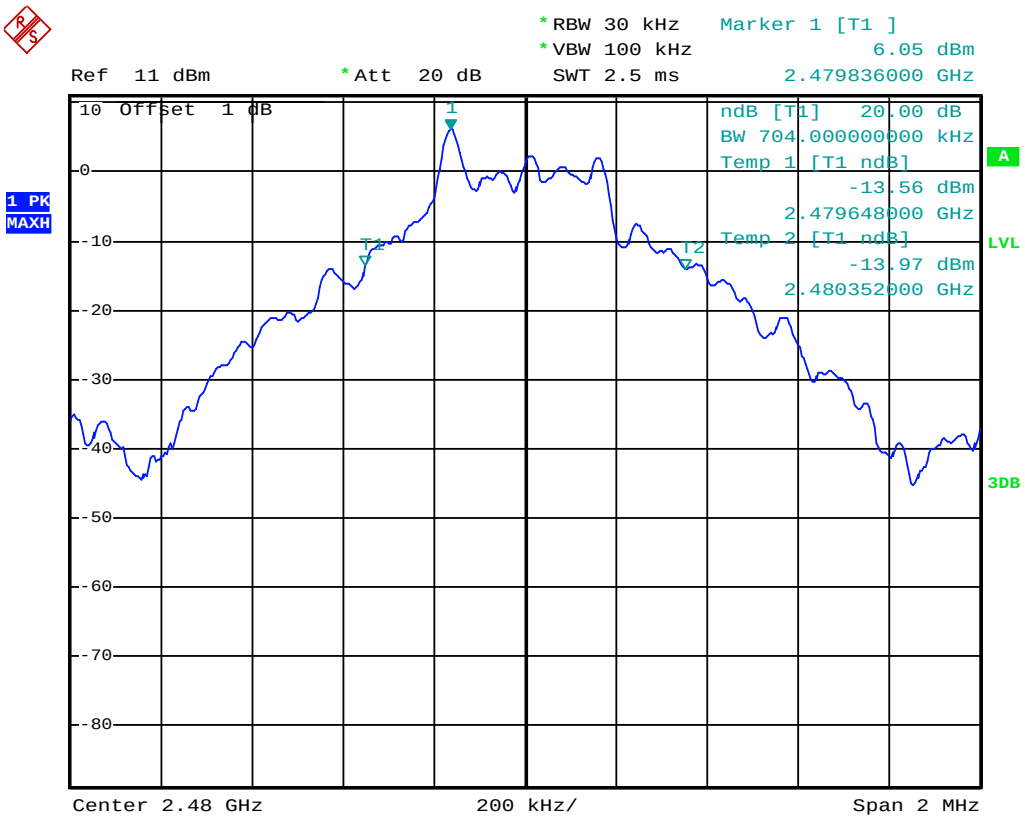
Low channel



Middle channel

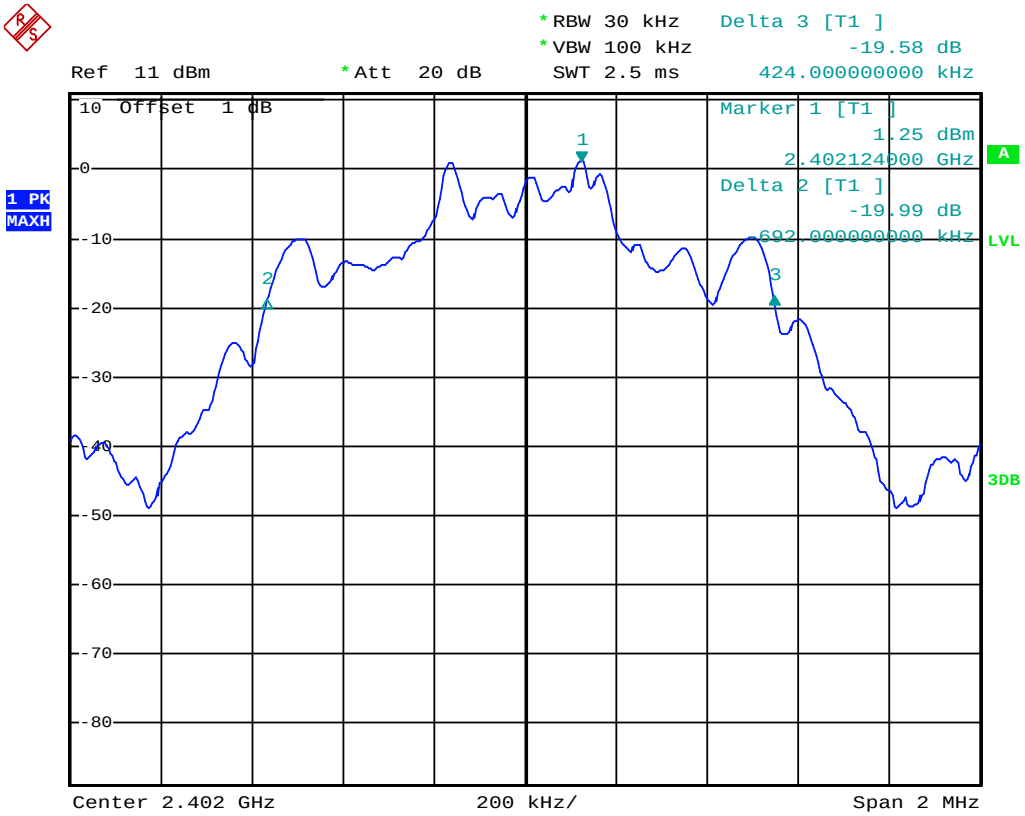


High channel

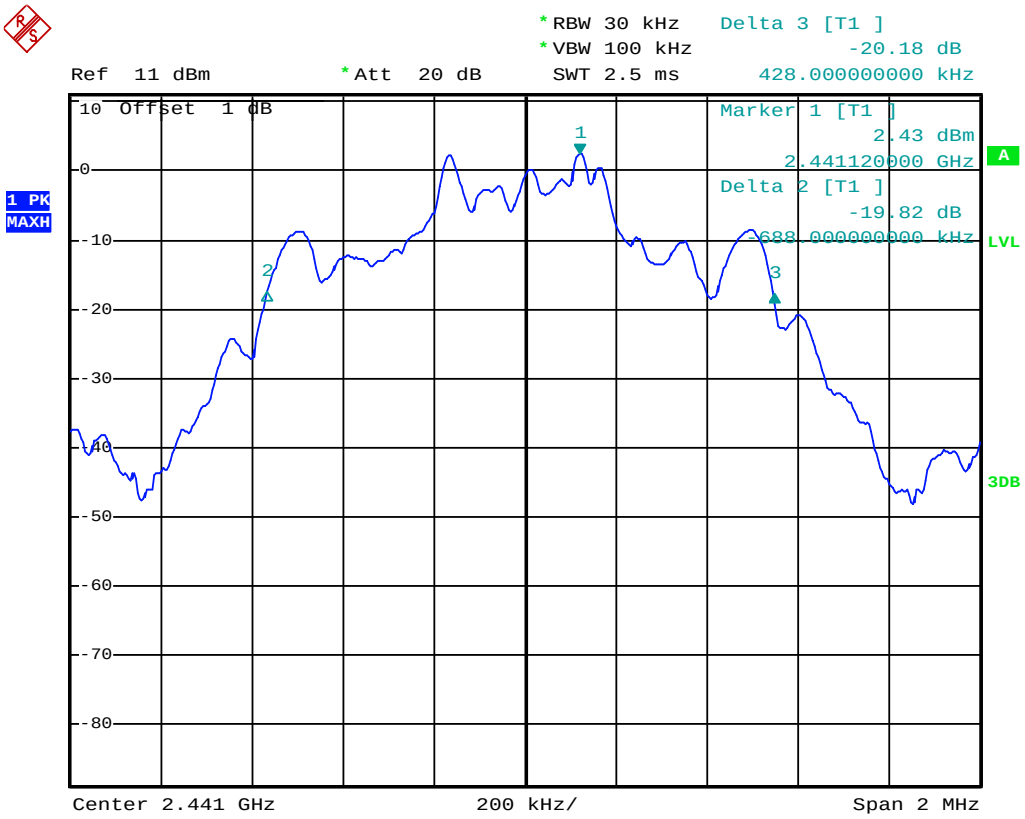


## Π/4-DQPSK Mode

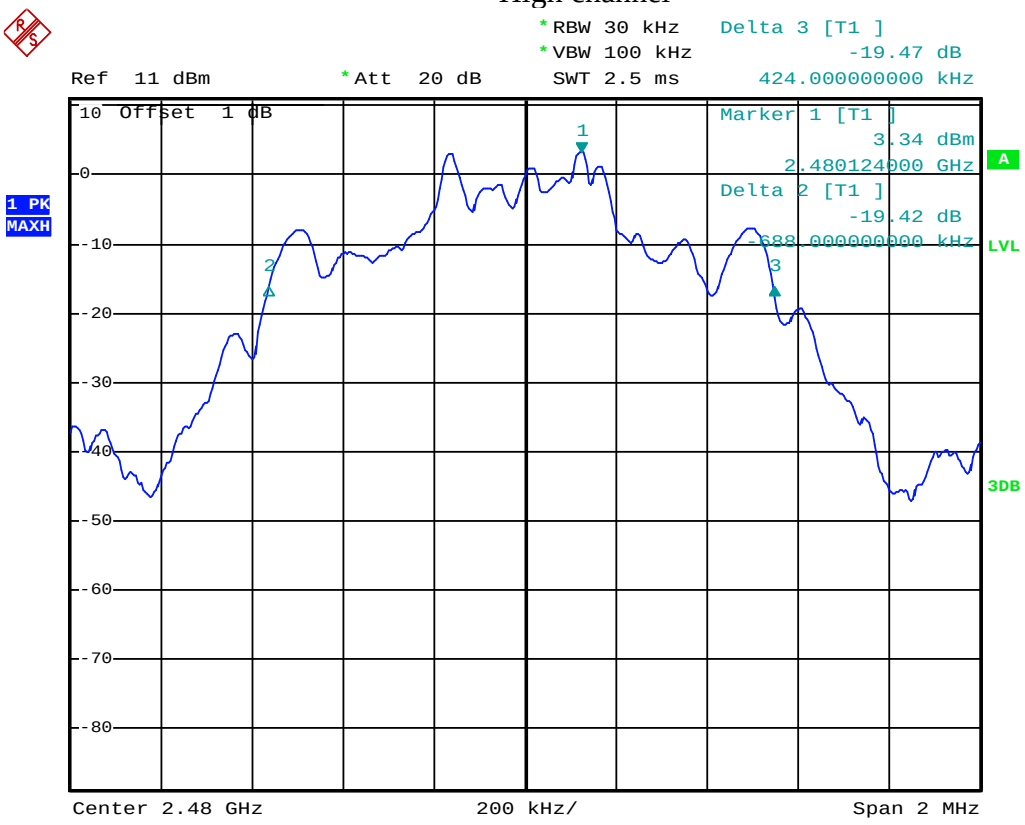
Low channel



Middle channel

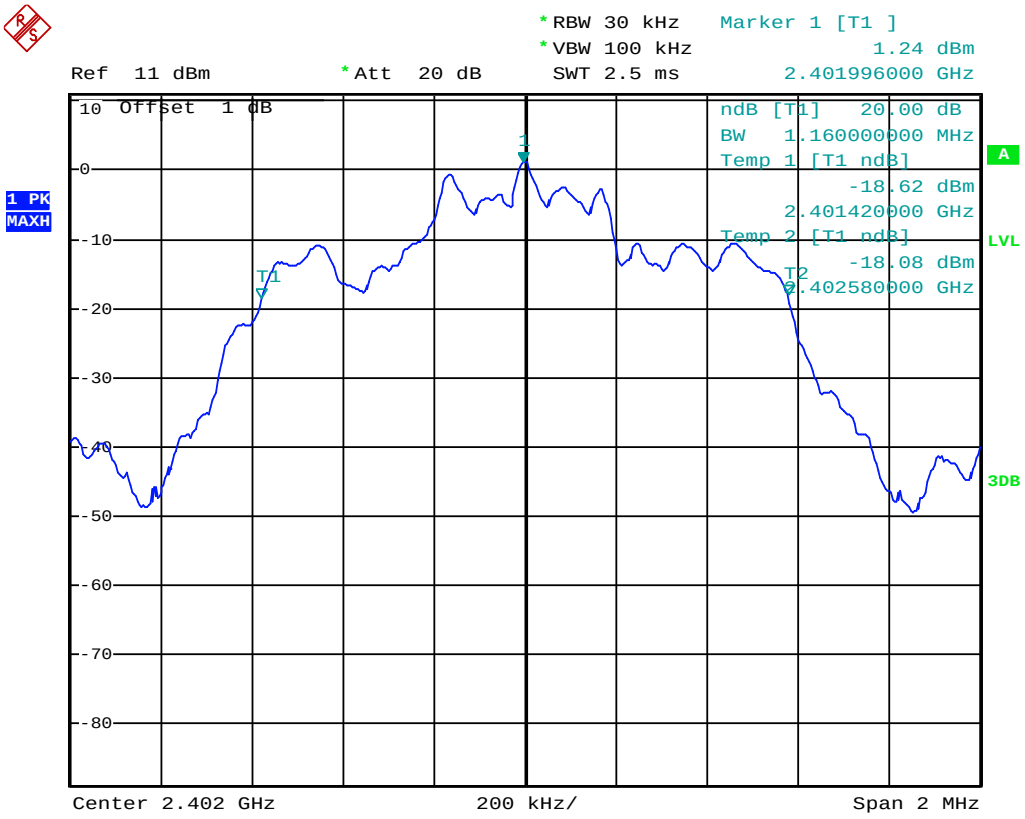


High channel

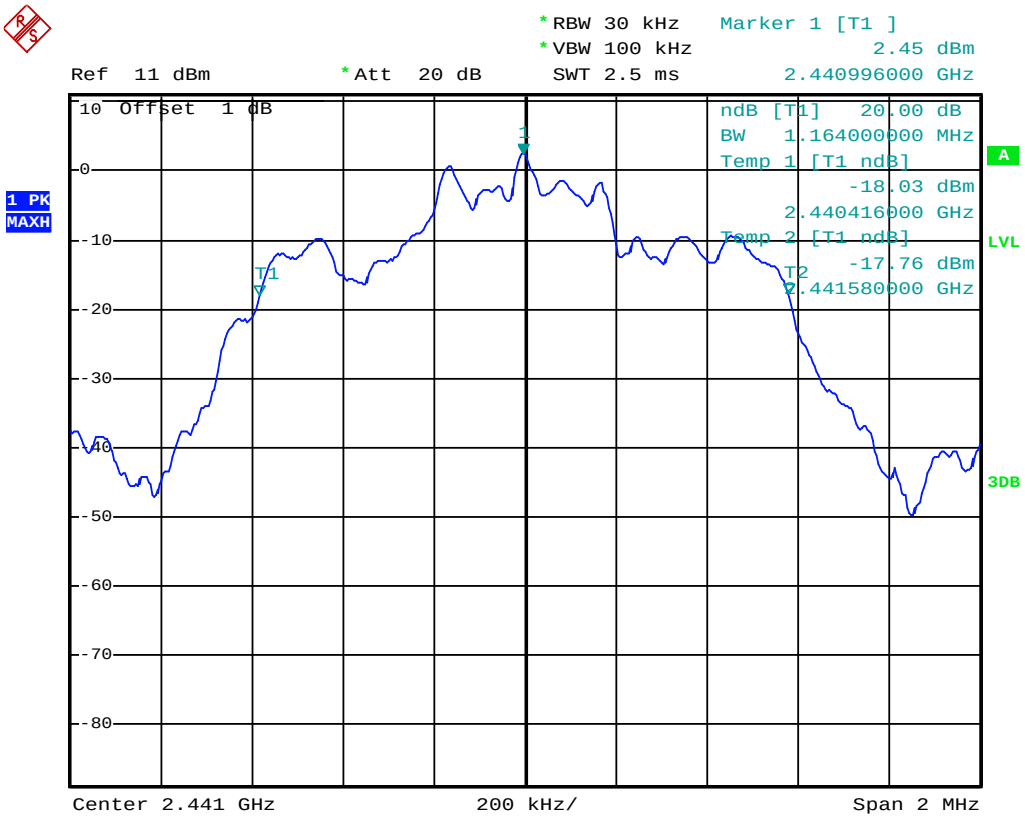


8DPSK Mode

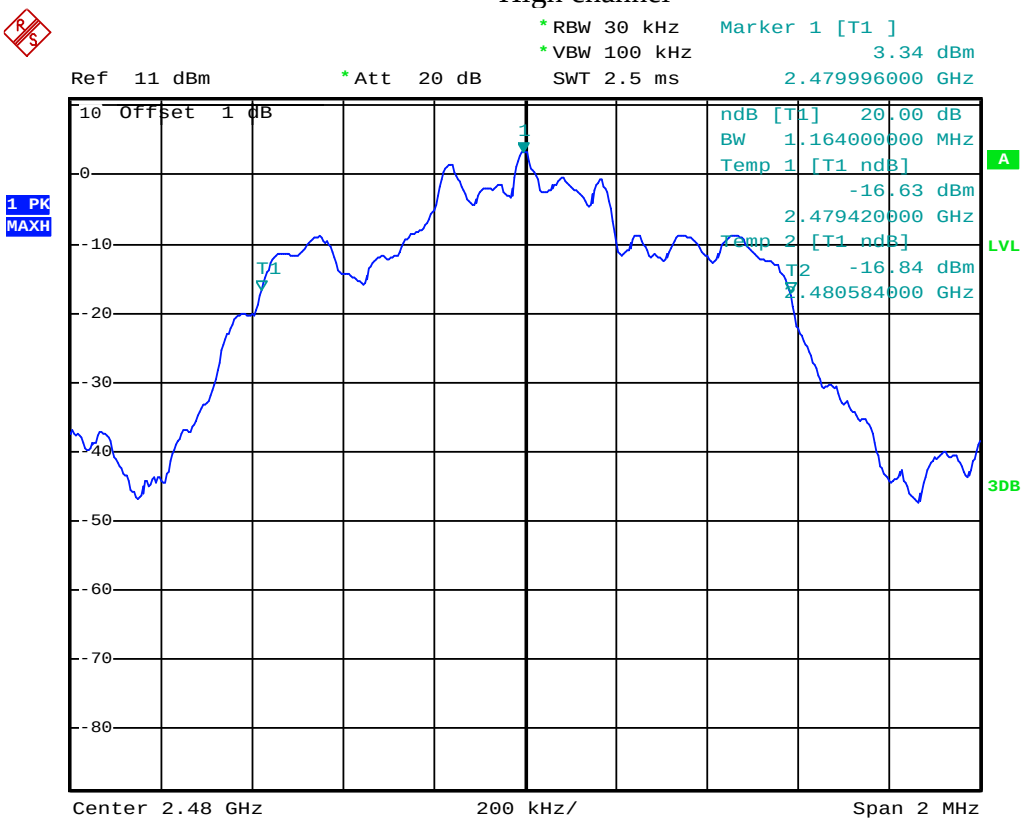
Low channel



Middle channel

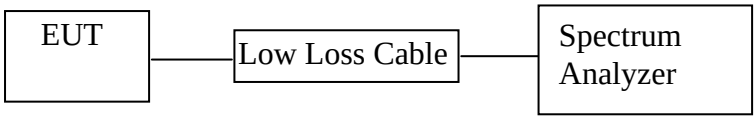


High channel



# 6. CARRIER FREQUENCY SEPARATION TEST

## 6.1.Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 6.2.The Requirement For Section 15.247(a)(1)

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, 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, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

## 6.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 6.4.Operating Condition of EUT

6.4.1.Setup the EUT and simulator as shown as Section 6.1.

6.4.2.Turn on the power of all equipment.

6.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

## 6.5.Test Procedure

6.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

6.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz. Adjust Span to 3 MHz.

6.5.3.Set the adjacent channel of the EUT maxhold another trace.

6.5.4.Measurement the channel separation

## 6.6.Test Result

GFSK

| Channel | Frequency (MHz) | Channel Separation(MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.000 | 25KHz or 20dB bandwidth | PASS |
| | 2403 | | | |
| Middle | 2440 | 1.000 | 25KHz or20dB bandwidth | PASS |
| | 2441 | | | |
| High | 2479 | 1.000 | 25KHz or 20dB bandwidth | PASS |
| | 2480 | | | |

Π/4-DQPSK

| Channel | Frequency (MHz) | Channel Separation(MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.002 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2403 | | | |
| Middle | 2440 | 1.008 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2441 | | | |
| High | 2479 | 1.002 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2480 | | | |

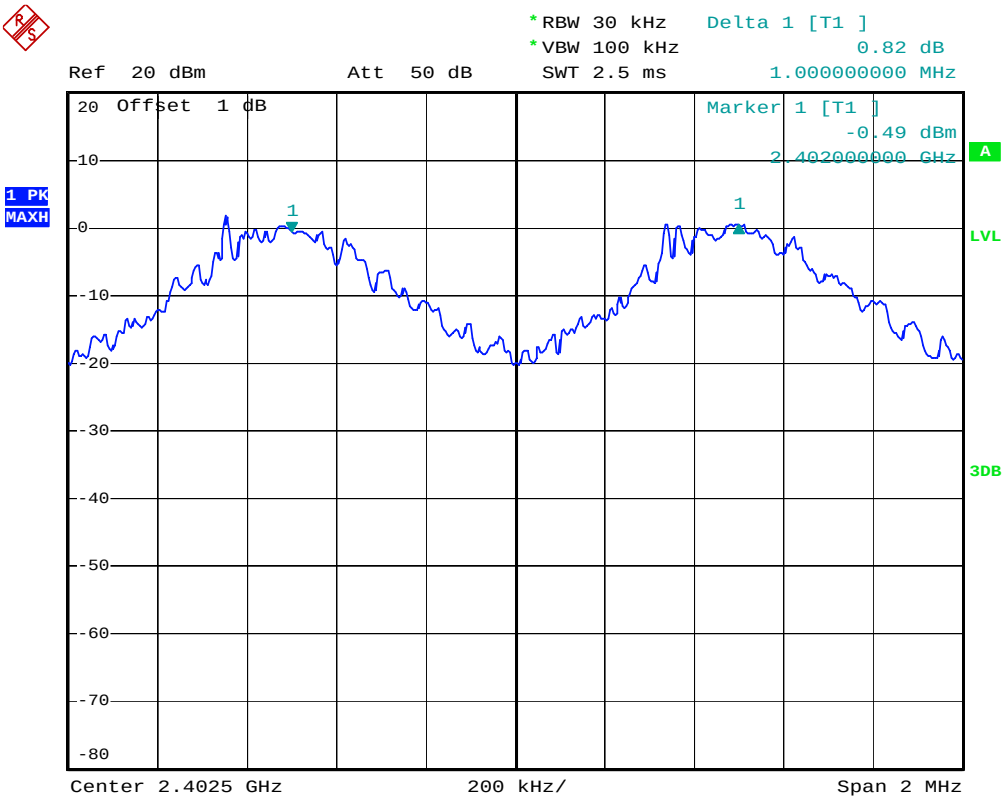
8QPSK

| Channel | Frequency (MHz) | Channel Separation(MHz) | Limit (MHz) | Result |
|---|---|---|---|---|
| Low | 2402 | 1.000 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2403 | | | |
| Middle | 2440 | 1.004 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2441 | | | |
| High | 2479 | 1.002 | 25KHz or 2/3*20dB bandwidth | PASS |
| | 2480 | | | |

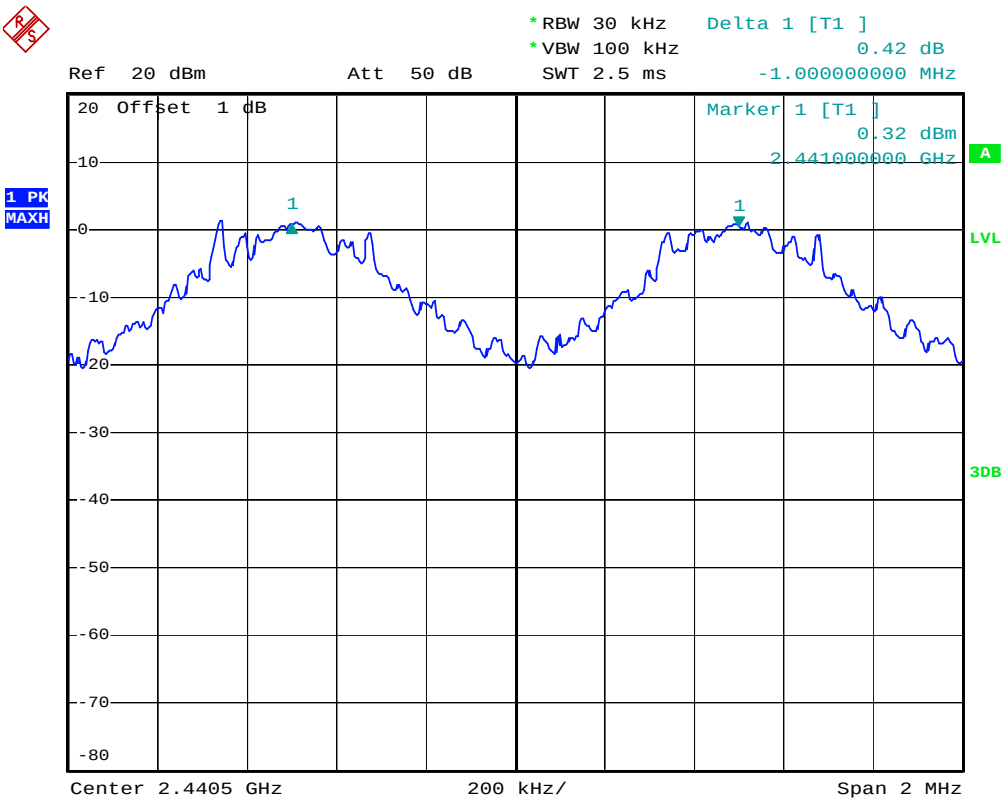
The spectrum analyzer plots are attached as below.

