

APPLICATION CERTIFICATION

On Behalf of
Nicetex Electronics Limited

AM/FM HD Radio with Bluetooth
Model No.: SHD-ITR2BT

FCC ID: 2AE3J-SHD-ITR2BT

Prepared for : Nicetex Electronics Limited
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Date of Test : Apr 22-May 06,2015
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Test Report Certification

Applicant : Nicetex Electronics Limited
Manufacturer : Mei Hua Electronics (Hui Zhou) Limited.
EUT Description : AM/FM HD Radio with Bluetooth
(A) MODEL NO.: SHD-ITR2BT
(B) POWER SUPPLY: AC 100-240V(Adapter)

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247
ANSI C63.10- 2013

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 : Apr 22-May 06,2015

Date of Report : May 07,2015

Prepared by :



(Eric Zhang, Engineer)

Approved & Authorized Signer :



(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	AM/FM HD Radio with Bluetooth
Model Number	:	SHD-ITR2BT
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Bluetooth Version	:	3.0+EDR
Modulation type	:	GFSK, $\Pi/4$ -DQPSK, 8DPSK
Antenna Gain	:	1dBi
Antenna type	:	PCB Antenna
Rating	:	AC 100-240V supplied from Adapter
Adapter	:	Model number: AS100-059-BA150 Input: AC 100-240V; 50/60Hz 0.5A Output: DC 5.98V/1.5A Line: Non-shielded, Non-detachable, 1.5m
Applicant	:	Nicetex Electronics Limited
Address	:	RM 20-21, 14/F., BLK A, Hi-Tech Industrial Centre, 5-21 Pak Tin Par St., Tsuen Wan, N.T., Hong Kong.
Manufacturer	:	Mei Hua Electronics (Hui Zhou) Limited.
Address	:	Jinlong road (Qingxi section), Longmen, Huizhou, Guangdong, China
Date of sample received	:	Apr 22, 2015
Date of Test	:	Apr 22-May 06, 2015

1.2. Description of Test Facility

EMC Lab	:	Accredited by TUV Rheinland Shenzhen
		Listed by FCC
		The Registration Number is 752051
		Listed by Industry Canada
		The Registration Number is 5077A-2
		Accredited by China National Accreditation Committee for Laboratories
		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	Cal. Interval
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2015	One Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2015	One Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2015	One Year
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 11, 2015	One Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2015	One Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2015	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2015	One Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2015	One Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2015	One Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2015	One Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 11, 2015	One Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 11, 2015	One Year

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

(EUT: AM/FM HD Radio with Bluetooth)

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) 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: AM/FM HD Radio with Bluetooth)

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.

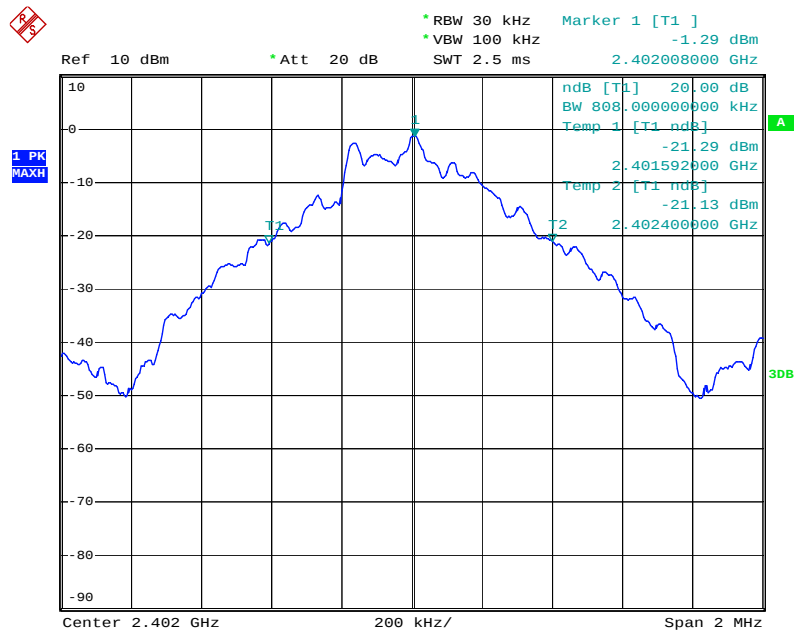
5.6. Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	$\Pi/4$ -DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	0.808	1.228	1.152	Pass
Middle	2441	0.808	1.224	1.152	Pass
High	2480	0.844	1.224	1.148	Pass

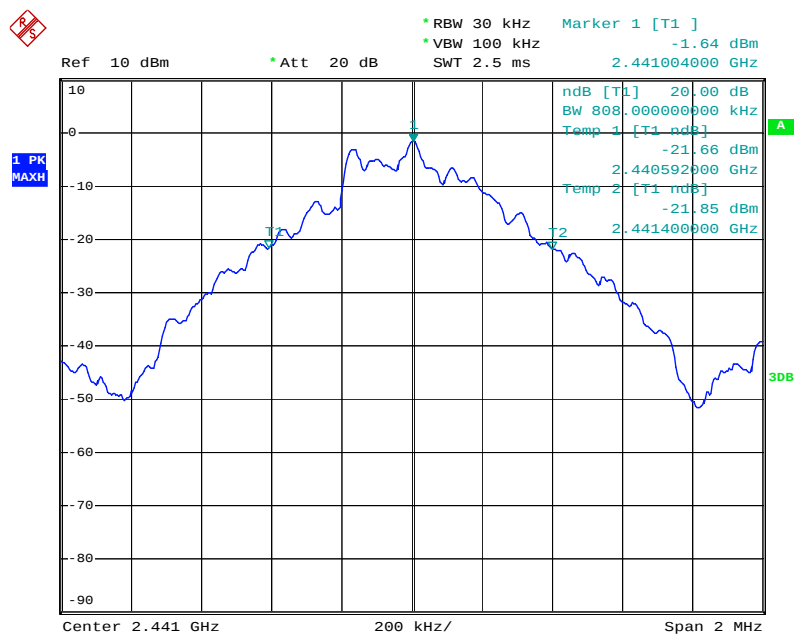
The spectrum analyzer plots are attached as below.

GFSK Mode

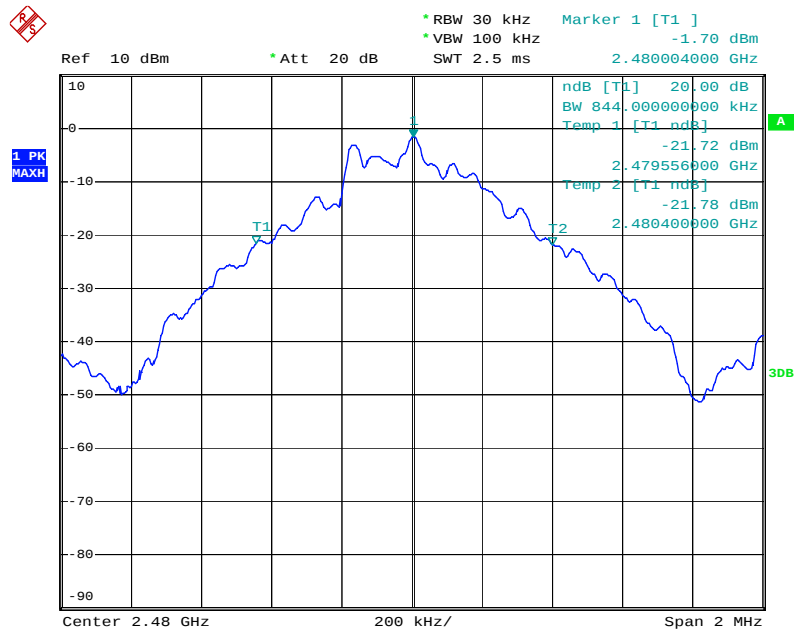
Low channel



Middle channel

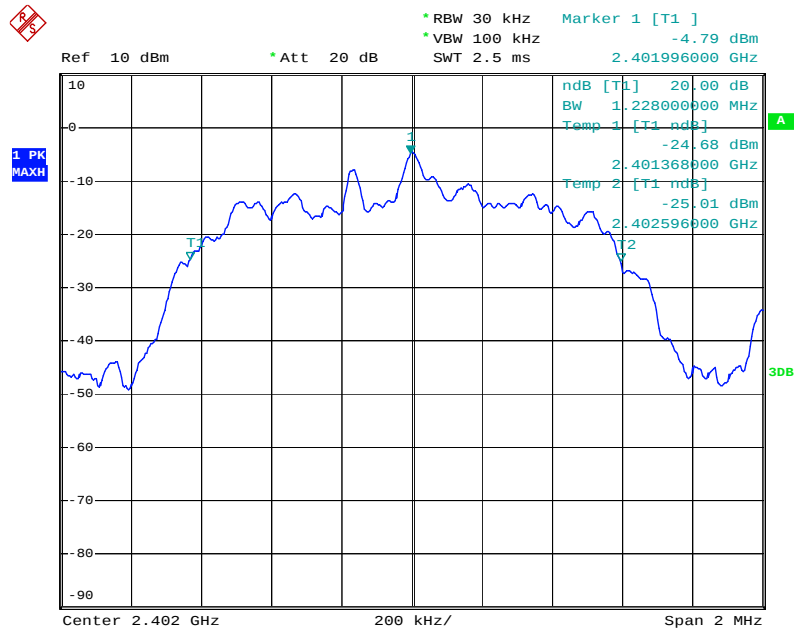


High channel

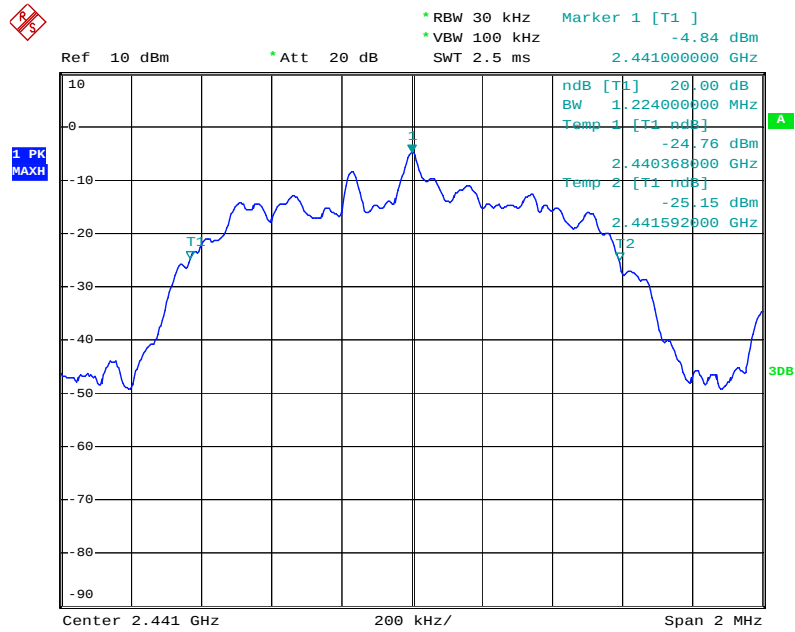


Π/4-DQPSK Mode

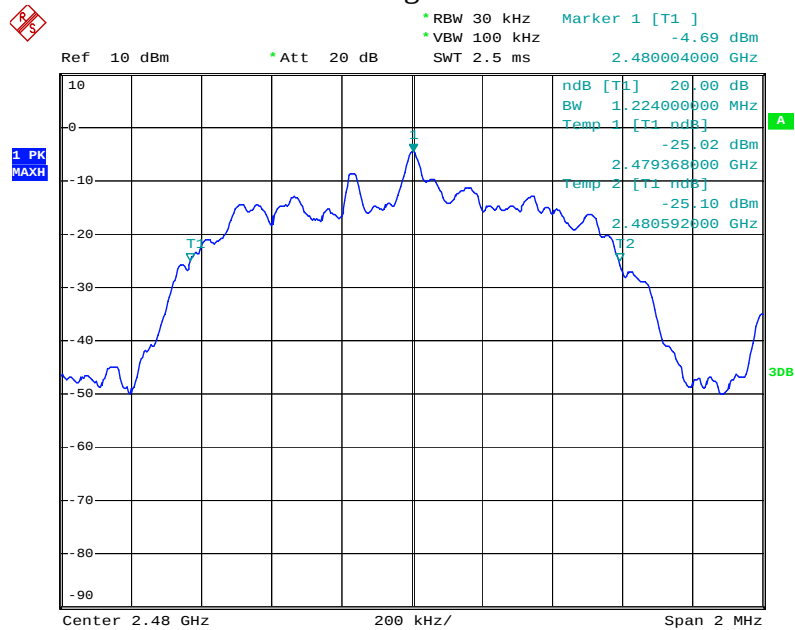
Low channel



Middle channel



High channel

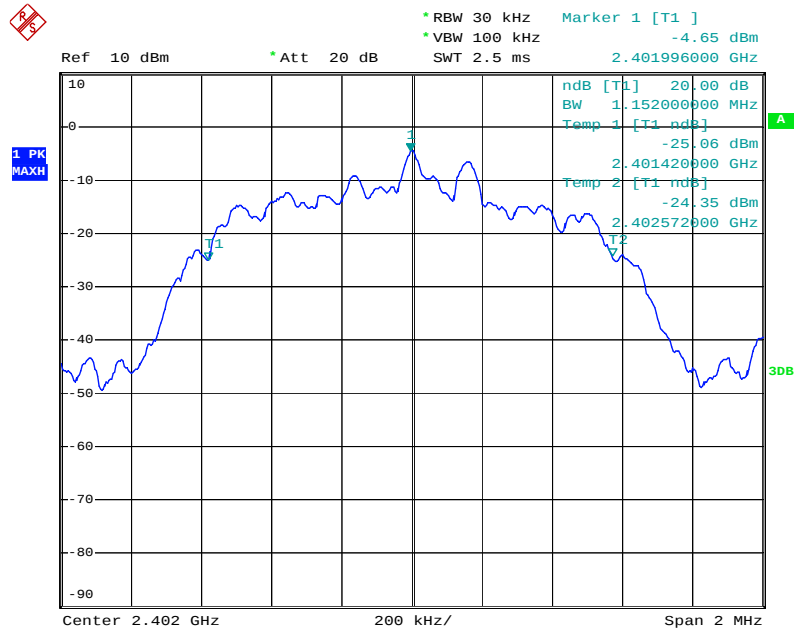


8DPSK Mode

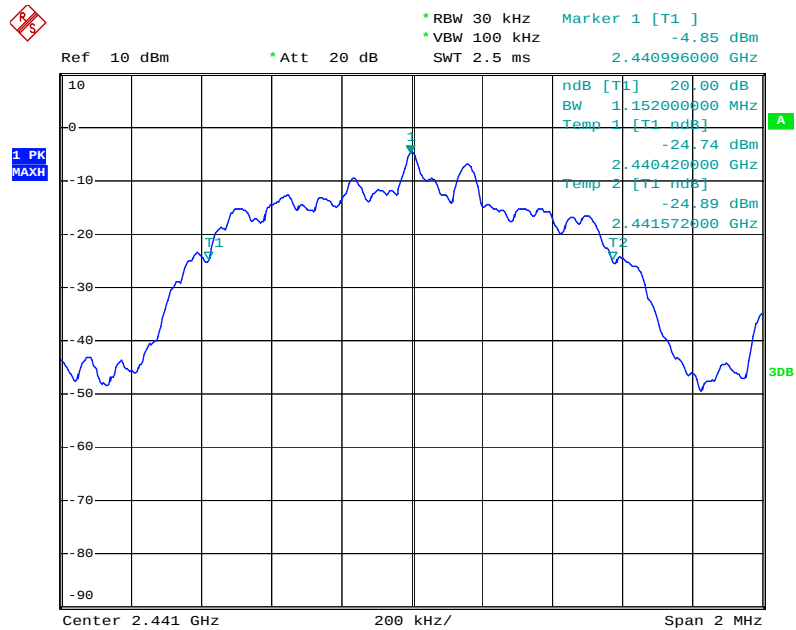
FCC ID: 2AE3J-SHD-ITR2BT

ACCURATE TECHNOLOGY CO. LTD

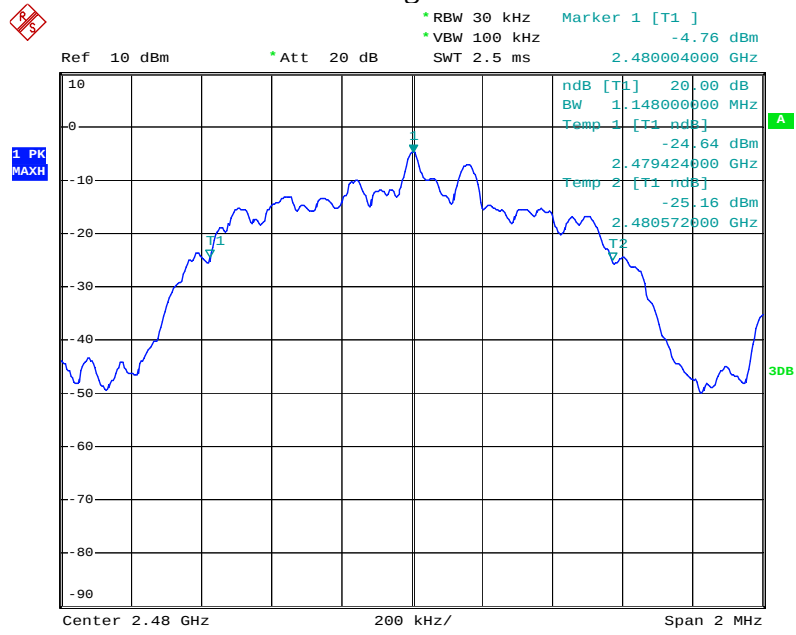
Low channel



Middle channel



High channel



6. CARRIER FREQUENCY SEPARATION TEST

6.1. Block Diagram of Test Setup



(EUT: AM/FM HD Radio with Bluetooth)

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 30 kHz and VBW to 100 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 or 20dB 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	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

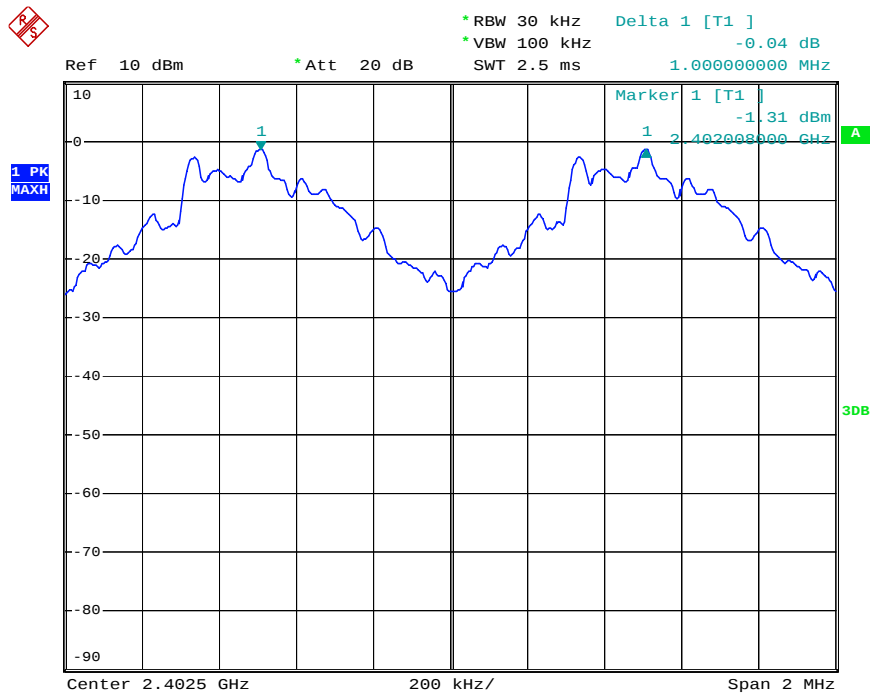
8DPSK

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

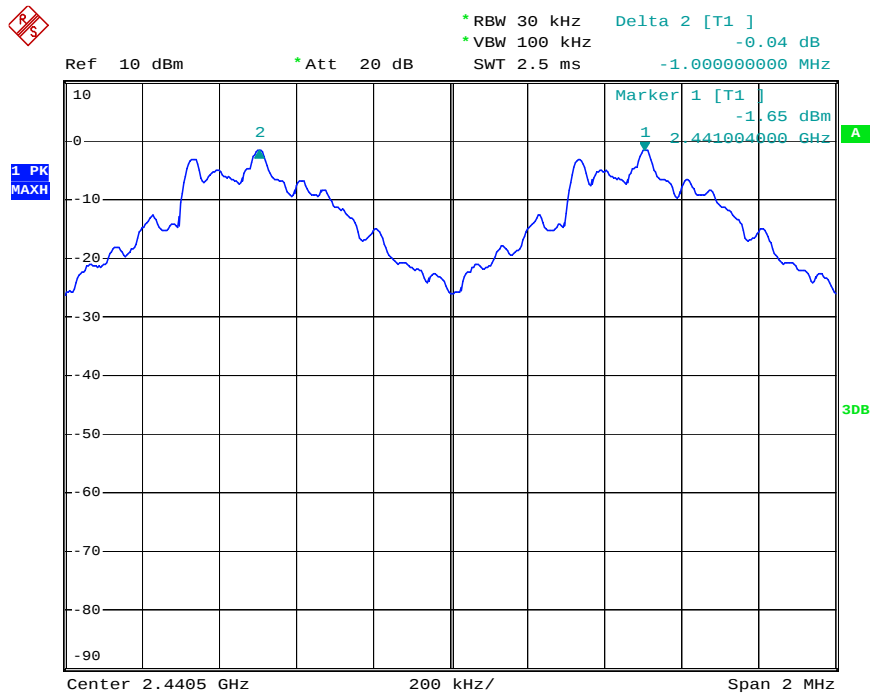
The spectrum analyzer plots are attached as below.

