

APPLICATION CERTIFICATION
On Behalf of
Shenzhen SKY DRAGON Audio-video Technology Co.LTD

Bluetooth Speaker
Model No.: BC229F

FCC ID: ZJPBC229FSP233

Prepared for : Shenzhen SKY DRAGON Audio-video Technology
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Test Report Certification

Applicant : Shenzhen SKY DRAGON Audio-video Technology Co.LTD
 Manufacturer : Shenzhen SKY DRAGON Audio-video Technology Co.LTD
 EUT Description : Bluetooth Speaker
 (A) MODEL NO.: BC229F
 (B) SERIAL NO.: N/A
 (C) POWER SUPPLY: DC 3.7V (Battery) & DC 5V(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 : Apr 22-24, 2014

Prepared by : 
 (Engineer)

Approved & Authorized Signer : 
 (Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

EUT	:	Bluetooth Speaker
Model Number	:	BC229F
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Modulation type	:	GFSK, $\Pi/4$ -DQPSK, 8DPSK
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna
Power Supply	:	DC 3.7V(Battery)&DC 5V(USB Port)
Applicant	:	Shenzhen SKY DRAGON Audio-video Technology Co.LTD
Address	:	B16,Laneway 3,Liuxian,2RD,District71, Baoan,shenzhen,China
Manufacturer	:	Shenzhen SKY DRAGON Audio-video Technology Co.LTD
Address	:	B16,Laneway 3,Liuxian,2RD,District71, Baoan,shenzhen,China
Date of sample received	:	Apr 22, 2014
Date of Test	:	Apr 22-24, 2014

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	Calibrated until
EMI Test Receiver	Rohde&Schwarz	ESCS30	100307	Jan. 11, 2014	Jan. 10, 2015
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 11, 2014	Jan. 10, 2015
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 11, 2014	Jan. 10, 2015
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 11, 2014	Jan. 10, 2015
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 15, 2014	Jan. 14, 2015
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 15, 2014	Jan. 14, 2015
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1067	Jan. 15, 2014	Jan. 14, 2015
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 11, 2014	Jan. 10, 2015
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 11, 2014	Jan. 10, 2015

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

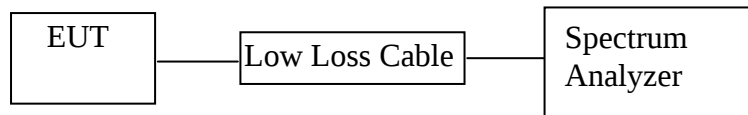
(EUT: Bluetooth Speaker)

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) 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: Bluetooth 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.

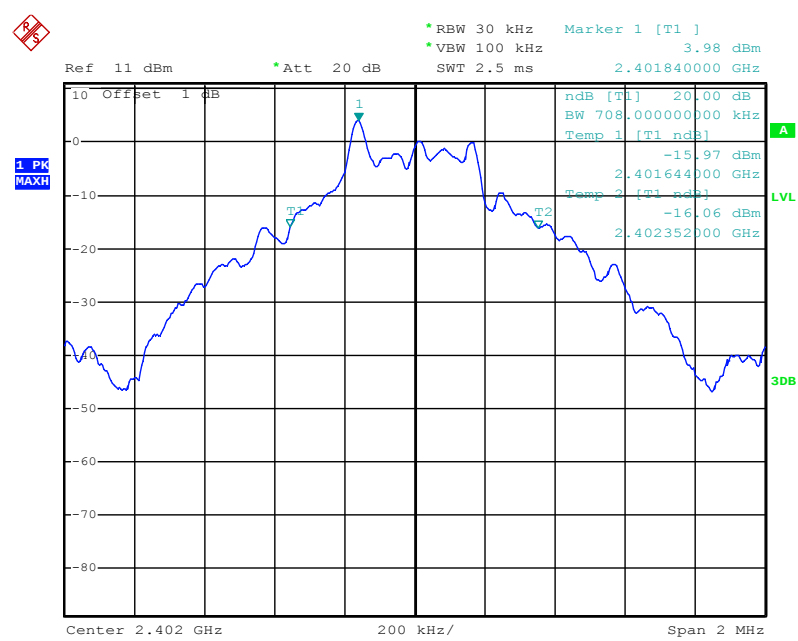
5.6. Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	$\Pi/4$ -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

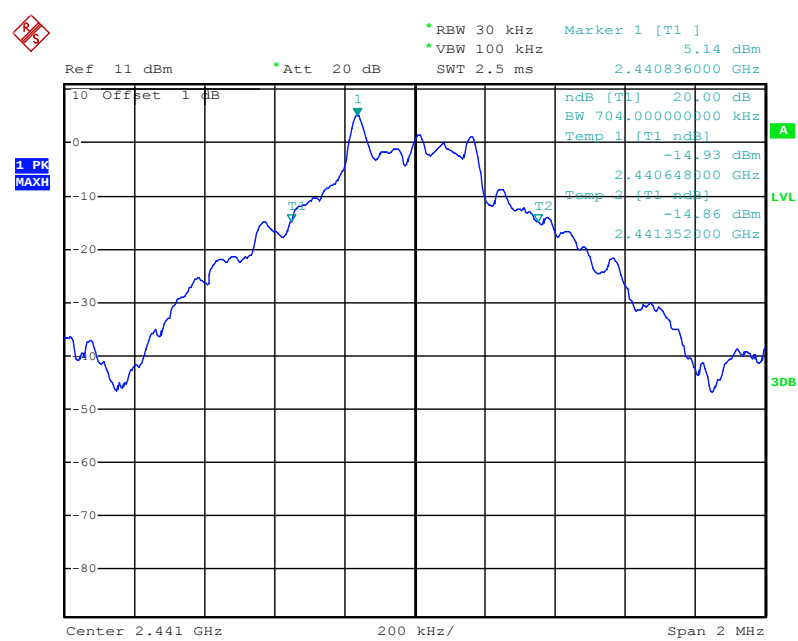
The spectrum analyzer plots are attached as below.

GFSK Mode

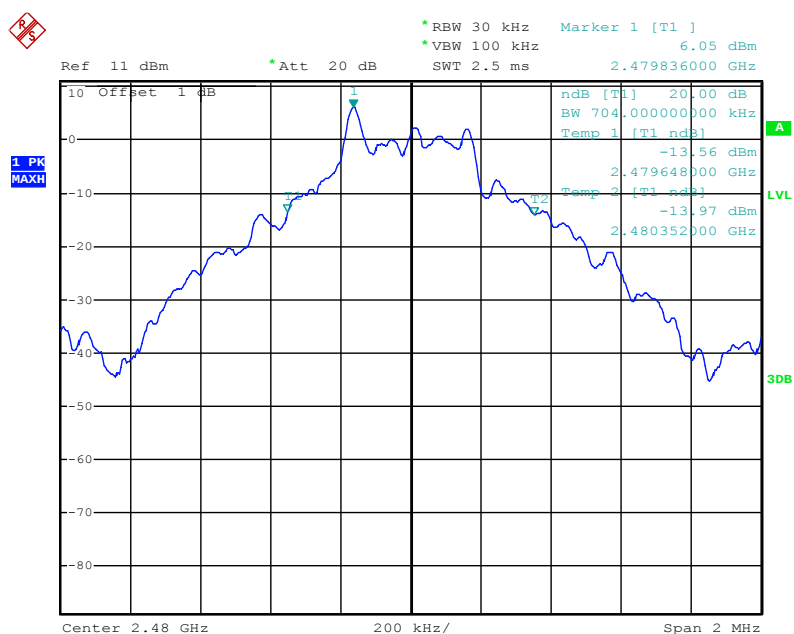
Low channel



Middle channel

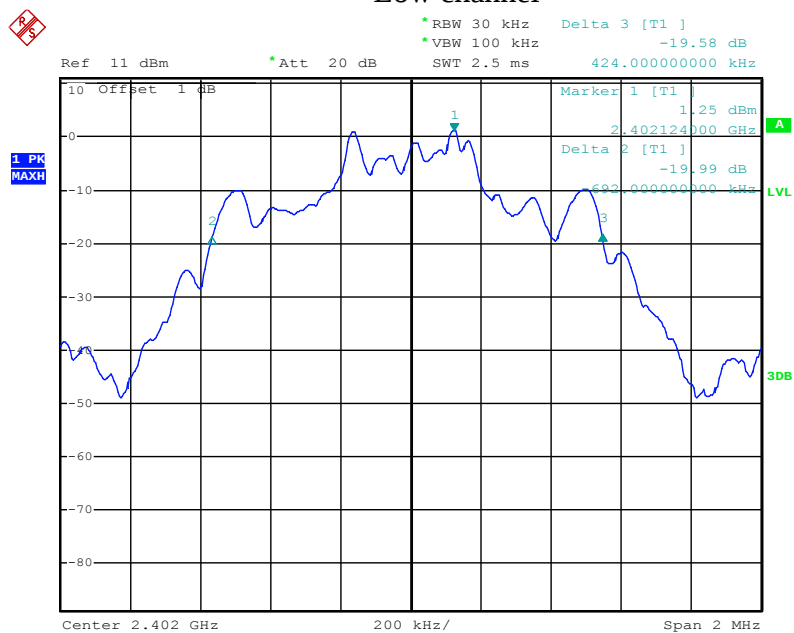


High channel

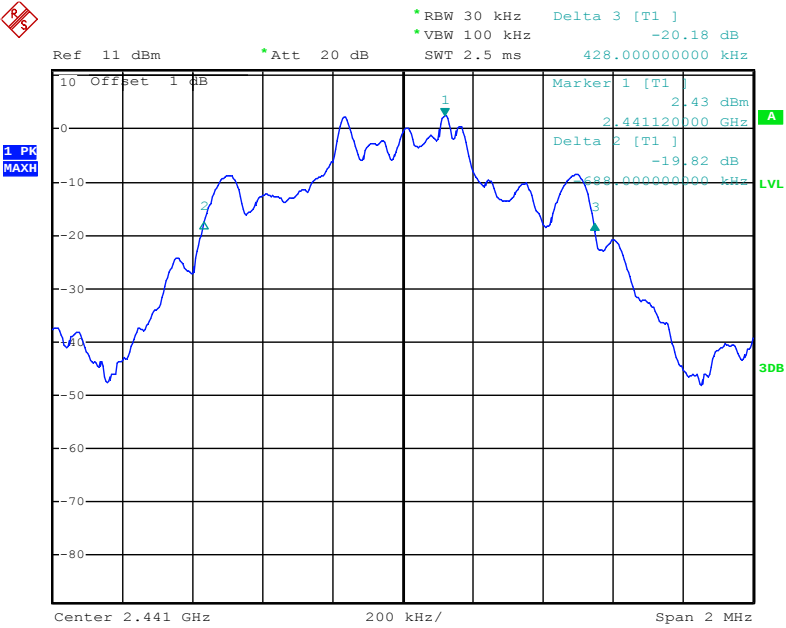


Π/4-DQPSK Mode

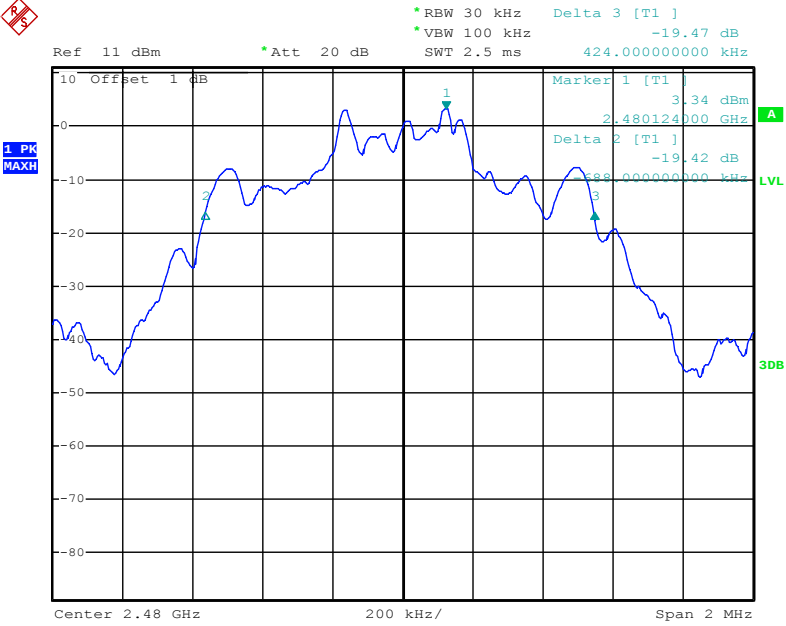
Low channel



Middle channel

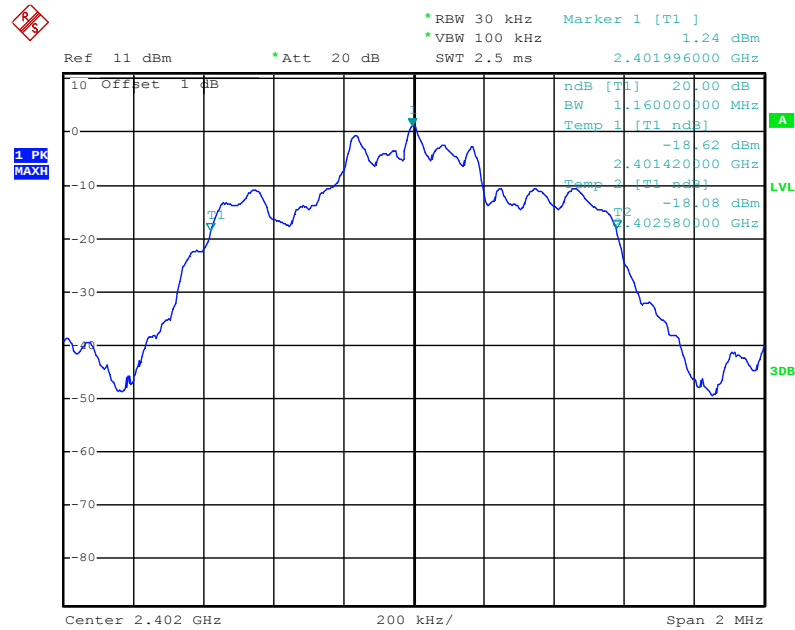


High channel

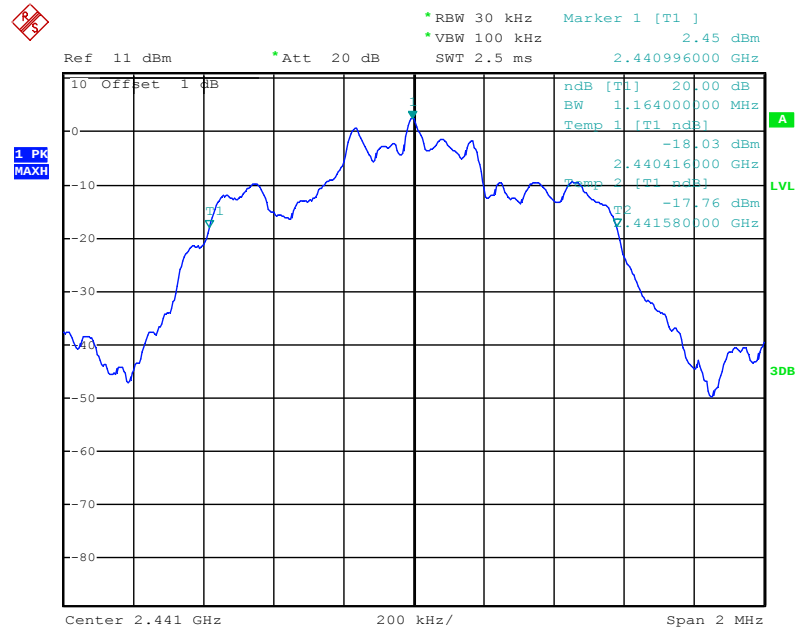


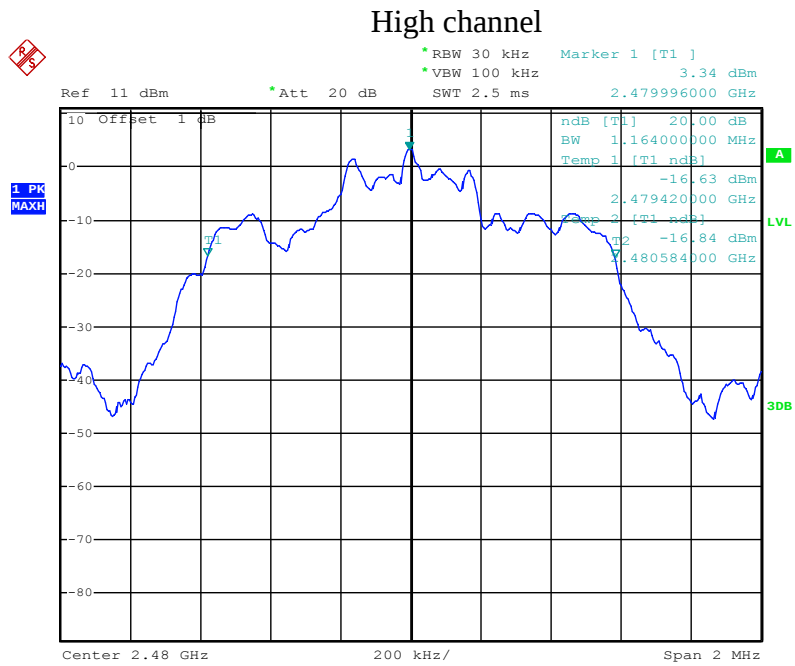
8DPSK Mode

Low channel



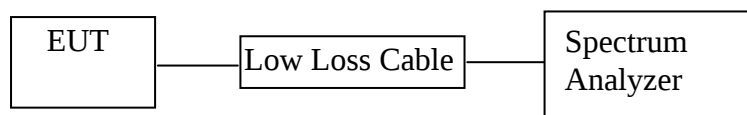
Middle channel





6. CARRIER FREQUENCY SEPARATION TEST

6.1. Block Diagram of Test Setup



(EUT: Bluetooth 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 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	1.008	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

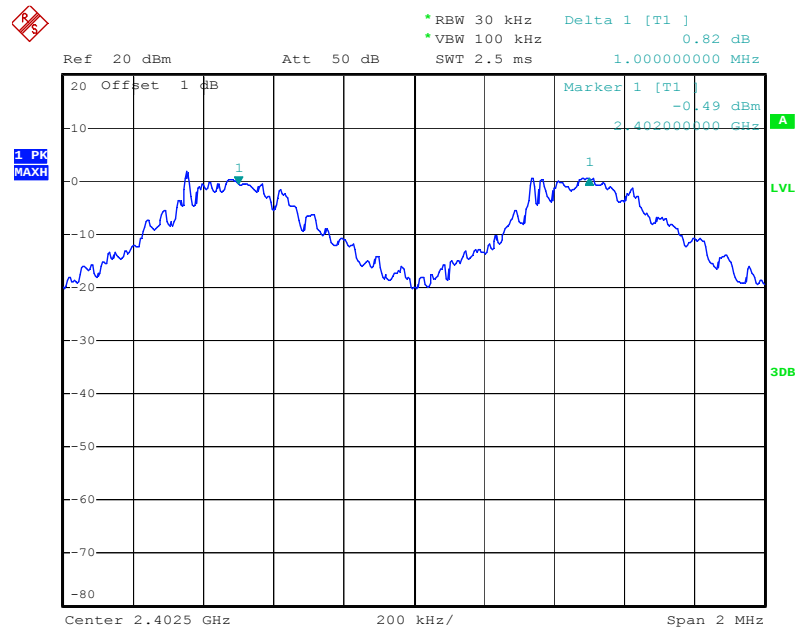
8QPSK

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			

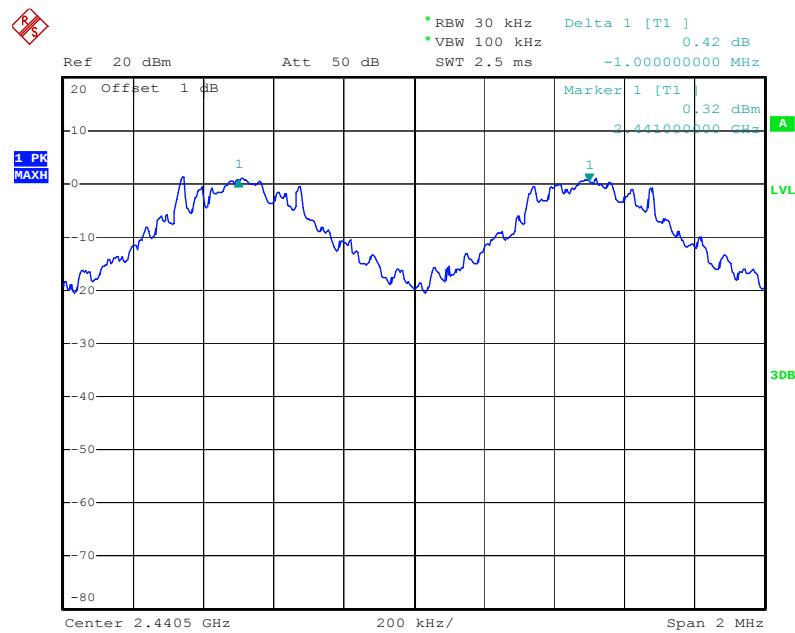
The spectrum analyzer plots are attached as below.

