

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C
REQUIREMENT T**

OF

15' rechargeable speaker

MODEL No.: PBX4000BAT

Trademark: N/A

FCC ID: 2AIV2-PBX4000BAT

REPORT NO: ES160617017E

ISSUE DATE: June 27, 2016

Prepared for

MR DJ INC.

1800E WASHINGTON BLVD LOS ANGELES, CA 90021

Prepared by

EMTEK (SHENZHEN) CO., LTD

Bldg 69, Majialong Industry Zone, Nanshan District,
Shenzhen, Guangdong, China

TEL: 0086-755-26954280

FAX: 0086-755-26954282

VERIFICATION OF COMPLIANCE

Applicant	:	MR DJ INC. 1800E WASHINGTON BLVD LOS ANGELES,CA 90021
Manufacturer	:	ZHEJIANG TONOECH ELECTRONICS LIMITED COMPANY No.1111, Jinhai Road,East Cixi Coastal District,Ningbo(315000),China
Product Description	:	15' rechargeable speaker
Brand Name	:	N/A
Model Number	:	PBX4000BAT
File Number	:	ES160617017E
Date of Test:	:	May 10, 2016 to June 27 , 2016

We hereby certify that:

The above equipment was tested by EMTEK (SHENZHEN) CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247.

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

Date of Test : May 10, 2016 to June 27 , 2016

Prepared by : 
Joe Xia /Editor

Reviewer : 
Yaping Shen /Supervisor

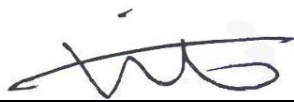
Approve & Authorized Signer : 
Lisa Wang/Manager

TABLE OF CONTENTS

1. GENERAL INFORMATION	5
1.1 Product Description	5
1.2 Related Submittal(s) / Grant (s).....	5
1.3 Test Methodology	5
1.4 Special Accessories	5
1.5 Equipment Modifications	5
1.6 Test Facility.....	6
2. SYSTEM TEST CONFIGURATION.....	7
2.1 EUT Configuration	7
2.2 EUT Exercise	7
2.3 Test Procedure	7
2.4 Limitation	8
2.5 Configuration of Tested System	10
2.6 Equipment Used in Tested System	11
2.7 Description of Test Modes	11
3. SUMMARY OF TEST RESULTS	12
4. CONDUCTED EMISSIONS TEST	13
4.1 Measurement Procedure	13
4.2 Test SET-UP (Block Diagram of Configuration)	13
4.3 Measurement Equipment Used	13
4.4 Measurement Equipment Used	13
5. RADIATED EMISSION TEST	18
5.1 Measurement Procedure	18
5.2 Test SET-UP (Block Diagram of Configuration)	18
5.3 Measurement Equipment Used	19
5.4 Measurement Result	19
6. CHANNEL SEPARATION TEST.....	23
6.1 Measurement Procedure	23
6.2 Test SET-UP (Block Diagram of Configuration)	23
6.3 Measurement Equipment Used	23
6.4 Measurement Results.....	23
7. BANDWIDTH TEST	28
7.1 Measurement Procedure	28
7.2 Test SET-UP (Block Diagram of Configuration)	28
7.3 Measurement Equipment Used	28
7.4 Measurement Results.....	28

8. QUANTITY OF HOPPING CHANNEL TEST	33
8.1 Measurement Procedure	33
8.2 Test SET-UP (Block Diagram of Configuration)	33
8.3 Measurement Equipment Used	33
8.4 Measurement Results	33
9. TIME OF OCCUPANCY (DWELL TIME) TEST	35
9.1 Measurement Procedure	35
9.2 Test SET-UP (Block Diagram of Configuration)	35
9.3 Measurement Equipment Used	35
9.4 Measurement Results	35
10. MAXIMUM PEAK OUTPUT POWER TEST	46
10.1 Measurement Procedure	46
10.2 Test SET-UP (Block Diagram of Configuration)	46
10.3 Measurement Equipment Used	46
10.4 Measurement Results	46
11. BAND EDGE TEST	51
11.1 Applicable Standard	51
11.2 Measurement Procedure	51
11.3 Measurement Equipment Used	51
11.4 Measurement Results	51
12. ANTENNA PORT EMISSION	68
12.1 Test Equipment	68
12.2 Measuring Instruments and setting	68
12.3 Test Procedures	68
12.4 Block Diagram of Test setup	68
12.5 Test Result	68
13. ANTENNA APPLICATION	71
13.1 Antenna requirement	71
13.2 Result	71

1. General Information

1.1 Product Description

MR DJ INC

Model: PBX4000BAT (referred to as the EUT in this report) The EUT (15' rechargeable speaker) is an short range, lower power Device. It is designed by way of utilizing the GFSK, $\pi/4$ -DQPSK modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 2402-2480MHz
- B). Modulation: GFSK, $\pi/4$ -DQPSK
- C). Number of Channel: 79
- D). Channel Space: 1MHz
- E). BIT Rate of Transmission: 1Mbps, 2Mbps
- F). Antenna Type: PCB antenna
- G). Antenna Gain: 3.3dBi
- H). AC Supply: INPUT AC 120V, 60Hz
- I).DC Supply:DC 12V lead-acid battery

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for 2AIV2-PBX4000BAT filing to comply with Section 15.247 of the FCC Part 15 Subpart C Rules.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10 -2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description EMC Lab.	:	Accredited by CNAS, 2013.10.29 The certificate is valid until 2016.10.28 The Laboratory has been assessed and proved to be in compliance with CNAS/CL01:2006(identical to ISO/IEC17025: 2005) The Certificate Registration Number is L2291 Accredited by TUV Rheinland Shenzhen 2010.5.25 The Laboratory has been assessed according to the requirements ISO/IEC 17025 Accredited by FCC, April 17, 2014 The Certificate Registration Number is 406365. Accredited by Industry Canada, November 29, 2012 The Certificate Registration Number is 4480A-4
Name of Firm	:	EMTEK (SHENZHEN) CO., LTD
Site Location	:	Bldg 69, Majialong Industry Zone, Nanshan District, Shenzhen, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 6.2 of ANSI C63.10-2013, conducted emissions from the EUT are measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this KoolMAX 40-Quart Wheeled Cooler, Bluetooth PA System and Charging Station (EUT) were rotated through three orthogonal axes according to the requirements in section 6.4, section 6.5 and section 6.6 of ANSI C63.10-2013.

2.4 Limitation

(1) Channel Separation Test

FCC Part 15, Subpart C Section 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

(2) 20dB Bandwidth

Frequency Range(MHz)	Quantity of Hopping Channel	Limit(kHz)			
		50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

(3) Quantity of Hopping Channel

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	20dB bandwidth <250kHz	Limit(Quantity of Hopping Channel)		
		20dB bandwidth >250k Hz	20dB bandwidth <1MHz	20dB bandwidth >1MHz
902-928	50	25	NA	NA
2400-2483.5	NA	NA	75	15
5725-5850	NA	NA	75	NA

(4) Time of Occupancy(Dwell Time)

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	20dB bandwidth <250kHz(50Channel)	LIMIT(rms)	
		20dB bandwidth >250kHz(25 Channel)	20dB bandwidth <1MHz(75Channel)
902-928	400(20S)	400(10S)	NA
2400-2483.5	NA	NA	400(30S)
5725-5850	NA	NA	400(30S)

Note: The “()” is all channel’s average time of occupancy.

(5) Maximum Peak Output Power

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	Quantity of Hopping Channel	LIMIT(W)			
		50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

(6) Band edge

FCC Part15, Subpart C Section 15.247, In any 100kHz bandwidth outside the frequency band in with the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, 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).

Operating Frequency Range(MHz)	Spurious emission frequency	Limit Peak power ration to emission(dBc)	Emission level(dBuV/m)
902-928	<902	>20	NA
	>928	>20	NA
	960-1240	NA	54
2400-2483.5	<2400	>20	NA
	>2483.5-2500	NA	54
5725-5850	<5350-5460	NA	54
	<5725	>20	NA
	>5850	>20	NA

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

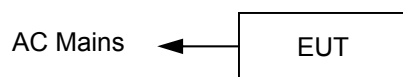
(8) Radiated Emission

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000GHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance(m)	Field strength at 3m $\text{dB}\mu\text{V/m}$
0.009~0.490	2400/F(KHz)	300	/
0.490~1.705	2400/F(KHz)	30	/
1.705~30.0	30	30	/
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

- Remark:
1. Emission level in $\text{dB}\mu\text{V/m} = 20 \log (\mu\text{V/m})$
 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Distance extrapolation factor $= 40 \log (\text{Specific distance} / \text{test distance}) (\text{dB})$;
Limit line = Specific limits ($\text{dB}\mu\text{V}$) + distance extrapolation factor.

2.5 Configuration of Tested System



2.6 Equipment Used in Tested System

Item	Equipment	Mfr/Brand	Model/Type No.	FCC ID	Series No.	Note
1.	15' rechargeable speaker	N/A	PBX4000BAT	2AIV2-PBX4000BAT	N/A	EUT

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

2.7 Description of Test Modes

The EUT (COOLER SPEAKER) has been tested under normal operating condition. This EUT is a FHSS system. Pre-scanned tests, were conducted to determine the final configuration from all possible combinations. We use software control the EUT, Let EUT hopping on and transmit with highest power, all the modes have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test

Channel	Frequency(MHz)
Low channel	2402
Middle channel	2441
High channel	2480

3. Summary of Test Results

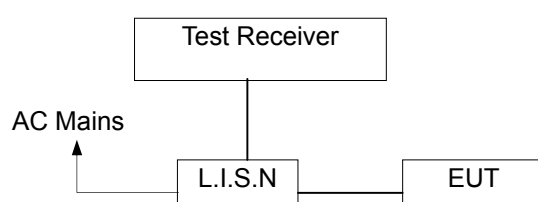
FCC Rules	Description Of Test	Result
FCC Part 15.247(a)(1)	Channel Separation Test	Compliant
FCC Part 15.247(a)(1)	20dB Bandwidth	Compliant
FCC Part 15.247(a)(1)	Quantity of Hopping Channel	Compliant
FCC Part 15.247(a)(1)	Time of Occupancy (Dwell Time)	Compliant
FCC Part 15.247(b)	Max Peak Output Power Test	Compliant
FCC Part 15.247(d)	Band Edge Test	Compliant
FCC Part 15.207	Conducted Emission	Compliant
FCC Part 15.247(d)&15.209	Radiated Emission	Compliant
FCC Part 15.247(d)	Antenna Port Emission	Compliant
FCC Part 15.203&15.247(b)	Antenna Requirement	Compliant

4. Conducted Emissions Test

4.1 Measurement Procedure

1. The EUT was placed on a table which is 0.1m above ground plane.
2. Maximum procedure was performed on the three highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

4.2 Test SET-UP (Block Diagram of Configuration)



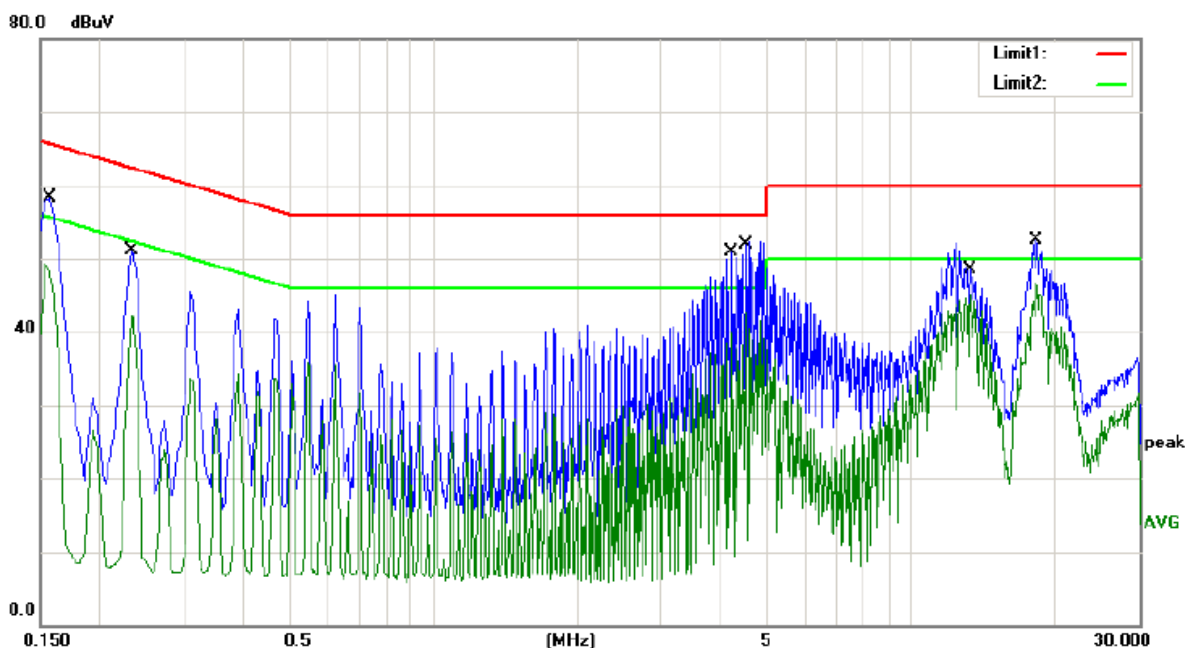
4.3 Measurement Equipment Used

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Test Receiver	Rohde & Schwarz	ESCS30	828985/018	05/15/2016	05/14/2017
L.I.S.N.	Rohde & Schwarz	ENV216	101161	05/15/2016	05/14/2017
L.I.S.N.	Schwarzbeck	NNLK8129	8129203	05/15/2016	05/14/2017
50Ω Coaxial Switch	Anritsu	MP59B	M20531	N/A	N/A
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100006	05/15/2016	05/14/2017

4.4 Measurement Equipment Used

Pass.
 Please refer to the following data.

Bluetooth Playing



Site site #1

Phase: **L1**

Temperature: 22

Limit: (CE)FCC PART 15 class B_QP

Power: AC 120V/60Hz

Humidity: 50 %

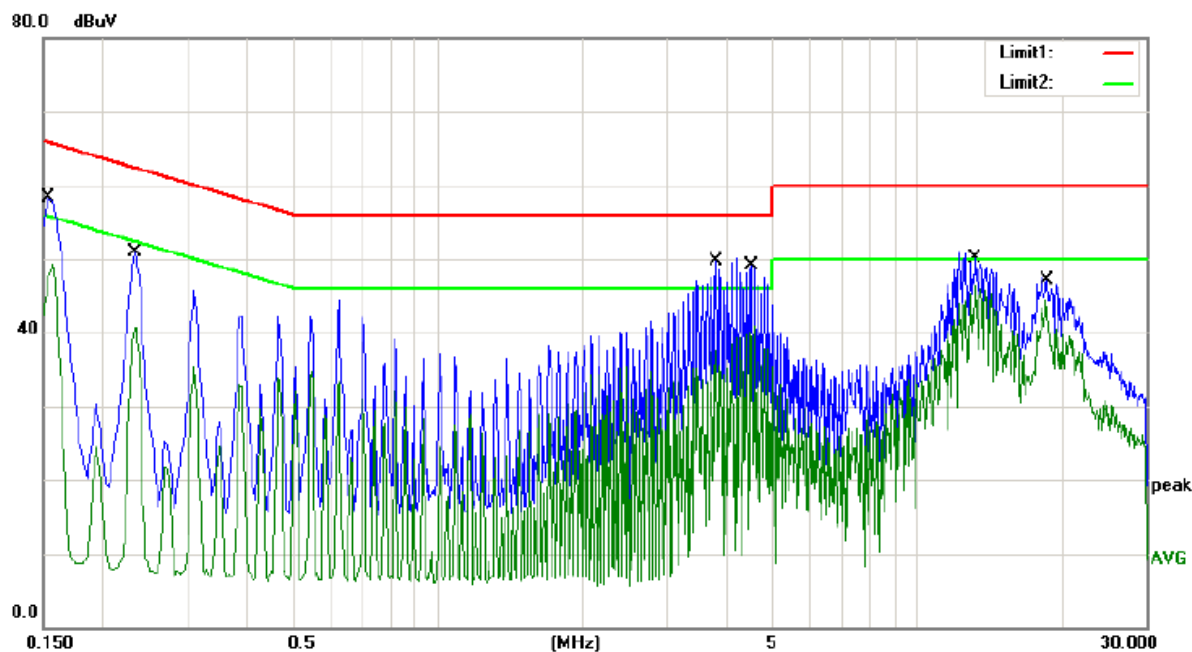
EUT: 15' rechargeable speaker

M/N: PBX4000BAT

Mode: Bluetooth Playing

Note:

No. Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
	MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	0.1580	47.30	11.00	58.30	65.57	-7.27	QP	
2	0.1580	36.50	11.00	47.50	55.57	-8.07	AVG	
3	0.2340	40.10	11.00	51.10	62.31	-11.21	QP	
4	0.2340	31.20	11.00	42.20	52.31	-10.11	AVG	
5	4.2020	39.80	11.00	50.80	56.00	-5.20	QP	
6	4.2020	28.80	11.00	39.80	46.00	-6.20	AVG	
7	4.5140	40.90	11.00	51.90	56.00	-4.10	QP	
8 *	4.5140	31.80	11.00	42.80	46.00	-3.20	AVG	
9	13.3000	37.50	11.00	48.50	60.00	-11.50	QP	
10	13.3000	34.10	11.00	45.10	50.00	-4.90	AVG	
11	18.2720	41.40	11.00	52.40	60.00	-7.60	QP	
12	18.2720	35.60	11.00	46.60	50.00	-3.40	AVG	



Site site #1

Phase: **N**

Temperature: 22

Limit: (CE)FCC PART 15 class B_QP

Power: AC 120V/60Hz

Humidity: 50 %

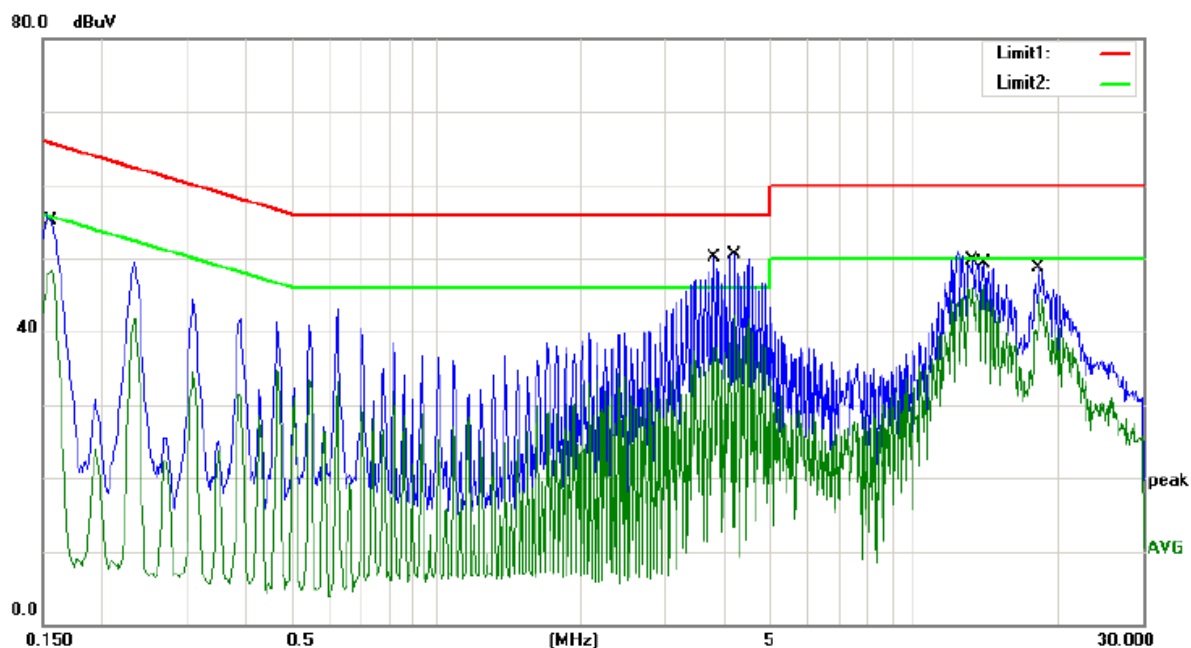
EUT: 15' rechargeable speaker

M/N: PBX4000BAT

Mode: Bluetooth Playing

Note:

No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	0.1540	47.20	11.00	58.20	65.78	-7.58	QP	
2	0.1540	36.40	11.00	47.40	55.78	-8.38	AVG	
3	0.2340	39.90	11.00	50.90	62.31	-11.41	QP	
4	0.2340	29.70	11.00	40.70	52.31	-11.61	AVG	
5	3.8020	38.70	11.00	49.70	56.00	-6.30	QP	
6	3.8020	26.40	11.00	37.40	46.00	-8.60	AVG	
7	4.5380	19.60	11.00	30.60	56.00	-25.40	QP	
8	4.5380	29.90	11.00	40.90	46.00	-5.10	AVG	
9	13.2560	36.90	11.00	47.90	60.00	-12.10	QP	
10 *	13.2560	35.30	11.00	46.30	50.00	-3.70	AVG	
11	18.5240	36.00	11.00	47.00	60.00	-13.00	QP	
12	18.5240	33.40	11.00	44.40	50.00	-5.60	AVG	

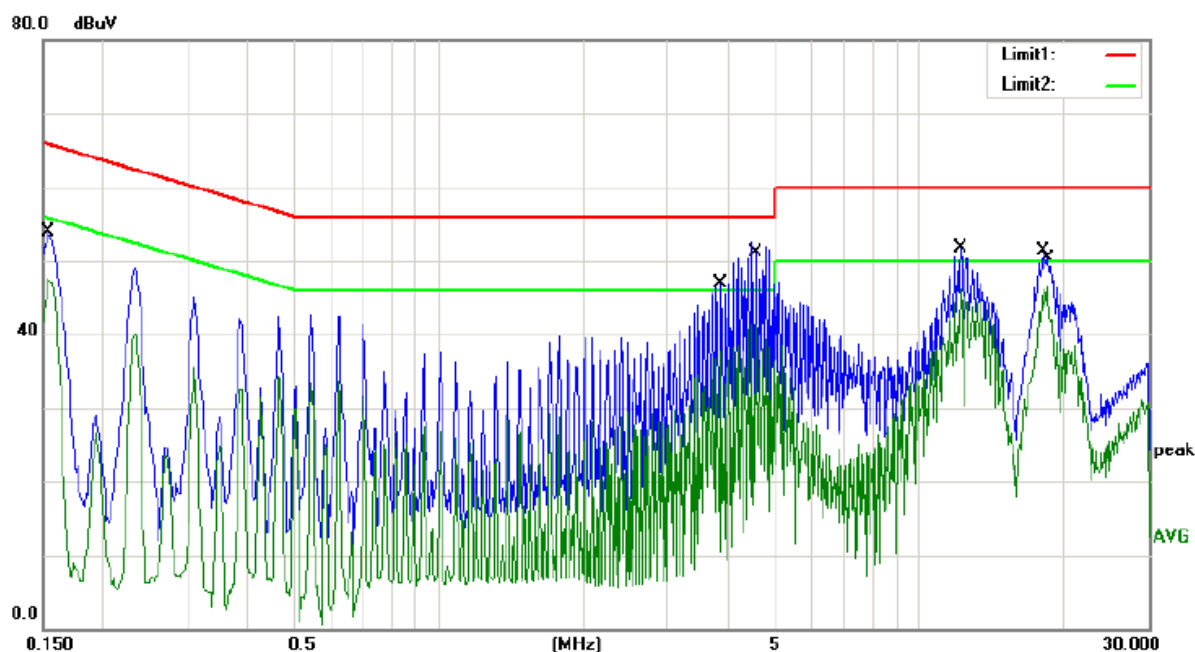


Site site #1
 Limit: (CE)FCC PART 15 class B_QP
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode: Bluetooth Playing
 Note:

Phase: **N**
 Power: AC 240V/60Hz

Temperature: 22
 Humidity: 50 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1580	43.90	11.00	54.90	65.57	-10.67	QP	
2		0.1580	37.30	11.00	48.30	55.57	-7.27	AVG	
3		3.8020	39.00	11.00	50.00	56.00	-6.00	QP	
4		3.8020	26.90	11.00	37.90	46.00	-8.10	AVG	
5		4.1900	29.90	11.00	40.90	56.00	-15.10	QP	
6	*	4.1900	31.20	11.00	42.20	46.00	-3.80	AVG	
7		13.2640	38.70	11.00	49.70	60.00	-10.30	QP	
8		13.2640	34.90	11.00	45.90	50.00	-4.10	AVG	
9		13.9600	38.20	11.00	49.20	60.00	-10.80	QP	
10		13.9600	35.20	11.00	46.20	50.00	-3.80	AVG	
11		18.1440	37.60	11.00	48.60	60.00	-11.40	QP	
12		18.1440	33.90	11.00	44.90	50.00	-5.10	AVG	



Site site #1 Phase: **L1** Temperature: 22
 Limit: (CE)FCC PART 15 class B_QP Power: AC 240V/60Hz Humidity: 50 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode: Bluetooth Playing
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.1540	42.70	11.00	53.70	65.78	-12.08	QP	
2		0.1540	36.50	11.00	47.50	55.78	-8.28	AVG	
3		3.8740	35.90	11.00	46.90	56.00	-9.10	QP	
4		3.8740	26.70	11.00	37.70	46.00	-8.30	AVG	
5		4.5700	38.90	11.00	49.90	56.00	-6.10	QP	
6		4.5700	30.30	11.00	41.30	46.00	-4.70	AVG	
7		12.2320	40.70	11.00	51.70	60.00	-8.30	QP	
8		12.2320	35.10	11.00	46.10	50.00	-3.90	AVG	
9		18.1120	39.80	11.00	50.80	60.00	-9.20	QP	
10		18.1120	35.00	11.00	46.00	50.00	-4.00	AVG	
11		18.5000	39.30	11.00	50.30	60.00	-9.70	QP	
12	*	18.5000	35.50	11.00	46.50	50.00	-3.50	AVG	

5. Radiated Emission Test

5.1 Measurement Procedure

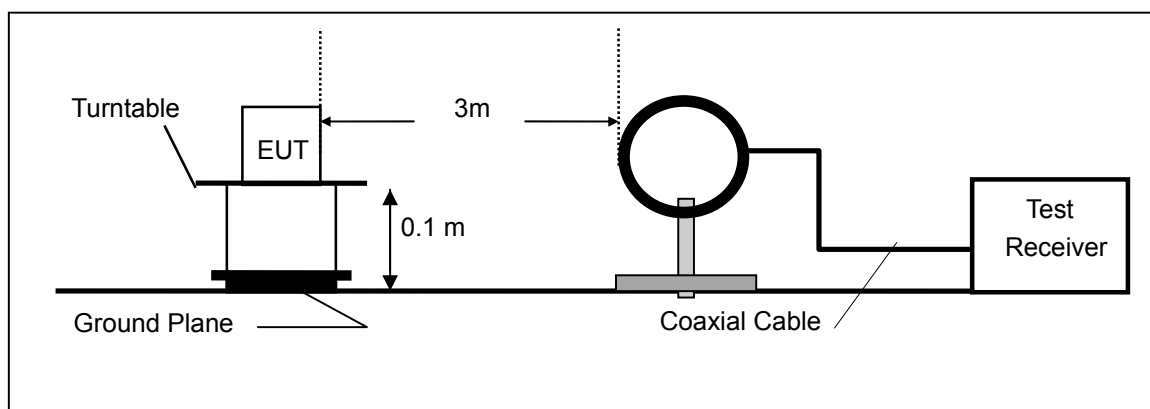
1. The EUT was placed on a turn table which is 0.1m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured was complete.

The frequency range from 30MHz to 1000MHz was pre-scanned with a peak detector (RBW=100kHz, VBW=300kHz) and all final readings of measurement from Test Receiver are Quasi-Peak values(Quasi Peak detector used with a bandwidth of 120 kHz).

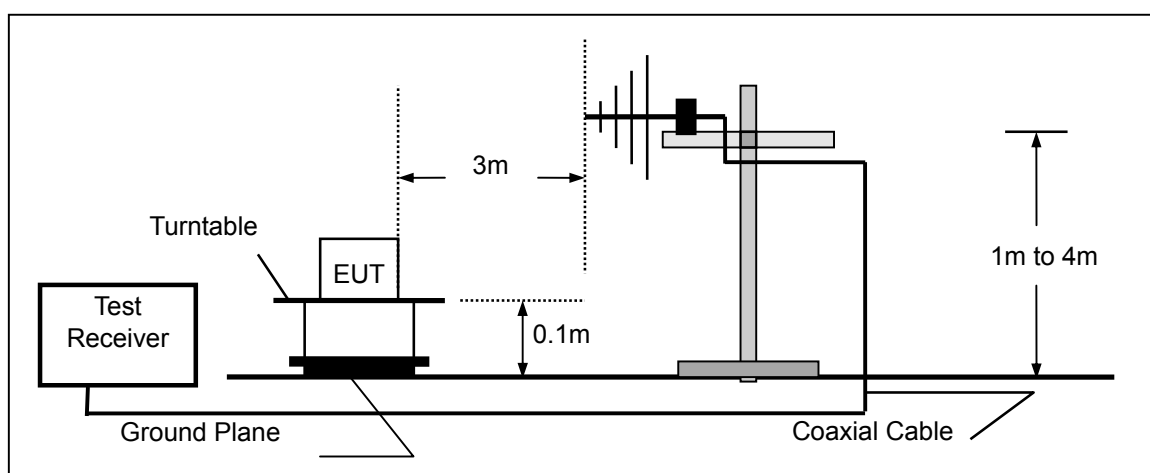
The frequency range above 1GHz the measuring instrument use RBW=1 MHz and VBW=3 MHz with Peak Detector for Peak Values, and use RBW=1 MHz and VBW=10 Hz with Peak Detector for Average Values.

5.2 Test SET-UP (Block Diagram of Configuration)

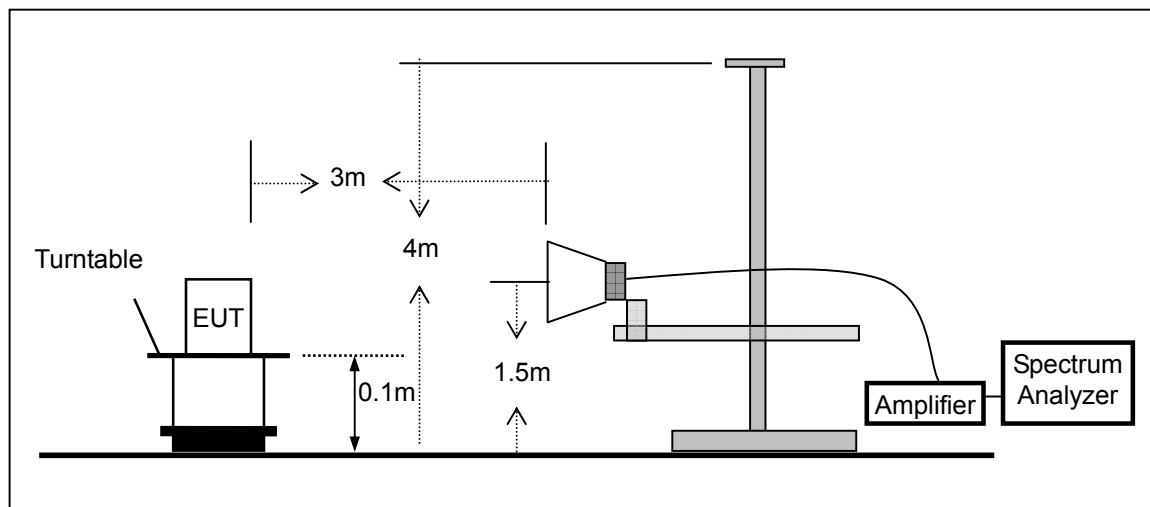
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



(B) Radiated Emission Test Set-Up, Frequency below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/15/2016	1 Year
2.	Pre-Amplifier	HP	8447D	2944A07999	05/15/2016	1 Year
3.	Pre-Amplifier	A.H.	PAM-0126	1415261	05/15/2016	1 Year
4.	Bilog Antenna	Schwarzbeck	VULB9163	142	05/15/2016	1 Year
5.	Loop Antenna	Schwarzbeck	FMZB 1519	1519-012	05/15/2016	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/15/2016	1 Year
7.	Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/15/2016	1 Year
8.	Cable	Schwarzbeck	AK9513	ACRX1	05/15/2016	1 Year
9.	Cable	Rosenberger	N/A	FP2RX2	05/15/2016	1 Year
10.	Cable	Schwarzbeck	AK9513	CRPX1	05/15/2016	1 Year
11.	Cable	Schwarzbeck	AK9513	CRRX2	05/15/2016	1 Year

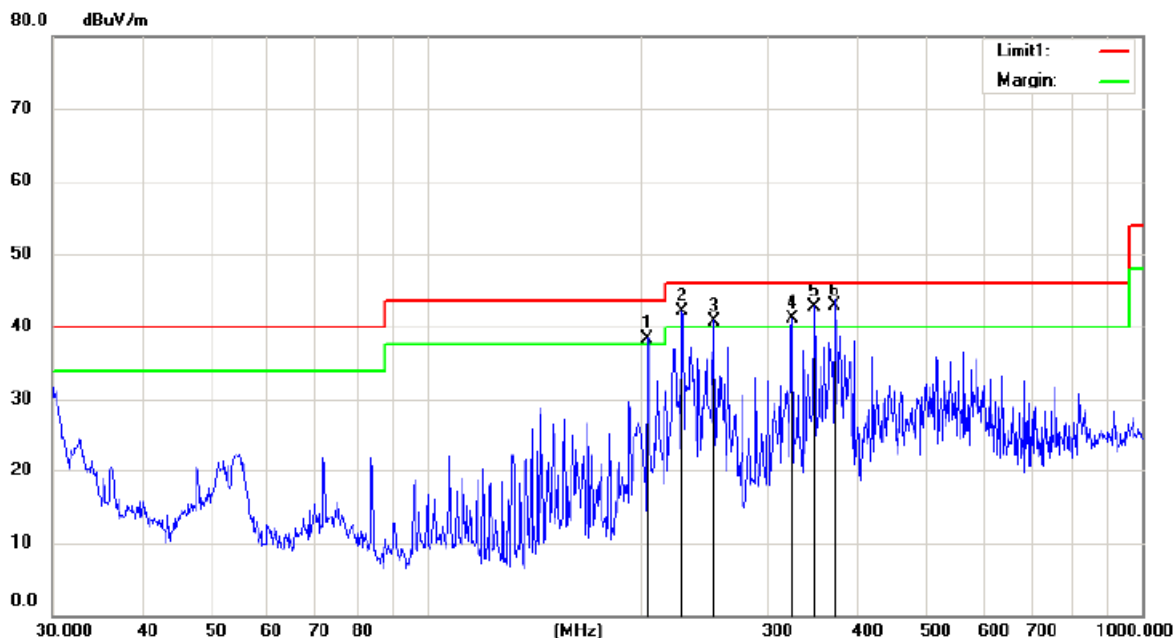
5.4 Measurement Result

(For range 9KHz~30MHz, The measured value is really too low to be recorded.)

Below 1000MHz (30M-1GHz)

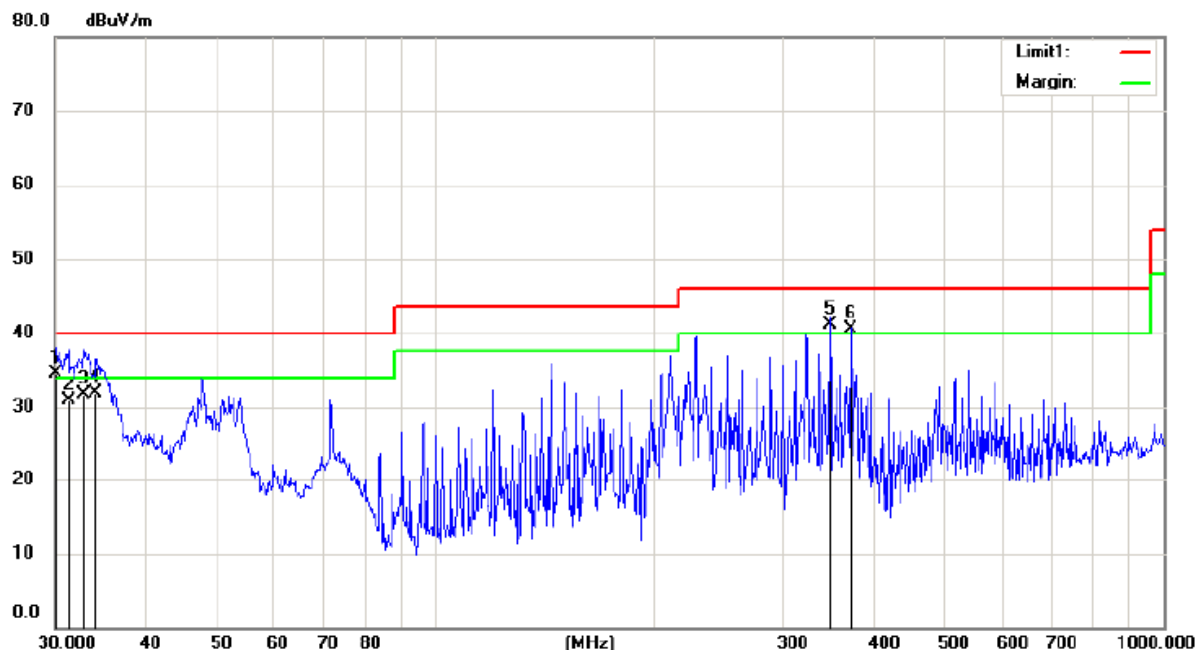
BT Tx mode:

(Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result was report as below.)