GFSK Mode

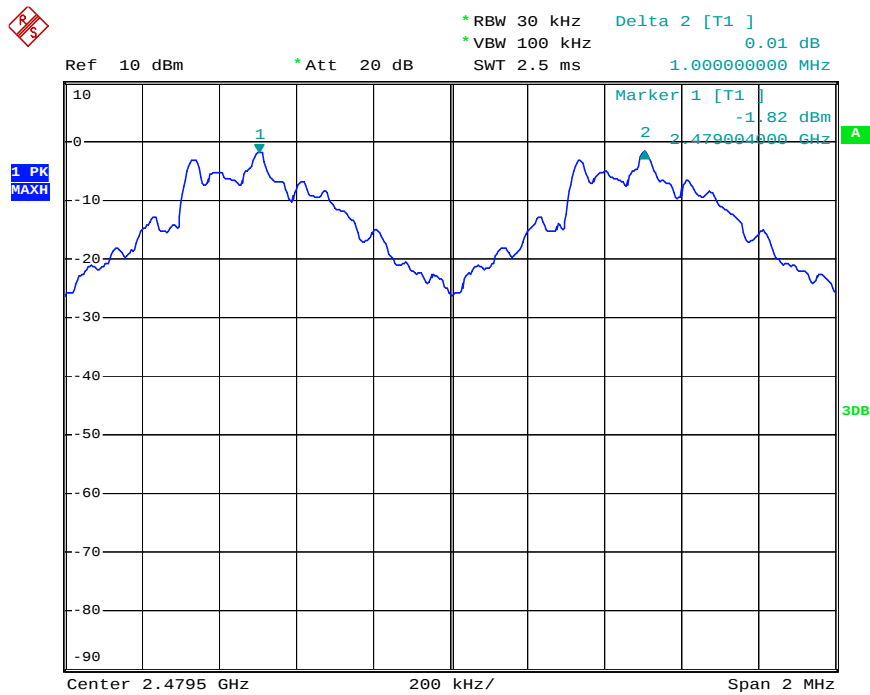
Low channel



Middle channel

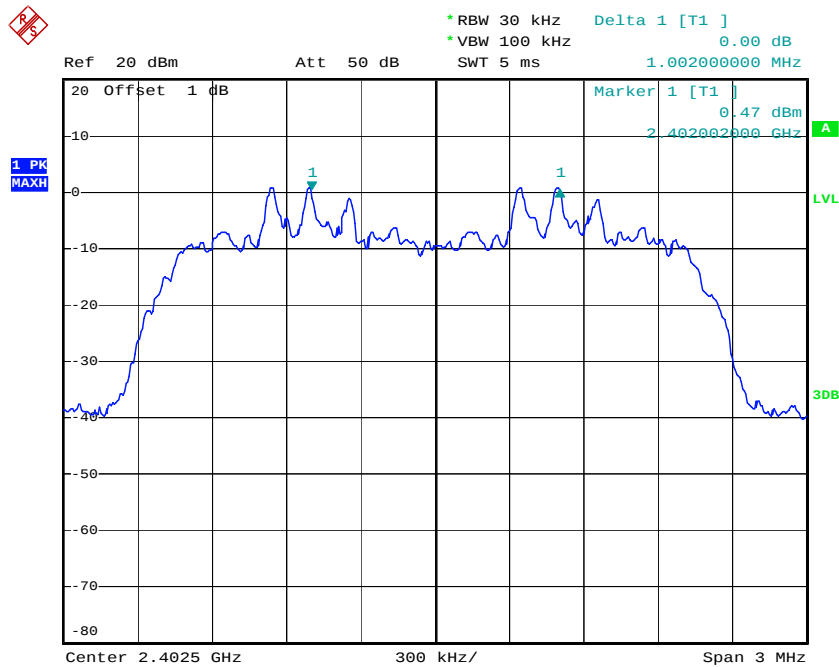


High channel

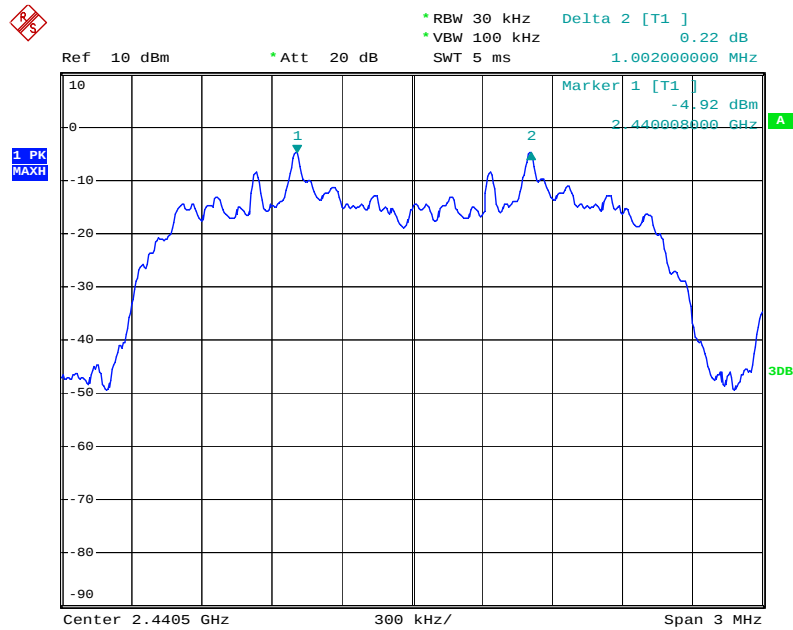


Π/4-DQPSK Mode

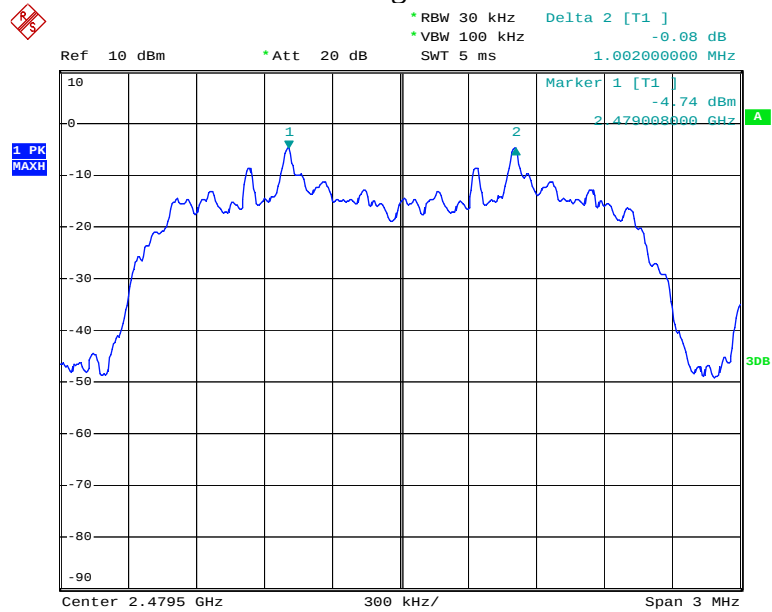
Low channel



Middle channel

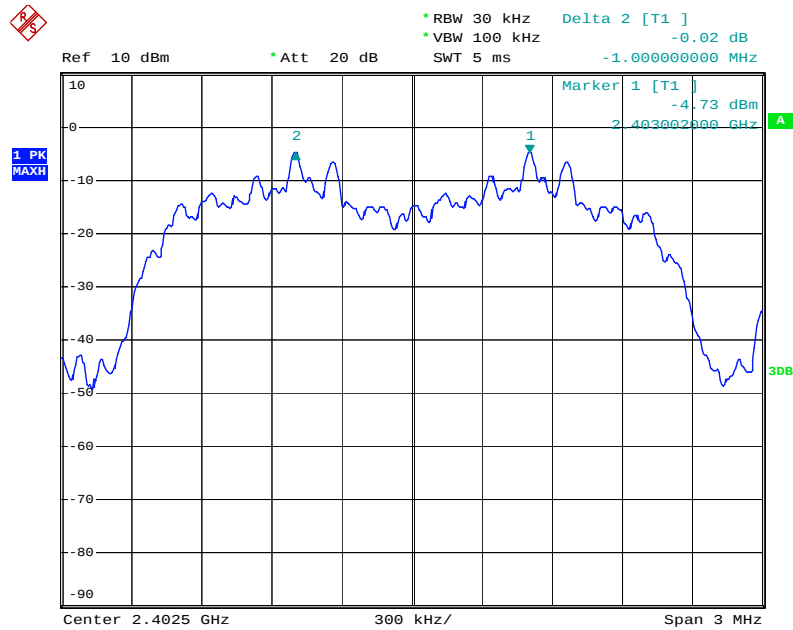


High channel

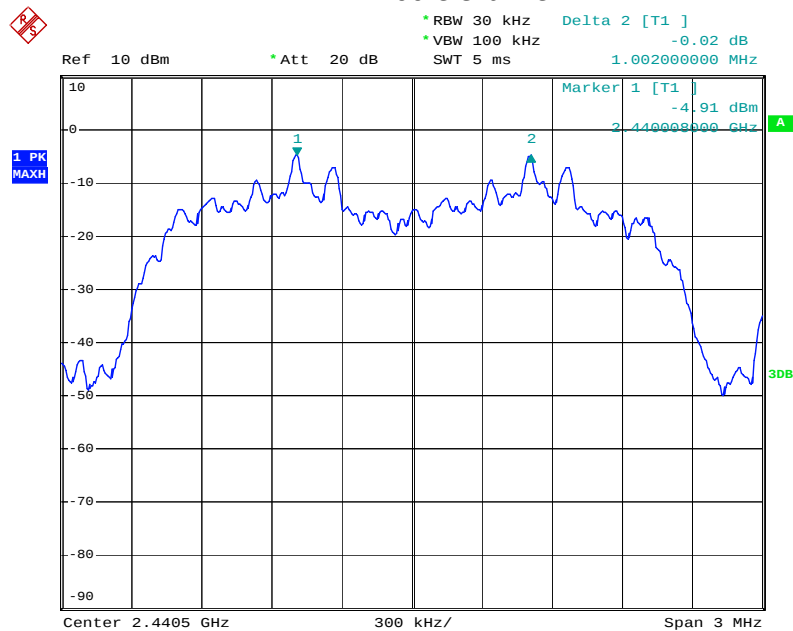


8DPSK Mode

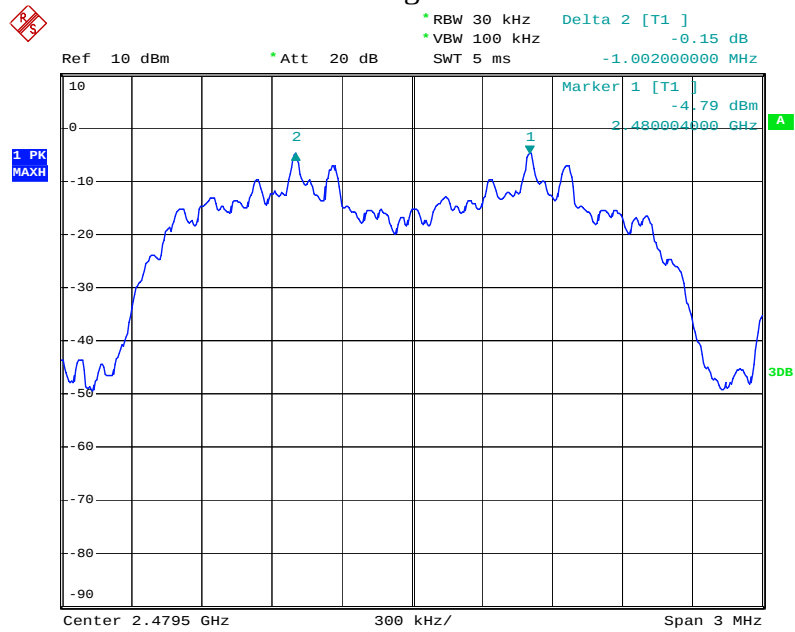
Low channel



Middle channel



High channel



7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Block Diagram of Test Setup



(EUT: AM/FM HD Radio with Bluetooth)

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

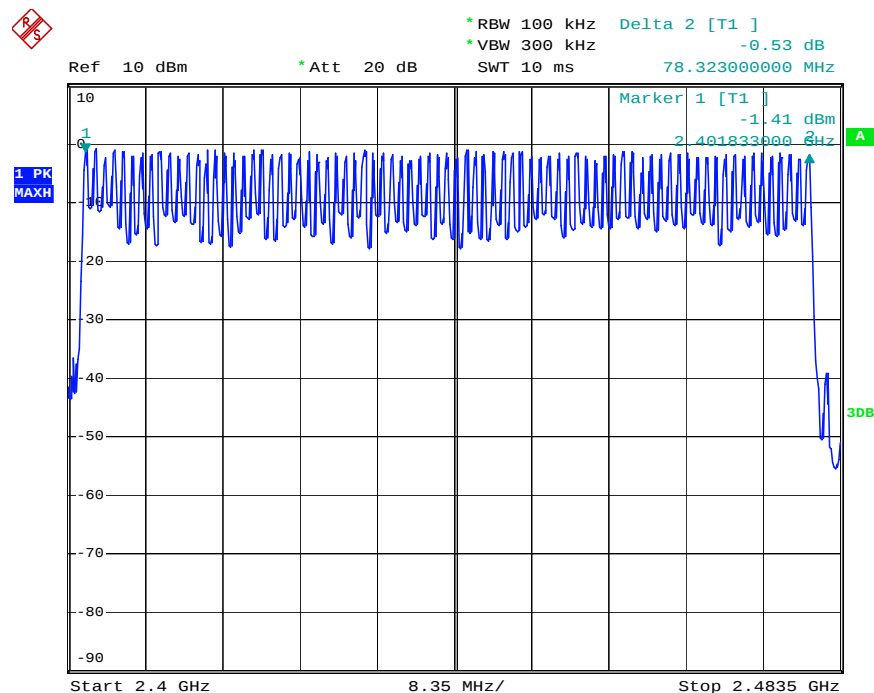
- 7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 7.5.2. Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.
- 7.5.3. Max hold, view and count how many channel in the band.

7.6. Test Result

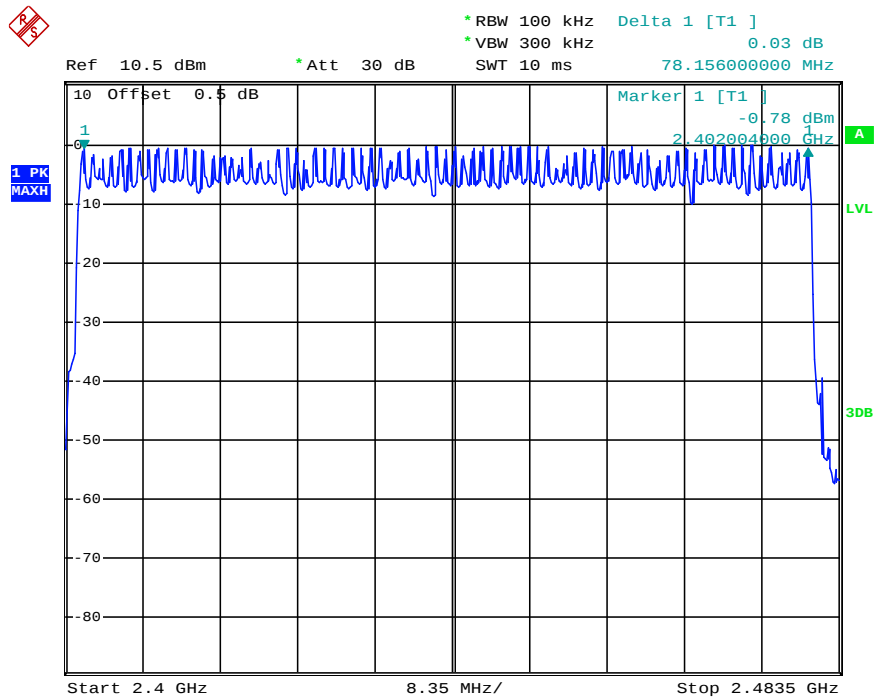
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	≥ 15

The spectrum analyzer plots are attached as below.

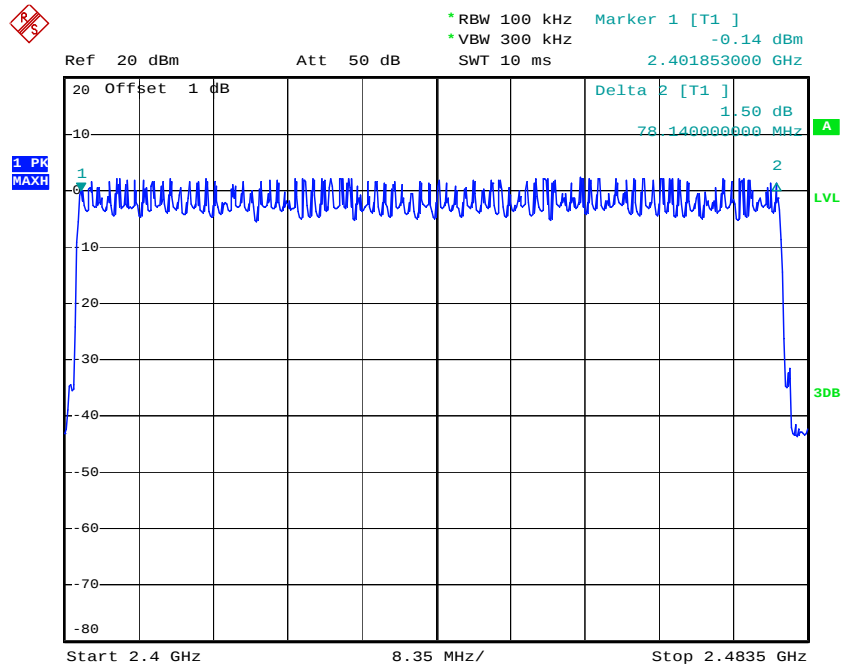
Number of hopping channels(GFSK)



Number of hopping channels($\Pi/4$ -DQPSK)



Number of hopping channels(8DPSK)



8. DWELL TIME TEST

8.1. Block Diagram of Test Setup



(EUT: AM/FM HD Radio with Bluetooth)

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=1MHz, VBW=3MHz, Span=0Hz.

8.5.4. 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	0.440	140.80	400
	2441	0.440	140.80	400
	2480	0.440	140.80	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.720	275.20	400
	2441	1.720	275.20	400
	2480	1.720	275.20	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	3.010	321.07	400
	2441	3.010	321.07	400
	2480	3.010	321.07	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

Π/4-DQPSK

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.460	147.20	400
	2441	0.460	147.20	400
	2480	0.460	147.20	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.740	278.40	400
	2441	1.740	278.40	400
	2480	1.740	278.40	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	3.000	320.00	400
	2441	3.000	320.00	400
	2480	3.000	320.00	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

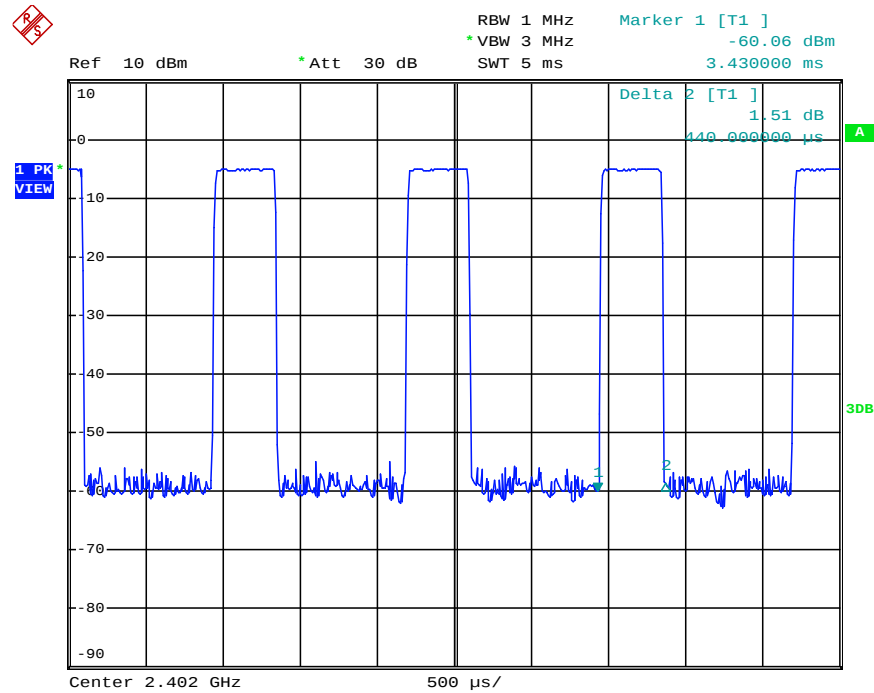
8DPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.440	140.80	400
	2441	0.430	137.60	400
	2480	0.440	140.80	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.720	275.20	400
	2441	1.700	272.00	400
	2480	1.720	275.20	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	2.970	316.80	400
	2441	2.920	311.47	400
	2480	2.940	313.60	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

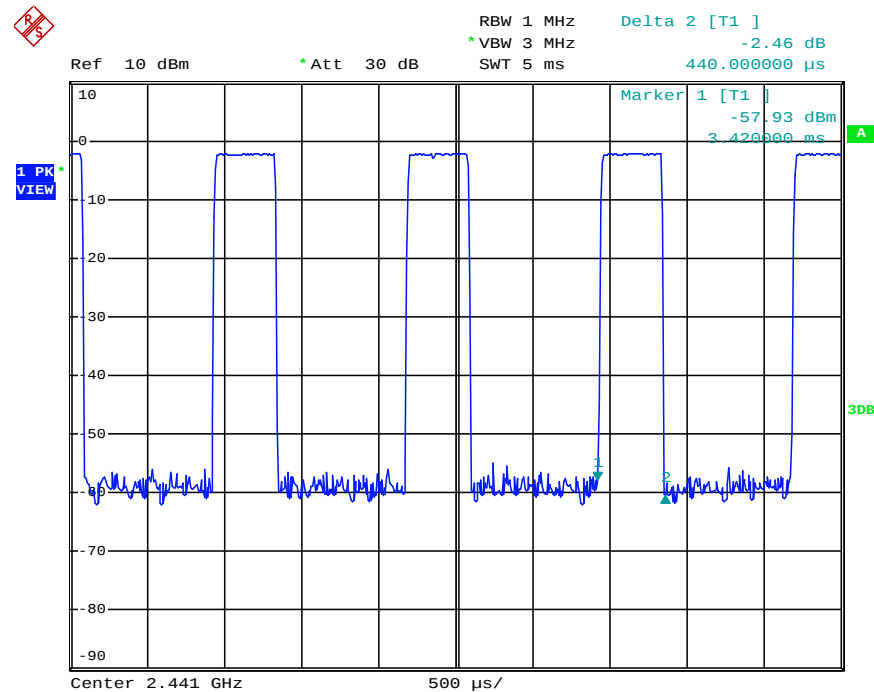
The spectrum analyzer plots are attached as below.