GFSK Mode

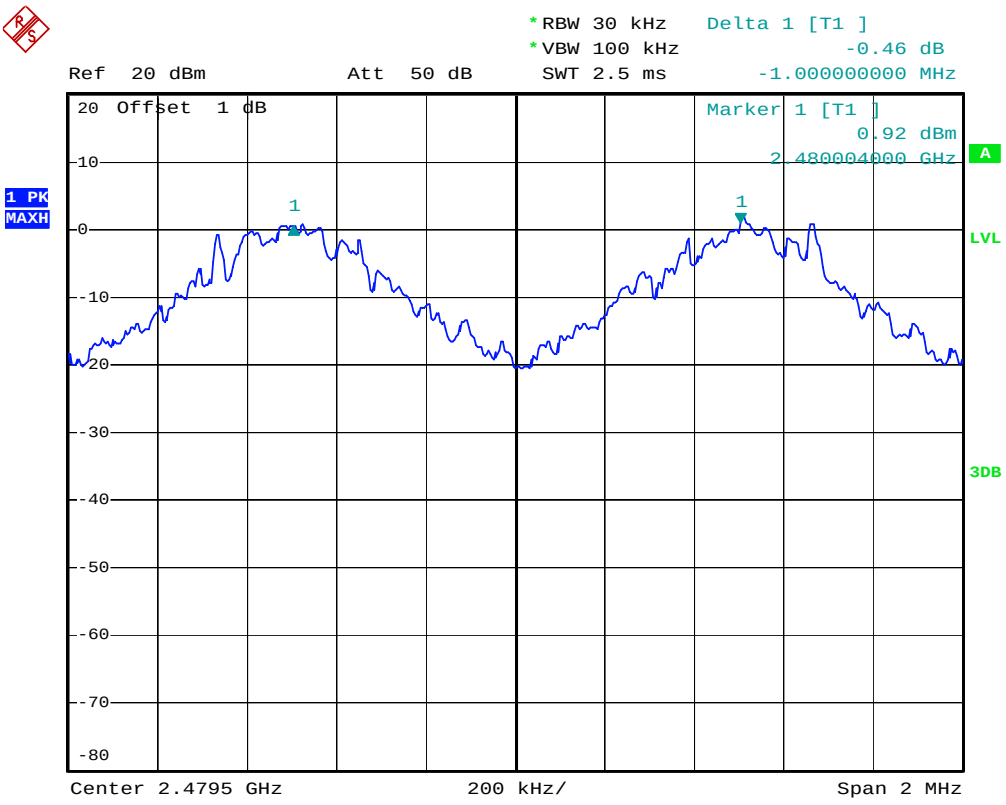
Low channel



Middle channel

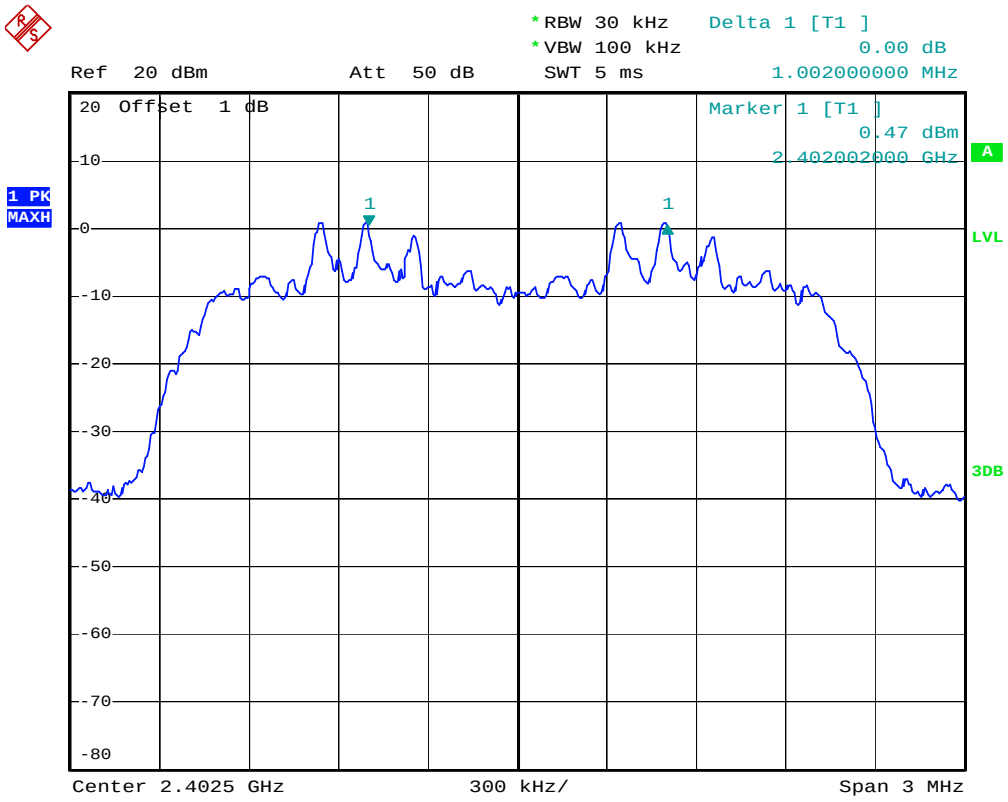


High channel

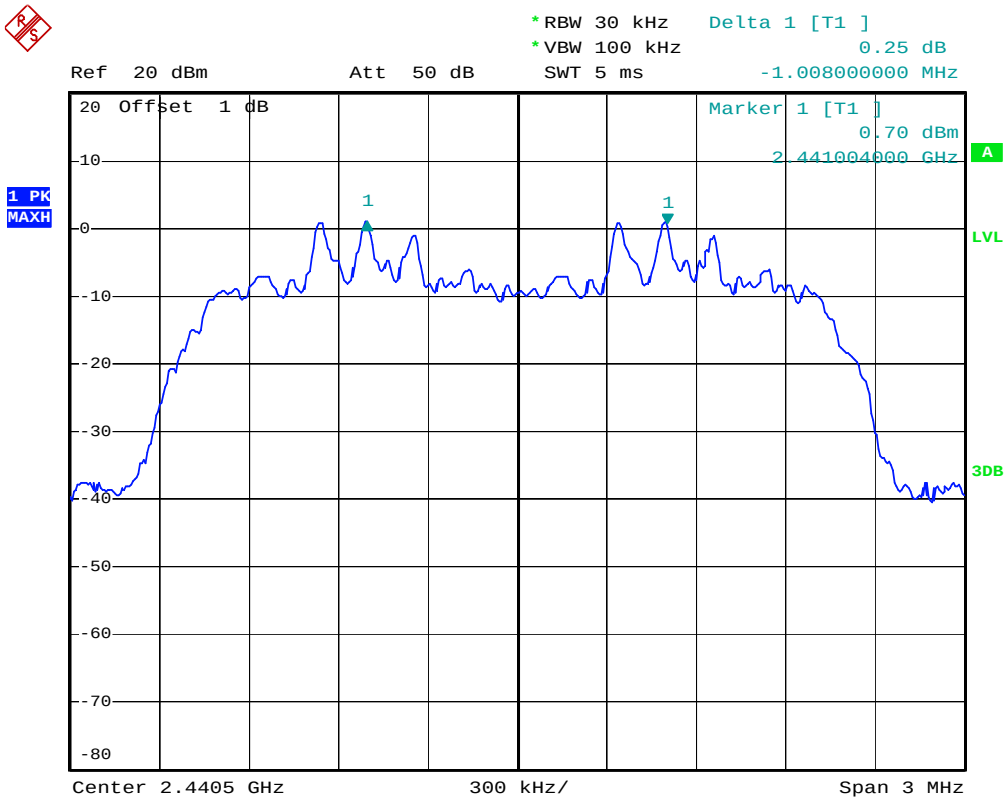


## Π/4-DQPSK Mode

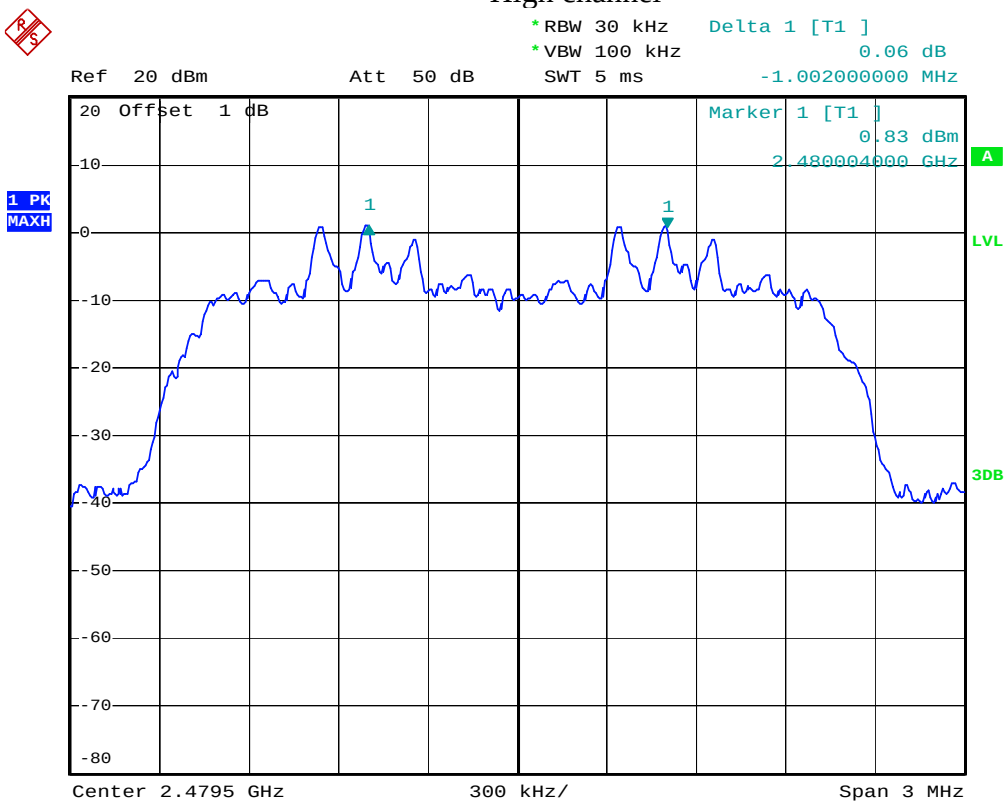
Low channel



Middle channel

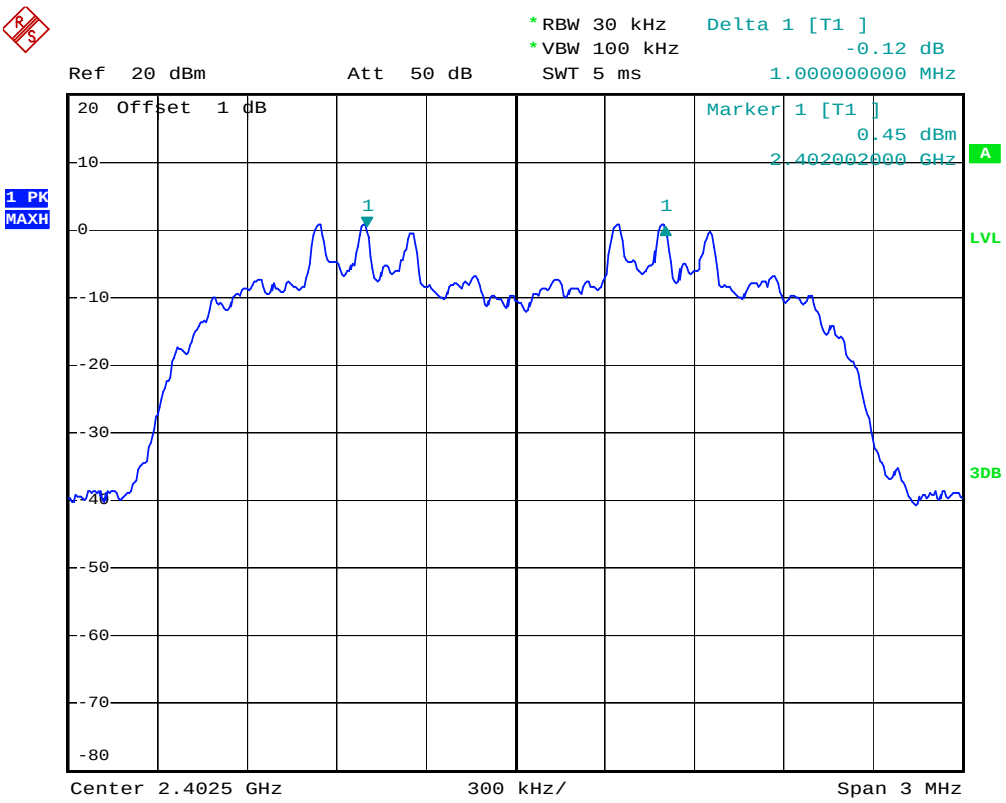


High channel

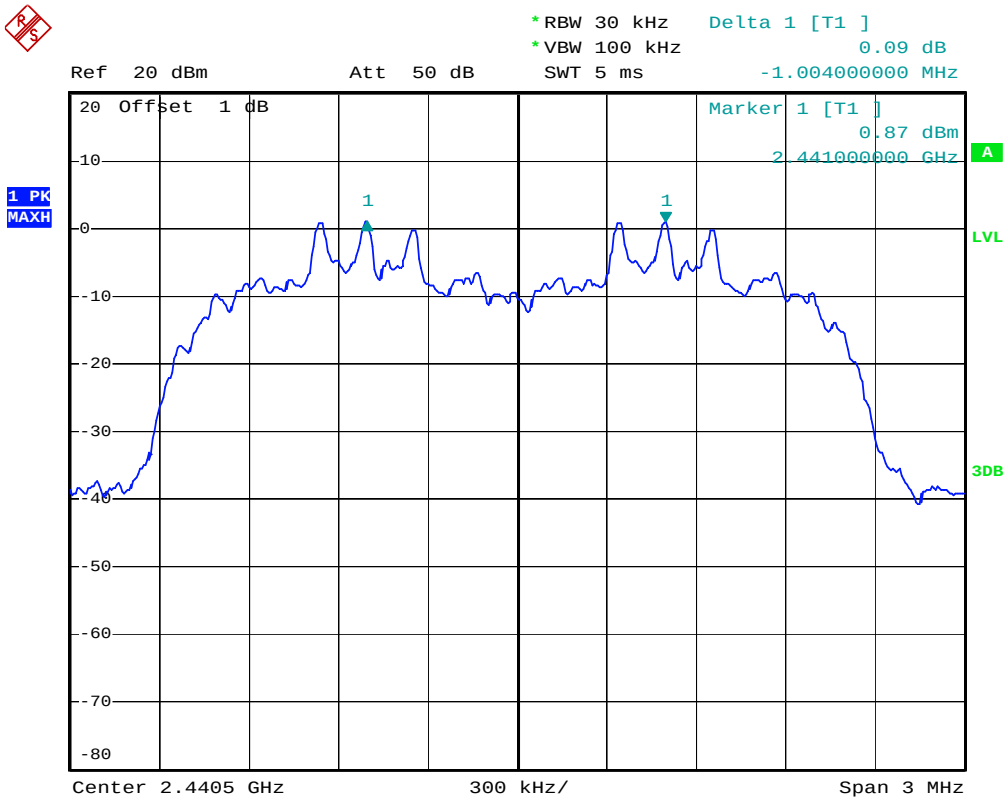


8DPSK Mode

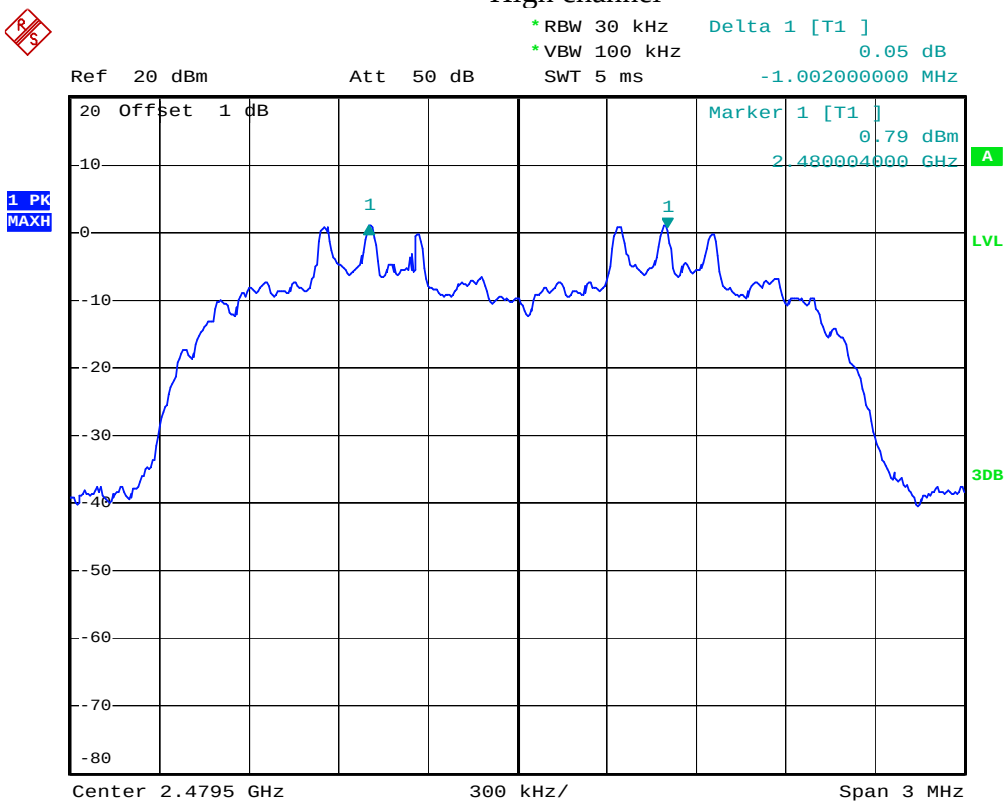
Low channel



Middle channel

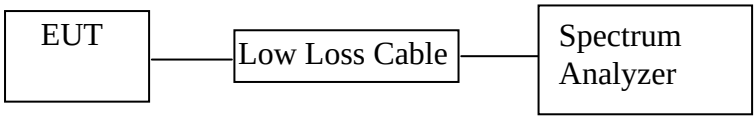


High channel



# 7. NUMBER OF HOPPING FREQUENCY TEST

## 7.1.Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 7.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

## 7.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 7.4.Operating Condition of EUT

7.4.1.Setup the EUT and simulator as shown as Section 7.1.

7.4.2.Turn on the power of all equipment.

7.4.3.Let the EUT work in TX (Hopping on) modes measure it.

## 7.5.Test Procedure

7.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

7.5.2.Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.

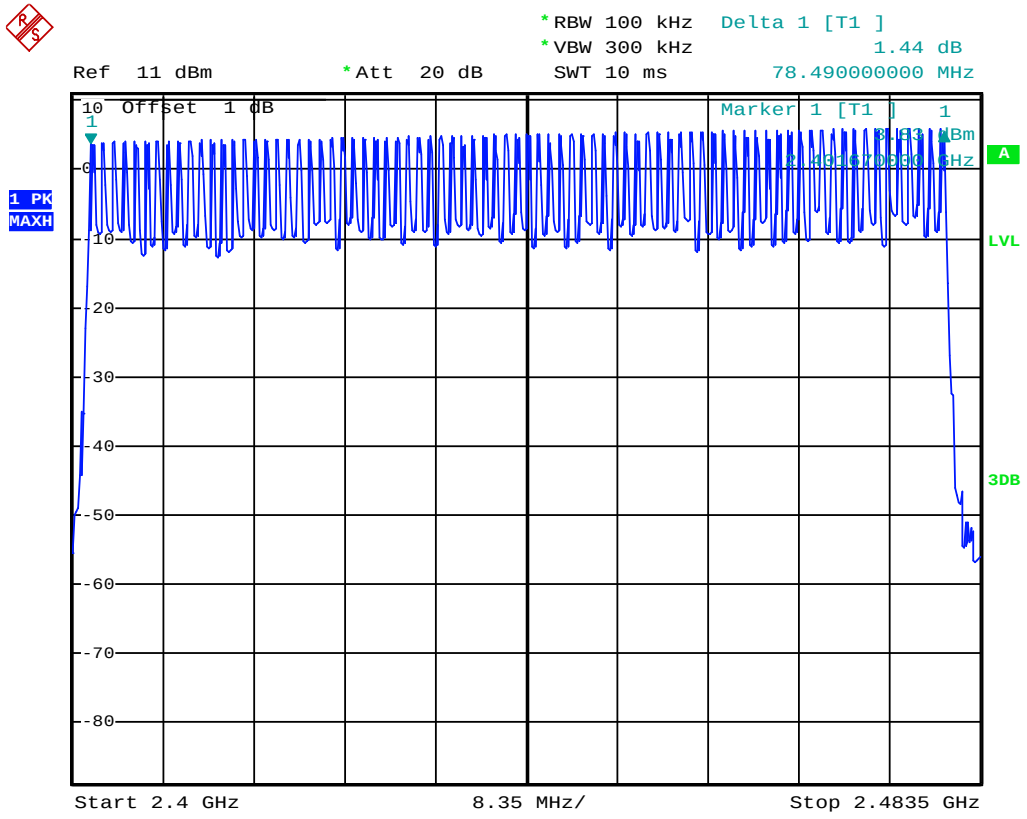
7.5.3.Max hold, view and count how many channel in the band.

## 7.6.Test Result

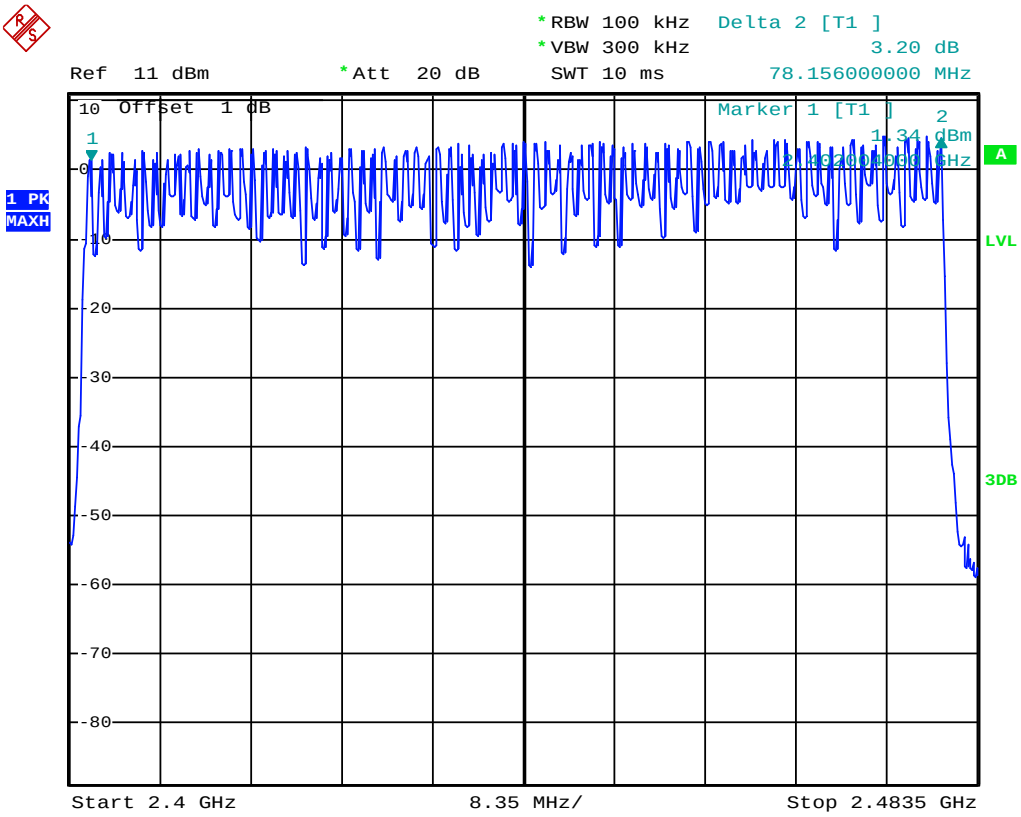
| Total number of hopping channel | Measurement result(CH) | Limit(CH) |
|---|---|---|
| | 79 | ⩾15 |

The spectrum analyzer plots are attached as below.

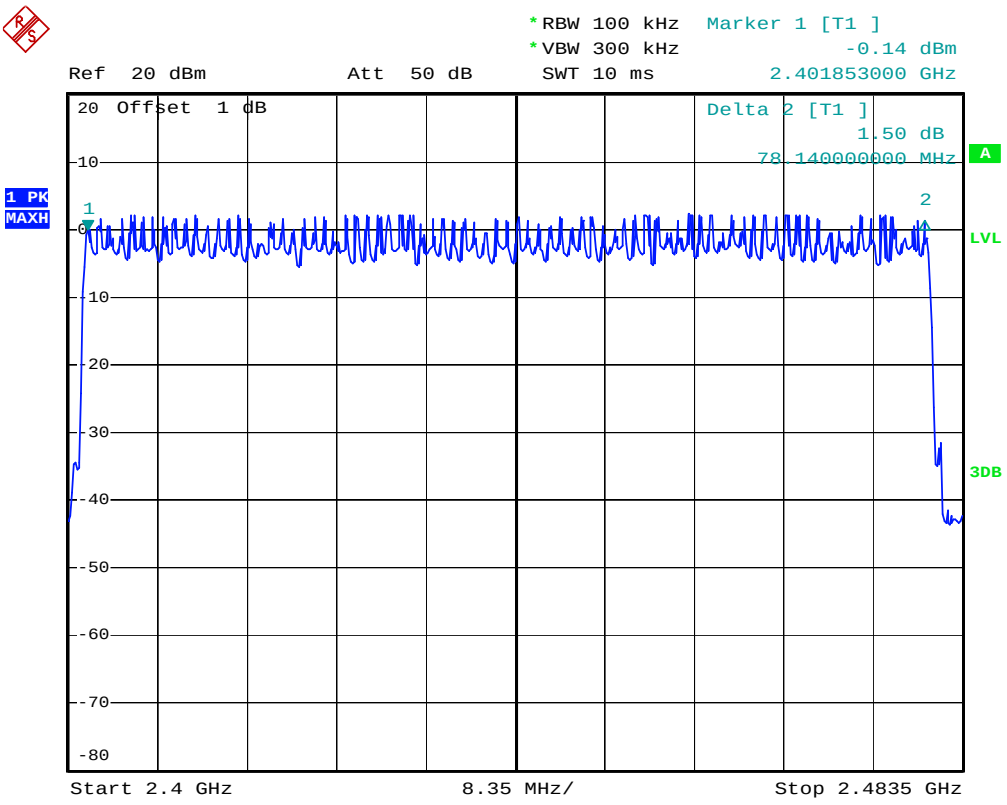
Number of hopping channels(GFSK)



Number of hopping channels(Π/4-DQPSK)

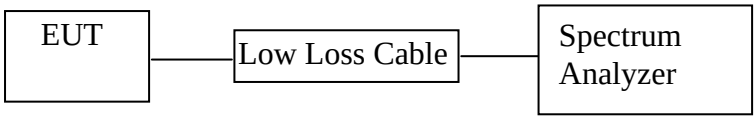


Number of hopping channels(8QPSK)



# 8. DWELL TIME TEST

## 8.1.Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 8.2.The Requirement For Section 15.247(a)(1)(iii)

Section 15.247(a)(1)(iii): Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

## 8.3.EUT Configuration on Measurement

The equipment are installed on the emission measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 8.4.Operating Condition of EUT

8.4.1.Setup the EUT and simulator as shown as Section 8.1.

8.4.2.Turn on the power of all equipment.

8.4.3.Let the EUT work in TX (Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

## 8.5.Test Procedure

8.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

8.5.2.Set center frequency of spectrum analyzer = operating frequency.

8.5.3.Set the spectrum analyzer as RBW=100 kHz, VBW=300 kHz, Span=0Hz, Adjust Sweep=1s. Get the burst (in 1 sec.).

8.5.4.Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=2ms. Get the pulse time.

8.5.5.Repeat above procedures until all frequency measured were complete.

## 8.6.Test Result

GFSK Mode

| Mode | Channel Frequency (MHz) | Pulse Time (ms) | Dwell Time (ms) | Limit (ms) |
|---|---|---|---|---|
| DH1 | 2402 | 0.415 | 132.80 | 400 |
| | 2441 | 0.410 | 131.20 | 400 |
| | 2480 | 0.415 | 132.80 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6 | | | | |
| DH3 | 2402 | 1.680 | 268.80 | 400 |
| | 2441 | 1.695 | 271.20 | 400 |
| | 2480 | 1.680 | 268.80 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6 | | | | |
| DH5 | 2402 | 2.960 | 315.73 | 400 |
| | 2441 | 2.960 | 315.73 | 400 |
| | 2480 | 2.960 | 315.73 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6 | | | | |

Π/4-DQPSK

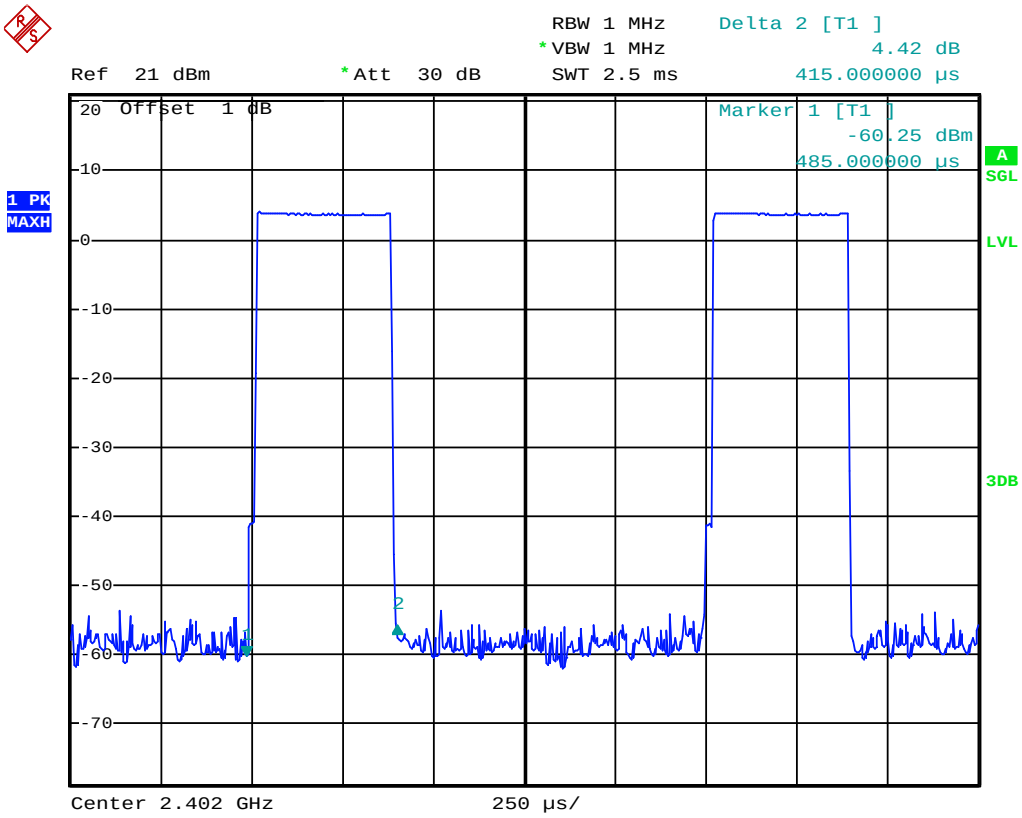
| Mode | Channel Frequency (MHz) | Pulse Time (ms) | Dwell Time (ms) | Limit (ms) |
|---|---|---|---|---|
| DH1 | 2402 | 0.415 | 132.80 | 400 |
| | 2441 | 0.420 | 134.40 | 400 |
| | 2480 | 0.420 | 134.40 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6 | | | | |
| DH3 | 2402 | 1.695 | 271.20 | 400 |
| | 2441 | 1.695 | 271.20 | 400 |
| | 2480 | 1.695 | 271.20 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6 | | | | |
| DH5 | 2402 | 2.960 | 315.73 | 400 |
| | 2441 | 2.960 | 315.73 | 400 |
| | 2480 | 2.960 | 315.73 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6 | | | | |

8QPSK Mode

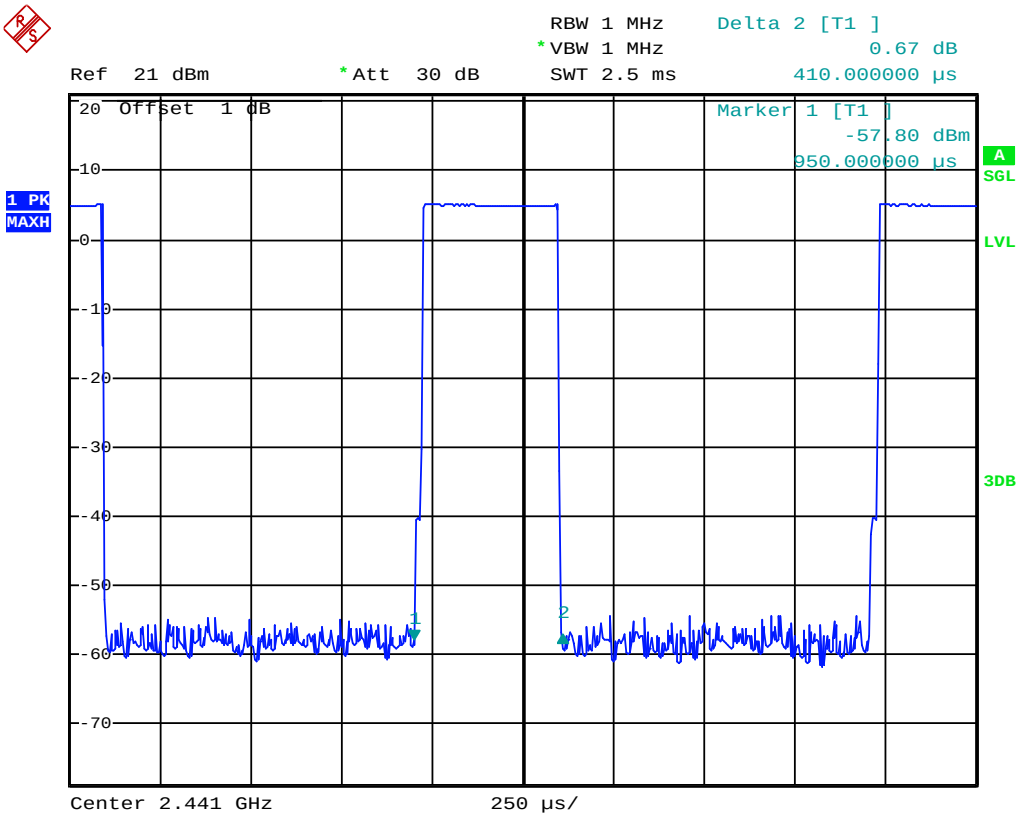
| Mode | Channel Frequency (MHz) | Pulse Time (ms) | Dwell Time (ms) | Limit (ms) |
|---|---|---|---|---|
| DH1 | 2402 | 0.420 | 134.40 | 400 |
| | 2441 | 0.420 | 134.40 | 400 |
| | 2480 | 0.420 | 134.40 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6 | | | | |
| DH3 | 2402 | 1.680 | 268.80 | 400 |
| | 2441 | 1.680 | 268.80 | 400 |
| | 2480 | 1.695 | 271.20 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(4*79))×31.6 | | | | |
| DH5 | 2402 | 2.960 | 315.73 | 400 |
| | 2441 | 2.960 | 315.73 | 400 |
| | 2480 | 2.960 | 315.73 | 400 |
| A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(6*79))×31.6 | | | | |

The spectrum analyzer plots are attached as below.