Site site #1 Polarization: **Horizontal** Temperature: 20 C
 Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:TX(GFSK,2402MHz)
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	!	203.5228	60.69	-22.29	38.40	43.50	-5.10	QP		
2	!	227.6906	63.70	-21.60	42.10	46.00	-3.90	QP		
3	!	252.0627	62.26	-21.46	40.80	46.00	-5.20	QP		
4	!	324.4561	59.17	-18.07	41.10	46.00	-4.90	QP		
5	!	348.0274	60.94	-18.14	42.80	46.00	-3.20	QP		
6	*	372.0045	60.26	-17.36	42.90	46.00	-3.10	QP		



Site site #1 Polarization: **Vertical** Temperature: 20 C
 Limit: FCC Part15 Class B 3M Radiation Power: AC 120V/60Hz Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:TX(GFSK,2402MHz)
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	!	30.0000	58.88	-24.38	34.50	40.00	-5.50	QP		
2		31.2893	54.66	-23.66	31.00	40.00	-9.00	QP		
3		32.8637	54.66	-22.86	31.80	40.00	-8.20	QP		
4		34.1561	54.36	-22.36	32.00	40.00	-8.00	QP		
5	*	348.0274	59.24	-18.14	41.10	46.00	-4.90	QP		
6	!	372.0045	57.96	-17.36	40.60	46.00	-5.40	QP		

Above 1000MHz:

Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result was report as below

Test Date :	06/18/2016	Temperature :	25 °C
Test Result:	PASS	Humidity :	55 %
Test By:	KK		

GFSK Mode: Low channel							
Freq. (MHz)	Ant.Pol. (H/V)	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4804.000	V	57.19	47.35	74.00	54.00	-16.81	-6.65
7534.000	V	50.91	40.59	74.00	54.00	-23.09	-13.41
9849.000	V	50.60	41.28	74.00	54.00	-23.40	-12.72
12554.000	V	53.59	41.57	74.00	54.00	-20.41	-12.43
16142.000	V	54.75	39.67	74.00	54.00	-19.25	-14.33
17320.000	V	59.38	42.81	74.00	54.00	-14.62	-11.19
4804.000	H	62.91	46.86	74.00	54.00	-11.09	-7.14
7985.000	H	60.85	43.62	74.00	54.00	-13.15	-10.38
10873.000	H	58.43	41.91	74.00	54.00	-15.57	-12.09
12574.000	H	59.59	41.65	74.00	54.00	-14.41	-12.35
16559.000	H	59.40	42.00	74.00	54.00	-14.60	-12.00
17368.000	H	50.47	44.51	74.00	54.00	-23.53	-9.49

GFSK Mode: Middle channel							
Freq. (MHz)	Ant.Pol. (H/V)	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4882.000	V	57.34	44.50	74.00	54.00	-16.66	-9.50
7599.000	V	51.18	37.18	74.00	54.00	-22.82	-16.82
10158.000	V	52.23	42.21	74.00	54.00	-21.77	-11.79
12410.000	V	51.90	40.75	74.00	54.00	-22.10	-13.25
16518.000	V	55.30	42.35	74.00	54.00	-18.70	-11.65
17472.000	V	51.44	42.22	74.00	54.00	-22.56	-11.78
4882.000	H	57.71	45.44	74.00	54.00	-16.29	-8.56
8409.000	H	52.96	43.19	74.00	54.00	-21.04	-10.81
9857.000	H	51.71	38.51	74.00	54.00	-22.29	-15.49
11203.000	H	51.19	42.45	74.00	54.00	-22.81	-11.55
14536.000	H	47.29	43.60	74.00	54.00	-26.71	-10.40
17638.000	H	51.13	40.81	74.00	54.00	-22.87	-13.19

GFSK Mode: High channel							
Freq. (MHz)	Ant.Pol. (H/V)	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4960.000	V	57.08	45.17	74.00	54.00	-16.92	-8.83
8752.000	V	49.91	40.80	74.00	54.00	-24.09	-13.20
9647.000	V	52.19	44.10	74.00	54.00	-21.81	-9.90
11275.000	V	52.07	38.85	74.00	54.00	-21.93	-15.15
13856.000	V	56.17	42.01	74.00	54.00	-17.83	-11.99
17461.000	V	51.66	42.11	74.00	54.00	-22.34	-11.89
4960.000	H	57.01	46.20	74.00	54.00	-16.99	-7.80
8148.000	H	52.71	41.55	74.00	54.00	-21.29	-12.45
9772.000	H	51.49	38.77	74.00	54.00	-22.51	-15.23
13692.000	H	51.82	39.65	74.00	54.00	-22.18	-14.35
15279.000	H	46.40	42.34	74.00	54.00	-27.60	-11.66
17626.000	H	51.14	41.01	74.00	54.00	-22.86	-12.99

6. Channel Separation Test

6.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	101414	05/15/2016	05/14/2017

6.4 Measurement Results

The following table is the setting of spectrum analyzer.

Attenuation	Auto
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max hold

Refer to attached data chart.

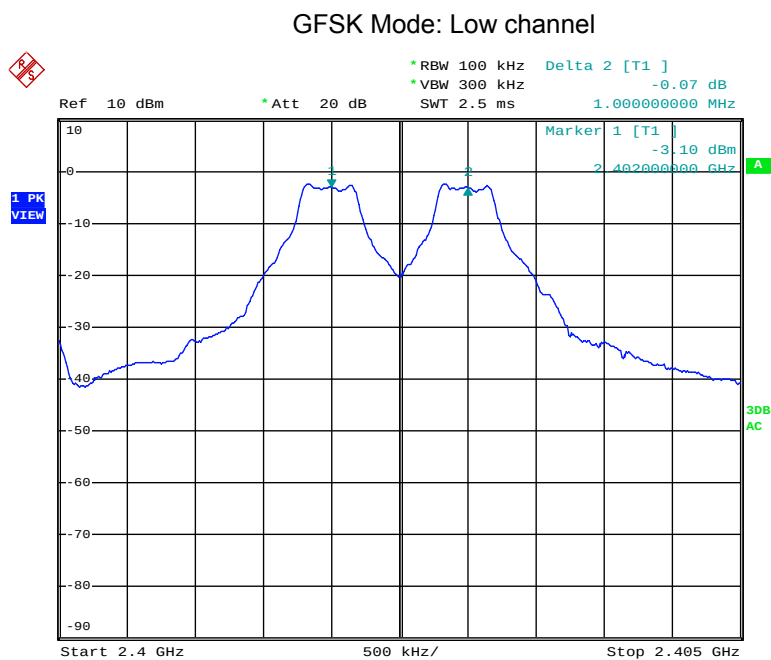
Spectrum Detector:	PK	Test Date :	06/13/2016
Test By:	KK	Temperature :	24 °C
Test Result:	PASS	Humidity :	54 %

GFSK Mode:

Test Channel	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 20dB Down BW(kHz)
Low Channel	2402	1000.00	774
Adjacency Channel	2403		
Middle channel	2441	1000.00	828
Adjacency Channel	2440		
High Channel	2480	1000.00	834
Adjacency Channel	2479		

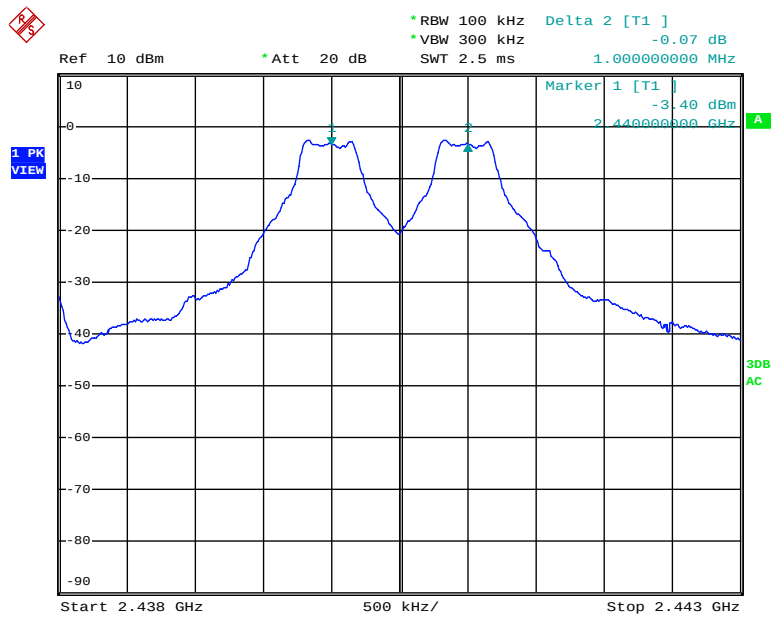
$\pi/4$ -DQPSK Mode

Test Channel	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
Low Channel	2402	1000.00	812
Adjacency Channel	2403		
Middle channel	2441	1000.00	812
Adjacency Channel	2440		
High Channel	2480	1000.00	820
Adjacency Channel	2479		



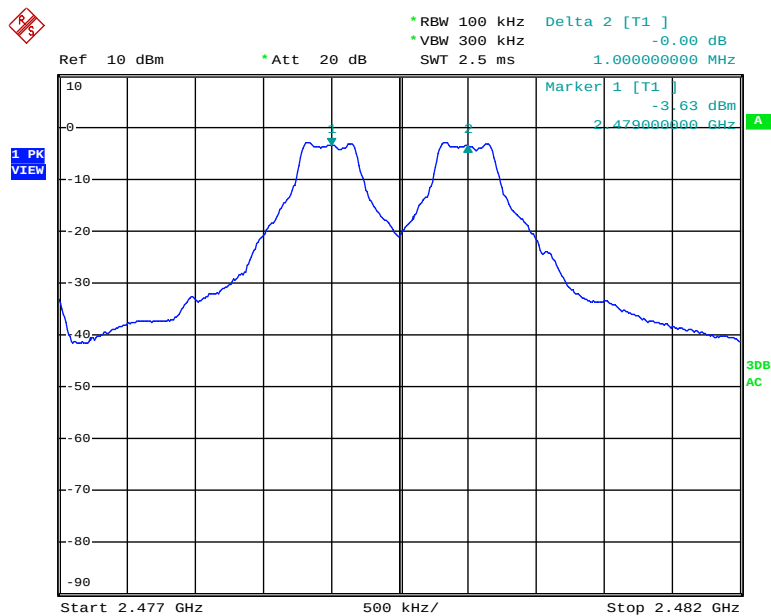
Date: 13.JUN.2016 13:24:56

GFSK Mode: Middle channel



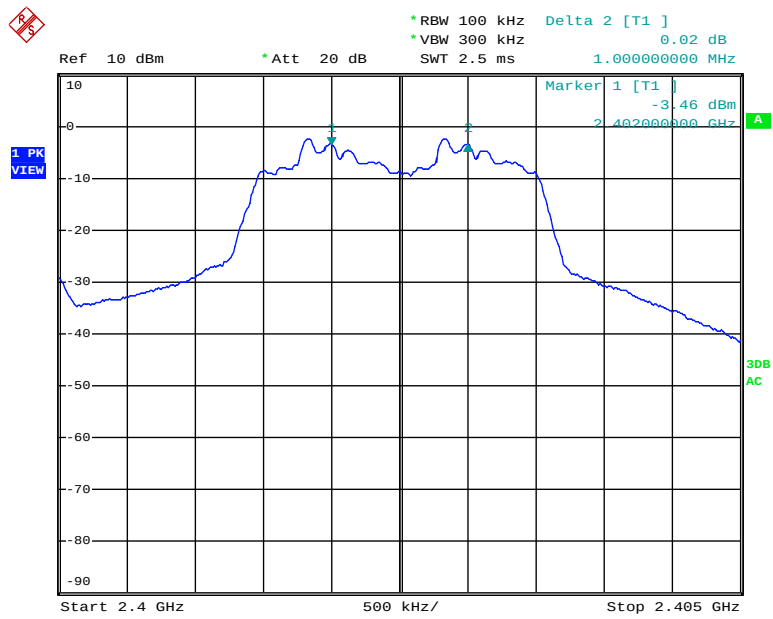
Date: 13.JUN.2016 13:26:06

GFSK Mode: High channel



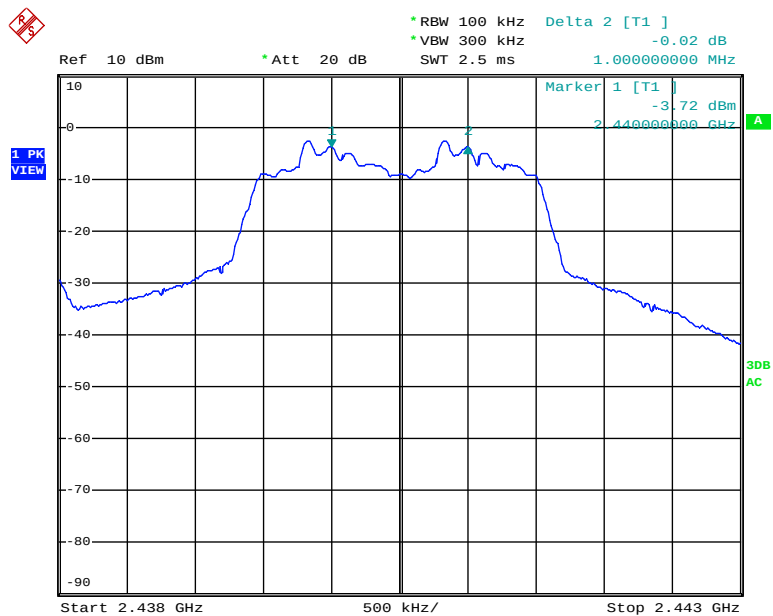
Date: 13.JUN.2016 13:27:15

$\pi/4$ -DQPSK Mode: Low channel



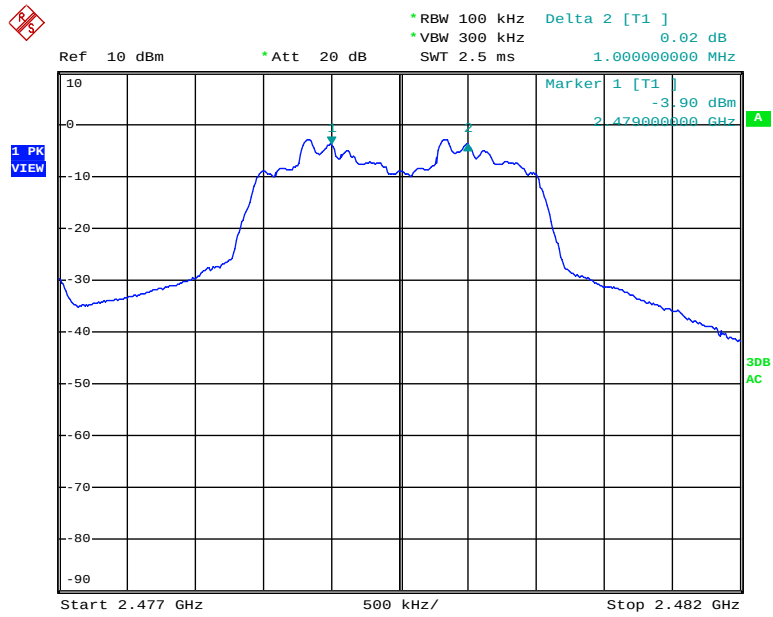
Date: 13.JUN.2016 13:28:38

$\pi/4$ -DQPSK Mode: Middle channel



Date: 13.JUN.2016 13:29:47

$\pi/4$ -DQPSK Mode: High channel



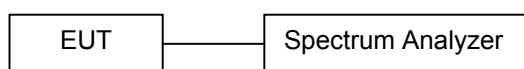
Date: 13.JUN.2016 13:30:47

7. Bandwidth Test

7.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	101414	05/15/2016	05/14/2017

7.4 Measurement Results

The following table is the setting of spectrum analyzer.

Attenuation	Auto
SPAN	3MHz
RB	30KHz
VB	100KHz
Detector	Peak
Trace	Max hold

20dB Bandwidth test data Chart:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date:	06/27/2016
Test By:	KK	Temperature:	24 °C
Test Result:	N/A	Humidity:	54 %

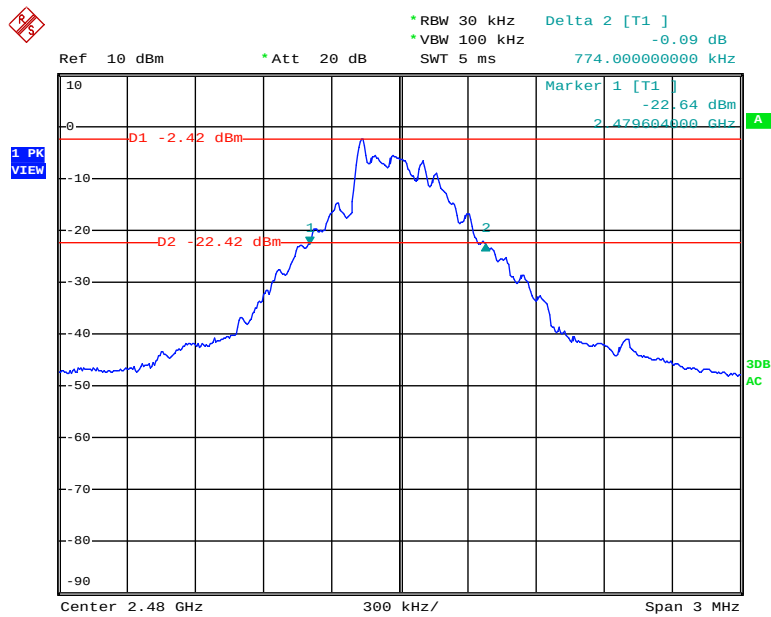
GFSK Mode:

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
Low channel	2402	774
Middle channel	2441	828
High channel	2480	834

$\pi/4$ -DQPSK Mode:

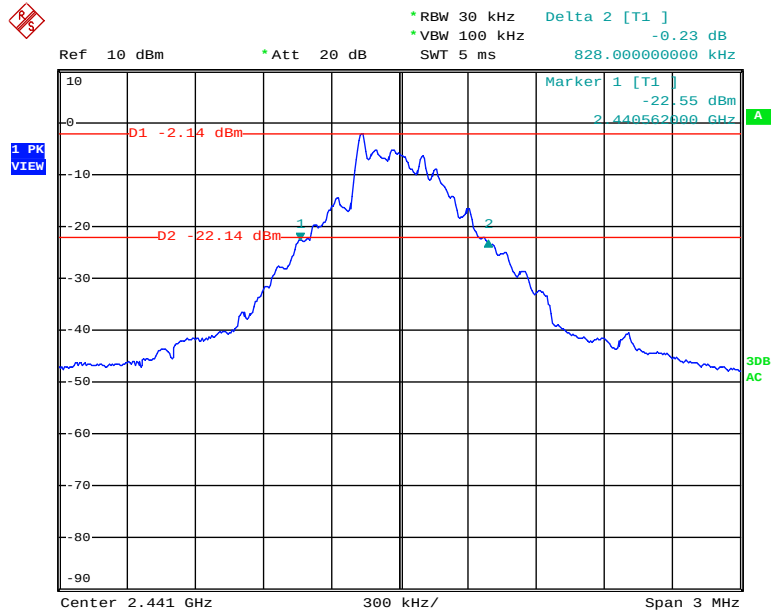
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
Low channel	2402	1218
Middle channel	2441	1218
High channel	2480	1230