Mode 1: GFSK Link Mode

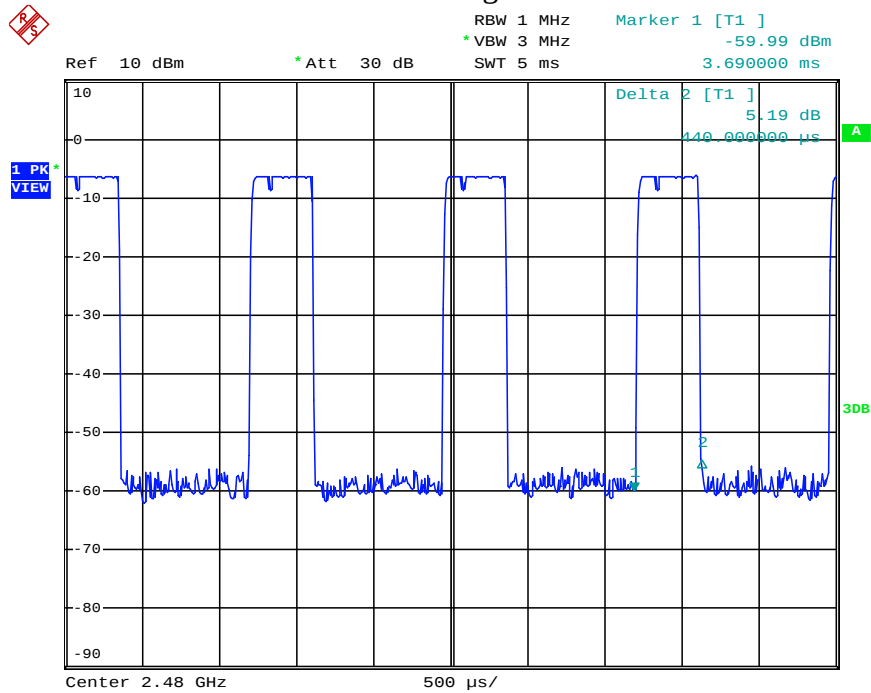
DH1 Low channel



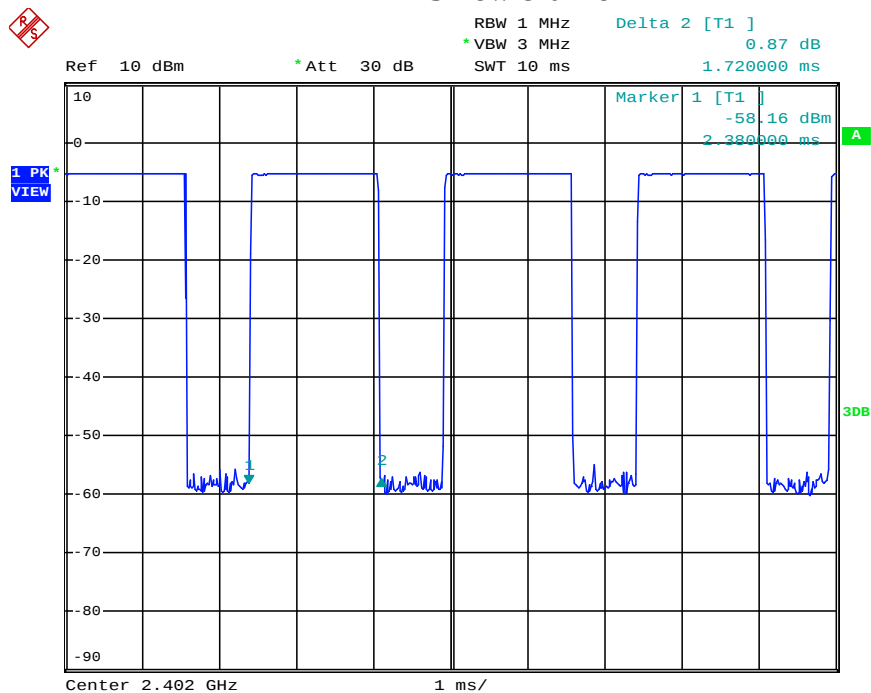
DH1 Middle channel



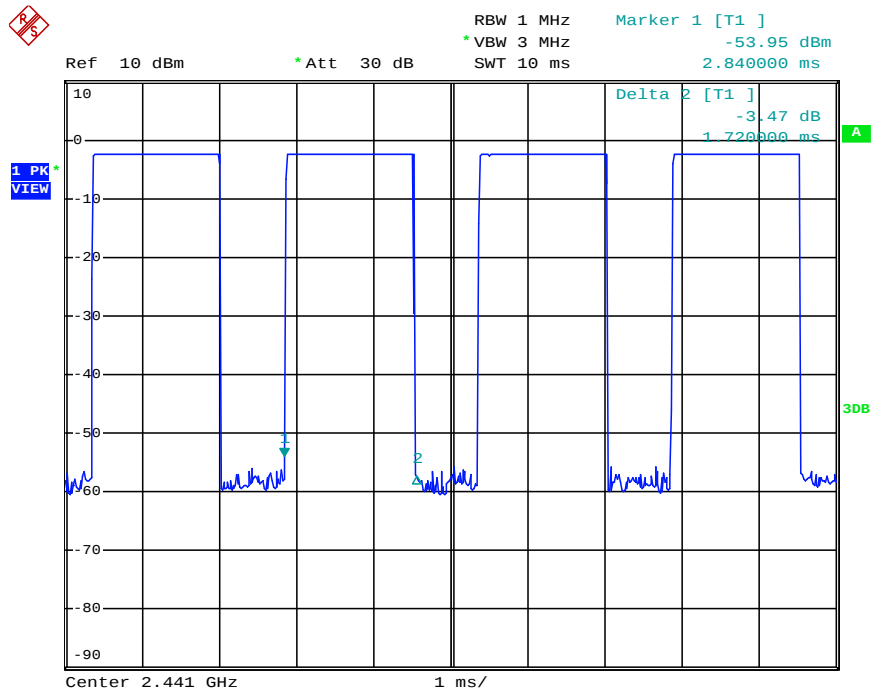
DH1 High channel



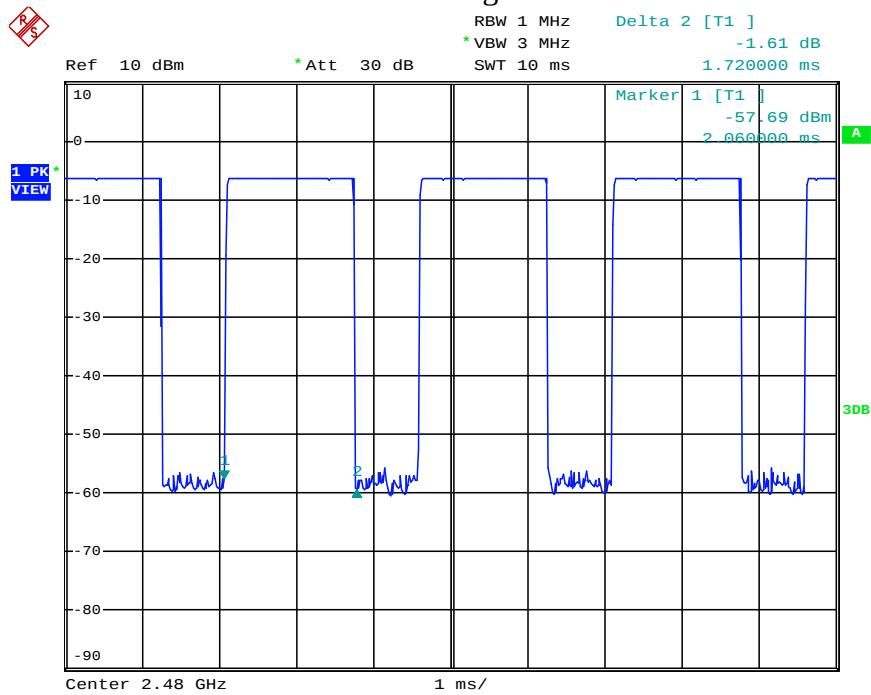
DH3 Low channel



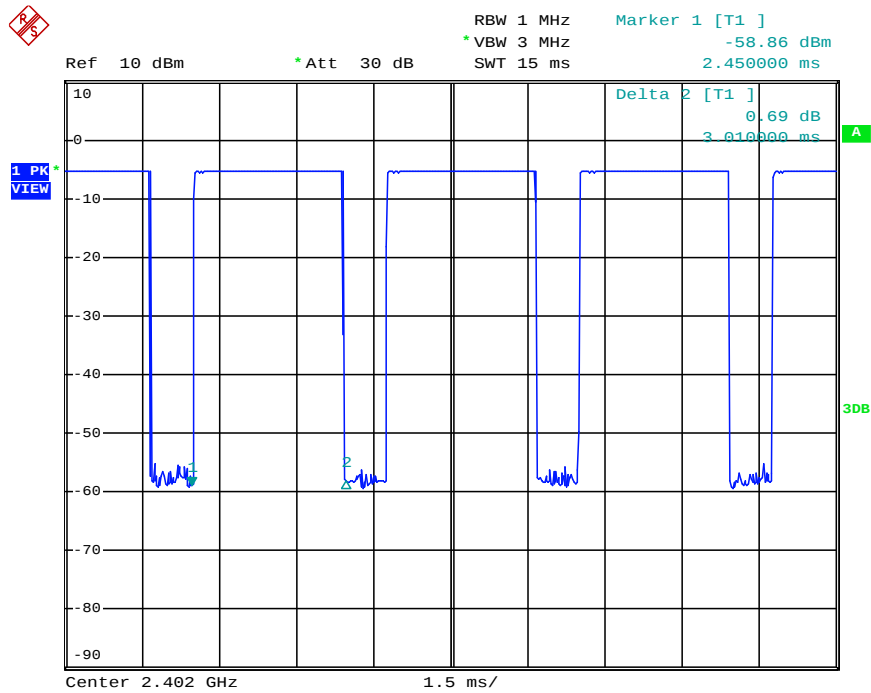
DH3 Middle channel



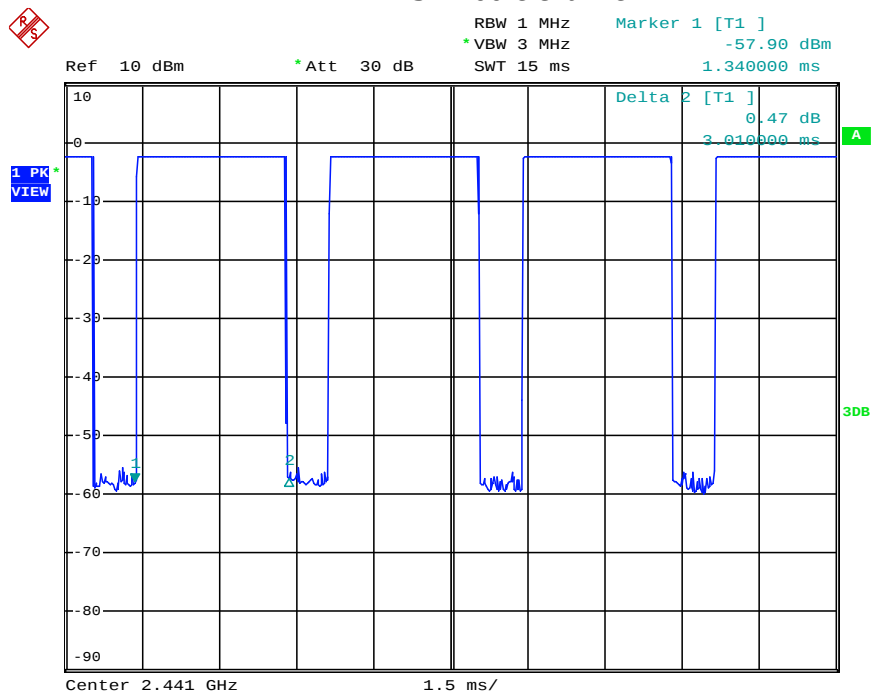
DH3 High channel



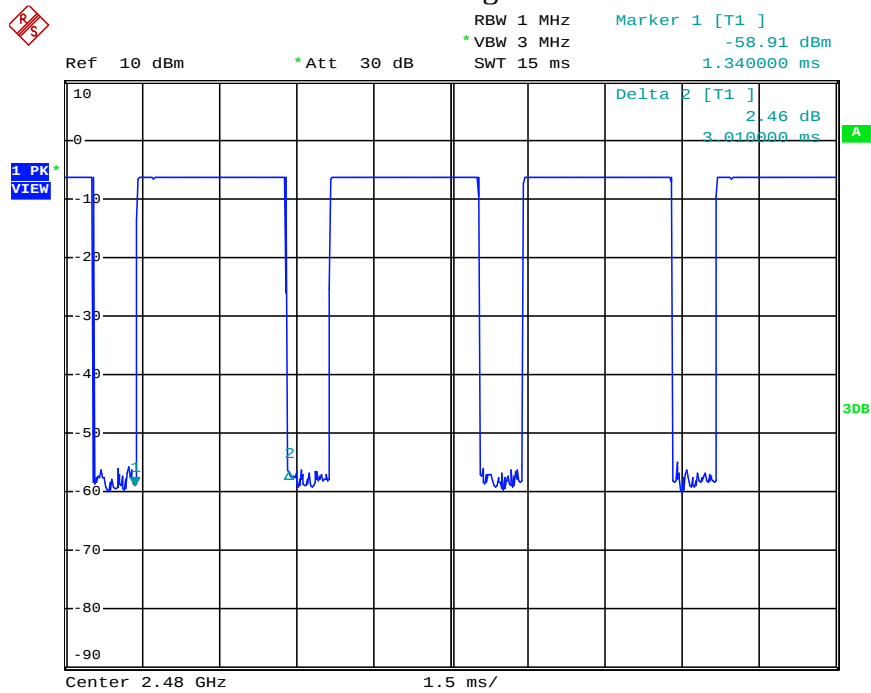
DH5 Low channel



DH5 Middle channel

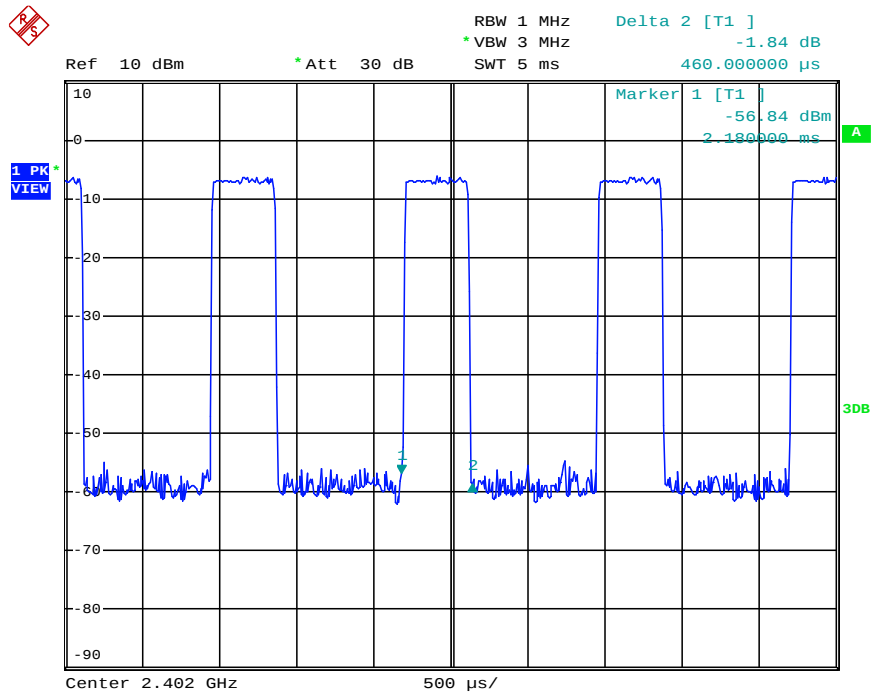


DH5 High channel

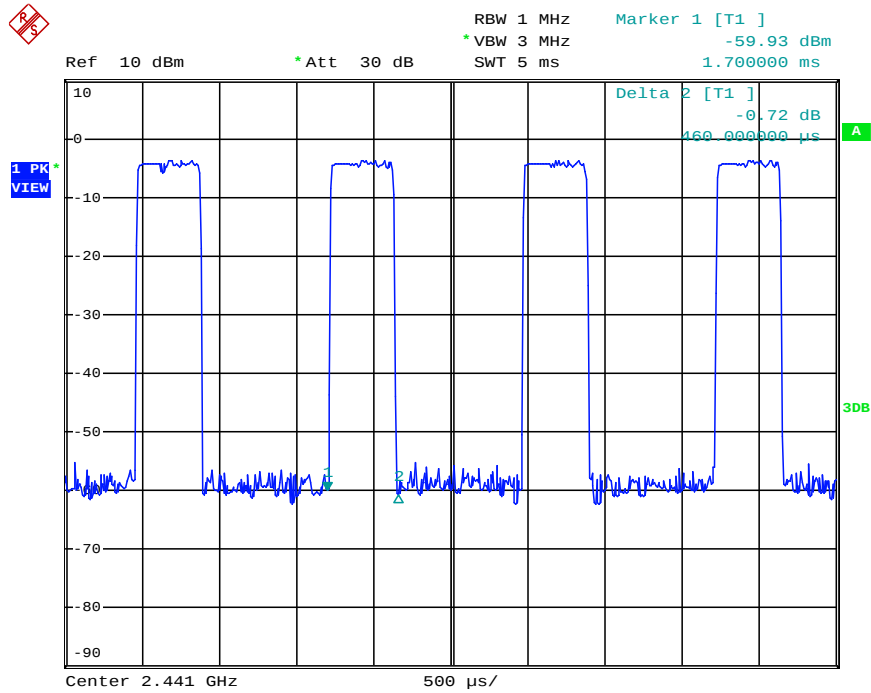


Mode 2: $\pi/4$ DQPSK Link Mode

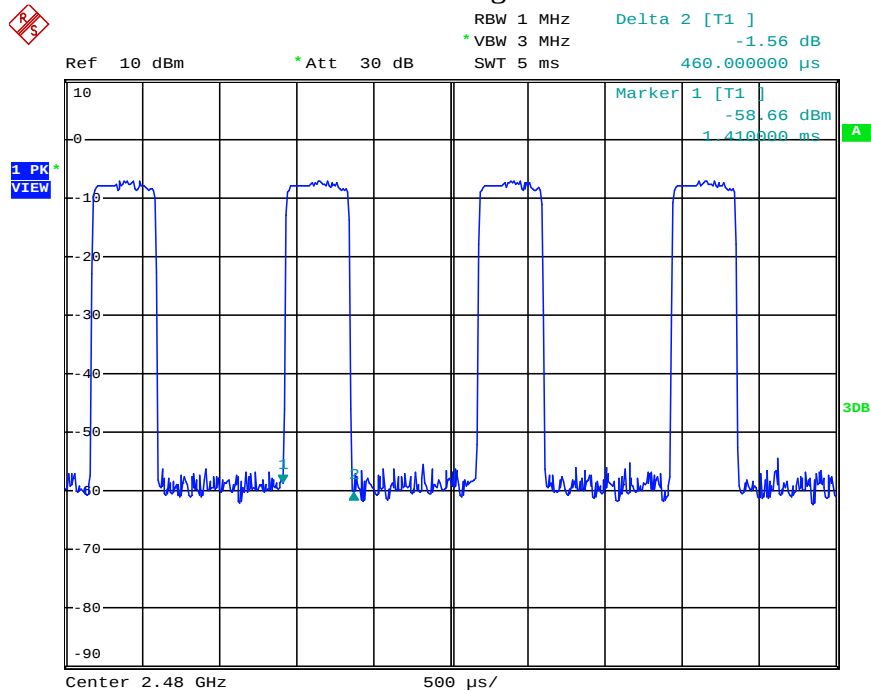
2DH1 Low channel



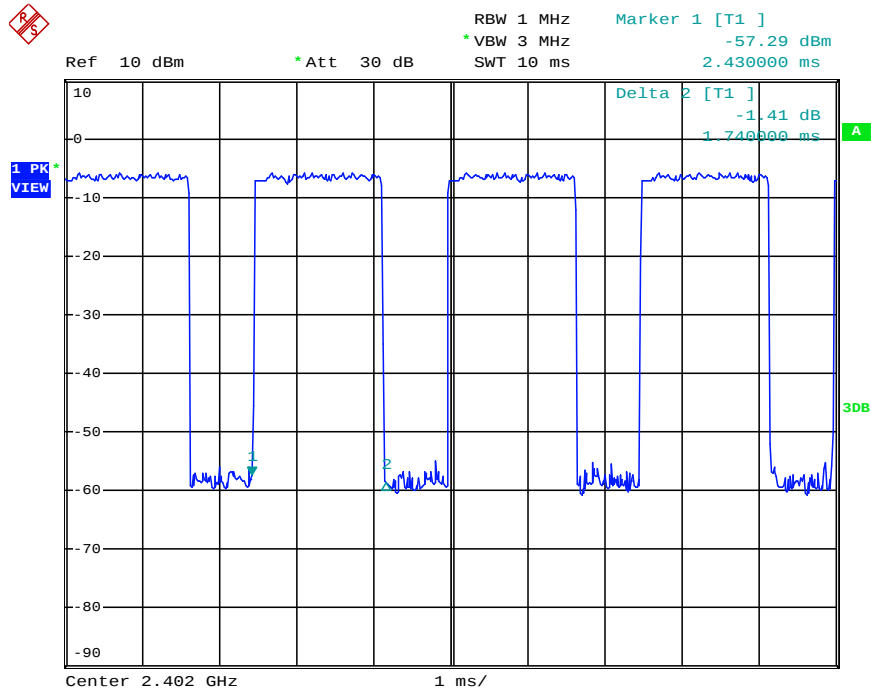
2DH1 Middle channel



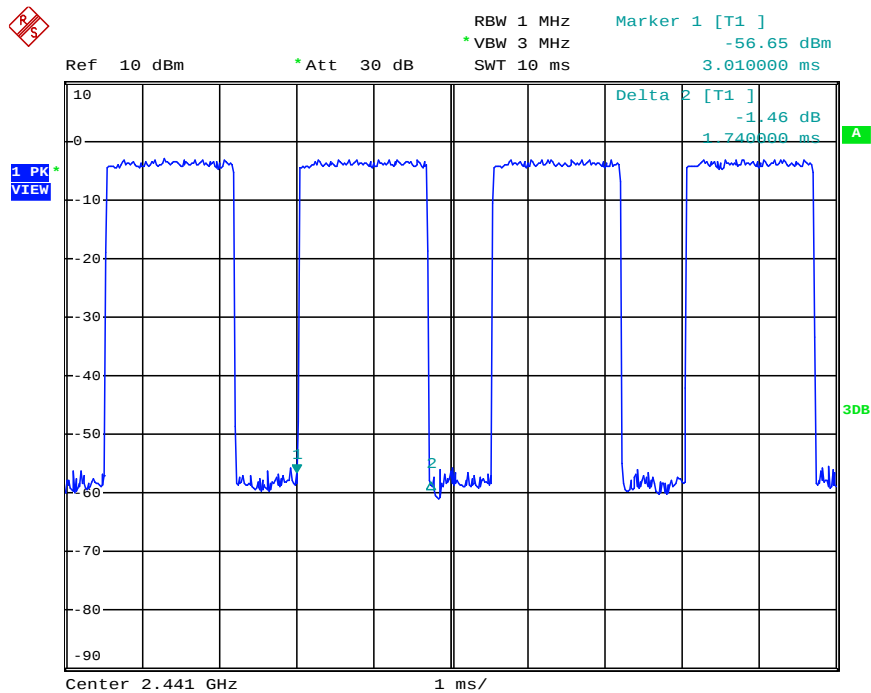
2DH1 High channel



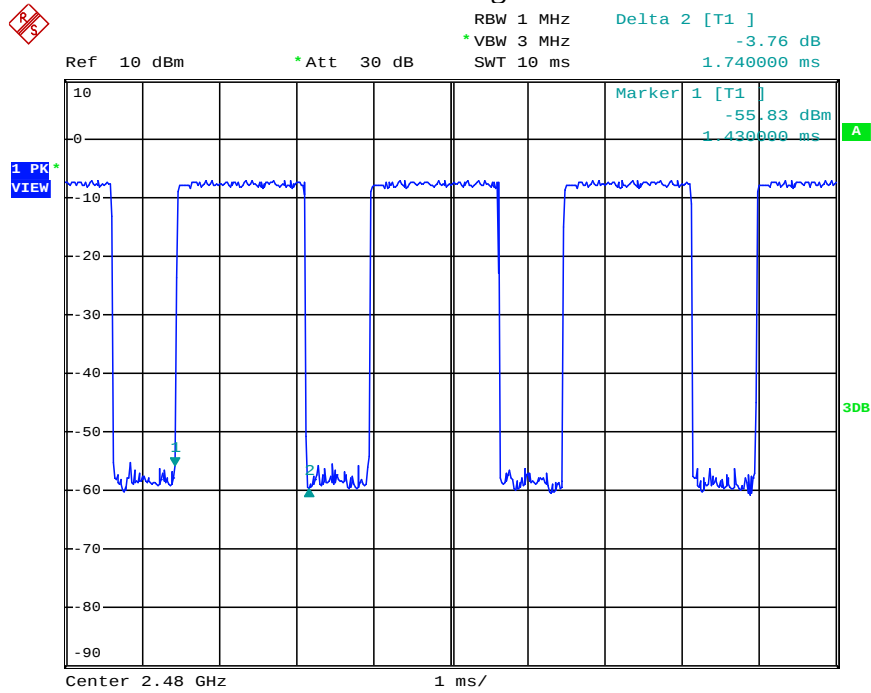
2DH3 Low channel



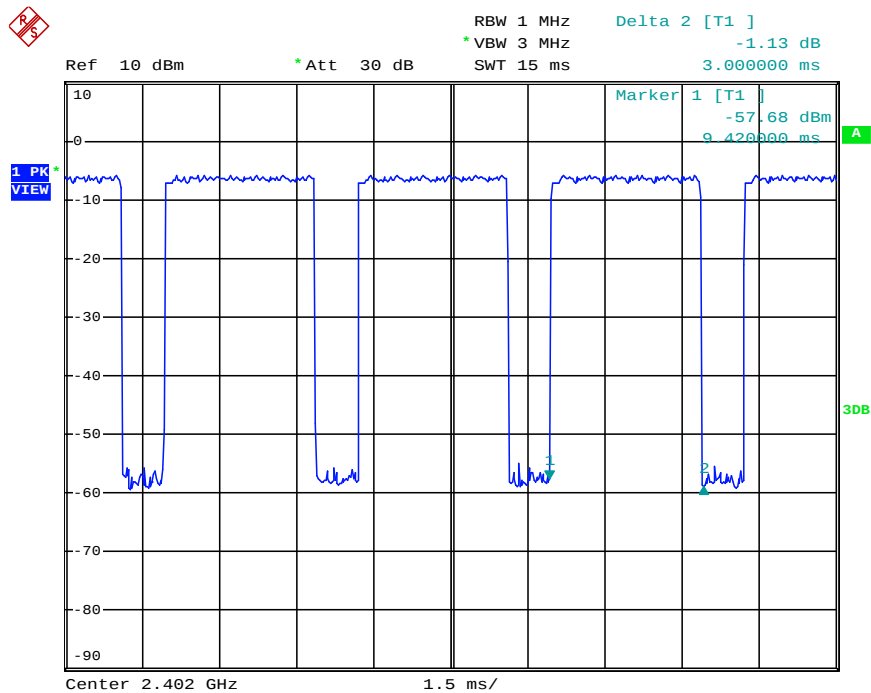
2DH3 Middle channel



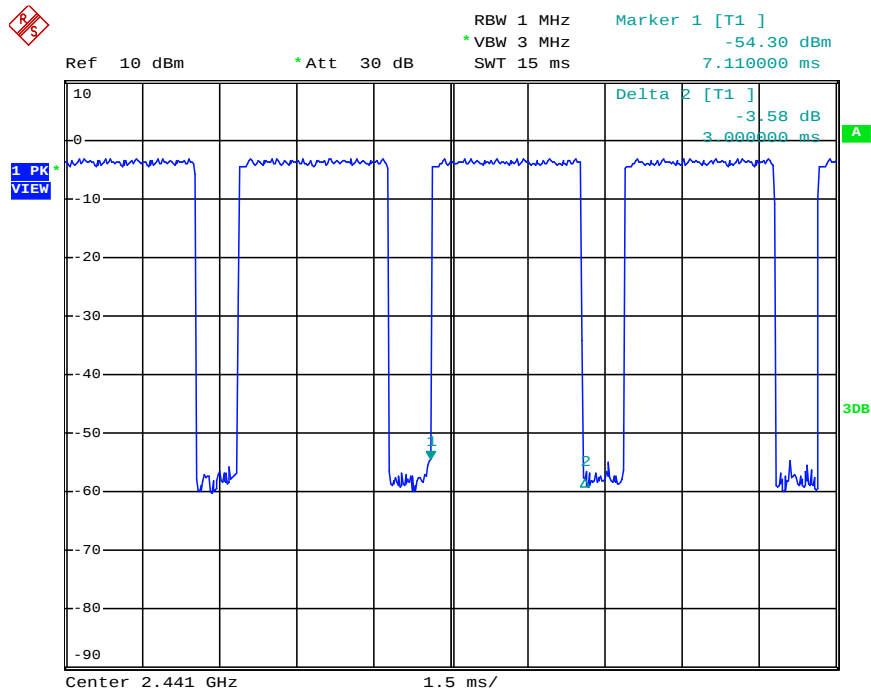
2DH3 High channel



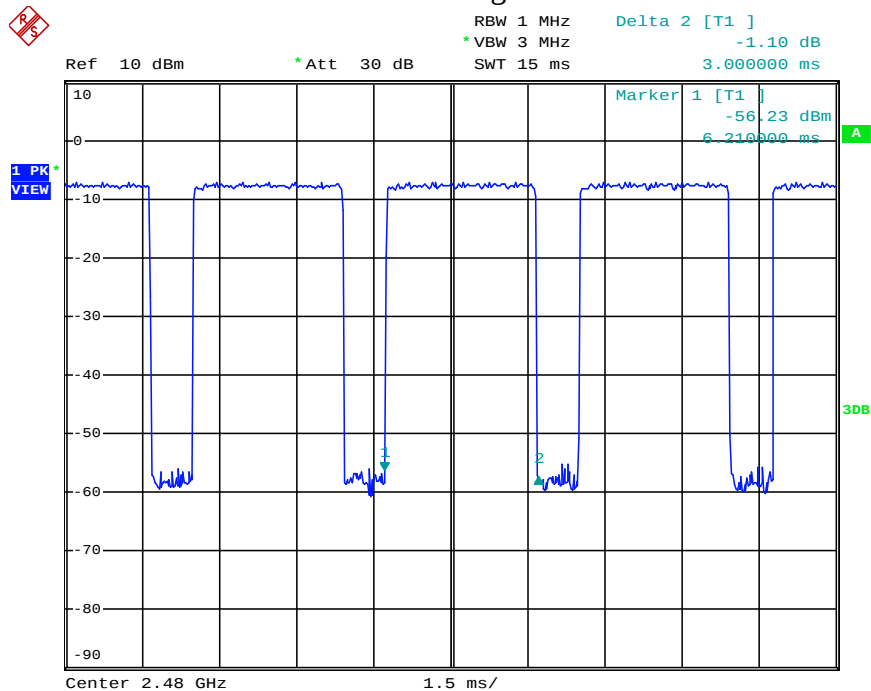
2DH5 Low channel



2DH5 Middle channel

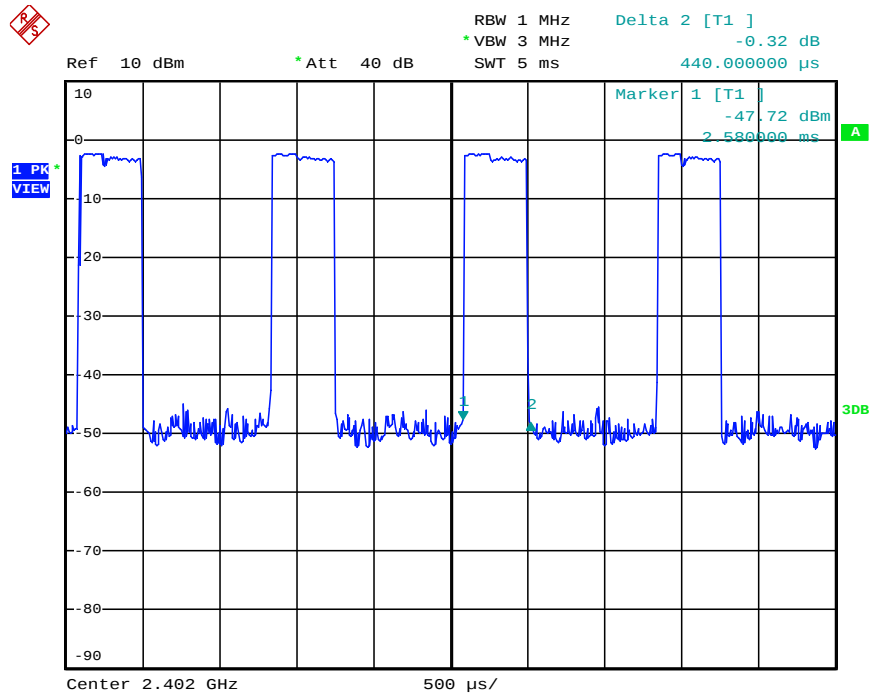


2DH5 High channel

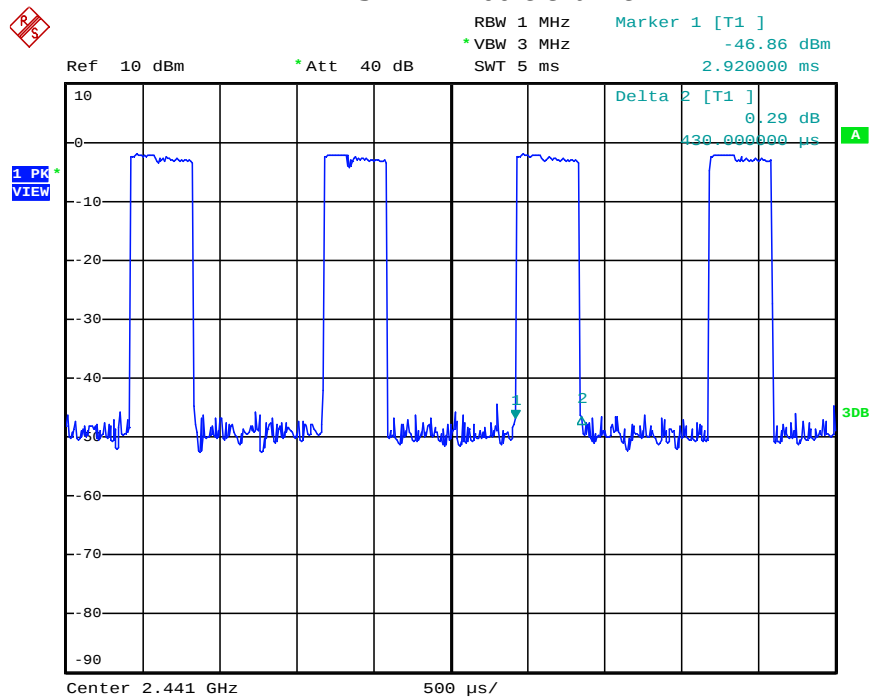


Mode 3: 8DPSK Link Mode

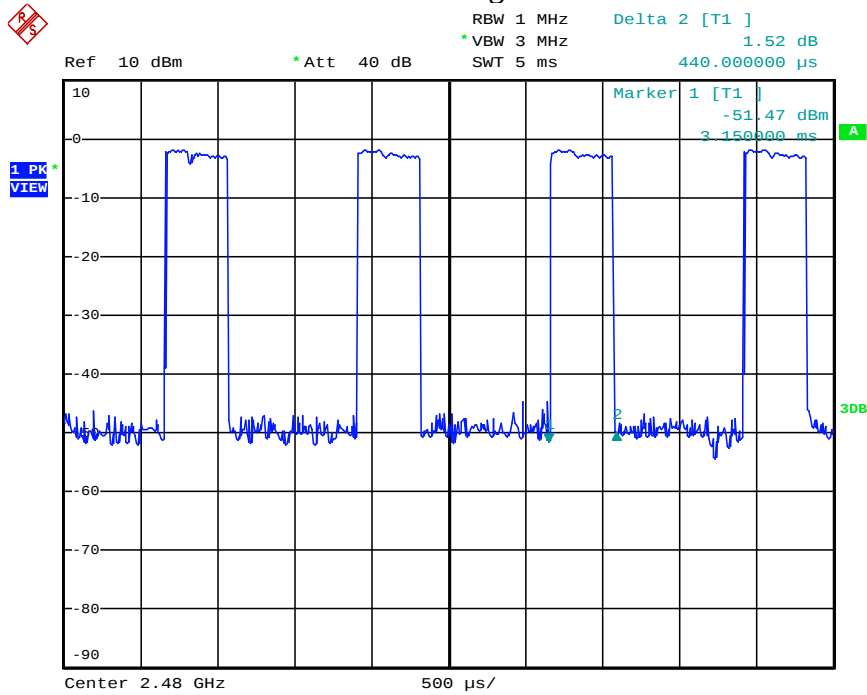
3DH1 Low channel



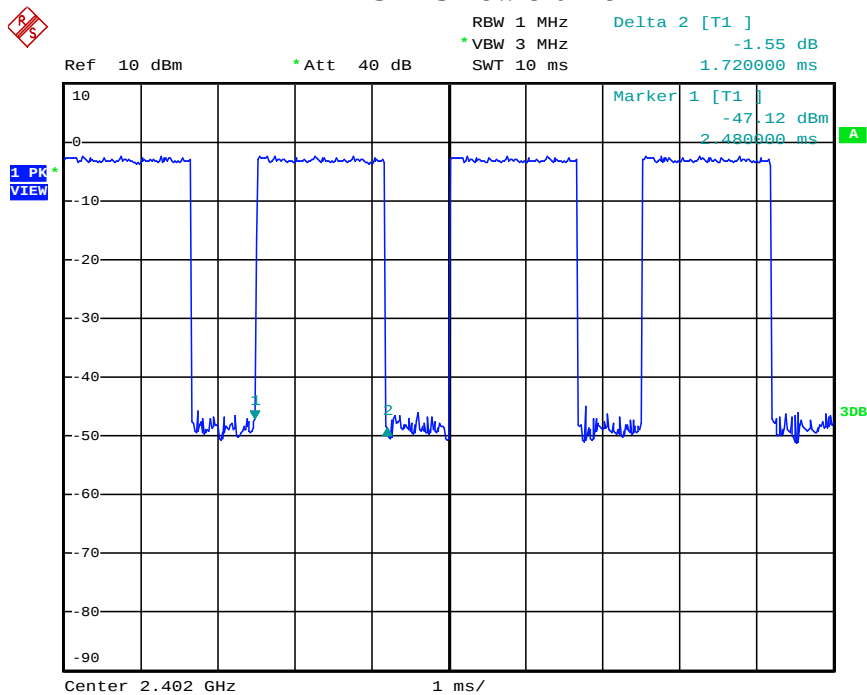
3DH1 Middle channel



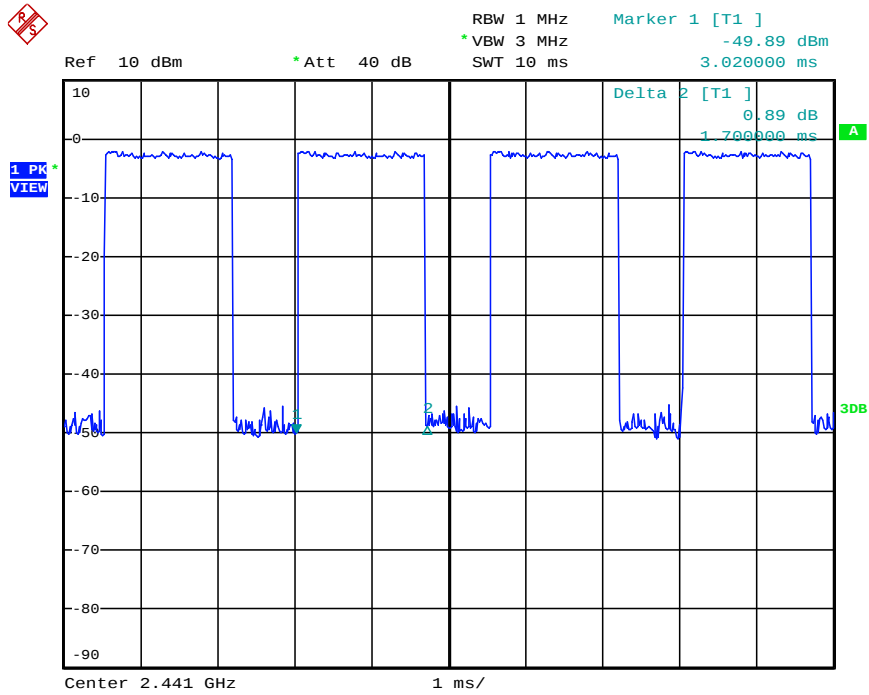
3DH1 High channel



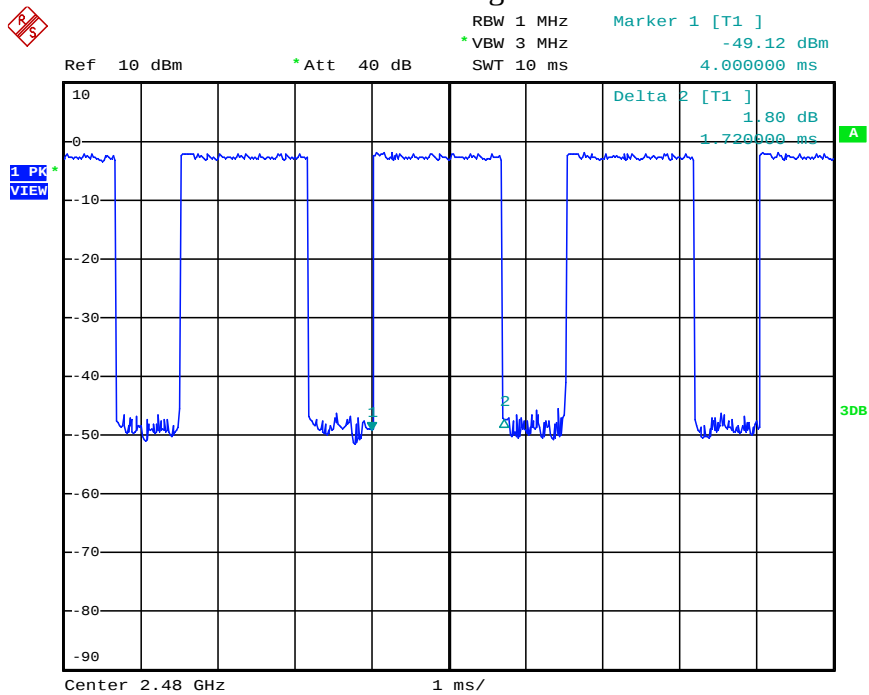
3DH3 Low channel



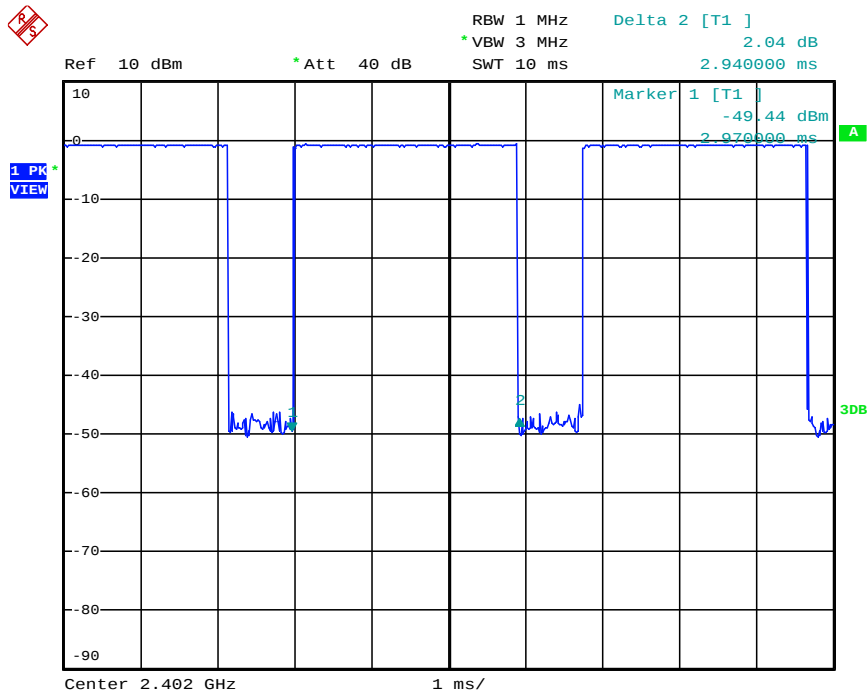
3DH3 Middle channel



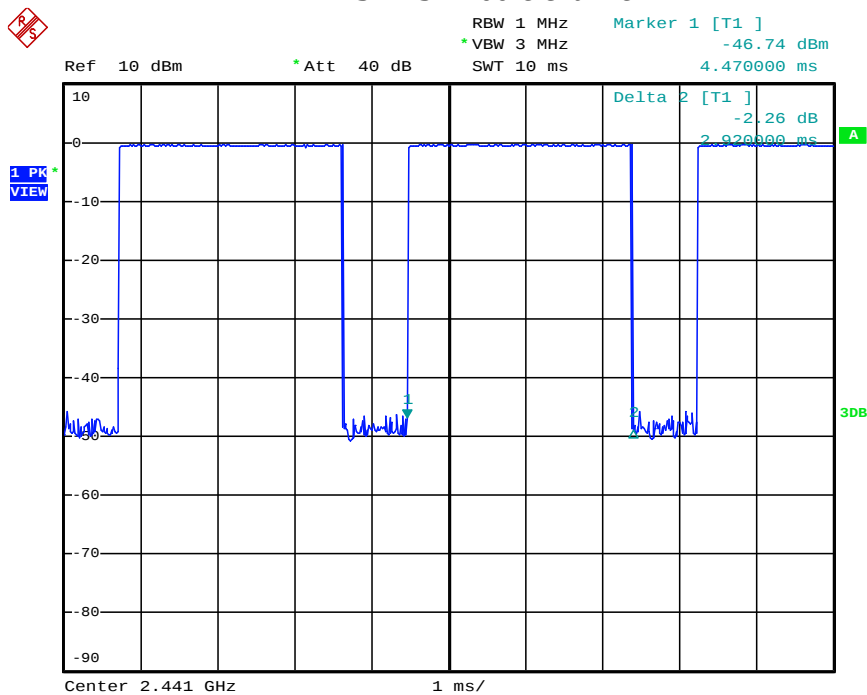
3DH3 High channel



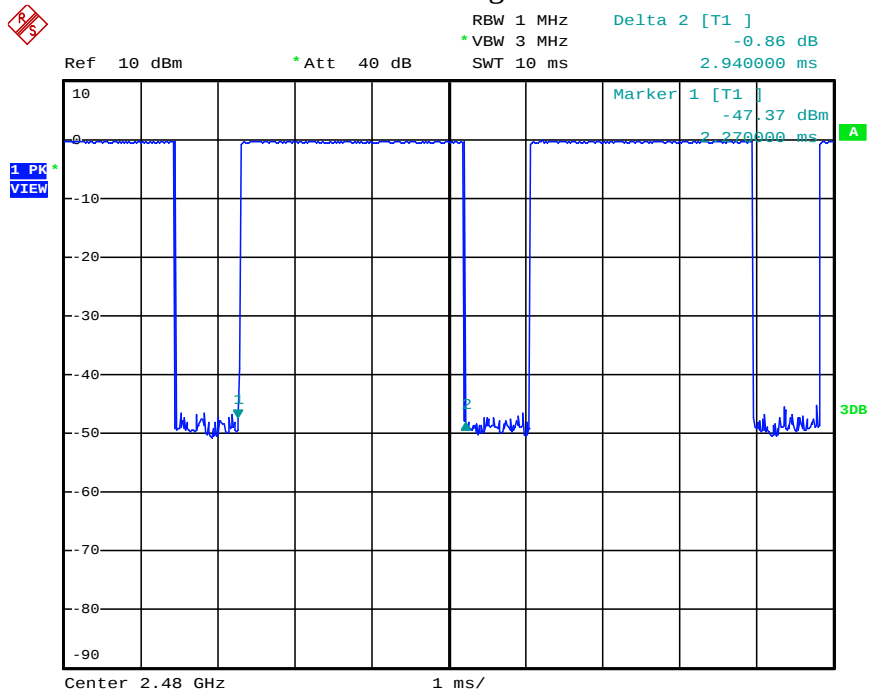
3DH5 Low channel



3DH5 Middle channel



3DH5 High channel



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Block Diagram of Test Setup



(EUT: AM/FM HD Radio with Bluetooth)

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)	Peak Output Power(mW)	Limits dBm / W
Low	2402	-0.82	0.83	30/1.0
Middle	2441	-1.15	0.77	30/1.0
High	2480	-1.28	0.74	30/1.0

II/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power(dBm)	Peak Output Power(mW)	Limits dBm / W