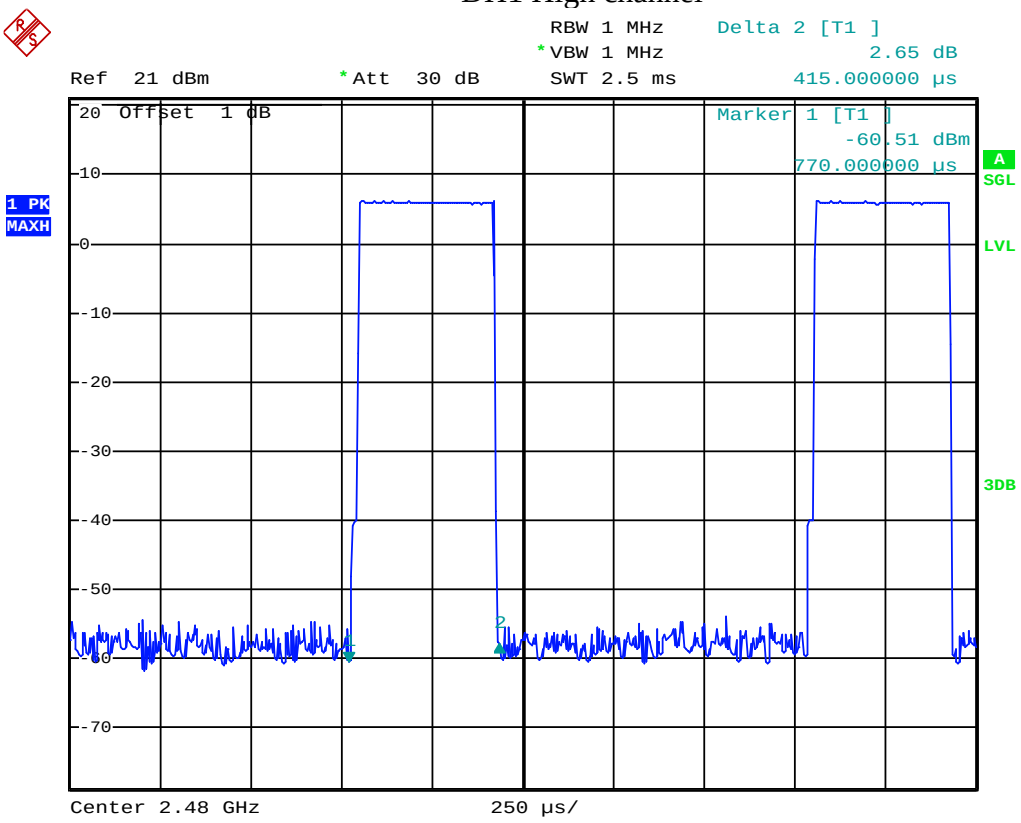
DH1 Low channel



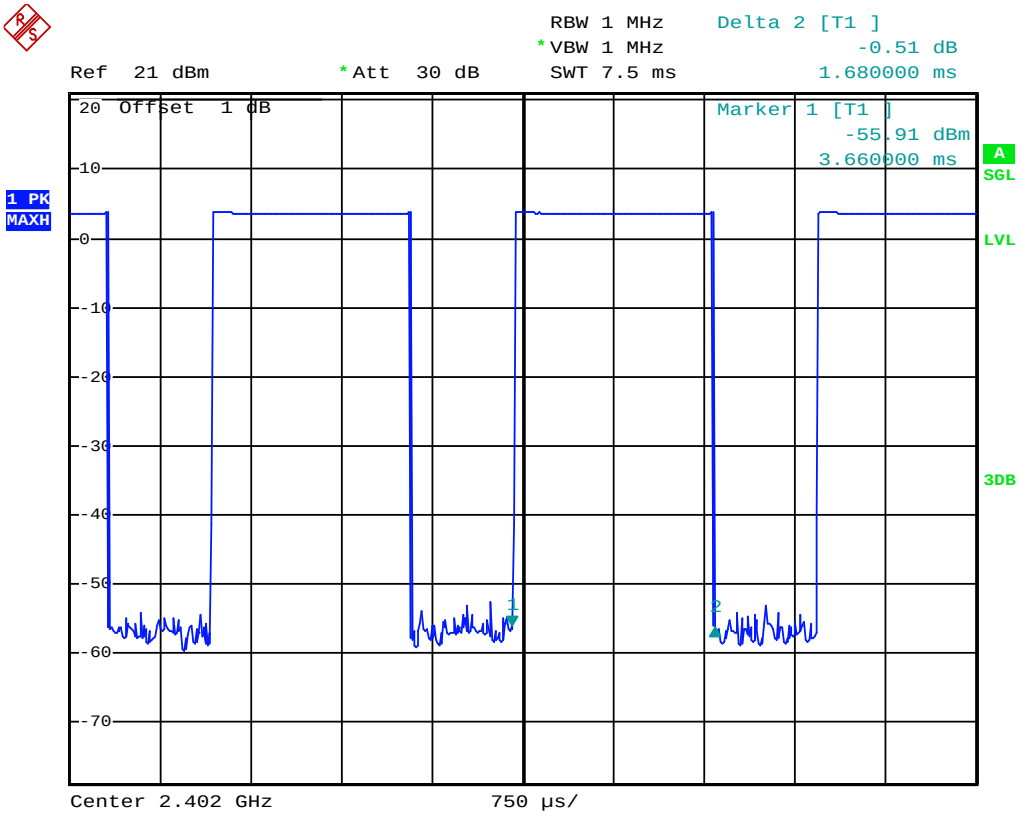
DH1 Middle channel



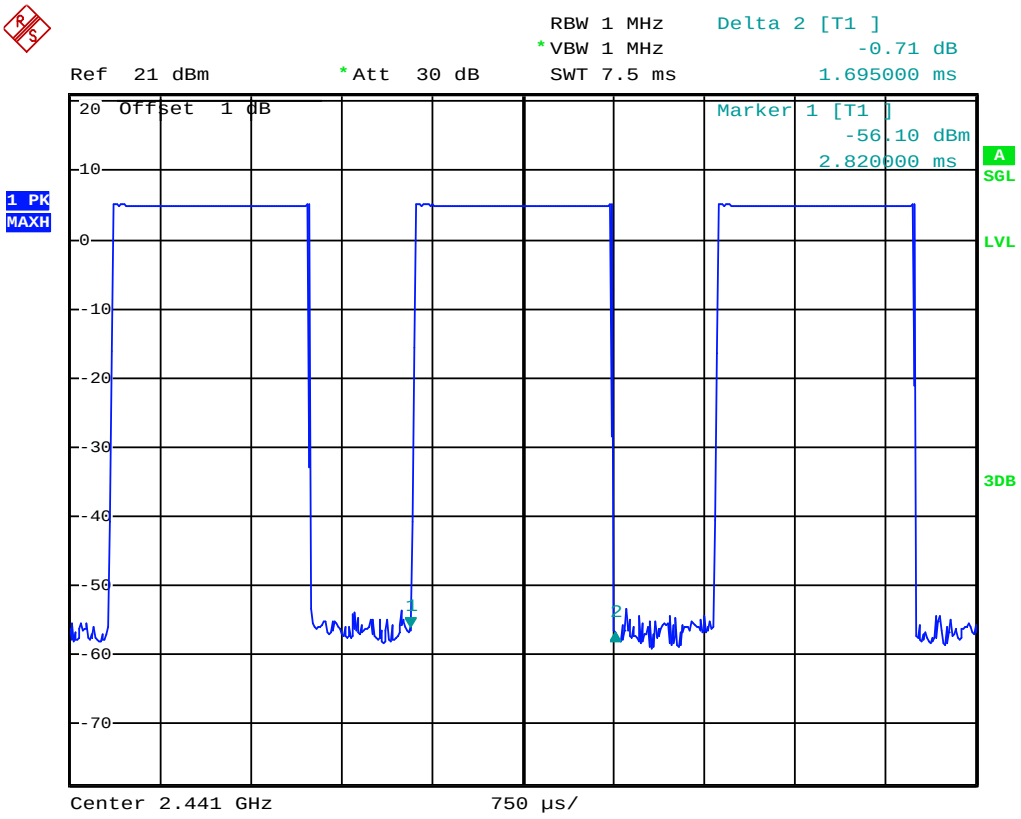
DH1 High channel



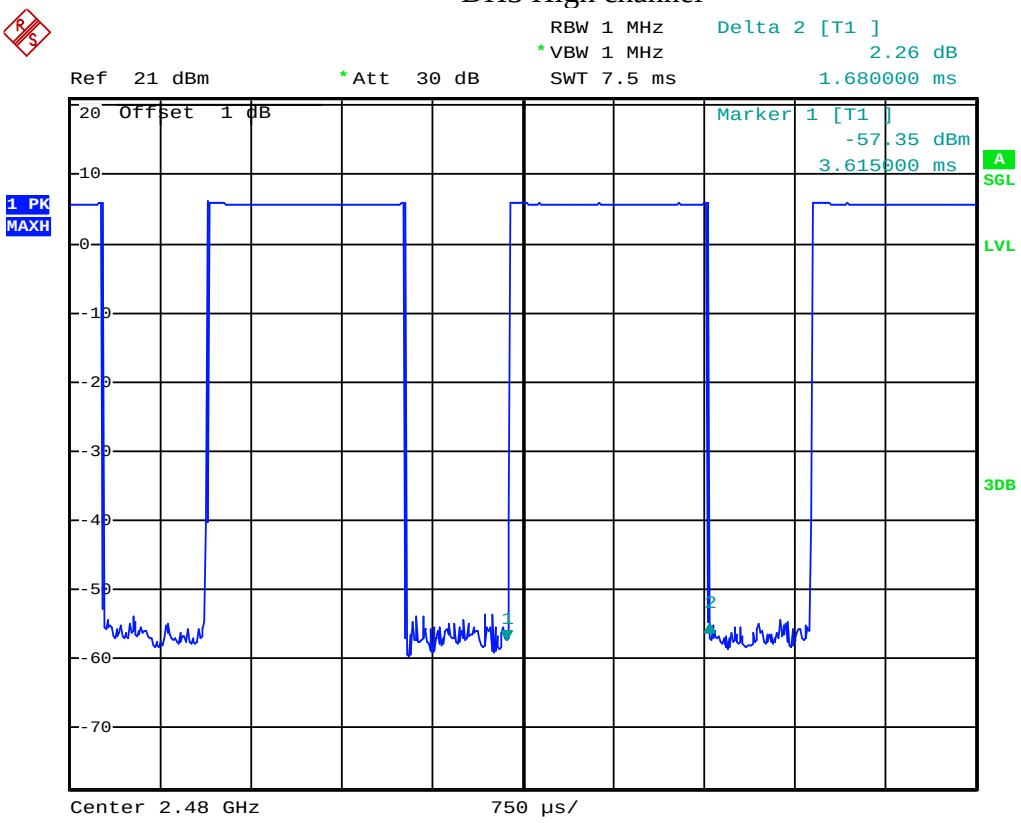
DH3 Low channel



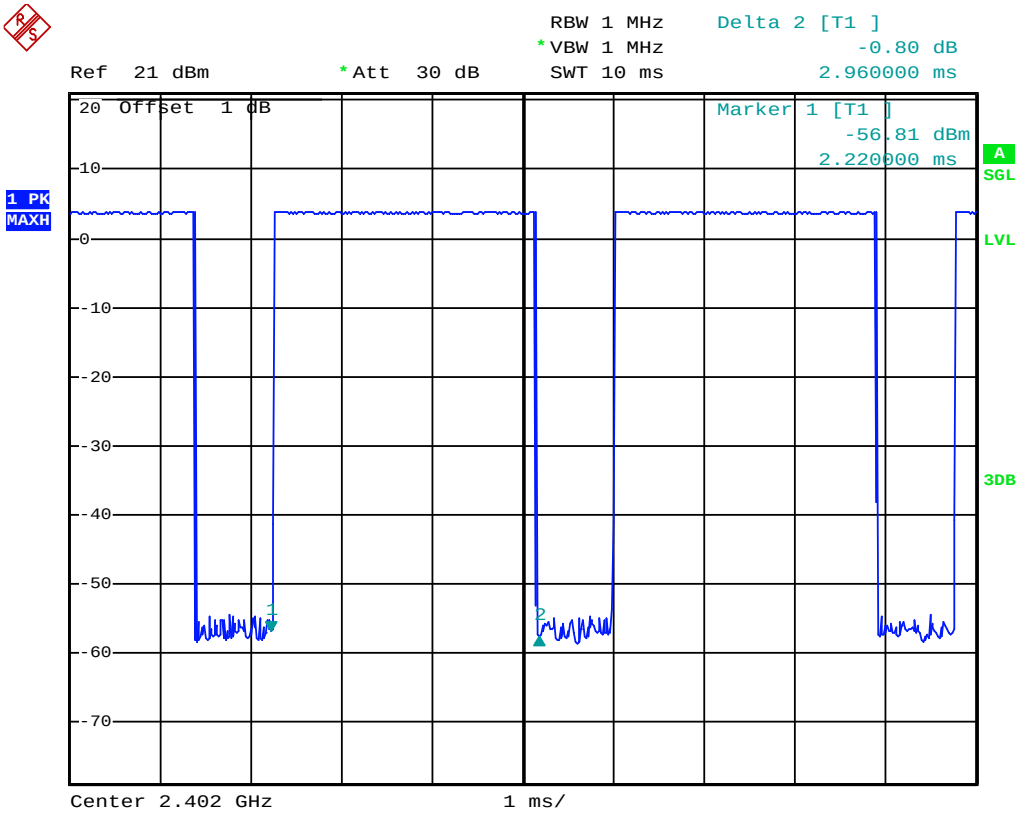
DH3 Middle channel



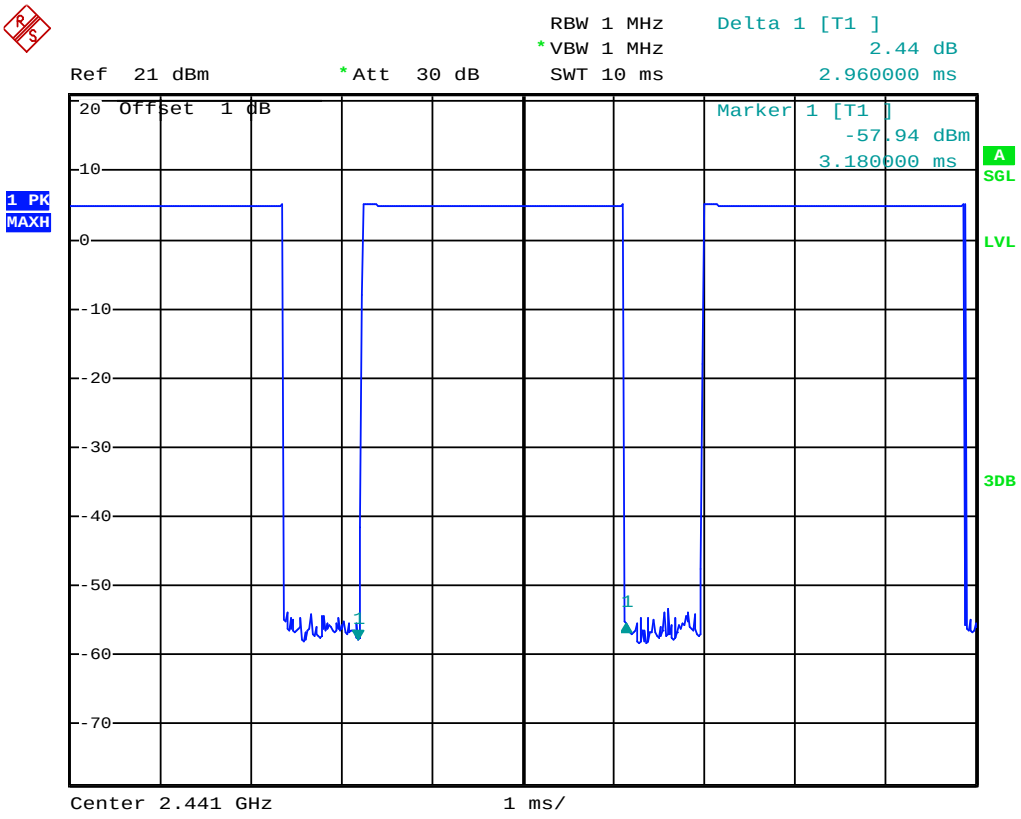
DH3 High channel



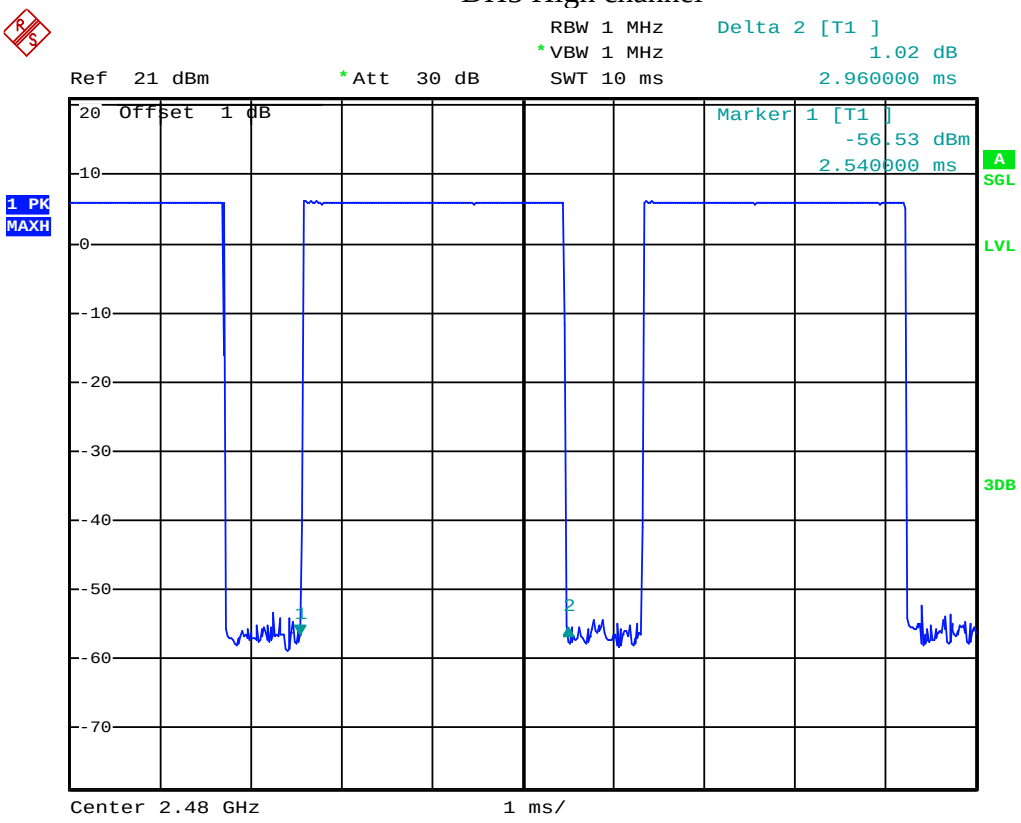
DH5 Low channel



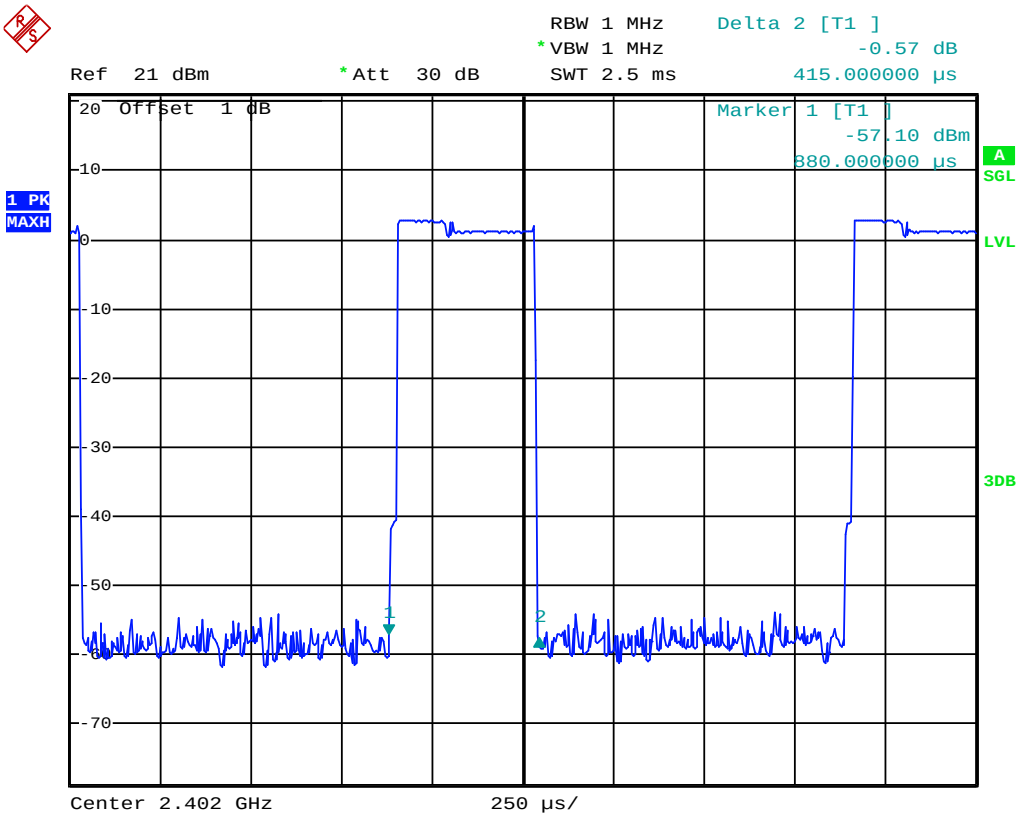
DH5 Middle channel



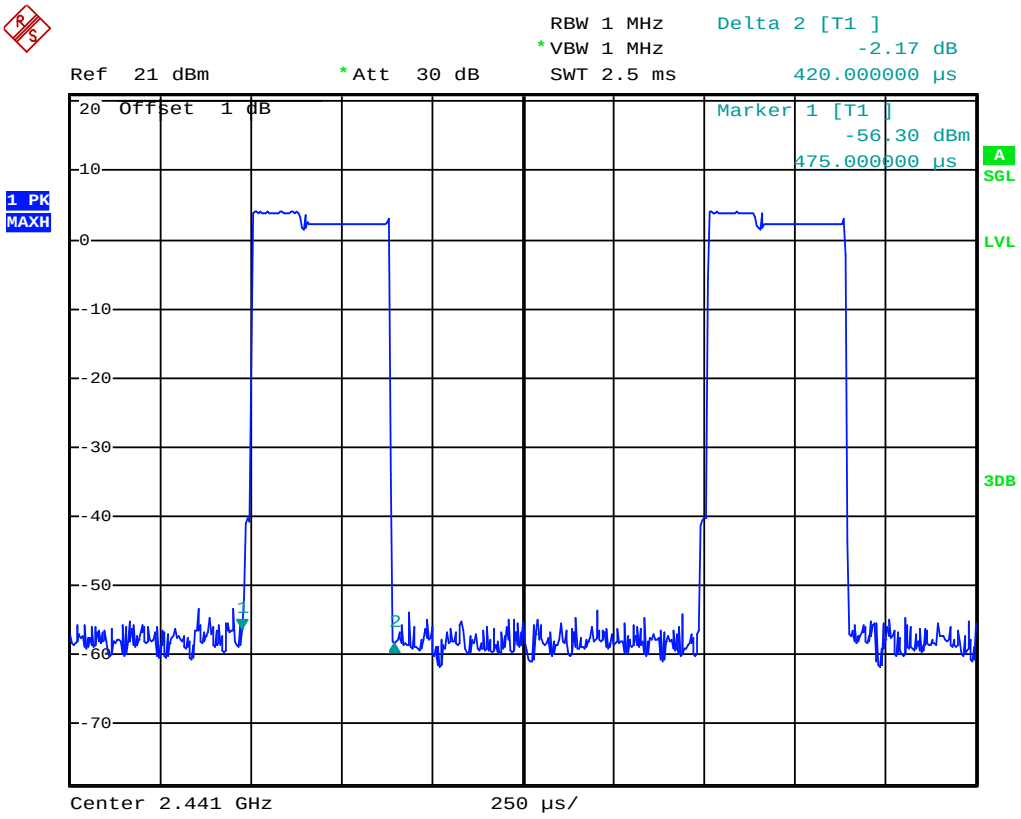
DH5 High channel



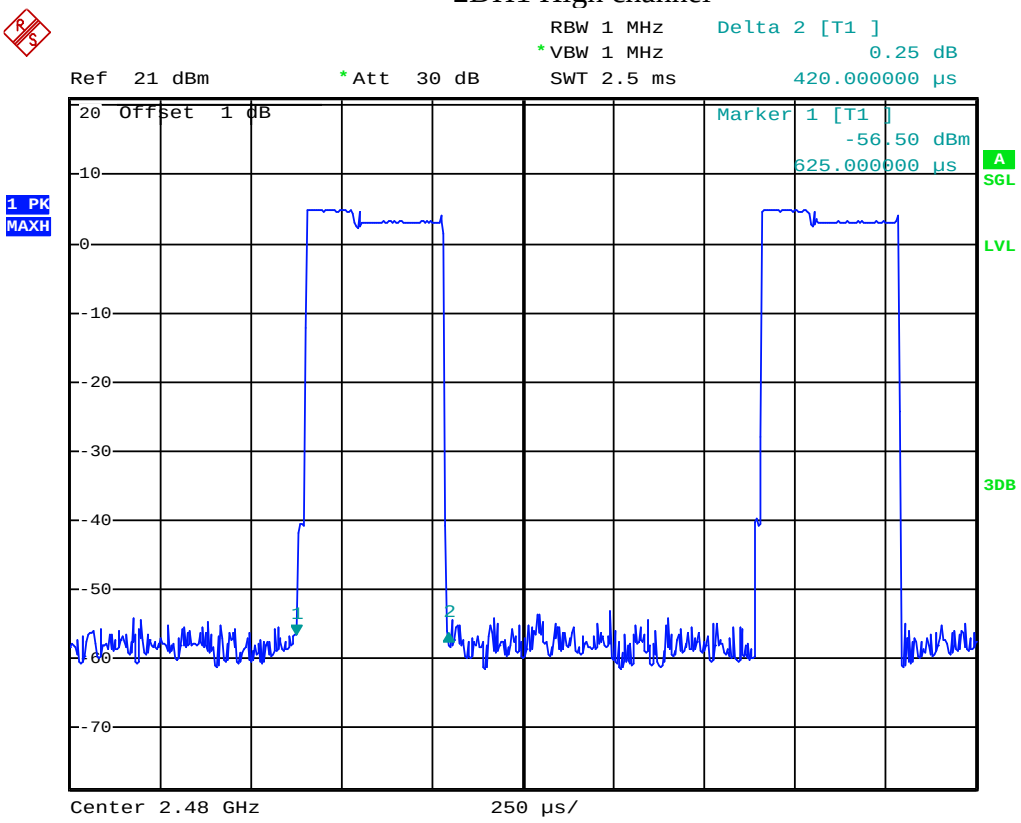
2DH1 Low channel



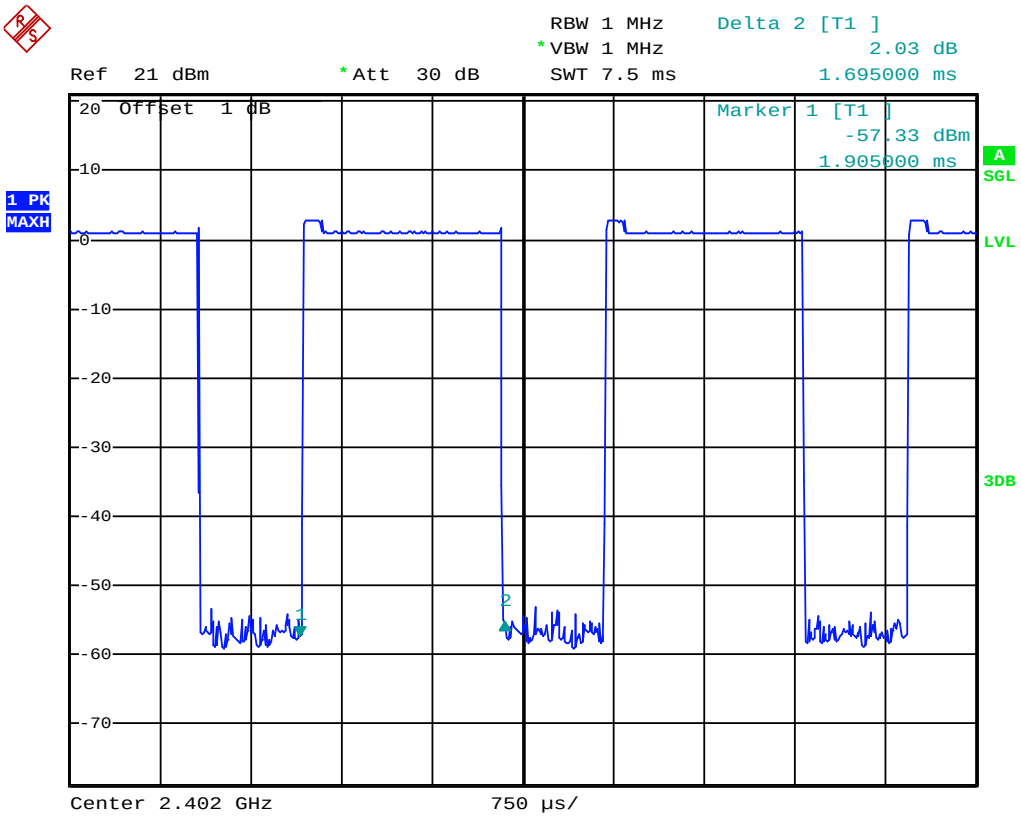
## 2DH1 Middle channel



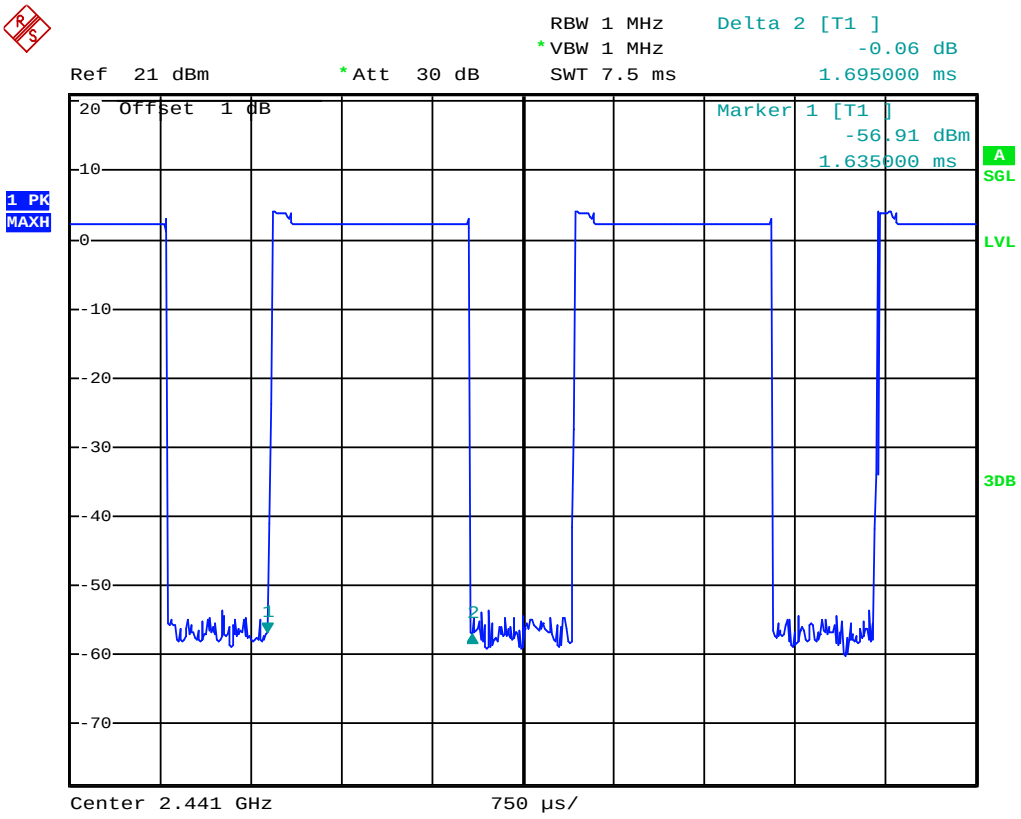
2DH1 High channel



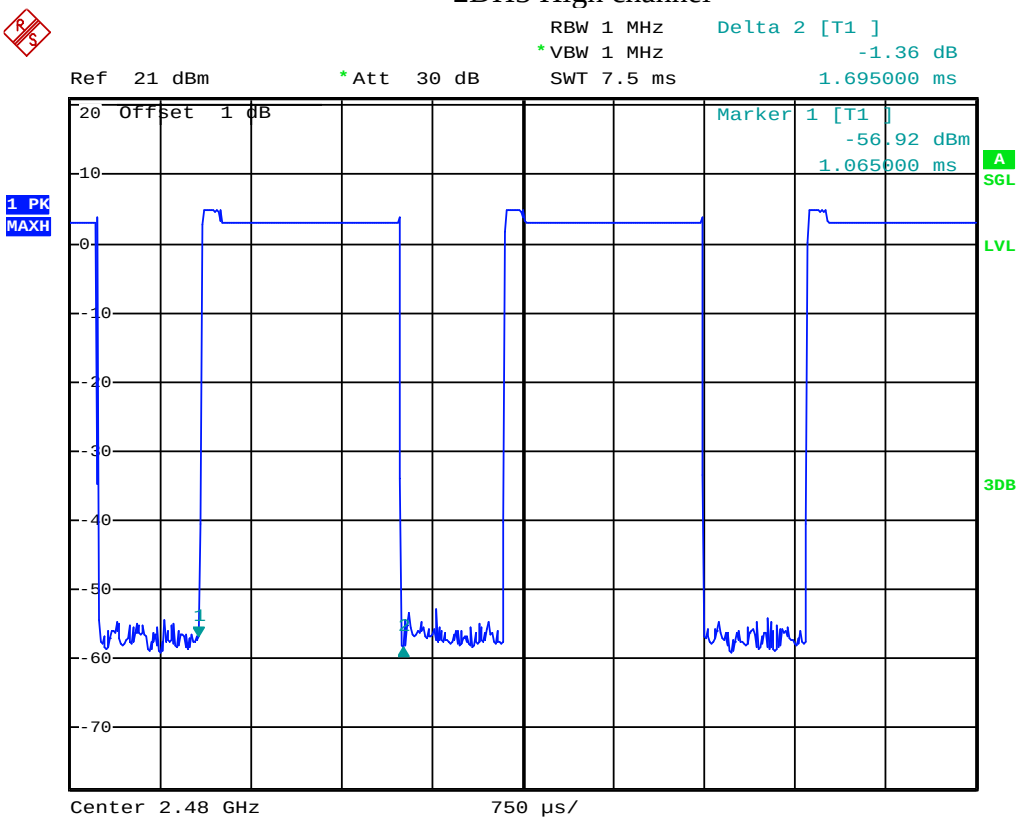
## 2DH3 Low channel



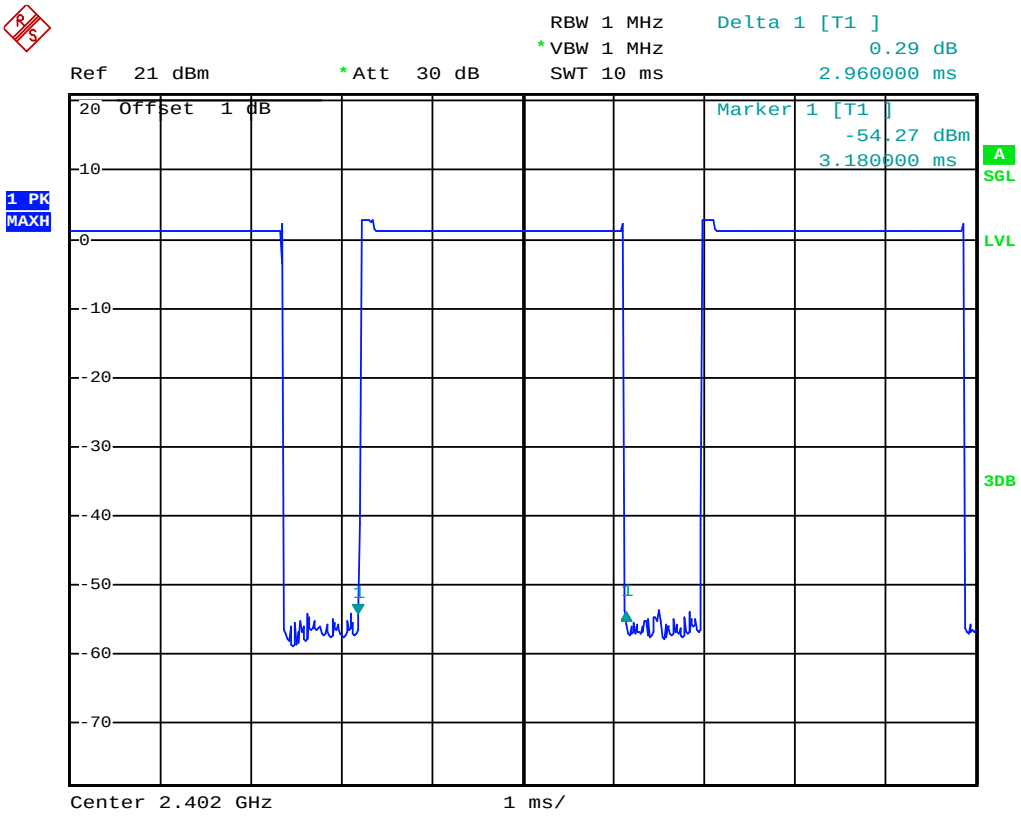
2DH3 Middle channel



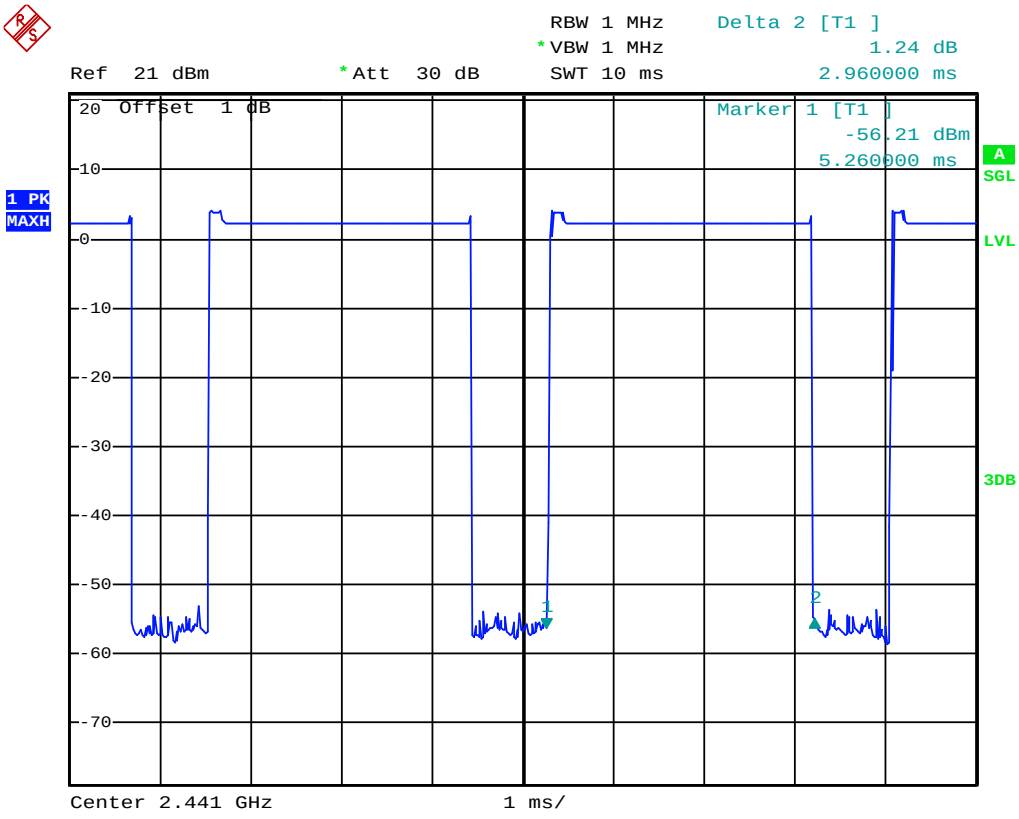
## 2DH3 High channel



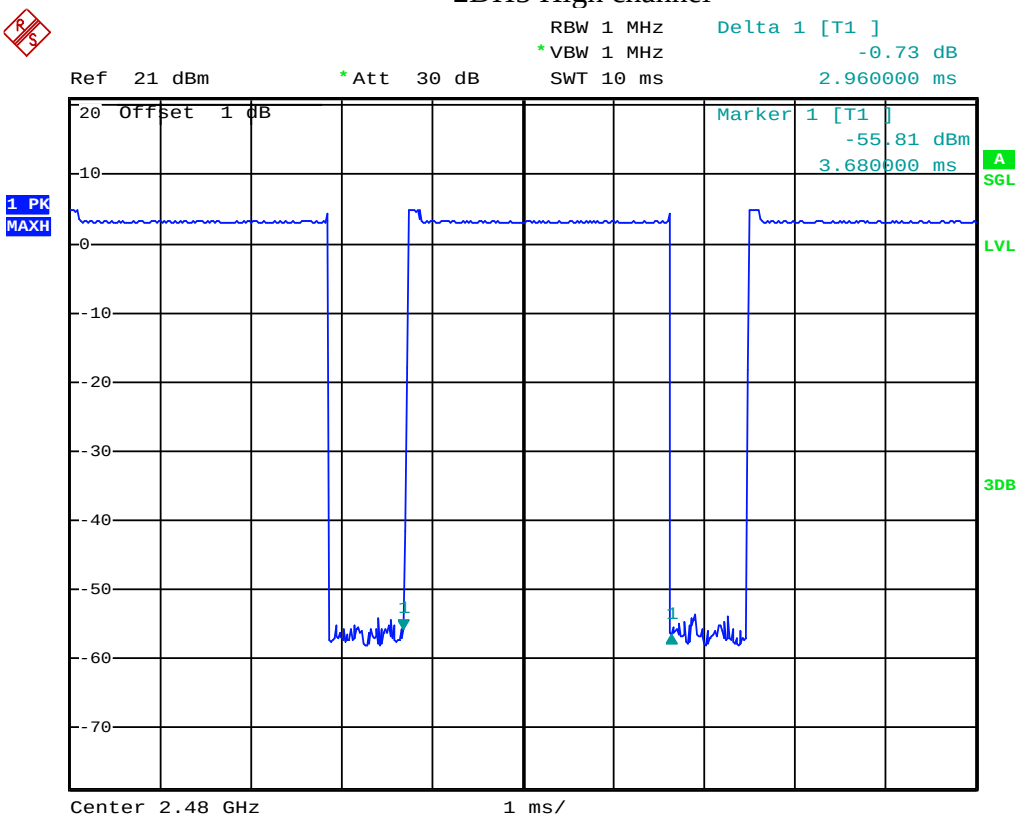
2DH5 Low channel



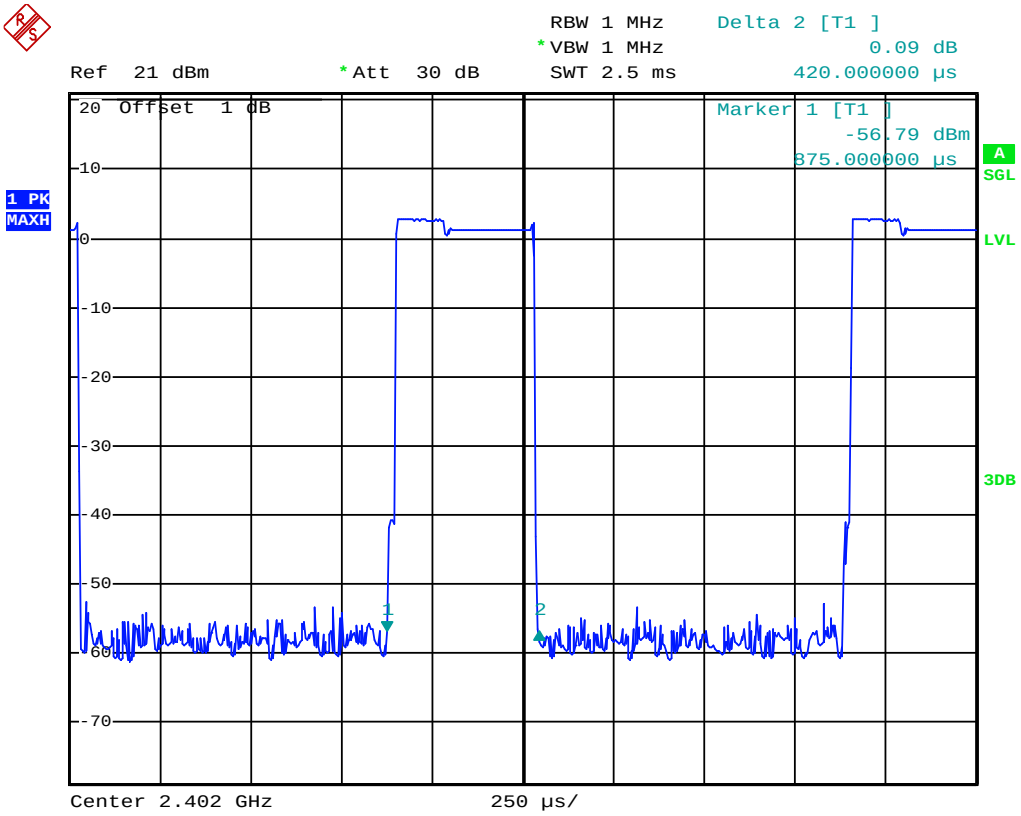
## 2DH5 Middle channel



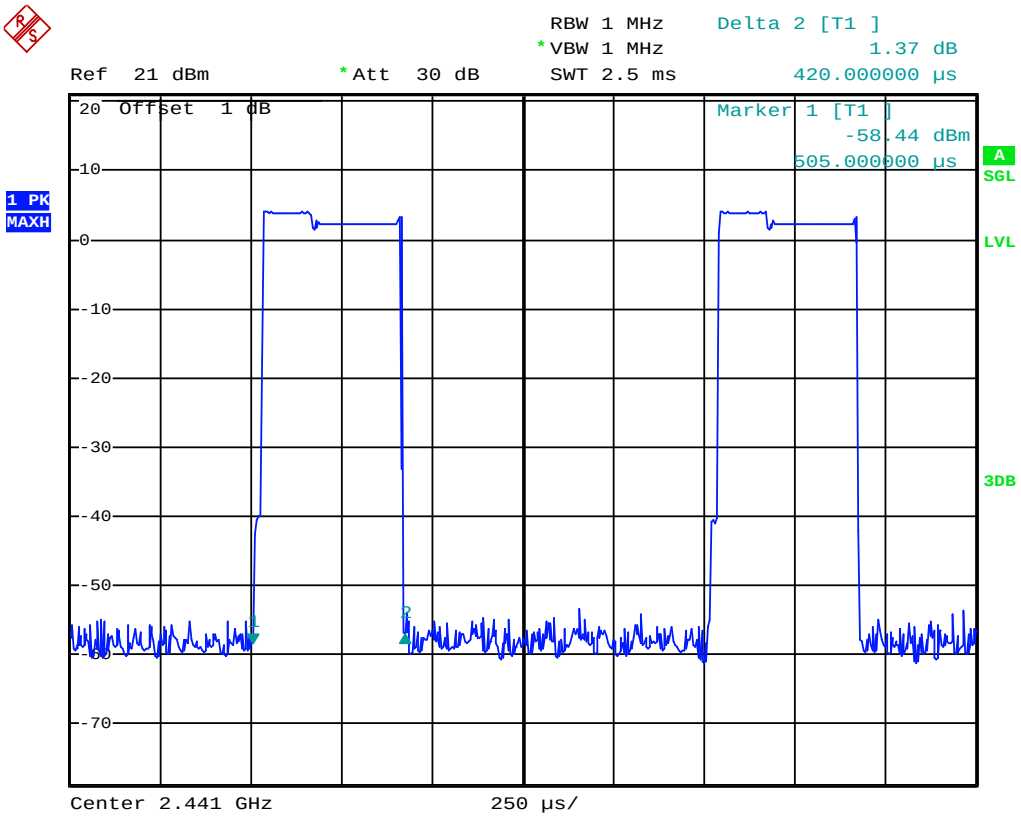
## 2DH5 High channel



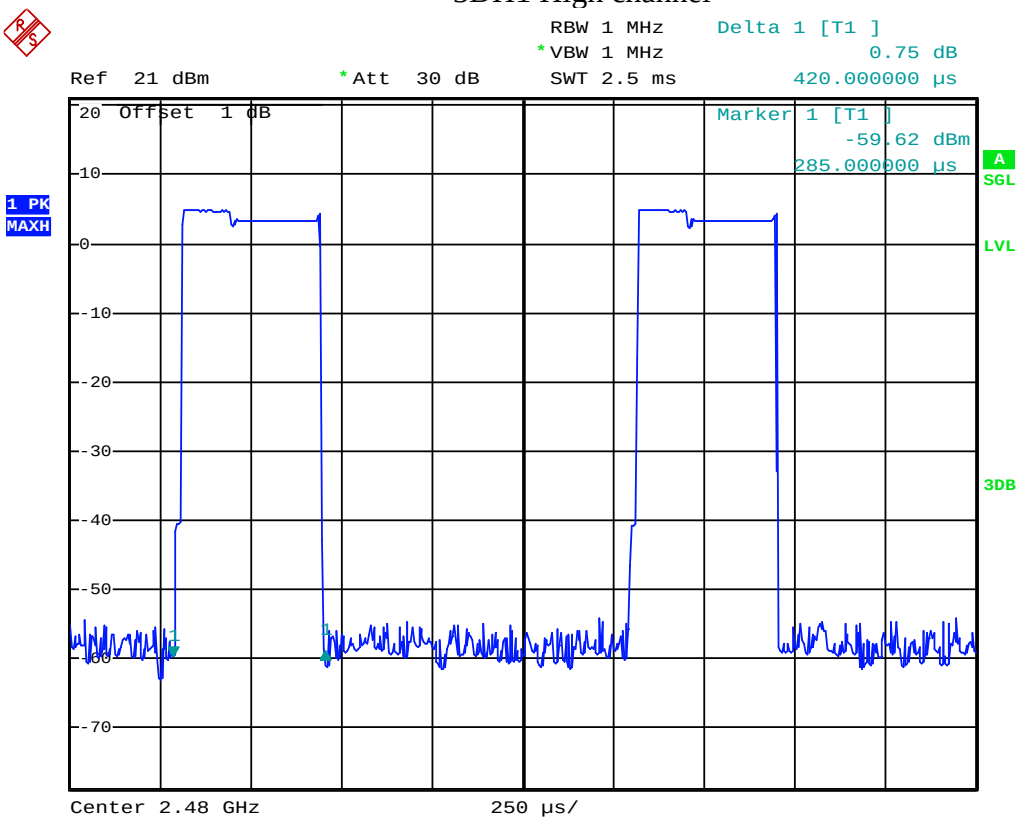
3DH1 Low channel



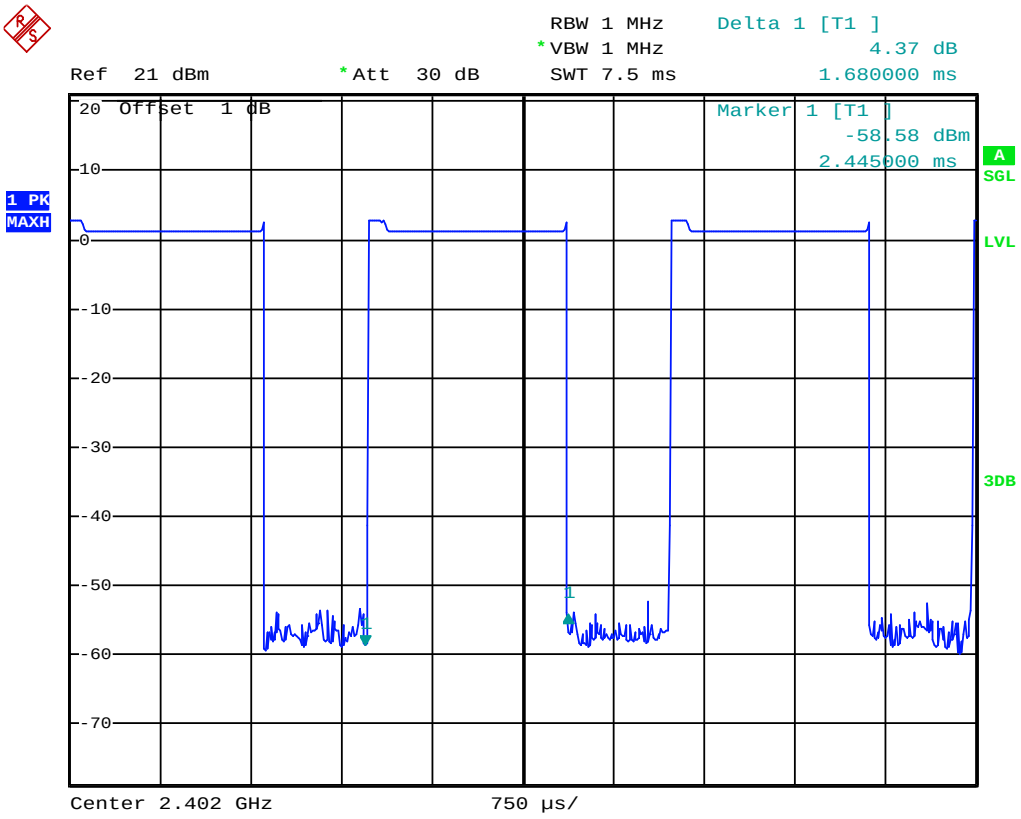
3DH1 Middle channel



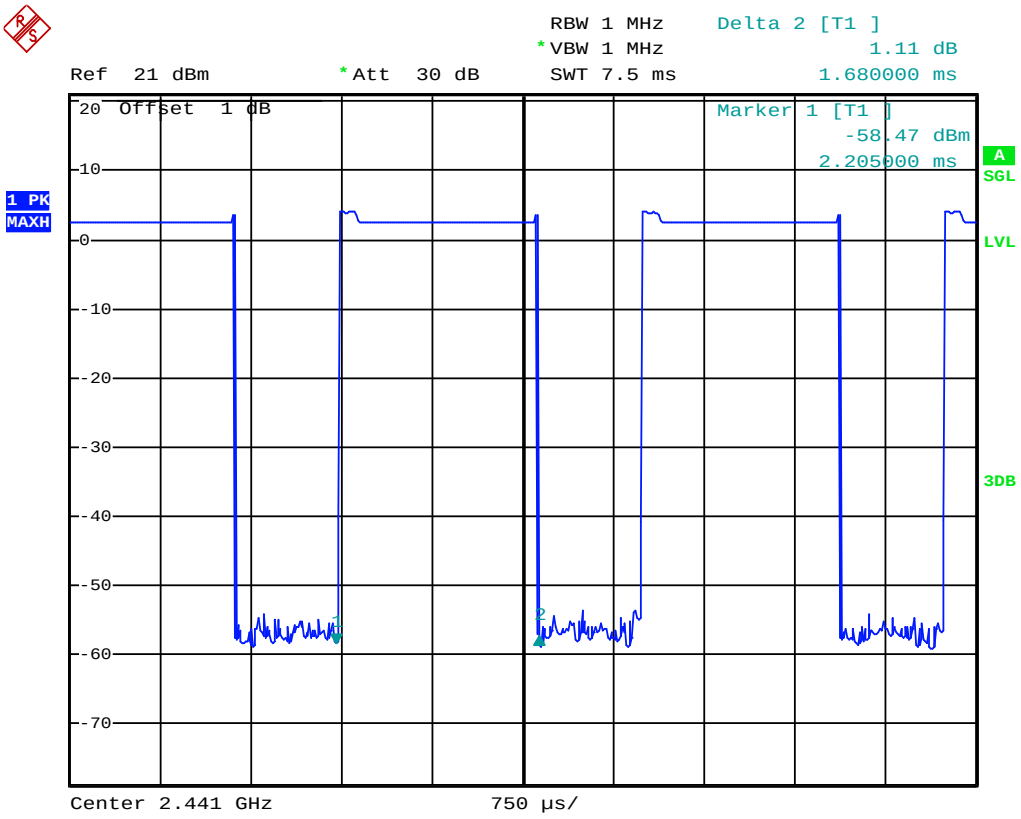
3DH1 High channel



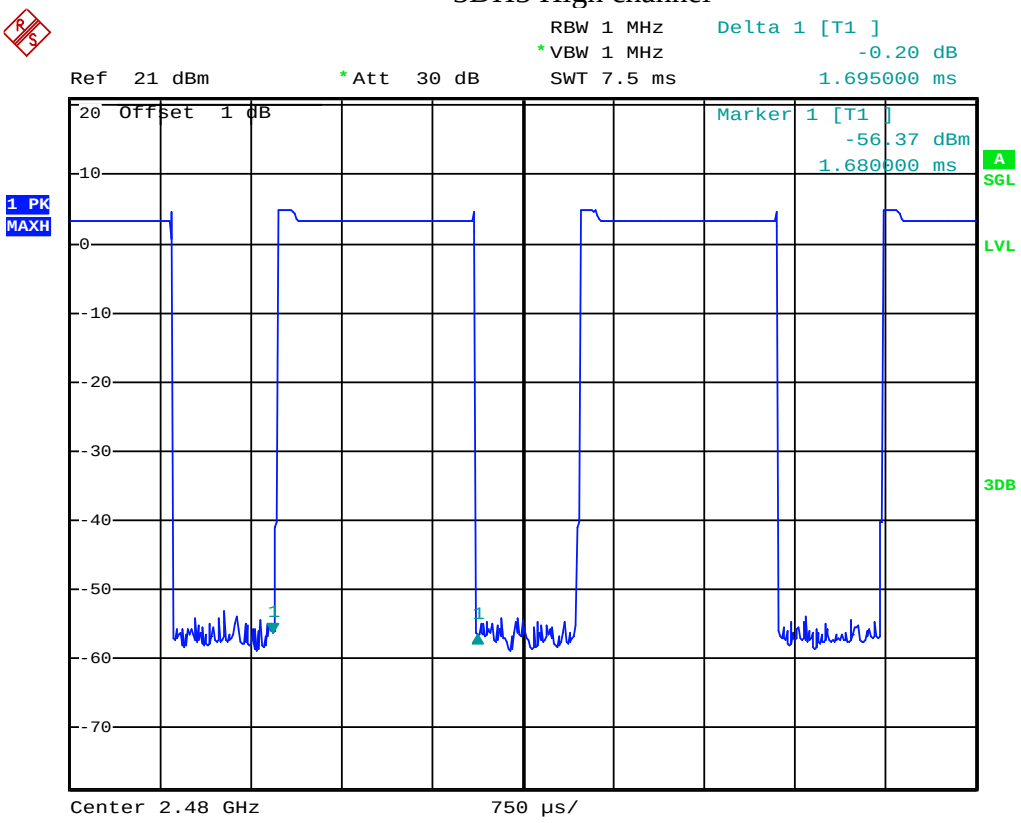
3DH3 Low channel



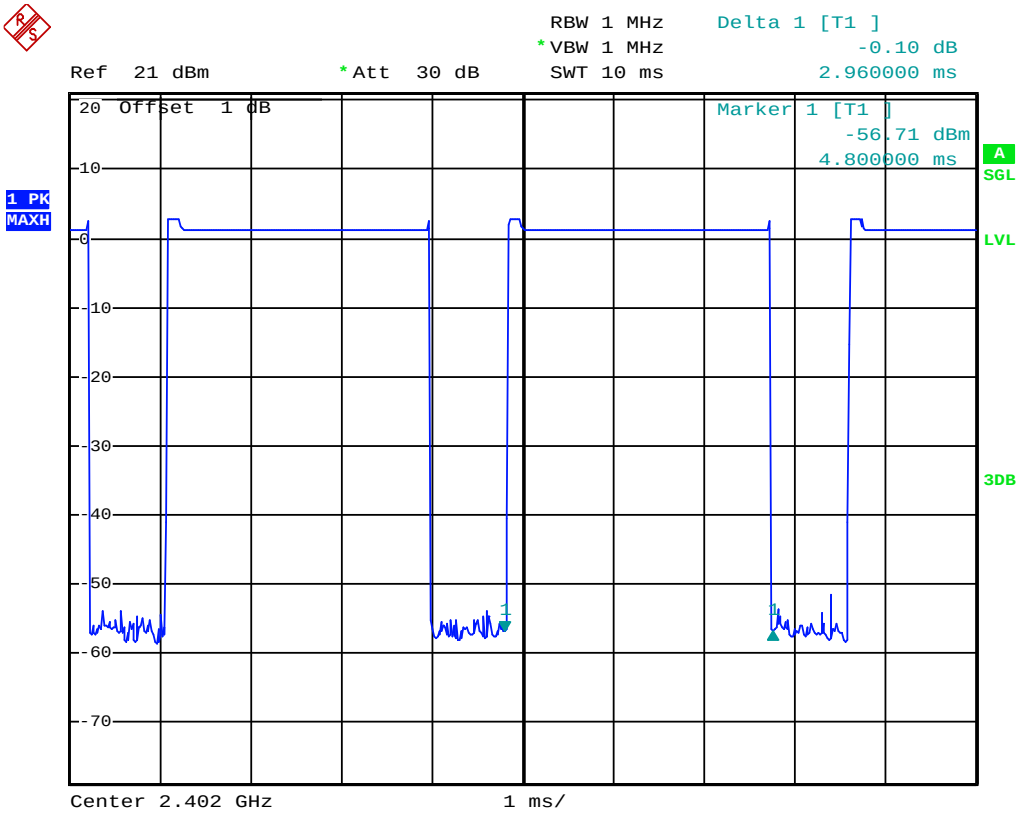
## 3DH3 Middle channel



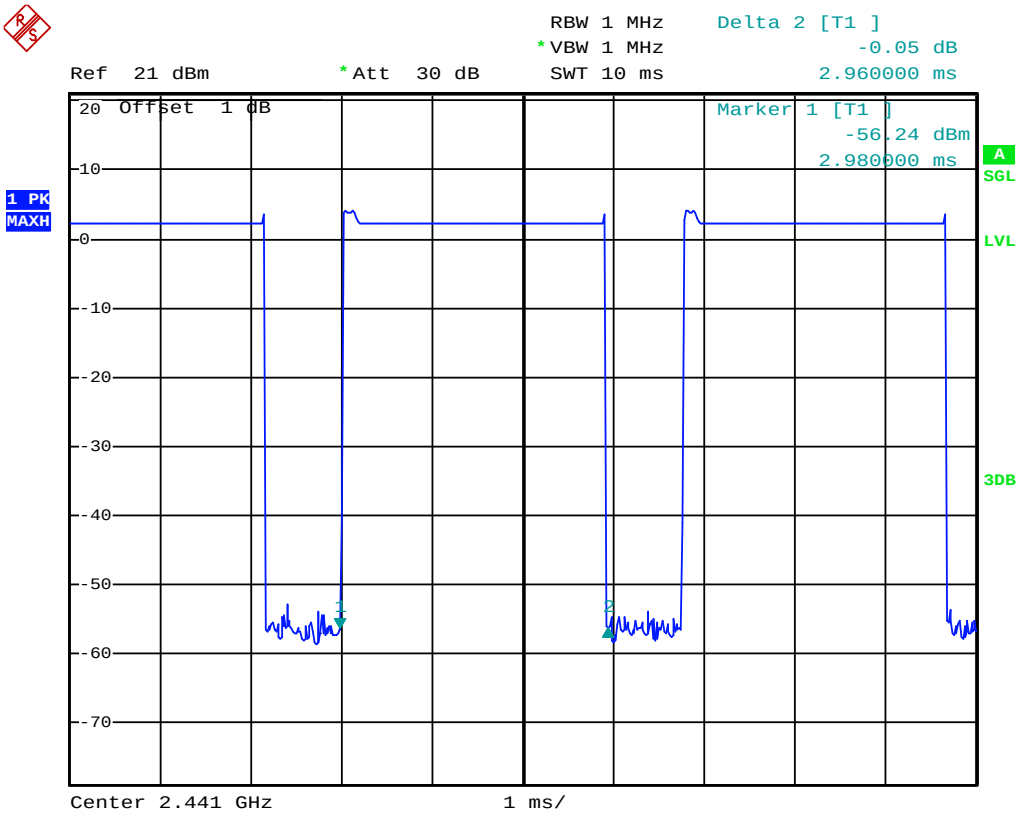
3DH3 High channel



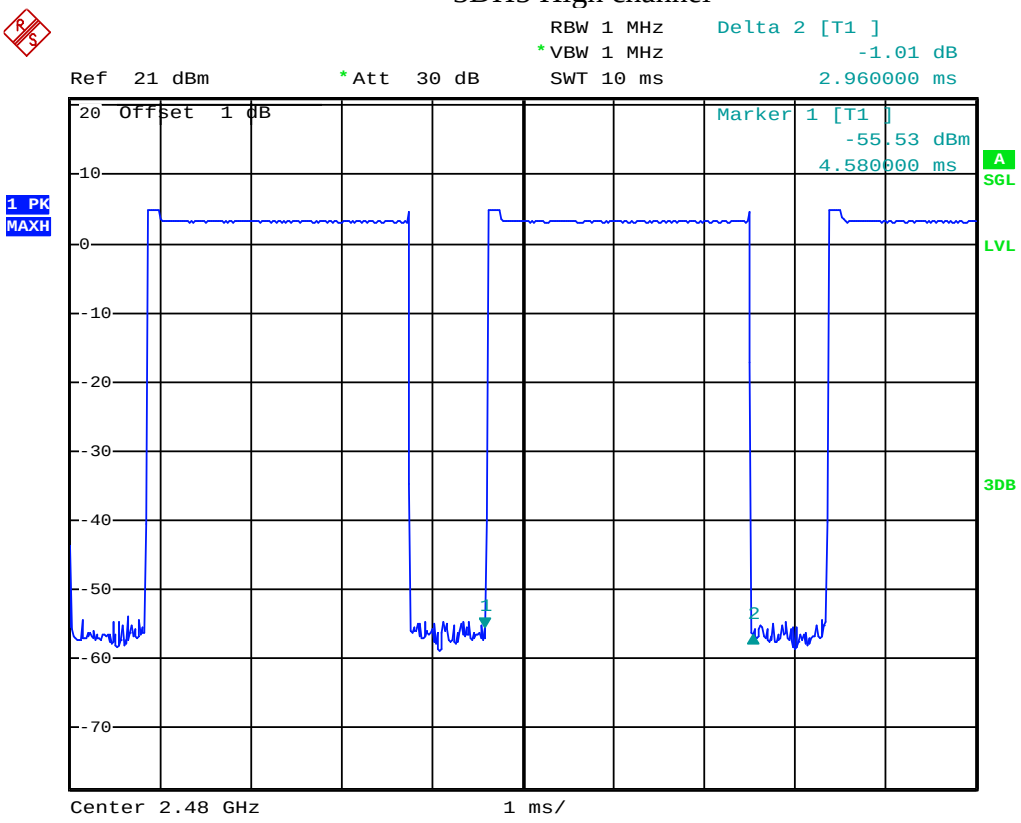
3DH5 Low channel



3DH5 Middle channel

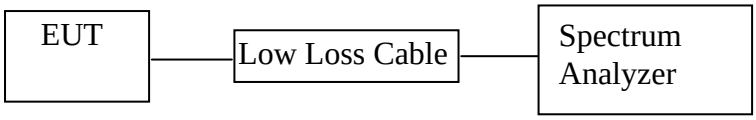


3DH5 High channel