GFSK Mode

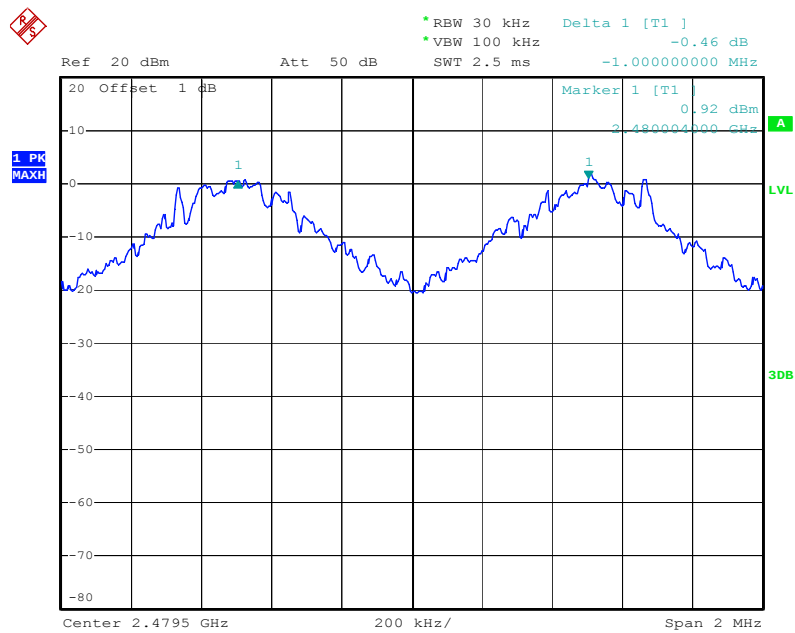
Low channel



Middle channel

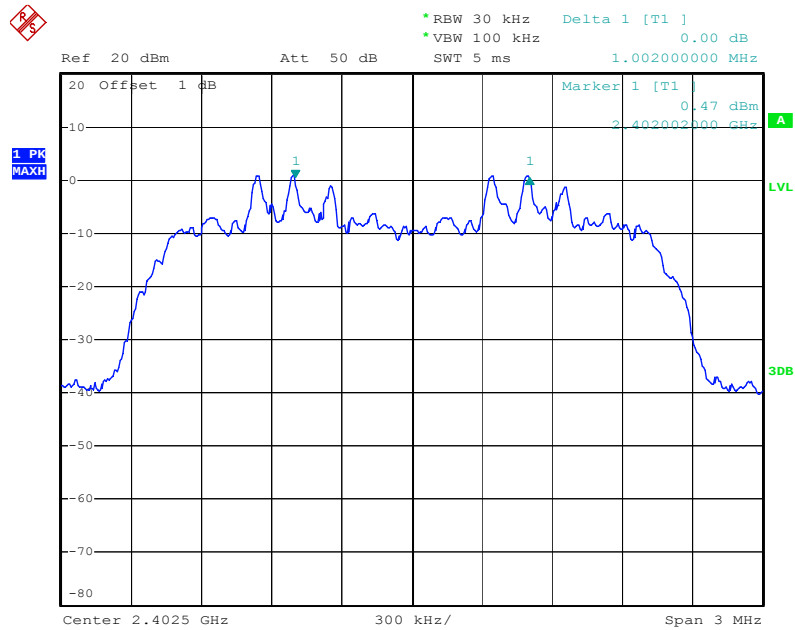


High channel

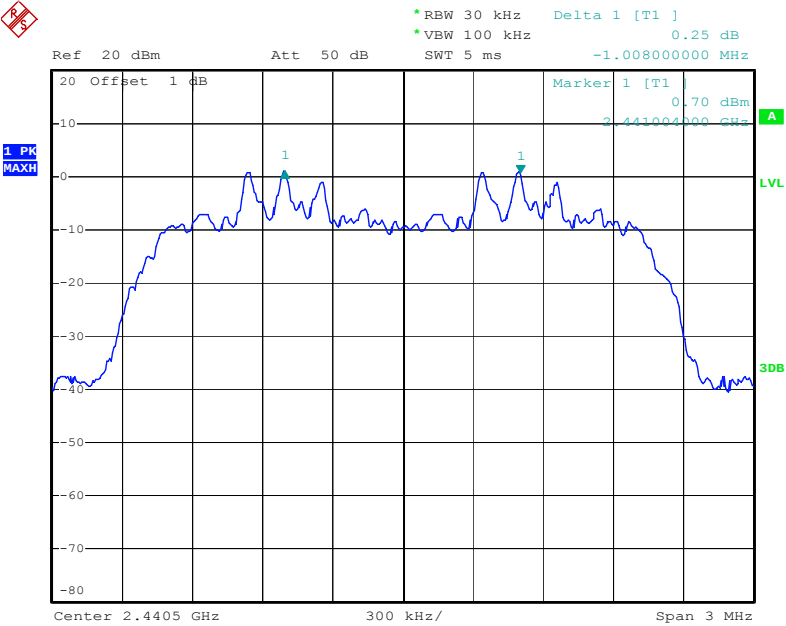


Π/4-DQPSK Mode

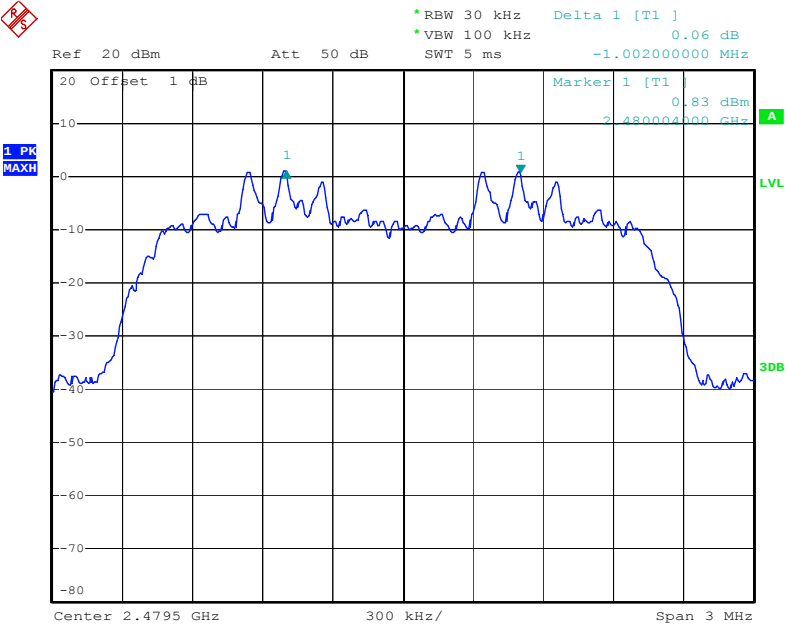
Low channel



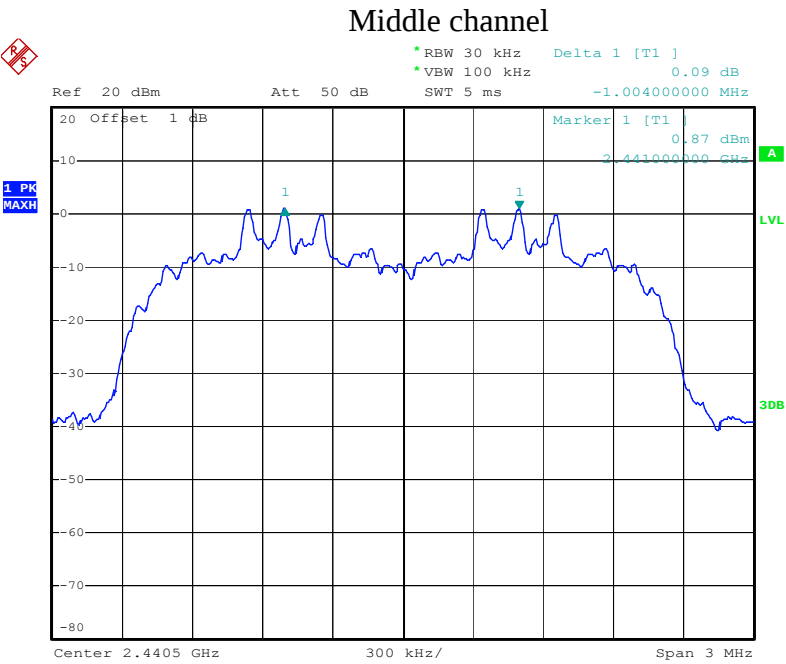
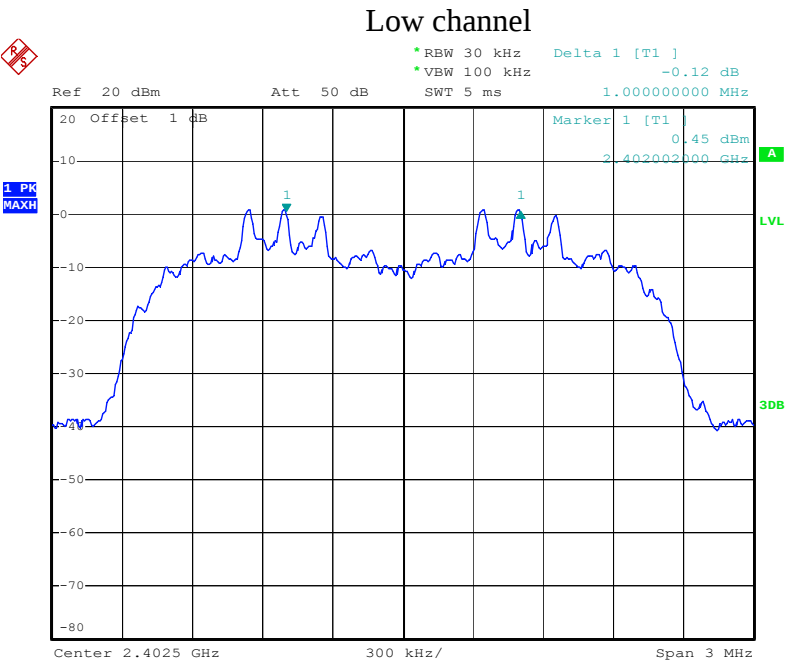
Middle channel

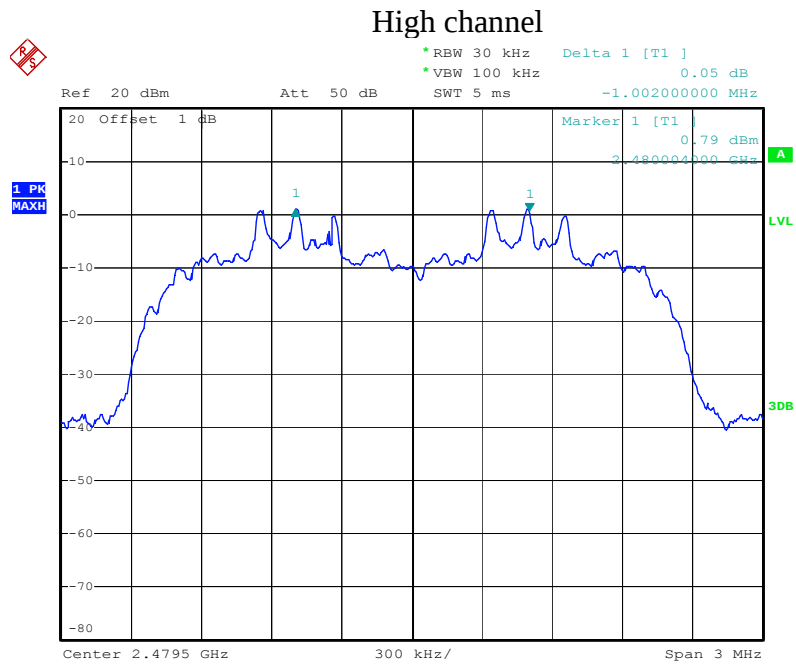


High channel



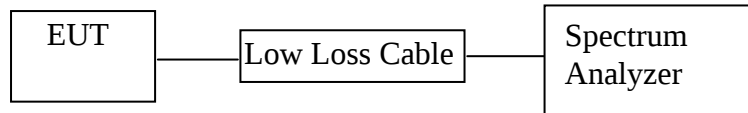
8DPSK Mode





7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Block Diagram of Test Setup



(EUT: Bluetooth 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

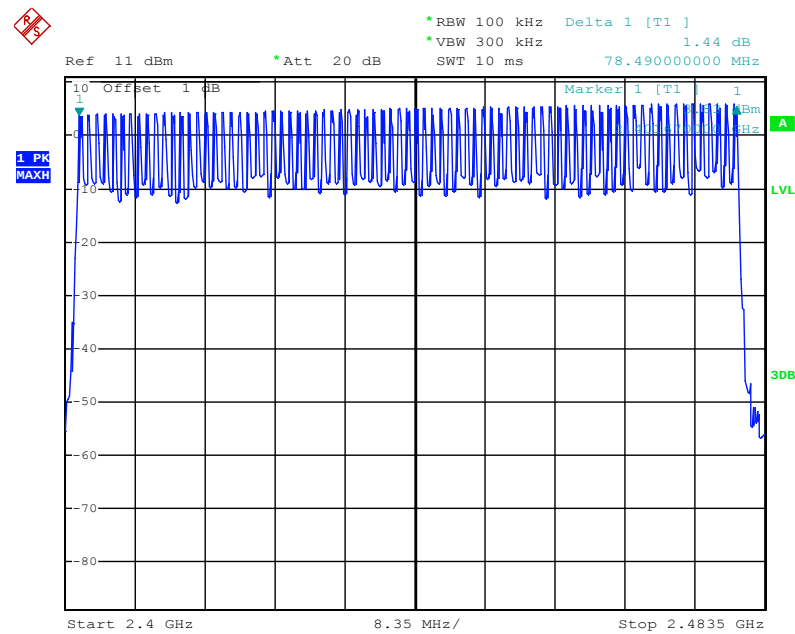
- 7.5.1. The transmitter output was connected to the spectrum analyzer through a low loss cable.
- 7.5.2. Set the spectrum analyzer as Span=83.5MHz, RBW=100 kHz, VBW=300 kHz.
- 7.5.3. Max hold, view and count how many channel in the band.

7.6. Test Result

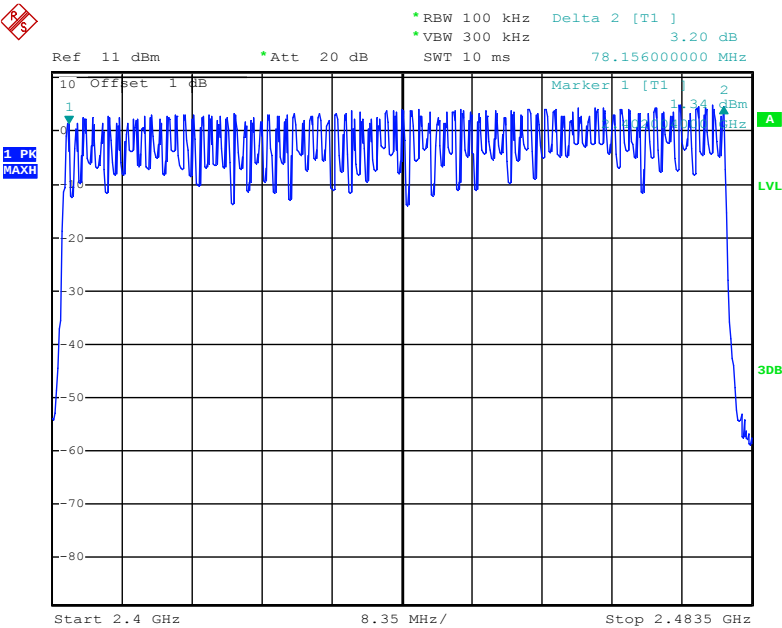
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	≥ 15

The spectrum analyzer plots are attached as below.

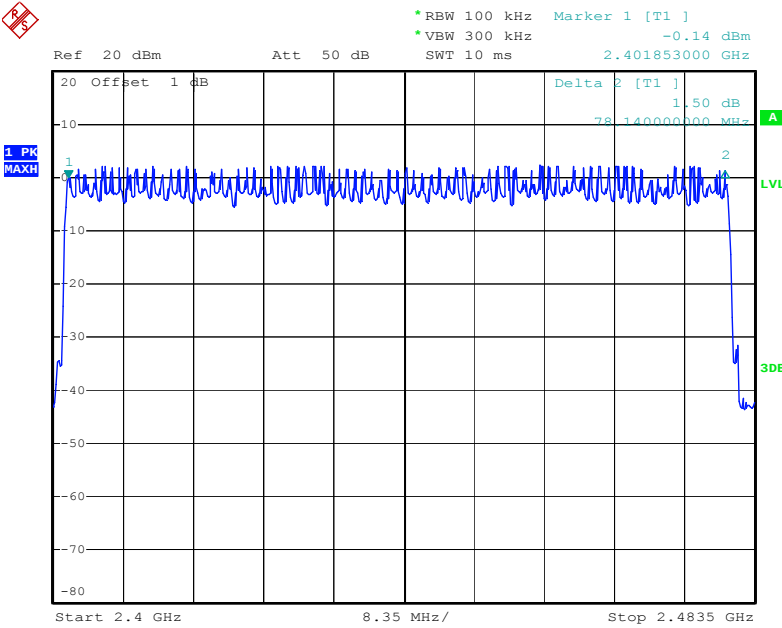
Number of hopping channels(GFSK)



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

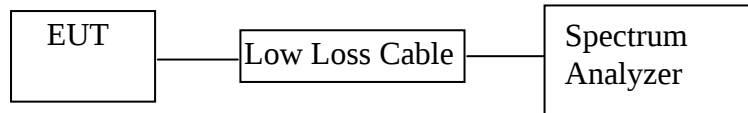


Number of hopping channels(8QPSK)



8. DWELL TIME TEST

8.1. Block Diagram of Test Setup



(EUT: Bluetooth 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 = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.680	268.80	400
	2441	1.695	271.20	400
	2480	1.680	268.80	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	2.960	315.73	400
	2441	2.960	315.73	400
	2480	2.960	315.73	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

Π/4-DQPSK

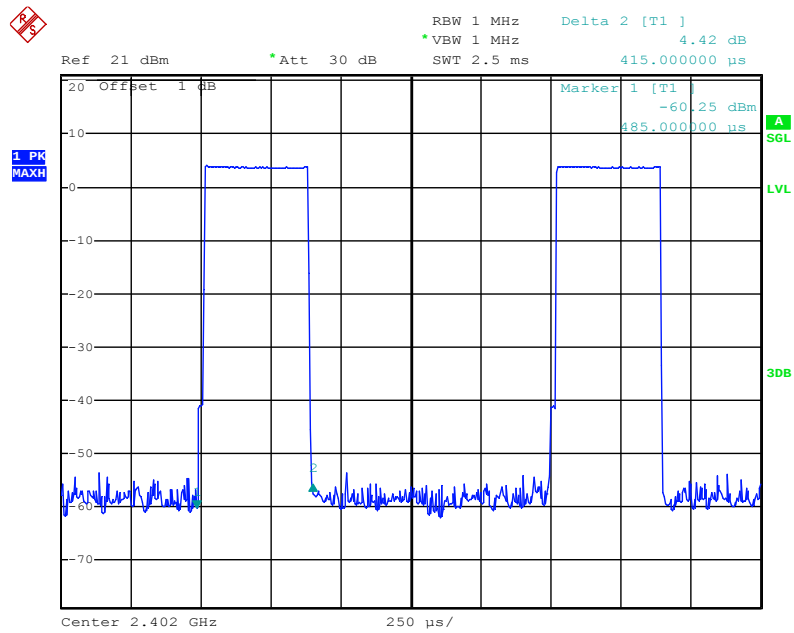
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.415	132.80	400
	2441	0.420	134.40	400
	2480	0.420	134.40	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.695	271.20	400
	2441	1.695	271.20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

8QPSK Mode

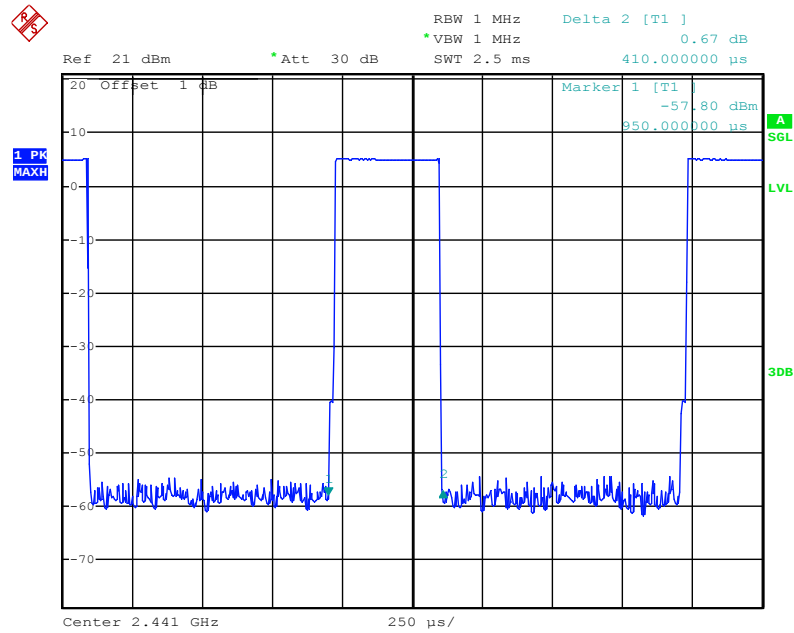
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.420	134.40	400
	2441	0.420	134.40	400
	2480	0.420	134.40	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(2 \times 79)) \times 31.6$				
DH3	2402	1.680	268.80	400
	2441	1.680	268.80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

The spectrum analyzer plots are attached as below.

DH1 Low channel



DH1 Middle channel



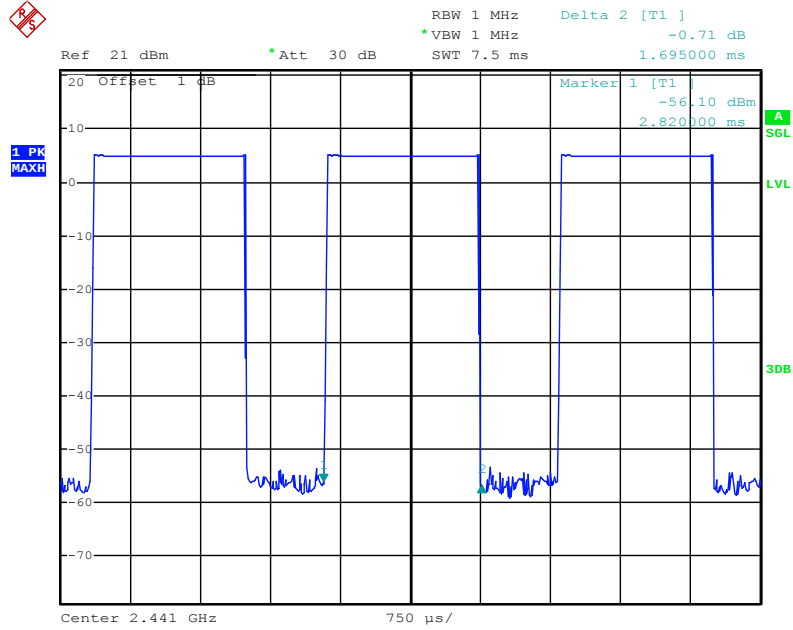
1 PK
MAXH



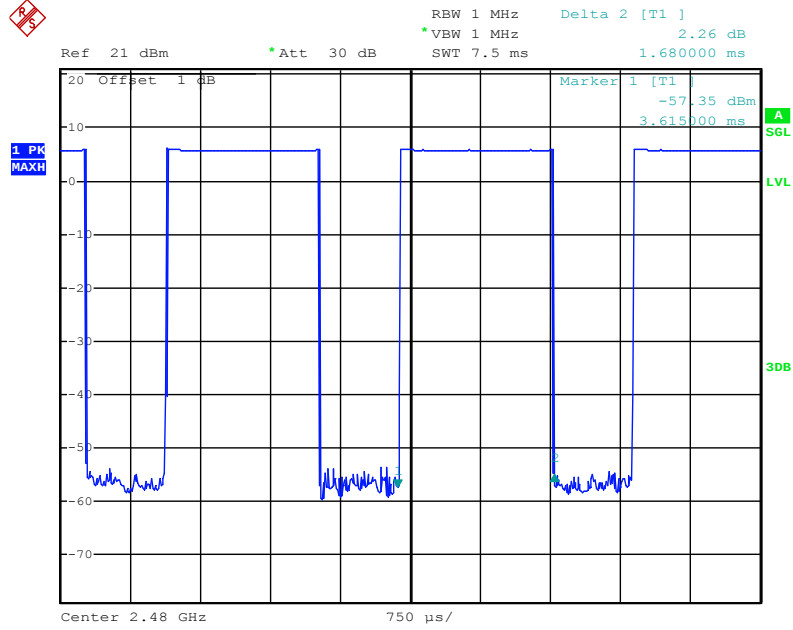
1 PK
MAXH



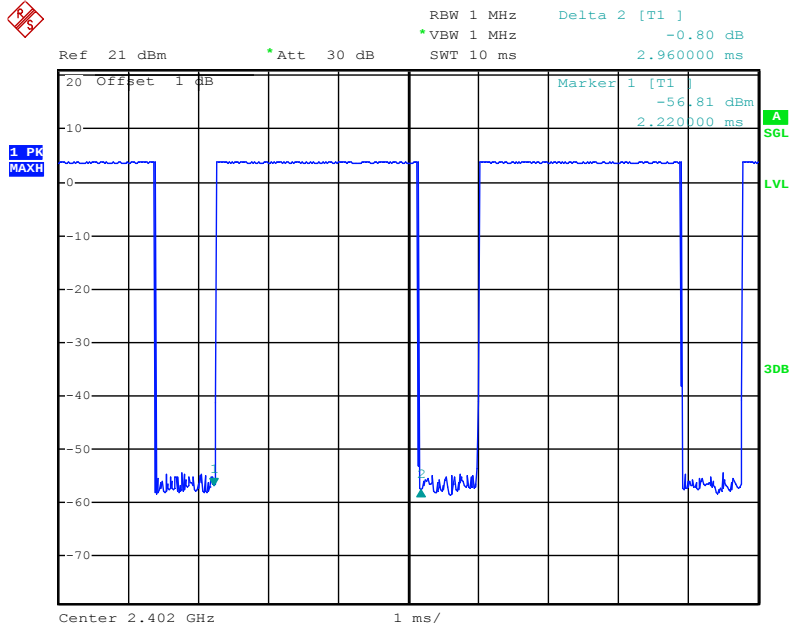
DH3 Middle channel



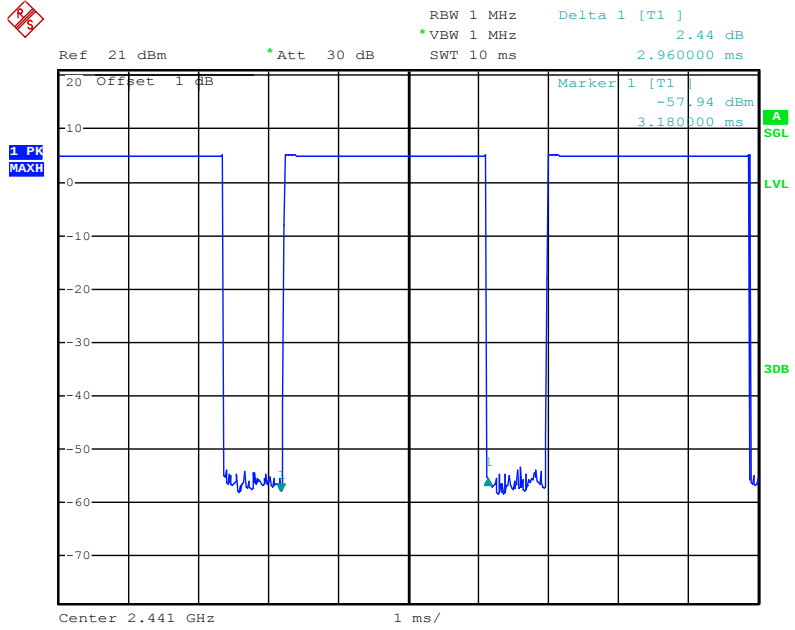
DH3 High channel

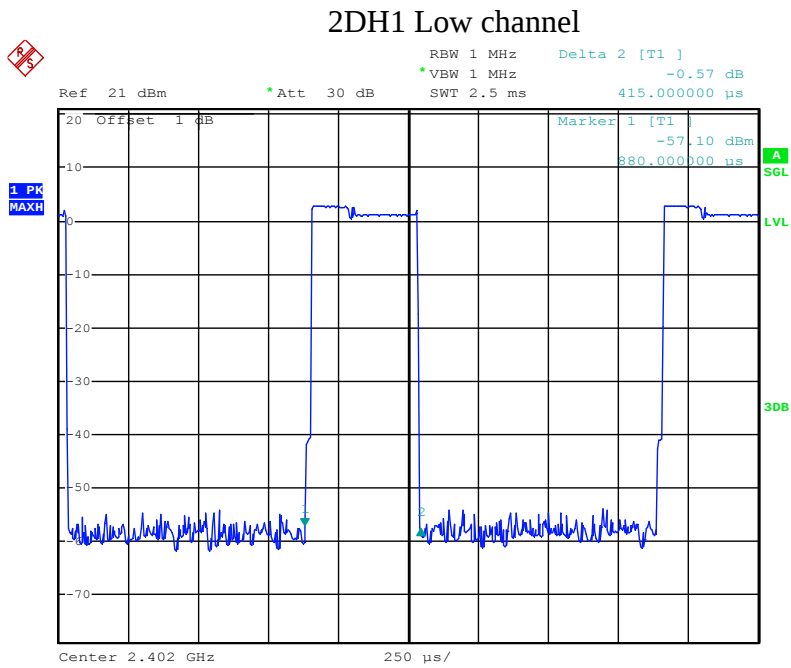
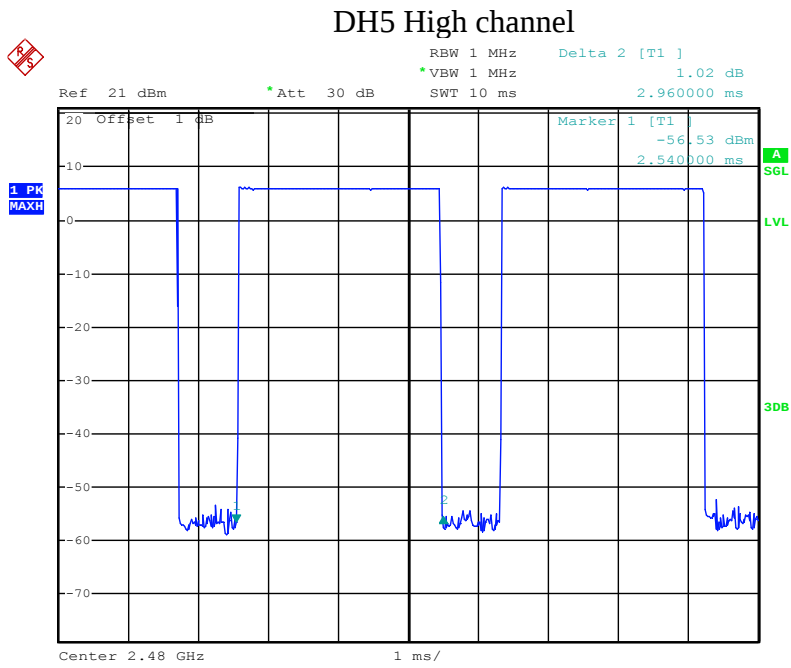