GFSK Mode: Low channel



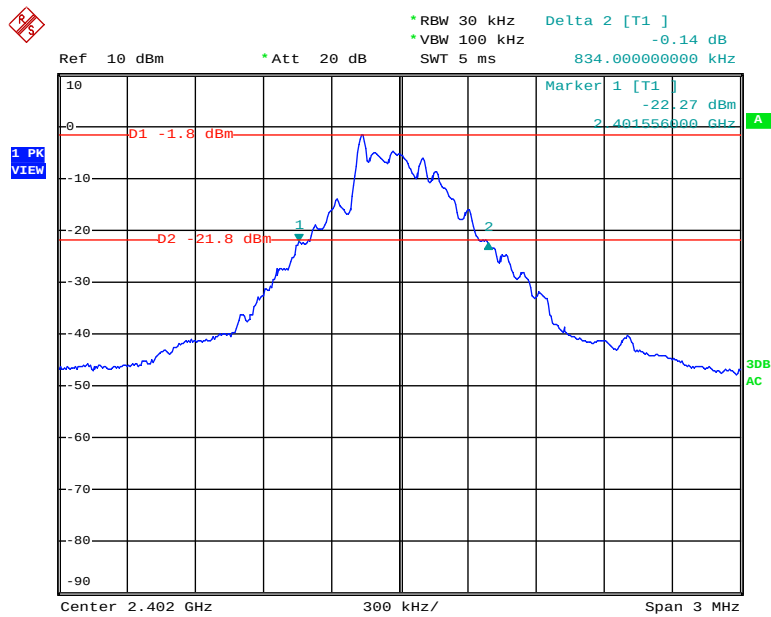
Date: 27.JUN.2016 12:19:54

GFSK Mode: Middle channel



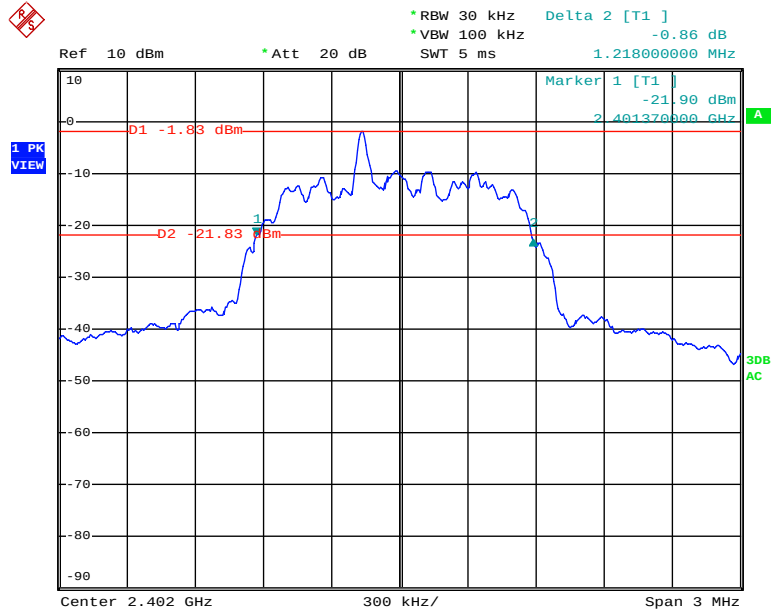
Date: 27.JUN.2016 12:20:45

GFSK Mode: High channel



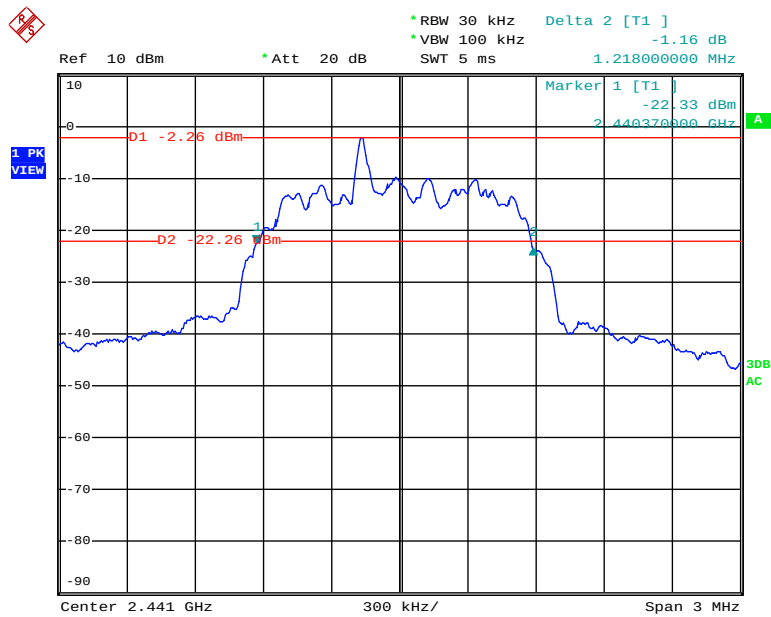
Date: 27.JUN.2016 12:21:38

$\pi/4$ -DQPSK Mode: Low channel



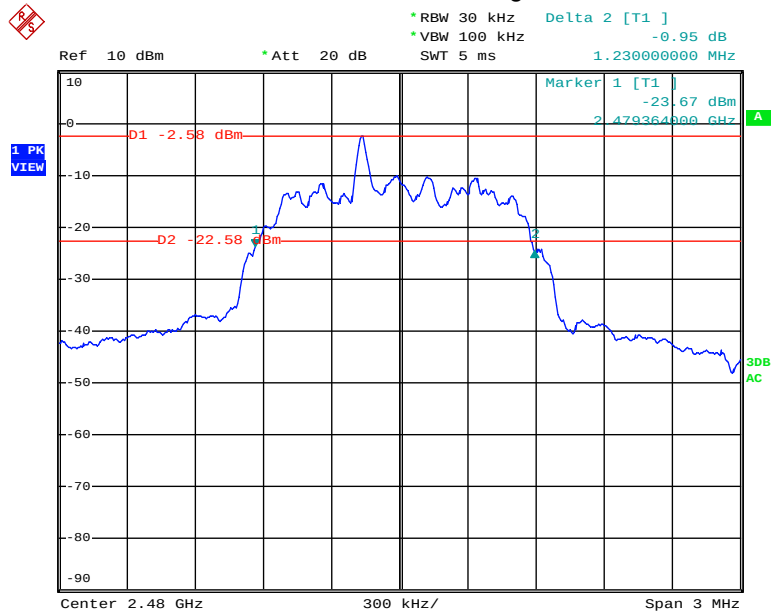
Date: 27.JUN.2016 12:22:24

$\pi/4$ -DQPSK Mode: Middle channel



Date: 27.JUN.2016 12:23:11

$\pi/4$ -DQPSK Mode: High channel



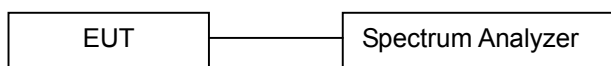
Date: 27.JUN.2016 12:24:01

8. Quantity of Hopping Channel Test

8.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Print out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	101414	05/15/2016	05/14/2017

8.4 Measurement Results

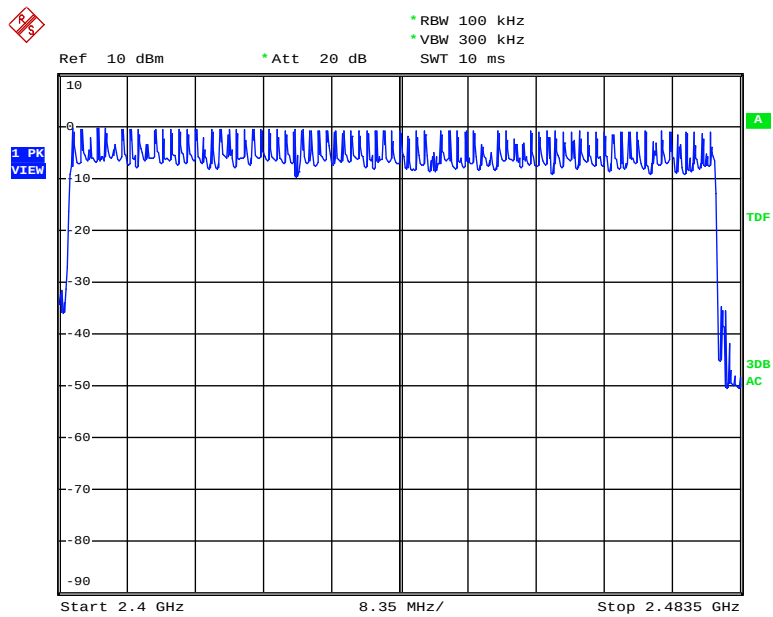
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	05/27/2016
Test By:	KK	Temperature :	24 °C
Test Result:	Pass	Humidity :	54 %

GFSK Mode, $\pi/4$ -DQPSK Mode:

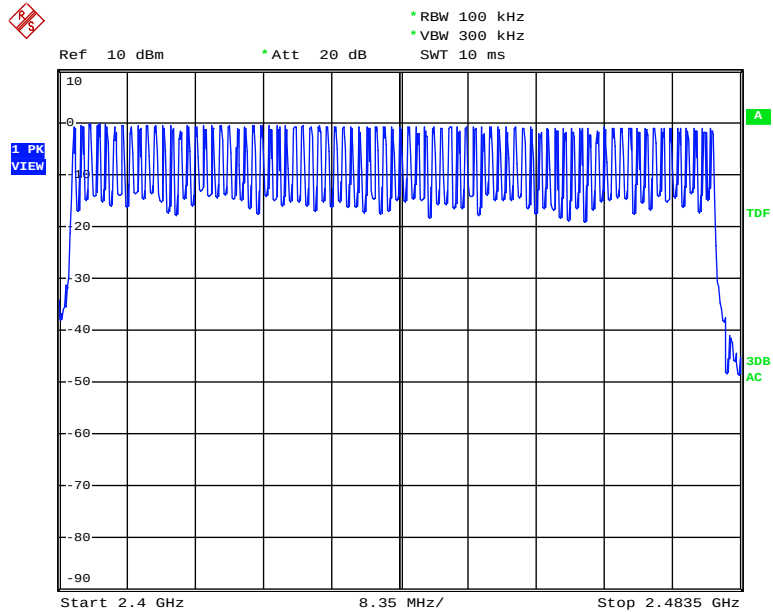
Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel limit
2402-2480	79	>15

GFSK Mode



Date: 27.JUN.2016 19:07:10

$\pi/4$ -DQPSK Mode



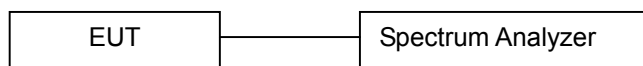
Date: 27.JUN.2016 19:08:57

9. Time of Occupancy (Dwell Time) Test

9.1 Measurement Procedure

- Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect its antenna terminal to measurement via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
- Adjust the center frequency of SA on any frequency be measured and set SA to zero span mode. And then, set RBW and VBW of spectrum analyzer to proper value.
- Measure the time duration of one transmission on the measured frequency. And then plot the result with time difference of this time duration.
- Repeat above procedures until all different time-slot modes have been completed.

9.2 Test SET-UP (Block Diagram of Configuration)



9.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	101414	05/15/2016	05/14/2017

9.4 Measurement Results

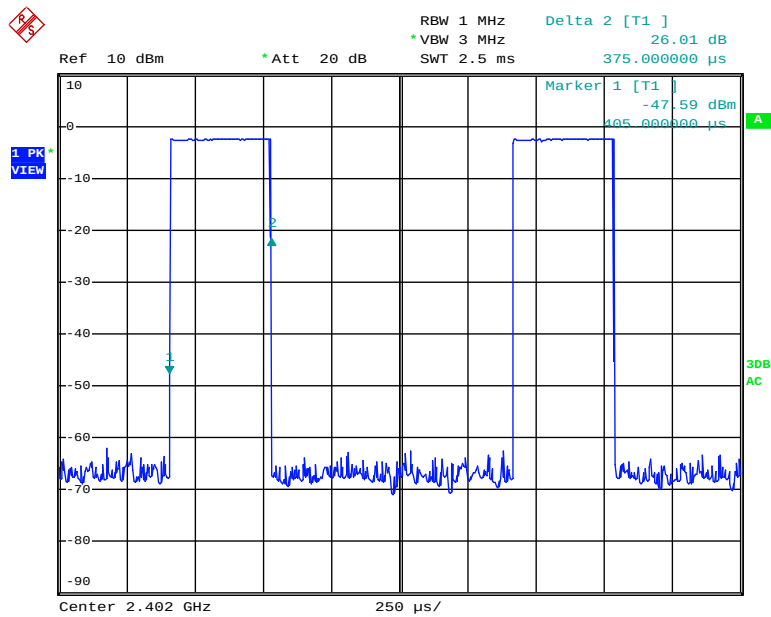
Refer to attached data chart.

Spectrum Detector: PK
 Test By: KK
 Test Result: PASS

Test Date : 06/13/2016
 Temperature : 24 °C
 Humidity : 54 %

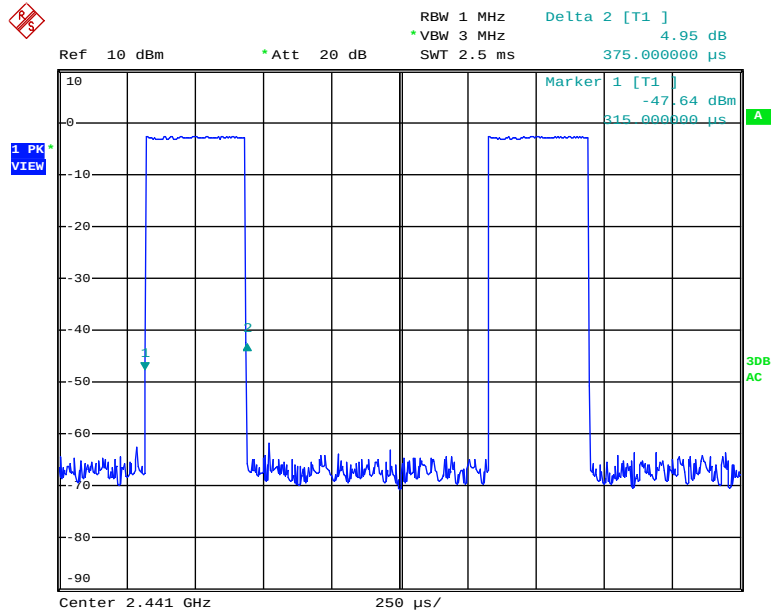
Mode	Channel	Pulse Width (ms)	Dwell Time (ms)	Limit (ms)	Result
GFSK Mode					
DH1	Low channel	0.375	120.0	400	Pass
	Middle channel	0.375	120.0	400	Pass
	High channel	0.375	120.0	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
DH3	Low channel	1.623	259.7	400	Pass
	Middle channel	1.639	262.2	400	Pass
	High channel	1.639	262.2	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
DH5	Low channel	2.883	307.5	400	Pass
	Middle channel	2.903	309.7	400	Pass
	High channel	2.883	307.5	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				
π/4-DPSK Mode					
2DH1	Low channel	0.384	128.9	400	Pass
	Middle channel	0.384	128.9	400	Pass
	High channel	0.384	128.9	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 2 ÷ 79) ×31.6 Second				
2DH3	Low channel	1.632	261.1	400	Pass
	Middle channel	1.632	261.1	400	Pass
	High channel	1.648	263.7	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 4 ÷ 79) ×31.6 Second				
2DH5	Low channel	2.892	308.5	400	Pass
	Middle channel	2.892	308.5	400	Pass
	High channel	2.912	310.6	400	Pass
	Note: Dwell time=Pulse Time (ms) × (1600 ÷ 6 ÷ 79) ×31.6 Second				