# 9. MAXIMUM PEAK OUTPUT POWER TEST

## 9.1.Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 9.2.The Requirement For Section 15.247(b)(1)

Section 15.247(b)(1): For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

## 9.3.EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 9.4.Operating Condition of EUT

9.4.1.Setup the EUT and simulator as shown as Section 9.1.

9.4.2.Turn on the power of all equipment.

9.4.3.Let the EUT work in TX (Hopping off) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2441MHz, and 2480MHz TX frequency to transmit.

## 9.5.Test Procedure

9.5.1.The transmitter output was connected to the spectrum analyzer through a low loss cable.

9.5.2.Set RBW of spectrum analyzer to 1MHz and VBW to 3MHz for GFSK mode

9.5.3.Set RBW of spectrum analyzer to 3MHz and VBW to 3MHz for other mode

9.5.4.Measurement the maximum peak output power.

## 9.6.Test Result

GFSK Mode

| Channel | Frequency (MHz) | Peak Output Power (dBm) | Limits dBm / W |
|---|---|---|---|
| Low | 2402 | 3.61 | 30/1.0 |
| Middle | 2441 | 2.48 | 30/1.0 |
| High | 2480 | 2.43 | 30/1.0 |

∏/4-DQPSK Mode

| Channel | Frequency (MHz) | Peak Output Power (dBm) | Limits dBm / W |
|---|---|---|---|
| Low | 2402 | 2.46 | 21 / 0.125 |
| Middle | 2441 | 1.87 | 21 / 0.125 |
| High | 2480 | 2.30 | 21 / 0.125 |

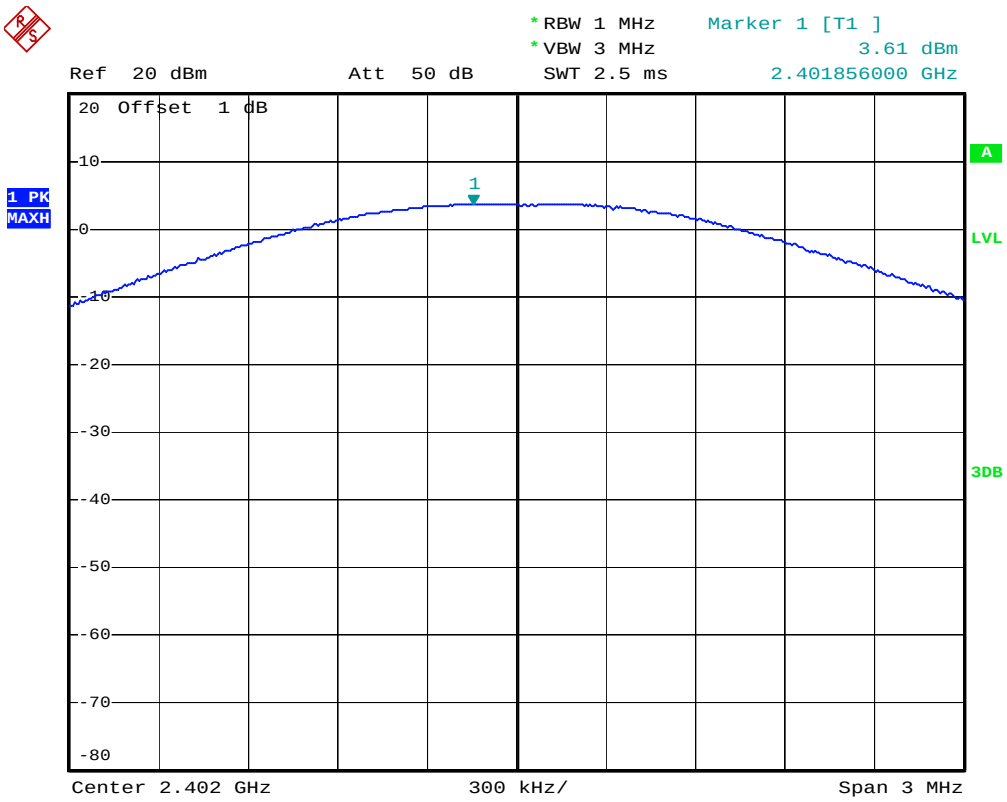
8QPSK Mode

| Channel | Frequency (MHz) | Peak Output Power (dBm) | Limits dBm / W |
|---|---|---|---|
| Low | 2402 | 2.23 | 21 / 0.125 |
| Middle | 2441 | 2.01 | 21 / 0.125 |
| High | 2480 | 2.80 | 21 / 0.125 |

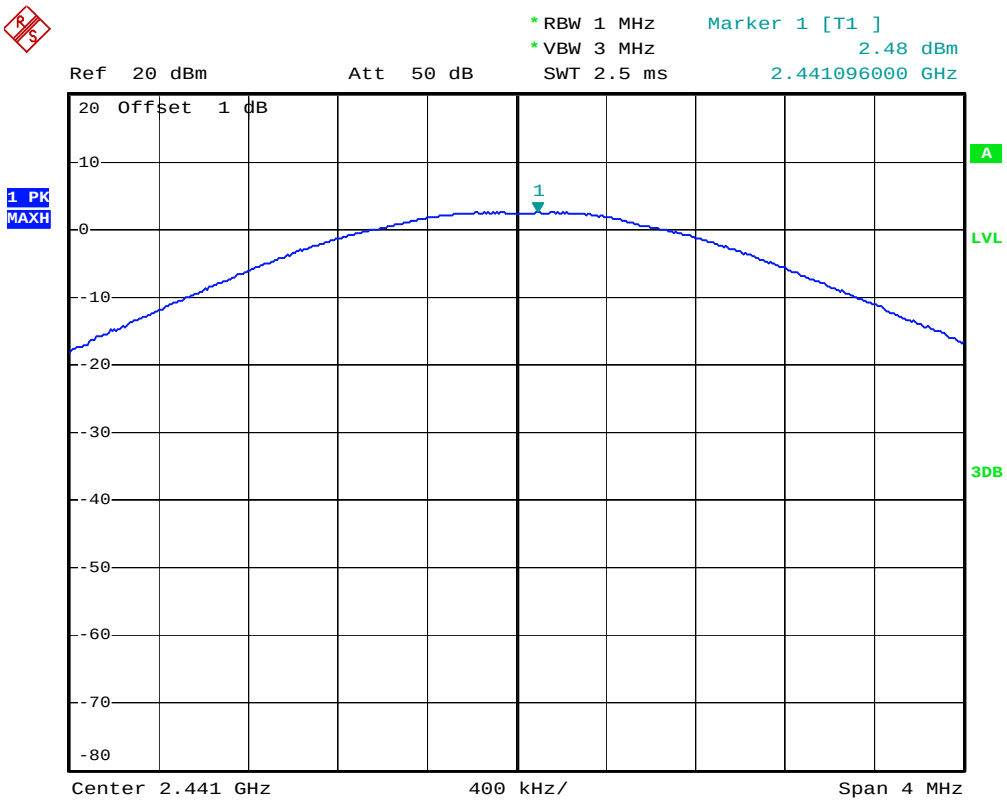
The spectrum analyzer plots are attached as below.