DH5 Low channel

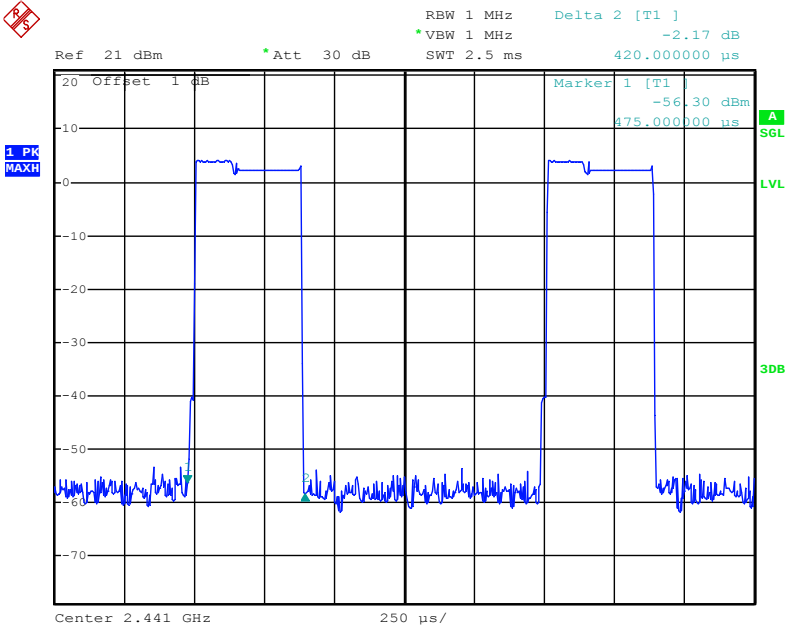


DH5 Middle channel

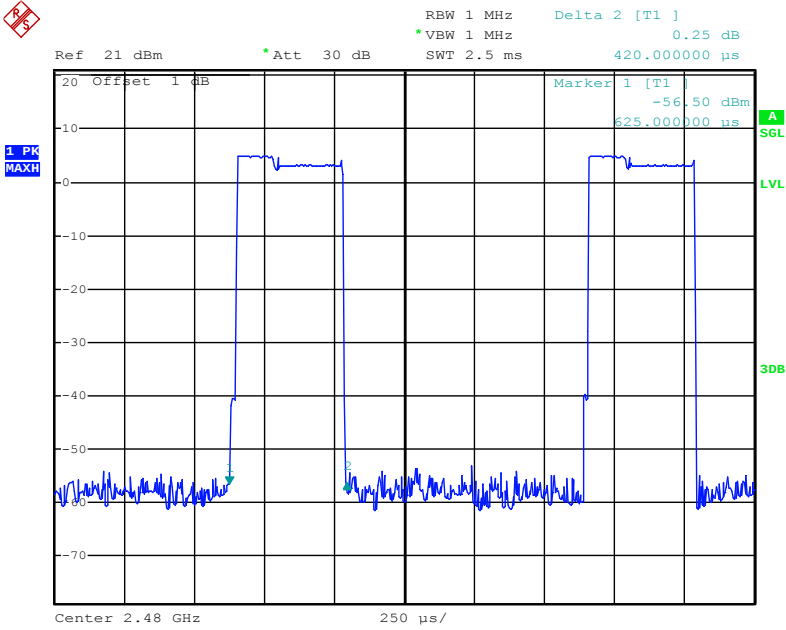




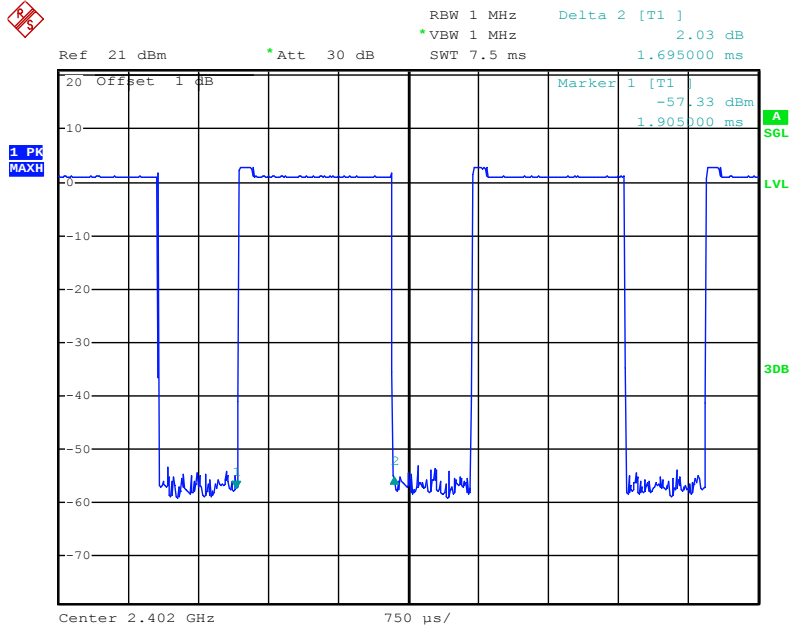
2DH1 Middle channel



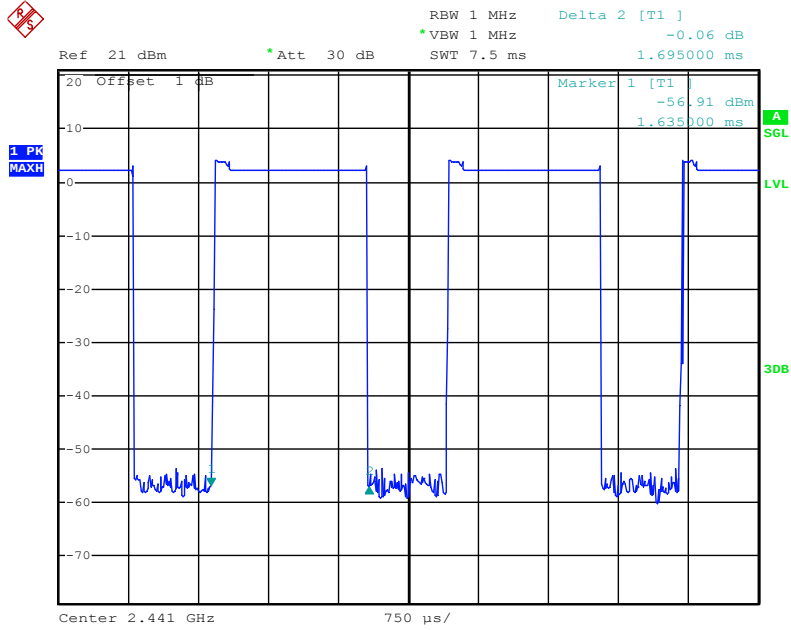
2DH1 High channel

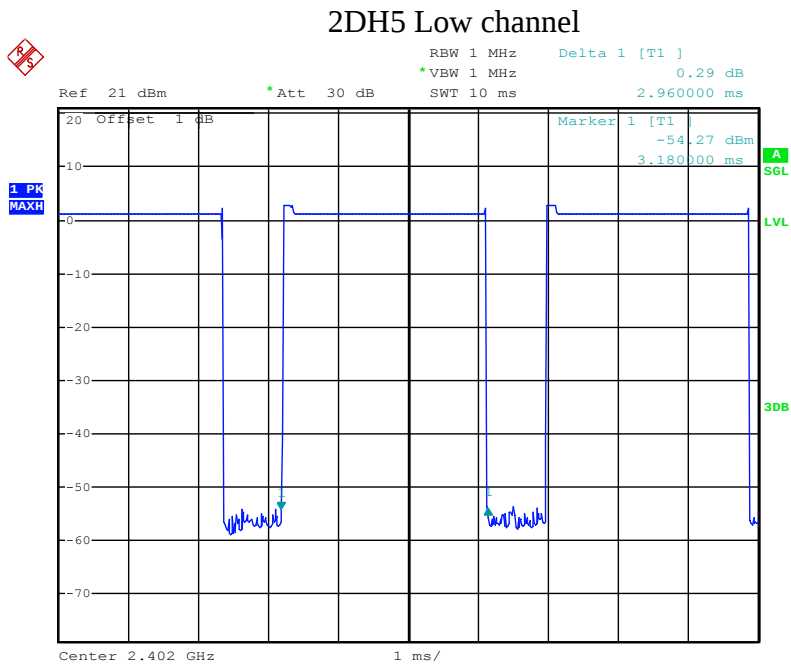
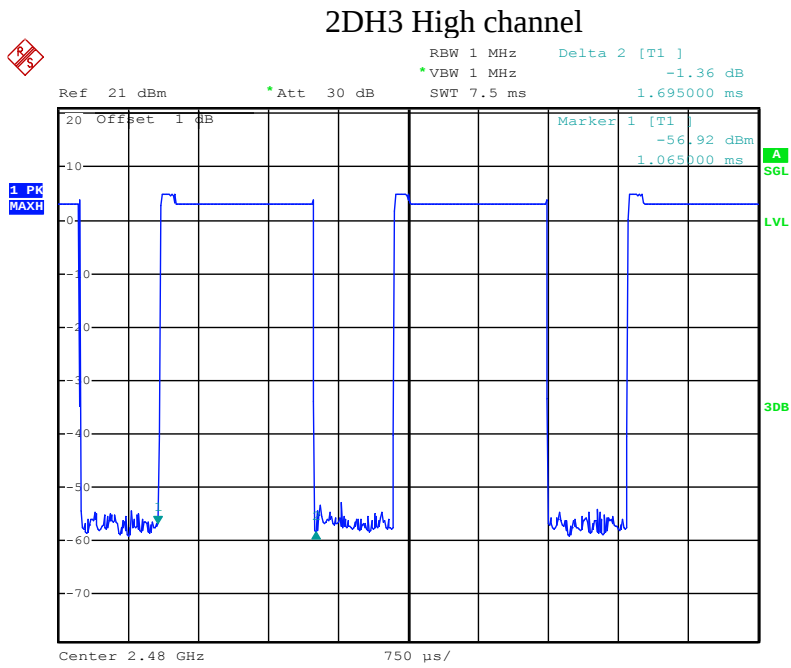


2DH3 Low channel

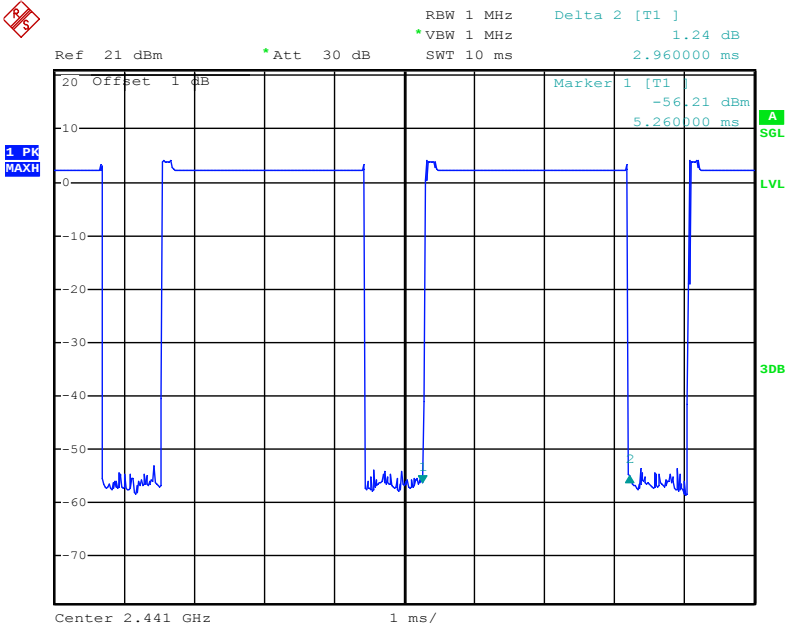


2DH3 Middle channel

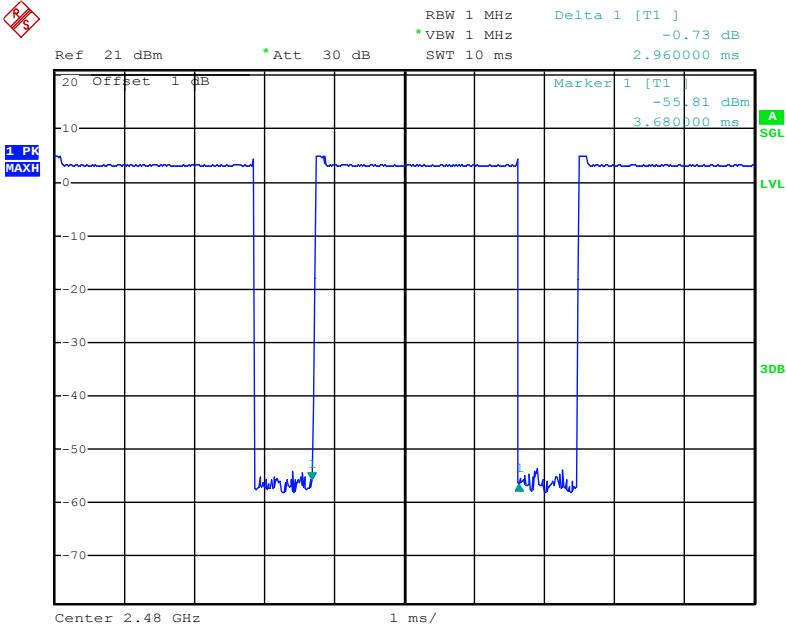


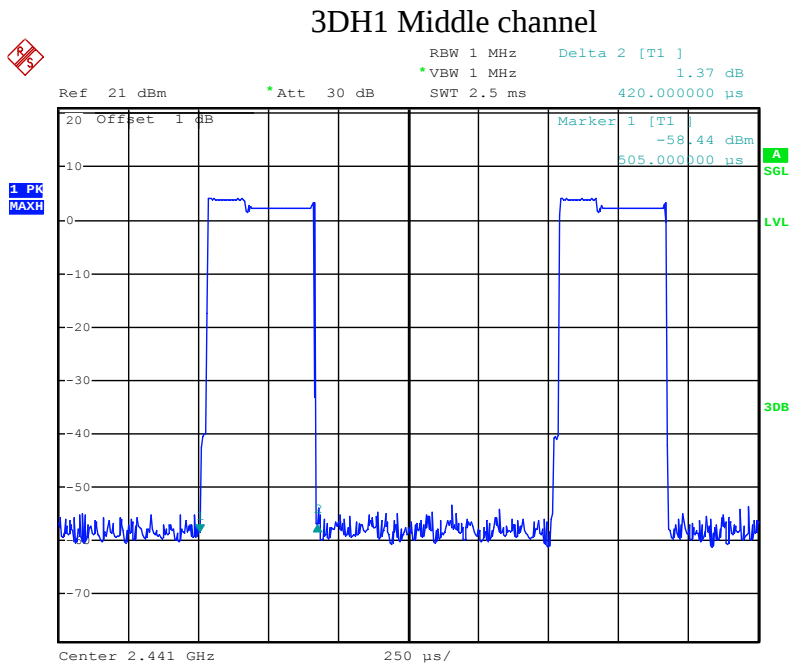
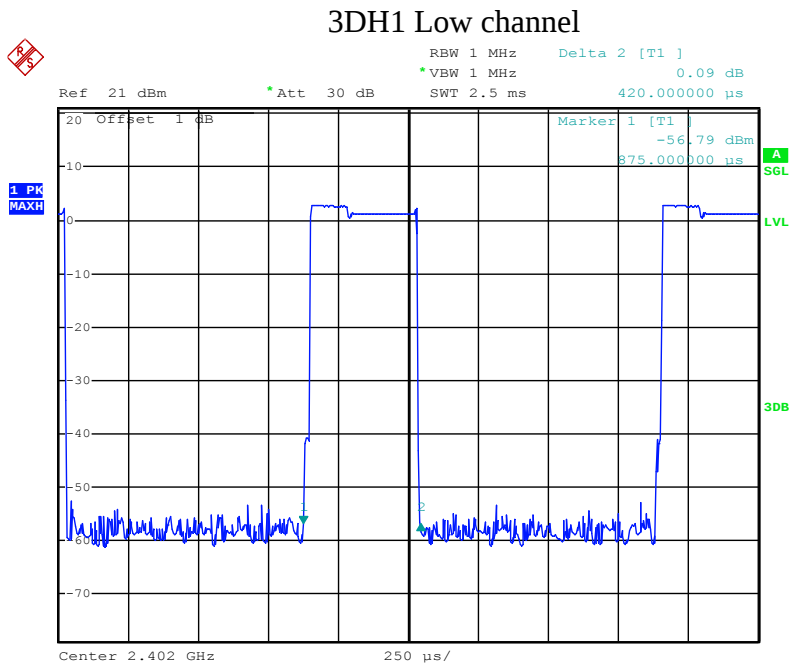


2DH5 Middle channel

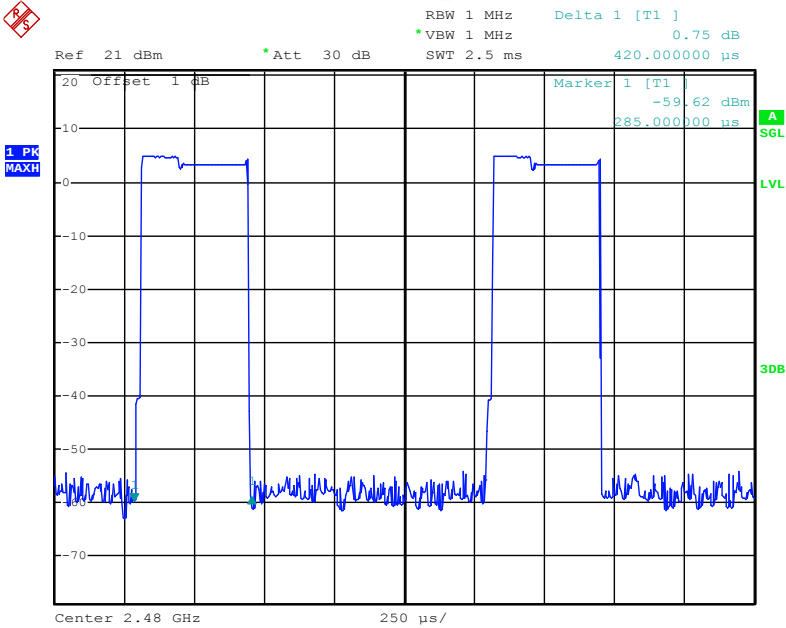


2DH5 High channel

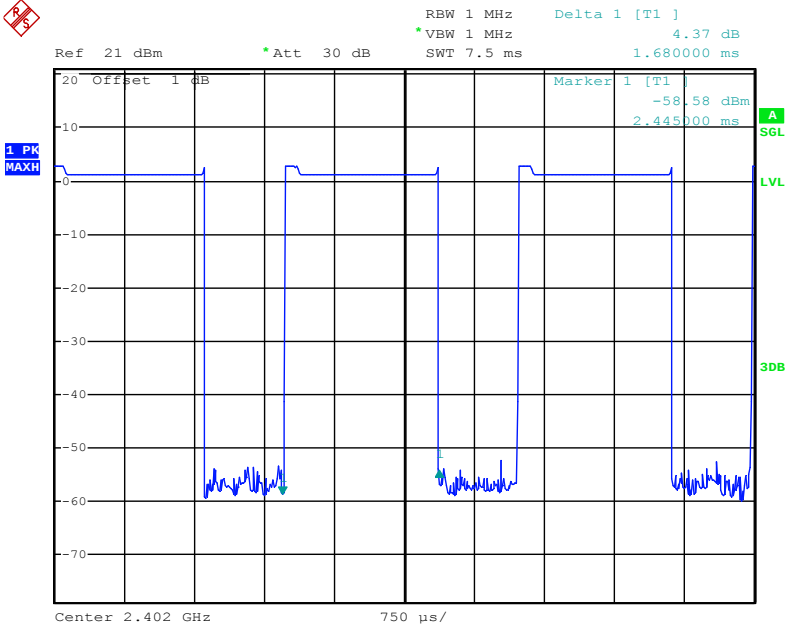




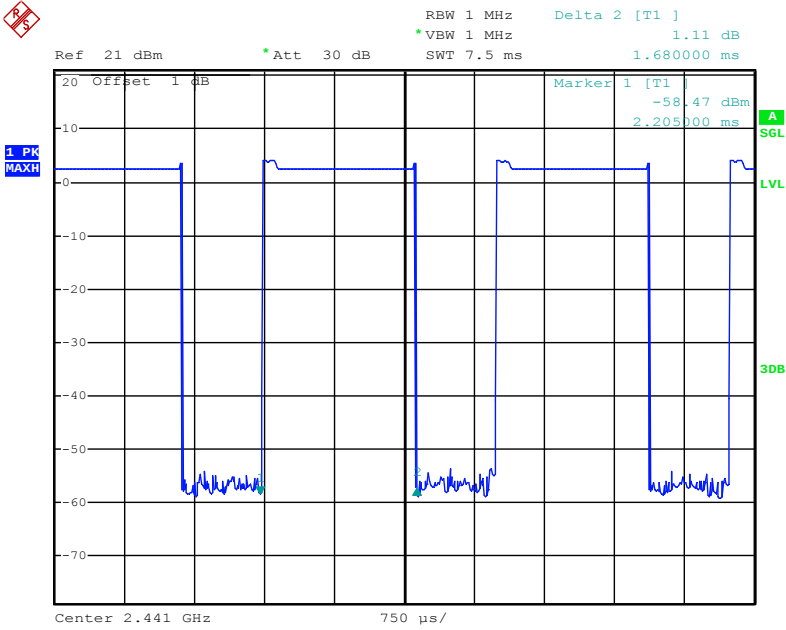
3DH1 High channel



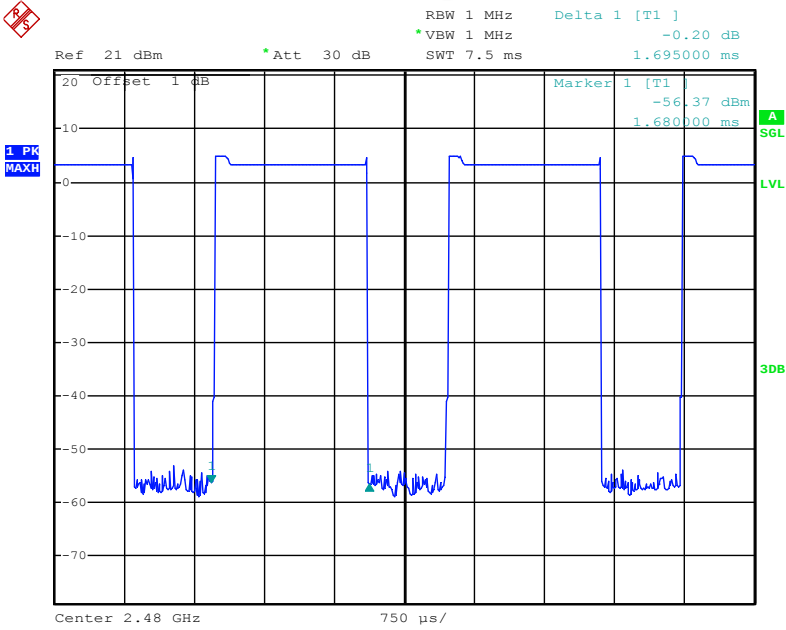
3DH3 Low channel

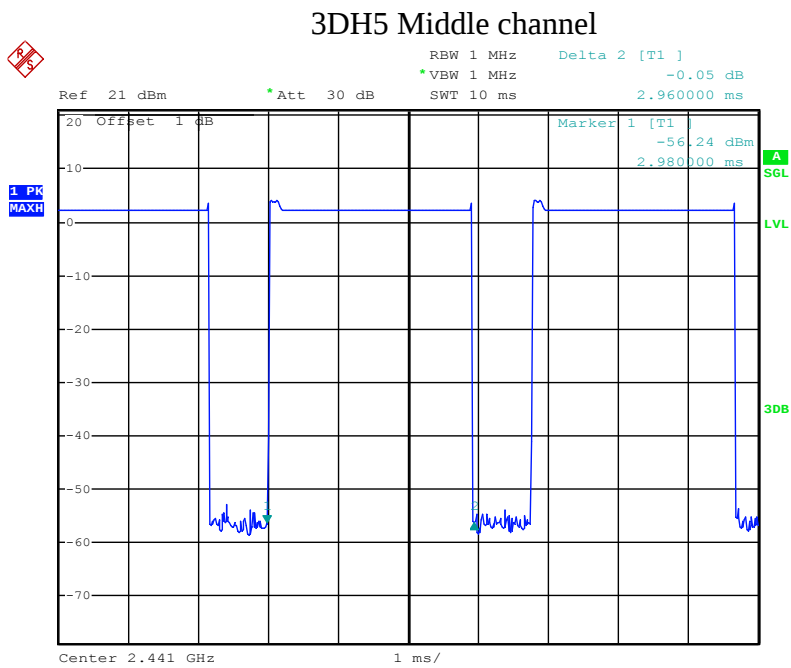
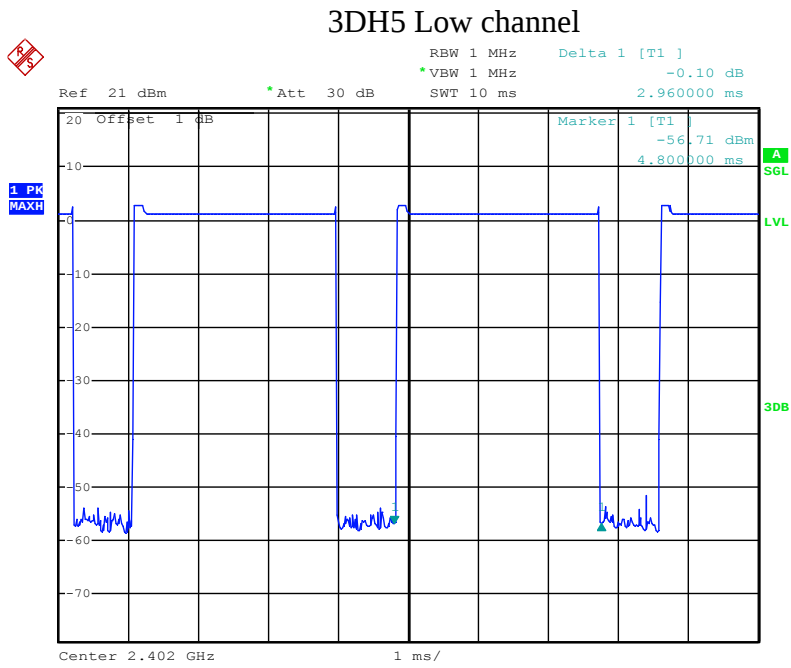