Low	2402	-2.24	0.60	21 / 0.125
Middle	2441	-1.59	0.69	21 / 0.125
High	2480	-1.66	0.68	21 / 0.125

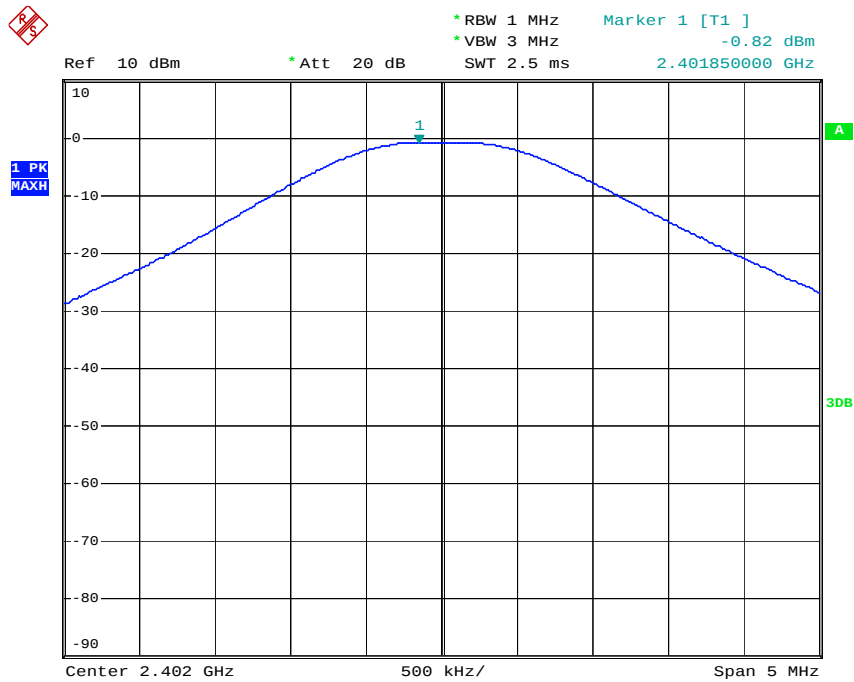
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power(dBm)	Peak Output Power(mW)	Limits dBm / W
Low	2402	-3.18	0.48	21 / 0.125
Middle	2441	-3.59	0.44	21 / 0.125
High	2480	-3.72	0.42	21 / 0.125

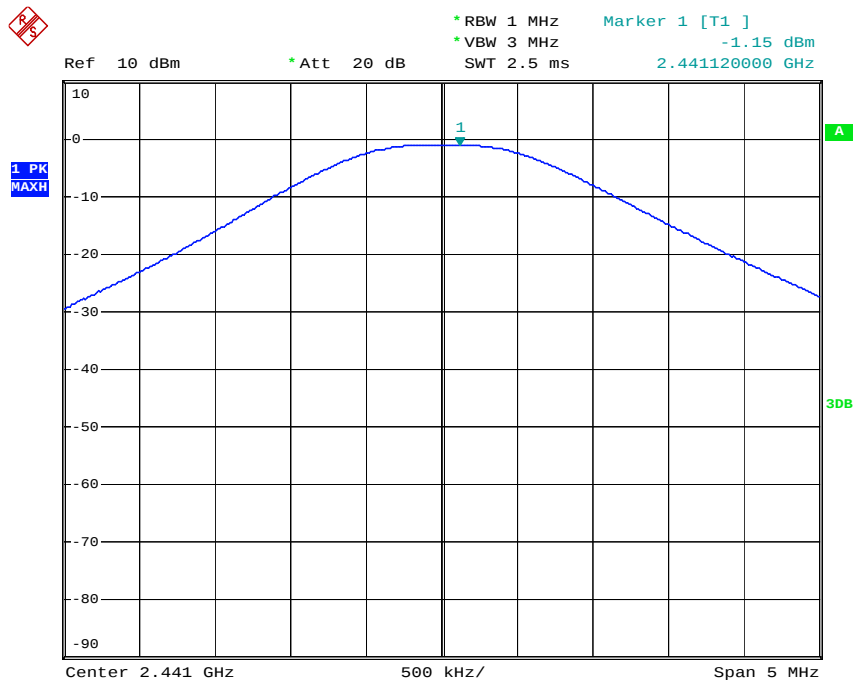
The spectrum analyzer plots are attached as below.

GFSK Mode

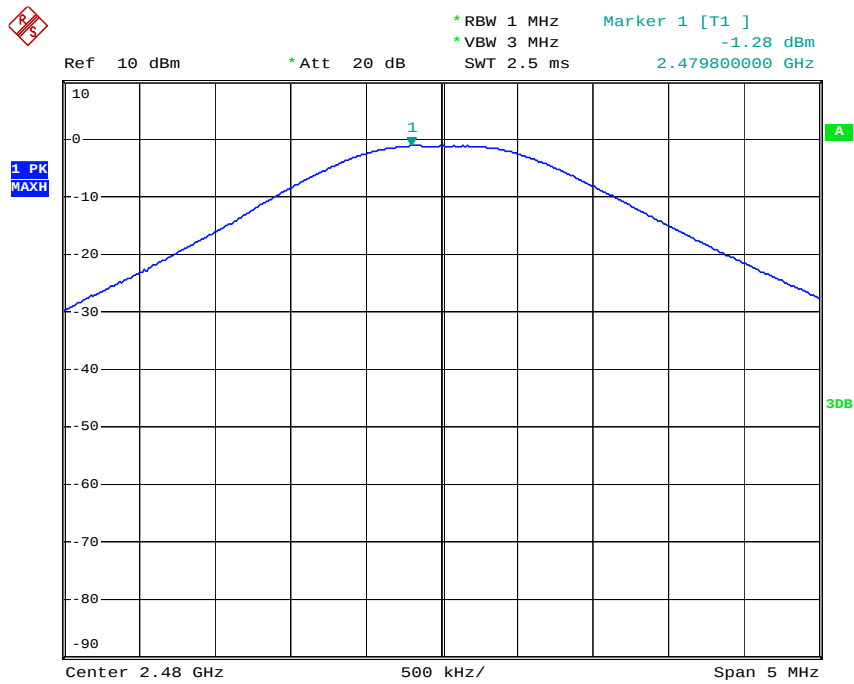
Low channel



Middle channel

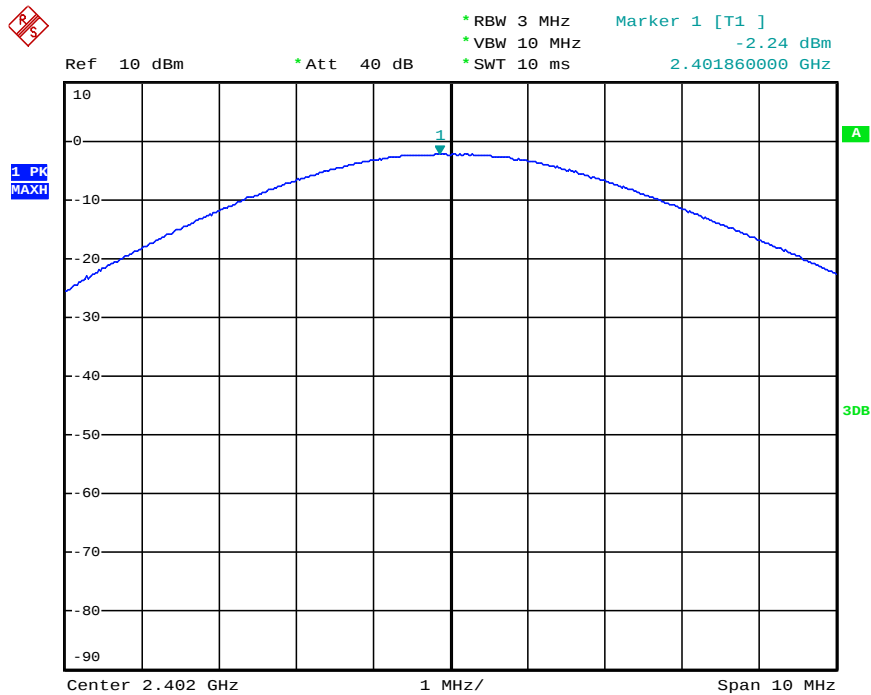


High channel

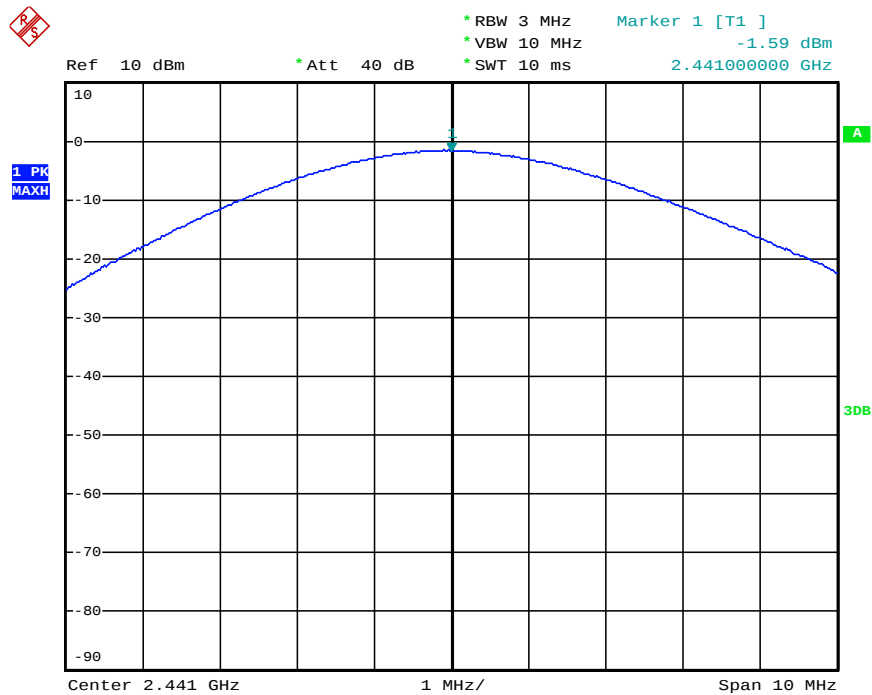


II/4-DQPSK Mode

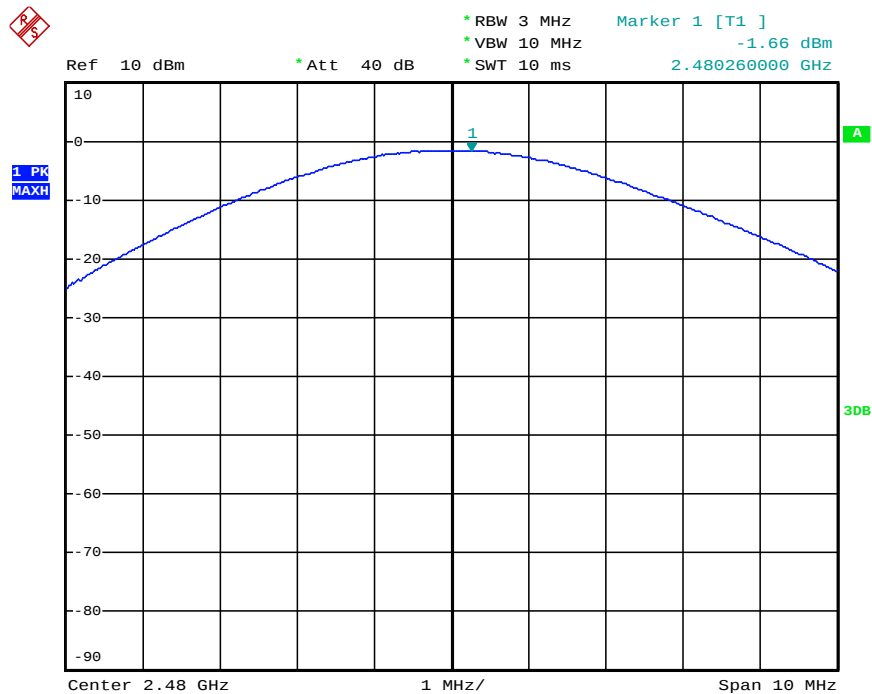
Low channel



Middle channel

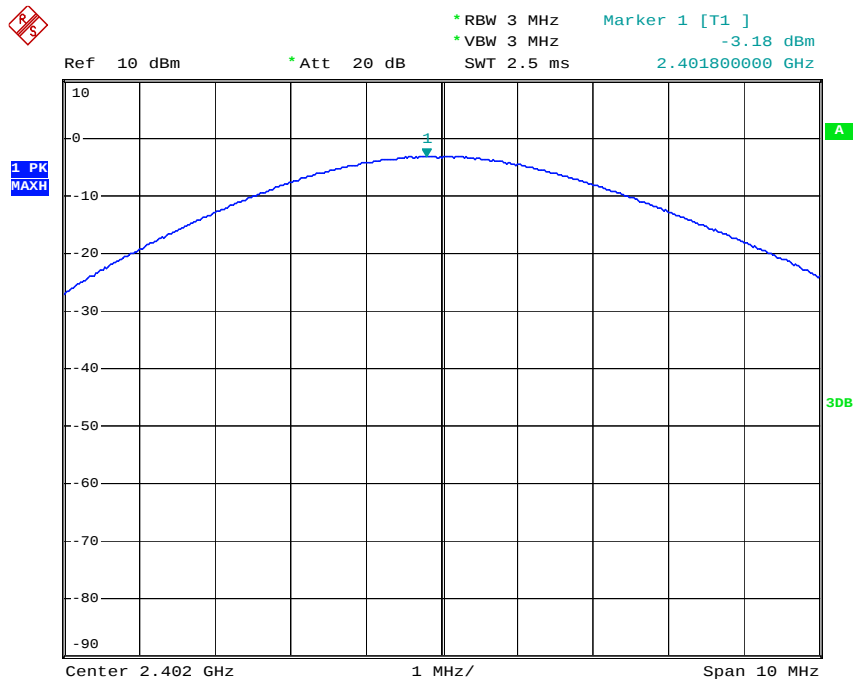


High channel

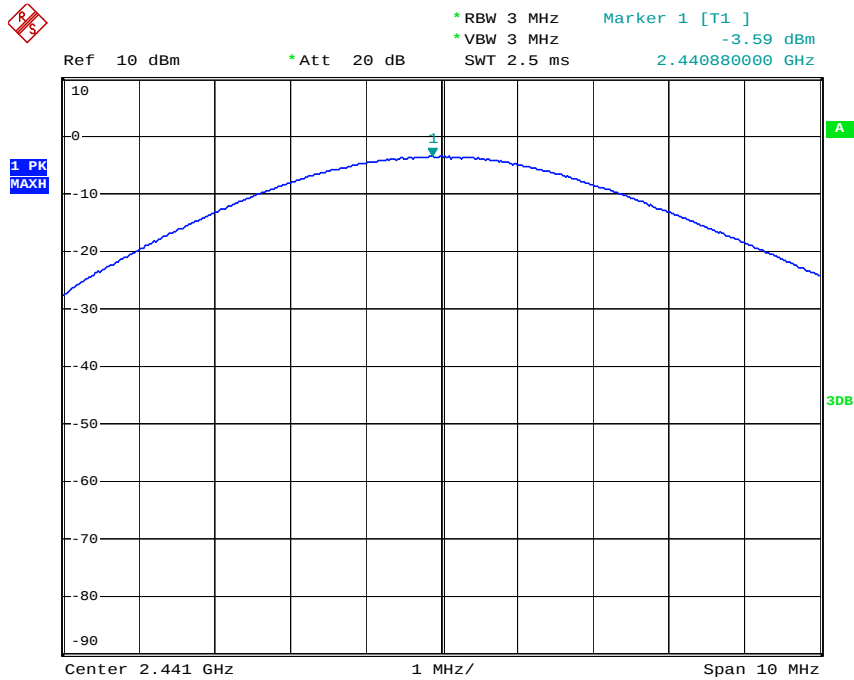


8DPSK Mode

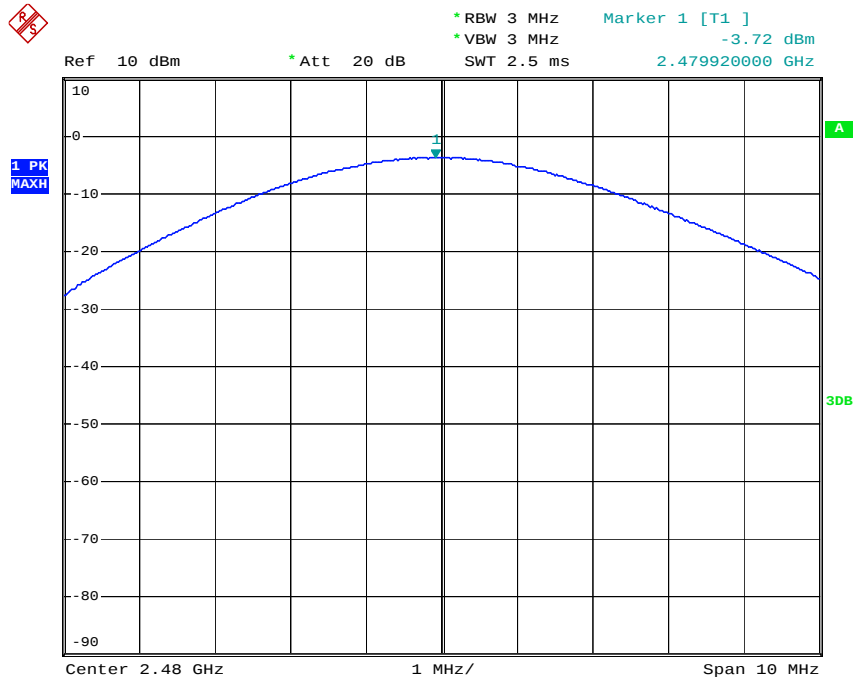
Low channel



Middle channel



High channel



10.RADIATED EMISSION TEST

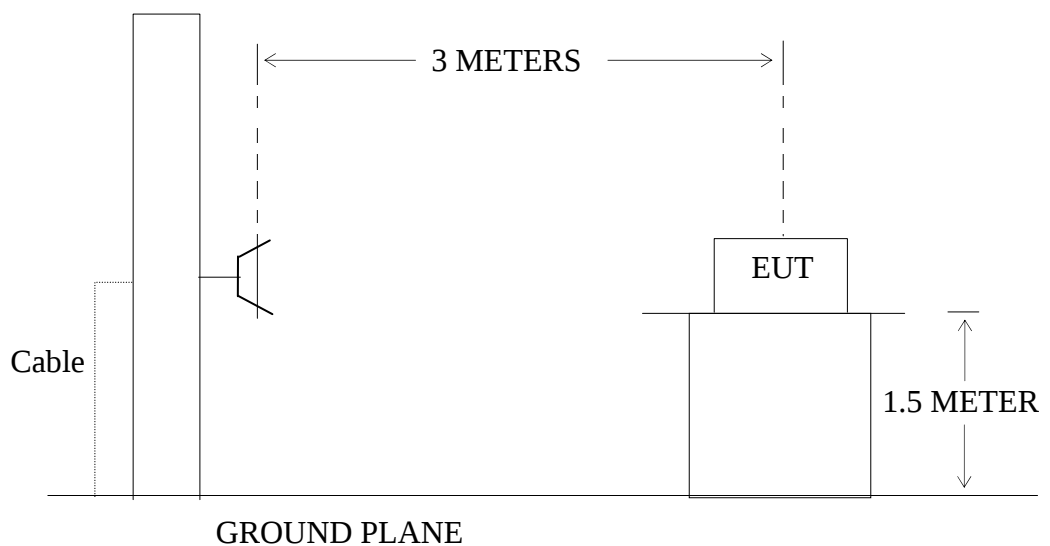
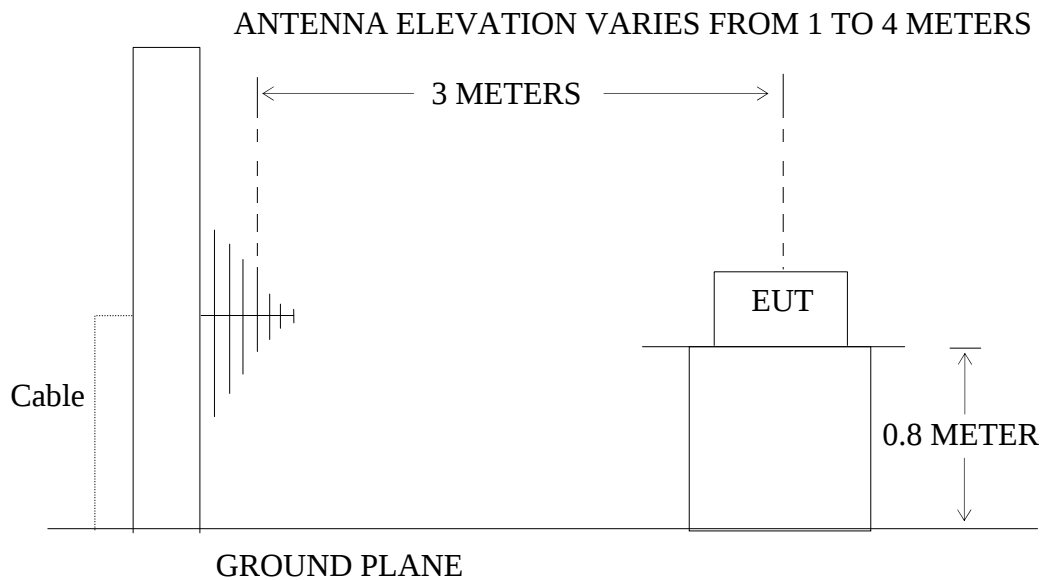
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators



(EUT: AM/FM HD Radio with Bluetooth)

10.1.2.Anechoic Chamber Test Setup Diagram



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			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510

²Above 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 Section 15.209 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 C63.10- 2013 on radiated emission measurement.

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.

RBW (120 kHz), VBW (300 kHz) for QP detector below 1GHz

Peak detector above 1GHz

RBW (1 MHz), VBW (3MHz) for Peak measurement

RBW (1 MHz), VBW (10Hz) for AV measurement

If the peak-detected amplitude can be shown to comply with the average limit, then it is not necessary to perform a separate average measurement.

10.6.The Field Strength of Radiation Emission Measurement Results

Note: 1.We tested GFSK mode, $\Pi/4$ -DQPSK Mode & 8DPSK mode and recorded the worst case data (8DPSK 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.