GFSK Mode

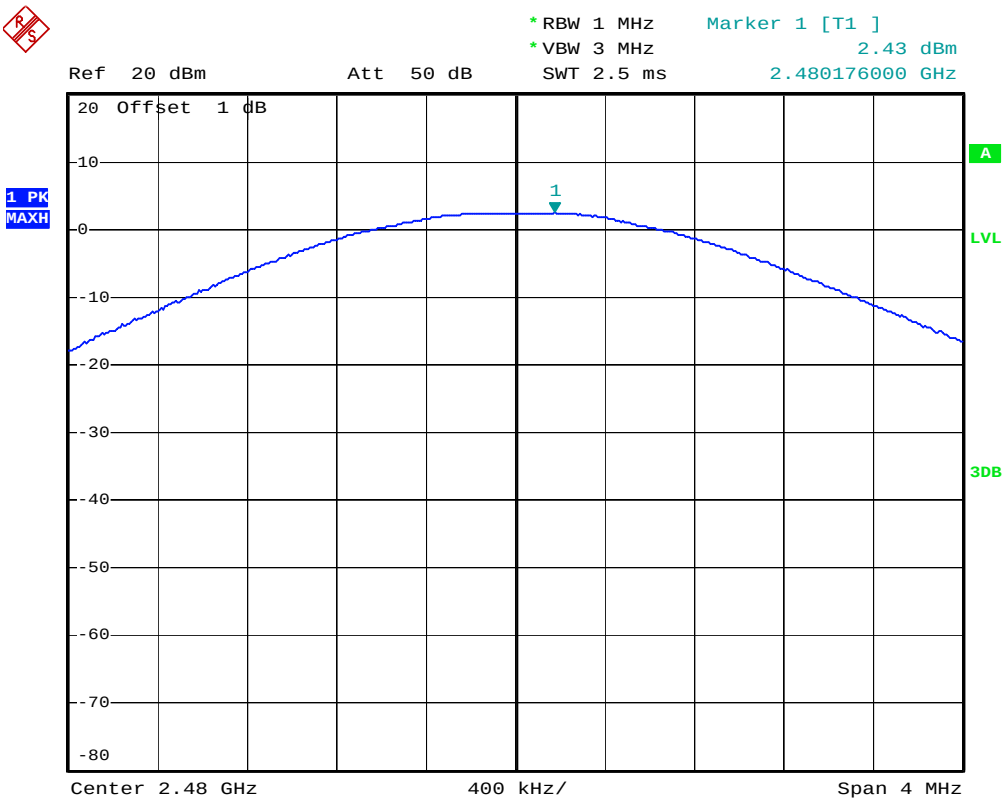
Low channel



Middle channel

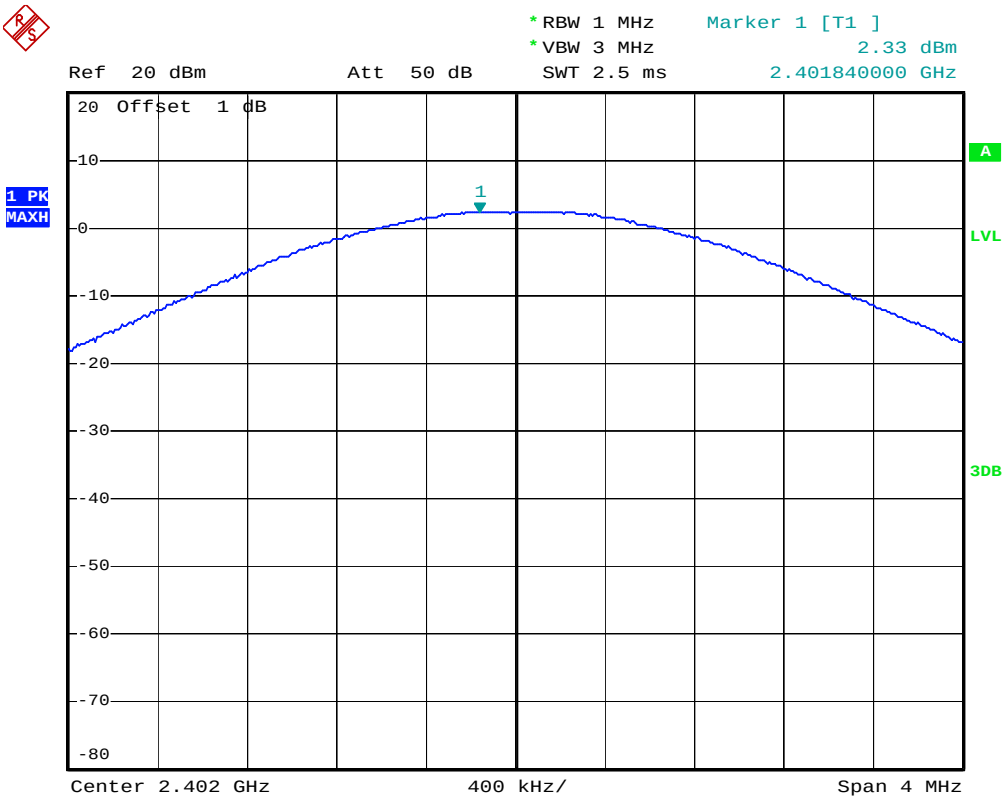


High channel

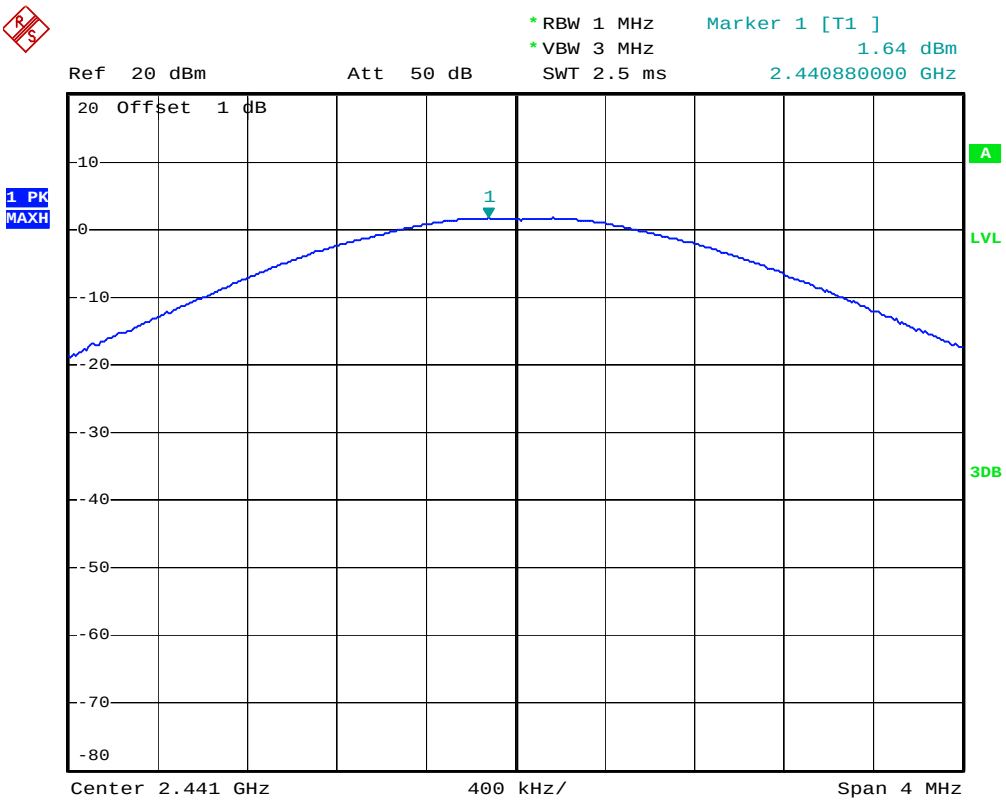


## Π/4-DQPSK Mode

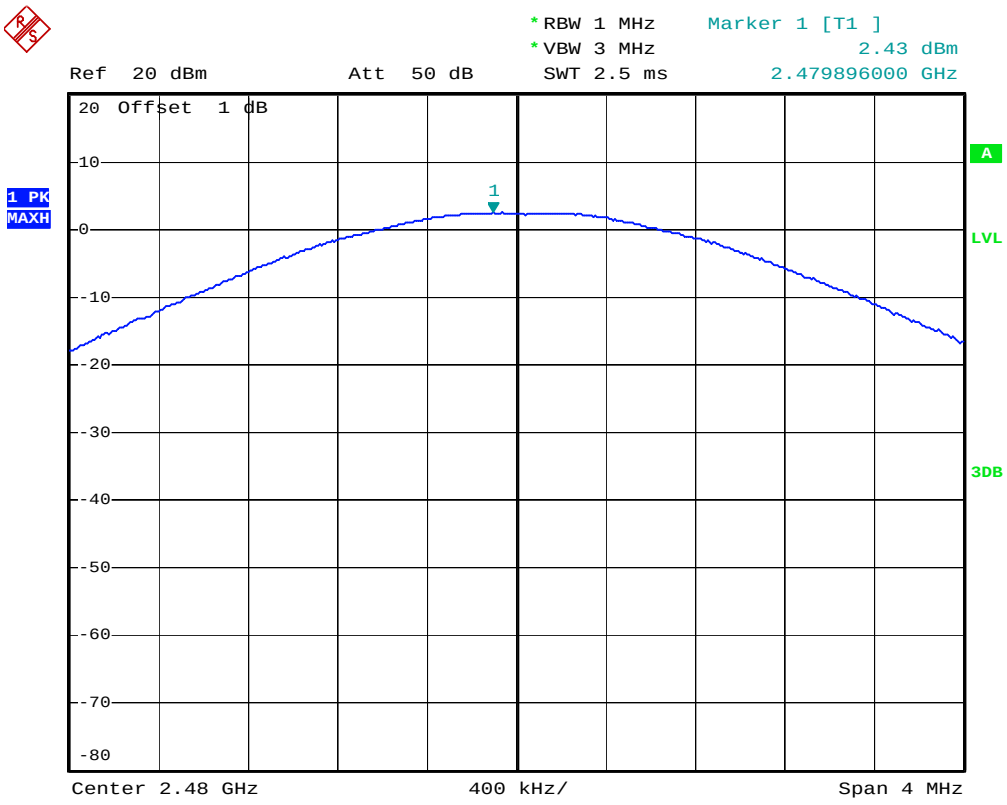
Low channel



Middle channel

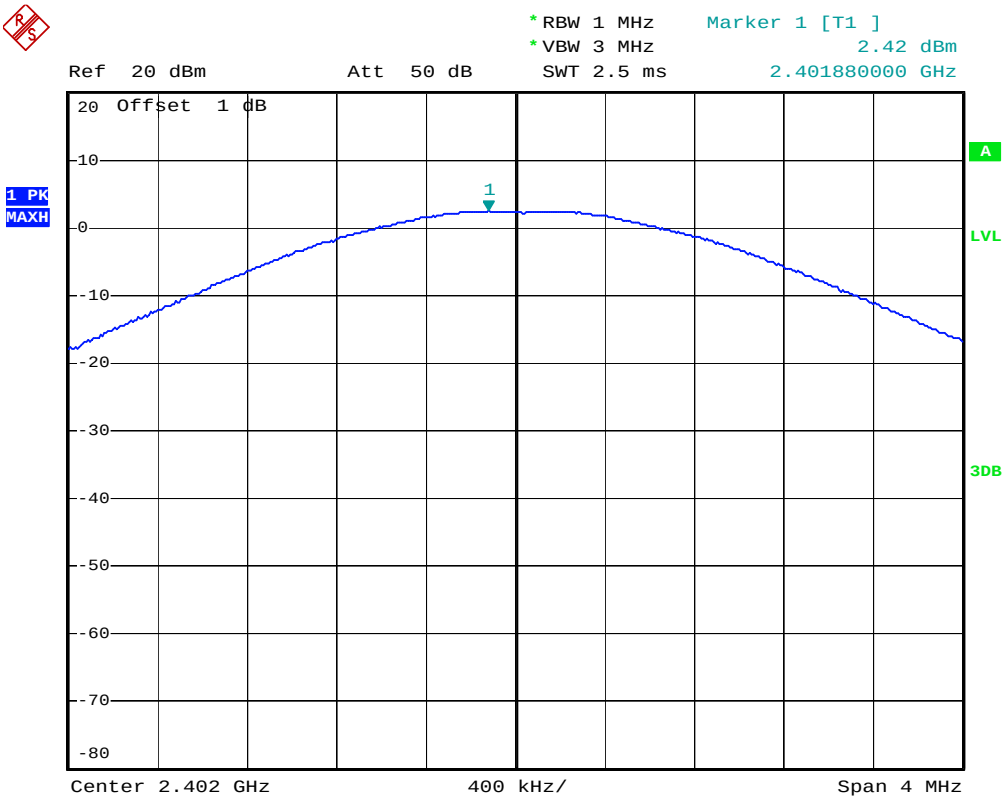


High channel

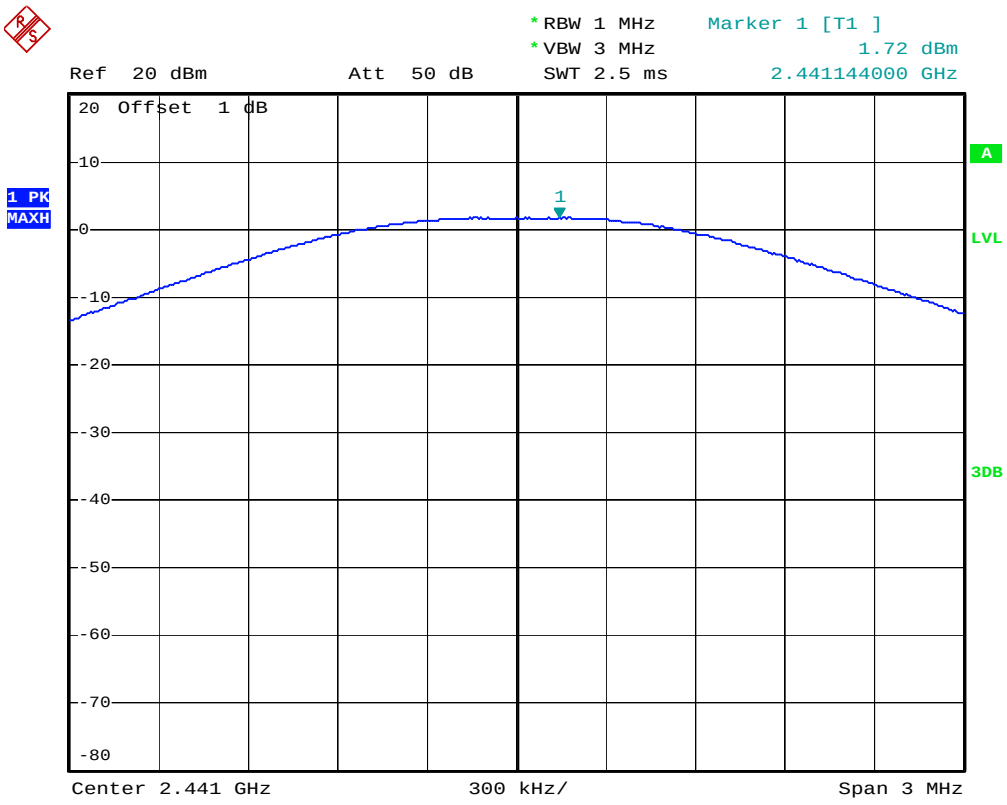


8QPSK Mode

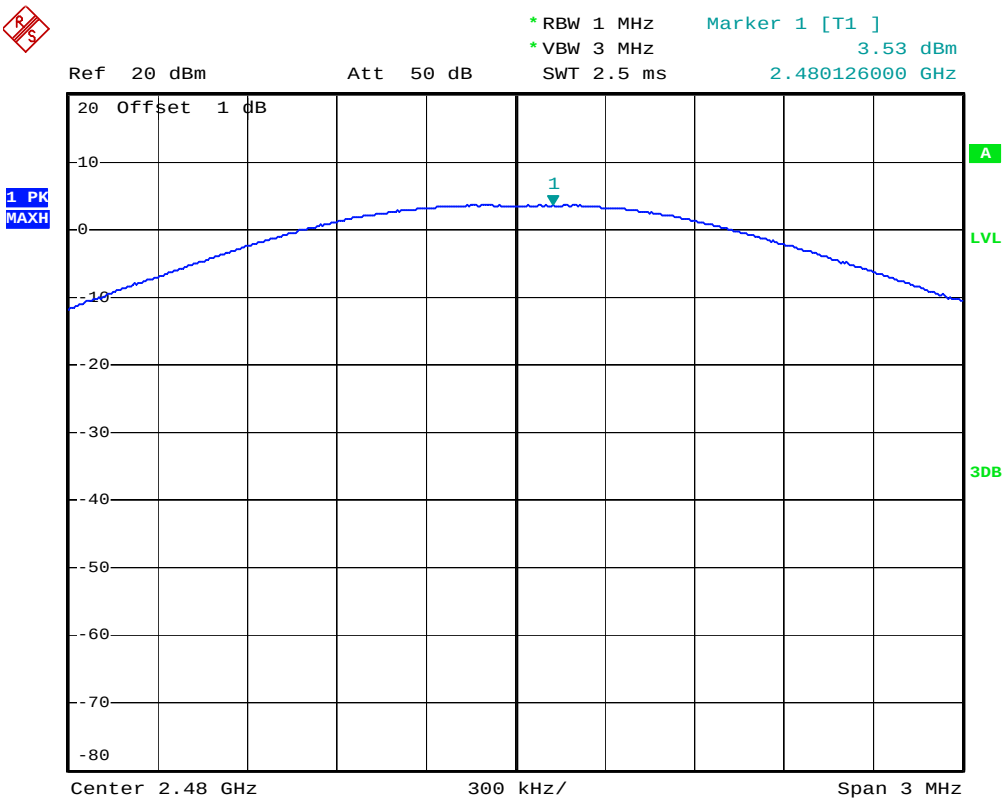
Low channel



Middle channel



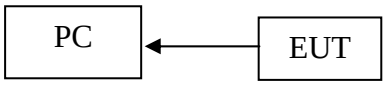
High channel



# 10.RADIATED EMISSION TEST

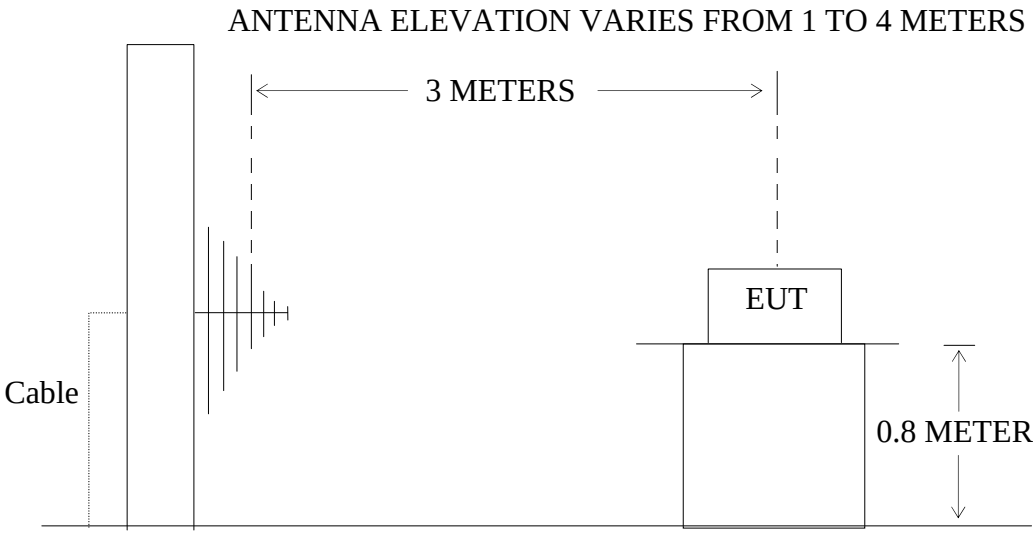
## 10.1.Block Diagram of Test Setup

### 10.1.1.Block diagram of connection between the EUT and simulators




(EUT: Wireless Floating Speaker)

### 10.1.2.Anechoic Chamber Test Setup Diagram




(EUT: Wireless Floating Speaker)

## 10.2.The Limit For Section 15.247(d)

Section 15.247(d): In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

## 10.3.Restricted bands of operation

### 10.3.1.FCC Part 15.205 Restricted bands of operation

(a) Except as shown in paragraph (d) of this section, Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|---|---|---|---|
| 0.090-0.110 | 16.42-16.423 | 399.9-410 | 4.5-5.15 |
| [1]0.495-0.505 | 16.69475-16.69525 | 608-614 | 5.35-5.46 |
| 2.1735-2.1905 | 16.80425-16.80475 | 960-1240 | 7.25-7.75 |
| 4.125-4.128 | 25.5-25.67 | 1300-1427 | 8.025-8.5 |
| 4.17725-4.17775 | 37.5-38.25 | 1435-1626.5 | 9.0-9.2 |
| 4.20725-4.20775 | 73-74.6 | 1645.5-1646.5 | 9.3-9.5 |
| 6.215-6.218 | 74.8-75.2 | 1660-1710 | 10.6-12.7 |
| 6.26775-6.26825 | 108-121.94 | 1718.8-1722.2 | 13.25-13.4 |
| 6.31175-6.31225 | 123-138 | 2200-2300 | 14.47-14.5 |
| 8.291-8.294 | 149.9-150.05 | 2310-2390 | 15.35-16.2 |
| 8.362-8.366 | 156.52475-156.52525 | 2483.5-2500 | 17.7-21.4 |
| 8.37625-8.38675 | 156.7-156.9 | 2690-2900 | 22.01-23.12 |
| 8.41425-8.41475 | 162.0125-167.17 | 3260-3267 | 23.6-24.0 |
| 12.29-12.293 | 167.72-173.2 | 3332-3339 | 31.2-31.8 |
| 12.51975-12.52025 | 240-285 | 3345.8-3358 | 36.43-36.5 |
| 12.57675-12.57725 | 322-335.4 | 3600-4400 | ([2]) |
| 13.36-13.41 | | | |

[1]Until February 1, 1999, this restricted band shall be 0.490-0.510
[2]Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emission appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, Compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

## 10.4.Configuration of EUT on Measurement

The equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 10.5.Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on an antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarizations of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4- 2009 on radiated emission measurement.
The bandwidth of test receiver (R&S ESI26) is set at 120 KHz in 30-1000MHz. and set at 1MHz in above 1000MHz.
The frequency range from 30MHz to 25000MHz is checked.
The final measurement in band 9-90 kHz, 110-490 kHz and above 1000MHz is performed with Average detector. Except those frequency bands mention above, the final measurement for frequencies below 1000MHz is performed with Quasi Peak detector.
The field strength is calculated by adding the antenna factor, and cable loss, and subtracting the amplifier gain from the measured reading. The basic equation calculation is as follows:
Result = Reading + Corrected Factor
Where Corrected Factor = Antenna Factor + Cable Loss – Amplifier Gain

## 10.6.The Field Strength of Radiation Emission Measurement Results

**Note: 1.We tested GFSK mode, ∏/4-DQPSK Mode & 8QPSK mode and recorded the worst case data (GFSK mode) for all test mode.**

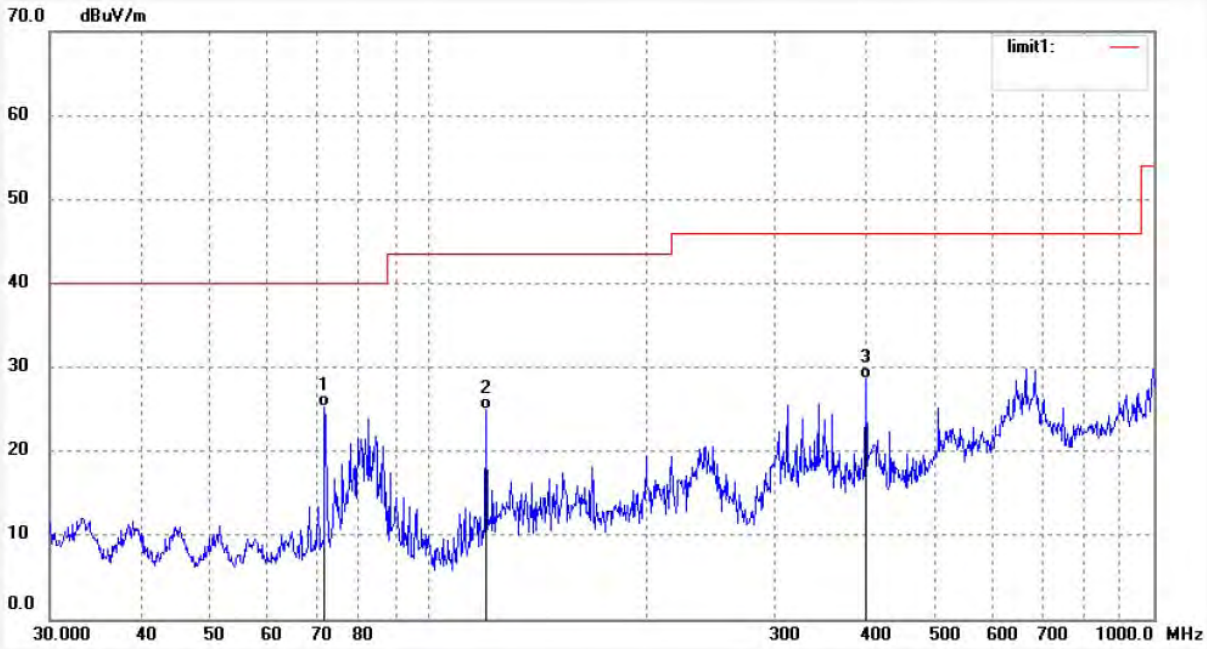
**2. The fundamental radiated emissions were reduced by 2.4G Band Reject Filter in the attached plots.**

**3. The 18-25GHz emissions are not reported, because the levels are too low against the limit.**

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3003 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 13/49/46 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

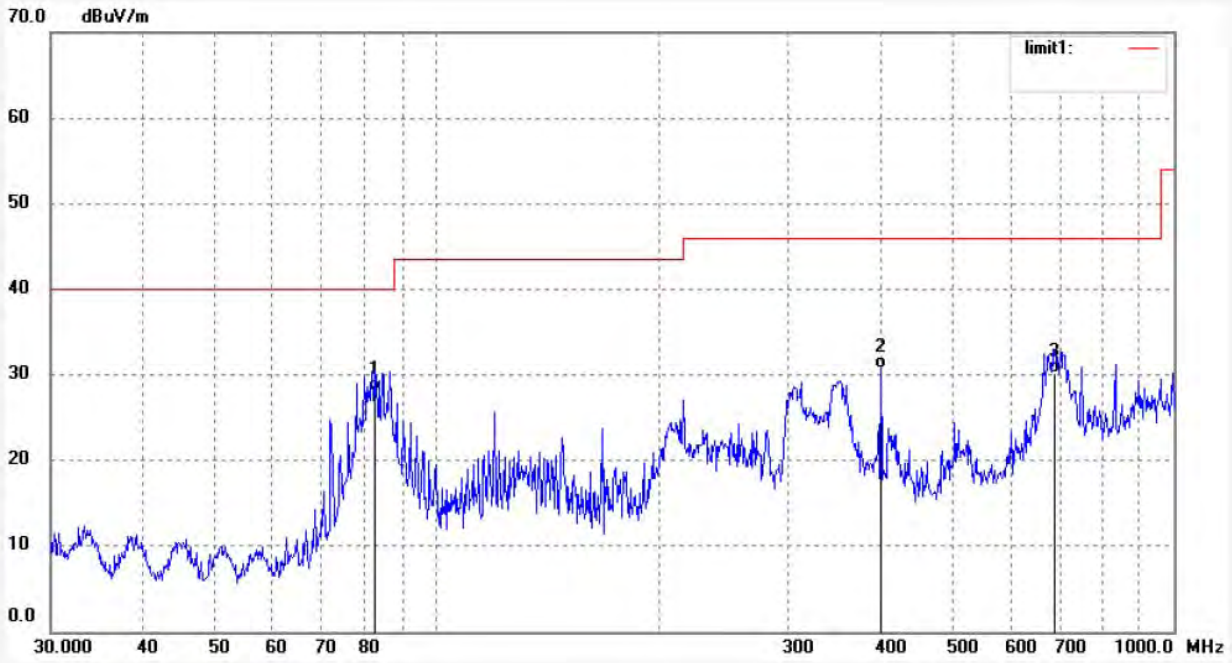



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 71.8320 | 46.72 | -21.45 | 25.27 | 40.00 | -14.73 | QP | | | |
| 2 | 119.8556 | 47.54 | -22.52 | 25.02 | 43.50 | -18.48 | QP | | | |
| 3 | 400.4319 | 44.18 | -15.63 | 28.55 | 46.00 | -17.45 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3004 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 13/52/24 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

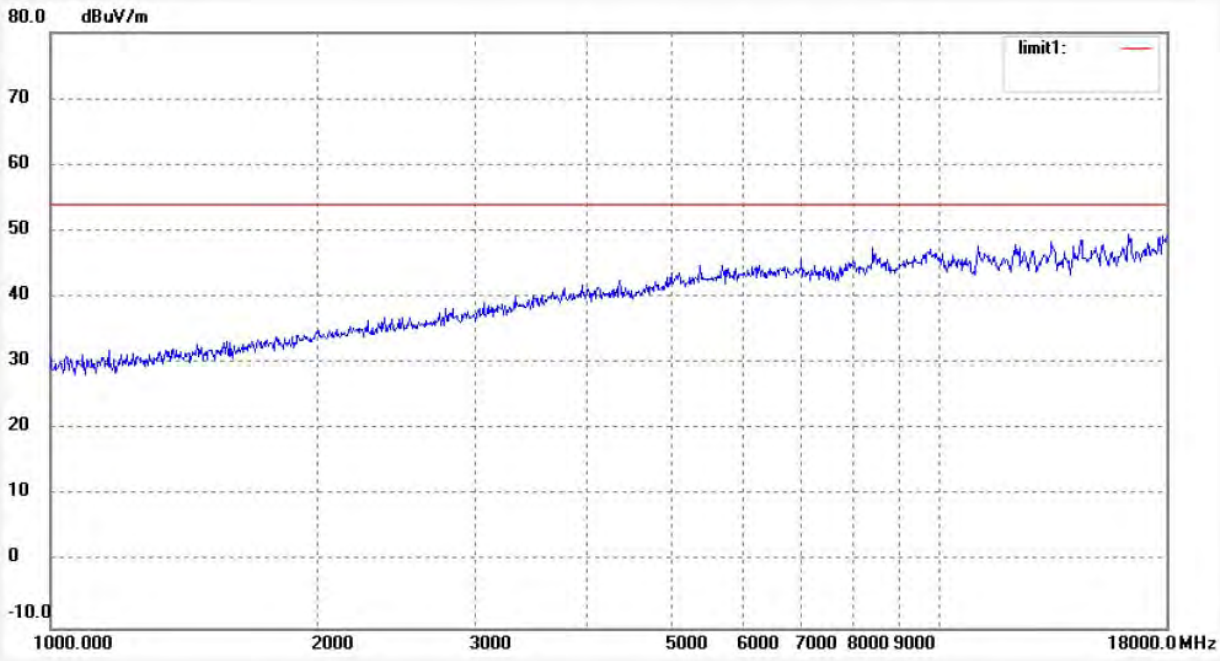



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 82.6482 | 49.50 | -21.47 | 28.03 | 40.00 | -11.97 | QP | | | |
| 2 | 400.4319 | 46.29 | -15.63 | 30.66 | 46.00 | -15.34 | QP | | | |
| 3 | 689.5644 | 40.18 | -9.98 | 30.20 | 46.00 | -15.80 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3033 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 11/46/08 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

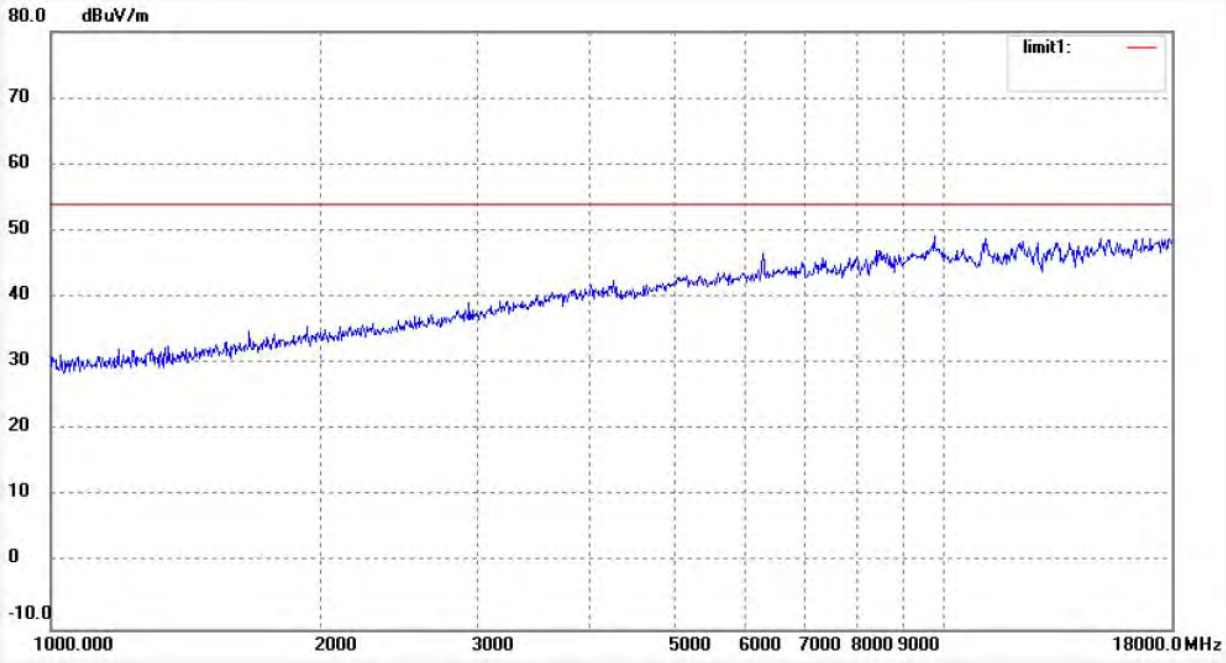



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3034 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 11/49/32 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2402MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

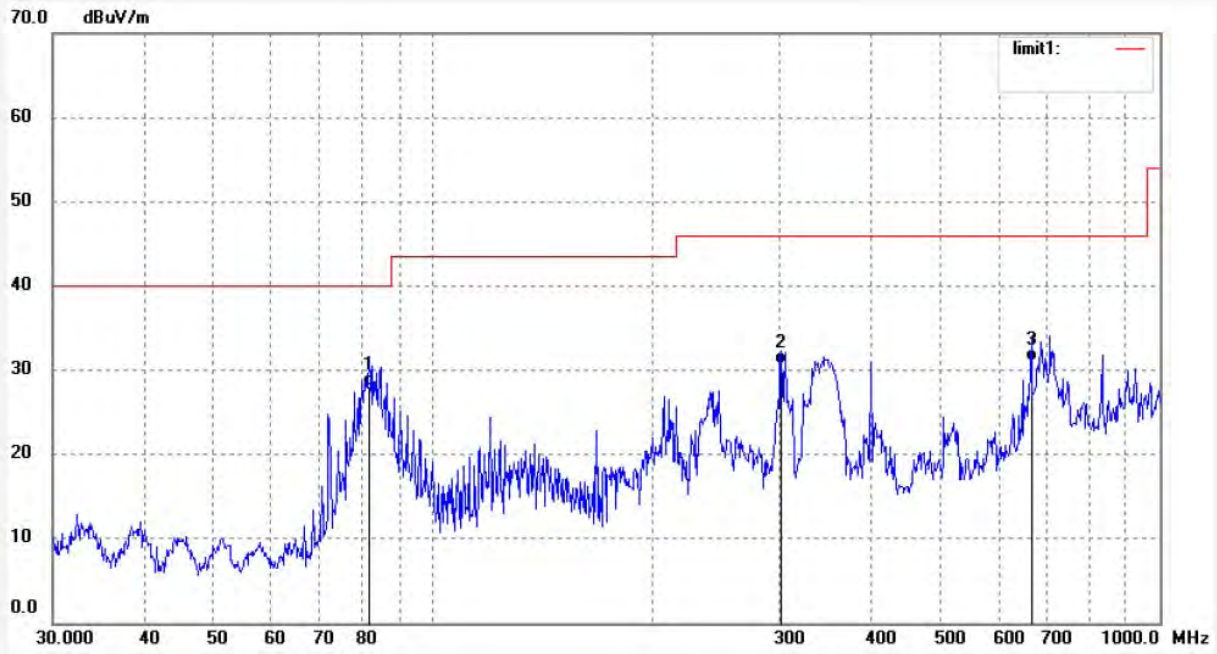



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3005 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 13/55/38 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2441MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

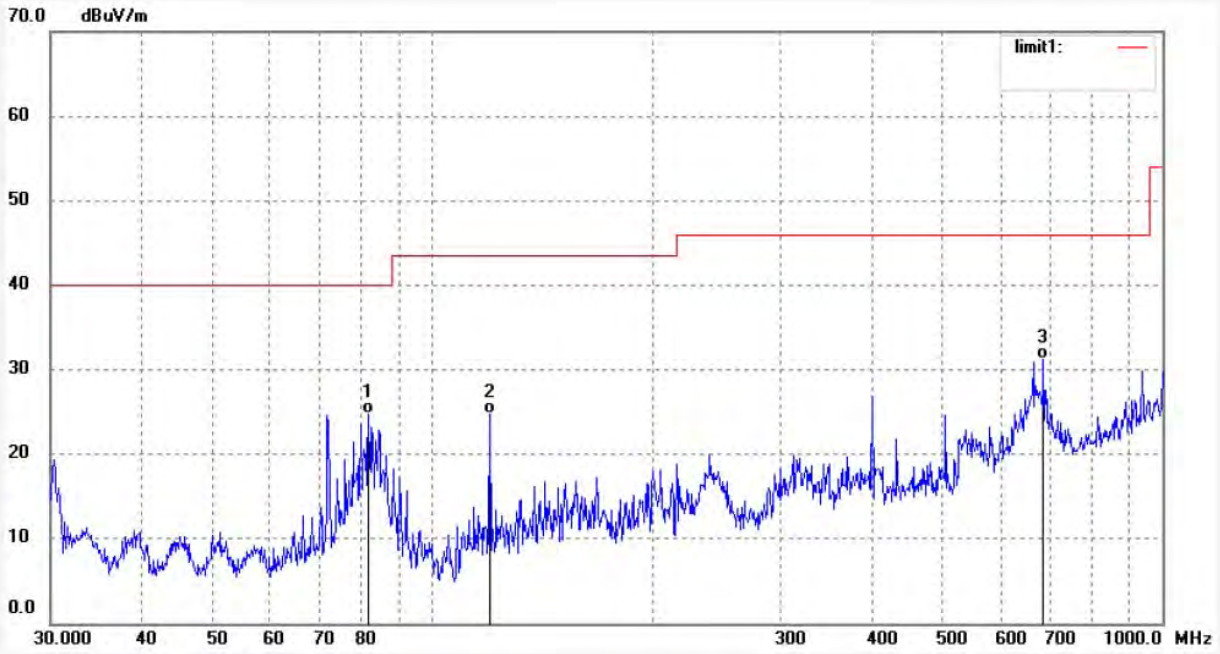



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 81.7833 | 49.56 | -21.43 | 28.13 | 40.00 | -11.87 | QP | | | |
| 2 | 301.4224 | 48.50 | -17.84 | 30.66 | 46.00 | -15.34 | QP | | | |
| 3 | 665.8035 | 41.39 | -10.35 | 31.04 | 46.00 | -14.96 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3006 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 13/58/21 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2441MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

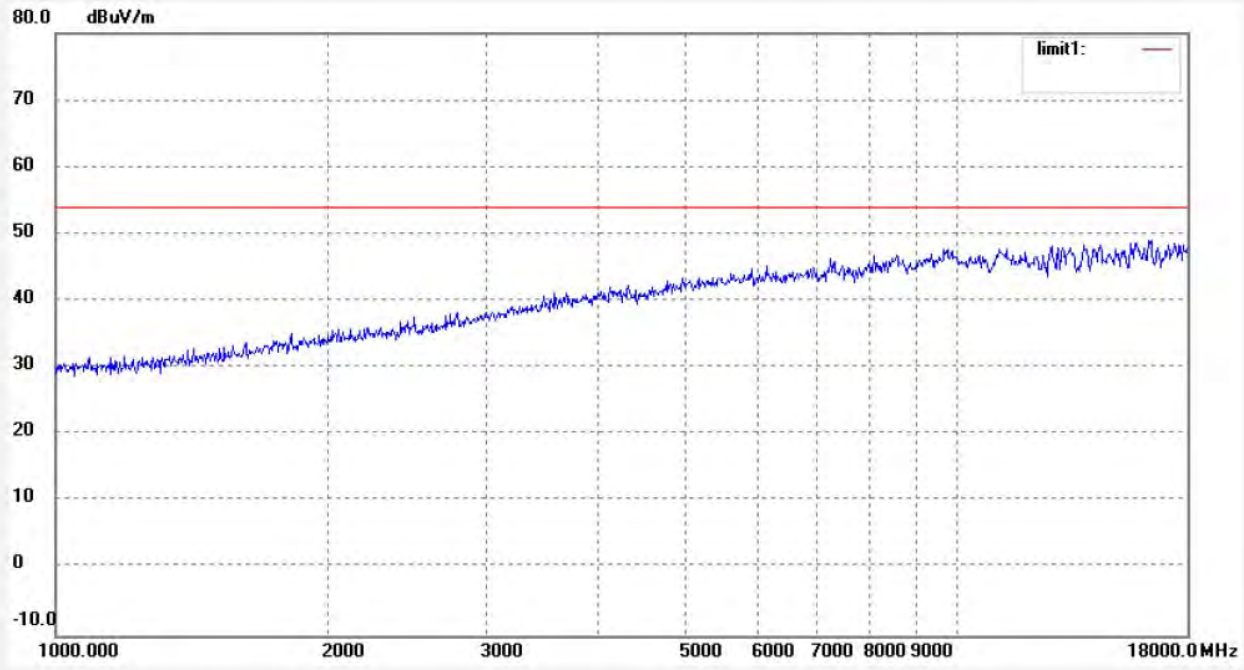



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 81.7833 | 46.12 | -21.43 | 24.69 | 40.00 | -15.31 | QP | | | |
| 2 | 119.8556 | 47.33 | -22.52 | 24.81 | 43.50 | -18.69 | QP | | | |
| 3 | 687.1507 | 41.32 | -10.01 | 31.31 | 46.00 | -14.69 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3035 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 11/52/06 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2441MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