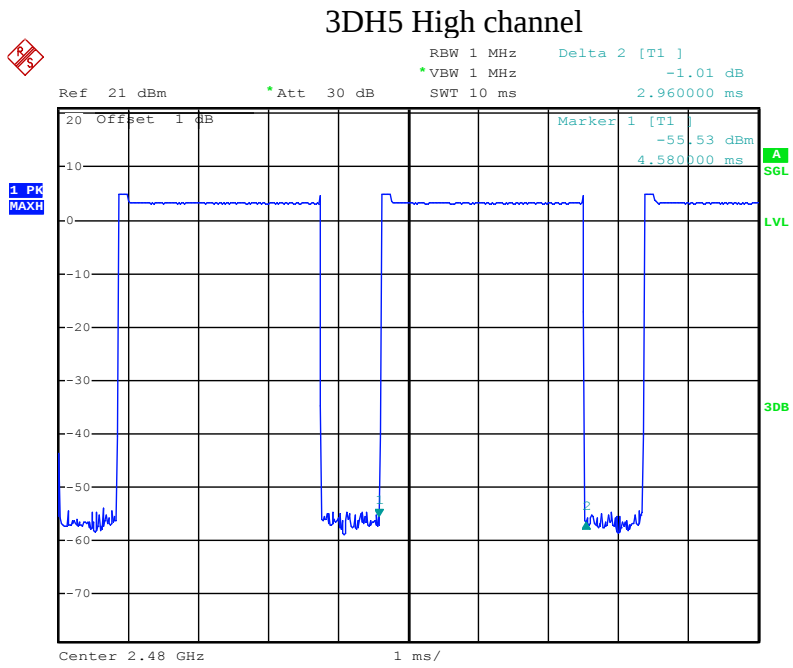
3DH3 Middle channel



3DH3 High channel

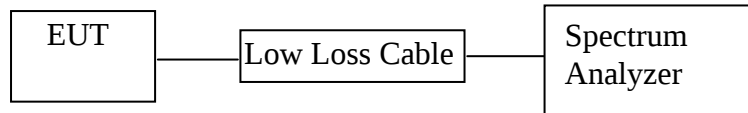






9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Block Diagram of Test Setup



(EUT: Bluetooth 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

Π/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm / W
Low	2402	2.33	21 / 0.125
Middle	2441	1.64	21 / 0.125
High	2480	2.43	21 / 0.125

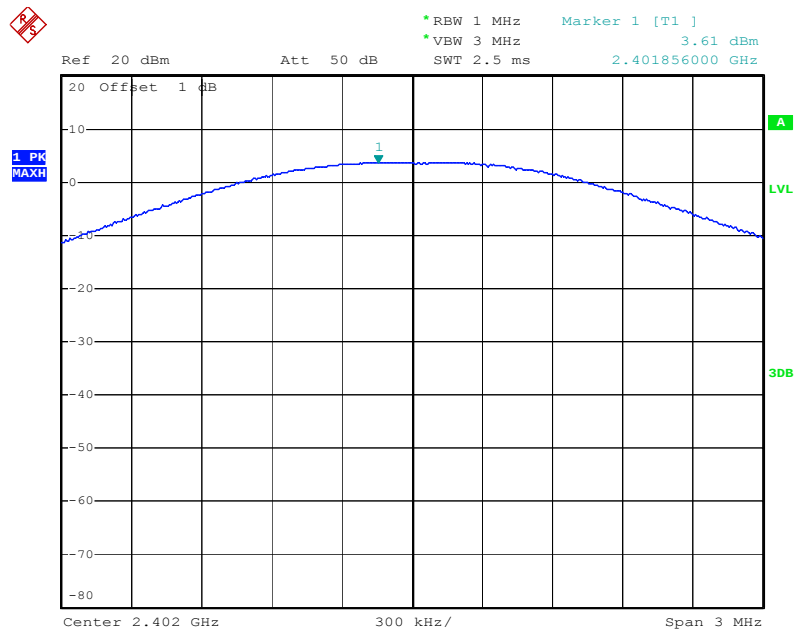
8QPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm)	Limits dBm / W
Low	2402	2.42	21 / 0.125
Middle	2441	1.72	21 / 0.125
High	2480	2.53	21 / 0.125

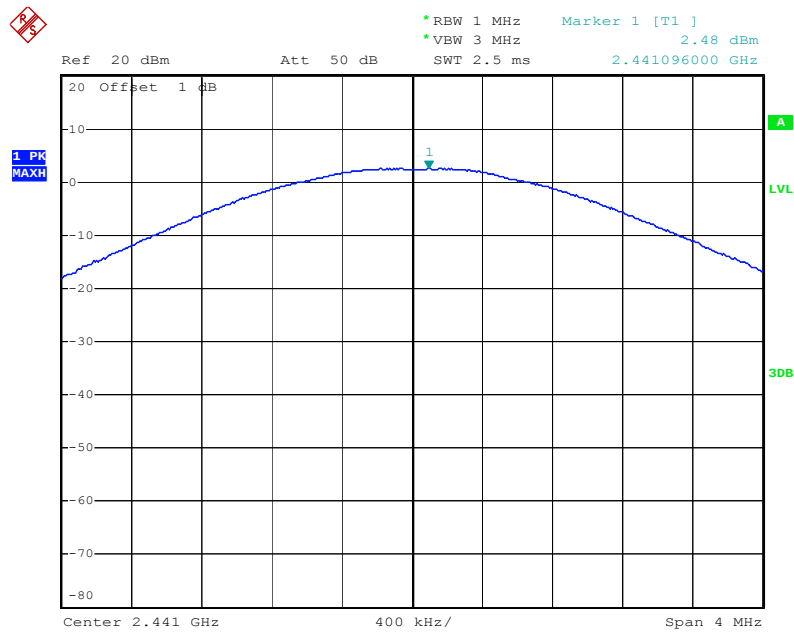
The spectrum analyzer plots are attached as below.

GFSK Mode

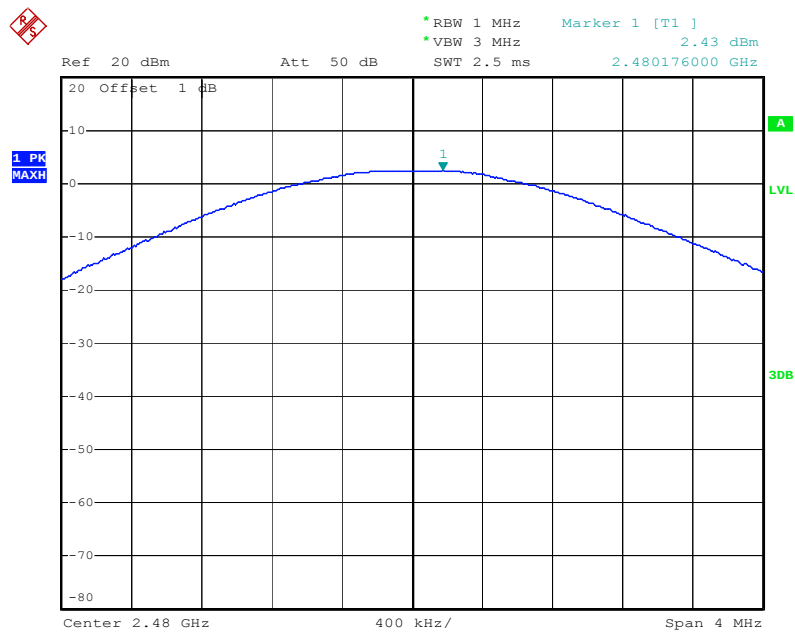
Low channel



Middle channel

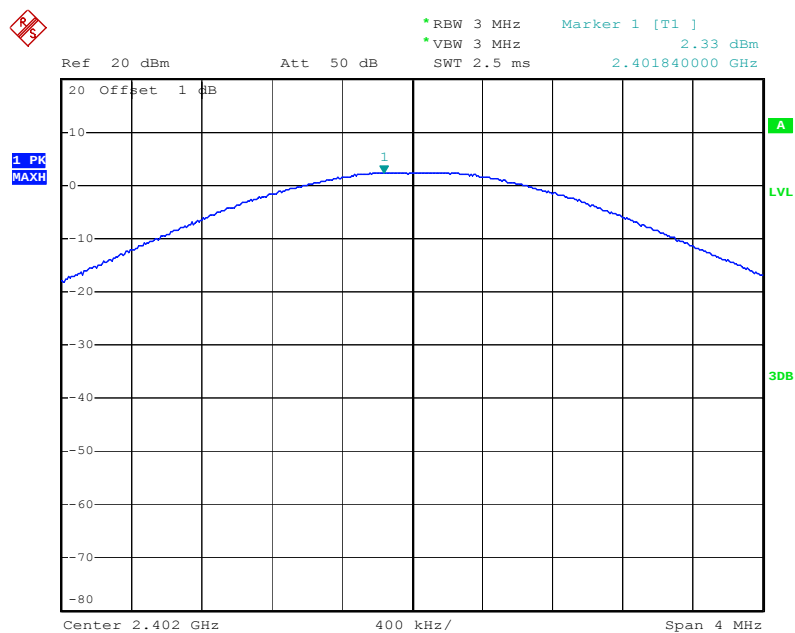


High channel

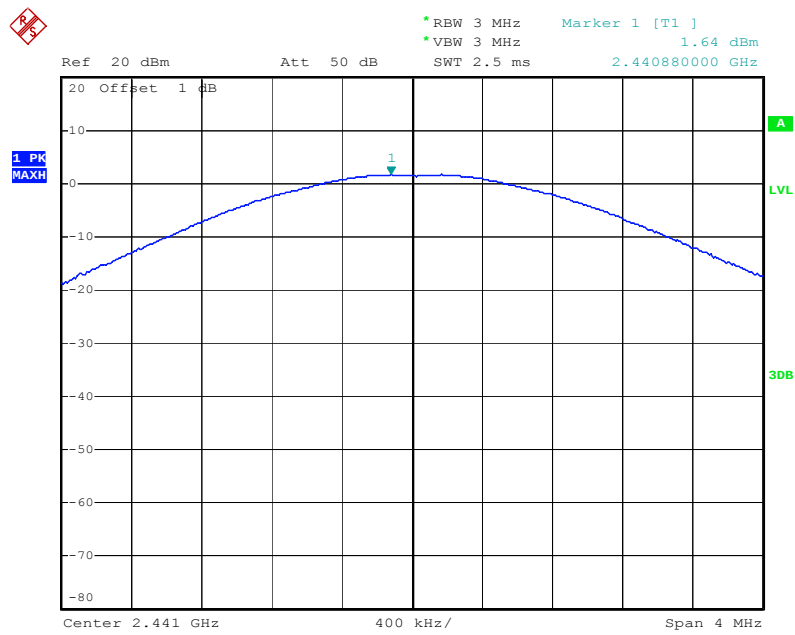


Π/4-DQPSK Mode

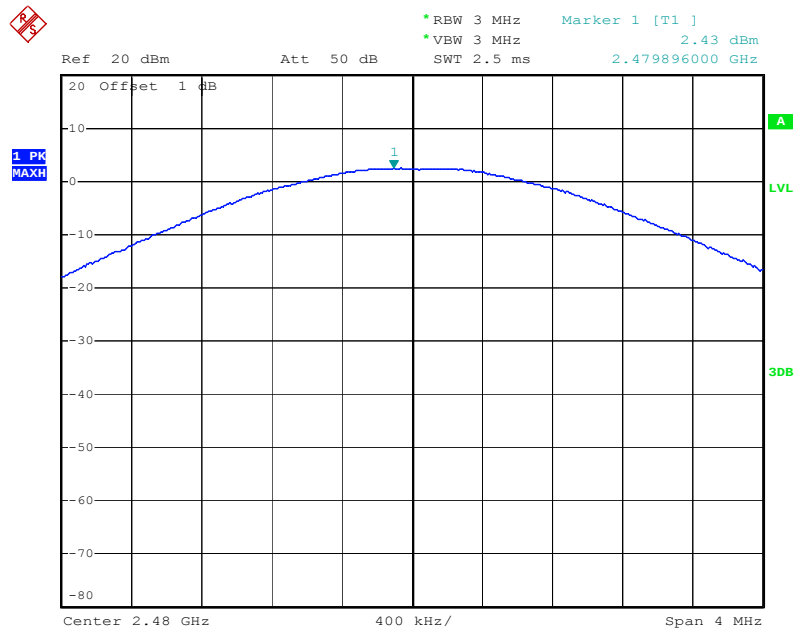
Low channel



Middle channel

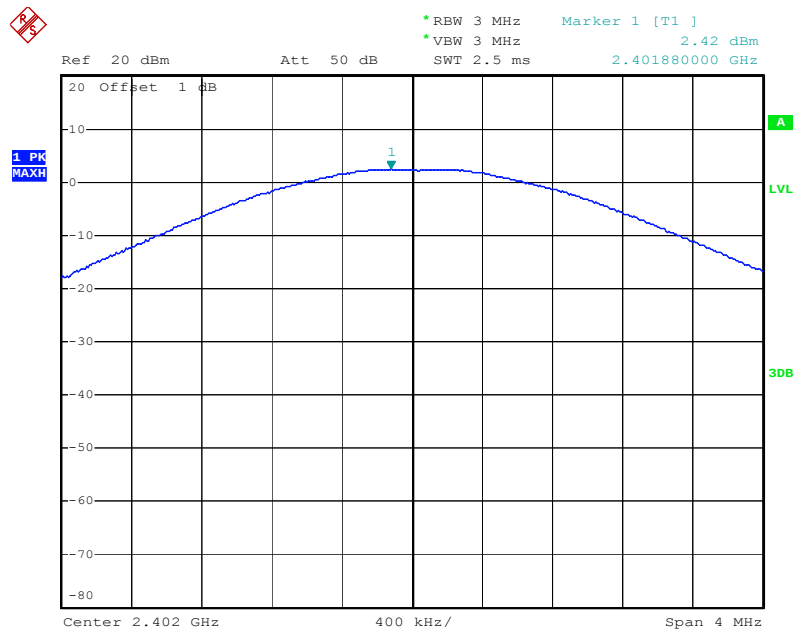


High channel

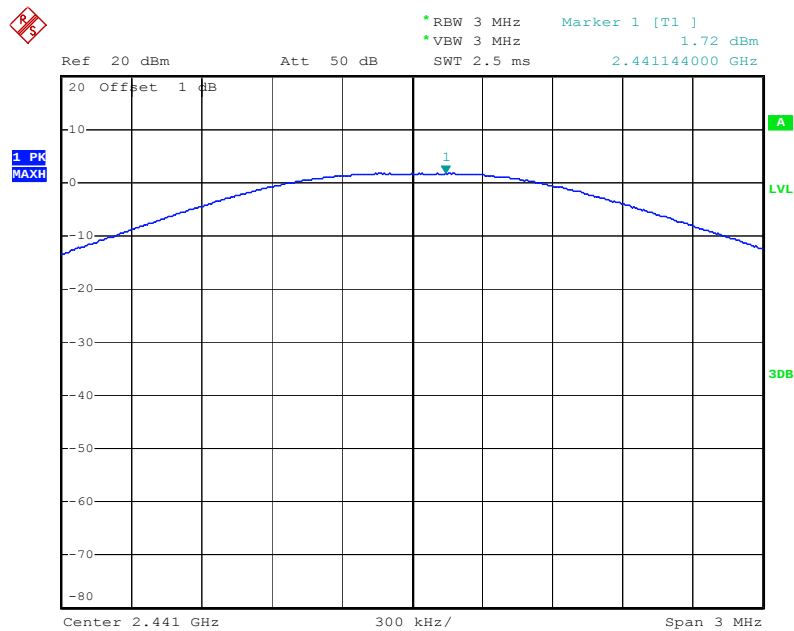


8QPSK Mode

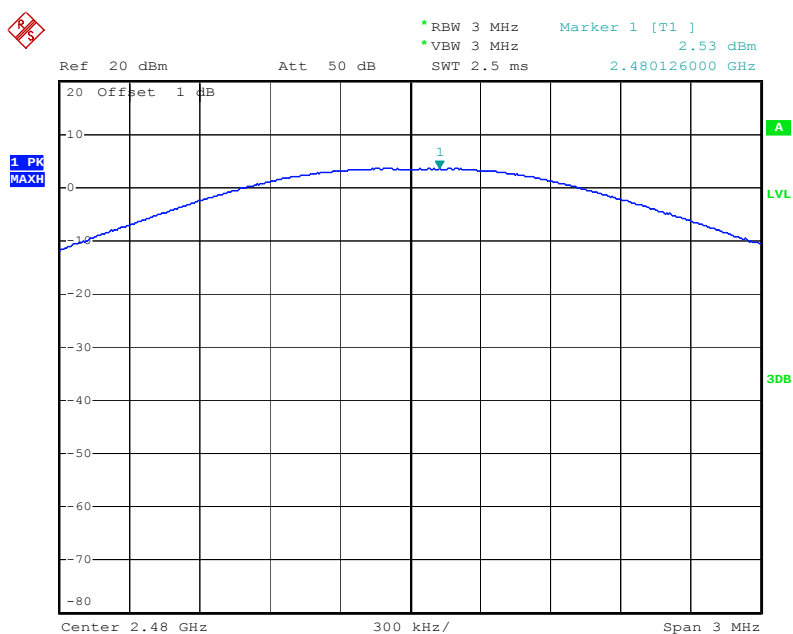
Low channel



Middle channel



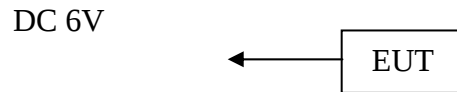
High channel



10.RADIATED EMISSION TEST

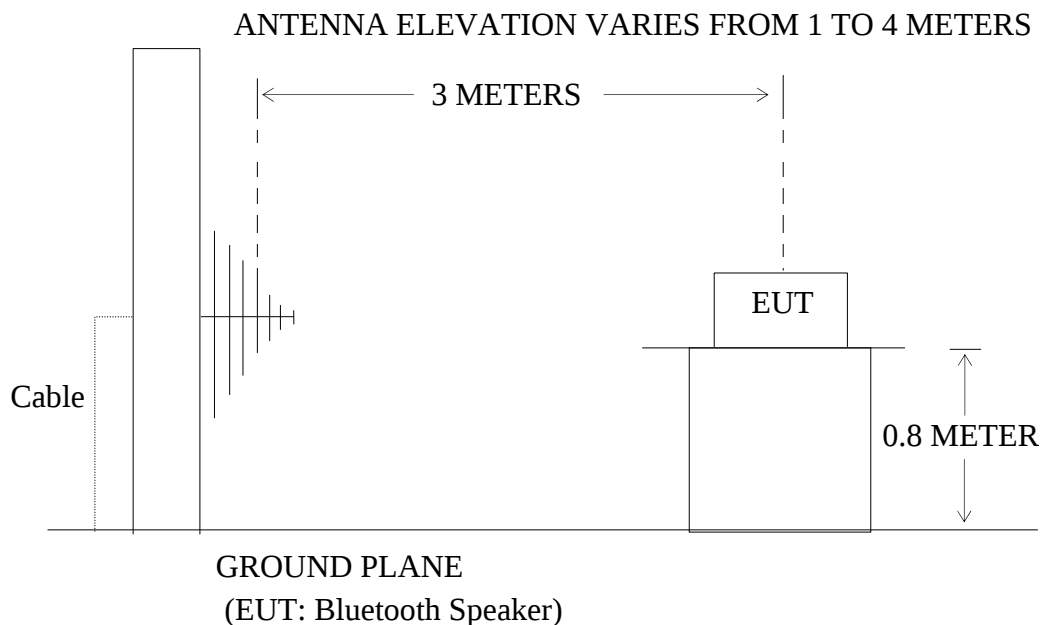
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators



(EUT: Bluetooth Speaker)

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 C63.4- 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, $\Pi/4$ -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.

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Site: 1# Chamber

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Job No.: RICKY #1198

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

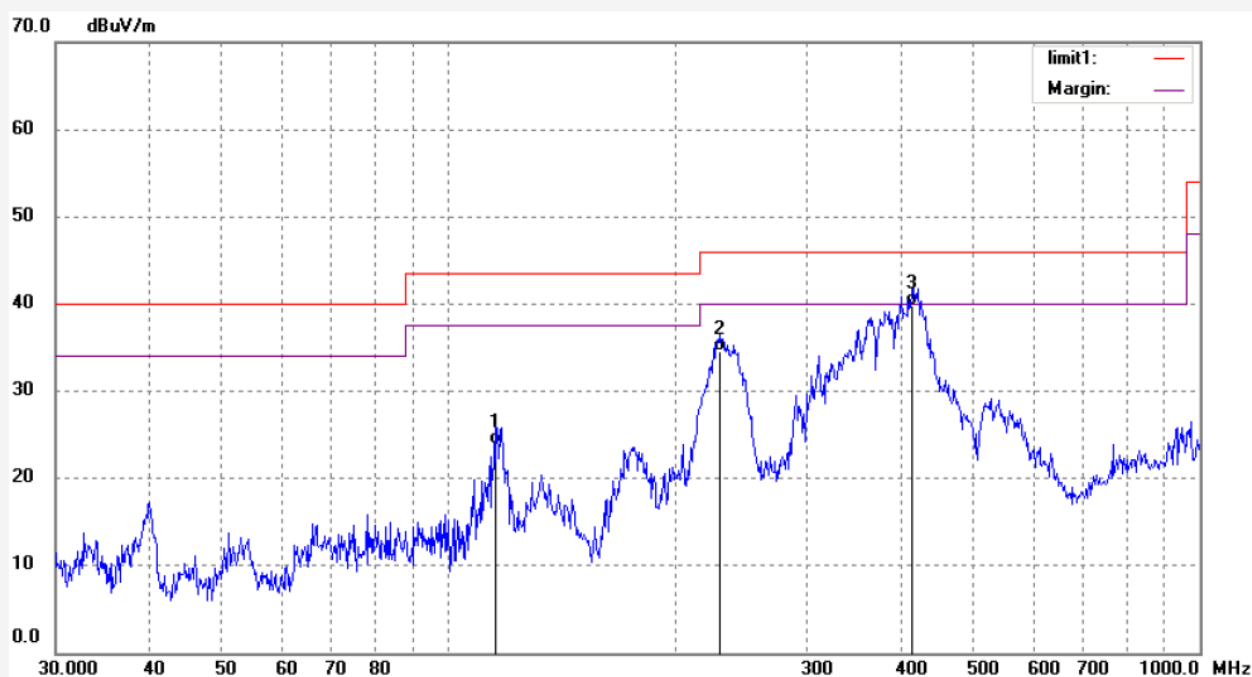
Date: 14/04/23/

Time: 9/19/18

Engineer Signature: PEI

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	115.3205	46.32	-22.35	23.97	43.50	-19.53	QP			
2	229.2931	54.43	-19.86	34.57	46.00	-11.43	QP			
3	414.7223	55.18	-15.41	39.77	46.00	-6.23	QP			



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Job No.: RICKY #1199

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

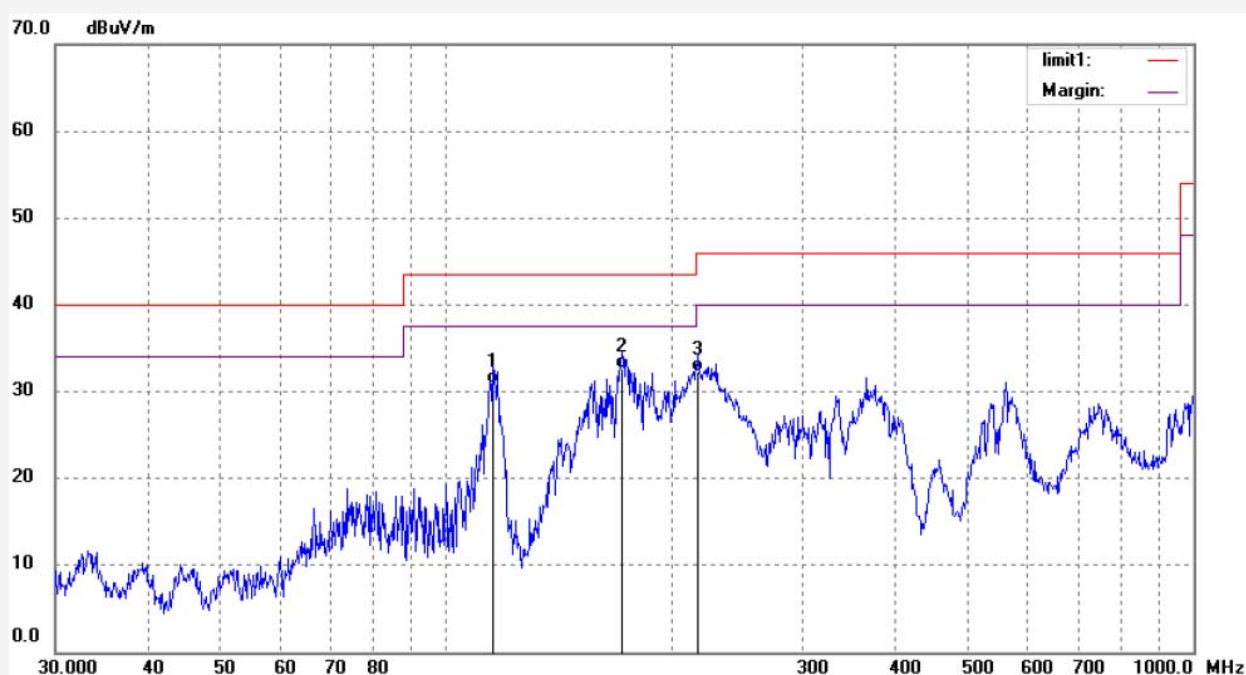
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Time: 9/20/12

Engineer Signature: PEI

Distance: 3m

Note: Report No.: ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	115.3205	53.30	-22.35	30.95	43.50	-12.55	QP			
2	171.9946	54.63	-22.01	32.62	43.50	-10.88	QP			
3	217.5443	52.28	-19.96	32.32	46.00	-13.68	QP			



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Job No.: RICKY #1200

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2441MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