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Site: 1# Chamber

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Job No.: ricky 2015 #301

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

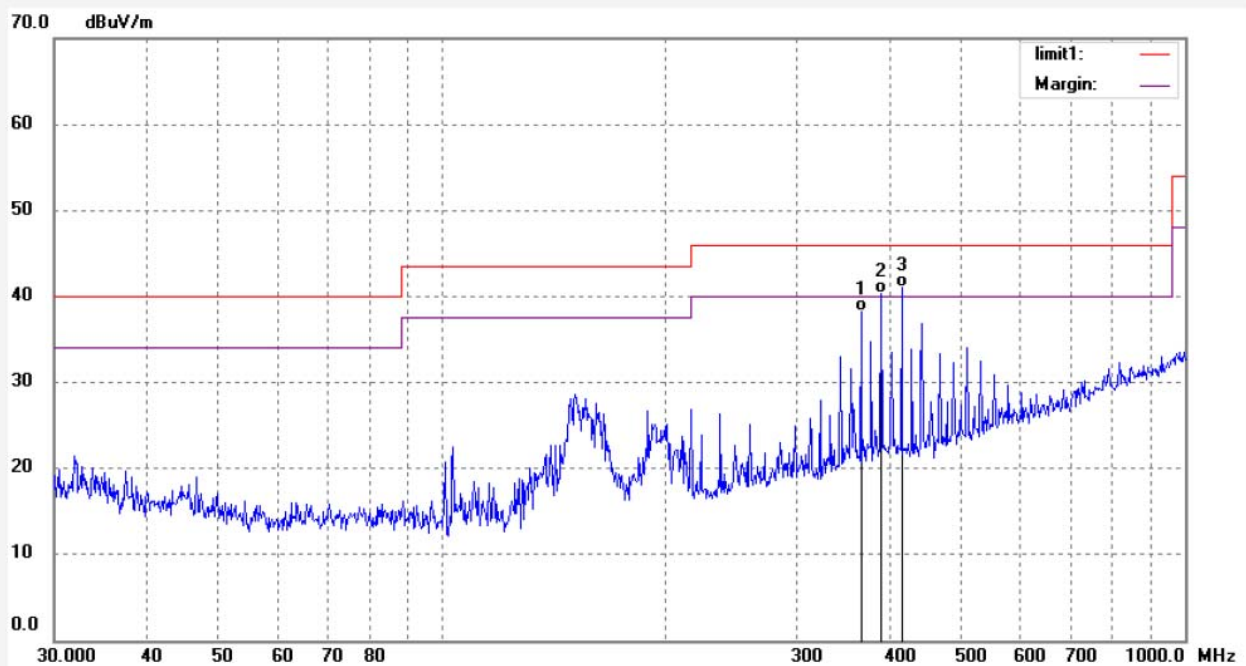
Date: 15/05/06/

Time: 8/40/09

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823

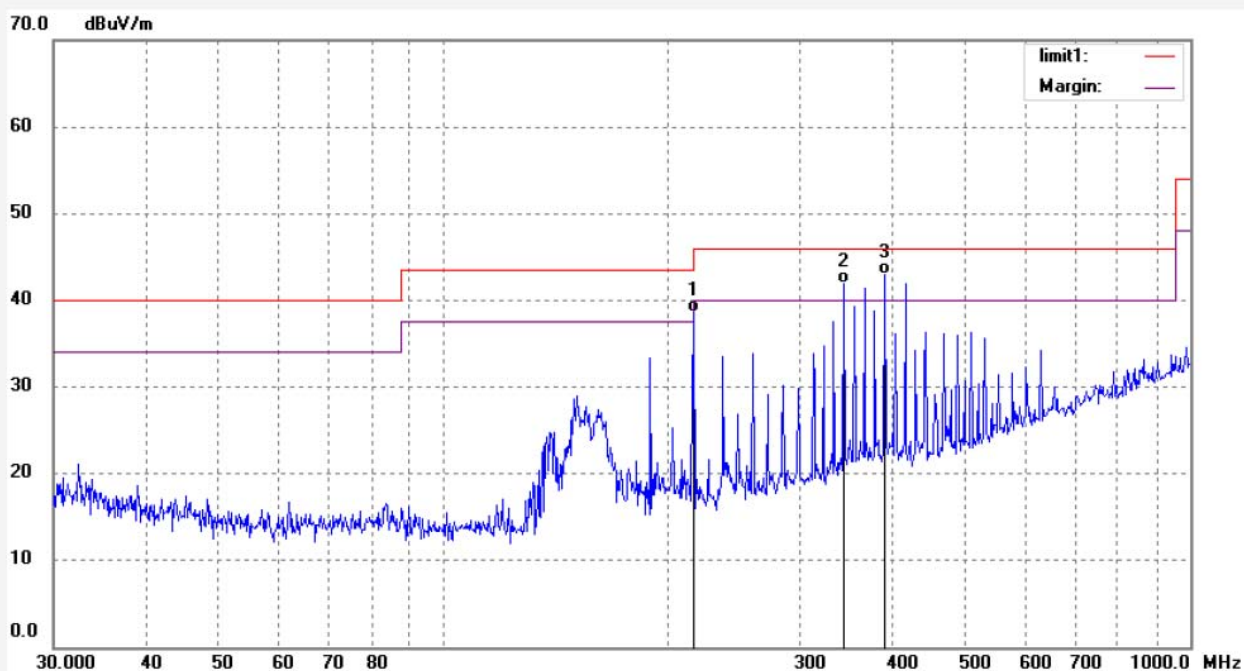


No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	366.0866	54.15	-15.88	38.27	46.00	-7.73	QP			
2	389.9874	56.10	-15.73	40.37	46.00	-5.63	QP			
3	415.4486	56.48	-15.40	41.08	46.00	-4.92	QP			

Job No.: ricky 2015 #302
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: AM/FM HD Radio with Bluetooth
Mode: TX 2402MHz
Model: SHD-ITR2BT
Manufacturer: MeiHua

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 15/05/06/
Time: 8/41/08
Engineer Signature: Ricky
Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	216.1197	58.47	-19.96	38.51	46.00	-7.49	QP			
2	343.6506	58.40	-16.47	41.93	46.00	-4.07	QP			
3	389.9874	58.66	-15.73	42.93	46.00	-3.07	QP			

Job No.: ricky 2015 #303

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2441MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

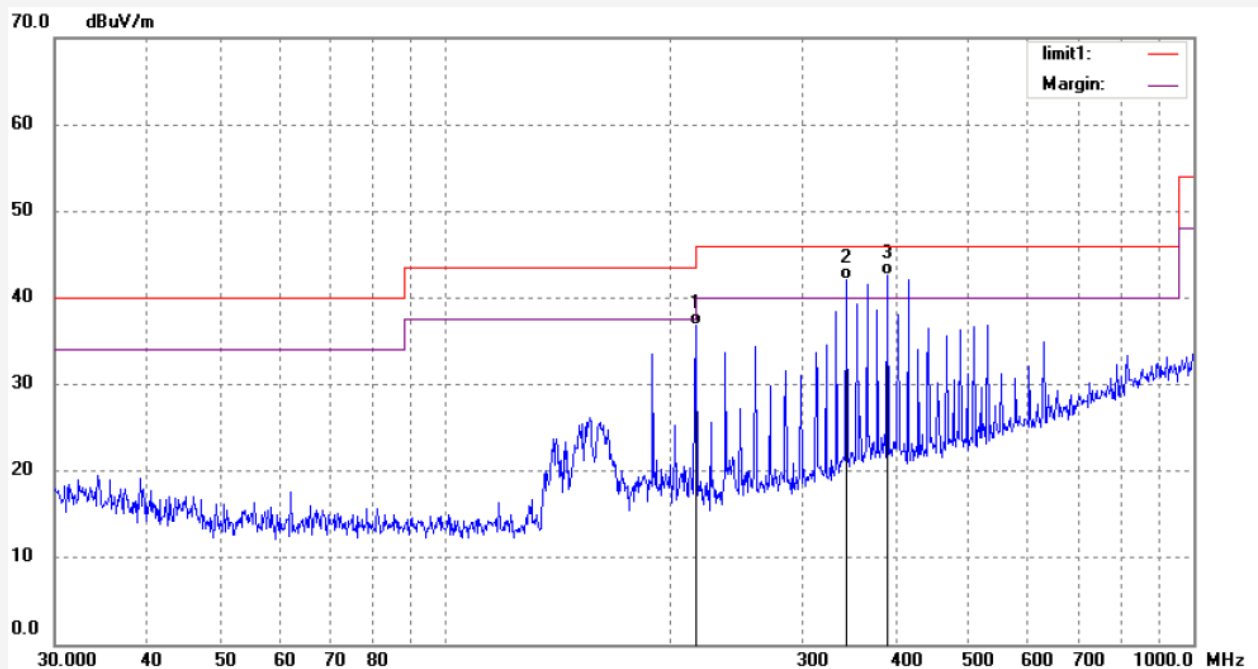
Date: 15/05/06/

Time: 8/46/28

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	216.1197	56.80	-19.96	36.84	46.00	-9.16	QP			
2	343.6506	58.49	-16.47	42.02	46.00	-3.98	QP			
3	389.9874	58.26	-15.73	42.53	46.00	-3.47	QP			



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Job No.: ricky 2015 #304

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2441MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

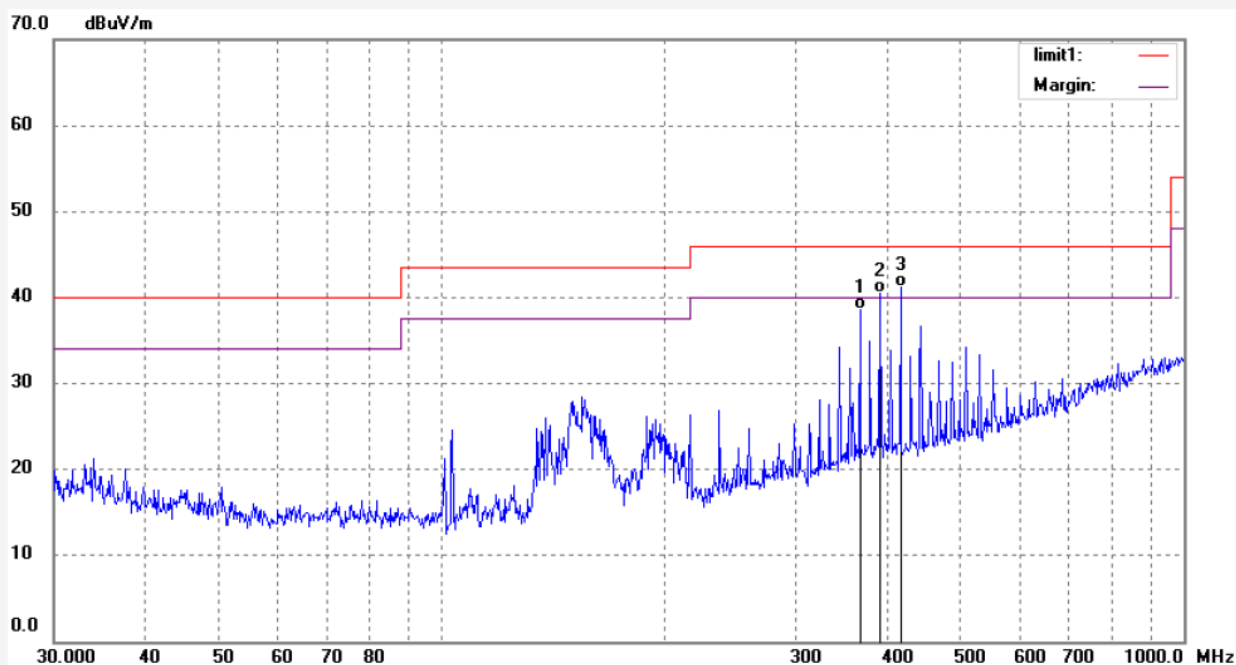
Date: 15/05/06/

Time: 8/47/53

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	366.0866	54.47	-15.88	38.59	46.00	-7.41	QP			
2	389.9874	56.27	-15.73	40.54	46.00	-5.46	QP			
3	415.4486	56.58	-15.40	41.18	46.00	-4.82	QP			

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Fax:+86-0755-26503396

Job No.: ricky 2015 #305

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

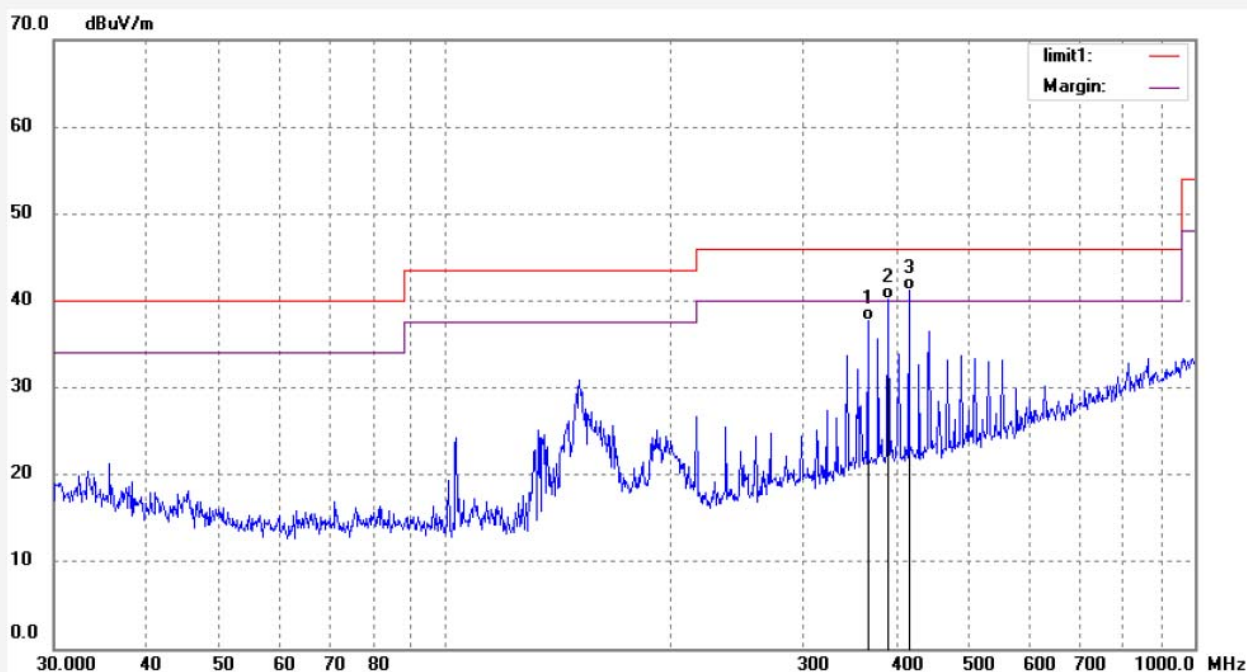
Date: 15/05/06/

Time: 8/49/08

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	366.0865	53.66	-15.88	37.78	46.00	-8.22	QP			
2	389.9873	55.94	-15.73	40.21	46.00	-5.79	QP			
3	415.4485	56.53	-15.40	41.13	46.00	-4.87	QP			

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Site: 1# Chamber

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Job No.: ricky 2015 #306

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

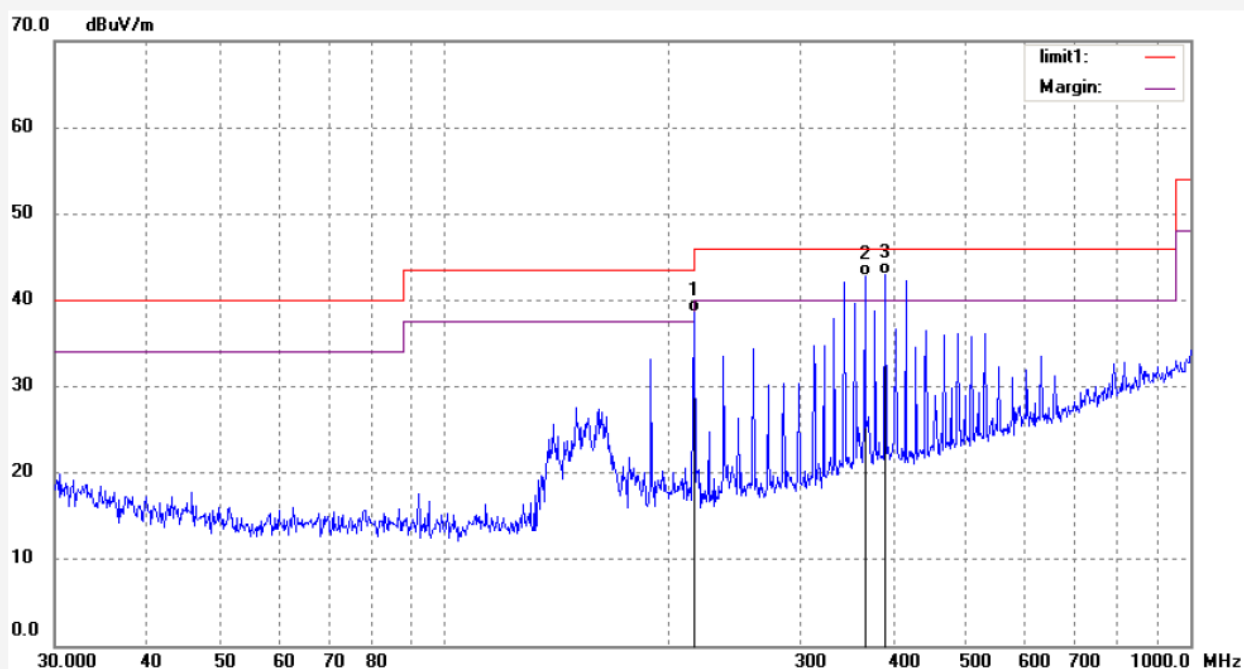
Date: 15/05/06/

Time: 8/50/12

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	216.1197	58.55	-19.96	38.59	46.00	-7.41	QP			
2	366.0866	58.73	-15.88	42.85	46.00	-3.15	QP			
3	389.9874	58.68	-15.73	42.95	46.00	-3.05	QP			



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Fax:+86-0755-26503396

Job No.: ricky 2015 #312

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

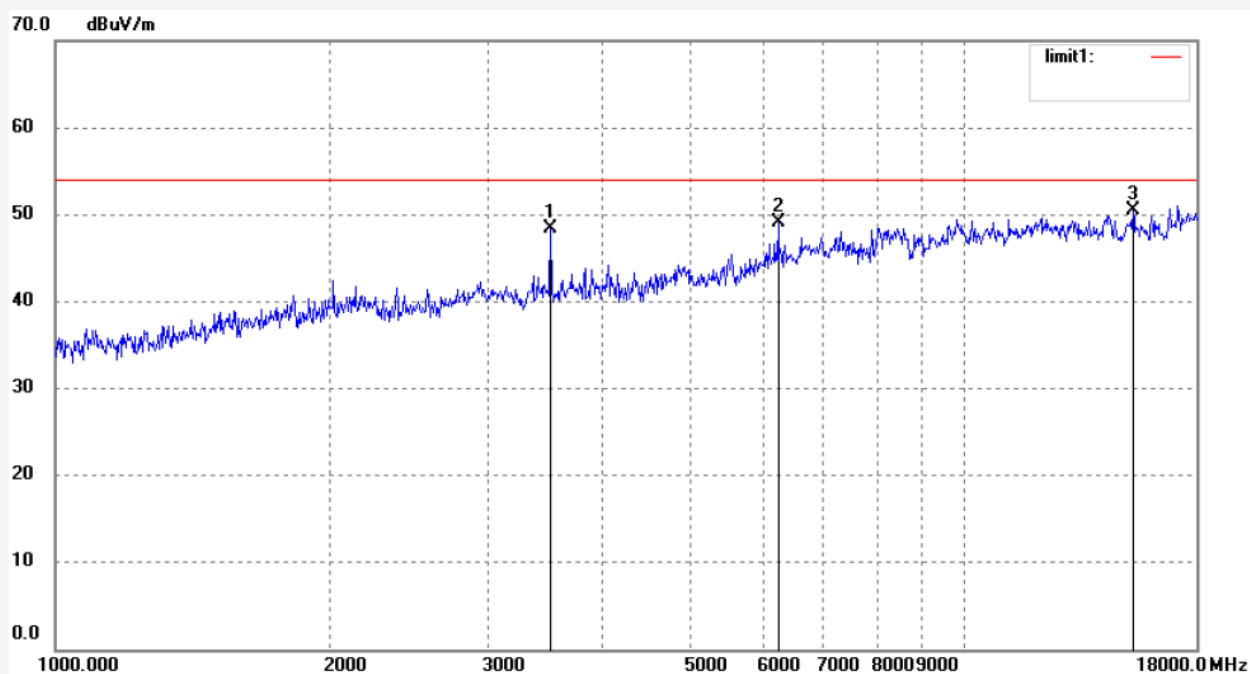
Date: 15/05/06/

Time: 9/05/34

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	3506.197	51.44	-2.98	48.46	54.00	-5.54	peak			
2	6239.249	45.25	3.76	49.01	54.00	-4.99	peak			
3	15337.191	1.78	48.76	50.54	54.00	-3.46	peak			



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Job No.: ricky 2015 #311

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

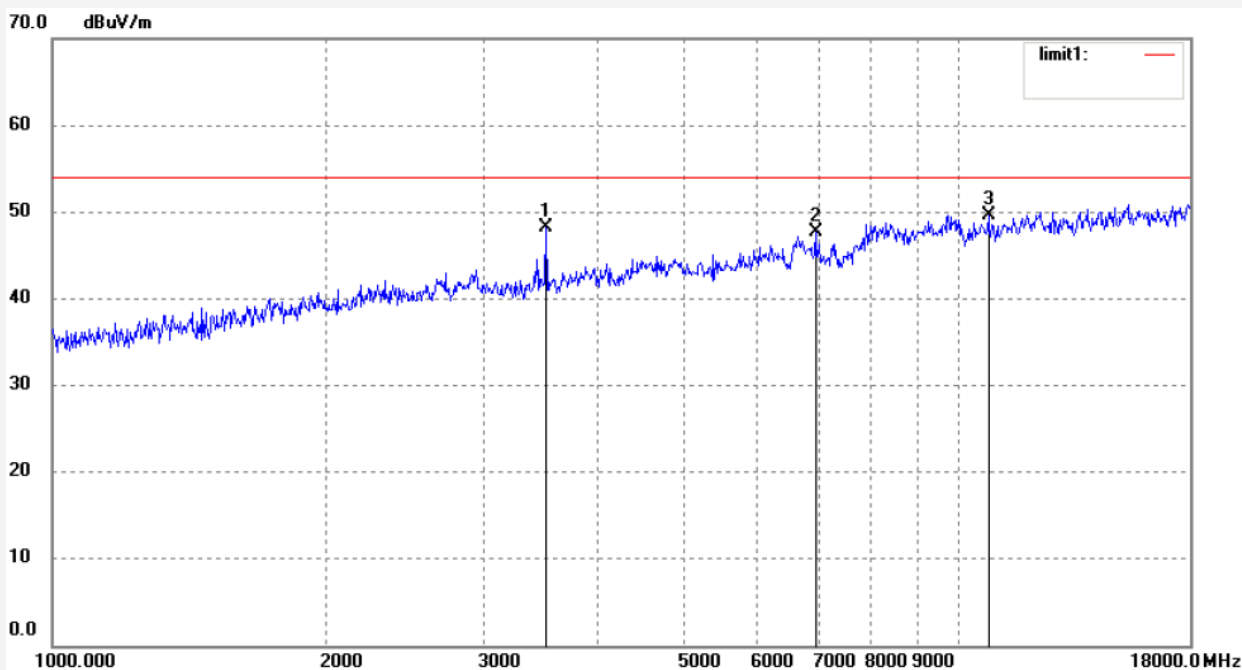
Date: 15/05/06/

Time: 9/03/25

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	3506.197	51.21	-2.98	48.23	54.00	-5.77	peak			
2	6948.720	42.16	5.50	47.66	54.00	-6.34	peak			
3	10784.181	39.41	10.28	49.69	54.00	-4.31	peak			

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Job No.: ricky 2015 #310

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2441MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

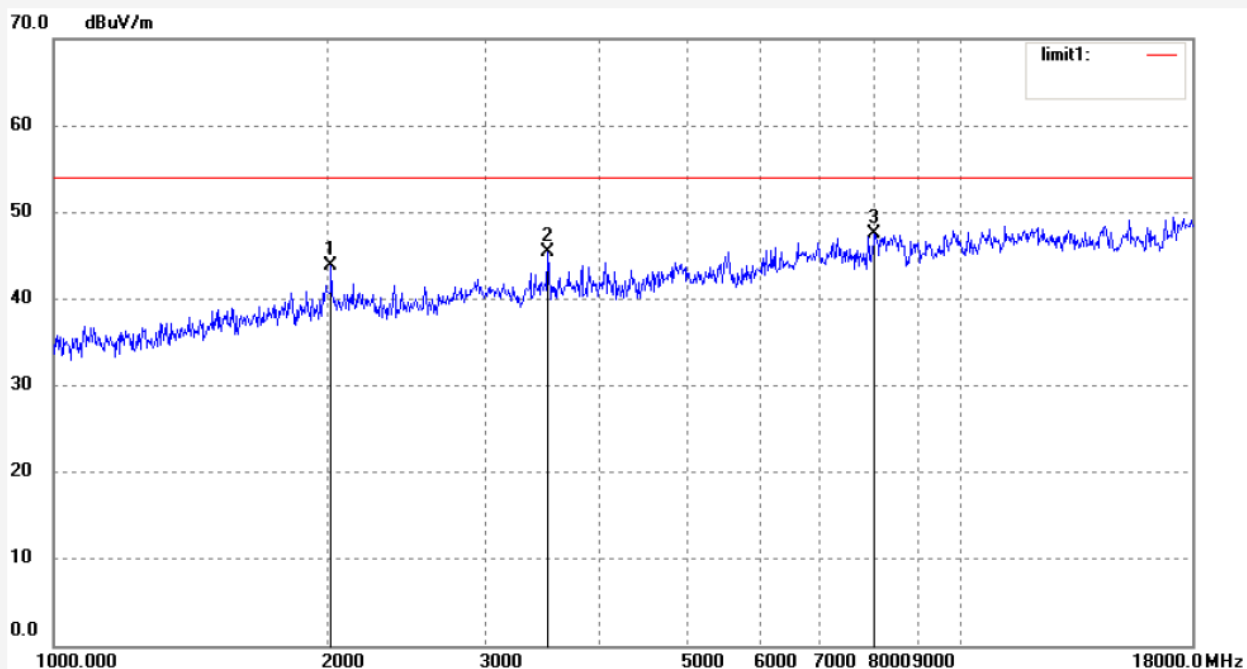
Date: 15/05/06/

Time: 8/59/57

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2022.634	52.75	-8.88	43.87	54.00	-10.13	peak			
2	3506.197	48.44	-2.98	45.46	54.00	-8.54	peak			
3	8037.313	39.05	8.38	47.43	54.00	-6.57	peak			

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Job No.: ricky 2015 #309

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2441MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

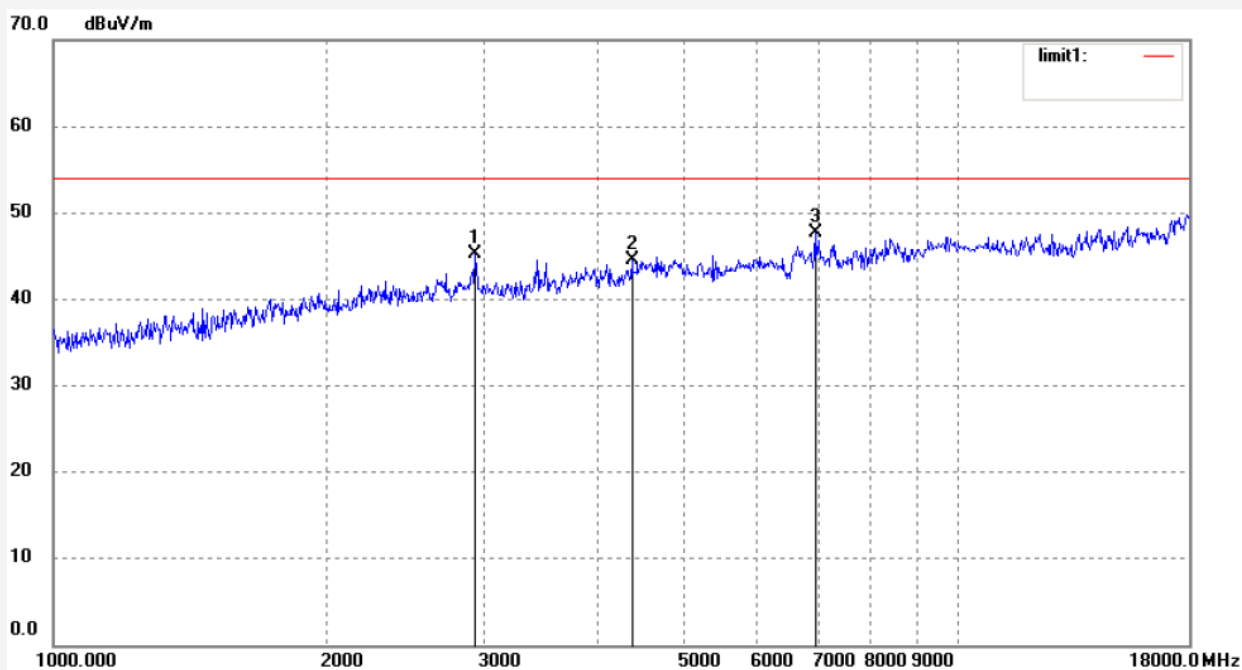
Date: 15/05/06/

Time: 8/58/21

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2927.256	50.89	-5.73	45.16	54.00	-8.84	peak			
2	4361.596	45.92	-1.42	44.50	54.00	-9.50	peak			
3	6948.720	42.16	5.50	47.66	54.00	-6.34	peak			