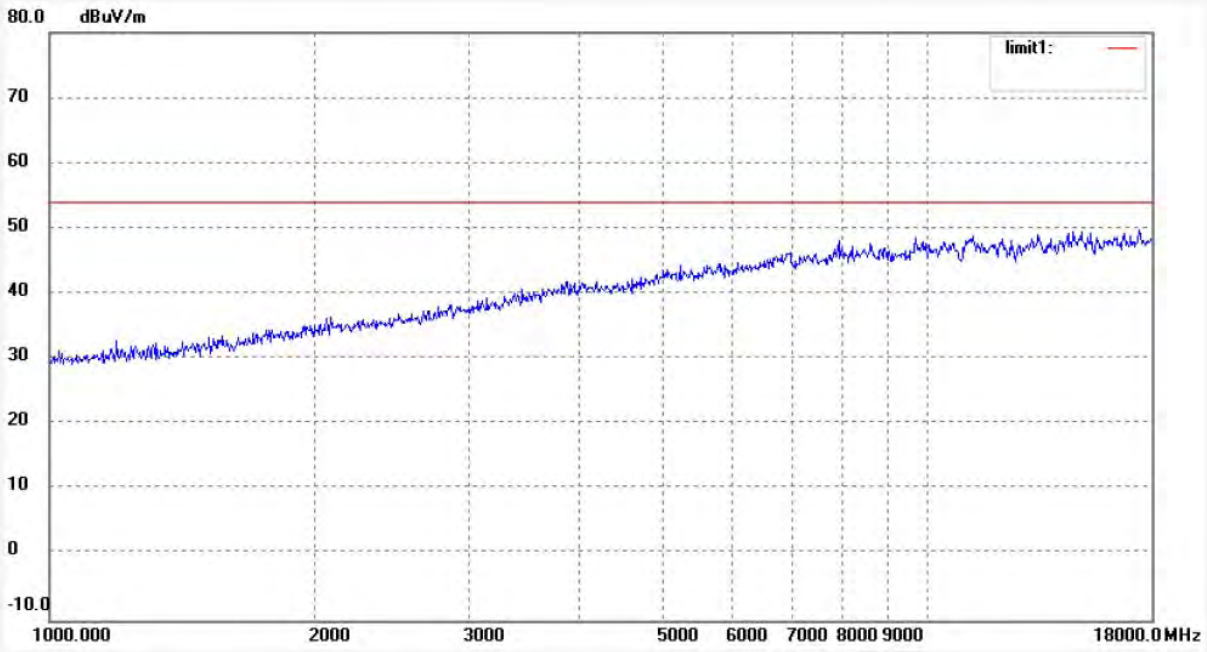



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3036 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 11/55/44 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2441MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

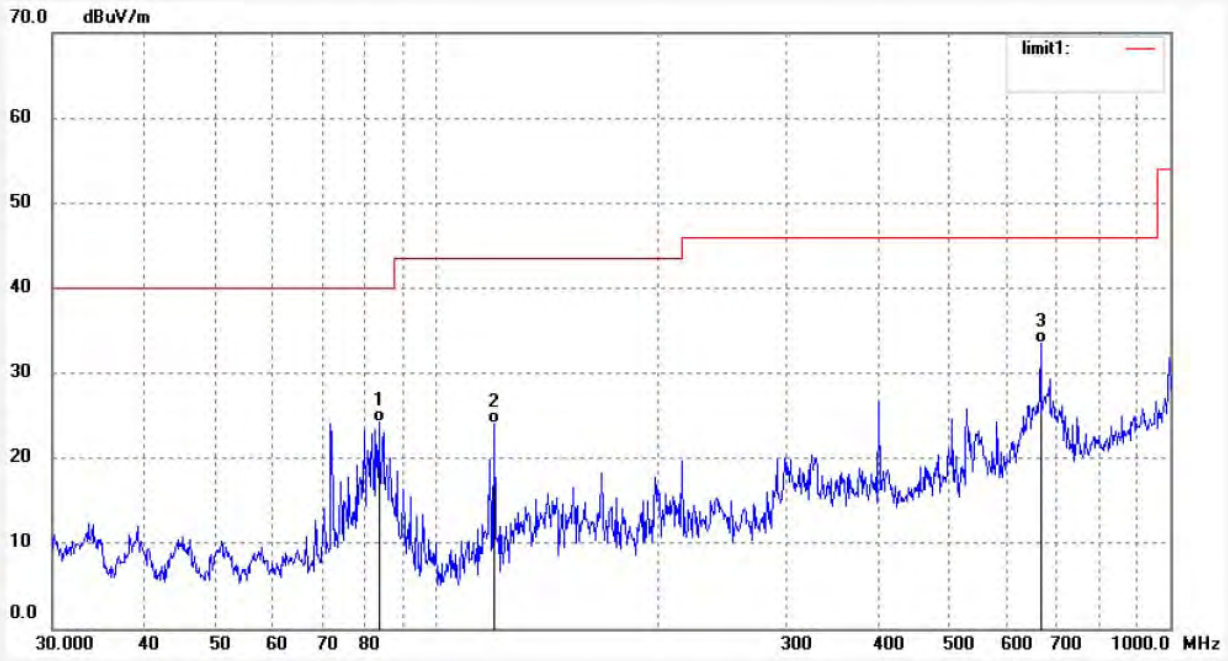



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3007 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 14/02/07 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

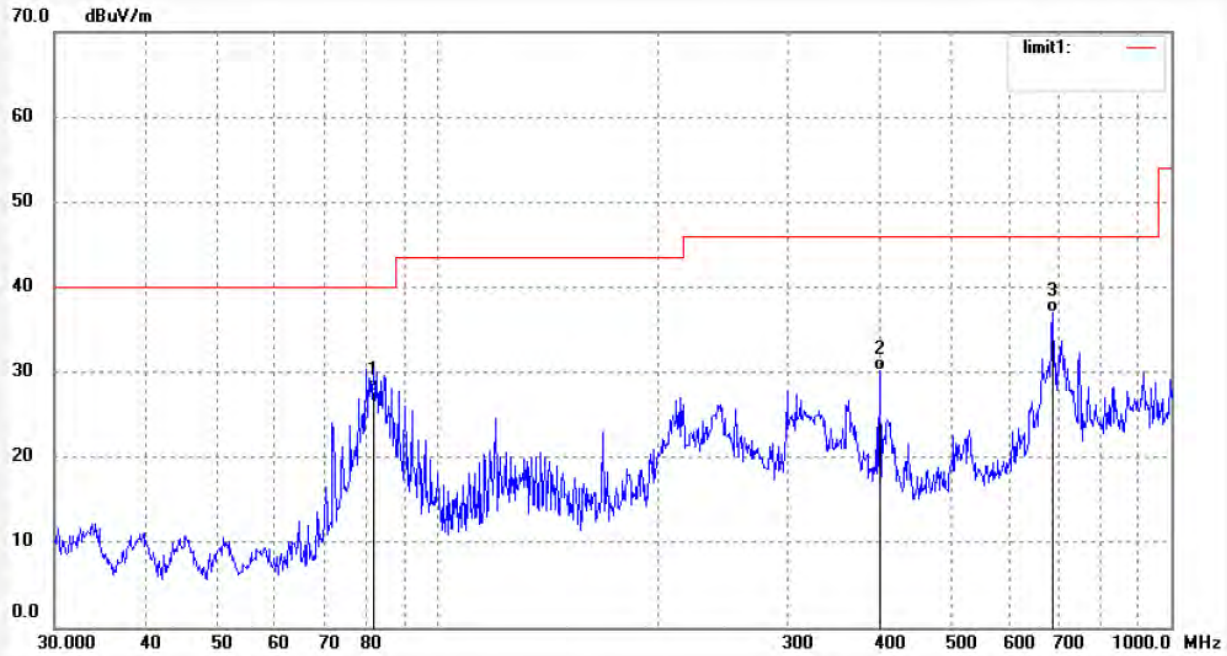



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 83.5221 | 45.78 | -21.50 | 24.28 | 40.00 | -15.72 | QP | | | |
| 2 | 119.8555 | 46.59 | -22.52 | 24.07 | 43.50 | -19.43 | QP | | | |
| 3 | 665.8034 | 43.79 | -10.35 | 33.44 | 46.00 | -12.56 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3008 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 14/05/48 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

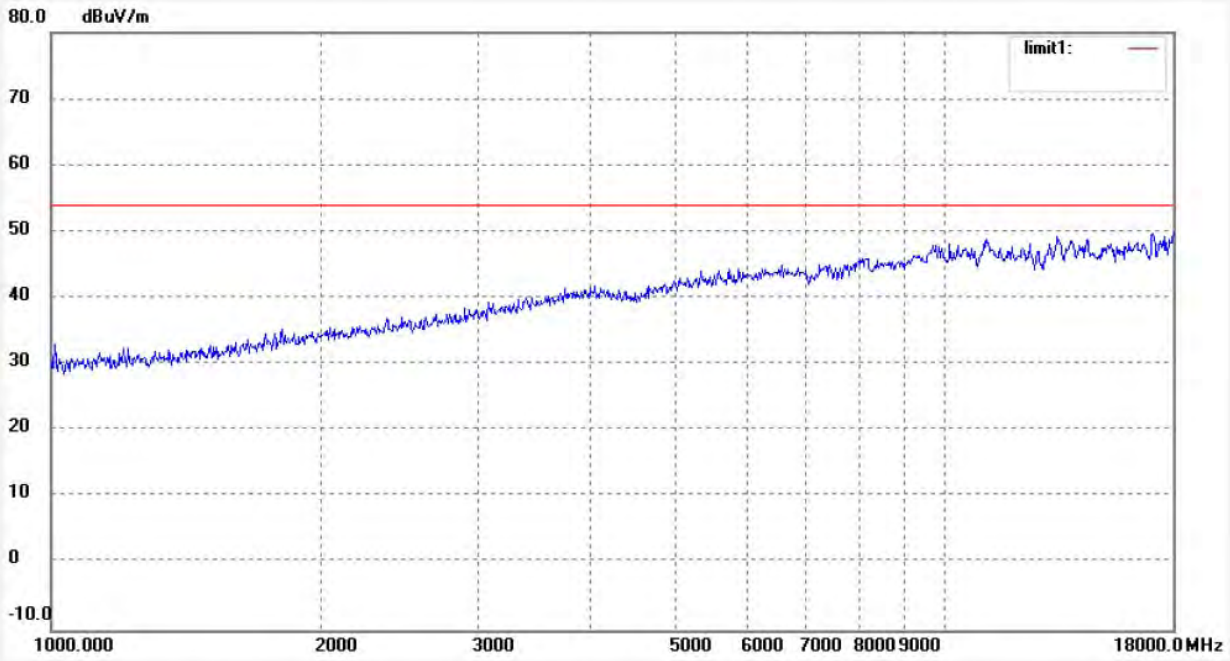



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 81.7833 | 49.24 | -21.43 | 27.81 | 40.00 | -12.19 | QP | | | |
| 2 | 400.4319 | 45.88 | -15.63 | 30.25 | 46.00 | -15.75 | QP | | | |
| 3 | 689.5644 | 46.94 | -9.98 | 36.96 | 46.00 | -9.04 | QP | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3037 | Polarization: Horizontal |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 11/58/19 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947

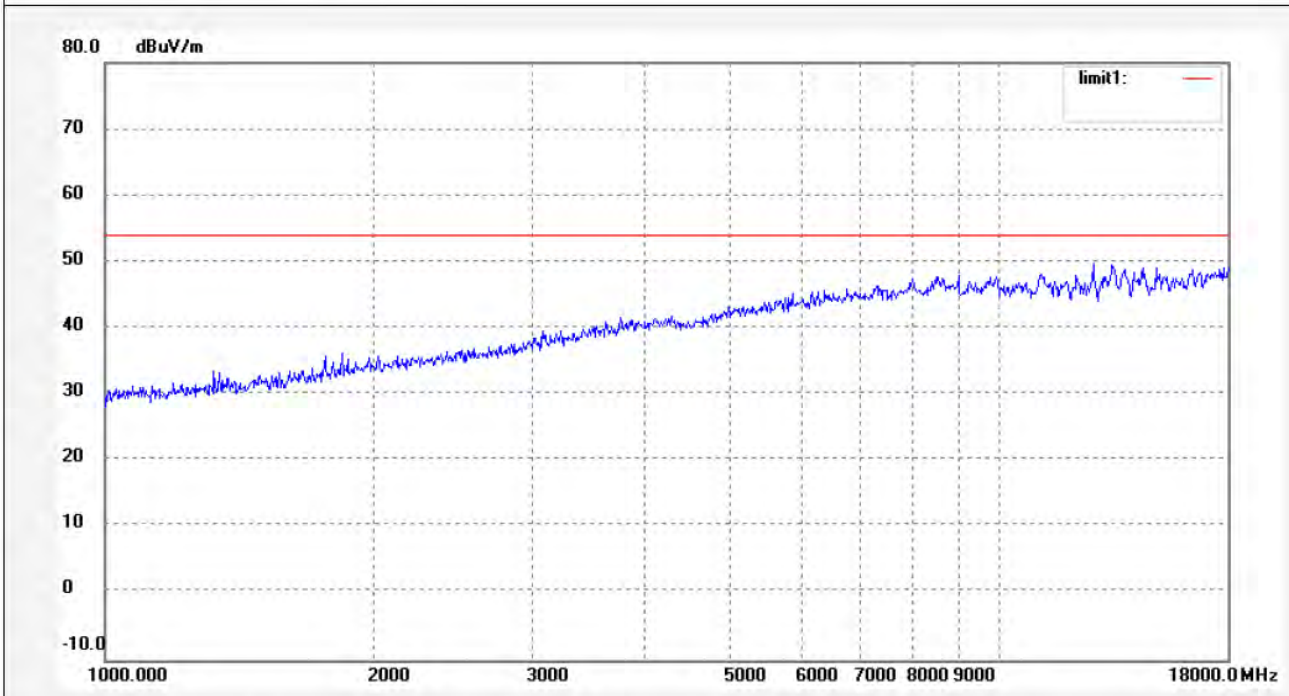



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3038 | Polarization: Vertical |
| Standard: FCC Class B 3M Radiated | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/11/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 12/02/47 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

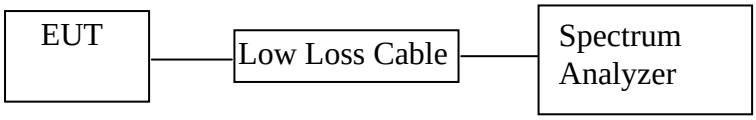
Note: Report No.:ATE20131947




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|

# 11. BAND EDGE COMPLIANCE TEST

## 11.1. Block Diagram of Test Setup




(EUT: Wireless Floating Speaker)

## 11.2. The Requirement For Section 15.247(d)

Section 15.247(d): In any 100 kHz 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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a).

## 11.3. EUT Configuration on Measurement

The equipment are installed on the emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

## 11.4. Operating Condition of EUT

11.4.1. Setup the EUT and simulator as shown as Section 11.1.

11.4.2. Turn on the power of all equipment.

11.4.3. Let the EUT work in TX (Hopping off, Hopping on) modes measure it. The transmit frequency are 2402-2480MHz. We select 2402MHz, 2480MHz TX frequency to transmit.

## 11.5.Test Procedure

11.5.1.The transmitter output was connected to the spectrum analyzer via a low loss cable.

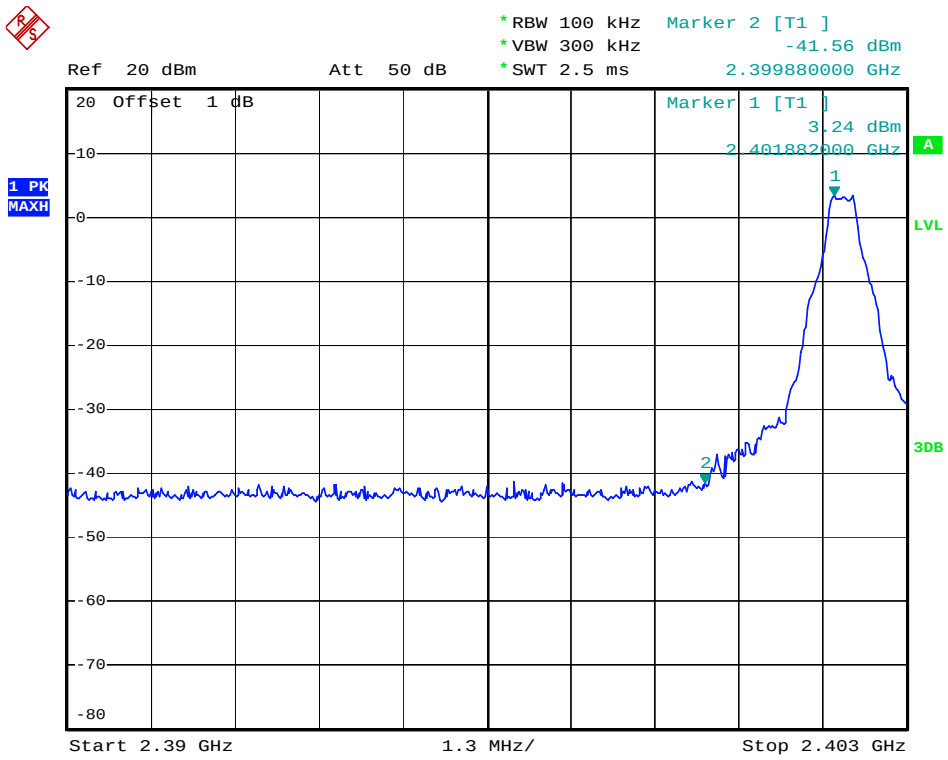
11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

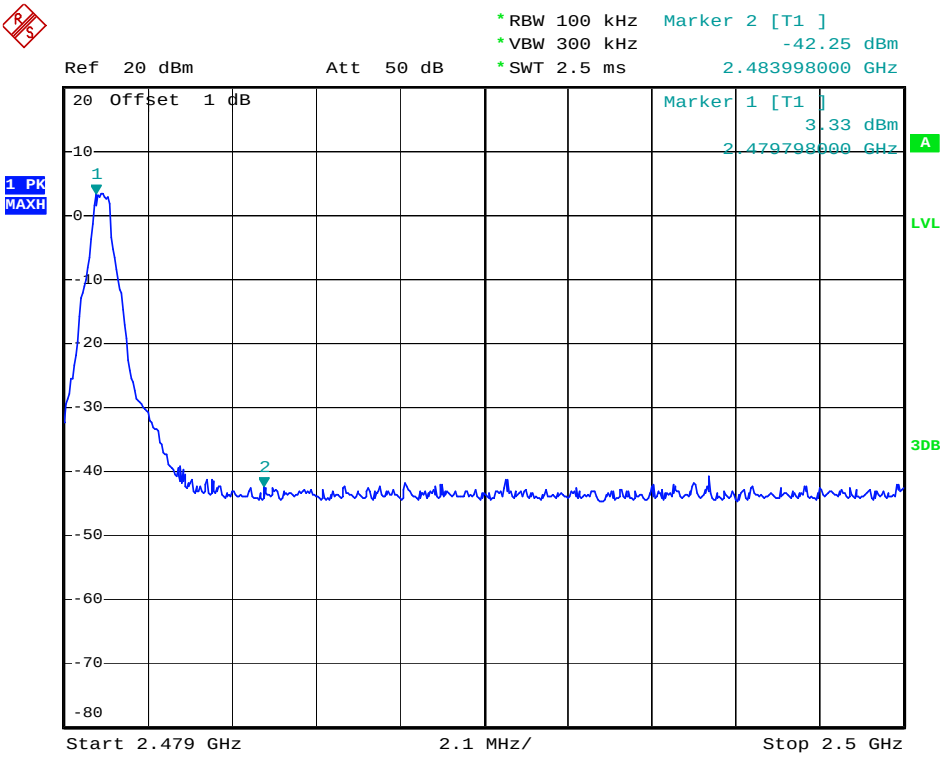
11.5.3.The band edges was measured and recorded.

## 11.6.Test Result

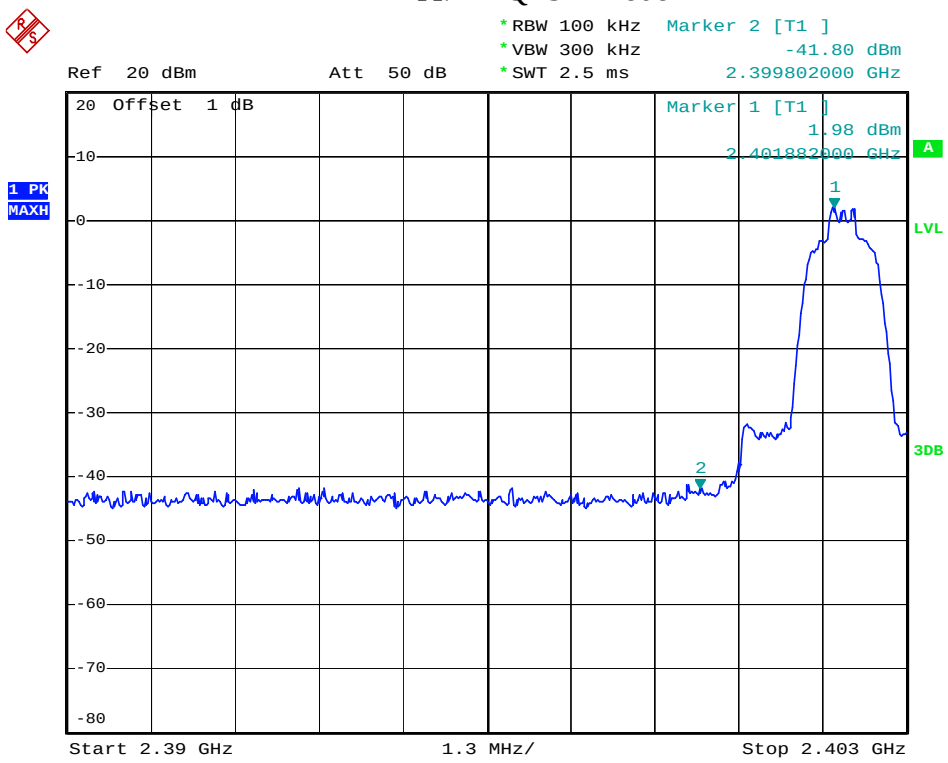
| Frequency (MHz) | Result of Band Edge (dBc) | Limit of Band Edge (dBc) |
|---|---|---|
| GFSK | | |
| 2399.880 | 44.80 | > 20dBc |
| 2483.998 | 45.58 | > 20dBc |
| Π/4-DQPSK Mode | | |
| 2399.802 | 43.79 | > 20dBc |
| 2484.838 | 44.09 | > 20dBc |
| 8QPSK | | |
| 2399.750 | 43.26 | > 20dBc |
| 2483.788 | 44.32 | > 20dBc |

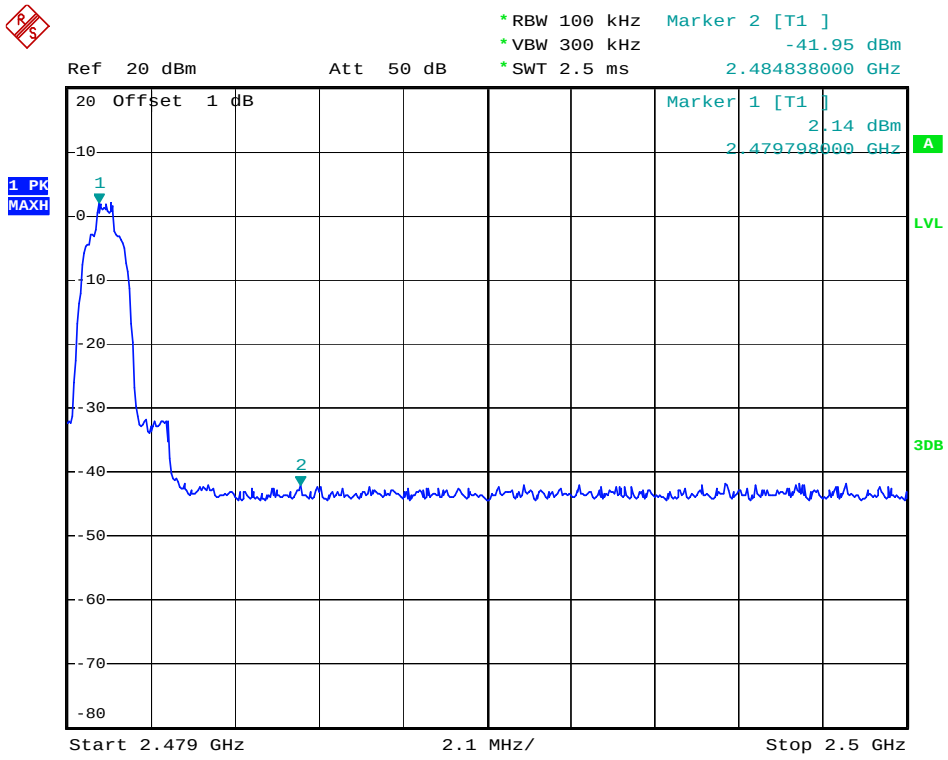
GFSK


*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Marker 2 [T1 ]
-41.56 dBm
2.399880000 GHz
Ref 20 dBm
Att 50 dB
20 Offset 1 dB
Marker 1 [T1 ]
3.24 dBm
2.401882000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.39 GHz
1.3 MHz/
Stop 2.403 GHz

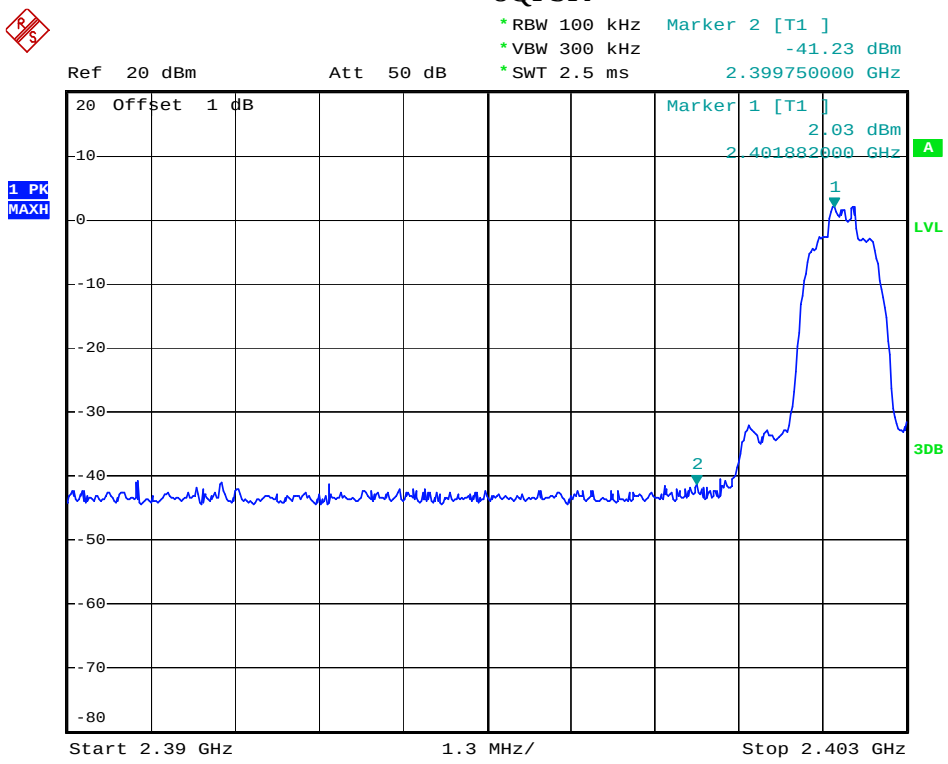

*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Marker 2 [T1 ]
-42.25 dBm
2.483998000 GHz
Ref 20 dBm
Att 50 dB
20 Offset 1 dB
Marker 1 [T1 ]
3.33 dBm
2.479798000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

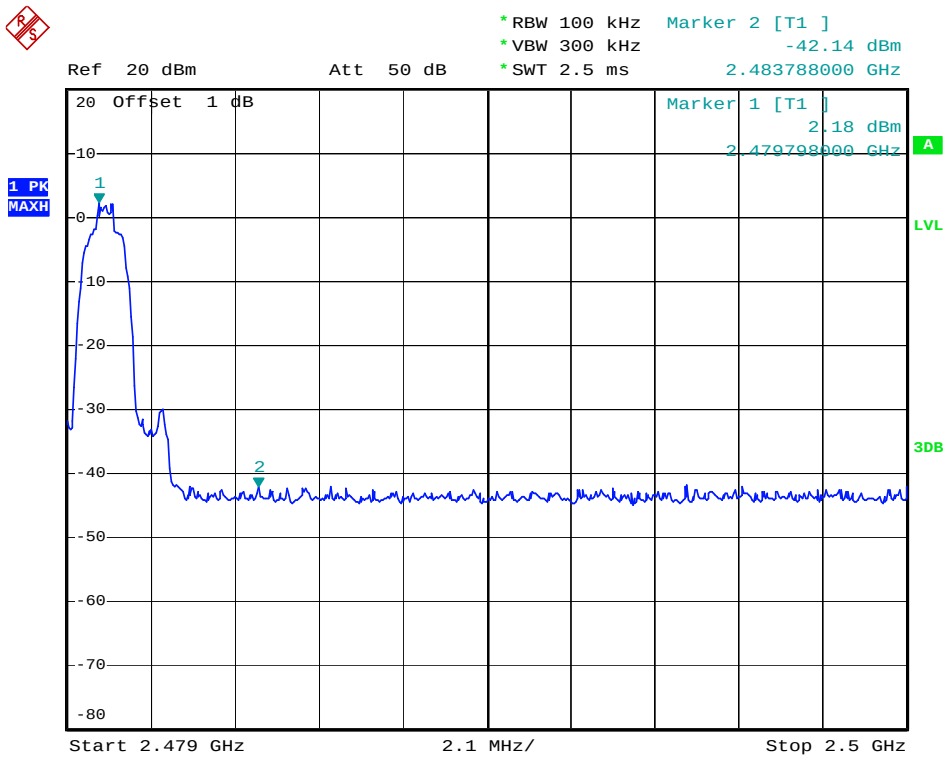
## Π/4-DQPSK Mode




*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
Att 50 dB
*SWT 2.5 ms
Marker 2 [T1 ]
-41.95 dBm
2.484838000 GHz
20 Offset 1 dB
Marker 1 [T1 ]
2.14 dBm
2.479798000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

8QPSK


*RBW 100 kHz
*VBW 300 kHz
Ref 20 dBm
Att 50 dB
*SWT 2.5 ms
Marker 2 [T1 ]
-41.23 dBm
2.399750000 GHz
20 Offset 1 dB
Marker 1 [T1 ]
2.03 dBm
2.401882000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.39 GHz
1.3 MHz/
Stop 2.403 GHz


*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Marker 2 [T1 ]
-42.14 dBm
2.483788000 GHz
Ref 20 dBm
Att 50 dB
20 Offset 1 dB
Marker 1 [T1 ]
2.18 dBm
2.479798000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

## Radiated Band Edge Result

Note:

1. Emissions attenuated more than 20 dB below the permissible value are not reported.
2. The field strength is calculated by adding the antenna factor, high pass filter loss(if used) and cable loss, and subtracting the amplifier gain(if any)from the measured reading. The basic equation calculation is as follows:

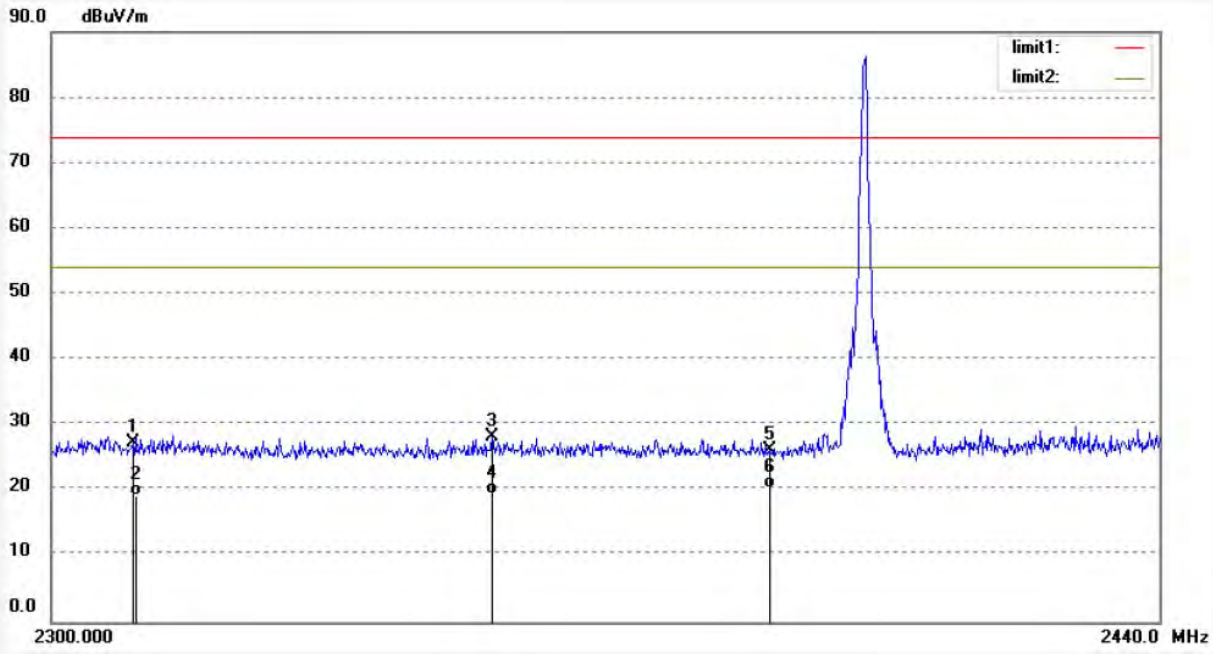
   Result = Reading + Corrected Factor
3. Display the measurement of peak values.