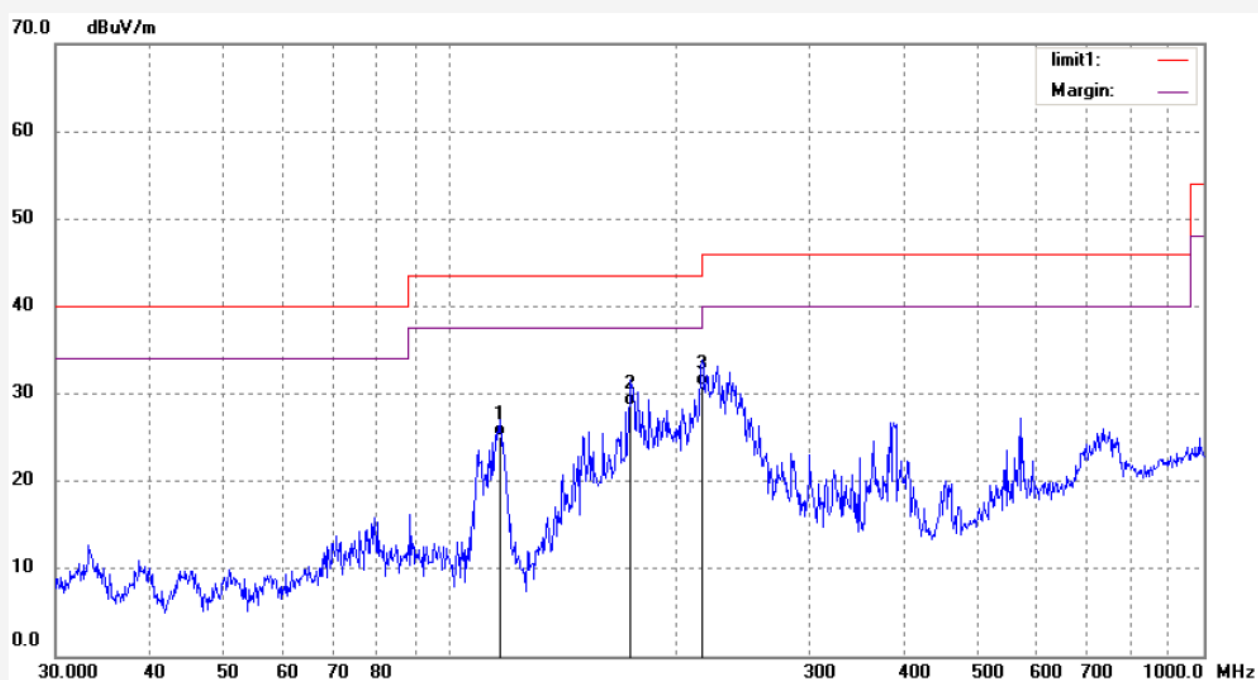
Date: 14/04/23/

Time: 9/20/49

Engineer Signature: PEI

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	116.5401	47.48	-22.40	25.08	43.50	-18.42	QP			
2	173.8135	50.81	-22.20	28.61	43.50	-14.89	QP			
3	216.0240	50.82	-19.96	30.86	46.00	-15.14	QP			



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Job No.: RICKY #1201

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2441MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

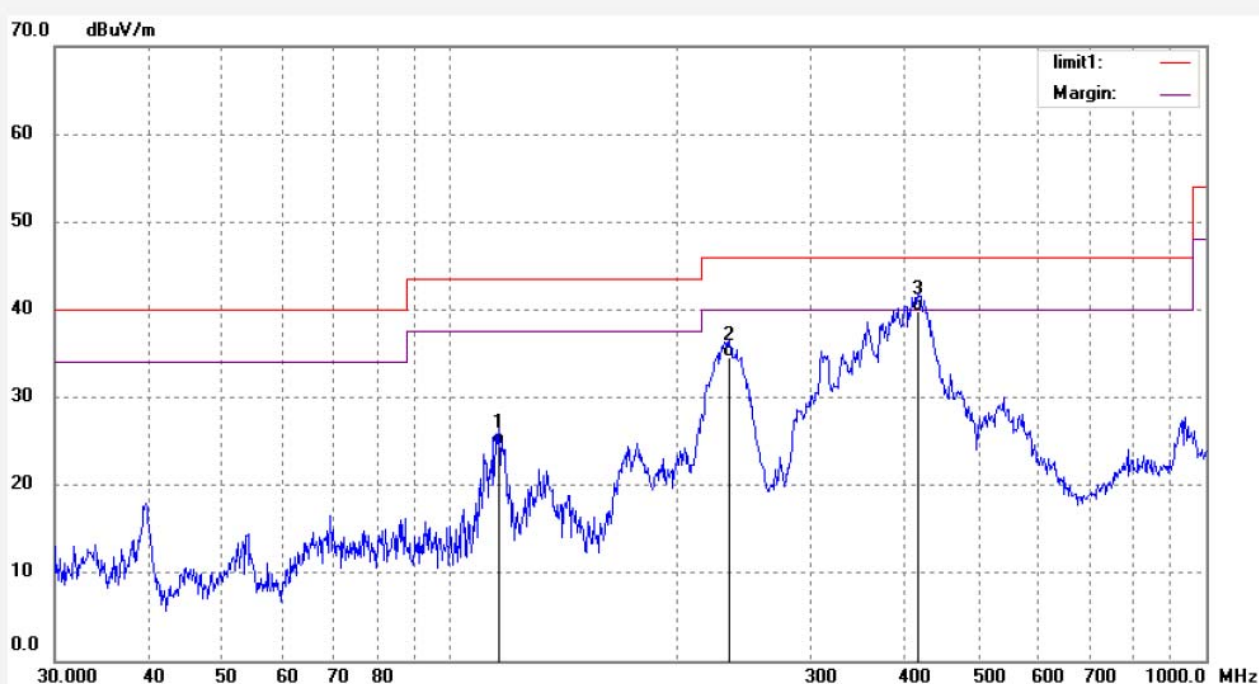
Date: 14/04/23/

Time: 9/21/26

Engineer Signature: PEI

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	116.1321	46.94	-22.39	24.55	43.50	-18.95	QP			
2	234.1684	54.37	-19.84	34.53	46.00	-11.47	QP			
3	416.1791	55.28	-15.40	39.88	46.00	-6.12	QP			



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Job No.: RICKY #1202

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2480MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

Date: 14/04/23/

Time: 9/22/05

Engineer Signature: PEI

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	116.1321	47.42	-22.39	25.03	43.50	-18.47	QP			
2	230.9068	54.78	-19.86	34.92	46.00	-11.08	QP			
3	413.2706	53.92	-15.43	38.49	46.00	-7.51	QP			



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Fax:+86-0755-26503396

Job No.: RICKY #1203

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2480MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

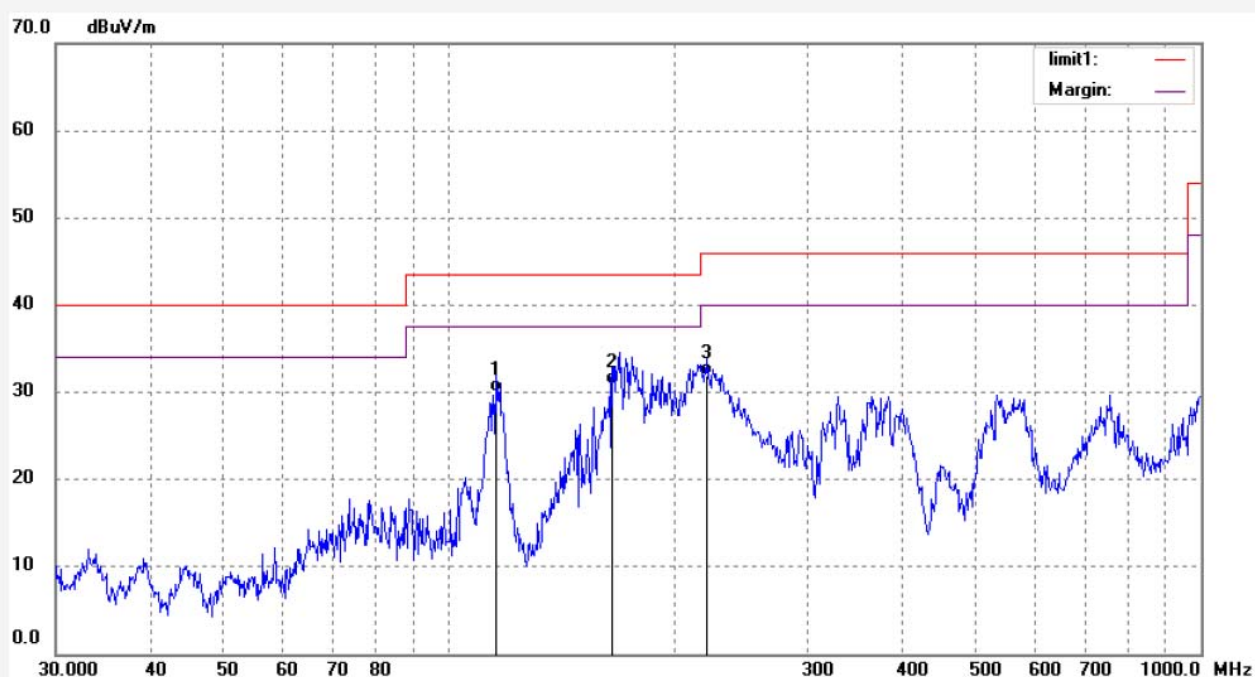
Date: 14/04/23/

Time: 9/22/48

Engineer Signature: PEI

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	115.3205	52.30	-22.35	29.95	43.50	-13.55	QP			
2	164.9075	53.24	-22.34	30.90	43.50	-12.60	QP			
3	220.6171	51.80	-19.94	31.86	46.00	-14.14	QP			



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Job No.: RICKY #1208

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

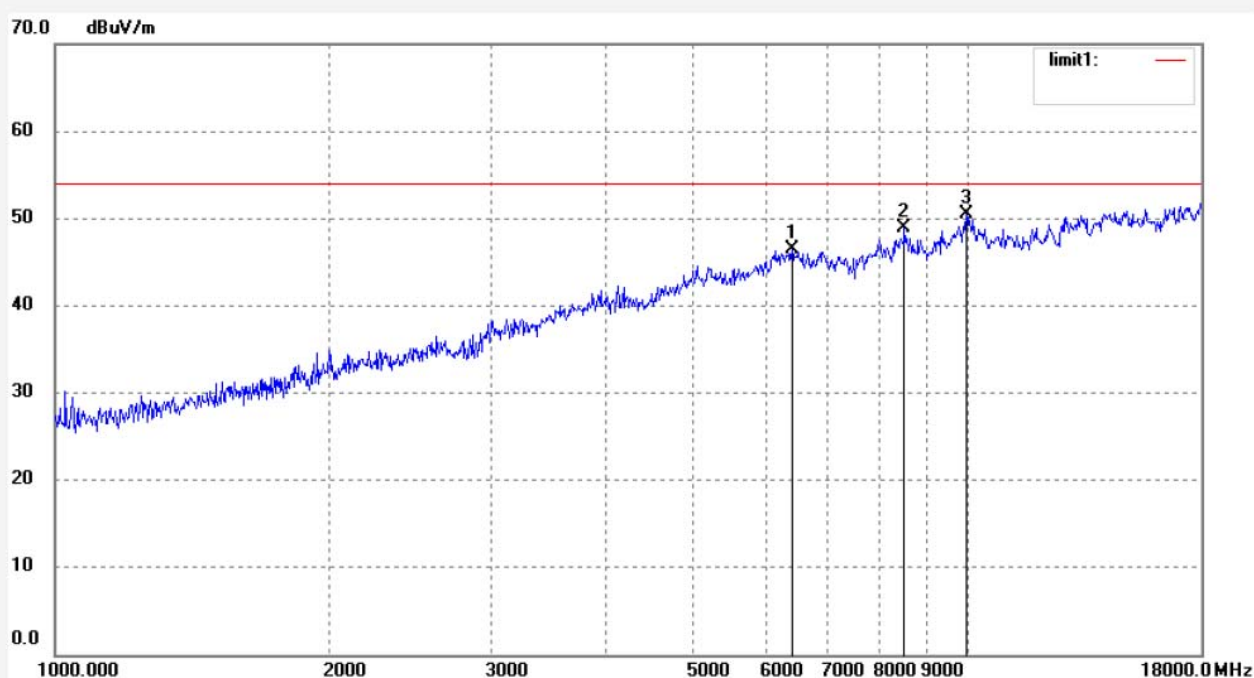
Date: 14/04/23/

Time: 10/10/07

Engineer Signature: Ricky

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6414.166	41.93	4.46	46.39	54.00	-7.61	peak			
2	8514.456	40.13	8.87	49.00	54.00	-5.00	peak			
3	9952.717	39.46	11.05	50.51	54.00	-3.49	peak			



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Job No.: RICKY #1209

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

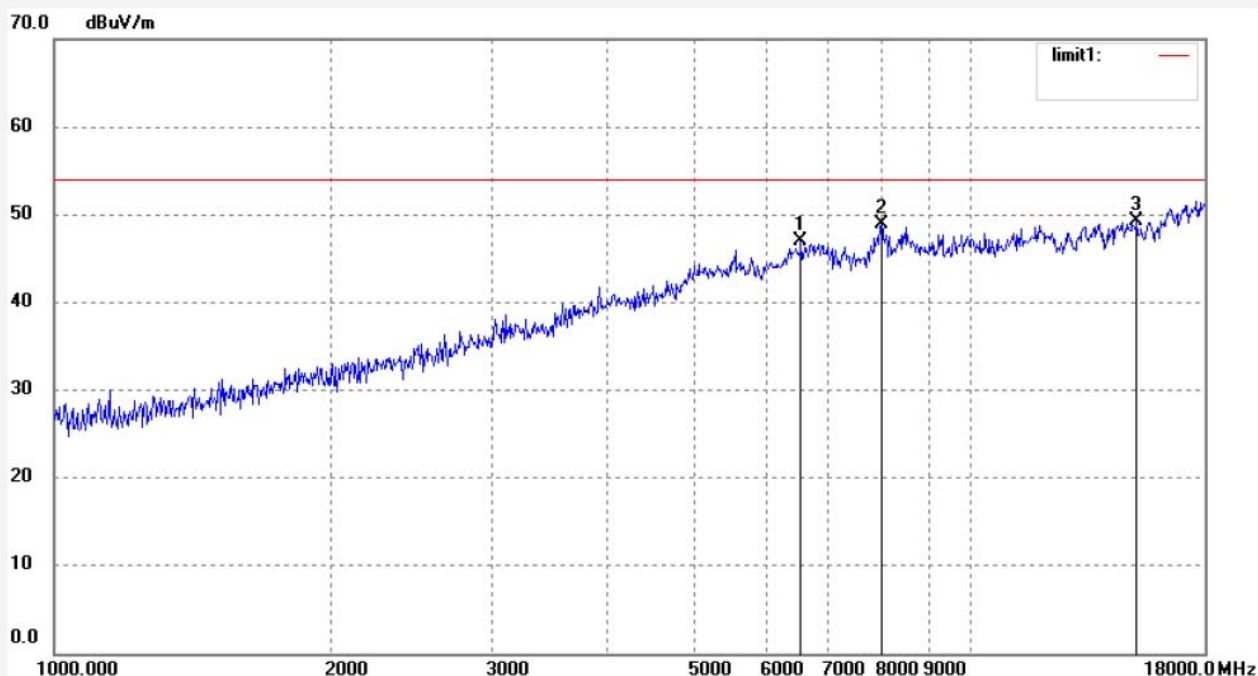
Date: 14/04/23/

Time: 10/12/10

Engineer Signature: Ricky

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6526.373	42.46	4.45	46.91	54.00	-7.09	peak			
2	7989.892	40.68	8.22	48.90	54.00	-5.10	peak			
3	15177.891	0.28	49.01	49.29	54.00	-4.71	peak			



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Job No.: RICKY #1210

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2441MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

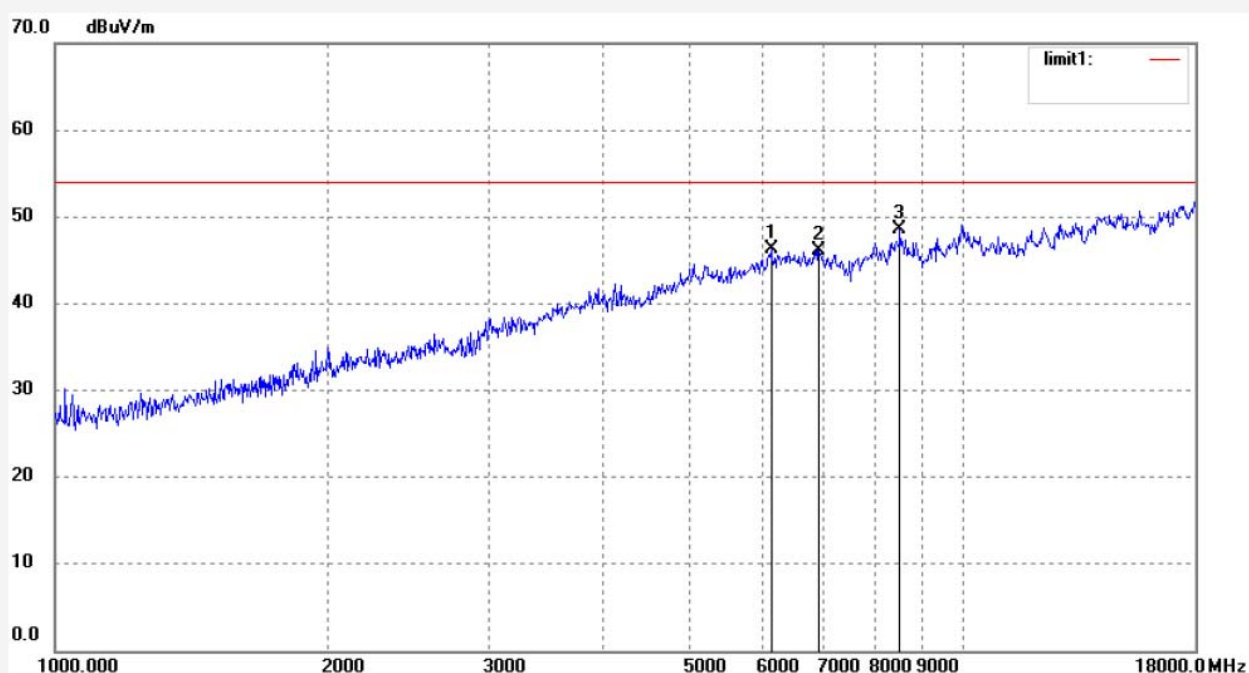
Date: 14/04/23/

Time: 10/14/25

Engineer Signature: Ricky

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	6142.019	42.68	3.56	46.24	54.00	-7.76	peak			
2	6934.778	40.65	5.48	46.13	54.00	-7.87	peak			
3	8514.456	39.63	8.87	48.50	54.00	-5.50	peak			



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Job No.: RICKY #1211

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2441MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

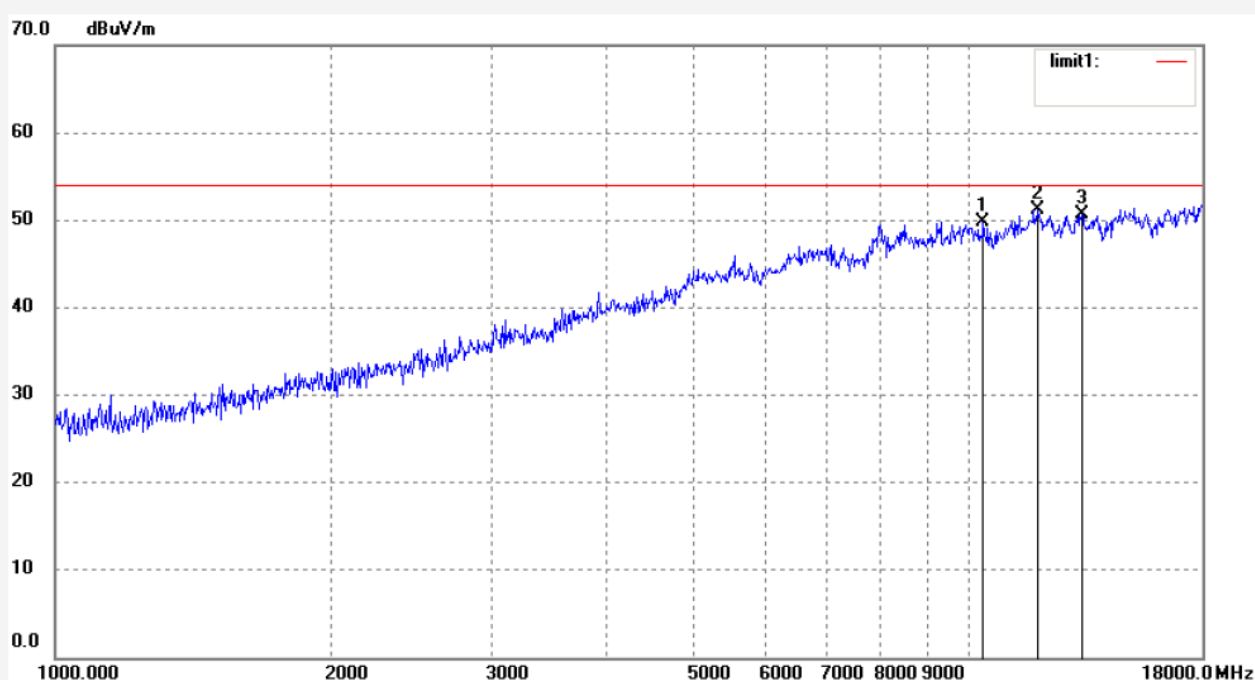
Date: 14/04/23/

Time: 10/17/33

Engineer Signature: Ricky

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	10363.715	39.60	10.20	49.80	54.00	-4.20	peak			
2	11871.710	38.37	12.84	51.21	54.00	-2.79	peak			
3	13288.284	3.94	46.64	50.58	54.00	-3.42	peak			



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Job No.: RICKY #1212

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Bluetooth

Mode: TX 2480MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

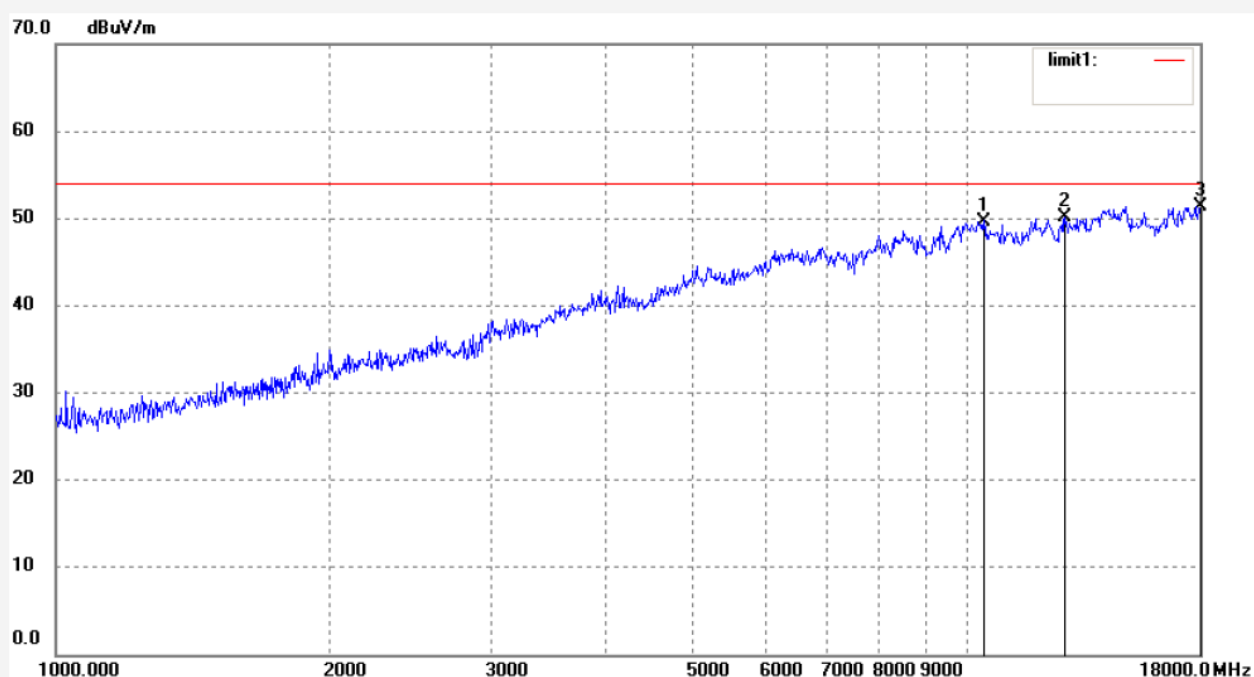
Date: 14/04/23/

Time: 10/19/34

Engineer Signature: Ricky

Distance: 3m

Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	10423.798	39.61	10.09	49.70	54.00	-4.30	peak			
2	12798.243	4.21	45.88	50.09	54.00	-3.91	peak			
3	18000.000	-0.18	51.60	51.42	54.00	-2.58	peak			



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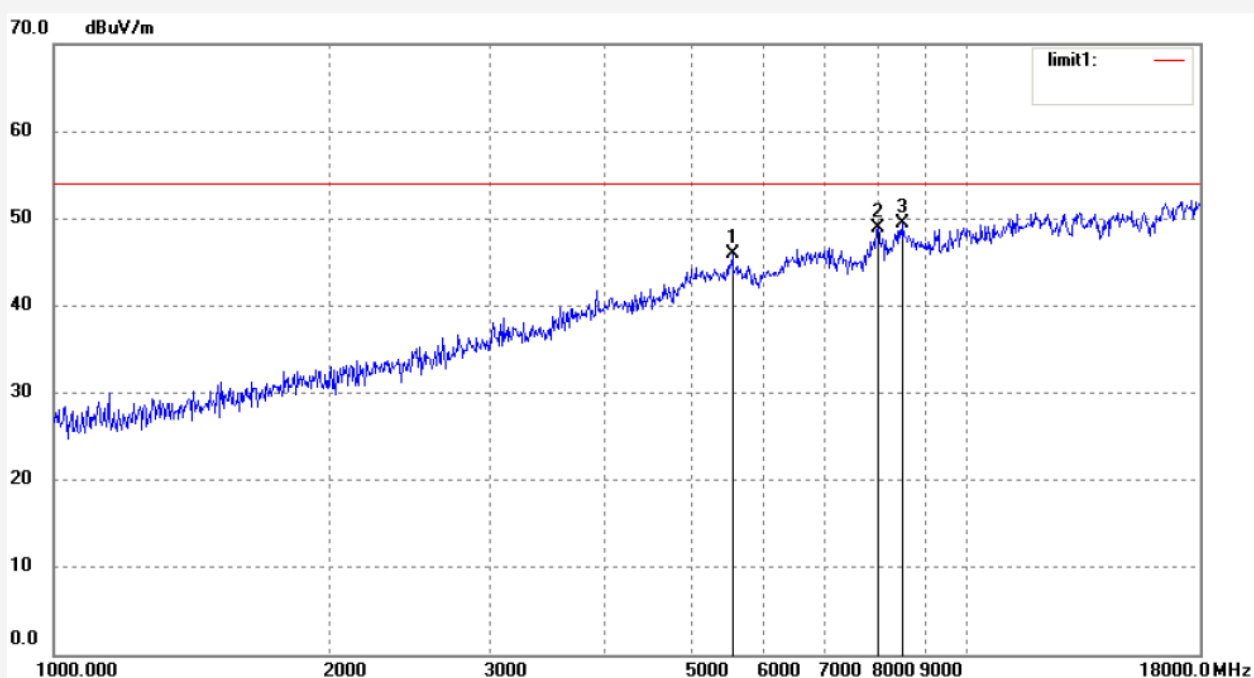
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Site: 1# Chamber
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Fax:+86-0755-26503396