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Job No.: ricky 2015 #308

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

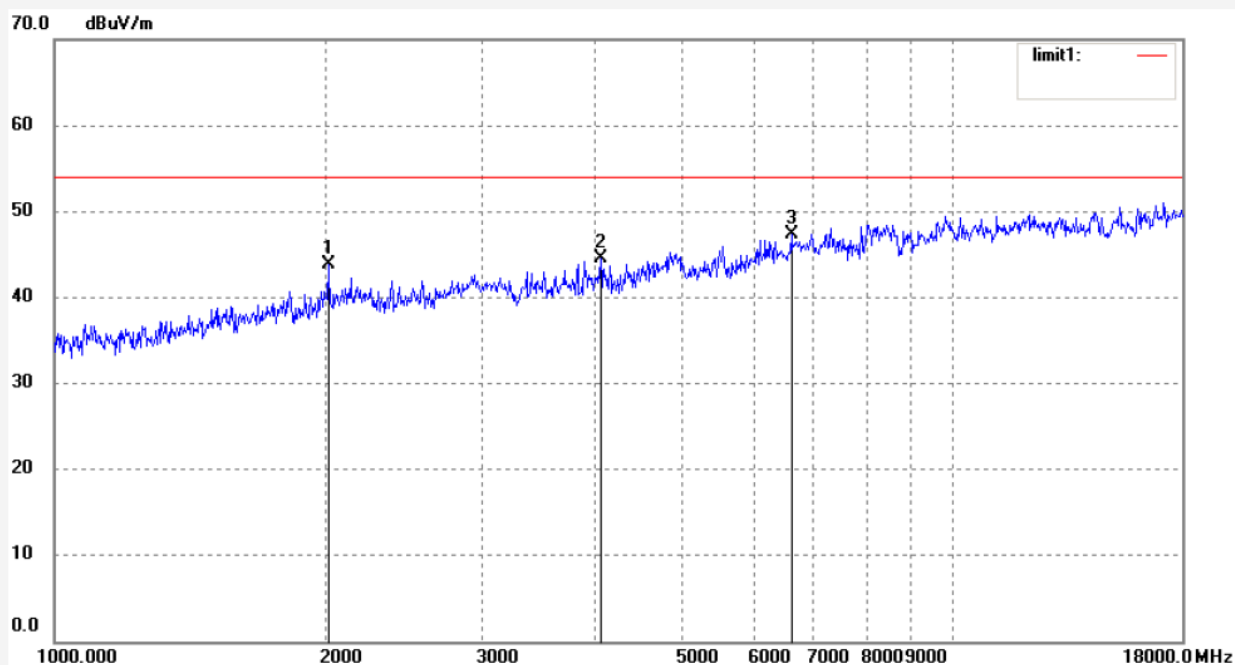
Date: 15/05/06/

Time: 8/56/04

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2016.755	52.75	-8.88	43.87	54.00	-10.13	peak			
2	4055.481	45.81	-1.19	44.62	54.00	-9.38	peak			
3	6613.247	42.92	4.49	47.41	54.00	-6.59	peak			

Job No.: ricky 2015 #307

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

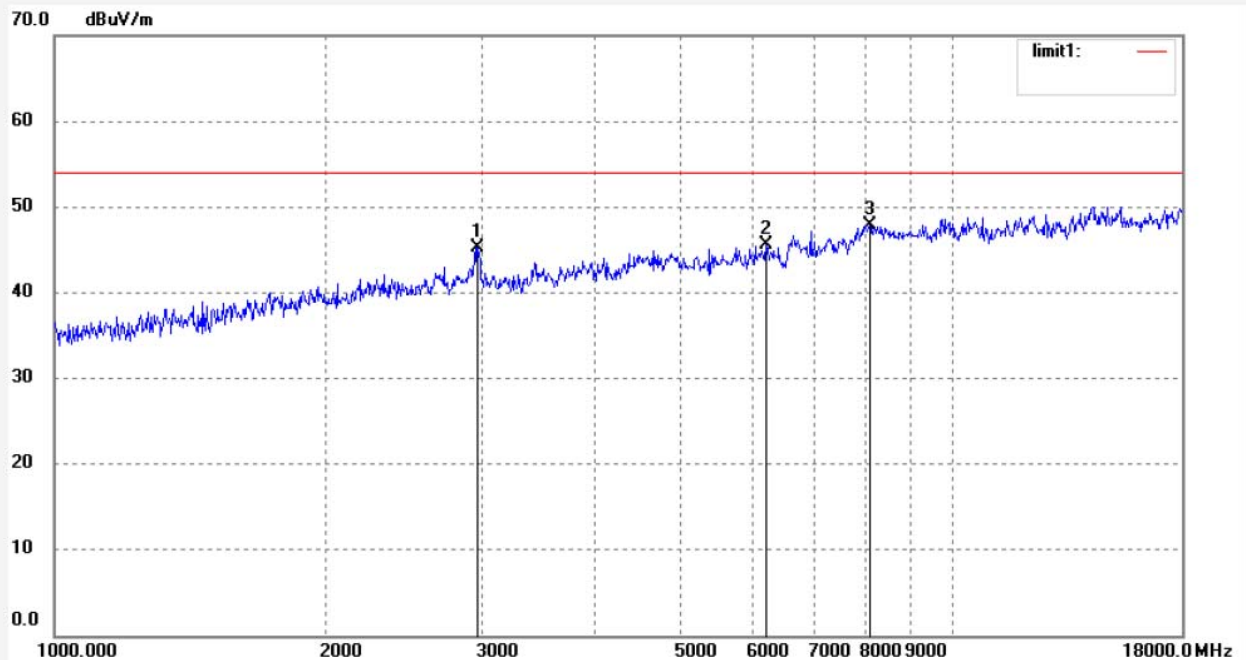
Date: 15/05/06/

Time: 8/54/14

Engineer Signature: Ricky

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2961.538	50.77	-5.48	45.29	54.00	-8.71	peak			
2	6203.033	42.02	3.59	45.61	54.00	-8.39	peak			
3	8084.239	39.40	8.47	47.87	54.00	-6.13	peak			

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: AM/FM HD Radio with Bluetooth)

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

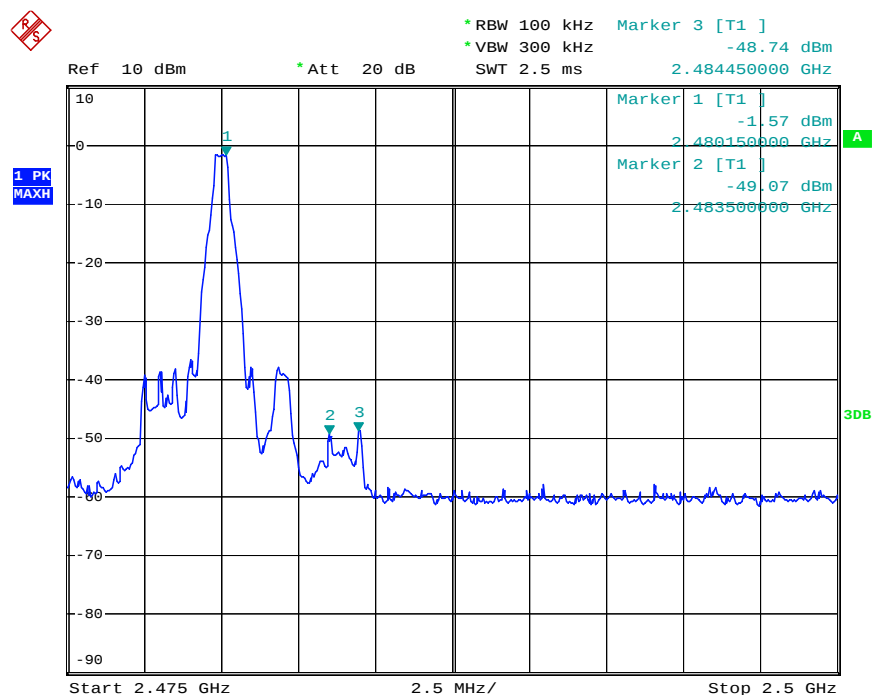
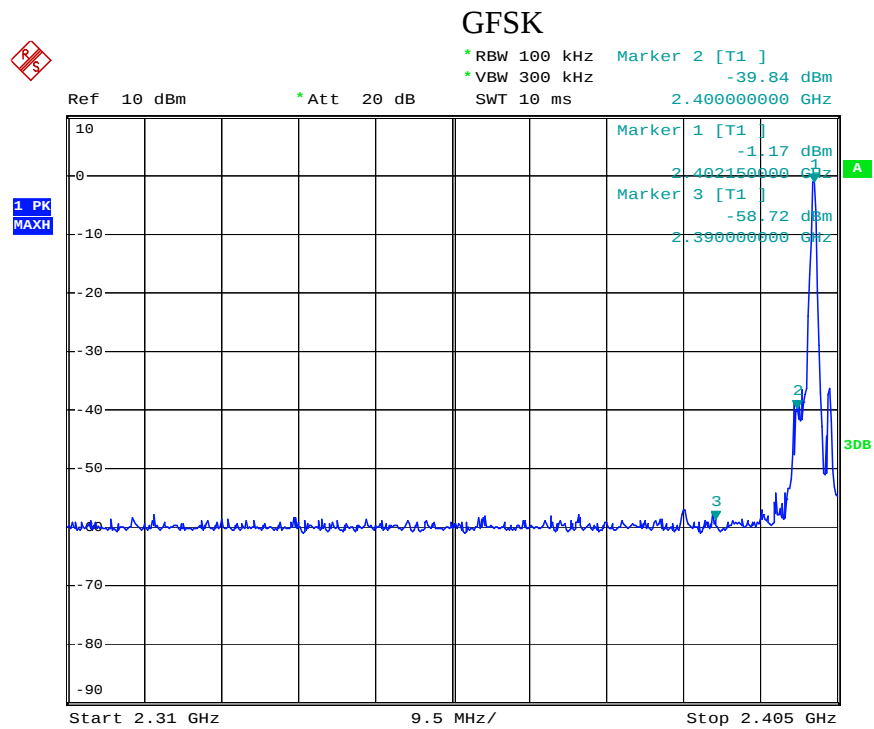
11.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

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.

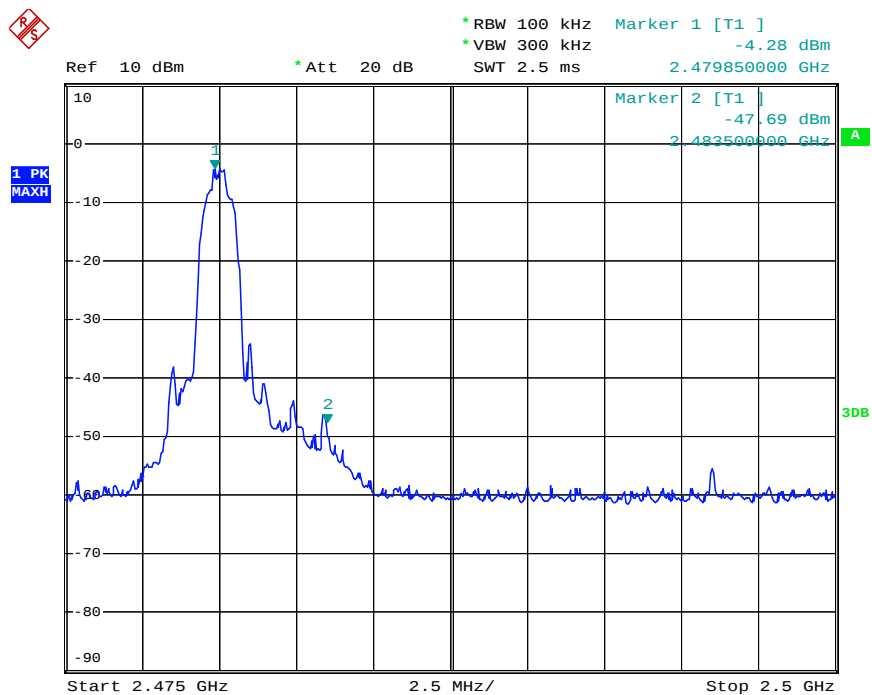
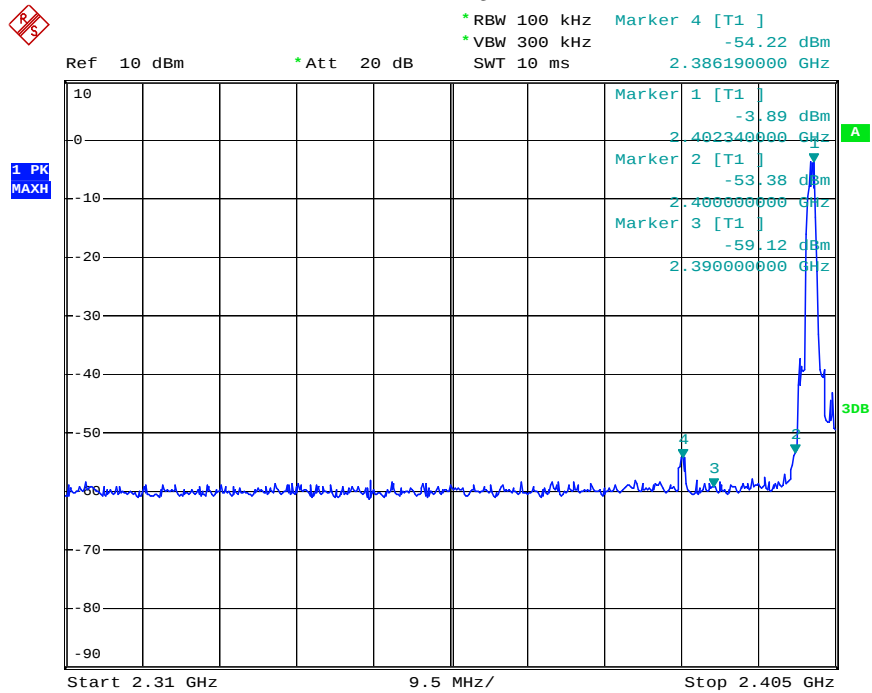
11.5.3. The band edges was measured and recorded.

11.6. Test Result

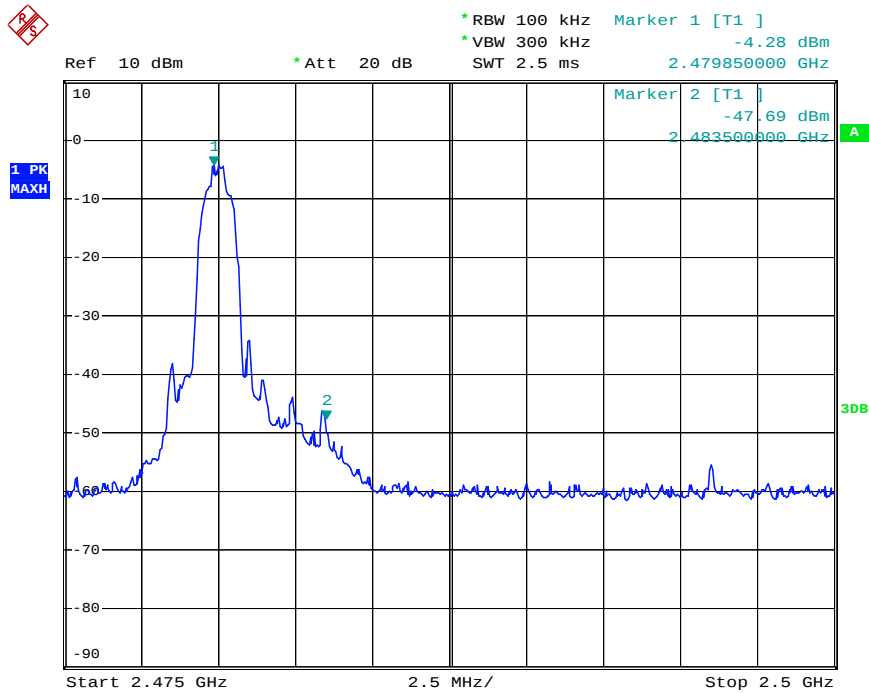
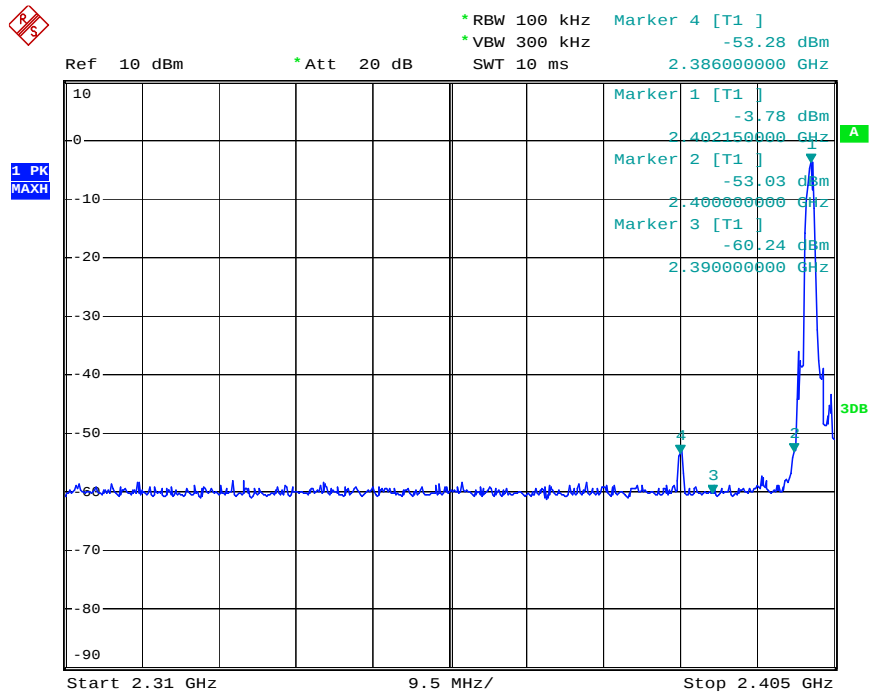
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK		
2400.00	38.67	> 20dBc
2484.45	47.17	> 20dBc
Π/4-DQPSK Mode		
2400.00	49.49	> 20dBc
2483.50	43.41	> 20dBc
8QPSK		
2400.00	49.25	> 20dBc
2483.50	43.41	> 20dBc



$\Pi/4$ -DQPSK Mode



8DPSK



Radiated Band Edge Result

Non-hopping mode



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Job No.: ricky 2015 #322

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

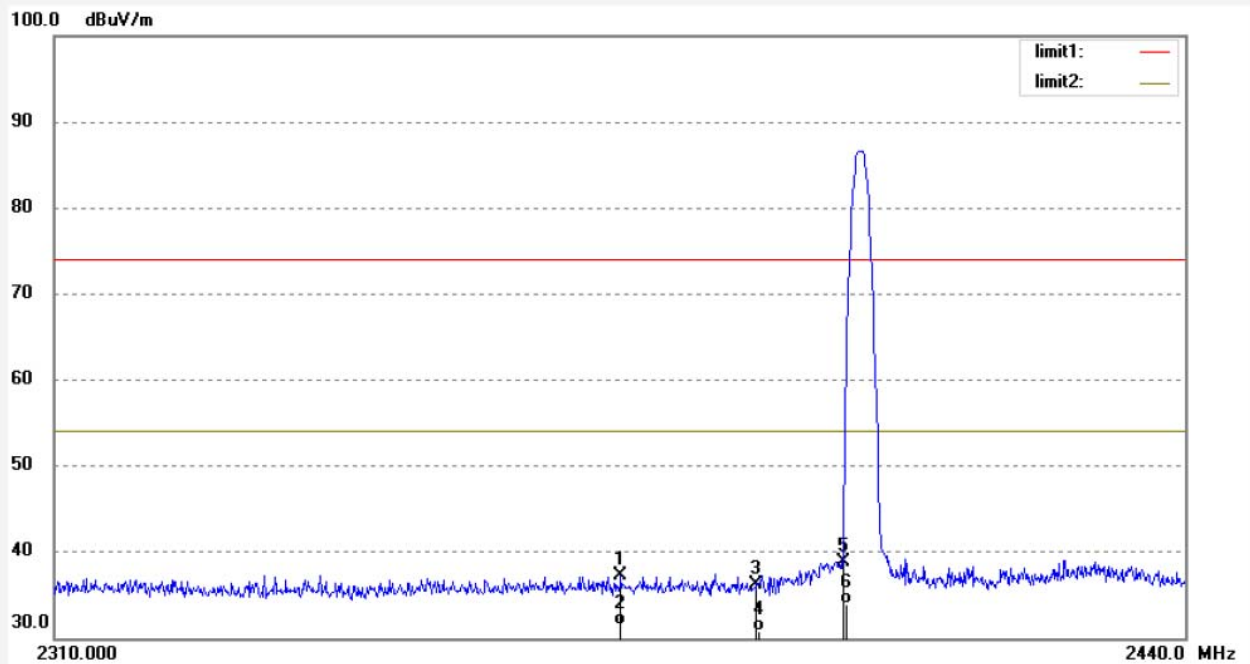
Date: 15/05/06/

Time: 9/20/30

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2374.350	44.92	-7.68	37.24	74.00	-36.76	peak			
2	2374.350	39.10	-7.68	31.42	54.00	-22.58	AVG			
3	2390.000	43.70	-7.57	36.13	74.00	-37.87	peak			
4	2390.000	38.35	-7.57	30.78	54.00	-23.22	AVG			
5	2400.000	46.26	-7.50	38.76	74.00	-35.24	peak			
6	2400.000	41.39	-7.50	33.89	54.00	-20.11	AVG			

Job No.: ricky 2015 #321

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

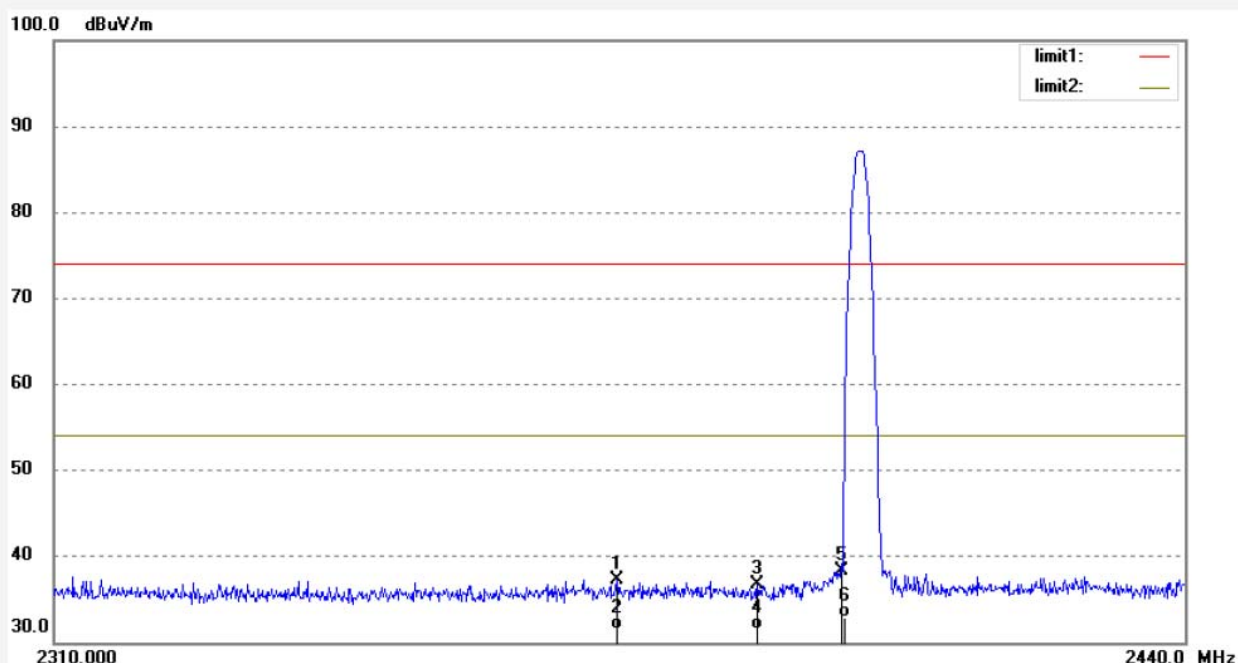
Date: 15/05/06/

Time: 9/19/30

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.960	44.92	-7.68	37.24	74.00	-36.76	peak			
2	2373.960	39.25	-7.68	31.57	54.00	-22.43	AVG			
3	2390.000	44.24	-7.57	36.67	74.00	-37.33	peak			
4	2390.000	39.11	-7.57	31.54	54.00	-22.46	AVG			
5	2400.000	45.77	-7.50	38.27	74.00	-35.73	peak			
6	2400.000	40.41	-7.50	32.91	54.00	-21.09	AVG			

Job No.: ricky 2015 #320

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

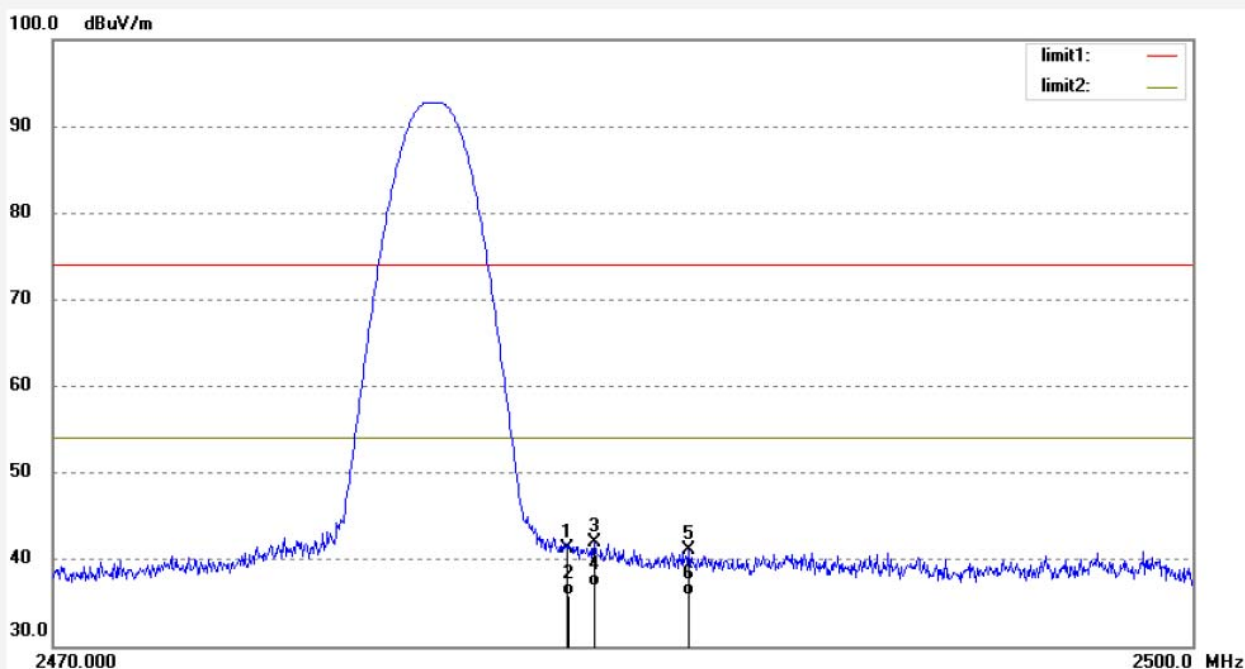
Date: 15/05/06/

Time: 9/18/29

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	48.71	-7.38	41.33	74.00	-32.67	peak			
2	2483.500	43.28	-7.38	35.90	54.00	-18.10	AVG			
3	2484.220	49.32	-7.39	41.93	74.00	-32.07	peak			
4	2484.220	44.34	-7.39	36.95	54.00	-17.05	AVG			
5	2486.710	48.52	-7.39	41.13	74.00	-32.87	peak			
6	2486.710	43.23	-7.39	35.84	54.00	-18.16	AVG			