**Non-hopping mode**

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3015 | Polarization: Horizontal |
| Standard: FCC PK | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 14/25/37 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2402MHz(GFSK) | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947



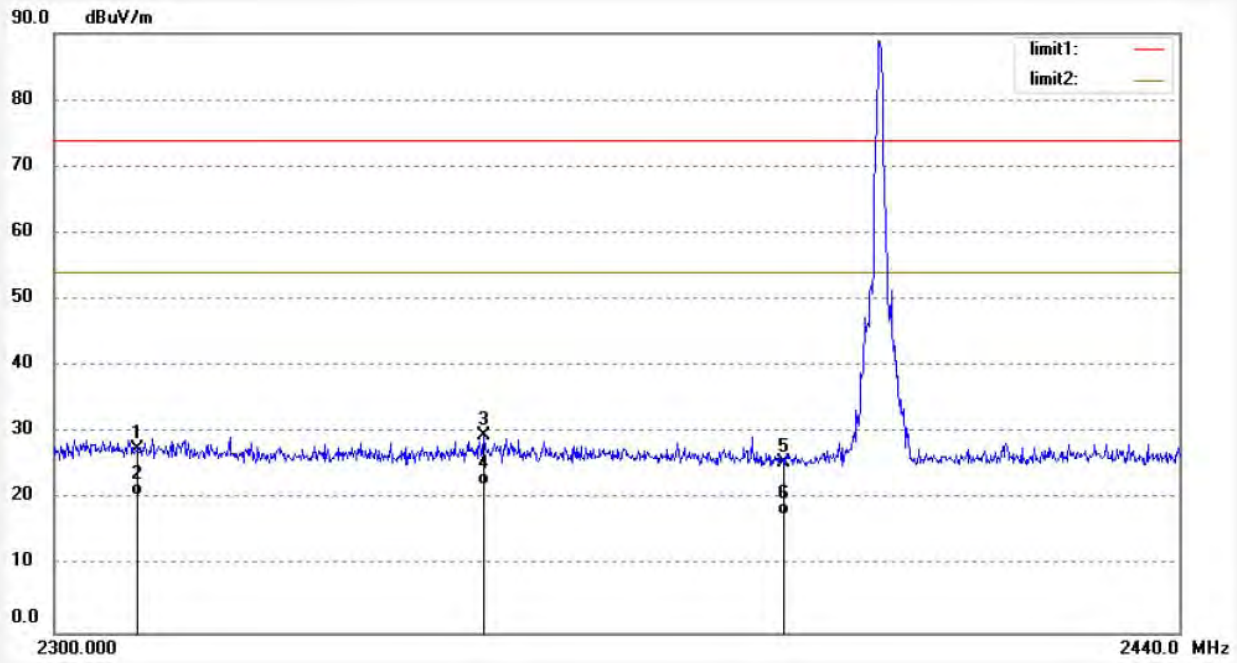

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 34.27 | -6.99 | 27.28 | 74.00 | -46.72 | peak | | | |
| 2 | 2310.000 | 26.25 | -6.99 | 19.26 | 54.00 | -34.74 | AVG | | | |
| 3 | 2354.740 | 35.04 | -6.88 | 28.16 | 74.00 | -45.84 | peak | | | |
| 4 | 2354.740 | 26.41 | -6.88 | 19.53 | 54.00 | -34.47 | AVG | | | |
| 5 | 2390.000 | 33.03 | -6.78 | 26.25 | 74.00 | -47.75 | peak | | | |
| 6 | 2390.000 | 27.20 | -6.78 | 20.42 | 54.00 | -33.58 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3016
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2402MHz(GFSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 14/29/06
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



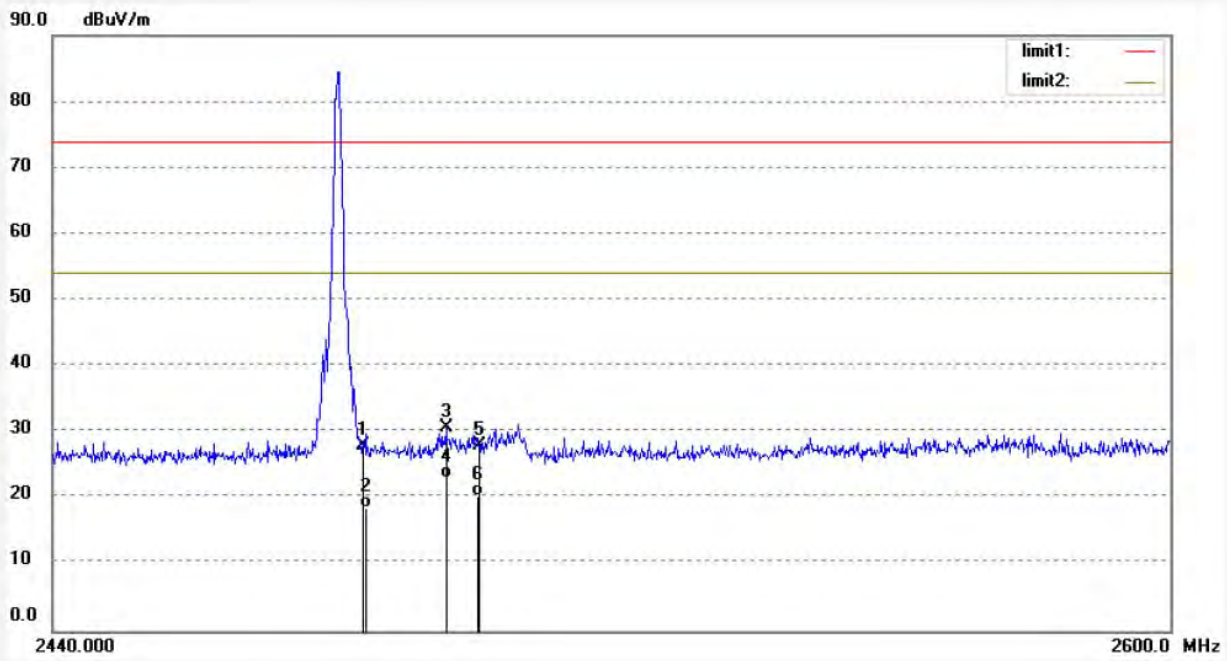

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 34.53 | -6.99 | 27.54 | 74.00 | -46.46 | peak | | | |
| 2 | 2310.000 | 27.58 | -6.99 | 20.59 | 54.00 | -33.41 | AVG | | | |
| 3 | 2352.640 | 36.54 | -6.88 | 29.66 | 74.00 | -44.34 | peak | | | |
| 4 | 2352.640 | 28.93 | -6.88 | 22.05 | 54.00 | -31.95 | AVG | | | |
| 5 | 2390.000 | 32.43 | -6.78 | 25.65 | 74.00 | -48.35 | peak | | | |
| 6 | 2390.000 | 24.55 | -6.78 | 17.77 | 54.00 | -36.23 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3017
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2480MHz(GFSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 14/32/02
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947

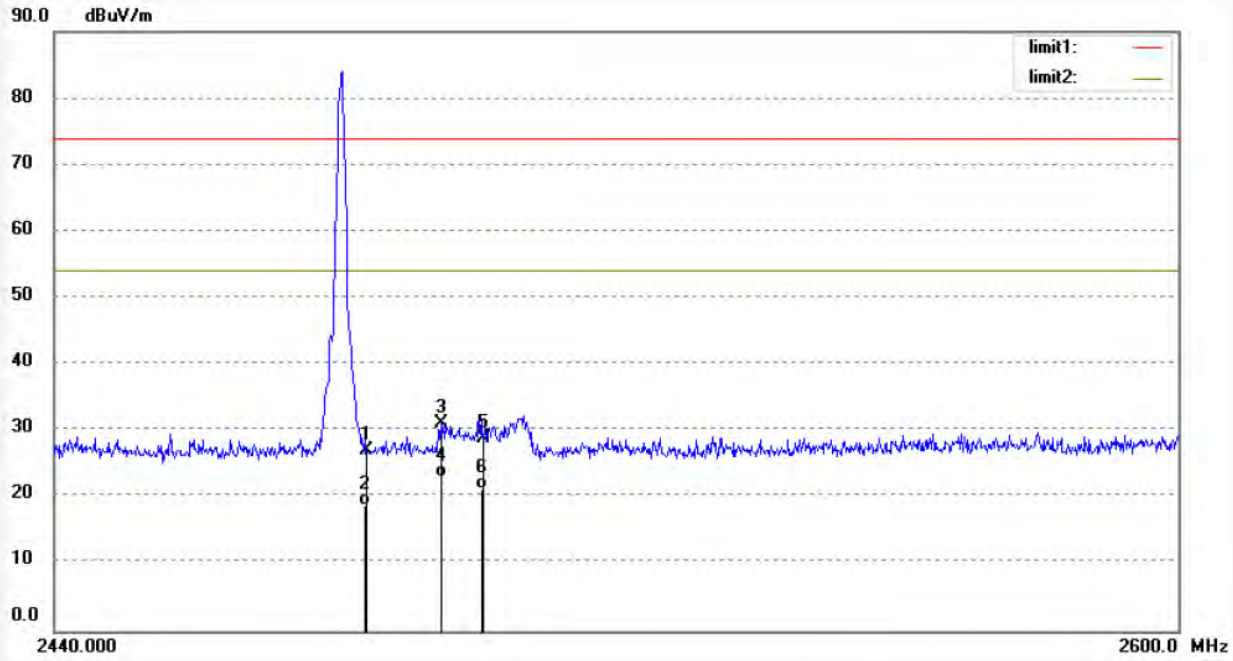



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 34.48 | -6.54 | 27.94 | 74.00 | -46.06 | peak | | | |
| 2 | 2483.500 | 25.17 | -6.54 | 18.63 | 54.00 | -35.37 | AVG | | | |
| 3 | 2495.200 | 37.21 | -6.50 | 30.71 | 74.00 | -43.29 | peak | | | |
| 4 | 2495.200 | 29.50 | -6.50 | 23.00 | 54.00 | -31.00 | AVG | | | |
| 5 | 2500.000 | 34.56 | -6.50 | 28.06 | 74.00 | -45.94 | peak | | | |
| 6 | 2500.000 | 26.93 | -6.50 | 20.43 | 54.00 | -33.57 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3018 | Polarization: Horizontal |
| Standard: FCC PK | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 14/36/21 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz(GFSK) | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947



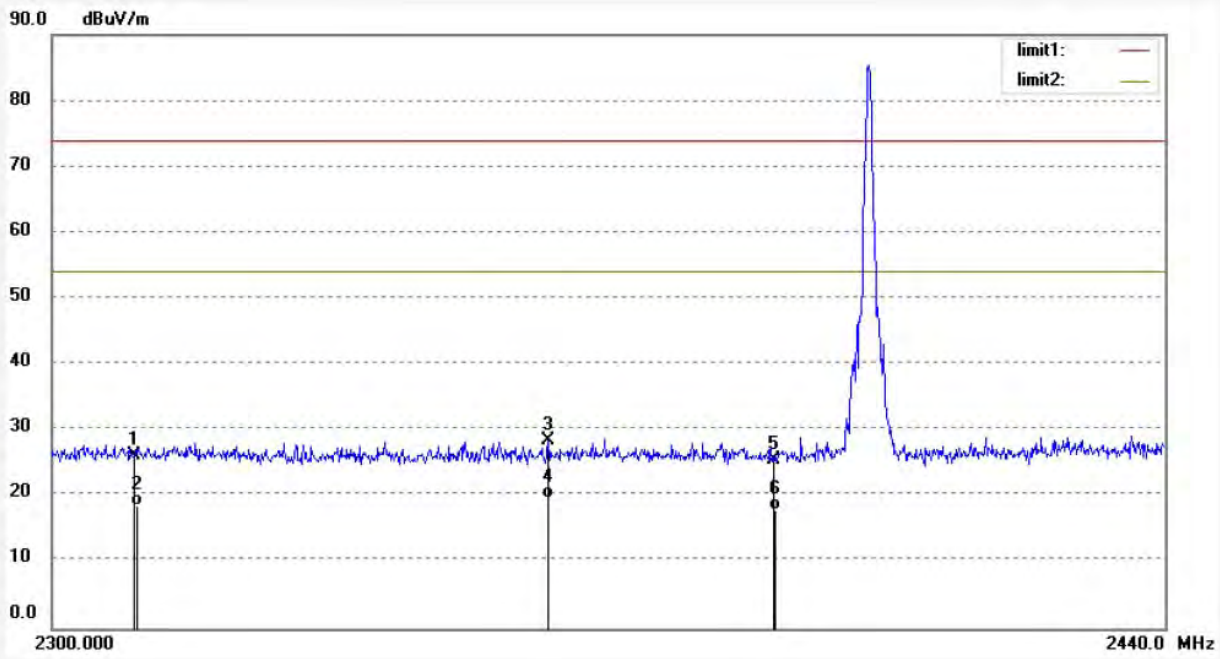

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 33.60 | -6.54 | 27.06 | 74.00 | -46.94 | peak | | | |
| 2 | 2483.500 | 25.40 | -6.54 | 18.86 | 54.00 | -35.14 | AVG | | | |
| 3 | 2493.920 | 37.76 | -6.51 | 31.25 | 74.00 | -42.75 | peak | | | |
| 4 | 2493.920 | 29.50 | -6.51 | 22.99 | 54.00 | -31.01 | AVG | | | |
| 5 | 2500.000 | 35.31 | -6.50 | 28.81 | 74.00 | -45.19 | peak | | | |
| 6 | 2500.000 | 27.80 | -6.50 | 21.30 | 54.00 | -32.70 | AVG | | | |

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3019
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2402MHz(PI/4DQPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Horizontal
Power Source: DC 5V
Date: 13/09/10/
Time: 14/40/13
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



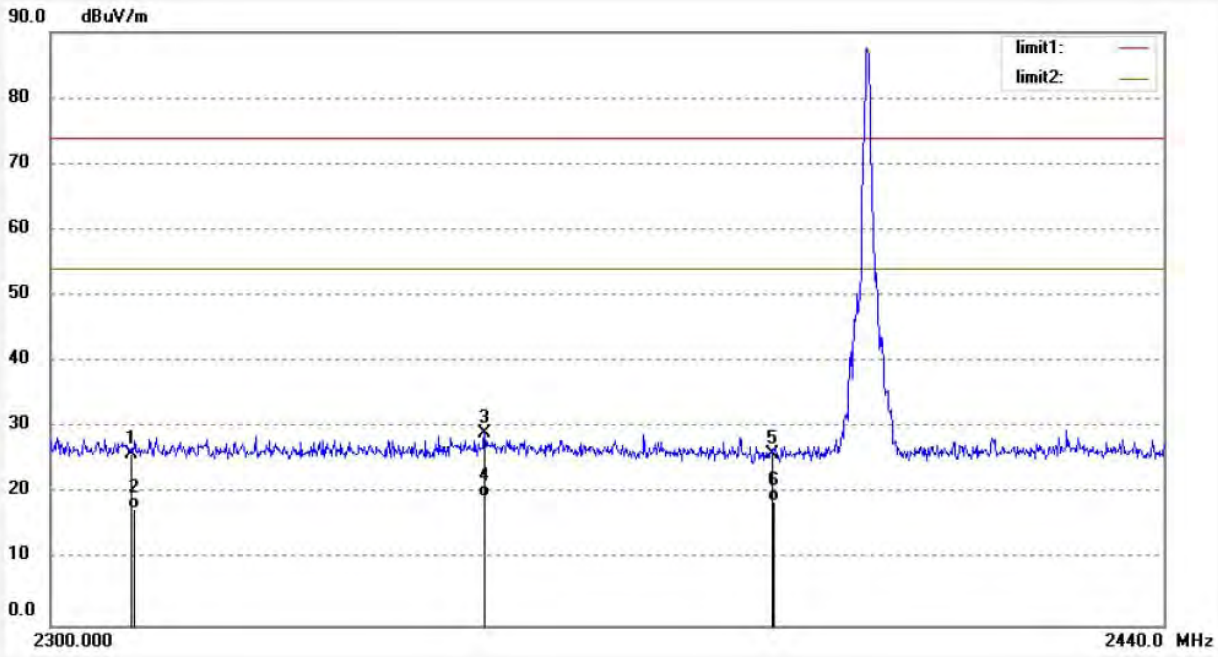

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 33.28 | -6.99 | 26.29 | 74.00 | -47.71 | peak | | | |
| 2 | 2310.000 | 25.46 | -6.99 | 18.47 | 54.00 | -35.53 | AVG | | | |
| 3 | 2361.460 | 35.25 | -6.86 | 28.39 | 74.00 | -45.61 | peak | | | |
| 4 | 2361.460 | 26.47 | -6.86 | 19.61 | 54.00 | -34.39 | AVG | | | |
| 5 | 2390.000 | 32.29 | -6.78 | 25.51 | 74.00 | -48.49 | peak | | | |
| 6 | 2390.000 | 24.77 | -6.78 | 17.99 | 54.00 | -36.01 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3020
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2402MHz(PI/4DQPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 14/43/43
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947

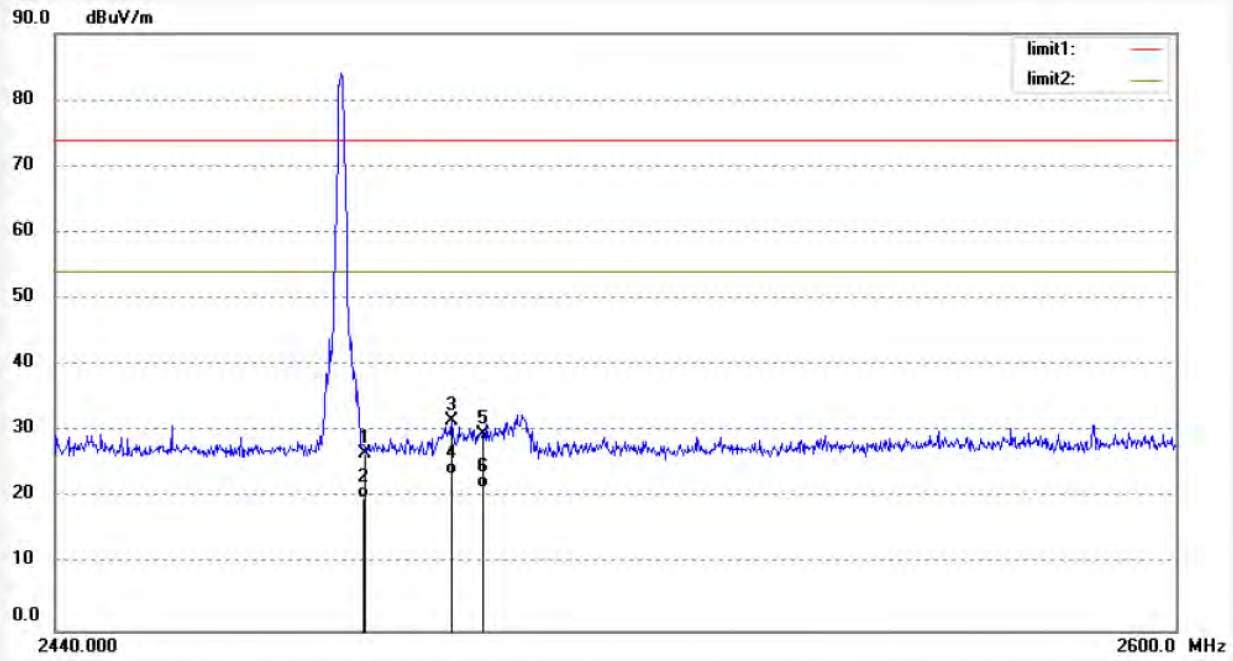



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 33.01 | -6.99 | 26.02 | 74.00 | -47.98 | peak | | | |
| 2 | 2310.000 | 24.55 | -6.99 | 17.56 | 54.00 | -36.44 | AVG | | | |
| 3 | 2353.620 | 35.99 | -6.88 | 29.11 | 74.00 | -44.89 | peak | | | |
| 4 | 2353.620 | 26.40 | -6.88 | 19.52 | 54.00 | -34.48 | AVG | | | |
| 5 | 2390.000 | 32.72 | -6.78 | 25.94 | 74.00 | -48.06 | peak | | | |
| 6 | 2390.000 | 25.60 | -6.78 | 18.82 | 54.00 | -35.18 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3025 | Polarization: Horizontal |
| Standard: FCC PK | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 15/01/26 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz(PI/4DQPSK) | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947



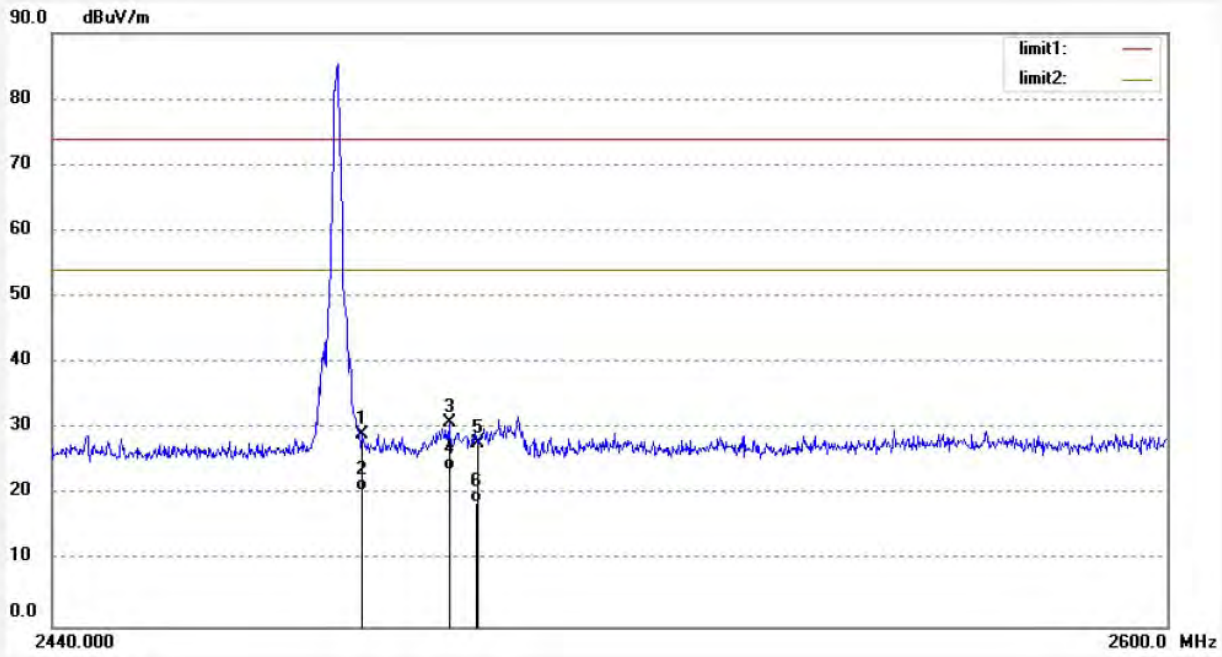

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 33.26 | -6.54 | 26.72 | 74.00 | -47.28 | peak | | | |
| 2 | 2483.500 | 26.50 | -6.54 | 19.96 | 54.00 | -34.04 | AVG | | | |
| 3 | 2495.520 | 38.08 | -6.50 | 31.58 | 74.00 | -42.42 | peak | | | |
| 4 | 2495.520 | 30.10 | -6.50 | 23.60 | 54.00 | -30.40 | AVG | | | |
| 5 | 2500.000 | 36.02 | -6.50 | 29.52 | 74.00 | -44.48 | peak | | | |
| 6 | 2500.000 | 27.91 | -6.50 | 21.41 | 54.00 | -32.59 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3026
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2480MHz((PI/4DQPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 15/04/18
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



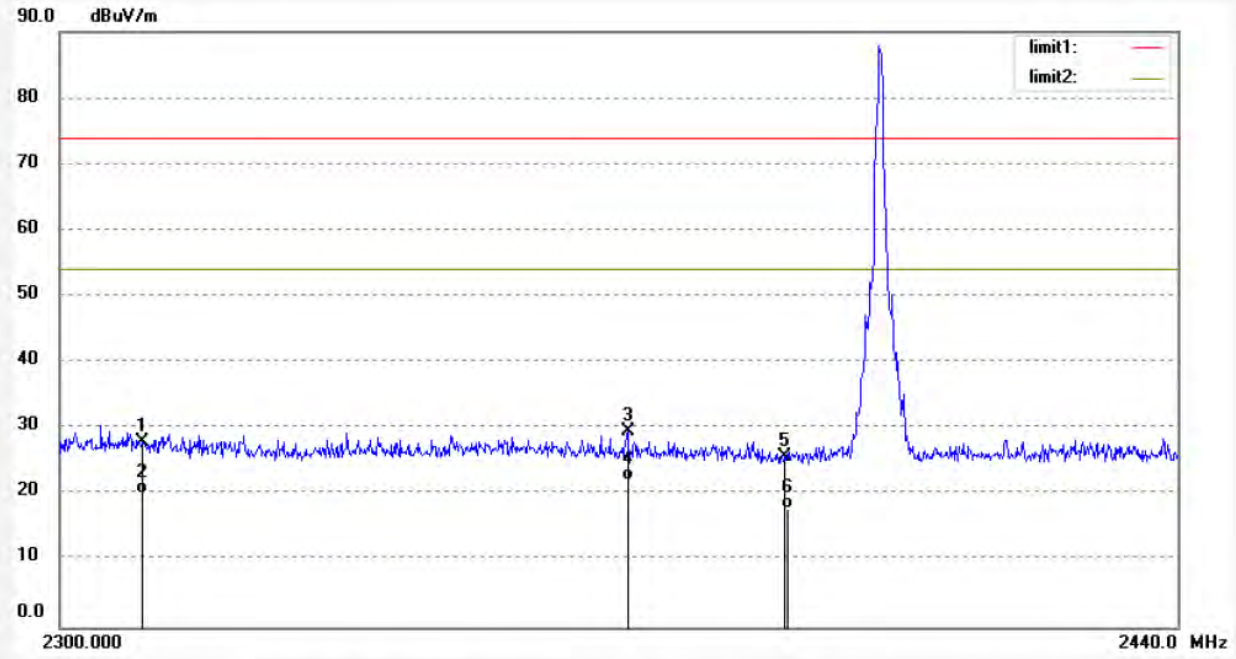

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 35.68 | -6.54 | 29.14 | 74.00 | -44.86 | peak | | | |
| 2 | 2483.500 | 27.22 | -6.54 | 20.68 | 54.00 | -33.32 | AVG | | | |
| 3 | 2495.840 | 37.34 | -6.50 | 30.84 | 74.00 | -43.16 | peak | | | |
| 4 | 2495.840 | 30.22 | -6.50 | 23.72 | 54.00 | -30.28 | AVG | | | |
| 5 | 2500.000 | 34.21 | -6.50 | 27.71 | 74.00 | -46.29 | peak | | | |
| 6 | 2500.000 | 25.34 | -6.50 | 18.84 | 54.00 | -35.16 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3021
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2402MHz(8QPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 14/46/17
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



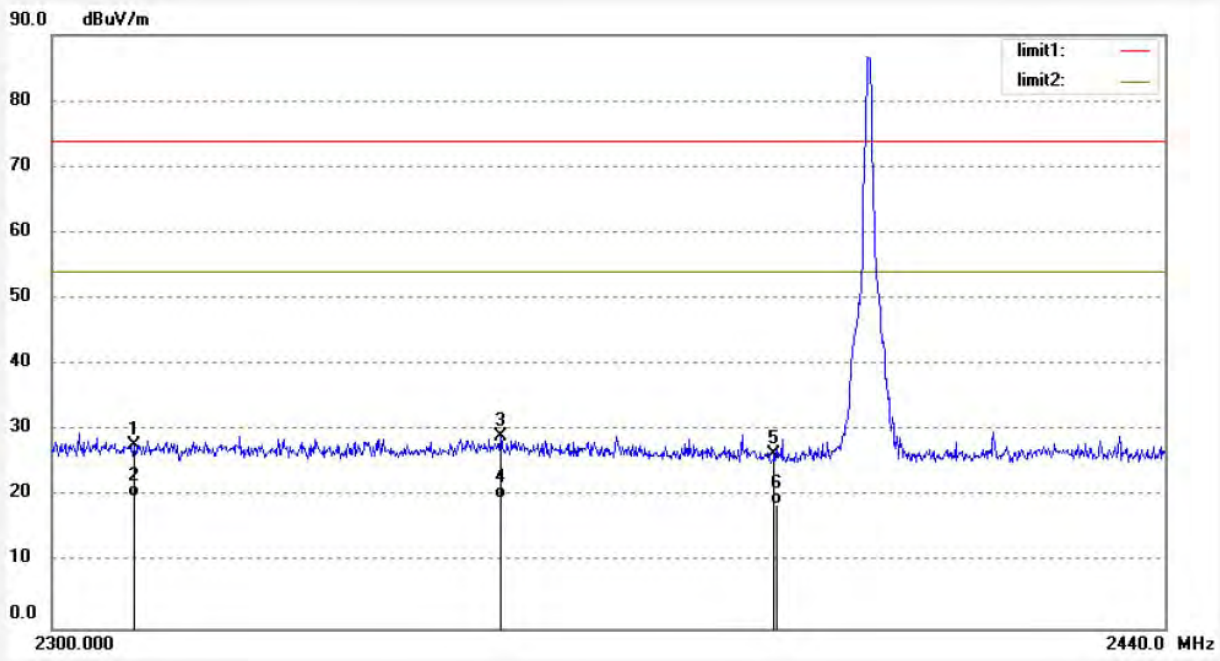

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 35.06 | -6.99 | 28.07 | 74.00 | -45.93 | peak | | | |
| 2 | 2310.000 | 27.17 | -6.99 | 20.18 | 54.00 | -33.82 | AVG | | | |
| 3 | 2370.140 | 36.32 | -6.83 | 29.49 | 74.00 | -44.51 | peak | | | |
| 4 | 2370.140 | 28.90 | -6.83 | 22.07 | 54.00 | -31.93 | AVG | | | |
| 5 | 2390.000 | 32.52 | -6.78 | 25.74 | 74.00 | -48.26 | peak | | | |
| 6 | 2390.000 | 24.67 | -6.78 | 17.89 | 54.00 | -36.11 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3022
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2402MHz(8QPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Horizontal
Power Source: DC 5V
Date: 13/09/10/
Time: 14/49/56
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



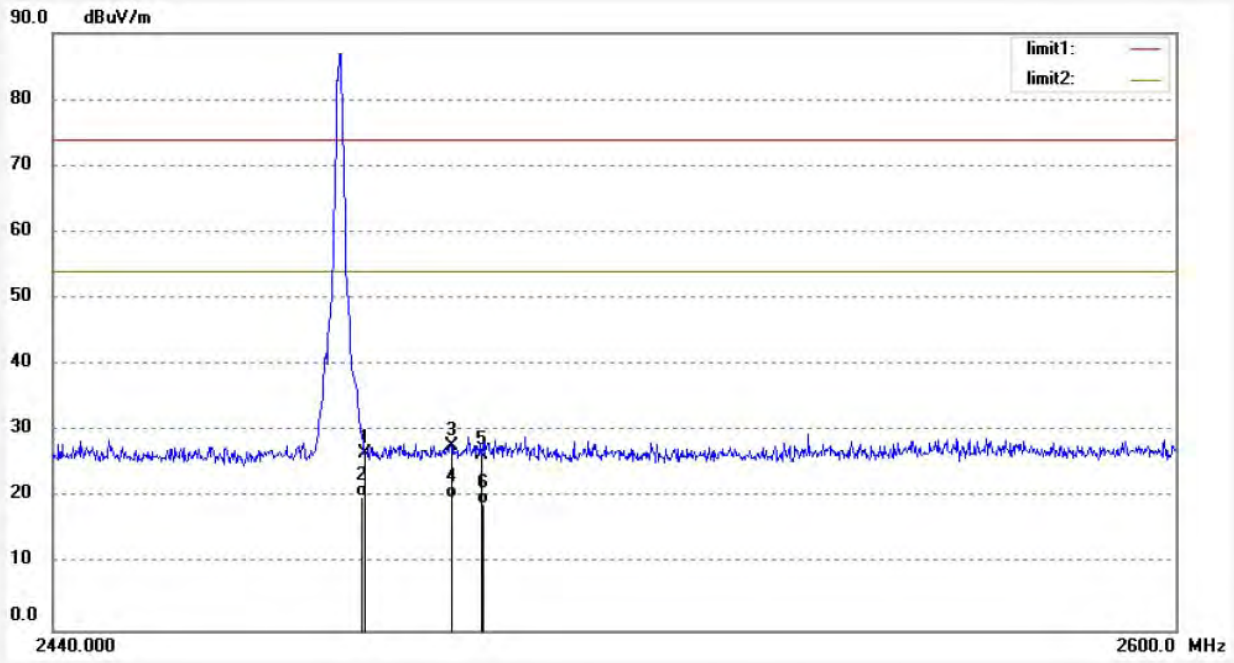

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 34.78 | -6.99 | 27.79 | 74.00 | -46.21 | peak | | | |
| 2 | 2310.000 | 26.87 | -6.99 | 19.88 | 54.00 | -34.12 | AVG | | | |
| 3 | 2355.440 | 35.96 | -6.88 | 29.08 | 74.00 | -44.92 | peak | | | |
| 4 | 2355.440 | 26.50 | -6.88 | 19.62 | 54.00 | -34.38 | AVG | | | |
| 5 | 2390.000 | 33.12 | -6.78 | 26.34 | 74.00 | -47.66 | peak | | | |
| 6 | 2390.000 | 25.63 | -6.78 | 18.85 | 54.00 | -35.15 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3023
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: TX 2480MHz(8QPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/10/
Time: 14/52/38
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947

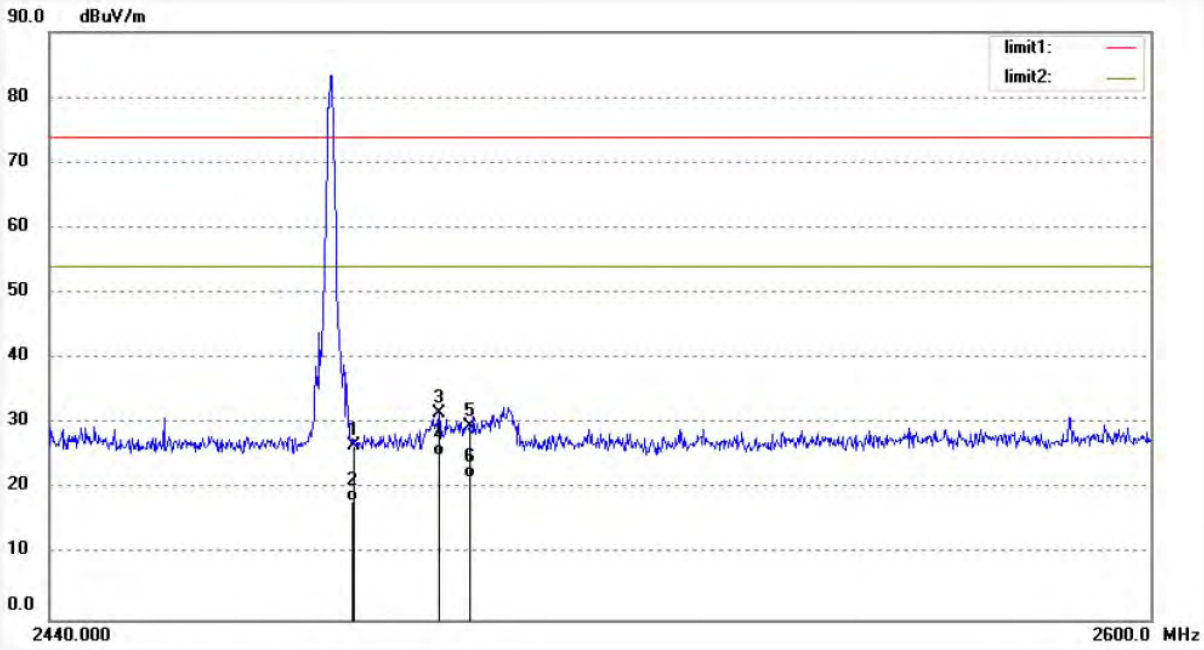



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 33.29 | -6.54 | 26.75 | 74.00 | -47.25 | peak | | | |
| 2 | 2483.500 | 26.78 | -6.54 | 20.24 | 54.00 | -33.76 | AVG | | | |
| 3 | 2495.680 | 34.31 | -6.50 | 27.81 | 74.00 | -46.19 | peak | | | |
| 4 | 2495.680 | 26.48 | -6.50 | 19.98 | 54.00 | -34.02 | AVG | | | |
| 5 | 2500.000 | 32.91 | -6.50 | 26.41 | 74.00 | -47.59 | peak | | | |
| 6 | 2500.000 | 25.61 | -6.50 | 19.11 | 54.00 | -34.89 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

| | |
|---|---|
| Job No.: STAR #3024 | Polarization: Horizontal |
| Standard: FCC PK | Power Source: DC 5V |
| Test item: Radiation Test | Date: 13/09/10/ |
| Temp.( C)/Hum.(%) 25 C / 55 % | Time: 14/56/46 |
| EUT: Wireless Floating Speaker | Engineer Signature: |
| Mode: TX 2480MHz(8QPSK) | Distance: 3m |
| Model: ASP-689 | |
| Manufacturer: ATake | |