Job No.: RICKY #1213
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Bluetooth
Mode: TX 2480MHz
Model: BC229F
Manufacturer: SKY DRAGON

Polarization: Vertical
Power Source: DC 3.7V
Date: 14/04/23/
Time: 10/21/50
Engineer Signature: Ricky
Distance: 3m

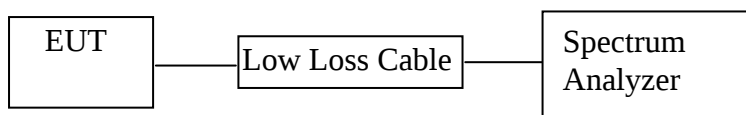
Note: Report No.:ATE20140603



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	5535.047	43.70	2.26	45.96	54.00	-8.04	peak			
2	7989.892	40.68	8.22	48.90	54.00	-5.10	peak			
3	8514.456	40.64	8.87	49.51	54.00	-4.49	peak			

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Bluetooth 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

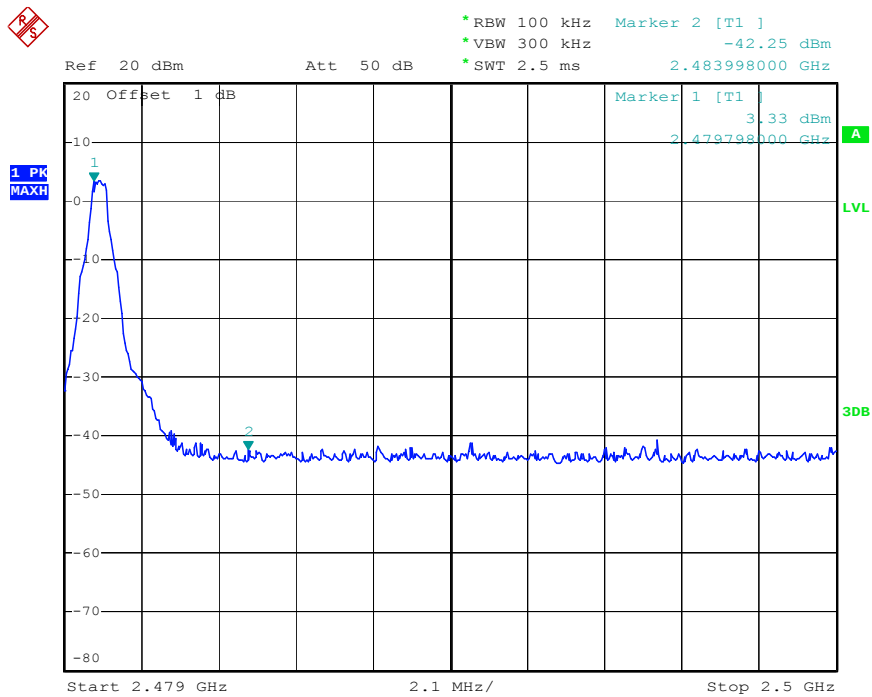
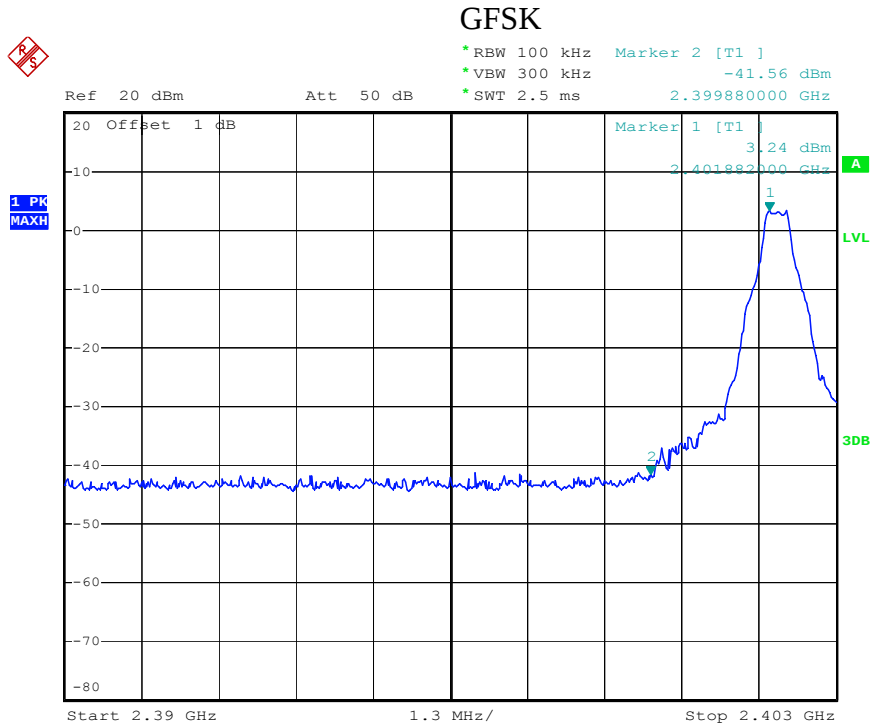
11.5.1. The transmitter output was connected to the spectrum analyzer via a low loss cable.

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.

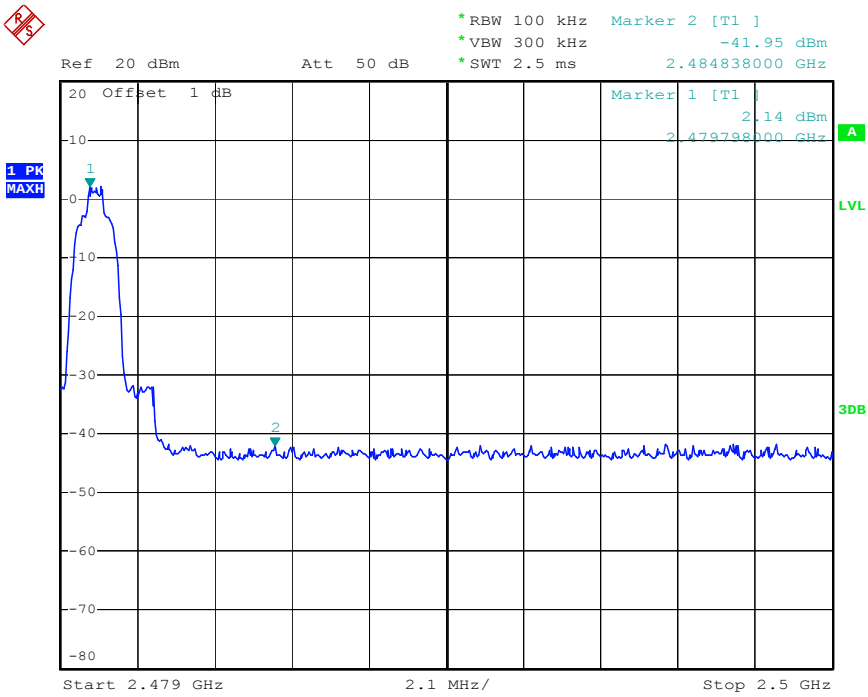
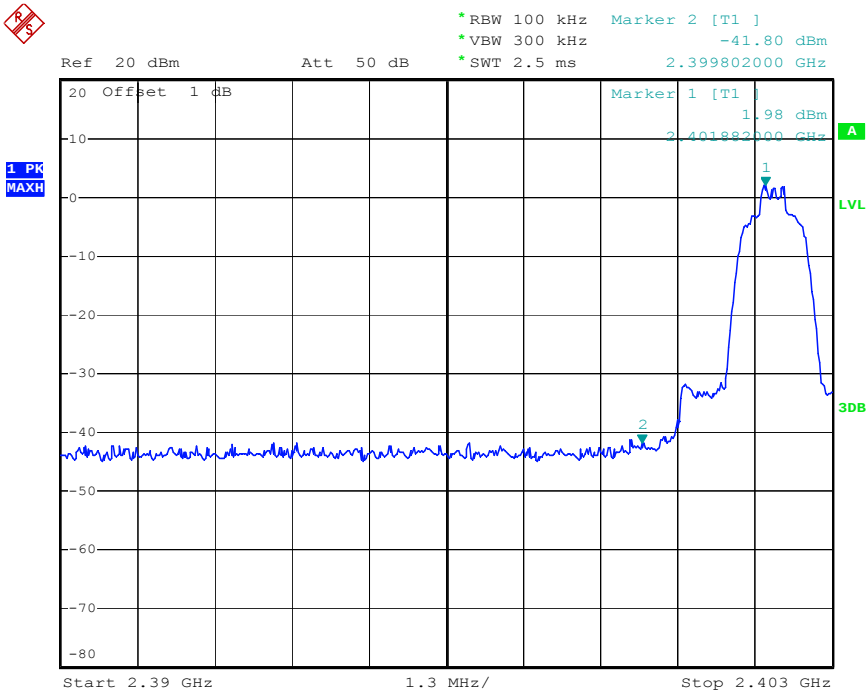
11.5.3. The band edges was measured and recorded.

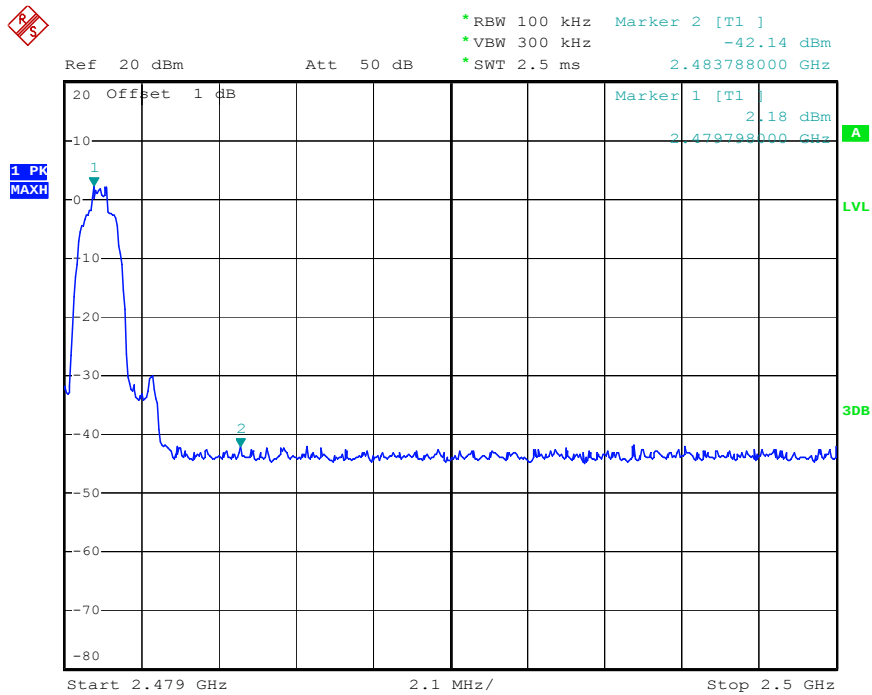
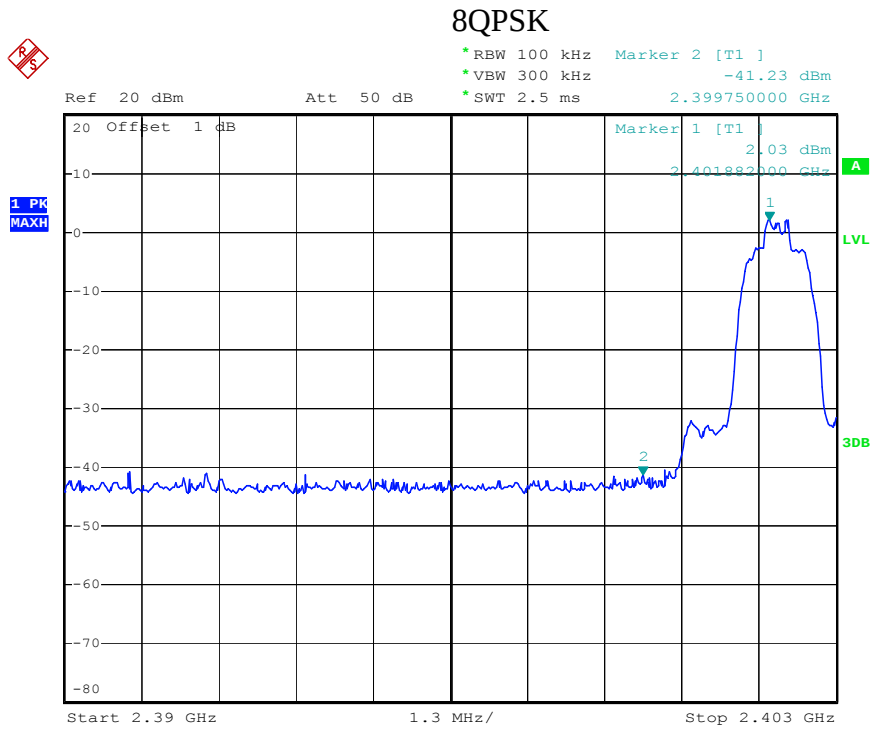
11.6. Test Result

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



$\Pi/4$ -DQPSK Mode





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



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Job No.: star #3970

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

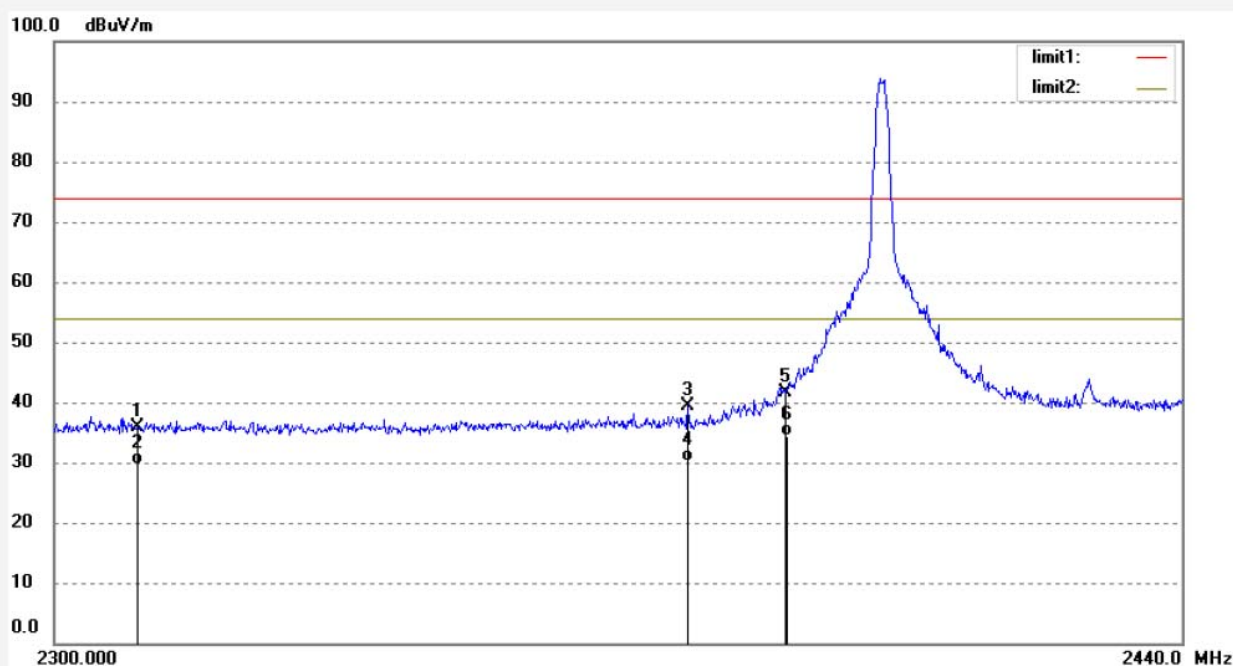
Date: 14/04/23/

Time: 9/04/16

Engineer Signature:

Distance: 3m

Note: Report No.: ATE20140603



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	42.93	-6.99	35.94	74.00	-38.06	peak			
2	2310.000	36.50	-6.99	29.51	54.00	-24.49	AVG			
3	2377.700	46.18	-6.82	39.36	74.00	-34.64	peak			
4	2377.700	37.00	-6.82	30.18	54.00	-23.82	AVG			
5	2390.000	48.37	-6.78	41.59	74.00	-32.41	peak			
6	2390.000	41.27	-6.78	34.49	54.00	-19.51	AVG			



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Fax:+86-0755-26503396

Job No.: star #3971

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

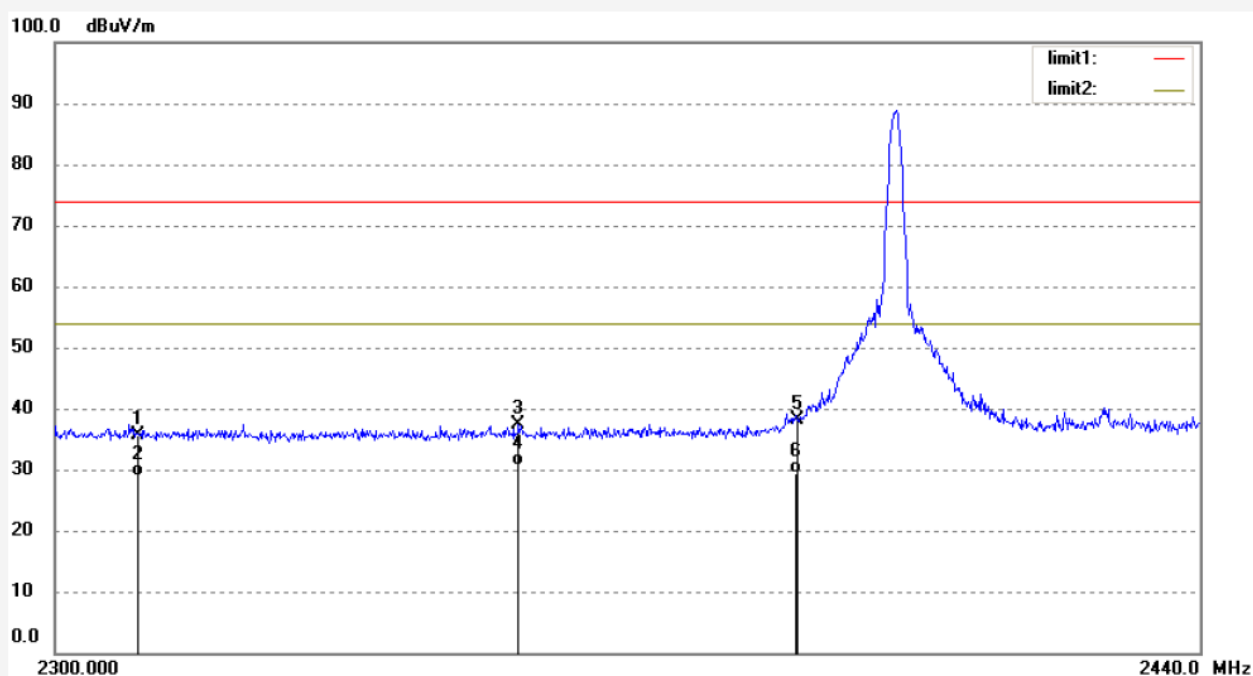
Date: 14/04/23/

Time: 9/08/49

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	42.73	-6.99	35.74	74.00	-38.26	peak			
2	2310.000	35.97	-6.99	28.98	54.00	-25.02	AVG			
3	2355.720	44.18	-6.88	37.30	74.00	-36.70	peak			
4	2355.720	37.50	-6.88	30.62	54.00	-23.38	AVG			
5	2390.000	44.99	-6.78	38.21	74.00	-35.79	peak			
6	2390.000	36.18	-6.78	29.40	54.00	-24.60	AVG			



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Job No.: star #3964

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

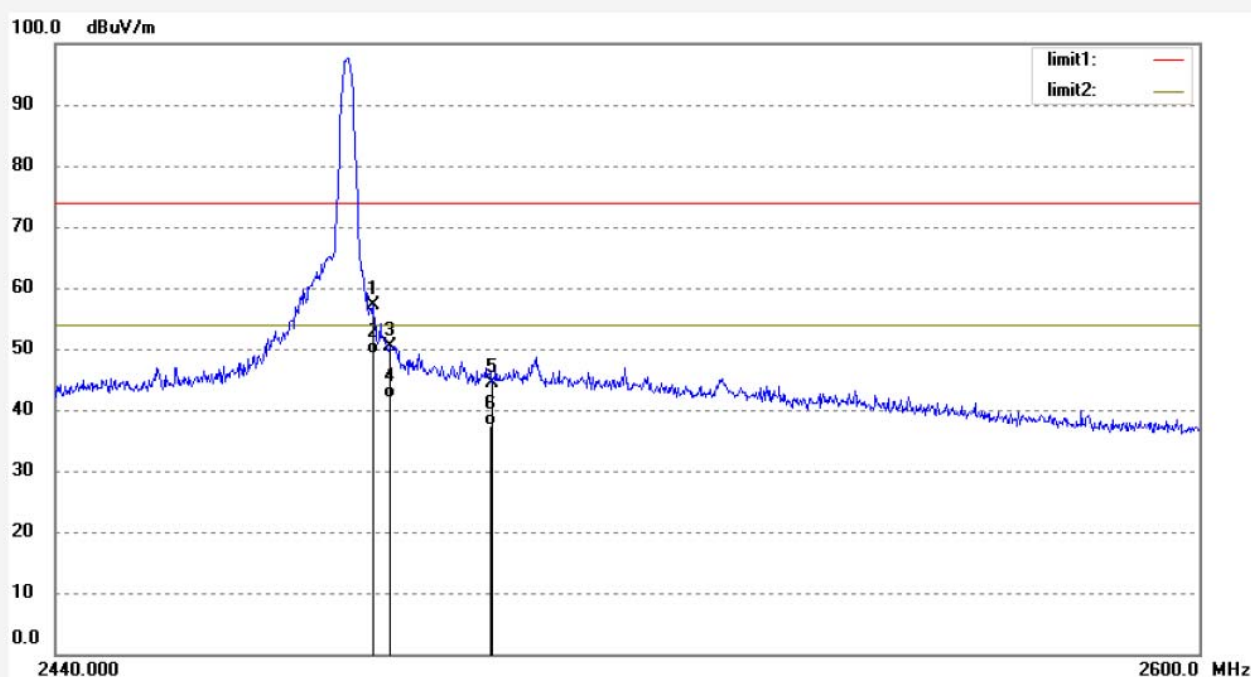
Date: 14/04/23/

Time: 8/55/04

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	63.79	-6.54	57.25	74.00	-16.75	peak			
2	2483.500	55.67	-6.54	49.13	54.00	-4.87	AVG			
3	2485.920	56.88	-6.54	50.34	74.00	-23.66	peak			
4	2485.920	48.34	-6.54	41.80	54.00	-12.20	AVG			
5	2500.000	50.79	-6.50	44.29	74.00	-29.71	peak			
6	2500.000	43.80	-6.50	37.30	54.00	-16.70	AVG			



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Job No.: star #3965

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

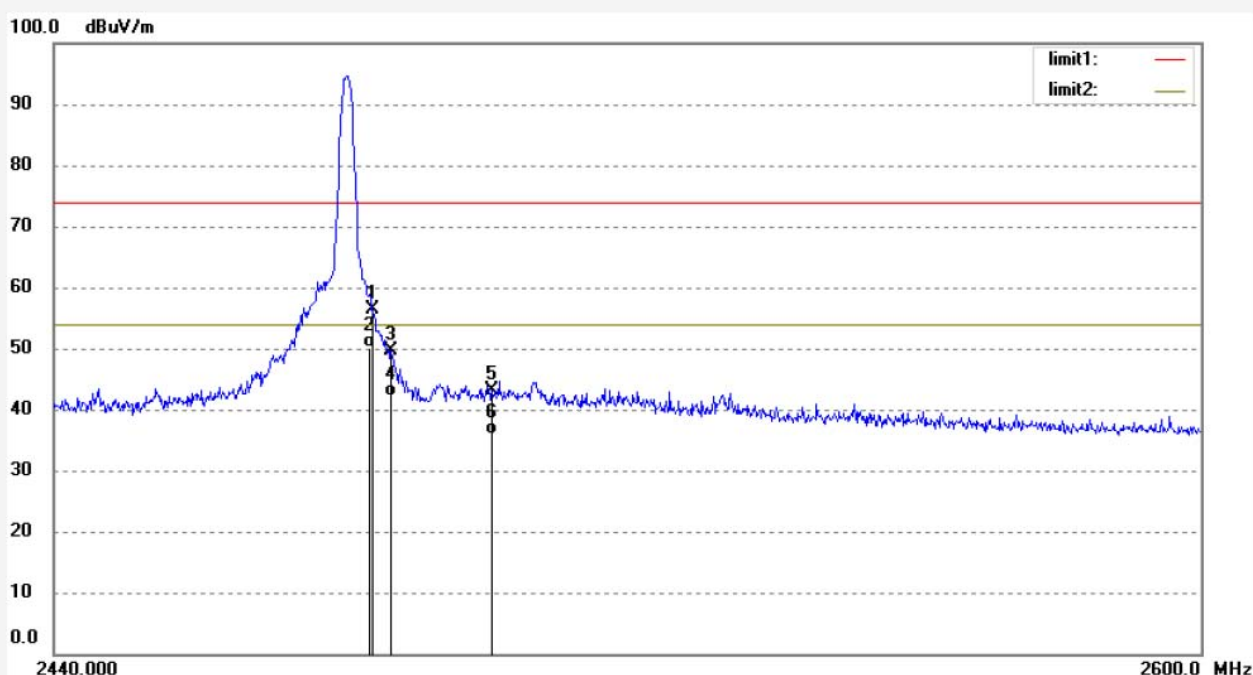
Date: 14/04/23/

Time: 8/57/34

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	63.02	-6.54	56.48	74.00	-17.52	peak			
2	2483.500	56.71	-6.54	50.17	54.00	-3.83	AVG			
3	2486.080	56.29	-6.54	49.75	74.00	-24.25	peak			
4	2486.080	48.67	-6.54	42.13	54.00	-11.87	AVG			
5	2500.000	49.62	-6.50	43.12	74.00	-30.88	peak			
6	2500.000	42.37	-6.50	35.87	54.00	-18.13	AVG			



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Job No.: star #3974

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz(PI/4DQPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