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Job No.: ricky 2015 #319

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

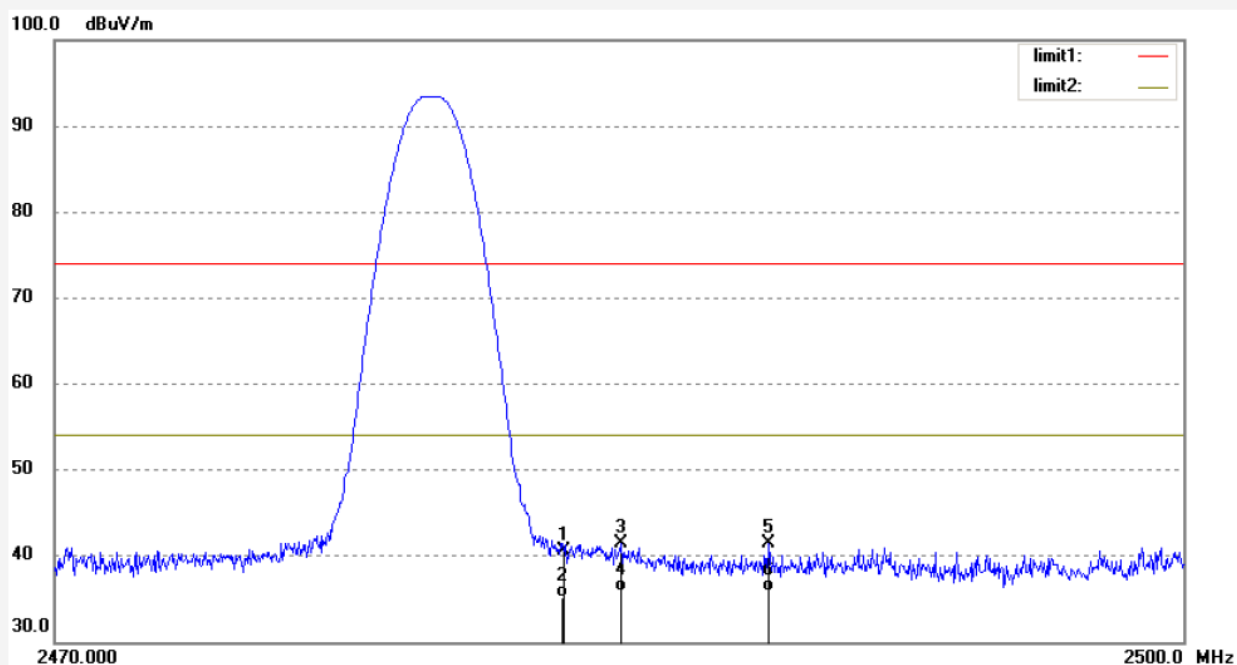
Date: 15/05/06/

Time: 9/17/00

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	47.90	-7.38	40.52	74.00	-33.48	peak			
2	2483.500	42.56	-7.38	35.18	54.00	-18.82	AVG			
3	2485.030	48.84	-7.39	41.45	74.00	-32.55	peak			
4	2485.030	43.28	-7.39	35.89	54.00	-18.11	AVG			
5	2488.960	48.93	-7.39	41.54	74.00	-32.46	peak			
6	2488.960	43.19	-7.39	35.80	54.00	-18.20	AVG			

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Job No.: ricky 2015 #326

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

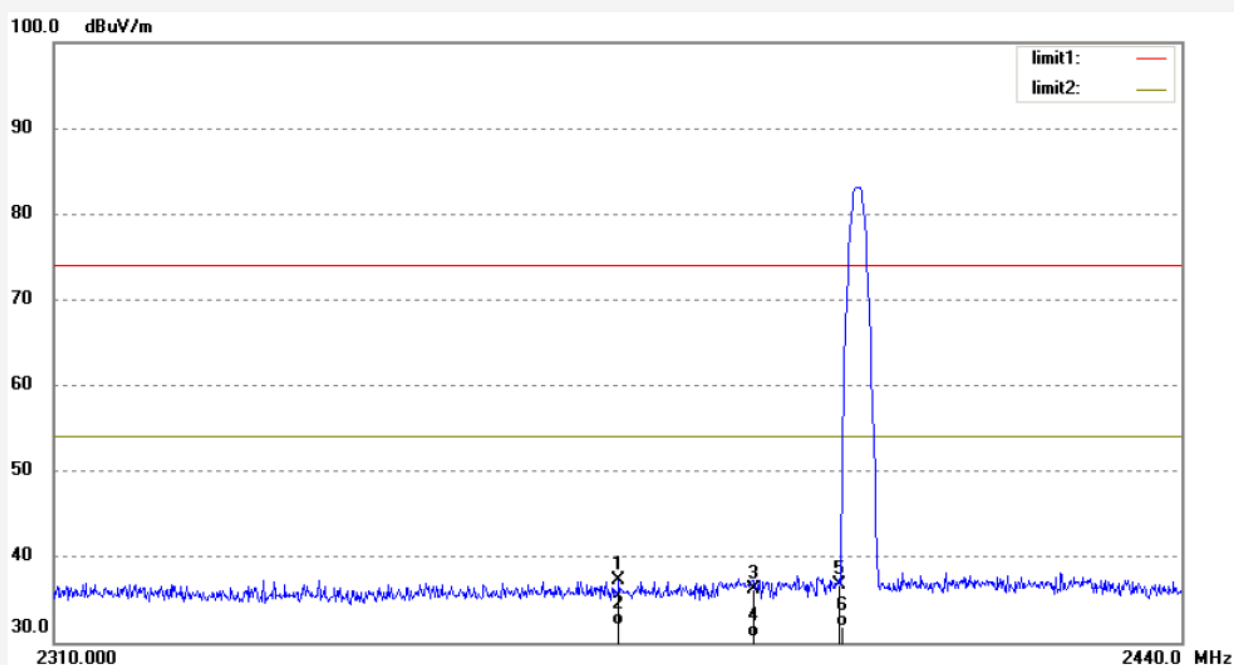
Date: 15/05/06/

Time: 9/24/24

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2374.350	44.92	-7.68	37.24	74.00	-36.76	peak			
2	2374.350	39.65	-7.68	31.97	54.00	-22.03	AVG			
3	2390.000	43.70	-7.57	36.13	74.00	-37.87	peak			
4	2390.000	38.22	-7.57	30.65	54.00	-23.35	AVG			
5	2400.000	44.26	-7.50	36.76	74.00	-37.24	peak			
6	2400.000	39.28	-7.50	31.78	54.00	-22.22	AVG			

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Job No.: ricky 2015 #325

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

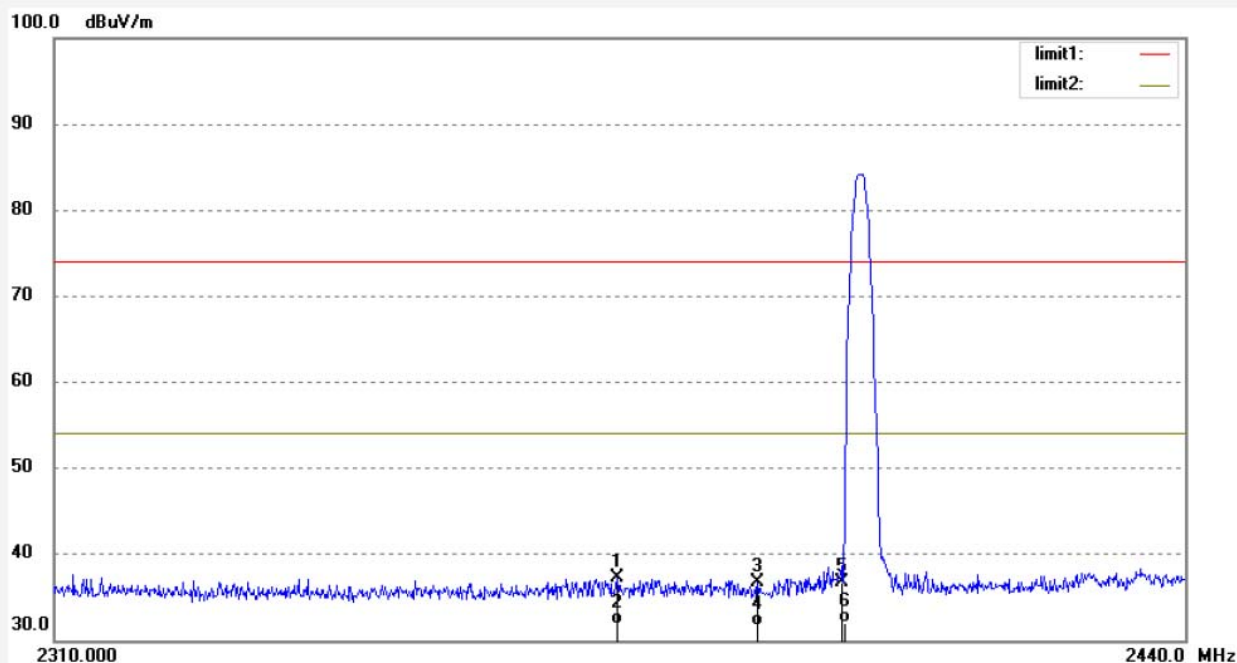
Date: 15/05/06/

Time: 9/23/37

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.960	44.92	-7.68	37.24	74.00	-36.76	peak			
2	2373.960	39.56	-7.68	31.88	54.00	-22.12	AVG			
3	2390.000	44.24	-7.57	36.67	74.00	-37.33	peak			
4	2390.000	39.18	-7.57	31.61	54.00	-22.39	AVG			
5	2400.000	44.27	-7.50	36.77	74.00	-37.23	peak			
6	2400.000	39.58	-7.50	32.08	54.00	-21.92	AVG			

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Job No.: ricky 2015 #324

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

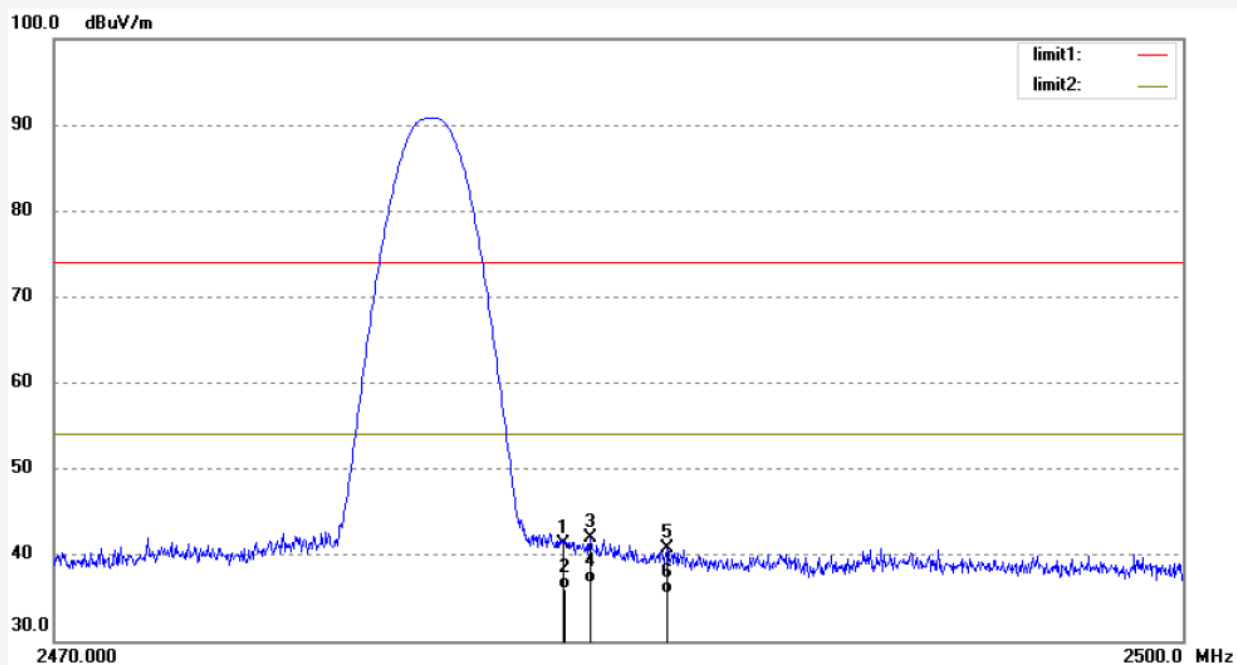
Date: 15/05/06/

Time: 9/22/15

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	48.71	-7.38	41.33	74.00	-32.67	peak			
2	2483.500	43.37	-7.38	35.99	54.00	-18.01	AVG			
3	2484.220	49.32	-7.39	41.93	74.00	-32.07	peak			
4	2484.220	44.13	-7.39	36.74	54.00	-17.26	AVG			
5	2486.260	48.13	-7.40	40.73	74.00	-33.27	peak			
6	2486.260	42.98	-7.40	35.58	54.00	-18.42	AVG			

Job No.: ricky 2015 #323

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

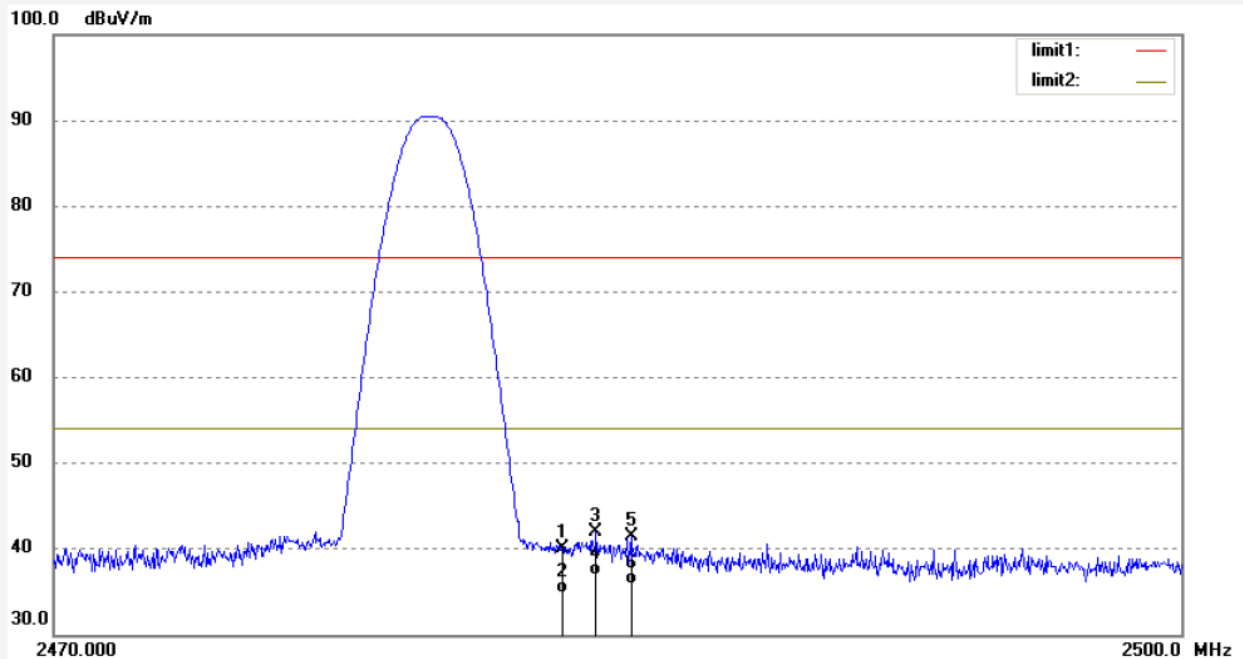
Date: 15/05/06/

Time: 9/21/21

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	47.40	-7.38	40.02	74.00	-33.98	peak			
2	2483.500	42.23	-7.38	34.85	54.00	-19.15	AVG			
3	2484.400	49.45	-7.39	42.06	74.00	-31.94	peak			
4	2484.400	44.26	-7.39	36.87	54.00	-17.13	AVG			
5	2485.330	48.90	-7.39	41.51	74.00	-32.49	peak			
6	2485.330	43.24	-7.39	35.85	54.00	-18.15	AVG			

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REPORT NO. ATE20150823

Page 79 of 93

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: ricky 2015 #330

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

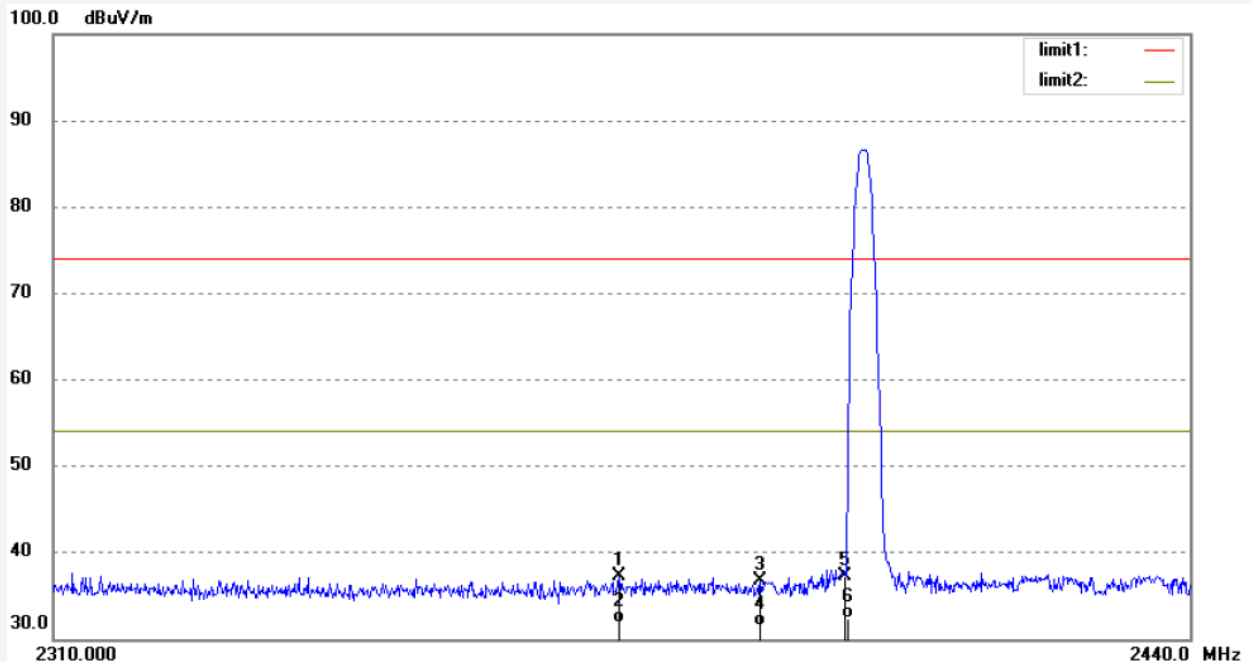
Date: 15/05/06/

Time: 9/28/27

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2373.960	44.92	-7.68	37.24	74.00	-36.76	peak			
2	2373.960	39.51	-7.68	31.83	54.00	-22.17	AVG			
3	2390.000	44.24	-7.57	36.67	74.00	-37.33	peak			
4	2390.000	39.02	-7.57	31.45	54.00	-22.55	AVG			
5	2400.000	44.77	-7.50	37.27	74.00	-36.73	peak			
6	2400.000	39.87	-7.50	32.37	54.00	-21.63	AVG			

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Site: 1# Chamber

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Fax:+86-0755-26503396

Job No.: ricky 2015 #329

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2402MHz(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

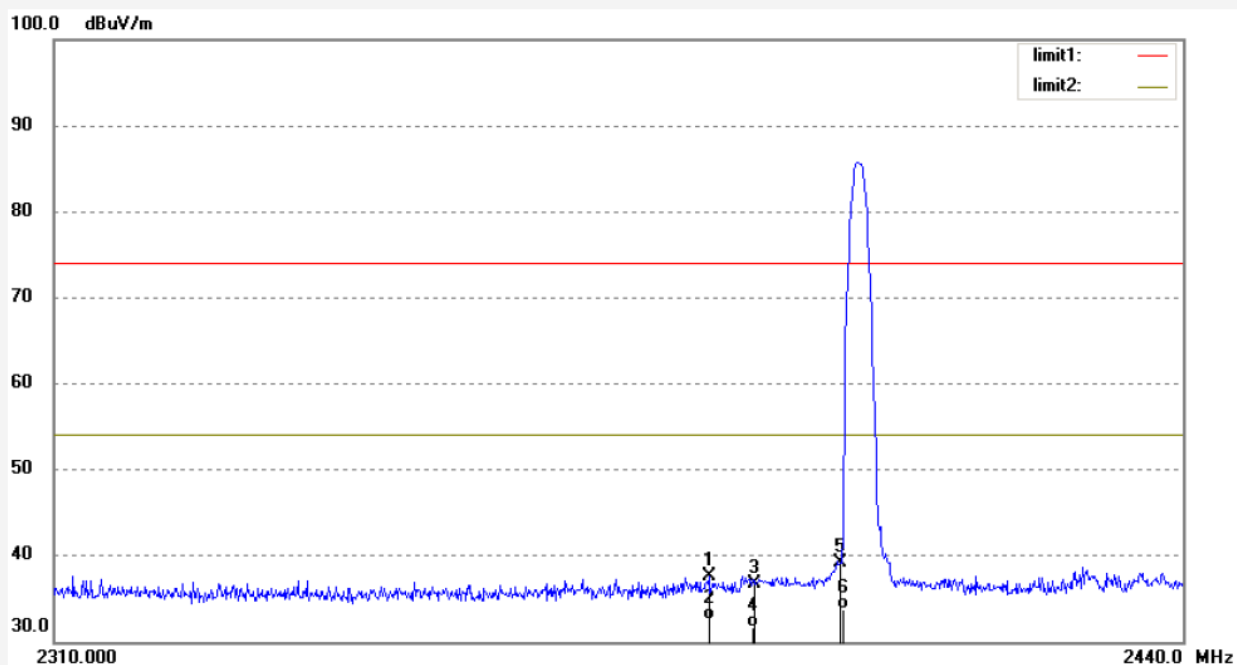
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Time: 9/27/41

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2384.620	45.22	-7.61	37.61	74.00	-36.39	peak			
2	2384.620	40.18	-7.61	32.57	54.00	-21.43	AVG			
3	2390.000	44.24	-7.57	36.67	74.00	-37.33	peak			
4	2390.000	39.27	-7.57	31.70	54.00	-22.30	AVG			
5	2400.000	46.77	-7.50	39.27	74.00	-34.73	peak			
6	2400.000	41.23	-7.50	33.73	54.00	-20.27	AVG			

Job No.: ricky 2015 #328

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

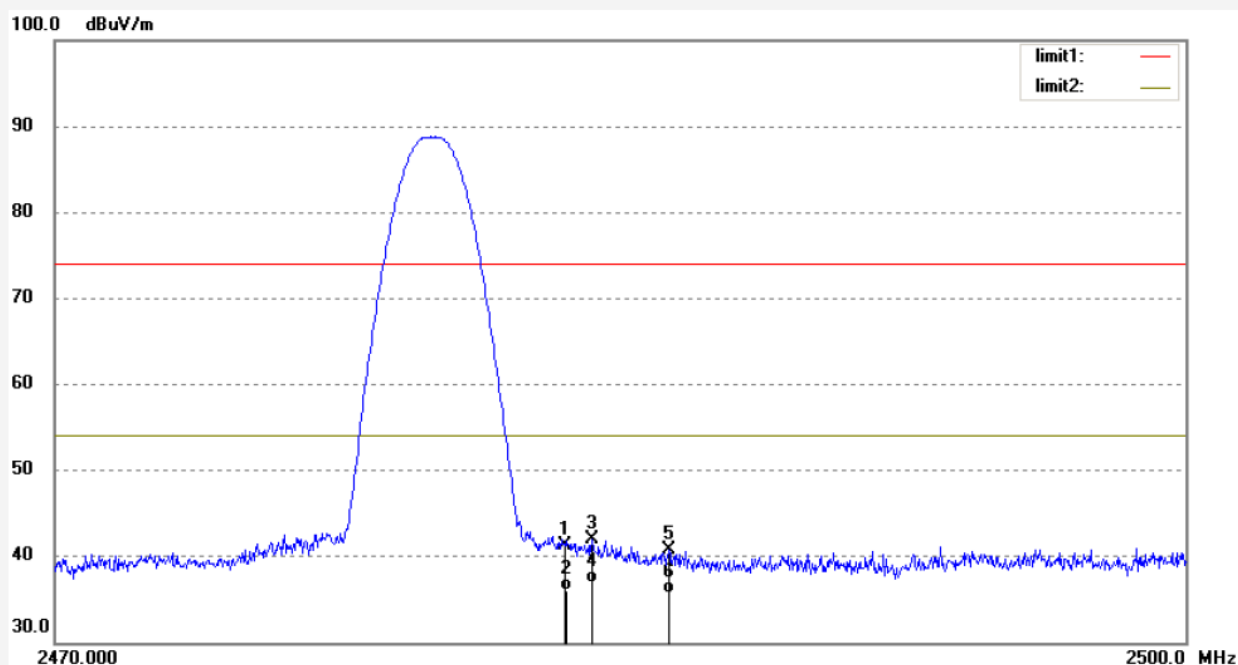
Date: 15/05/06/

Time: 9/26/28

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	48.71	-7.38	41.33	74.00	-32.67	peak			
2	2483.500	43.35	-7.38	35.97	54.00	-18.03	AVG			
3	2484.220	49.32	-7.39	41.93	74.00	-32.07	peak			
4	2484.220	44.29	-7.39	36.90	54.00	-17.10	AVG			
5	2486.260	48.13	-7.40	40.73	74.00	-33.27	peak			
6	2486.260	43.10	-7.40	35.70	54.00	-18.30	AVG			

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Job No.: ricky 2015 #327

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: TX 2480MHz(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

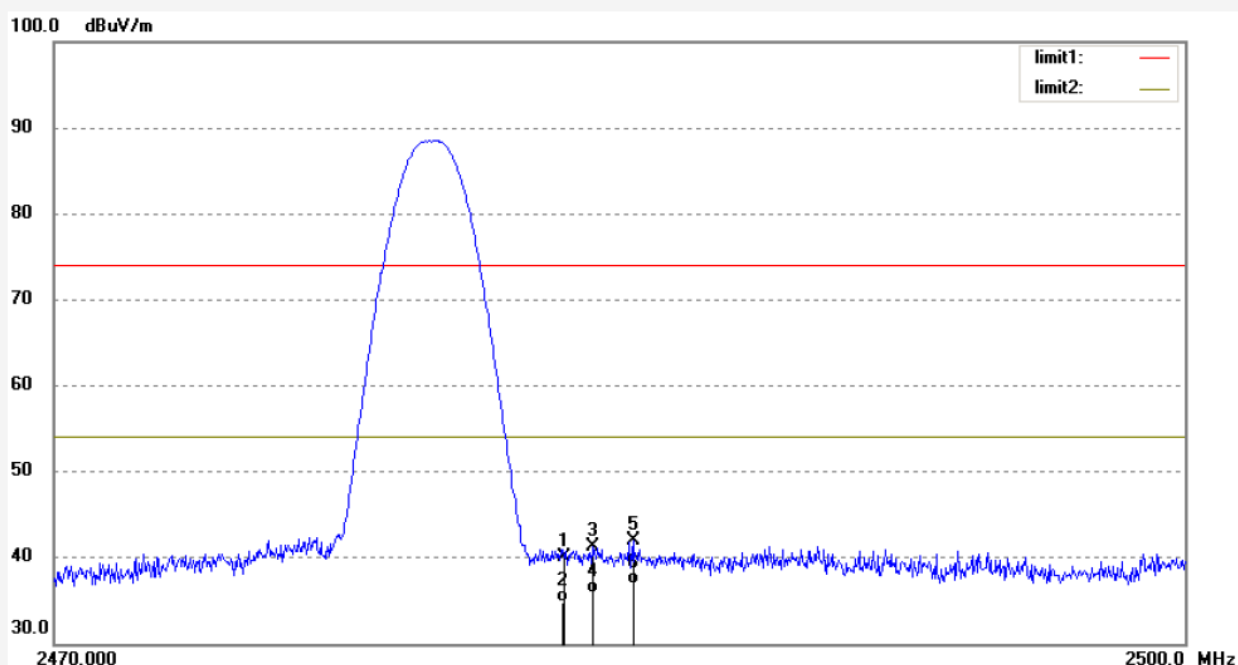
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Time: 9/25/38

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



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	47.40	-7.38	40.02	74.00	-33.98	peak			
2	2483.500	42.19	-7.38	34.81	54.00	-19.19	AVG			
3	2484.250	48.75	-7.39	41.36	74.00	-32.64	peak			
4	2484.250	43.25	-7.39	35.86	54.00	-18.14	AVG			
5	2485.330	49.40	-7.39	42.01	74.00	-31.99	peak			
6	2485.330	44.28	-7.39	36.89	54.00	-17.11	AVG			