DH1: Low channel



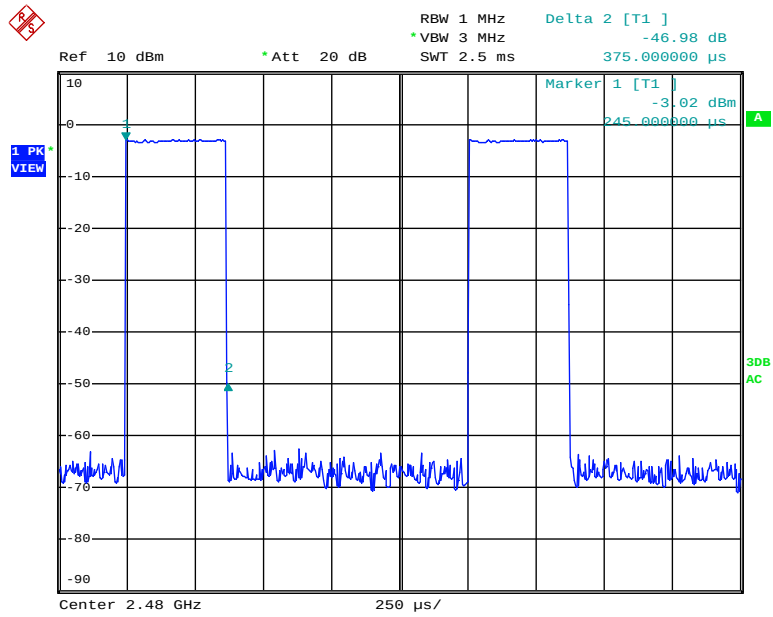
Date: 13.JUN.2016 19:14:50

DH1: Middle channel



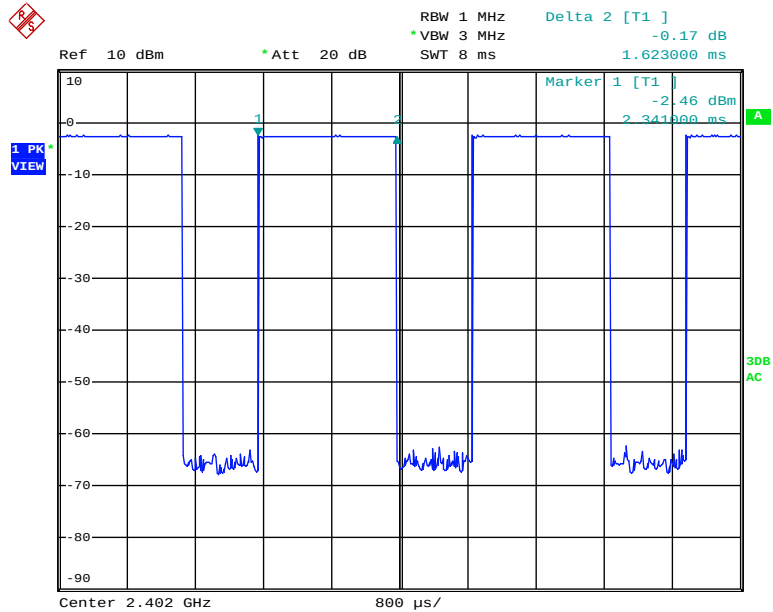
Date: 13.JUN.2016 19:16:15

DH1: High channel



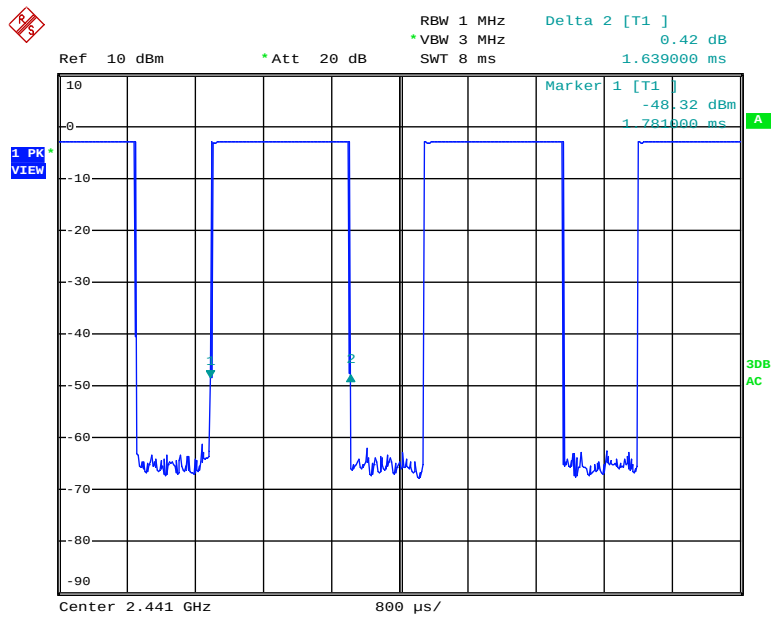
Date: 13.JUN.2016 19:16:35

DH3: Low channel



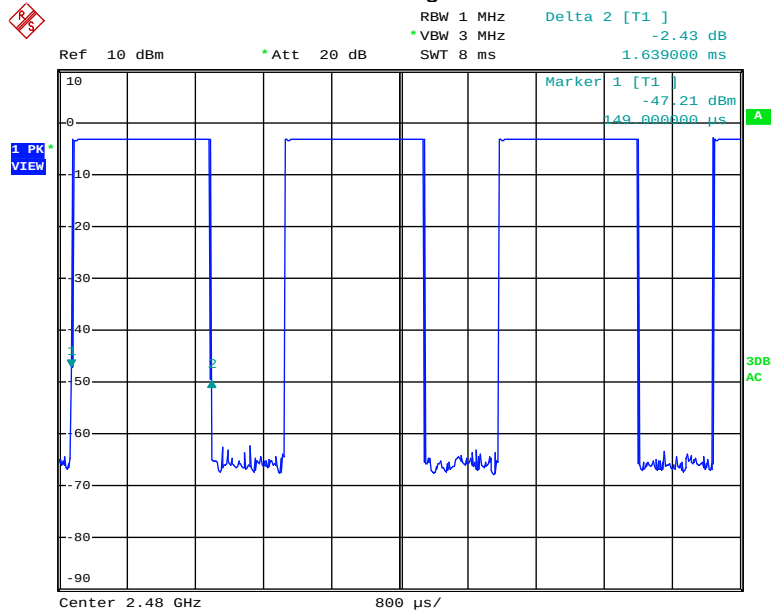
Date: 13.JUN.2016 19:17:53

DH3: Middle channel



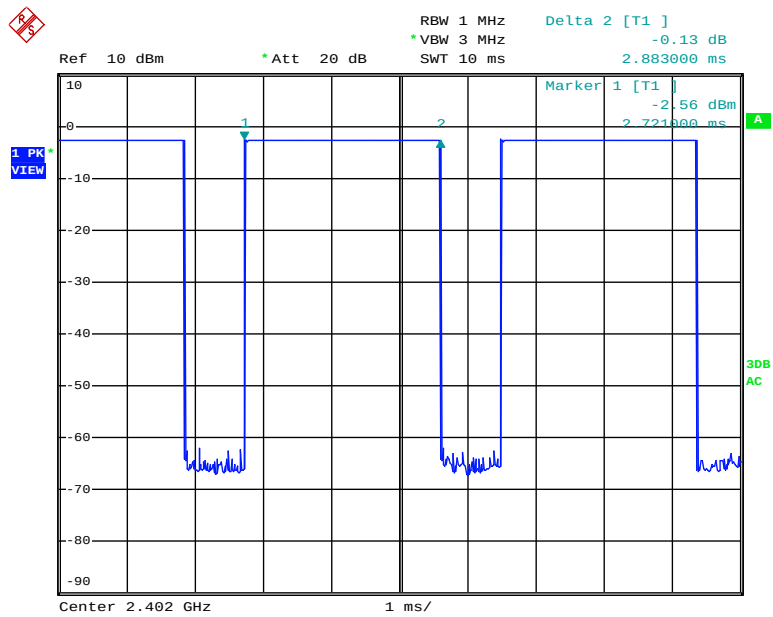
Date: 13.JUN.2016 19:17:31

DH3: High channel



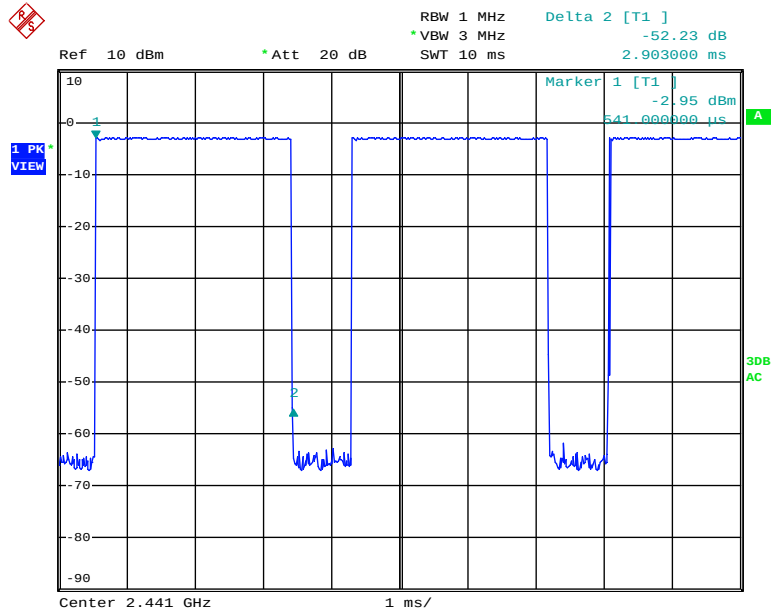
Date: 13.JUN.2016 19:17:05

DH5: Low channel



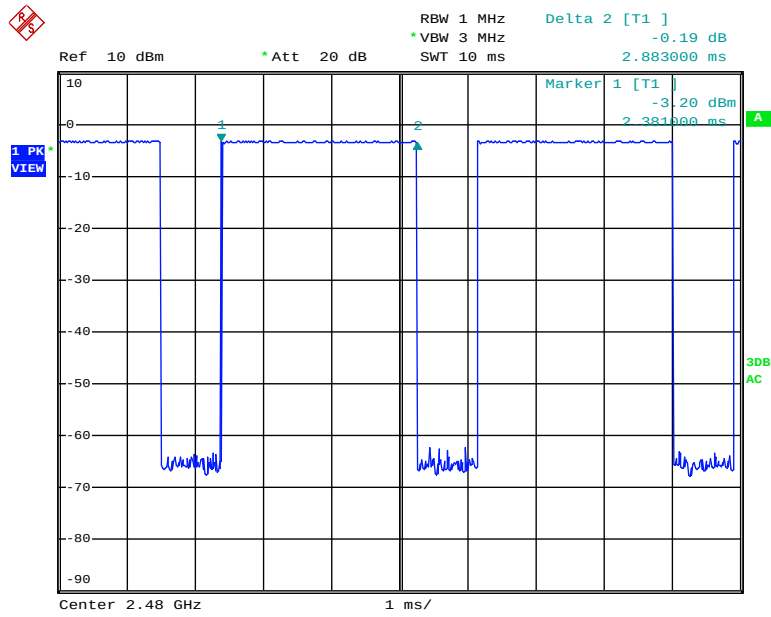
Date: 13.JUN.2016 19:18:17

DH5: Middle channel



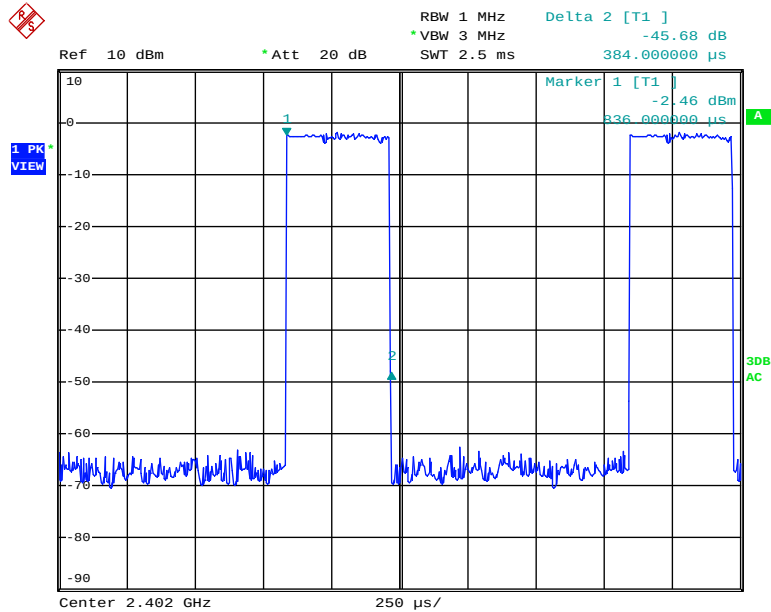
Date: 13.JUN.2016 19:18:55

DH5: High channel



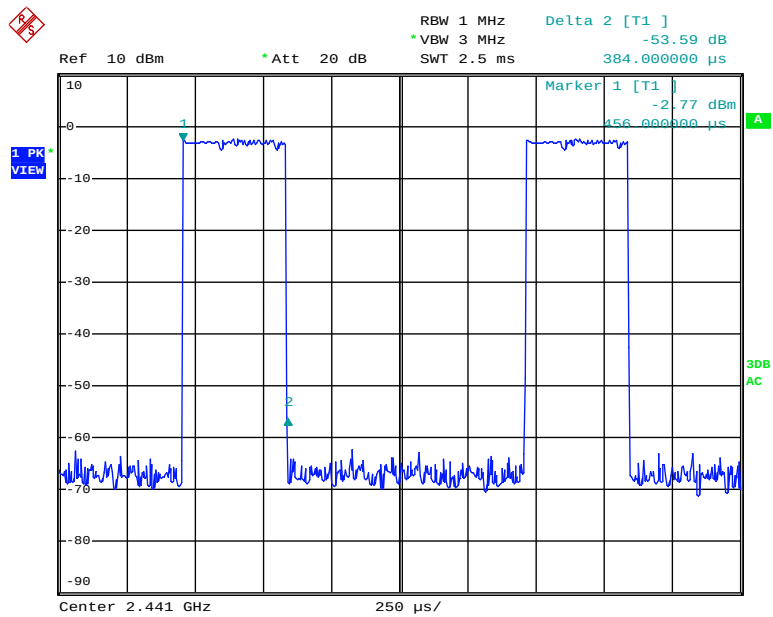
Date: 13.JUN.2016 19:19:18

2DH1: Low channel



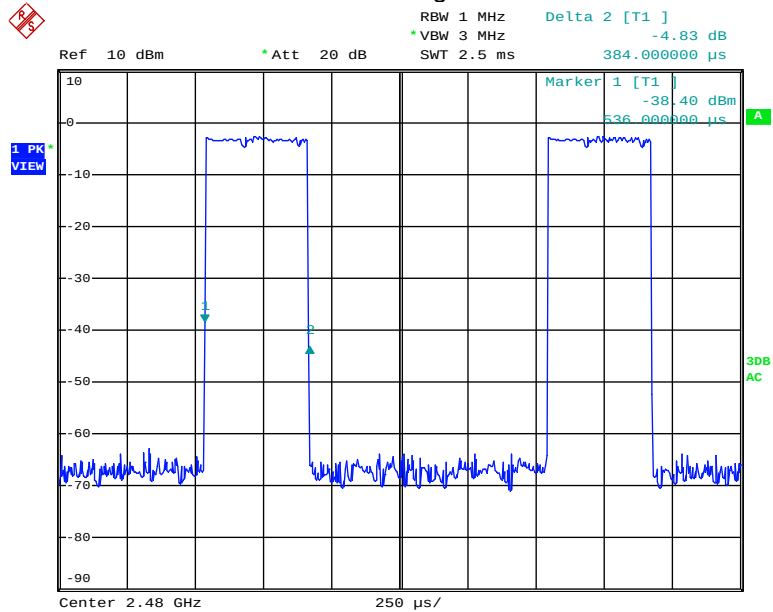
Date: 13.JUN.2016 19:20:00

2DH1: Middle channel



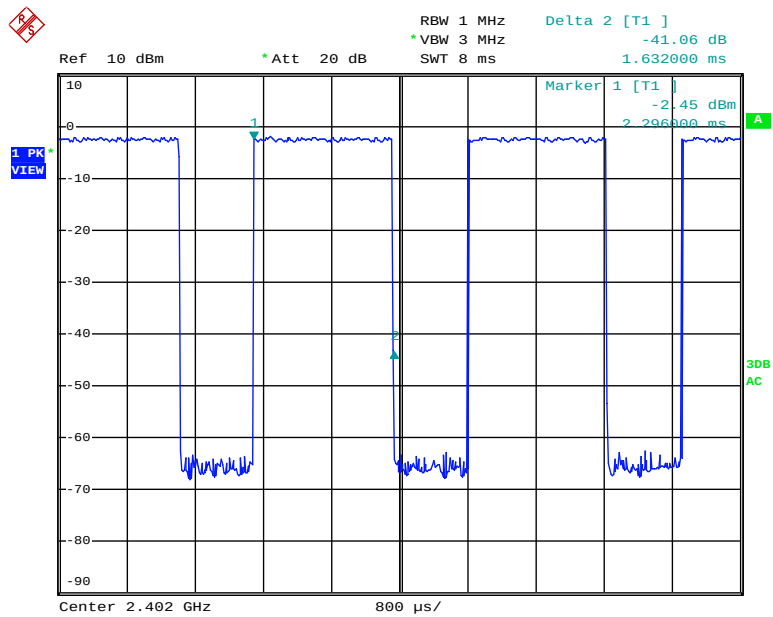
Date: 13.JUN.2016 19:20:23

2DH1: High channel



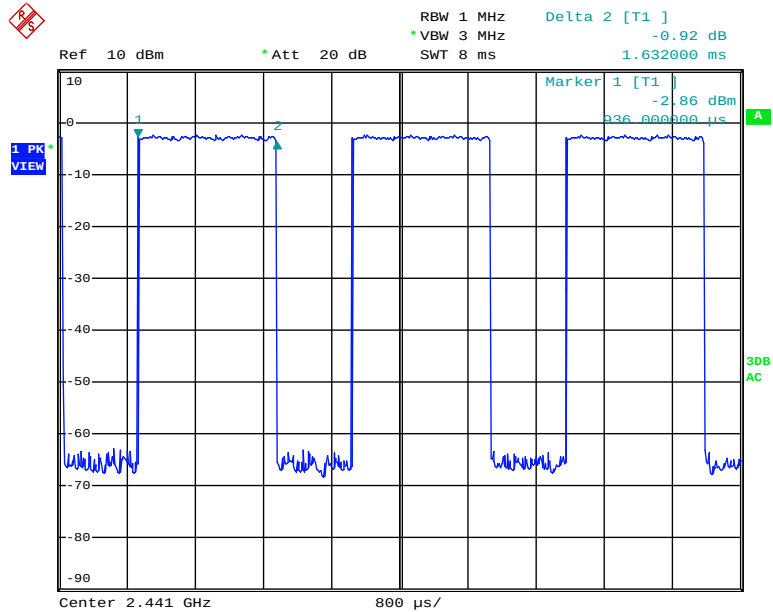
Date: 13.JUN.2016 19:20:58

2DH3: Low channel



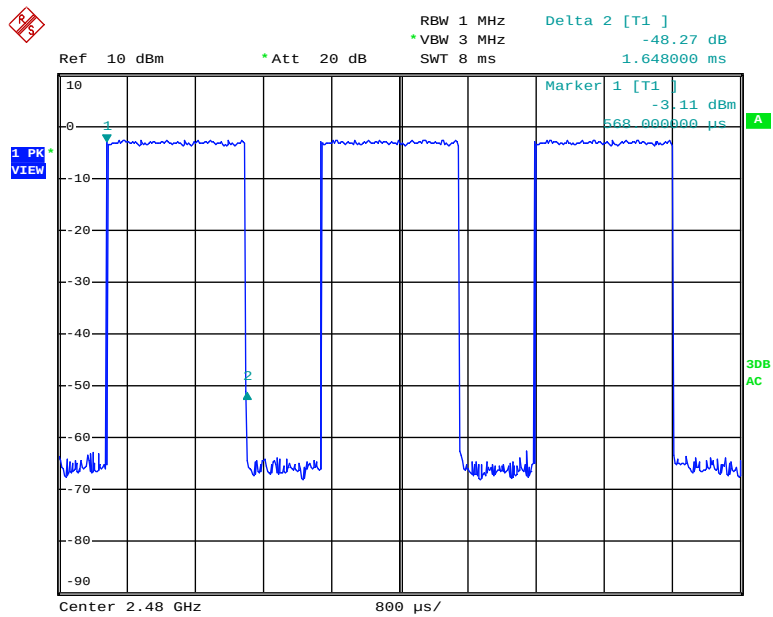
Date: 13.JUN.2016 19:22:06

2DH3: Middle channel



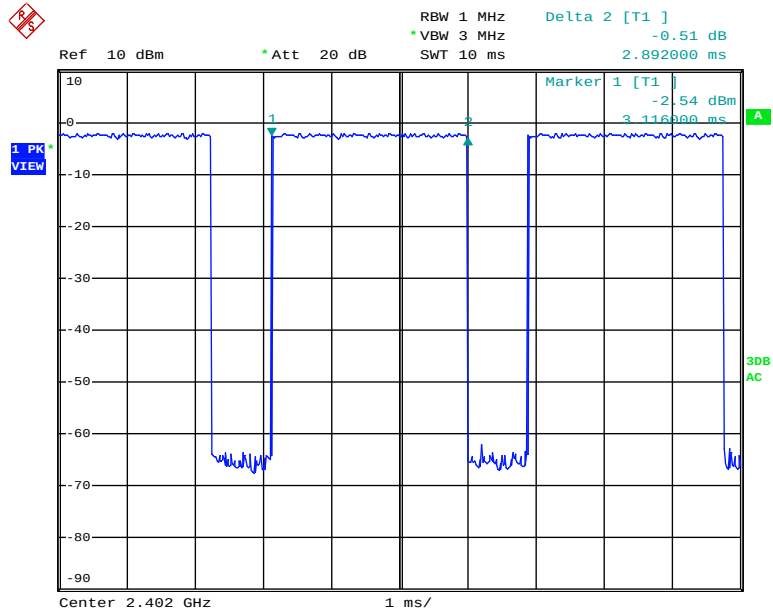
Date: 13.JUN.2016 19:21:43

2DH3: High channel



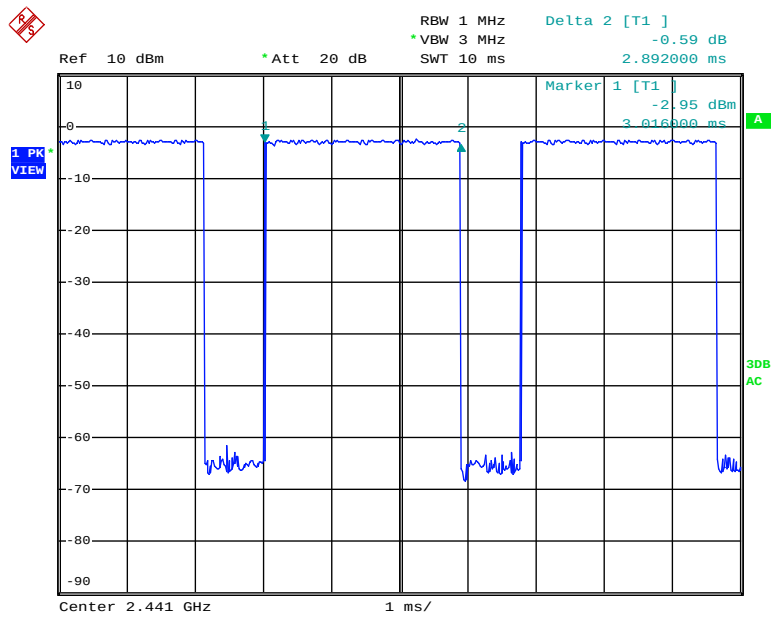
Date: 13.JUN.2016 19:21:19

2DH5: Low channel



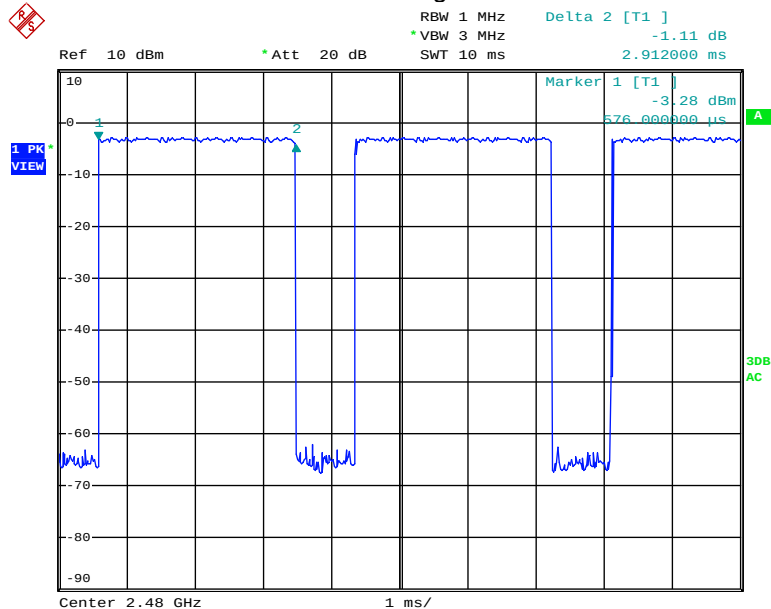
Date: 13.JUN.2016 19:22:25

2DH5: Middle channel



Date: 13.JUN.2016 19:23:06

2DH5: High channel



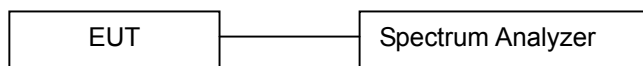
Date: 13.JUN.2016 19:23:42

10. Maximum Peak Output Power Test

10.1 Measurement Procedure

- Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.
- Measure the captured power within the band and recording the plot.
- Repeat above procedures until all frequencies required were complete.