Note: Report No.:ATE20131947




| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2483.500 | 33.26 | -6.54 | 26.72 | 74.00 | -47.28 | peak | | | |
| 2 | 2483.500 | 24.60 | -6.54 | 18.06 | 54.00 | -35.94 | AVG | | | |
| 3 | 2495.520 | 38.08 | -6.50 | 31.58 | 74.00 | -42.42 | peak | | | |
| 4 | 2495.520 | 31.52 | -6.50 | 25.02 | 54.00 | -28.98 | AVG | | | |
| 5 | 2500.000 | 36.02 | -6.50 | 29.52 | 74.00 | -44.48 | peak | | | |
| 6 | 2500.000 | 28.11 | -6.50 | 21.61 | 54.00 | -32.39 | AVG | | | |

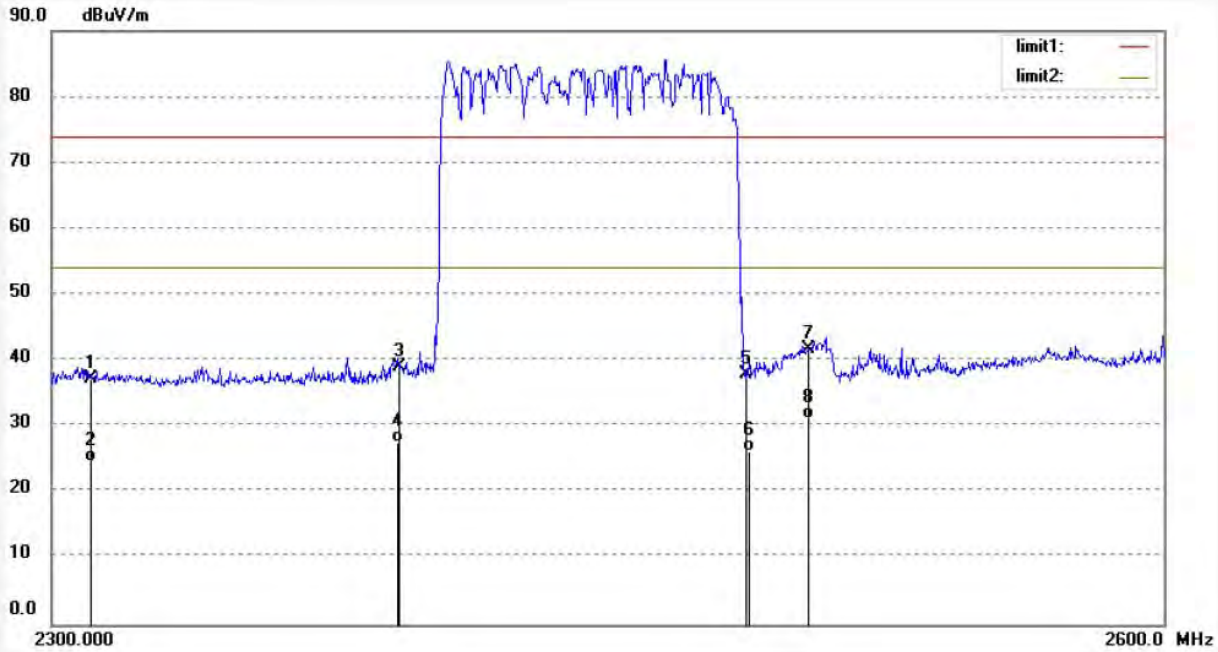
**Hopping mode**

ACCURATE TECHNOLOGY CO., LTD.
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3027
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (GFSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Horizontal
Power Source: DC 5V
Date: 13/09/11/
Time: 11/22/51
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



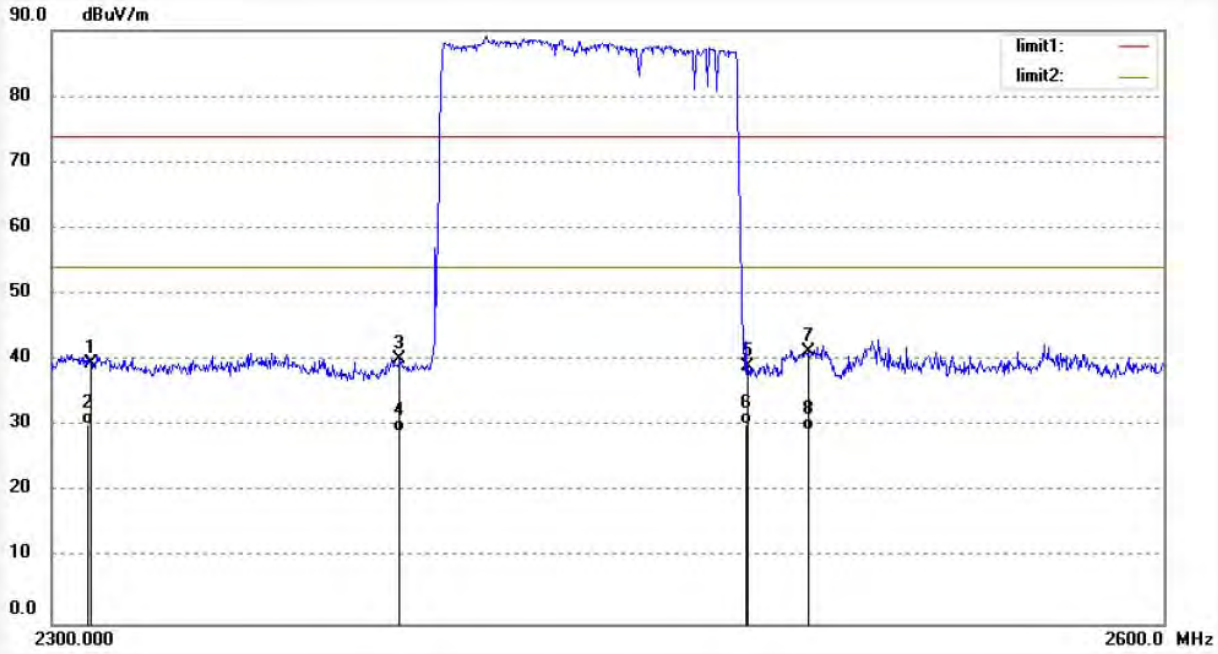

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 44.18 | -6.99 | 37.19 | 74.00 | -36.81 | peak | | | |
| 2 | 2310.000 | 31.58 | -6.99 | 24.59 | 54.00 | -29.41 | AVG | | | |
| 3 | 2390.000 | 45.89 | -6.78 | 39.11 | 74.00 | -34.89 | peak | | | |
| 4 | 2390.000 | 34.25 | -6.78 | 27.47 | 54.00 | -26.53 | AVG | | | |
| 5 | 2483.500 | 44.36 | -6.54 | 37.82 | 74.00 | -36.18 | peak | | | |
| 6 | 2483.500 | 32.69 | -6.54 | 26.15 | 54.00 | -27.85 | AVG | | | |
| 7 | 2500.000 | 48.29 | -6.50 | 41.79 | 74.00 | -32.21 | peak | | | |
| 8 | 2500.000 | 37.66 | -6.50 | 31.16 | 54.00 | -22.84 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3028
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (GFSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/11/
Time: 11/25/42
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



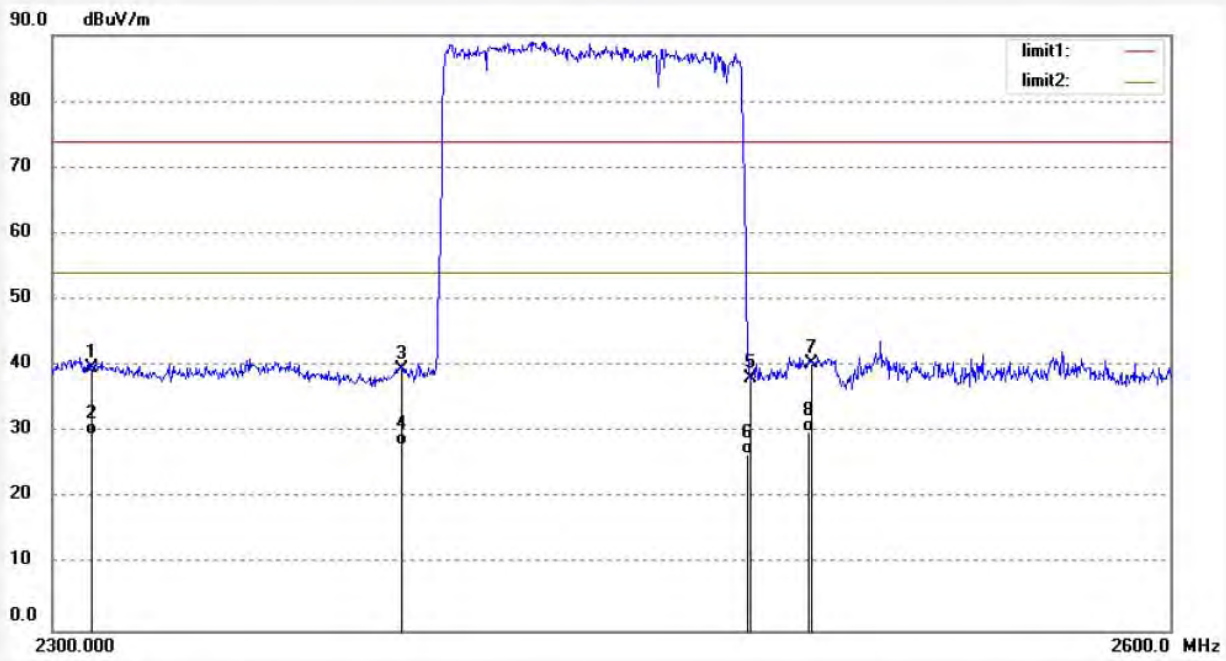

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 46.43 | -6.99 | 39.44 | 74.00 | -34.56 | peak | | | |
| 2 | 2310.000 | 37.25 | -6.99 | 30.26 | 54.00 | -23.74 | AVG | | | |
| 3 | 2390.000 | 46.86 | -6.78 | 40.08 | 74.00 | -33.92 | peak | | | |
| 4 | 2390.000 | 35.86 | -6.78 | 29.08 | 54.00 | -24.92 | AVG | | | |
| 5 | 2483.500 | 45.50 | -6.54 | 38.96 | 74.00 | -35.04 | peak | | | |
| 6 | 2483.500 | 36.87 | -6.54 | 30.33 | 54.00 | -23.67 | AVG | | | |
| 7 | 2500.000 | 47.78 | -6.50 | 41.28 | 74.00 | -32.72 | peak | | | |
| 8 | 2500.000 | 35.88 | -6.50 | 29.38 | 54.00 | -24.62 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3029
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (PI/4DQPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/11/
Time: 11/28/17
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



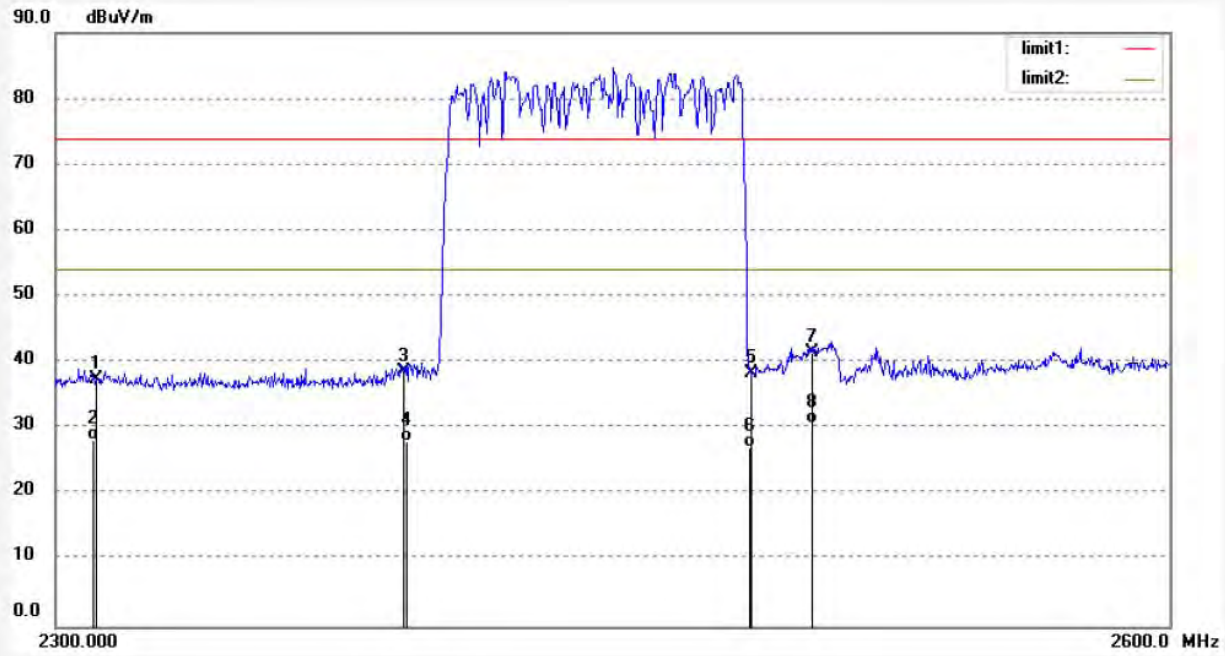

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 46.75 | -6.99 | 39.76 | 74.00 | -34.24 | peak | | | |
| 2 | 2310.000 | 36.55 | -6.99 | 29.56 | 54.00 | -24.44 | AVG | | | |
| 3 | 2390.000 | 46.28 | -6.78 | 39.50 | 74.00 | -34.50 | peak | | | |
| 4 | 2390.000 | 34.89 | -6.78 | 28.11 | 54.00 | -25.89 | AVG | | | |
| 5 | 2483.500 | 44.59 | -6.54 | 38.05 | 74.00 | -35.95 | peak | | | |
| 6 | 2483.500 | 33.24 | -6.54 | 26.70 | 54.00 | -27.30 | AVG | | | |
| 7 | 2500.000 | 46.93 | -6.50 | 40.43 | 74.00 | -33.57 | peak | | | |
| 8 | 2500.000 | 36.43 | -6.50 | 29.93 | 54.00 | -24.07 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3030
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (PI/4DQPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Horizontal
Power Source: DC 5V
Date: 13/09/11/
Time: 11/31/16
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



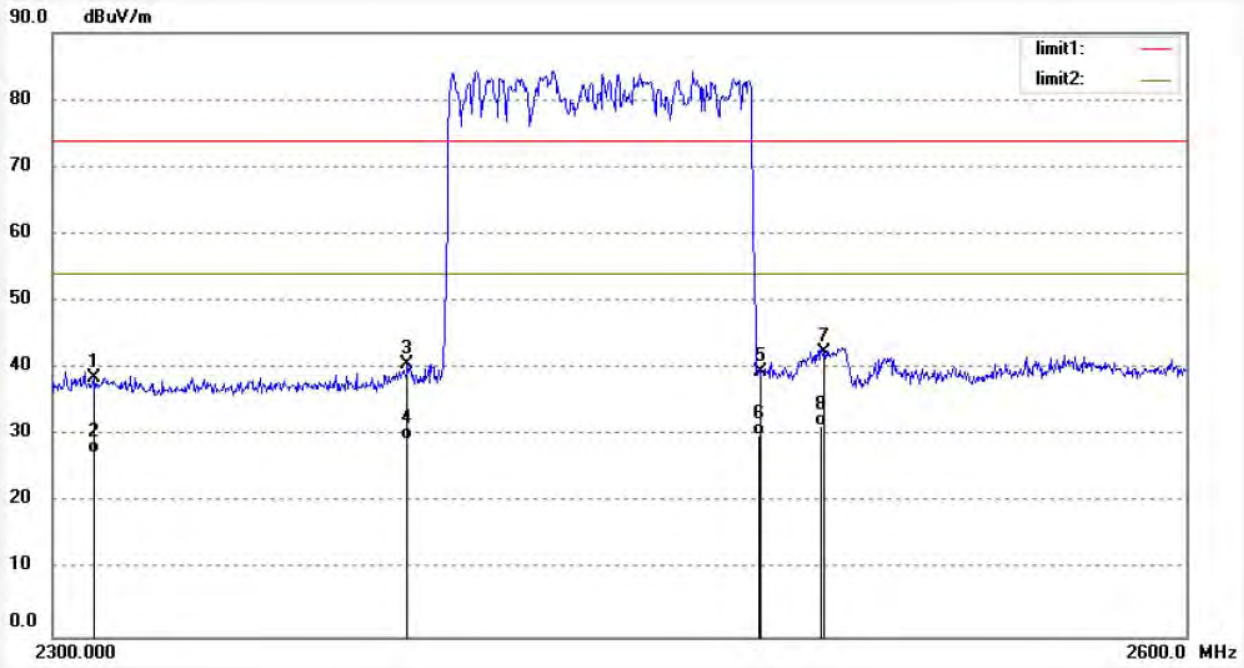

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 44.36 | -6.99 | 37.37 | 74.00 | -36.63 | peak | | | |
| 2 | 2310.000 | 35.24 | -6.99 | 28.25 | 54.00 | -25.75 | AVG | | | |
| 3 | 2390.000 | 45.45 | -6.78 | 38.67 | 74.00 | -35.33 | peak | | | |
| 4 | 2390.000 | 34.80 | -6.78 | 28.02 | 54.00 | -25.98 | AVG | | | |
| 5 | 2483.500 | 44.82 | -6.54 | 38.28 | 74.00 | -35.72 | peak | | | |
| 6 | 2483.500 | 33.58 | -6.54 | 27.04 | 54.00 | -26.96 | AVG | | | |
| 7 | 2500.000 | 48.09 | -6.50 | 41.59 | 74.00 | -32.41 | peak | | | |
| 8 | 2500.000 | 37.32 | -6.50 | 30.82 | 54.00 | -23.18 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3031
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (8QPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Horizontal
Power Source: DC 5V
Date: 13/09/11/
Time: 11/36/34
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947



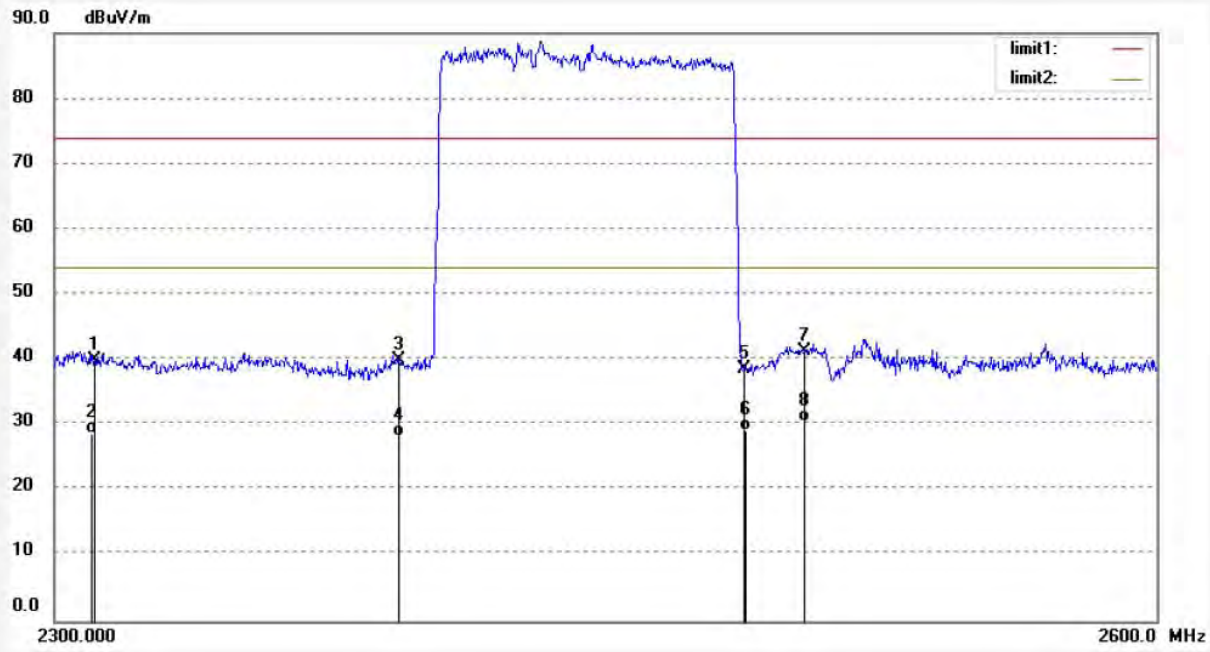

| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 45.68 | -6.99 | 38.69 | 74.00 | -35.31 | peak | | | |
| 2 | 2310.000 | 34.29 | -6.99 | 27.30 | 54.00 | -26.70 | AVG | | | |
| 3 | 2390.000 | 47.42 | -6.78 | 40.64 | 74.00 | -33.36 | peak | | | |
| 4 | 2390.000 | 36.10 | -6.78 | 29.32 | 54.00 | -24.68 | AVG | | | |
| 5 | 2483.500 | 45.92 | -6.54 | 39.38 | 74.00 | -34.62 | peak | | | |
| 6 | 2483.500 | 36.61 | -6.54 | 30.07 | 54.00 | -23.93 | AVG | | | |
| 7 | 2500.000 | 48.96 | -6.50 | 42.46 | 74.00 | -31.54 | peak | | | |
| 8 | 2500.000 | 37.88 | -6.50 | 31.38 | 54.00 | -22.62 | AVG | | | |

**ACCURATE TECHNOLOGY CO., LTD.**
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #3032
Standard: FCC PK
Test item: Radiation Test
Temp.( C)/Hum.(%) 25 C / 55 %
EUT: Wireless Floating Speaker
Mode: HOPPING (8QPSK)
Model: ASP-689
Manufacturer: ATake

Polarization: Vertical
Power Source: DC 5V
Date: 13/09/11/
Time: 11/39/37
Engineer Signature:
Distance: 3m

Note: Report No.:ATE20131947

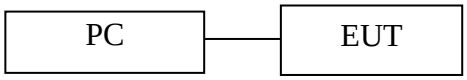



| No. | Freq. (MHz) | Reading (dBuV/m) | Factor (dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Degree (deg.) | Remark |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 2310.000 | 46.88 | -6.99 | 39.89 | 74.00 | -34.11 | peak | | | |
| 2 | 2310.000 | 35.60 | -6.99 | 28.61 | 54.00 | -25.39 | AVG | | | |
| 3 | 2390.000 | 46.74 | -6.78 | 39.96 | 74.00 | -34.04 | peak | | | |
| 4 | 2390.000 | 35.10 | -6.78 | 28.32 | 54.00 | -25.68 | AVG | | | |
| 5 | 2483.500 | 45.21 | -6.54 | 38.67 | 74.00 | -35.33 | peak | | | |
| 6 | 2483.500 | 35.66 | -6.54 | 29.12 | 54.00 | -24.88 | AVG | | | |
| 7 | 2500.000 | 47.76 | -6.50 | 41.26 | 74.00 | -32.74 | peak | | | |
| 8 | 2500.000 | 36.91 | -6.50 | 30.41 | 54.00 | -23.59 | AVG | | | |

# 12. AC POWER LINE CONDUCTED EMISSION FOR FCC PART 15 SECTION 15.207(A)

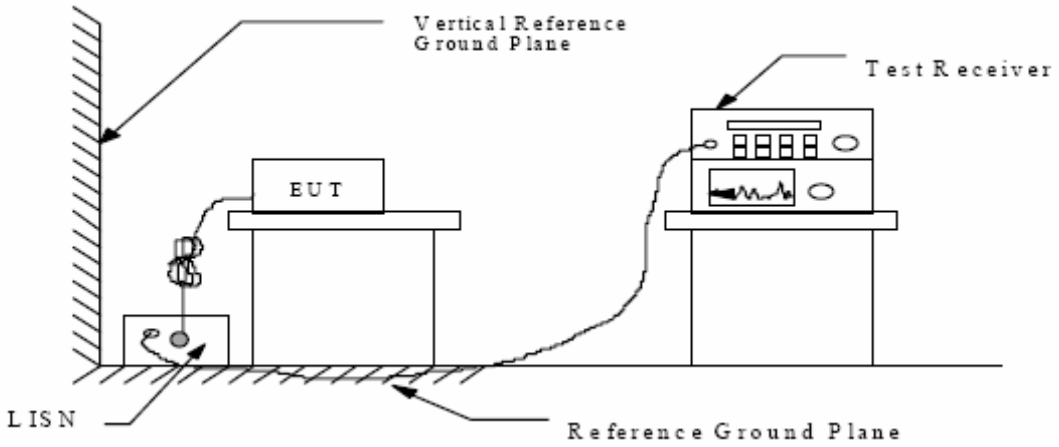
## 12.1. Block Diagram of Test Setup

### 12.1.1. Block diagram of connection between the EUT and simulators




(EUT: Wireless Floating Speaker)

### 12.1.2. Shielding Room Test Setup Diagram




(EUT: Wireless Floating Speaker)

## 12.2. The Emission Limit

### 12.2.1. Conducted Emission Measurement Limits According to Section 15.207(a)

| Frequency (MHz) | Limit dB(μV) | |
|---|---|---|
| | Quasi-peak Level | Average Level |
| 0.15 - 0.50 | 66.0 – 56.0 * | 56.0 – 46.0 * |
| 0.50 - 5.00 | 56.0 | 46.0 |
| 5.00 - 30.00 | 60.0 | 50.0 |

* Decreases with the logarithm of the frequency.

## 12.3.Configuration of EUT on Measurement

The following equipment are installed on the Conducted Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

12.3.1.Wireless Floating Speaker (EUT)

| | | |
|---|---|---|
| Model Number | **:** | ASP-689 |
| Serial Number | **:** | N/A |
| Manufacturer | **:** | ATake Digital Technology Shenzhen Co., Ltd |

## 12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 11.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in (TX) mode measure it.

## 12.5.Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.4-2009 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESCS30) is set at 9kHz.

The frequency range from 150kHz to 30MHz is checked.

## 12.6.Power Line Conducted Emission Measurement Results

**PASS.**

The frequency range from 150kHz to 30MHz is checked.

| | | | |
|---|---|---|---|
| Date of Test: | September 10, 2013 | Temperature: | 25°C |
| EUT: | Wireless Floating Speaker | Humidity: | 50% |
| Model No.: | ASP-689 | Power Supply: | AC 120V/60Hz |
| Test Mode: | Tx | Test Engineer: | Pei |

| Frequency (MHz) | Result (dBμV) | Limit (dBμV) | Margin (dB) | Detector | Line |
|---|---|---|---|---|---|
| 0.170439 | 53.70 | 65 | -11.2 | QP | Neutral |
| 0.223595 | 47.90 | 63 | -14.8 | QP | |
| 0.523291 | 45.70 | 56 | -10.3 | QP | |
| 0.163769 | 45.90 | 55 | -9.4 | AV | |
| 0.223595 | 37.50 | 53 | -15.2 | AV | |
| 0.523291 | 34.90 | 46 | -11.1 | AV | |
| 0.171806 | 57.40 | 65 | -7.5 | QP | Live |
| 0.212287 | 51.90 | 63 | -11.2 | QP | |
| 0.523291 | 45.60 | 56 | -10.4 | QP | |
| 0.173876 | 46.8 | 55 | -8.0 | AV | |
| 0.213989 | 40.20 | 53 | -12.8 | AV | |
| 0.542434 | 35.70 | 46 | -10.3 | AV | |

Emissions attenuated more than 20 dB below the permissible value are not reported.
The spectral diagrams are attached as below.

**ACCURATE TECHNOLOGY CO.,LTD**

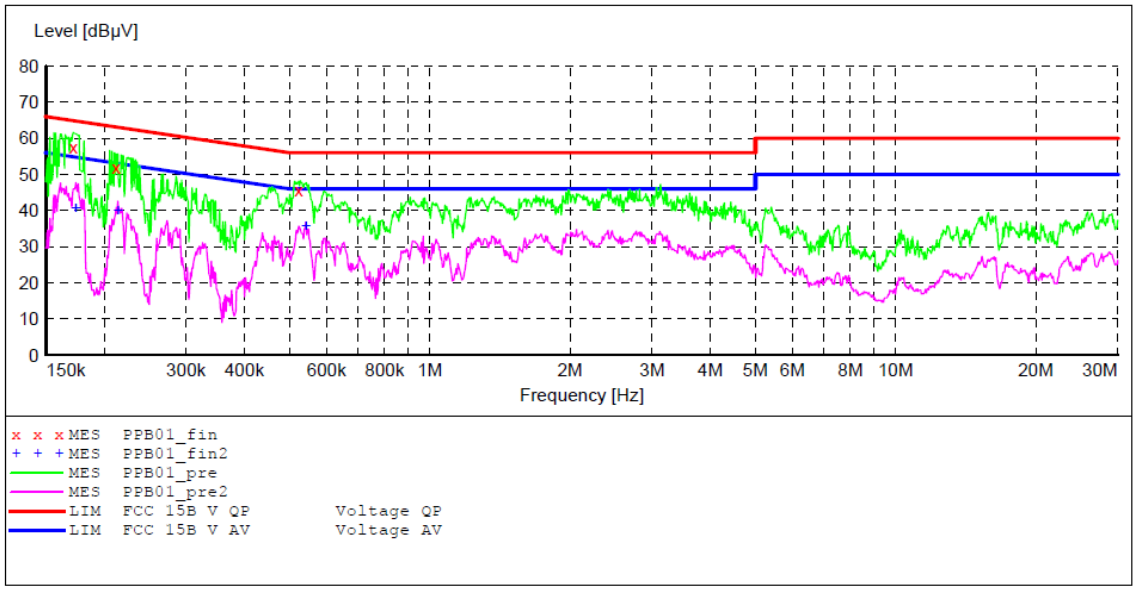
**CONDUCTED EMISSION STANDARD FCC PART 15 B**

EUT: Wireless Floating Speaker M/N:ASP-689
Manufacturer: ATake
Operating Condition: ON
Test Site: 1#Shielding Room
Operator: star
Test Specification: L 120V/60Hz
Comment: Report No.:ATE20131947
Start of Test: 9/10/2013 / 3:02:57PM

**SCAN TABLE: "V 150K-30MHz fin"**

Short Description: _SUB_STD_VTERM2 1.70

| Start Frequency | Stop Frequency | Step Width | Detector | Meas. Time | IF Bandw. | Transducer |
|---|---|---|---|---|---|---|
| 150.0 kHz | 30.0 MHz | 4.5 kHz | QuasiPeak<br>Average | 1.0 s | 9 kHz | NSLK8126 2008 |




**MEASUREMENT RESULT: "PPB01_fin"**

9/10/2013 3:05PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.171806 | 57.40 | 11.6 | 65 | 7.5 | QP | L1 | GND |
| 0.212287 | 51.90 | 11.8 | 63 | 11.2 | QP | L1 | GND |
| 0.523291 | 45.60 | 12.6 | 56 | 10.4 | QP | L1 | GND |

**MEASUREMENT RESULT: "PPB01_fin2"**

9/10/2013 3:05PM

| Frequency MHz | Level dBµV | Transd dB | Limit dBµV | Margin dB | Detector | Line | PE |
|---|---|---|---|---|---|---|---|
| 0.173876 | 46.80 | 11.6 | 55 | 8.0 | AV | L1 | GND |
| 0.213989 | 40.20 | 11.8 | 53 | 12.8 | AV | L1 | GND |
| 0.542434 | 35.70 | 12.6 | 46 | 10.3 | AV | L1 | GND |

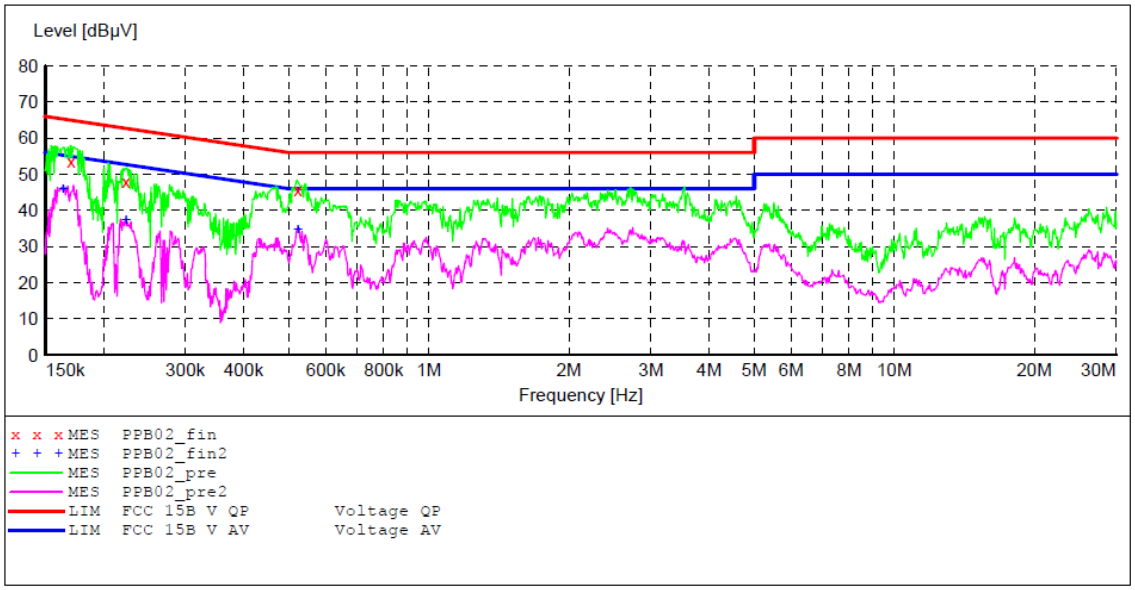
***ACCURATE TECHNOLOGY CO.,LTD***

***CONDUCTED EMISSION STANDARD FCC PART 15 B***

```
EUT:                 Wireless Floating Speaker    M/N:ASP-689
Manufacturer:        ATake
Operating Condition: ON
Test Site:           1#Shielding Room
Operator:            star
Test Specification:  N  120V/60Hz
Comment:             Report No.:ATE20131947
Start of Test:       9/10/2013 / 3:05:58PM
```

***SCAN TABLE: "V  150K-30MHz fin"***

```
  Short Description:            _SUB_STD_VTERM2 1.70
  Start      Stop       Step       Detector  Meas.     IF       Transducer
  Frequency  Frequency  Width                Time      Bandw.
  150.0 kHz  30.0 MHz   4.5 kHz    QuasiPeak 1.0 s     9 kHz    NSLK8126 2008
                                   Average
```




***MEASUREMENT RESULT: "PPB02_fin"***

```
9/10/2013  3:08PM
   Frequency     Level  Transd  Limit  Margin  Detector  Line   PE
         MHz      dBµV      dB   dBµV      dB

    0.170439     53.70    11.6     65    11.2  QP        N      GND
    0.223595     47.90    11.8     63    14.8  QP        N      GND
    0.523291     45.70    12.6     56    10.3  QP        N      GND
```

***MEASUREMENT RESULT: "PPB02_fin2"***

```
9/10/2013  3:08PM
   Frequency     Level  Transd  Limit  Margin  Detector  Line   PE
         MHz      dBµV      dB   dBµV      dB

    0.163769     45.90    11.6     55     9.4  AV        N      GND
    0.223595     37.50    11.8     53    15.2  AV        N      GND
    0.523291     34.90    12.6     46    11.1  AV        N      GND
```

# 13. ANTENNA REQUIREMENT

## 13.1. The Requirement

According to Section 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.

## 13.2. Antenna Construction

The antenna is PCB Layout antenna, no consideration of replacement. Therefore, the equipment complies with the antenna requirement of Section 15.203.