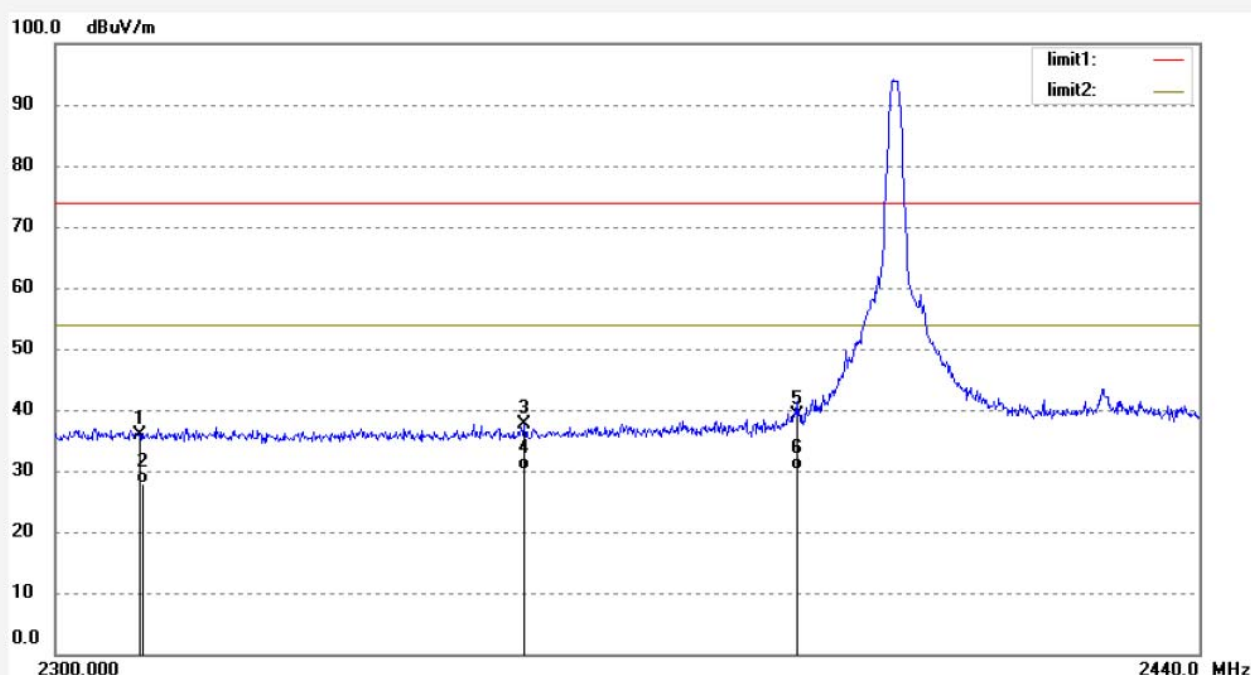
Date: 14/04/23/

Time: 9/06/06

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	42.78	-6.99	35.79	74.00	-38.21	peak			
2	2310.000	34.80	-6.99	27.81	54.00	-26.19	AVG			
3	2356.420	44.54	-6.87	37.67	74.00	-36.33	peak			
4	2356.420	36.99	-6.87	30.12	54.00	-23.88	AVG			
5	2390.000	45.90	-6.78	39.12	74.00	-34.88	peak			
6	2390.000	36.93	-6.78	30.15	54.00	-23.85	AVG			



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Job No.: star #3975

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz(PI/4DQPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

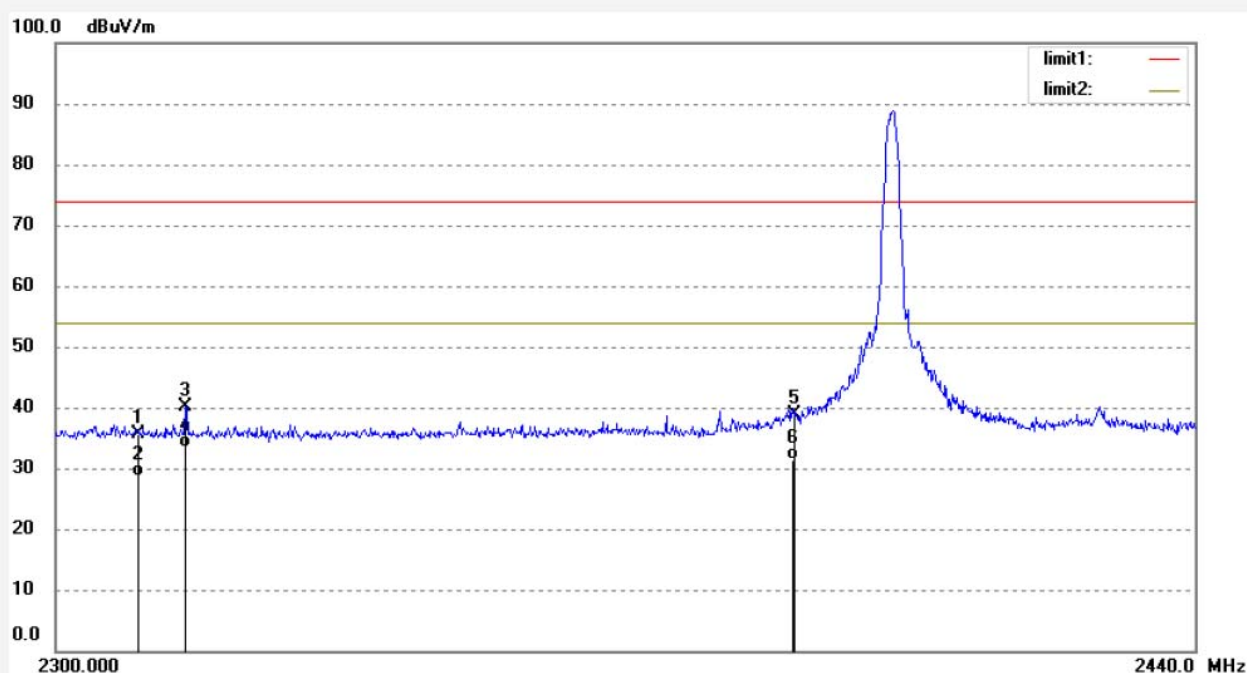
Date: 14/04/23/

Time: 9/07/56

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	42.74	-6.99	35.75	74.00	-38.25	peak			
2	2310.000	35.64	-6.99	28.65	54.00	-25.35	AVG			
3	2315.680	47.04	-6.97	40.07	74.00	-33.93	peak			
4	2315.680	40.30	-6.97	33.33	54.00	-20.67	AVG			
5	2390.000	45.57	-6.78	38.79	74.00	-35.21	peak			
6	2390.000	38.10	-6.78	31.32	54.00	-22.68	AVG			



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Job No.: star #3968

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz(PI/4DQPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

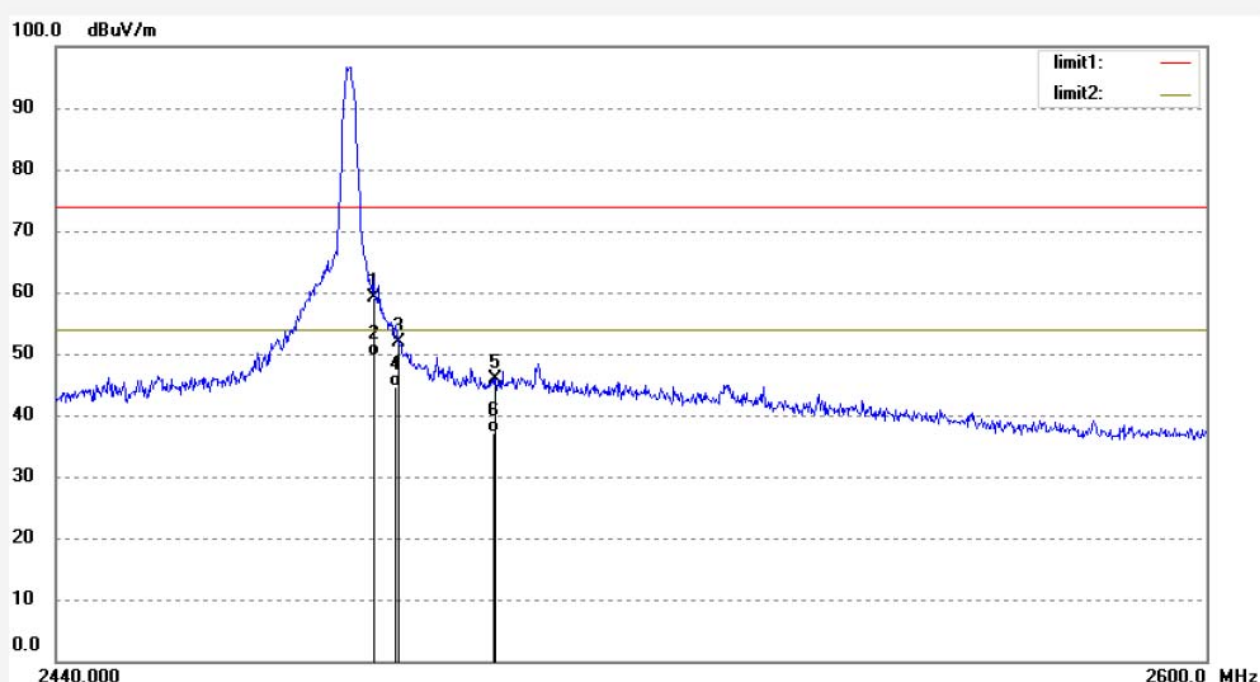
Date: 14/04/23/

Time: 8/56/20

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	65.77	-6.54	59.23	74.00	-14.77	peak			
2	2483.500	56.24	-6.54	49.70	54.00	-4.30	AVG			
3	2486.720	58.34	-6.53	51.81	74.00	-22.19	peak			
4	2486.720	51.22	-6.53	44.69	54.00	-9.31	AVG			
5	2500.000	52.40	-6.50	45.90	74.00	-28.10	peak			
6	2500.000	43.55	-6.50	37.05	54.00	-16.95	AVG			



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Job No.: star #3969

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz(PI/4DQPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

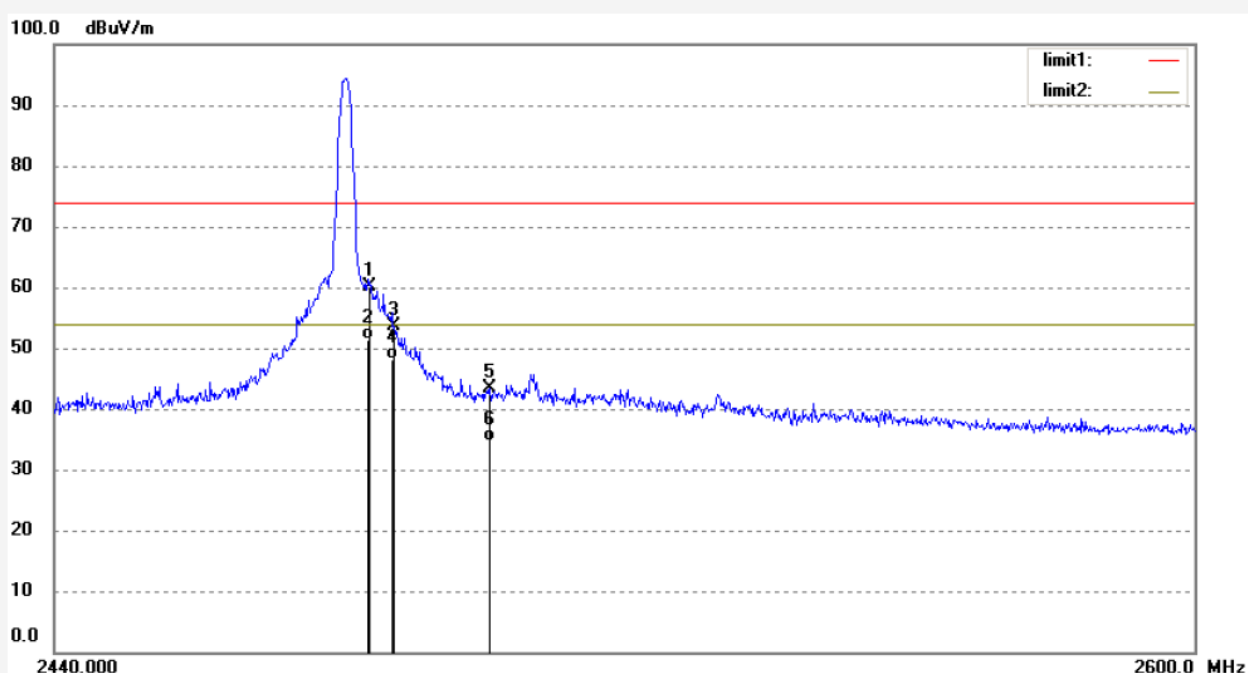
Date: 14/04/23/

Time: 8/58/07

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	66.66	-6.54	60.12	74.00	-13.88	peak			
2	2483.500	57.88	-6.54	51.34	54.00	-2.66	AVG			
3	2486.720	60.19	-6.53	53.66	74.00	-20.34	peak			
4	2486.720	54.57	-6.53	48.04	54.00	-5.96	AVG			
5	2500.000	49.84	-6.50	43.34	74.00	-30.66	peak			
6	2500.000	41.24	-6.50	34.74	54.00	-19.26	AVG			



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Job No.: star #3972

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz(8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

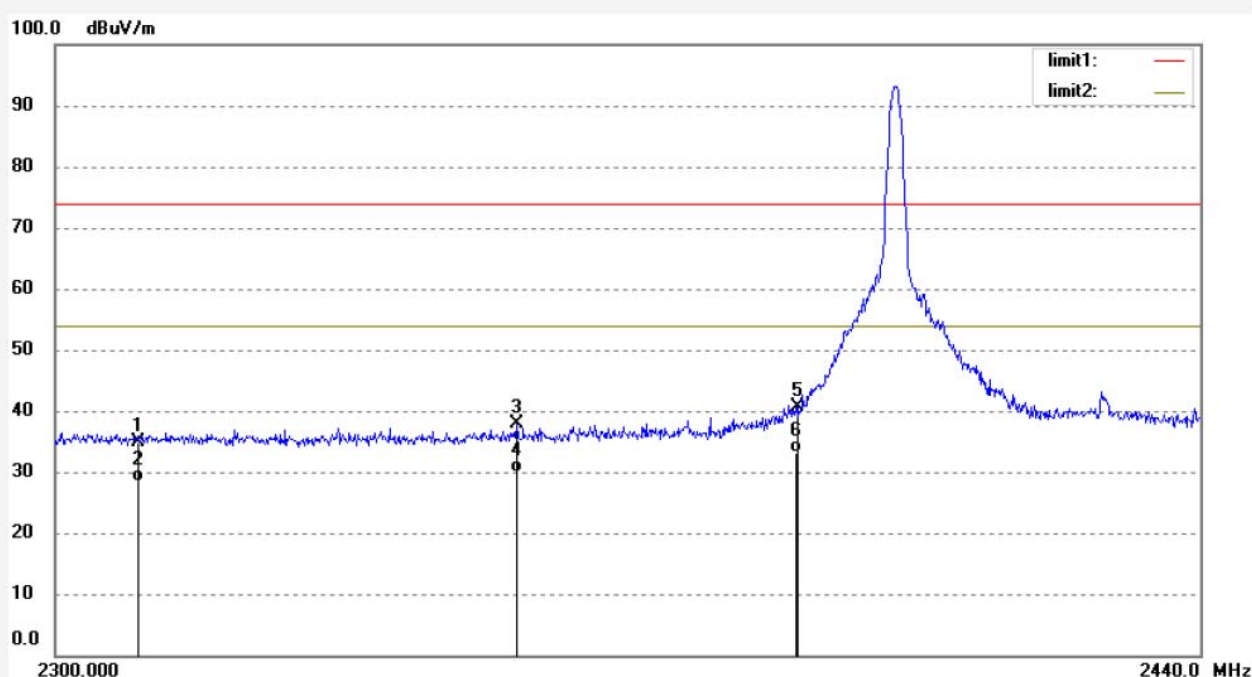
Date: 14/04/23/

Time: 9/05/22

Engineer Signature:

Distance: 3m

Note: Report No.: ATE20140603



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	41.95	-6.99	34.96	74.00	-39.04	peak			
2	2310.000	35.40	-6.99	28.41	54.00	-25.59	AVG			
3	2355.440	44.66	-6.88	37.78	74.00	-36.22	peak			
4	2355.440	36.88	-6.88	30.00	54.00	-24.00	AVG			
5	2390.000	47.31	-6.78	40.53	74.00	-33.47	peak			
6	2390.000	40.00	-6.78	33.22	54.00	-20.78	AVG			



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Job No.: star #3973

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2402MHz(8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

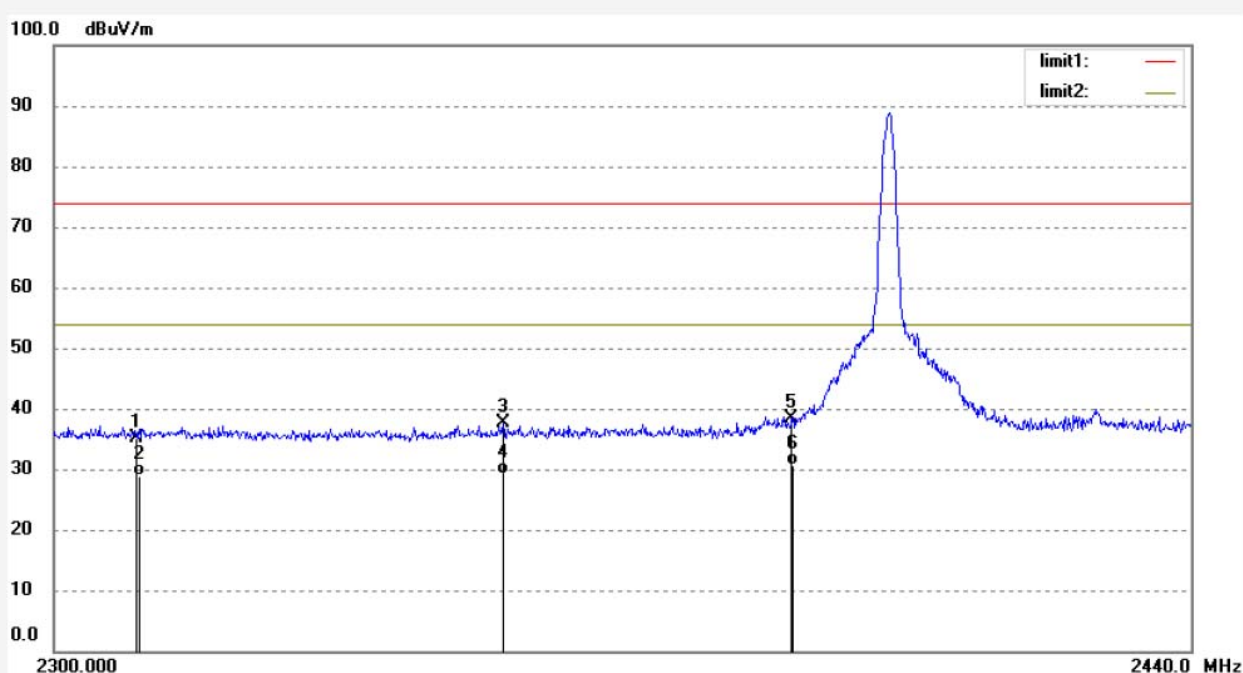
Date: 14/04/23/

Time: 9/07/10

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	42.15	-6.99	35.16	74.00	-38.84	peak			
2	2310.000	35.82	-6.99	28.83	54.00	-25.17	AVG			
3	2354.320	44.42	-6.88	37.54	74.00	-36.46	peak			
4	2354.320	35.97	-6.88	29.09	54.00	-24.91	AVG			
5	2390.000	45.22	-6.78	38.44	74.00	-35.56	peak			
6	2390.000	37.37	-6.78	30.59	54.00	-23.41	AVG			



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Job No.: star #3966

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz(8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

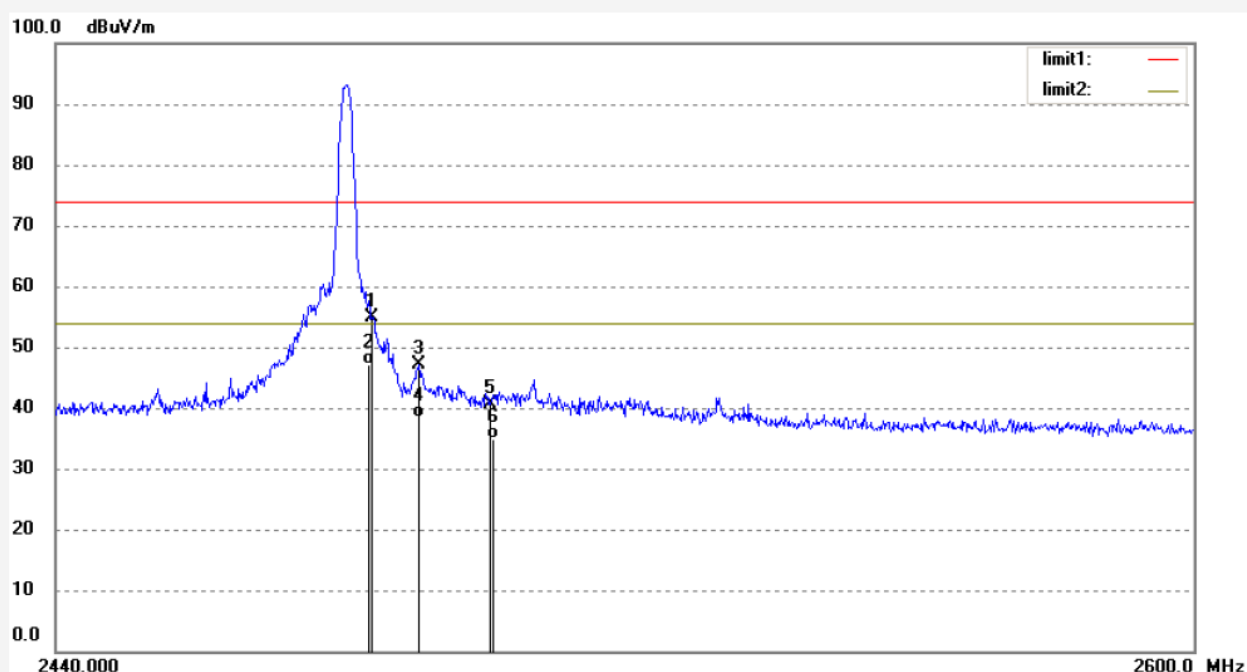
Date: 14/04/23/

Time: 8/58/59

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	61.31	-6.54	54.77	74.00	-19.23	peak			
2	2483.500	53.57	-6.54	47.03	54.00	-6.97	AVG			
3	2490.080	53.58	-6.52	47.06	74.00	-26.94	peak			
4	2490.080	44.85	-6.52	38.33	54.00	-15.67	AVG			
5	2500.000	47.02	-6.50	40.52	74.00	-33.48	peak			
6	2500.000	41.28	-6.50	34.78	54.00	-19.22	AVG			



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Job No.: star #3967

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: TX 2480MHz(8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

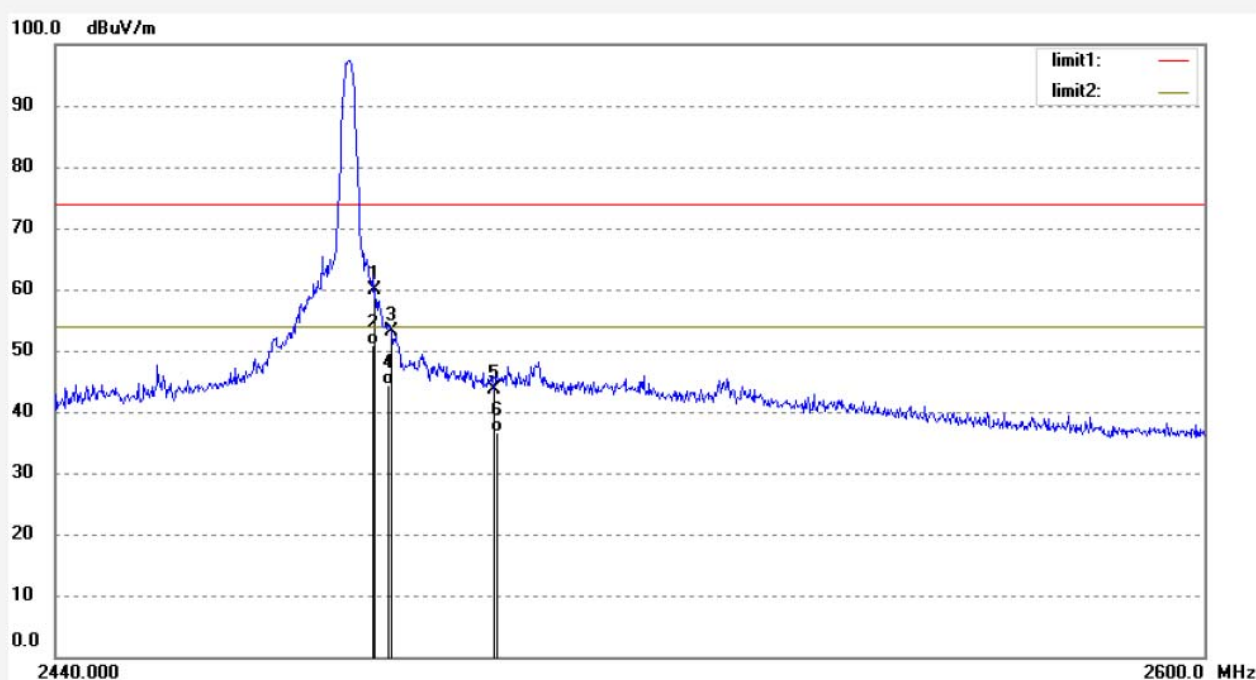
Date: 14/04/23/

Time: 8/59/53

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	66.37	-6.54	59.83	74.00	-14.17	peak			
2	2483.500	57.50	-6.54	50.96	54.00	-3.04	AVG			
3	2485.920	59.69	-6.54	53.15	74.00	-20.85	peak			
4	2485.920	50.87	-6.54	44.33	54.00	-9.67	AVG			
5	2500.000	50.10	-6.50	43.60	74.00	-30.40	peak			
6	2500.000	43.20	-6.50	36.70	54.00	-17.30	AVG			

Hopping mode



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Job No.: star #3976

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: HOPPING (GFSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