Hopping mode



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Job No.: ricky 2015 #313

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

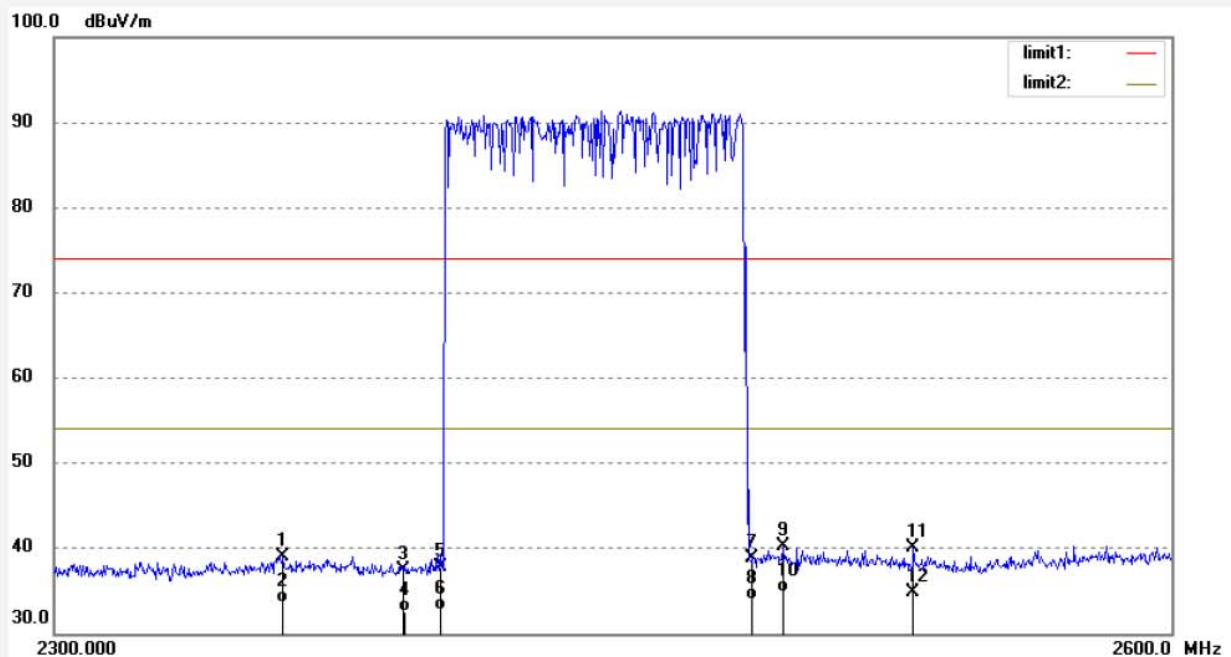
Date: 15/05/06/

Time: 9/11/37

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2358.800	46.78	-7.79	38.99	74.00	-35.01	peak			
2	2358.800	41.38	-7.79	33.59	54.00	-20.41	AVG			
3	2390.000	44.98	-7.57	37.41	74.00	-36.59	peak			
4	2390.000	40.06	-7.57	32.49	54.00	-21.51	AVG			
5	2400.000	45.34	-7.50	37.84	74.00	-36.16	peak			
6	2400.000	40.24	-7.50	32.74	54.00	-21.26	AVG			
7	2483.500	46.20	-7.38	38.82	74.00	-35.18	peak			
8	2483.500	41.33	-7.38	33.95	54.00	-20.05	AVG			
9	2491.700	47.55	-7.39	40.16	74.00	-33.84	peak			
10	2491.700	42.18	-7.39	34.79	54.00	-19.21	AVG			
11	2527.700	47.19	-7.19	40.00	74.00	-34.00	peak			
12	2527.700	42.09	-7.19	34.90	74.00	-39.10	peak			

Job No.: ricky 2015 #314

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(GFSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

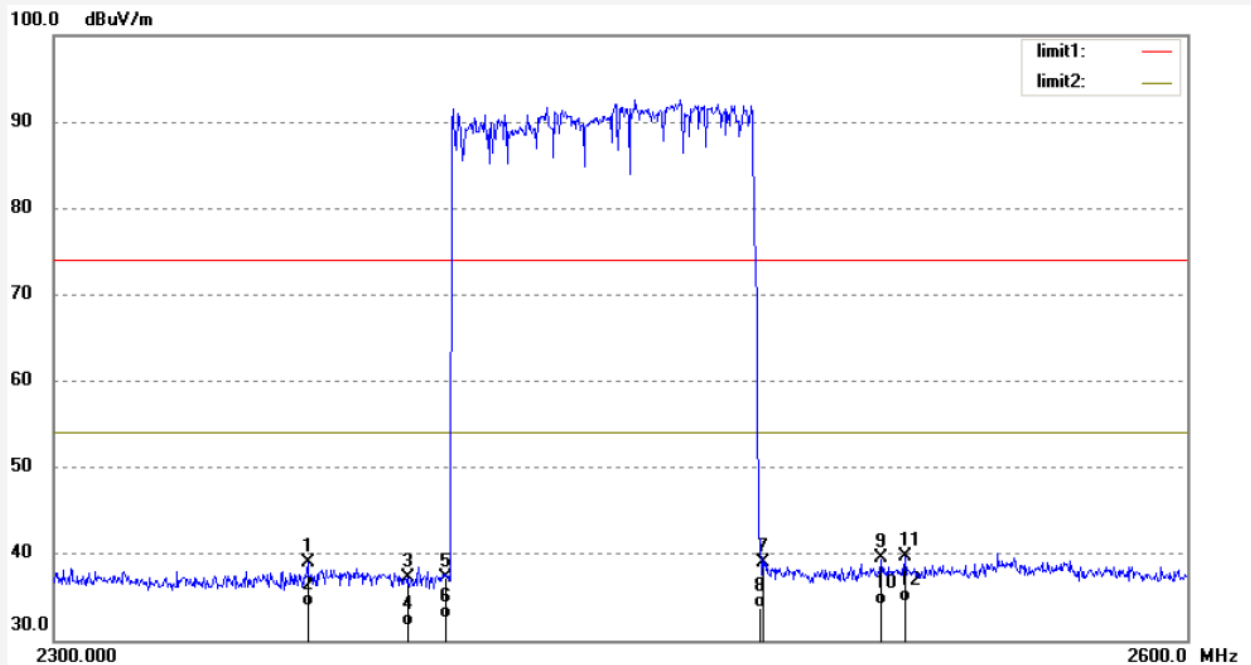
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Time: 9/12/50

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2364.200	46.79	-7.74	39.05	74.00	-34.95	peak			
2	2364.200	41.67	-7.74	33.93	54.00	-20.07	AVG			
3	2390.000	44.76	-7.57	37.19	74.00	-36.81	peak			
4	2390.000	39.21	-7.57	31.64	54.00	-22.36	AVG			
5	2400.000	44.82	-7.50	37.32	74.00	-36.68	peak			
6	2400.000	39.98	-7.50	32.48	54.00	-21.52	AVG			
7	2483.500	46.34	-7.38	38.96	74.00	-35.04	peak			
8	2483.500	41.22	-7.38	33.84	54.00	-20.16	AVG			
9	2515.400	46.74	-7.29	39.45	74.00	-34.55	peak			
10	2515.400	41.38	-7.29	34.09	54.00	-19.91	AVG			
11	2522.000	46.92	-7.24	39.68	74.00	-34.32	peak			
12	2522.000	41.75	-7.24	34.51	54.00	-19.49	AVG			



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Job No.: ricky 2015 #315

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

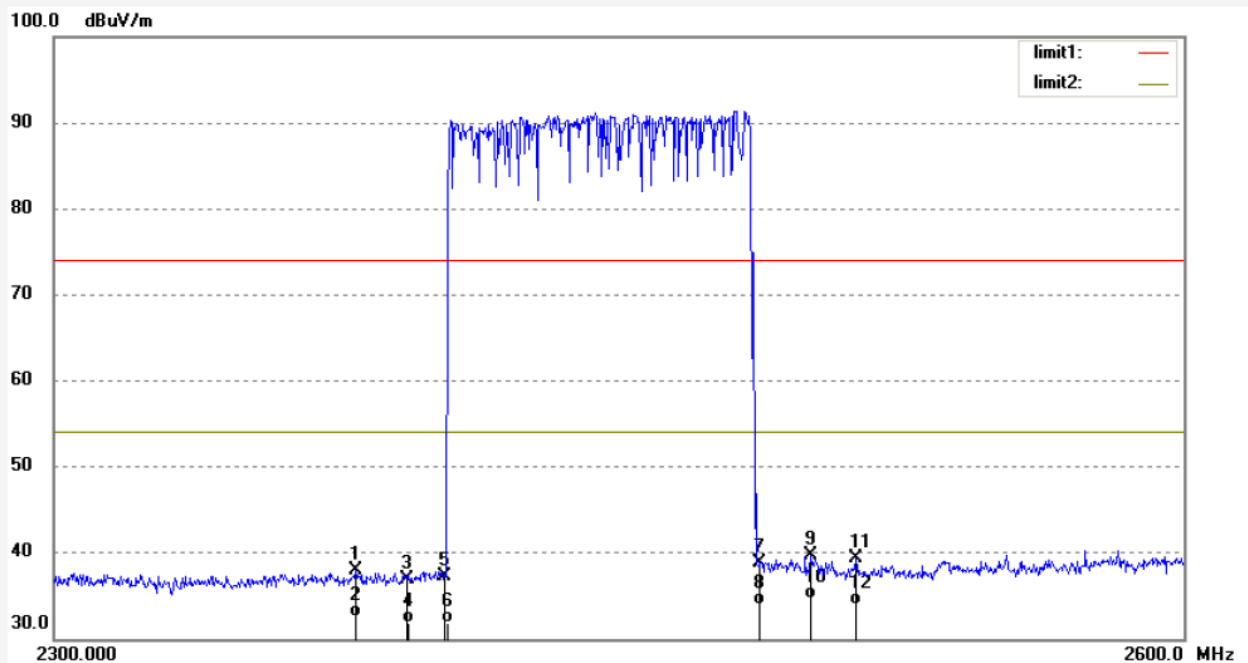
Date: 15/05/06/

Time: 9/13/32

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2376.800	45.59	-7.66	37.93	74.00	-36.07	peak			
2	2376.800	40.12	-7.66	32.46	54.00	-21.54	AVG			
3	2390.000	44.48	-7.57	36.91	74.00	-37.09	peak			
4	2390.000	39.45	-7.57	31.88	54.00	-22.12	AVG			
5	2400.000	44.84	-7.50	37.34	74.00	-36.66	peak			
6	2400.000	39.28	-7.50	31.78	54.00	-22.22	AVG			
7	2483.500	46.20	-7.38	38.82	74.00	-35.18	peak			
8	2483.500	41.32	-7.38	33.94	54.00	-20.06	AVG			
9	2497.100	47.13	-7.40	39.73	74.00	-34.27	peak			
10	2497.100	42.00	-7.40	34.60	54.00	-19.40	AVG			
11	2509.400	46.62	-7.32	39.30	74.00	-34.70	peak			
12	2509.400	41.33	-7.32	34.01	54.00	-19.99	AVG			



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Fax:+86-0755-26503396

Job No.: ricky 2015 #316

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(pi/4 DQPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

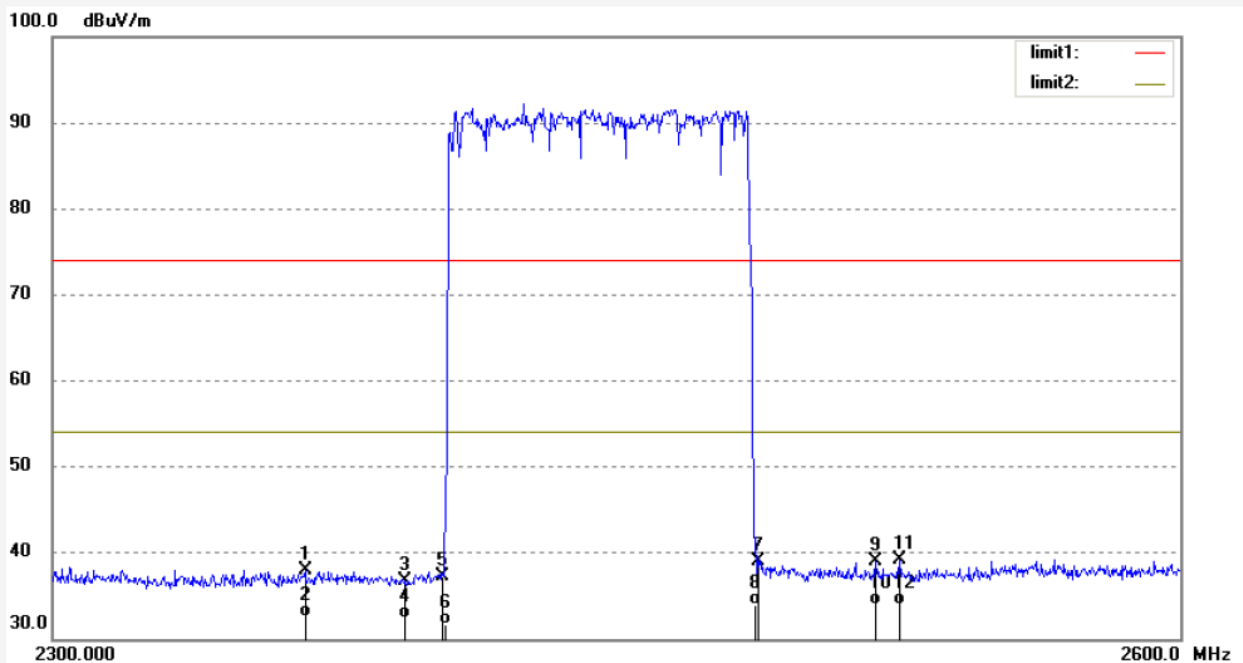
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Time: 9/14/28

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2364.200	45.79	-7.74	38.05	74.00	-35.95	peak			
2	2364.200	40.25	-7.74	32.51	54.00	-21.49	AVG			
3	2390.000	44.26	-7.57	36.69	74.00	-37.31	peak			
4	2390.000	39.87	-7.57	32.30	54.00	-21.70	AVG			
5	2400.000	44.82	-7.50	37.32	74.00	-36.68	peak			
6	2400.000	39.21	-7.50	31.71	54.00	-22.29	AVG			
7	2483.500	46.34	-7.38	38.96	74.00	-35.04	peak			
8	2483.500	41.24	-7.38	33.86	54.00	-20.14	AVG			
9	2515.400	46.24	-7.29	38.95	74.00	-35.05	peak			
10	2515.400	41.21	-7.29	33.92	54.00	-20.08	AVG			
11	2522.000	46.42	-7.24	39.18	74.00	-34.82	peak			
12	2522.000	41.23	-7.24	33.99	54.00	-20.01	AVG			



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Fax:+86-0755-26503396

Job No.: ricky 2015 #317

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Horizontal

Power Source: AC 120V/60Hz

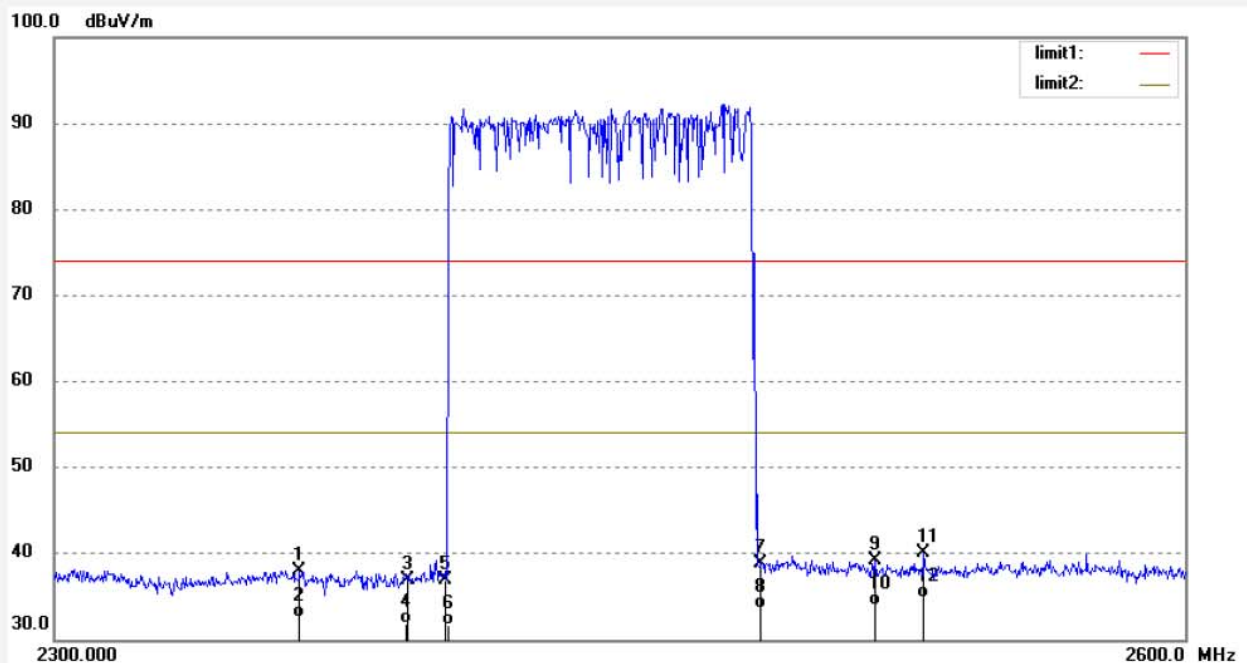
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Time: 9/15/25

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2362.100	45.79	-7.77	38.02	74.00	-35.98	peak			
2	2362.100	40.28	-7.77	32.51	54.00	-21.49	AVG			
3	2390.000	44.48	-7.57	36.91	74.00	-37.09	peak			
4	2390.000	39.38	-7.57	31.81	54.00	-22.19	AVG			
5	2400.000	44.34	-7.50	36.84	74.00	-37.16	peak			
6	2400.000	39.24	-7.50	31.74	54.00	-22.26	AVG			
7	2483.500	46.20	-7.38	38.82	74.00	-35.18	peak			
8	2483.500	41.04	-7.38	33.66	54.00	-20.34	AVG			
9	2514.200	46.42	-7.29	39.13	74.00	-34.87	peak			
10	2514.200	41.28	-7.29	33.99	54.00	-20.01	AVG			
11	2527.700	47.19	-7.19	40.00	74.00	-34.00	peak			
12	2527.700	41.92	-7.19	34.73	54.00	-19.27	AVG			

Job No.: ricky 2015 #318

Standard: FCC PK

Test item: Radiation Test

Temp.(C)/Hum.(%) 25 C / 55 %

EUT: AM/FM HD Radio with Bluetooth

Mode: HOPPING(8DPSK)

Model: SHD-ITR2BT

Manufacturer: MeiHua

Polarization: Vertical

Power Source: AC 120V/60Hz

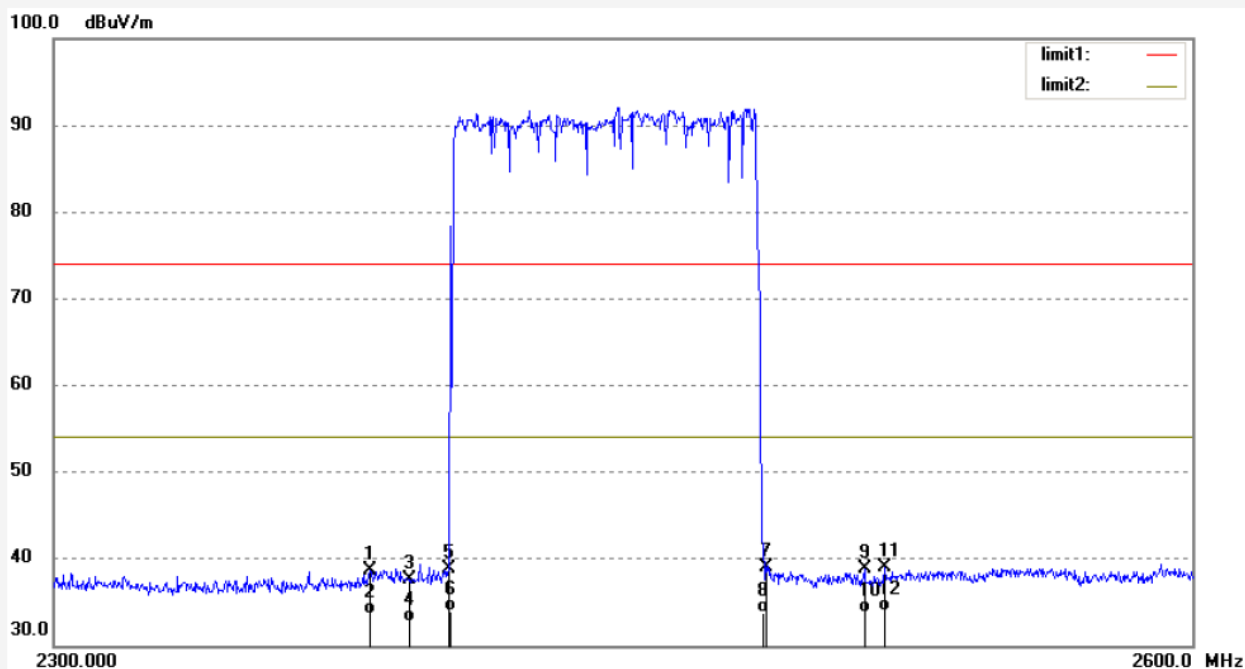
Date: 15/05/06/

Time: 9/16/52

Engineer Signature:

Distance: 3m

Note: Report NO.:ATE20150823



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2379.800	46.26	-7.64	38.62	74.00	-35.38	peak			
2	2379.800	41.20	-7.64	33.56	54.00	-20.44	AVG			
3	2390.000	45.26	-7.57	37.69	74.00	-36.31	peak			
4	2390.000	40.31	-7.57	32.74	54.00	-21.26	AVG			
5	2400.000	46.32	-7.50	38.82	74.00	-35.18	peak			
6	2400.000	41.38	-7.50	33.88	54.00	-20.12	AVG			
7	2483.500	46.34	-7.38	38.96	74.00	-35.04	peak			
8	2483.500	41.11	-7.38	33.73	54.00	-20.27	AVG			
9	2510.000	46.14	-7.32	38.82	74.00	-35.18	peak			
10	2510.000	41.08	-7.32	33.76	54.00	-20.24	AVG			
11	2515.400	46.24	-7.29	38.95	74.00	-35.05	peak			
12	2515.400	41.29	-7.29	34.00	54.00	-20.00	AVG			

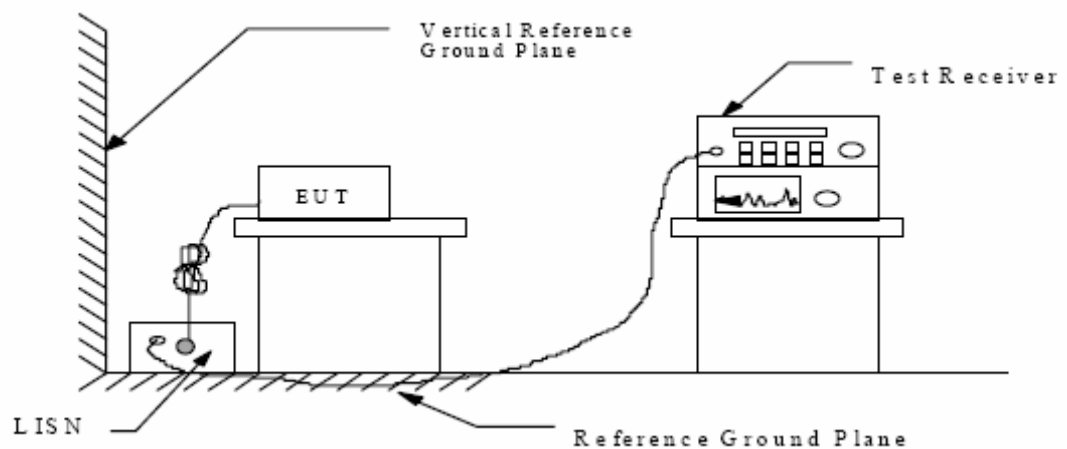
12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

15 SECTION 15.207(A)

12.1.Block Diagram of Test Setup

12.1.1.Block diagram of connection between the EUT and simulators

12.1.2.Shielding Room Test Setup Diagram



(EUT: AM/FM HD Radio with Bluetooth)

12.2.The Emission Limit

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

Frequency (MHz)	Limit dB(μ V)	
	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 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.

12.4.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 (Operation) 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 C63.10- 2013 on Conducted Emission Measurement.

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

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

12.6.Power Line Conducted Emission Measurement Results

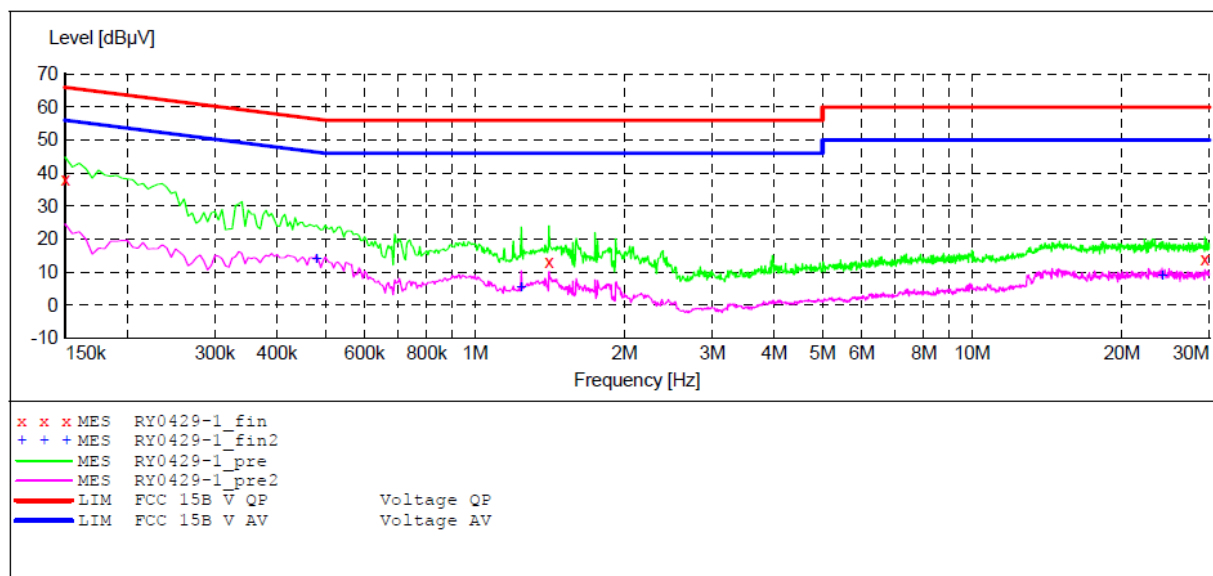
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: AM/FM HD Radio with Bluetooth M/N:SHD-ITR2BT
 Manufacturer: MeiHua
 Operating Condition: Operation
 Test Site: 1#Shielding Room
 Operator: Ricky
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20150823
 Start of Test: 4/29/2015 / 3:03:00PM

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: "RY0429-1_fin"

4/29/2015 3:06PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.150000	38.10	10.5	66	27.9	QP	L1	GND
1.410000	13.20	10.9	56	42.8	QP	L1	GND
29.400000	13.70	11.5	60	46.3	QP	L1	GND

MEASUREMENT RESULT: "RY0429-1_fin2"

4/29/2015 3:06PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.480000	14.00	10.7	46	32.3	AV	L1	GND
1.240000	5.30	10.9	46	40.7	AV	L1	GND
24.125000	9.00	11.5	50	41.0	AV	L1	GND



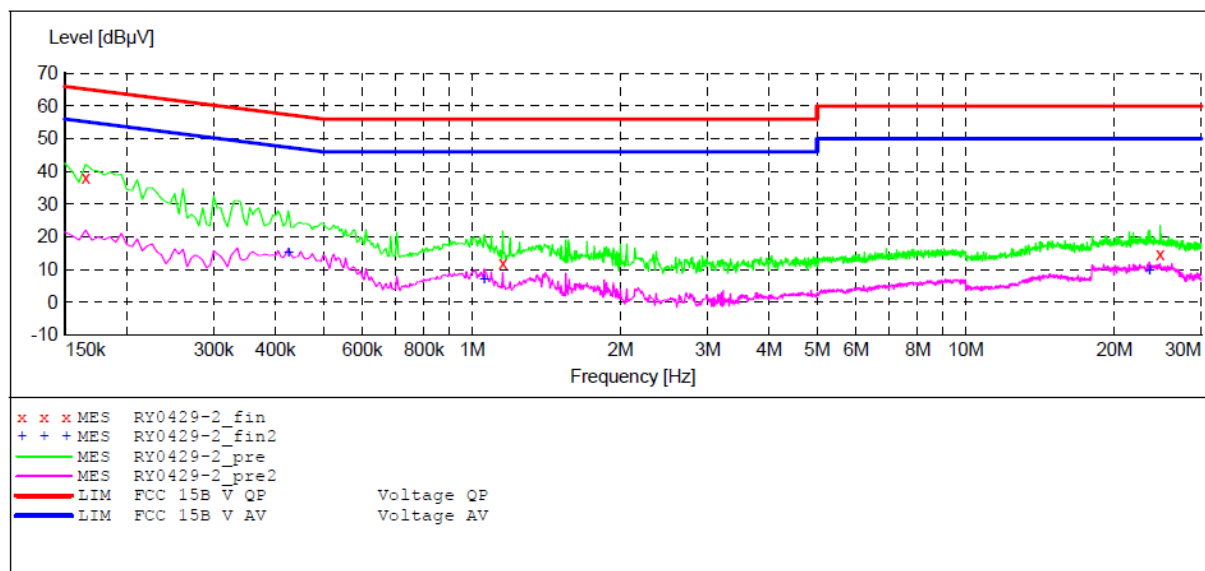
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART 15B

EUT: AM/FM HD Radio with Bluetooth M/N:SHD-ITR2BT
Manufacturer: MeiHua
Operating Condition: Operation
Test Site: 1#Shielding Room
Operator: Ricky
Test Specification: N 120V/60Hz
Comment: Report NO.:ATE20150823
Start of Test: 4/29/2015 / 3:07:05PM

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: "RY0429-2_fin"

4/29/2015 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.165000	38.00	10.5	65	27.2	QP	N	GND
1.155000	11.80	10.9	56	44.2	QP	N	GND
24.800000	14.70	11.5	60	45.3	QP	N	GND

MEASUREMENT RESULT: "RY0429-2_fin2"

4/29/2015 3:11PM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.425000	15.20	10.7	47	32.1	AV	N	GND
1.060000	7.00	10.9	46	39.0	AV	N	GND
23.575000	9.50	11.5	50	40.5	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 antenna, no consideration of replacement. Therefore, the equipment complies with the antenna requirement of Section 15.203.

Antenna