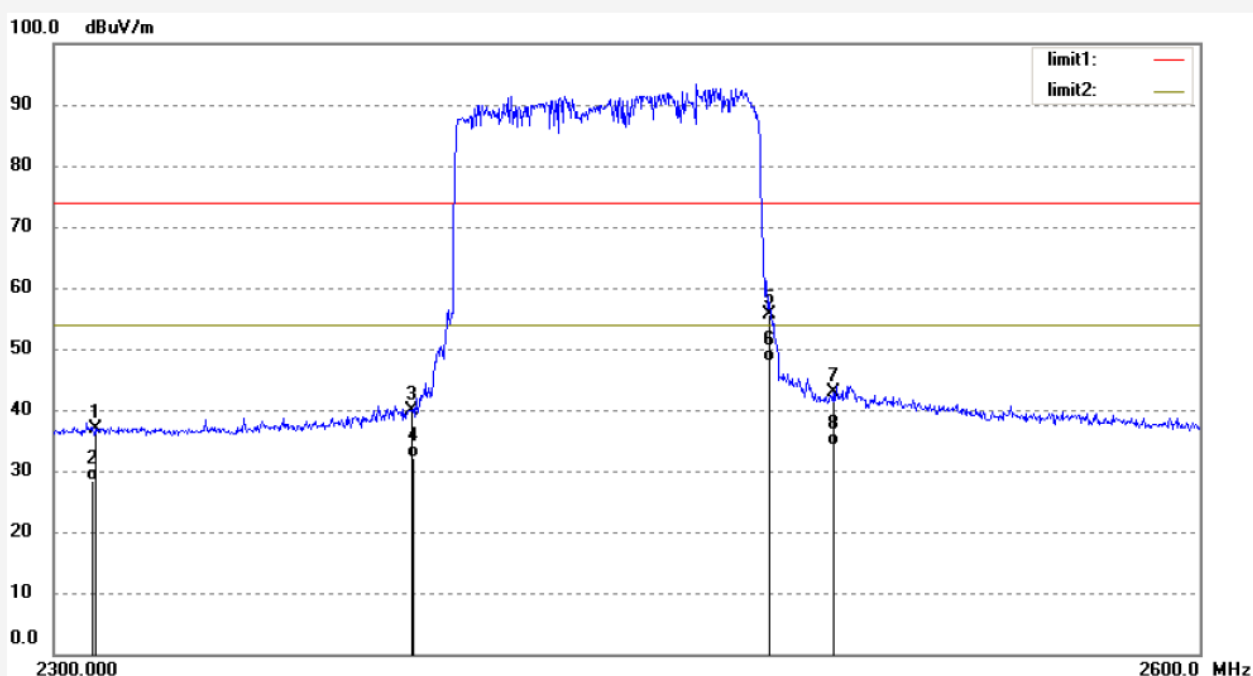
Date: 14/04/23/

Time: 9/18/04

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	43.82	-6.99	36.83	74.00	-37.17	peak			
2	2310.000	35.28	-6.99	28.29	54.00	-25.71	AVG			
3	2390.000	46.66	-6.78	39.88	74.00	-34.12	peak			
4	2390.000	38.90	-6.78	32.12	54.00	-21.88	AVG			
5	2483.500	62.21	-6.54	55.67	74.00	-18.33	peak			
6	2483.500	54.32	-6.54	47.78	54.00	-6.22	AVG			
7	2500.000	49.28	-6.50	42.78	74.00	-31.22	peak			
8	2500.000	40.58	-6.50	34.08	54.00	-19.92	AVG			



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Job No.: star #3977

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: HOPPING (GFSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

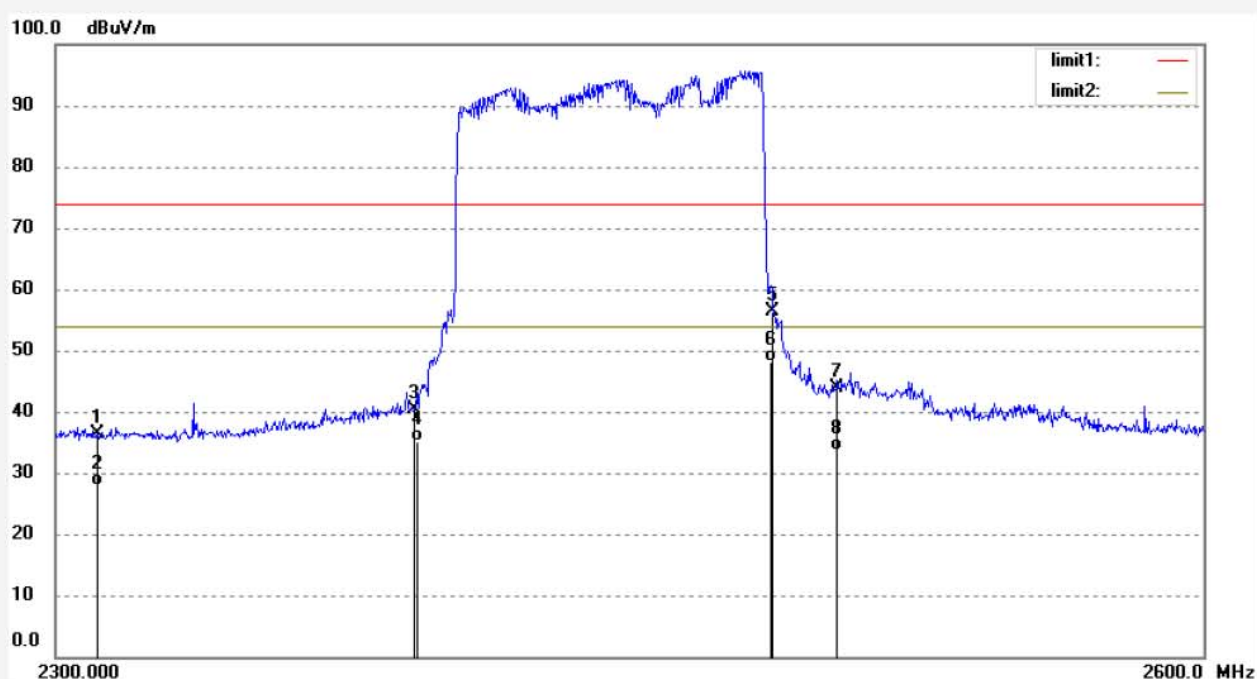
Date: 14/04/23/

Time: 9/20/41

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	43.47	-6.99	36.48	74.00	-37.52	peak			
2	2310.000	34.92	-6.99	27.93	54.00	-26.07	AVG			
3	2390.000	47.25	-6.78	40.47	74.00	-33.53	peak			
4	2390.000	41.92	-6.78	35.14	54.00	-18.86	AVG			
5	2483.500	62.88	-6.54	56.34	74.00	-17.66	peak			
6	2483.500	54.71	-6.54	48.17	54.00	-5.83	AVG			
7	2500.000	50.35	-6.50	43.85	74.00	-30.15	peak			
8	2500.000	40.21	-6.50	33.71	54.00	-20.29	AVG			



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Job No.: star #3979

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: HOPPING(PI/4DQPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

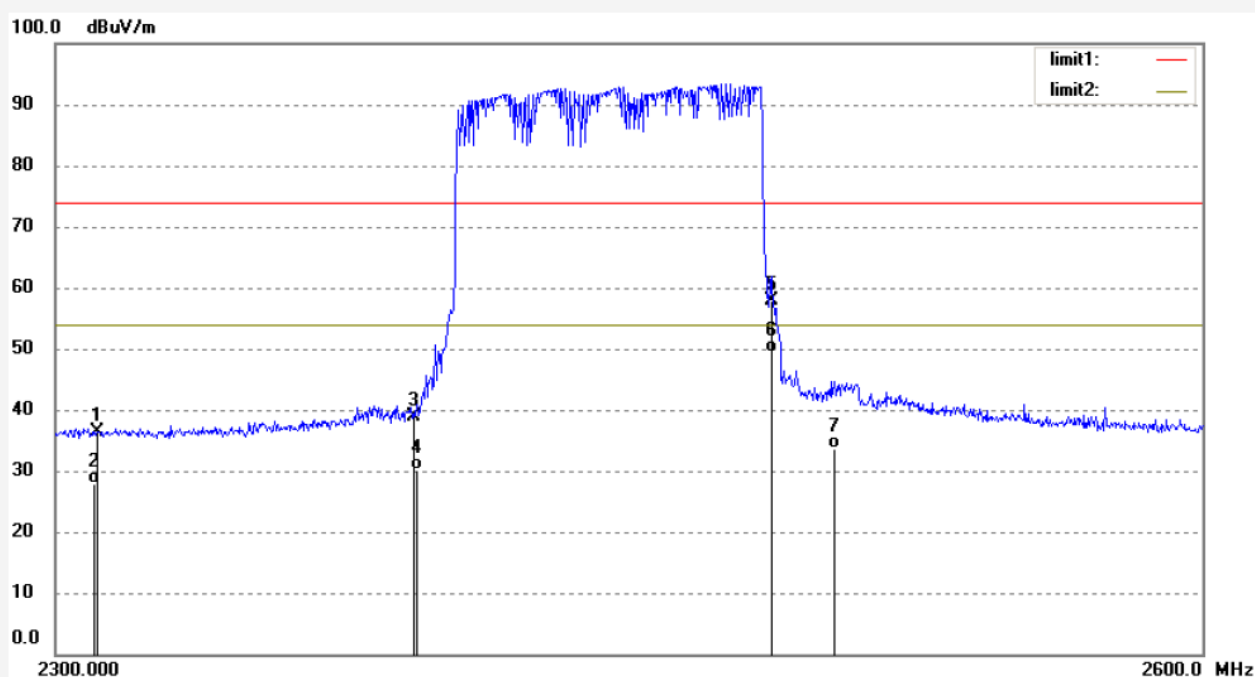
Date: 14/04/23/

Time: 9/25/53

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	43.42	-6.99	36.43	74.00	-37.57	peak			
2	2310.000	34.75	-6.99	27.76	54.00	-26.24	AVG			
3	2390.000	45.67	-6.78	38.89	74.00	-35.11	peak			
4	2390.000	36.82	-6.78	30.04	54.00	-23.96	AVG			
5	2483.500	64.54	-6.54	58.00	74.00	-16.00	peak			
6	2483.500	55.91	-6.54	49.37	54.00	-4.63	AVG			
7	2500.000	40.20	-6.50	33.70	54.00	-20.30	AVG			



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Job No.: star #3980

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: HOPPING (8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Horizontal

Power Source: DC 3.7V

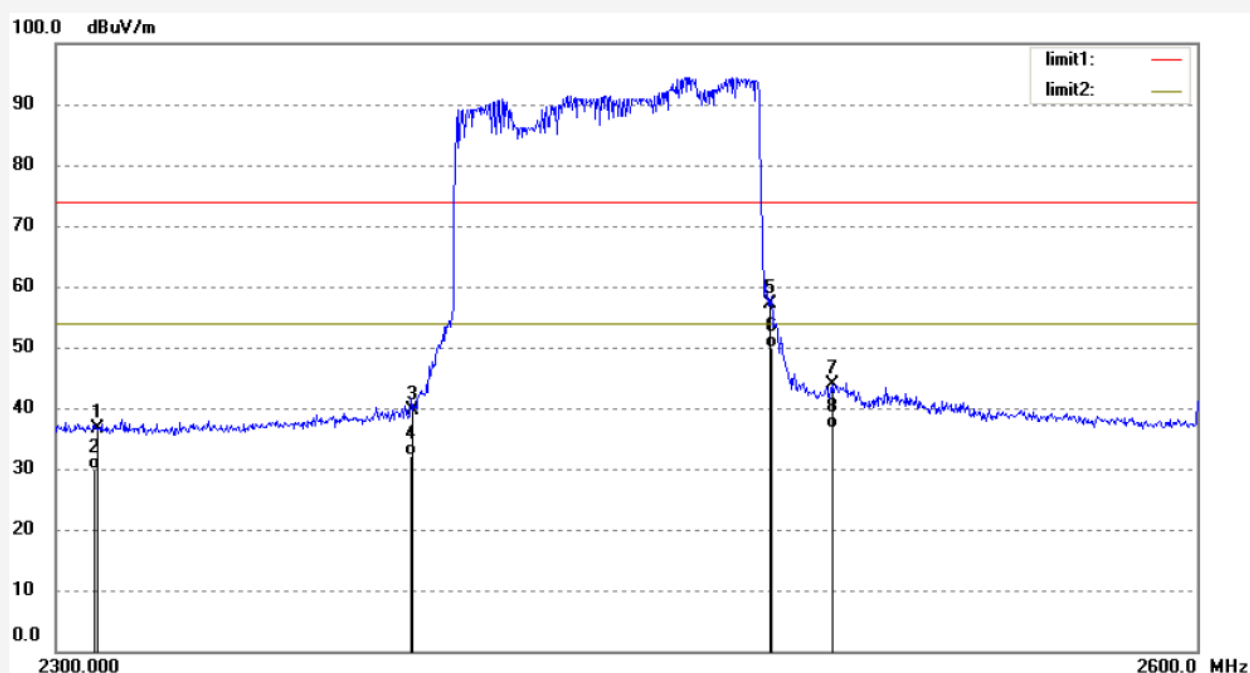
Date: 14/04/23/

Time: 9/32/13

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	43.63	-6.99	36.64	74.00	-37.36	peak			
2	2310.000	36.87	-6.99	29.88	54.00	-24.12	AVG			
3	2390.000	46.29	-6.78	39.51	74.00	-34.49	peak			
4	2390.000	38.99	-6.78	32.21	54.00	-21.79	AVG			
5	2483.500	63.62	-6.54	57.08	74.00	-16.92	peak			
6	2483.500	56.31	-6.54	49.77	54.00	-4.23	AVG			
7	2500.000	50.27	-6.50	43.77	74.00	-30.23	peak			
8	2500.000	43.22	-6.50	36.72	54.00	-17.28	AVG			



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Job No.: star #3981

Standard: FCC PK

Test item: Radiation Test

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

EUT: Bluetooth speaker

Mode: HOPPING (8QPSK)

Model: BC229F

Manufacturer: SKY DRAGON

Polarization: Vertical

Power Source: DC 3.7V

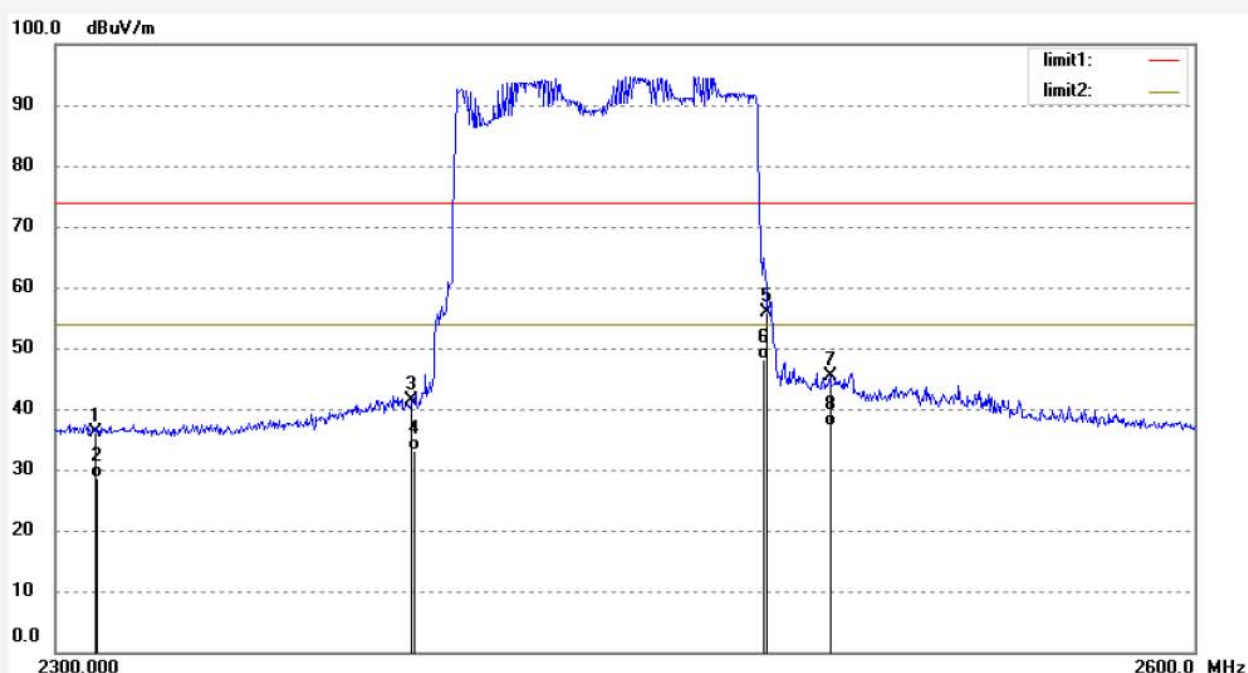
Date: 14/04/23/

Time: 9/38/58

Engineer Signature:

Distance: 3m

Note: Report No.:ATE20140603



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	43.14	-6.99	36.15	74.00	-37.85	peak			
2	2310.000	35.67	-6.99	28.68	54.00	-25.32	AVG			
3	2390.000	48.04	-6.78	41.26	74.00	-32.74	peak			
4	2390.000	39.86	-6.78	33.08	54.00	-20.92	AVG			
5	2483.500	62.31	-6.54	55.77	74.00	-18.23	peak			
6	2483.500	54.57	-6.54	48.03	54.00	-5.97	AVG			
7	2500.000	51.81	-6.50	45.31	74.00	-28.69	peak			
8	2500.000	43.55	-6.50	37.05	54.00	-16.95	AVG			

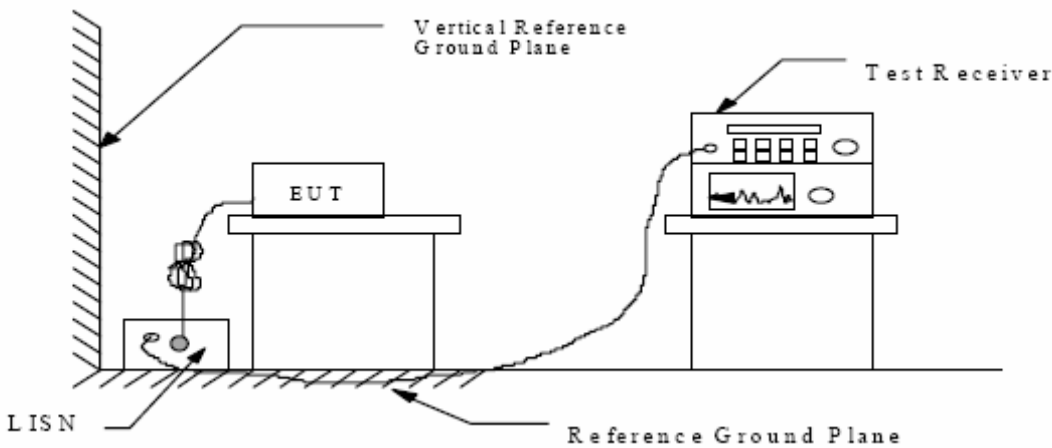
12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

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: Bluetooth 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 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 C63.4- 2009 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 15 B**

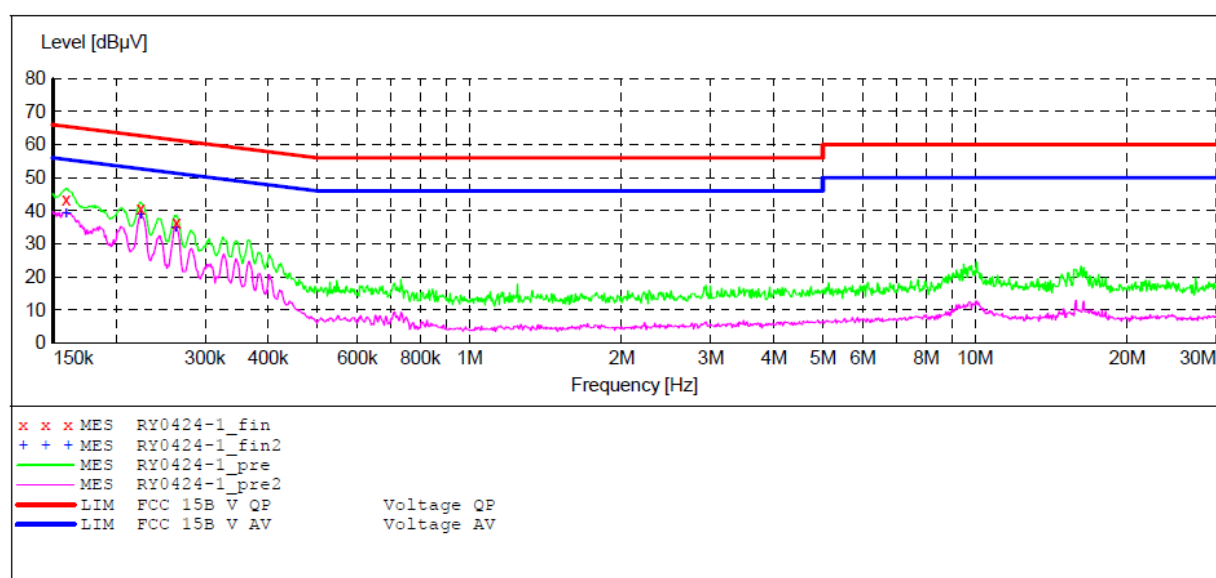
EUT: Bluetooth Speaker M/N:BC229F
 Manufacturer: SKY DRAGON
 Operating Condition: Operation
 Test Site: 1#Shielding Room
 Operator: Ricky
 Test Specification: L 120V/60Hz
 Comment:

Report No:ATE20140603

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

Short Description: _SUB_STD_VTERM2 1.70

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

**MEASUREMENT RESULT: "RY0424-1_fin"**

4/24/2014 8:35AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159256	43.50	10.5	66	22.0	QP	L1	GND
0.223595	40.70	10.6	63	22.0	QP	L1	GND
0.263357	36.30	10.6	61	25.0	QP	L1	GND

MEASUREMENT RESULT: "RY0424-1_fin2"

4/24/2014 8:35AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159256	39.30	10.5	56	16.2	AV	L1	GND
0.223595	38.60	10.6	53	14.1	AV	L1	GND
0.262308	34.70	10.6	51	16.7	AV	L1	GND

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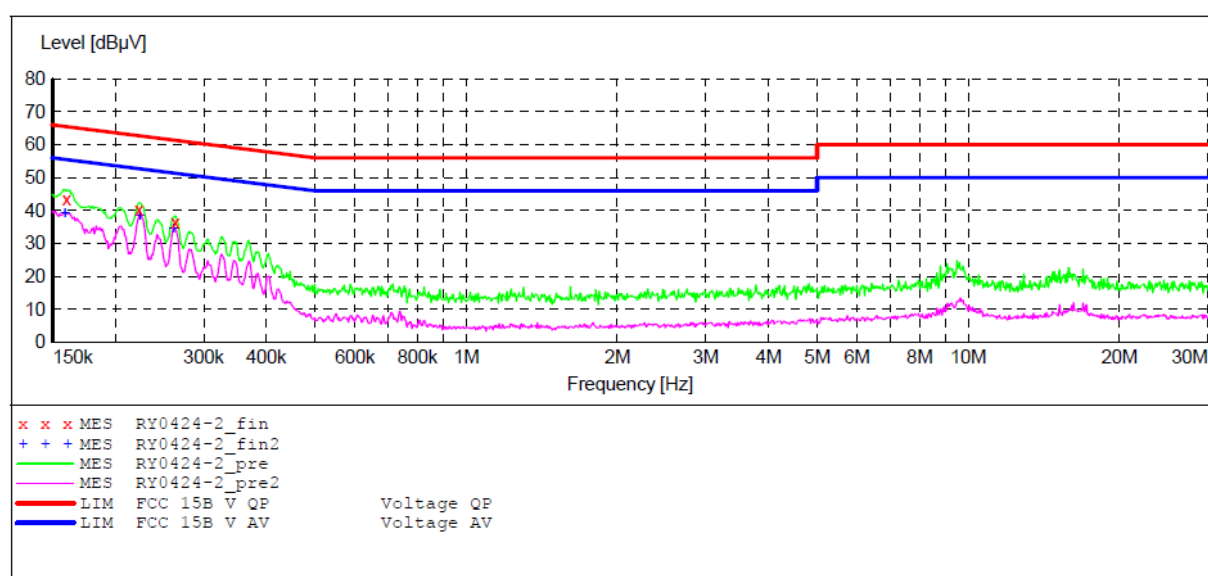
CONDUCTED EMISSION STANDARD FCC PART 15 B

EUT: Bluetooth Speaker M/N:BC229F
 Manufacturer: SKY DRAGON
 Operating Condition: Operation
 Test Site: 1#Shielding Room
 Operator: Ricky
 Test Specification: N 120V/60Hz
 Comment:

Report No:ATE20140603

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: "RY0424-2_fin"

4/24/2014 8:38AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.159893	43.40	10.5	66	22.1	QP	N	GND
0.222704	40.30	10.6	63	22.4	QP	N	GND
0.263357	36.40	10.6	61	24.9	QP	N	GND

MEASUREMENT RESULT: "RY0424-2_fin2"

4/24/2014 8:38AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.158622	39.20	10.5	56	16.3	AV	N	GND
0.223595	38.40	10.6	53	14.3	AV	N	GND
0.261263	34.30	10.6	51	17.1	AV	N	GND

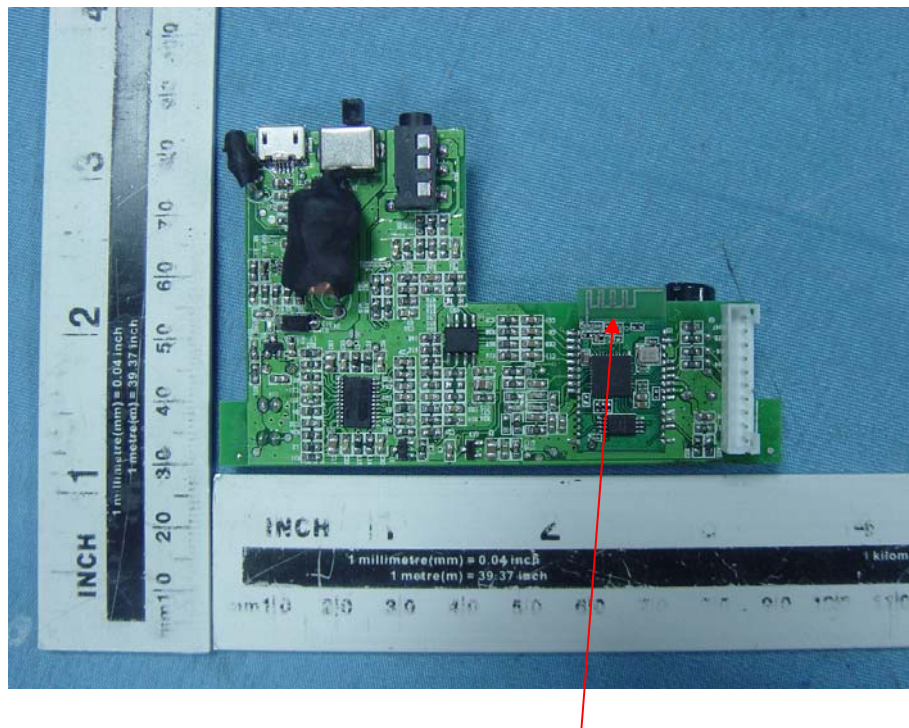
13.ANTENNA REQUIREMENT

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.



Antenna