10.2 Test SET-UP (Block Diagram of Configuration)



10.3 Measurement Equipment Used

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	ESCI	101414	05/15/2016	05/14/2017

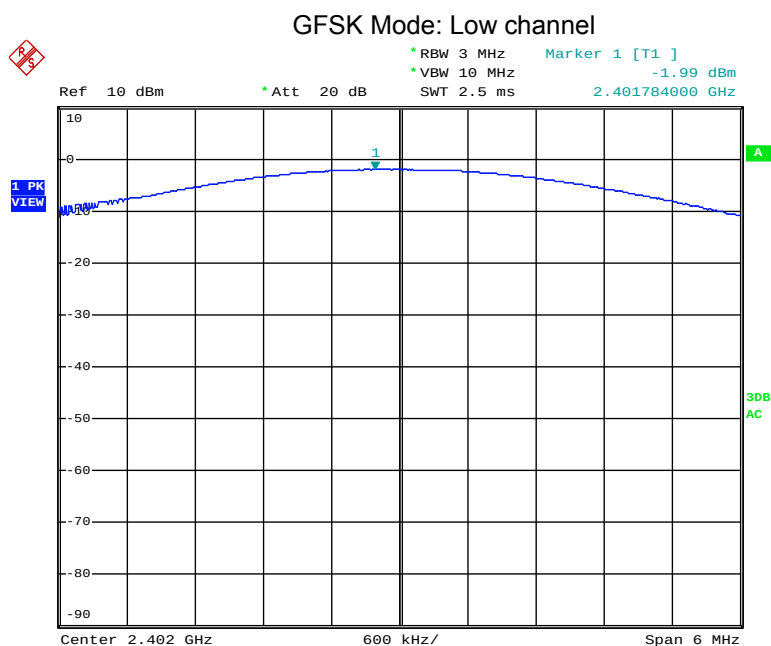
10.4 Measurement Results

Refer to attached data chart.

Spectrum Detector: PK
Test By: Kk
Test Result: PASS

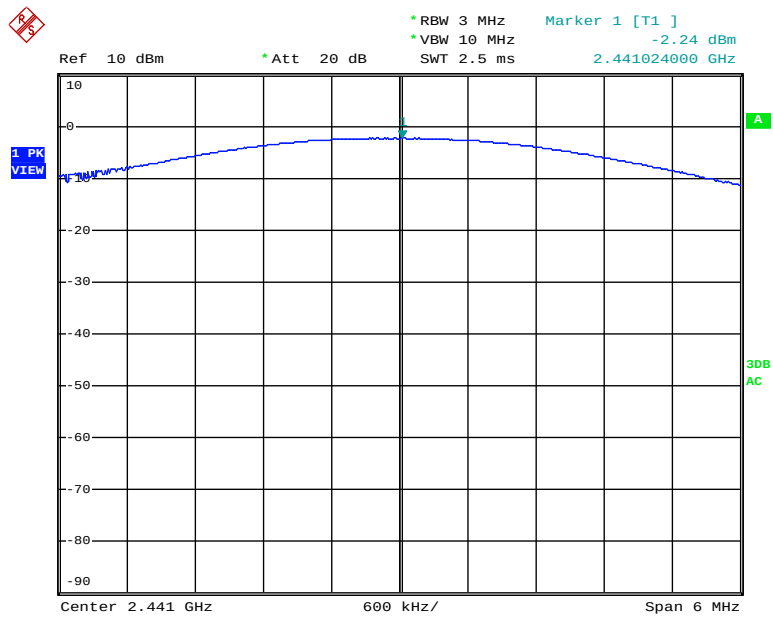
Test Date : 06/13/2016
Temperature : 24 °C
Humidity : 54 %

GFSK Mode					
Channel	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(W)	Pass/Fail
Low channel	2402.00	-1.99	0.632	1	PASS
Middle channel	2441.00	-2.24	0.597	1	PASS
High channel	2480.00	-2.48	0.565	1	PASS
$\pi/4$ -DQPSK Mode					
Channel	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
Low channel	2402.00	-1.11	0.692	125	PASS
Middle channel	2441.00	-1.41	0.723	125	PASS
High channel	2480.00	-1.60	0.774	125	PASS



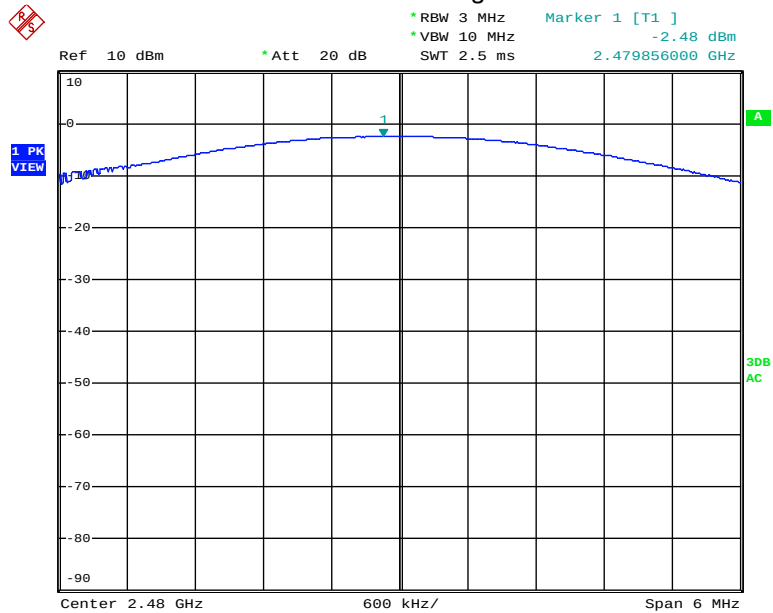
Date: 13.JUN.2016 13:19:29

GFSK Mode: Middle channel



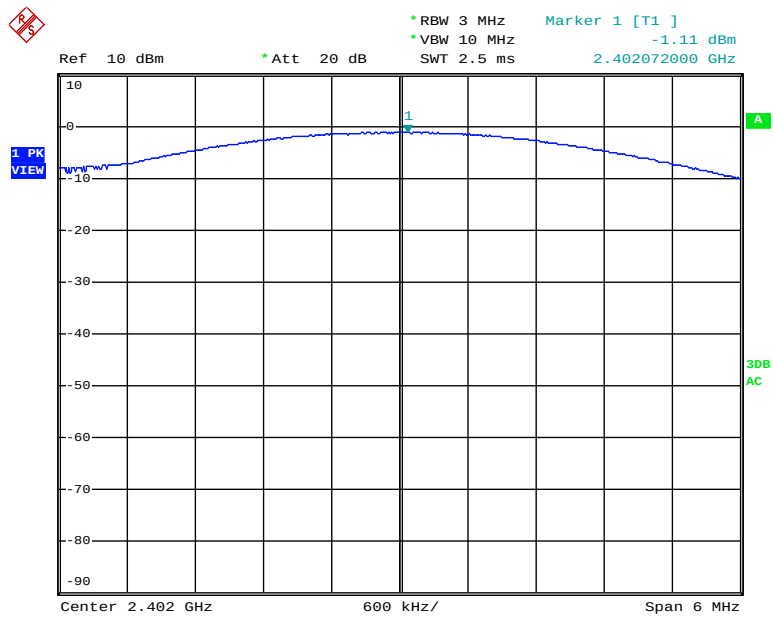
Date: 13.JUN.2016 13:19:53

GFSK Mode: High channel



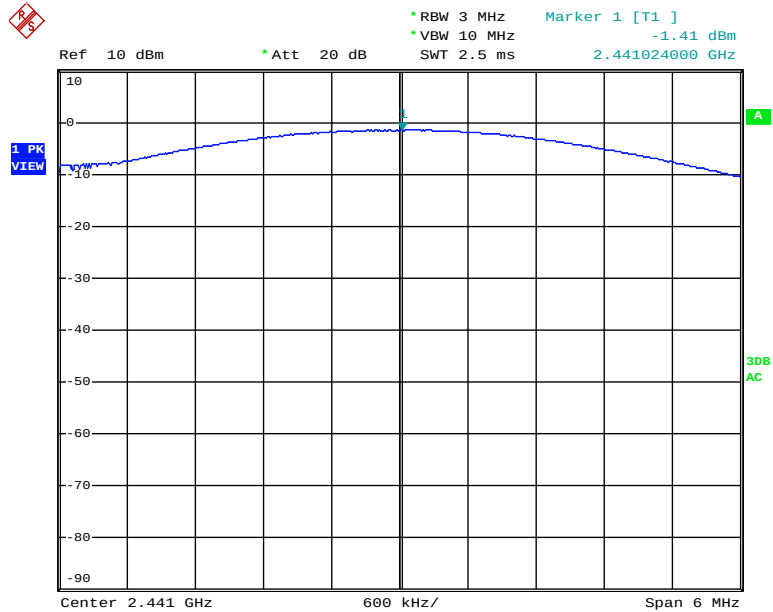
Date: 13.JUN.2016 13:20:14

$\pi/4$ -DQPSK Mode: Low channel



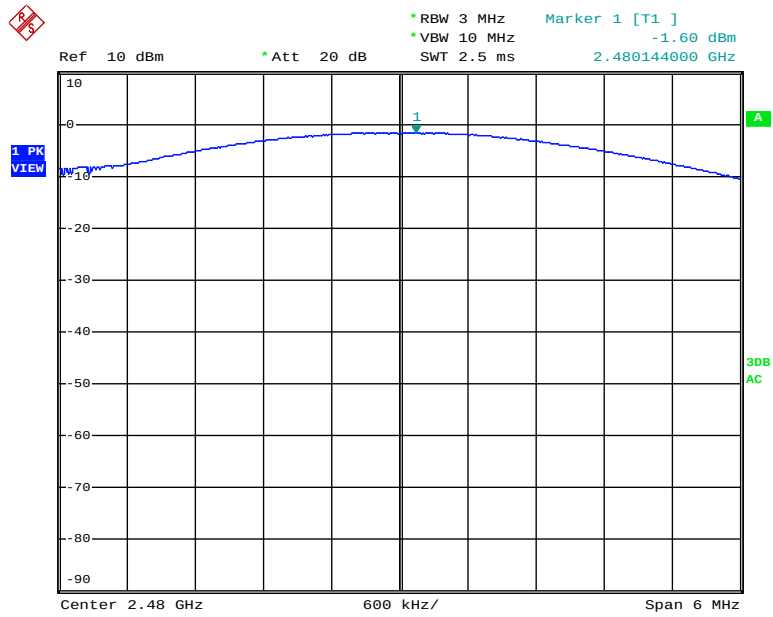
Date: 13.JUN.2016 13:21:40

$\pi/4$ -DQPSK Mode: Middle channel



Date: 13.JUN.2016 13:21:09

$\pi/4$ -DQPSK Mode: High channel



Date: 13.JUN.2016 13:20:35

11. Band Edge Test

11.1 Applicable Standard

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 §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

11.2 Measurement Procedure

(A) Conducted method:

Measurements were performed using a spectrum analyzer with a suitable span to encompass the peak of the fundamental and using the following settings: RBW = 100kHz, VBW = 300kHz.

(B) Radiated method:

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.
(Peak measurement: Peak detector, RBW=1MHz, VBW=3MHz, Sweep=Auto
Average measurement: Peak detector, RBW=1MHz, VBW=10Hz, Sweep=Auto)

11.3 Measurement Equipment Used

Conducted method: Same as 6.3 Channel Separation Measurement.

Radiated method: Same as 5.3 Radiated Emission Measurement.

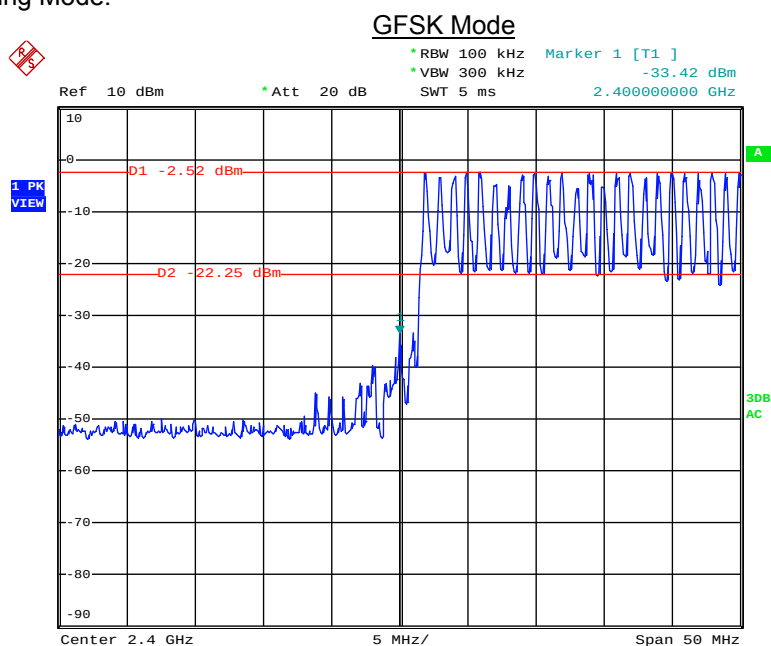
11.4 Measurement Results

Pass

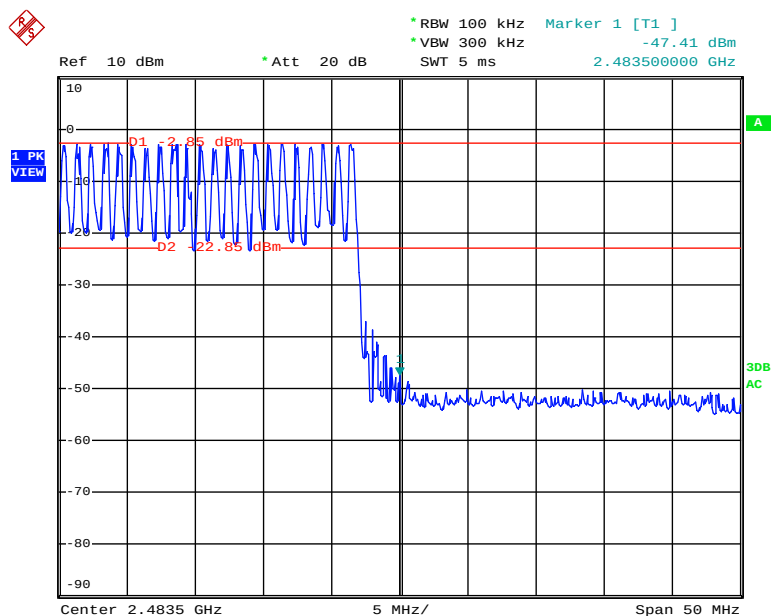
Refer to attached data chart.

(A) Conducted Measurement

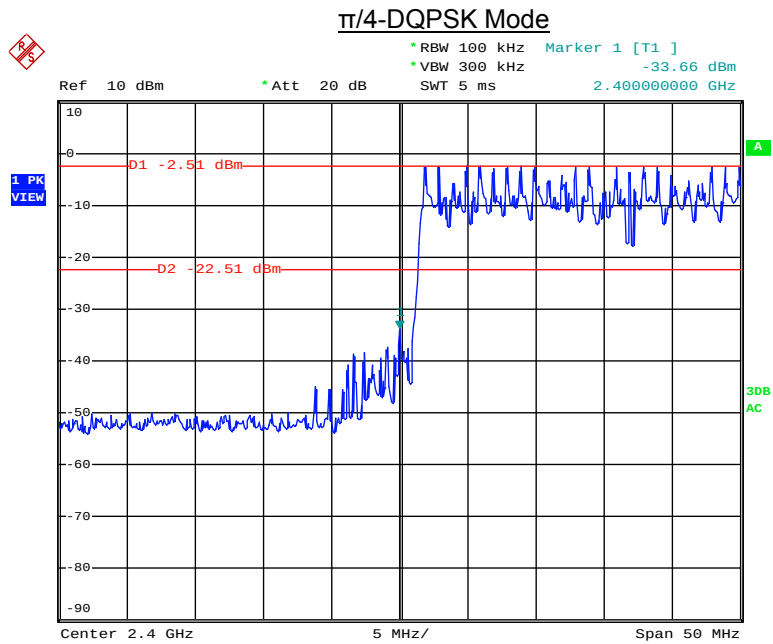
For Hopping Mode:



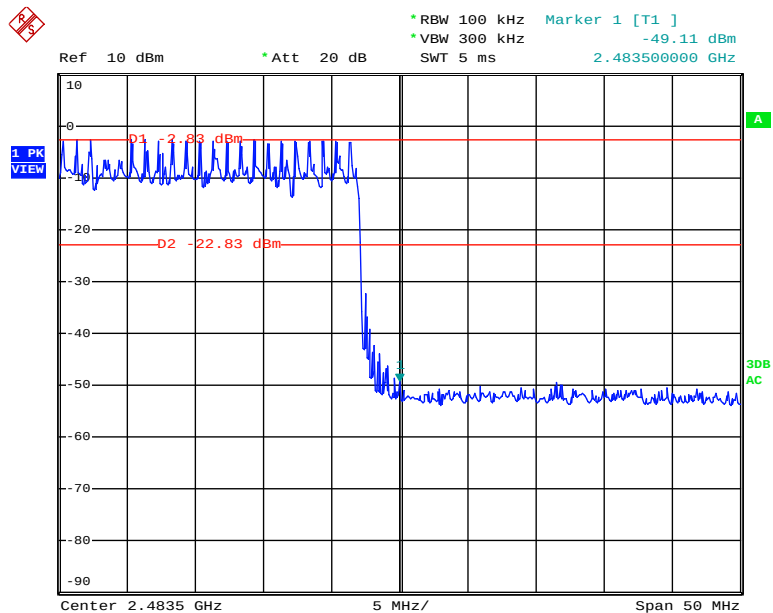
Date: 13.JUN.2016 13:37:30



Date: 13.JUN.2016 13:39:03



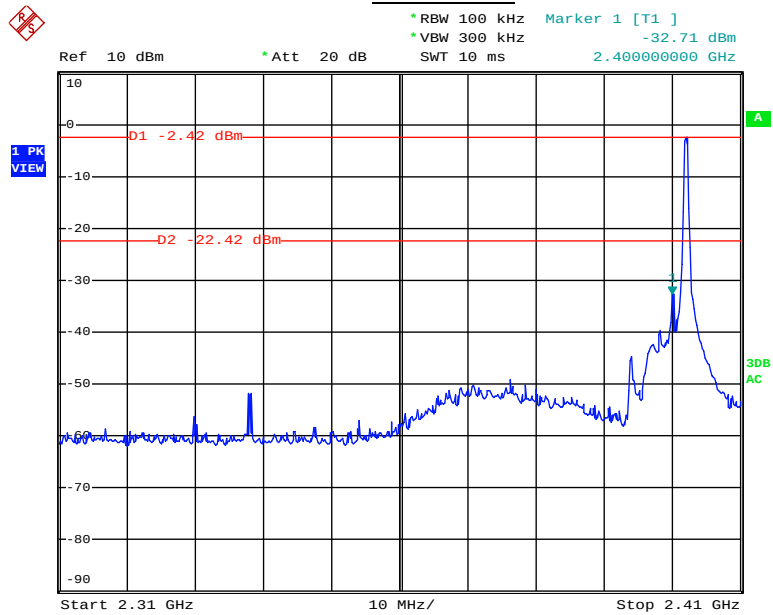
Date: 13.JUN.2016 13:41:46



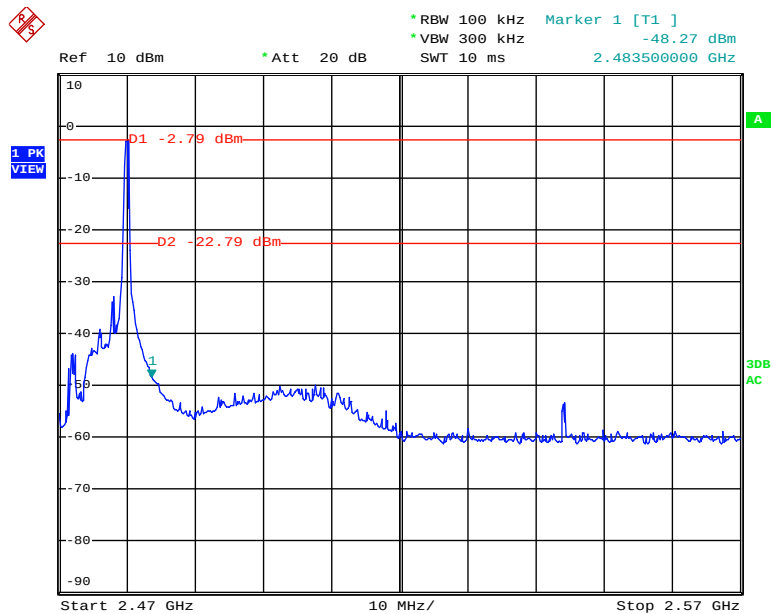
Date: 13.JUN.2016 13:40:23

For Non-Hopping Mode

GFSK Mode

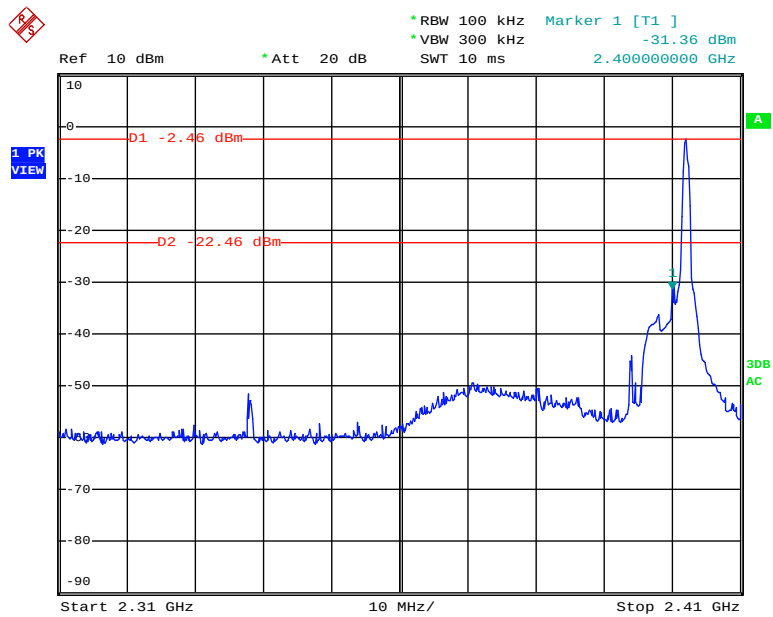


Date: 13.JUN.2016 13:43:17

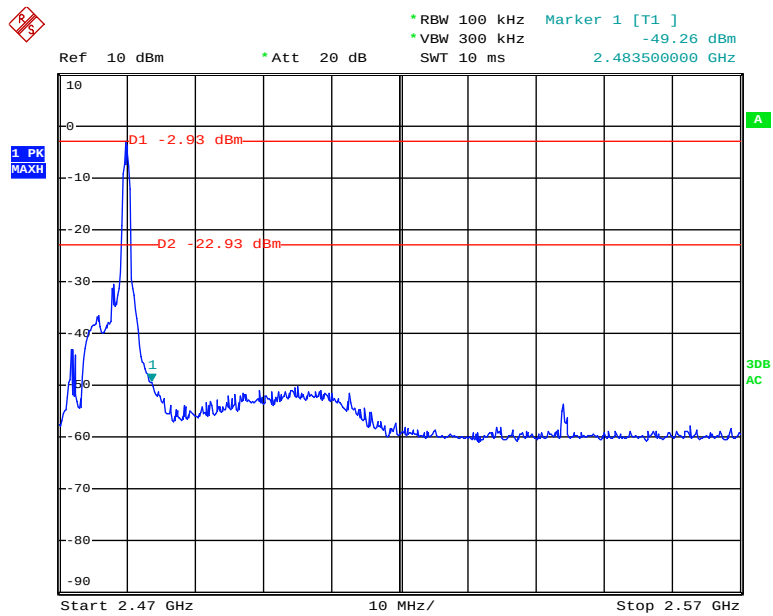


Date: 13.JUN.2016 13:44:50

$\pi/4$ -DQPSK Mode



Date: 13.JUN.2016 13:46:05



Date: 13.JUN.2016 13:47:27

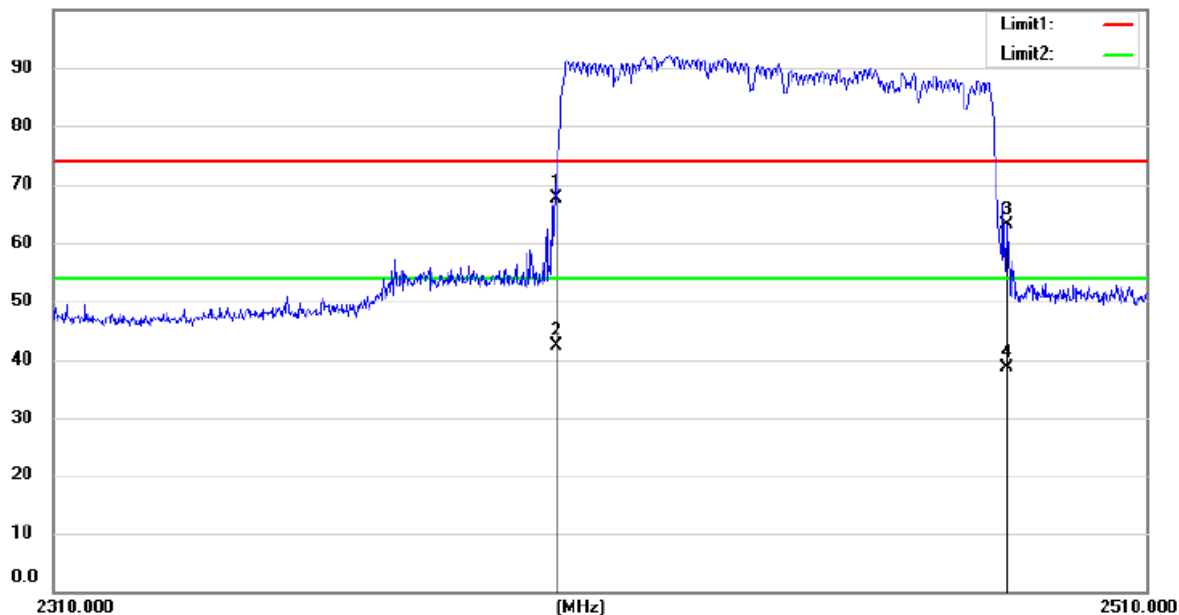
(B) Radiated Measurement

For Hopping Mode:

GFSK Mode

Vertical:

100.0 dBuV/m



Site site #1

Polarization: **Vertical**

Temperature: 20 C

Limit: (RE)FCC Part15 Class B (1~6GHz)Peak

Power: DC 5V

Humidity: 52 %

EUT: 15' rechargeable speaker

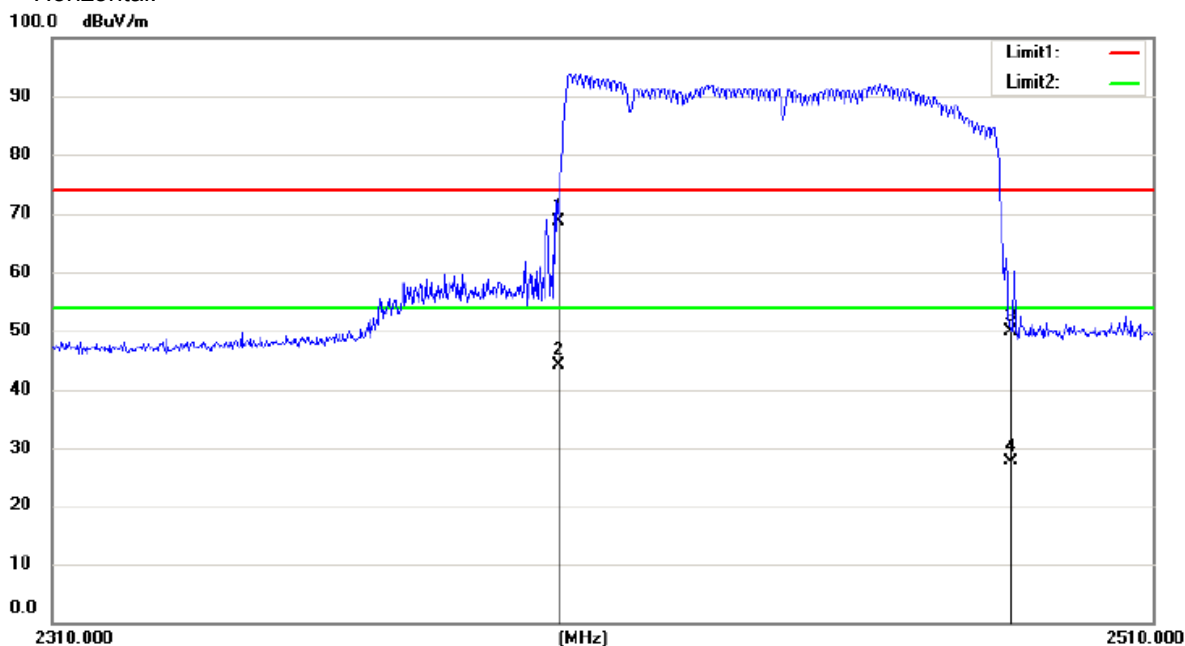
M/N: PBX4000BAT

Mode:GFSK

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	56.82	10.93	67.75	74.00	-6.25	peak		
2		2400.000	31.37	10.93	42.30	54.00	-11.70	AVG		
3		2483.500	52.20	11.00	63.20	74.00	-10.80	peak		
4		2483.500	27.70	11.00	38.70	54.00	-15.30	AVG		

Horizontal:



Site site #1

Polarization: **Horizontal**

Temperature: 20 C

Limit: (RE)FCC Part15 Class B (1~6GHz)Peak

Power: DC 5V

Humidity: 52 %

EUT: 15' rechargeable speaker

M/N: PBX4000BAT

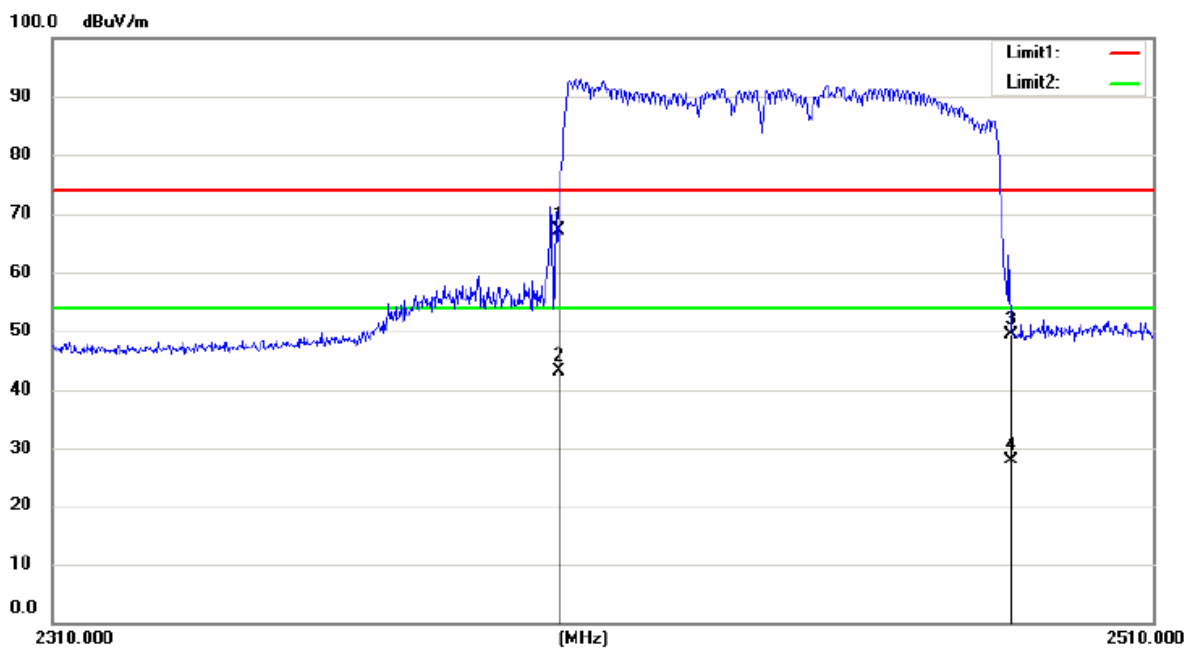
Mode:GFSK

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	57.68	10.93	68.61	74.00	-5.39	peak		
2		2400.000	33.27	10.93	44.20	54.00	-9.80	AVG		
3		2483.500	38.90	11.00	49.90	74.00	-24.10	peak		
4		2483.500	16.60	11.00	27.60	54.00	-26.40	AVG		

$\pi/4$ -DQPSK Mode

Horizontal:



Site site #1

Polarization: **Horizontal**

Temperature: 20 C

Limit: (RE)FCC Part15 Class B (1~6GHz)Peak

Power: DC 5V

Humidity: 52 %

EUT: 15' rechargeable speaker

M/N: PBX4000BAT

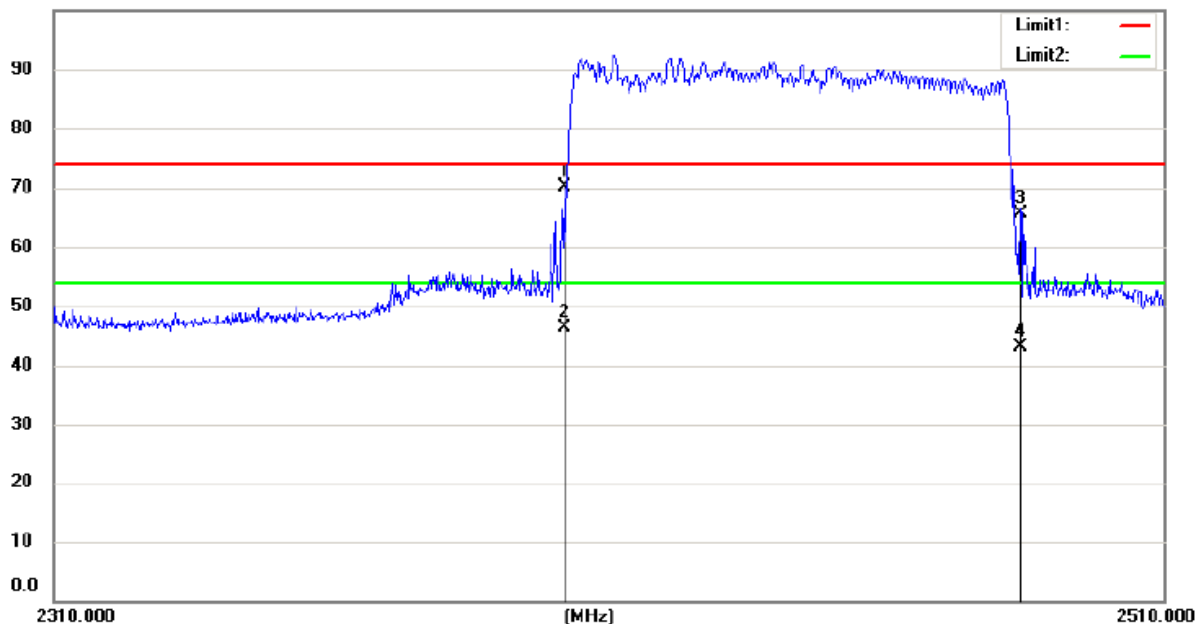
Mode: $\pi/4$ DQPSK

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1	*	2400.000	56.12	10.93	67.05	74.00	-6.95	peak		
2		2400.000	32.27	10.93	43.20	54.00	-10.80	AVG		
3		2483.500	38.50	11.00	49.50	74.00	-24.50	peak		
4		2483.500	16.90	11.00	27.90	54.00	-26.10	AVG		

Vertical:

100.0 dBuV/m



Site site #1

Polarization: **Vertical**

Temperature: 20 C

Limit: (RE)FCC Part15 Class B (1~6GHz)Peak

Power: DC 5V

Humidity: 52 %

EUT: 15' rechargeable speaker

M/N: PBX4000BAT

Mode: $\pi/4$ DQPSK

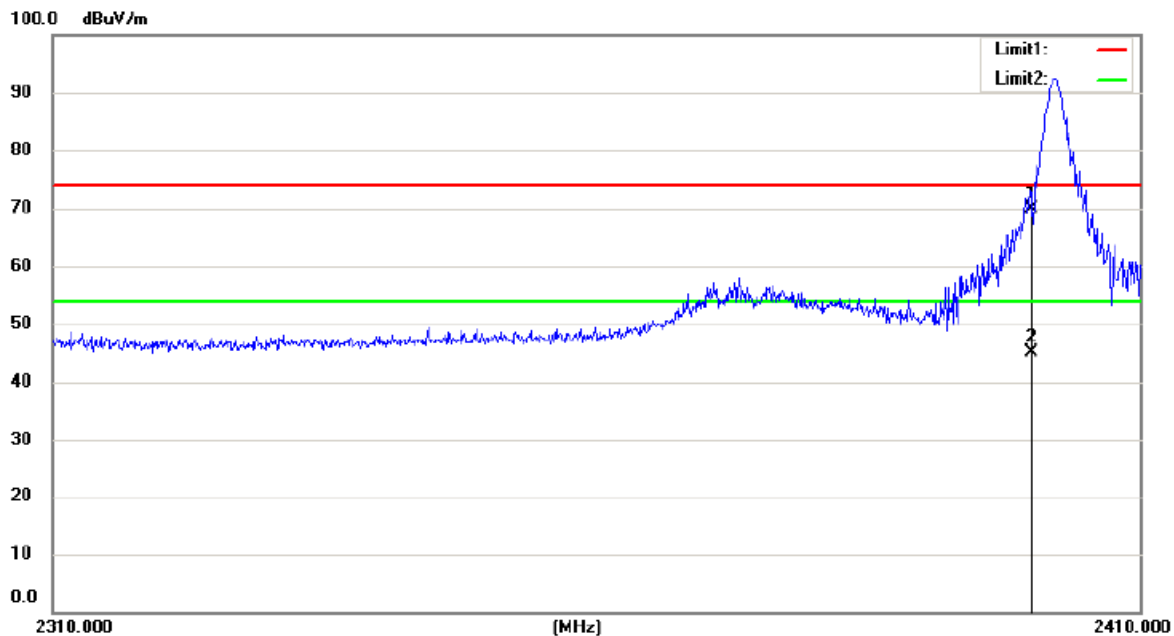
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	59.10	10.93	70.03	74.00	-3.97			peak
2		2400.000	35.47	10.93	46.40	54.00	-7.60			AVG
3		2483.500	54.66	11.00	65.66	74.00	-8.34			peak
4		2483.500	32.20	11.00	43.20	54.00	-10.80			AVG

For Non-Hopping Mode:

GFSK Mode

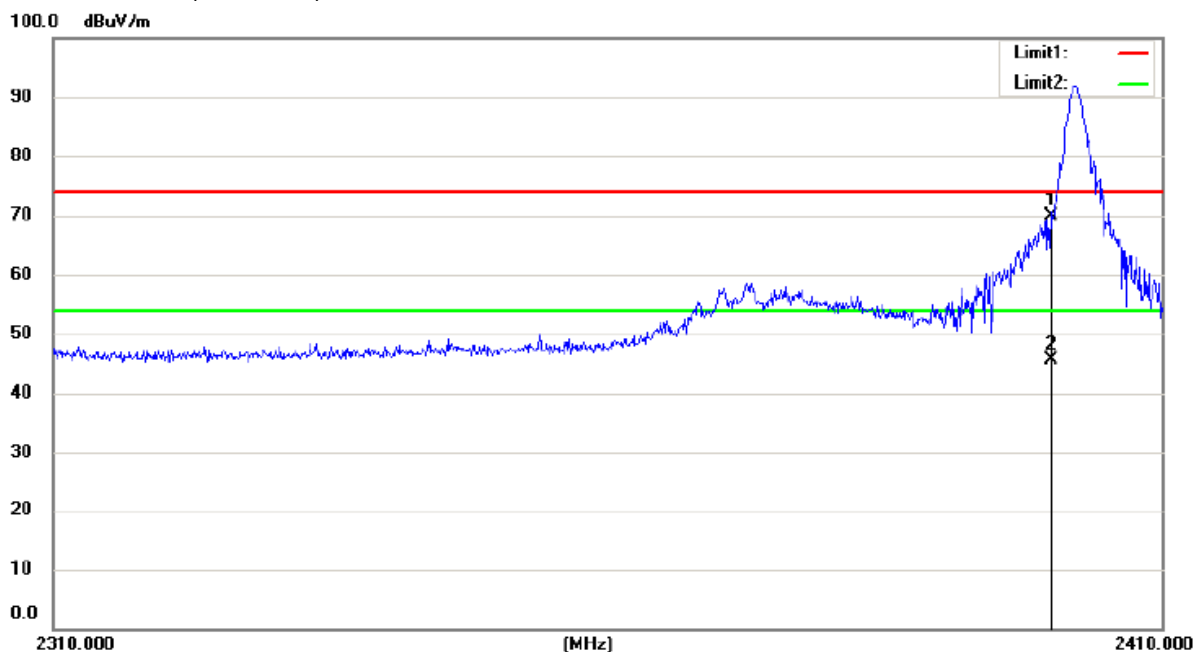
Low Channel (Vertical):



Site site #1 Polarization: **Vertical** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:GFSK
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	58.95	10.93	69.88	74.00	-4.12	peak		
2		2400.000	34.27	10.93	45.20	54.00	-8.80	AVG		

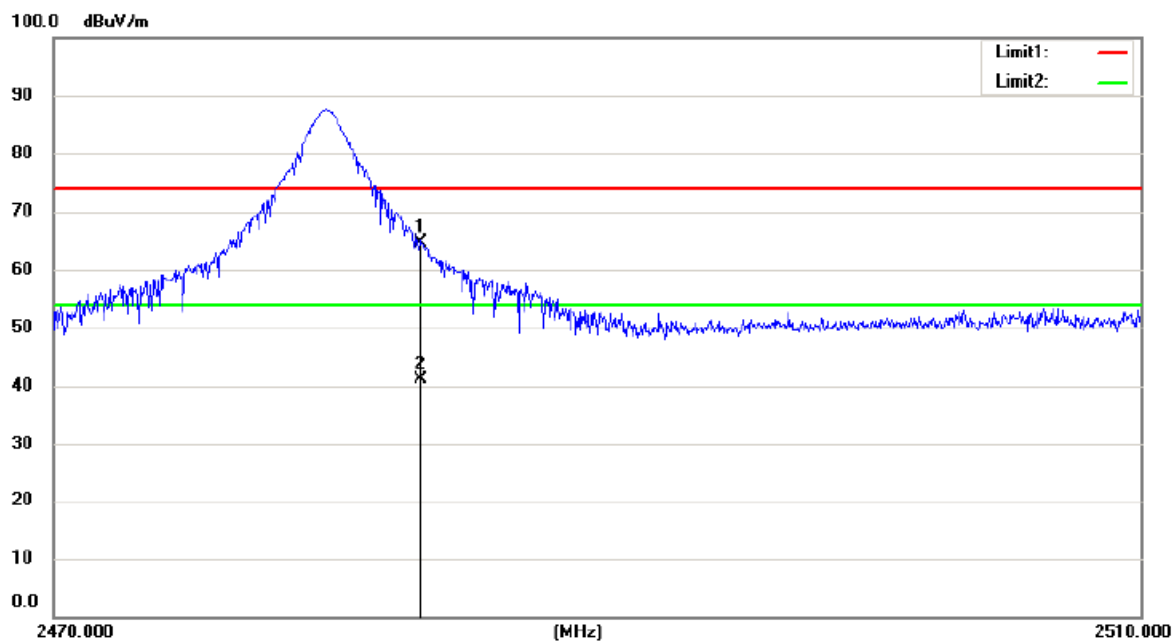
Low Channel (Horizontal):



Site site #1 Polarization: **Horizontal** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:GFSK
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	*	2400.000	58.98	10.93	69.91	74.00	-4.09	peak			
2		2400.000	34.67	10.93	45.60	54.00	-8.40	AVG			

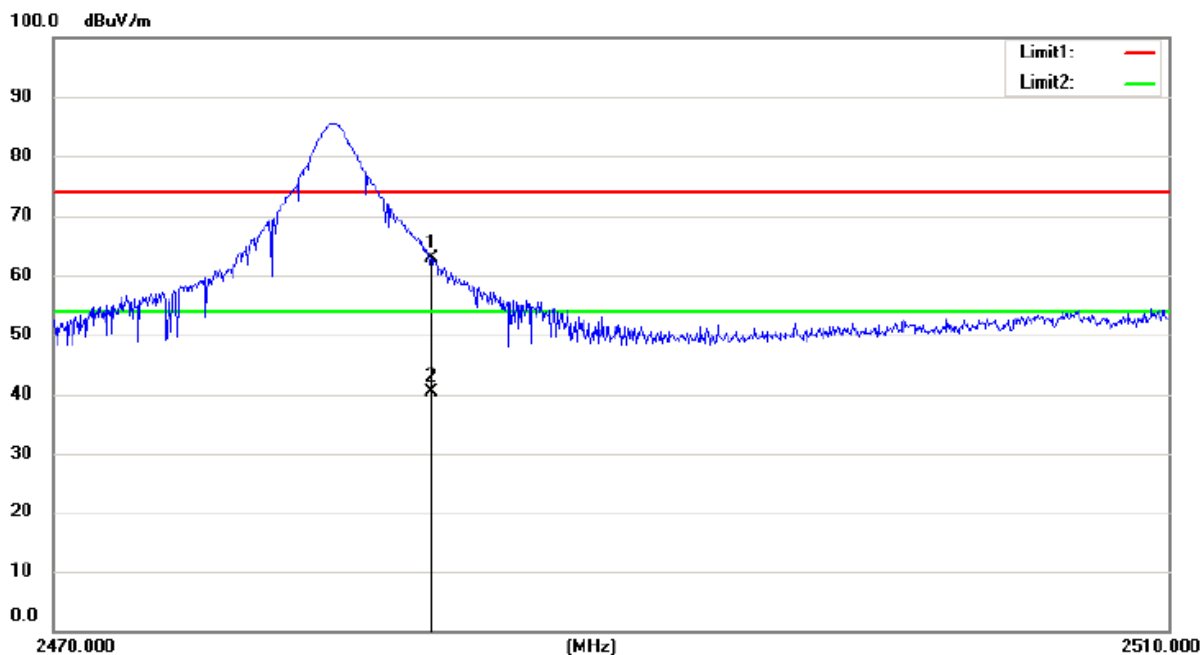
High Channel (Vertical):



Site site #1 Polarization: **Vertical** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:GFSK
 Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	53.61	11.00	64.61	74.00	-9.39	peak		
2		2483.500	30.20	11.00	41.20	54.00	-12.80	AVG		

High Channel (Horizontal):

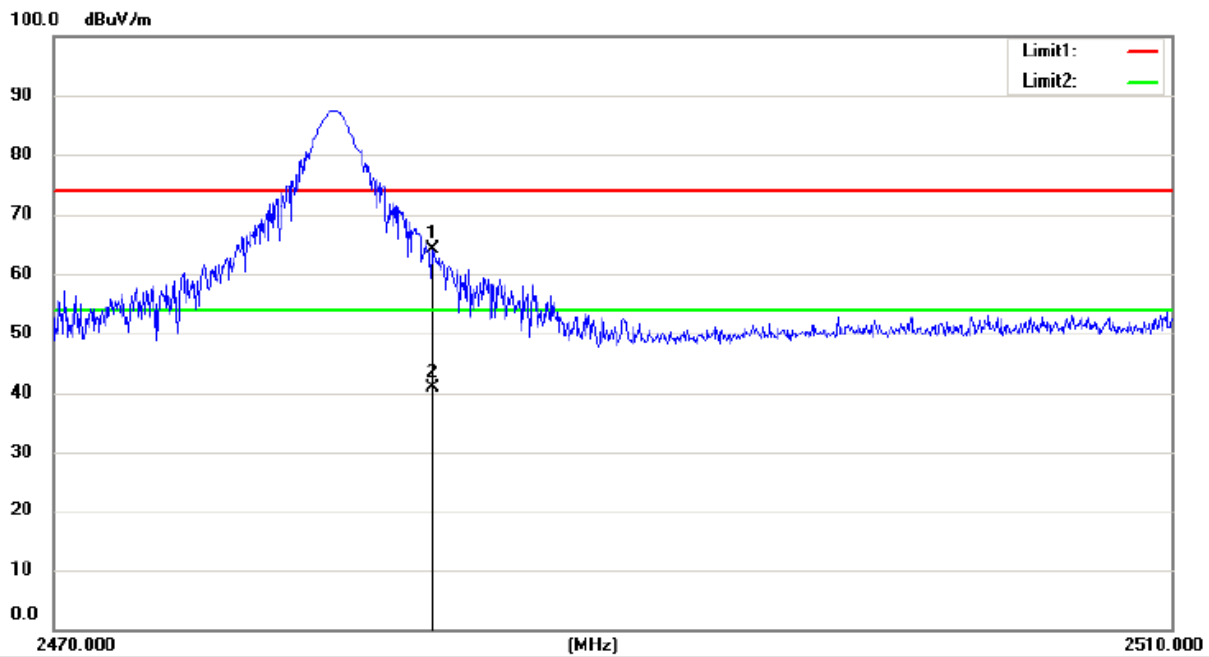


Site site #1 Polarization: **Horizontal** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode:GFSK
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree	Comment
1	*	2483.500	51.99	11.00	62.99	74.00	-11.01	peak		
2		2483.500	29.30	11.00	40.30	54.00	-13.70	AVG		

$\pi/4$ -DQPSK Mode

Low Channel (Vertical):



Site site #1

Polarization: **Vertical**

Temperature: 20 C

Limit: (RE)FCC Part15 Class B (1~6GHz)Peak

Power: DC 5V

Humidity: 52 %

EUT: 15' rechargeable speaker

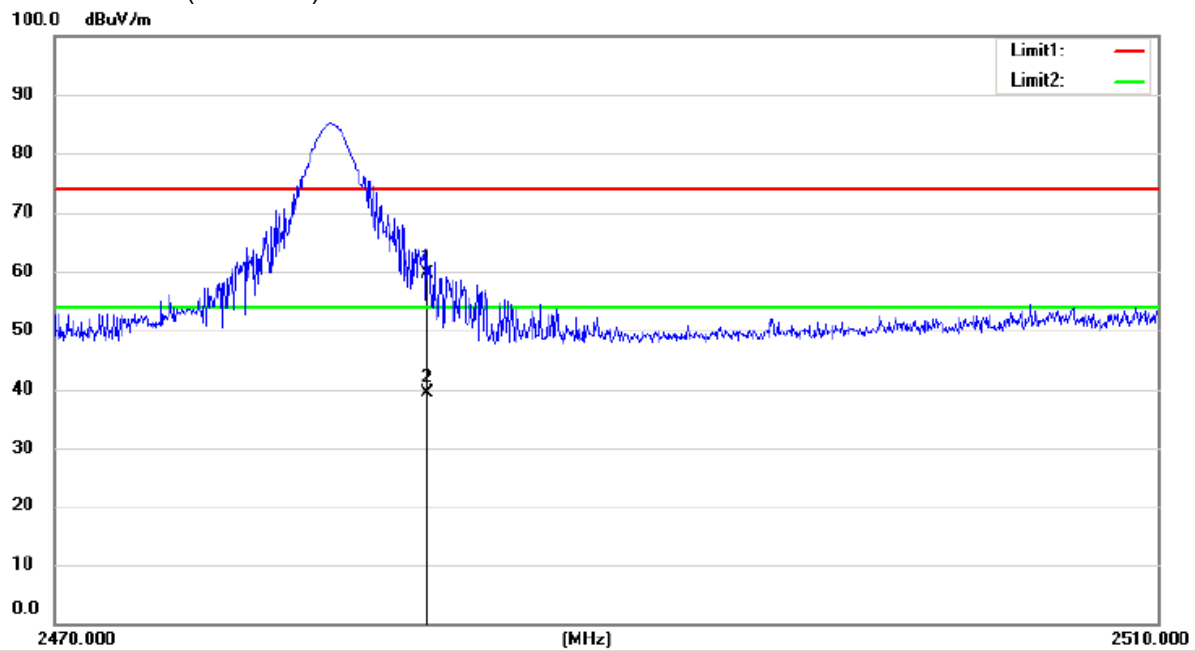
M/N: PBX4000BAT

Mode: $\pi/4$ DQPSK

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	53.06	11.00	64.06	74.00	-9.94	peak		
2		2483.500	29.80	11.00	40.80	54.00	-13.20	AVG		

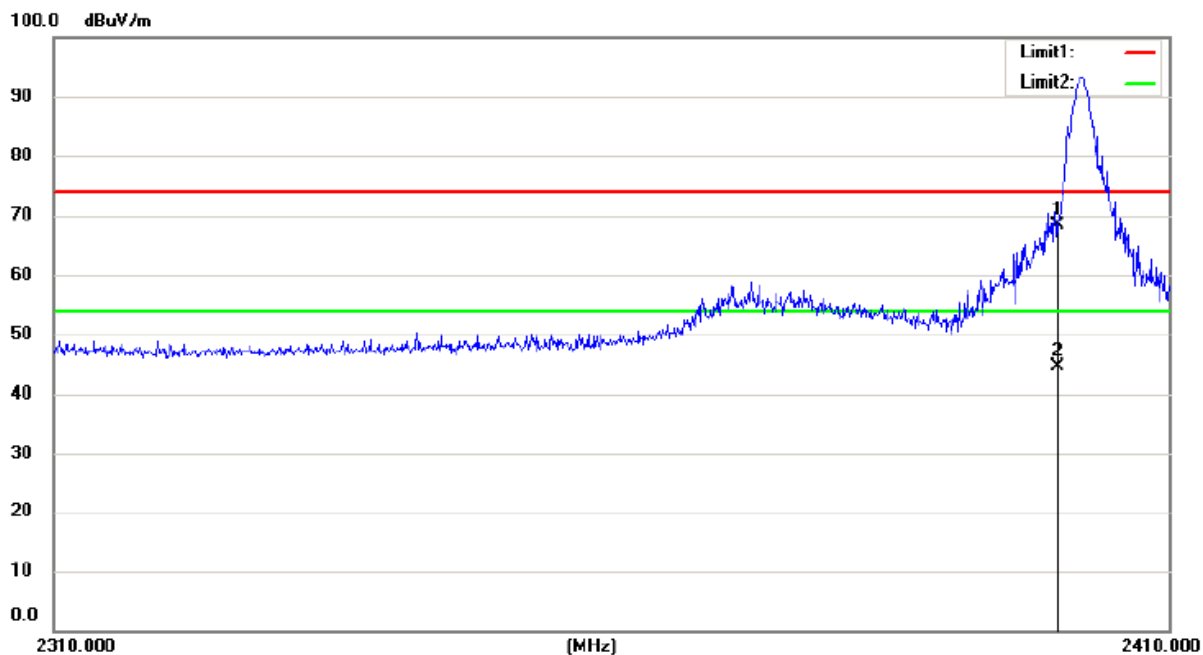
Low Channel (Horizontal):



Site site #1 Polarization: **Horizontal** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode: $\pi/4$ DQPSK
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2483.500	48.61	11.00	59.61	74.00	-14.39	peak		
2		2483.500	28.50	11.00	39.50	54.00	-14.50	AVG		

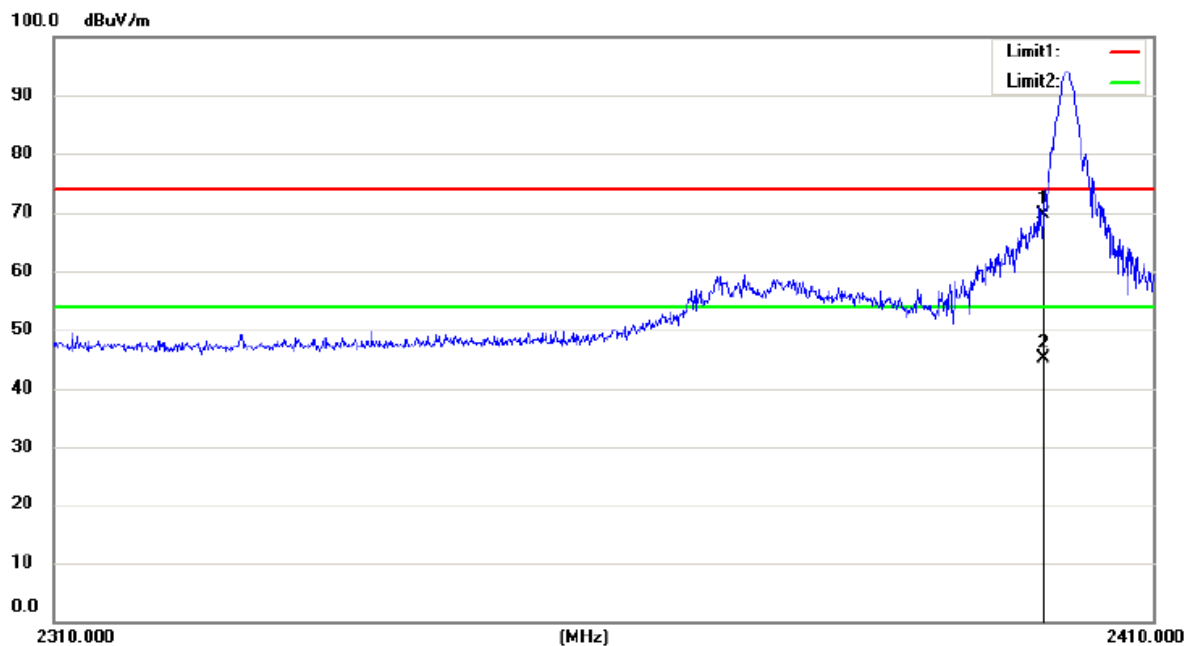
High Channel (Vertical):



Site site #1 Polarization: **Vertical** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode: $\pi/4$ DQPSK
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	57.39	10.93	68.32	74.00	-5.68	peak		
2		2400.000	33.67	10.93	44.60	54.00	-9.40	AVG		

High Channel (Horizontal):



Site site #1 Polarization: **Horizontal** Temperature: 20 C
 Limit: (RE)FCC Part15 Class B (1~6GHz)Peak Power: DC 5V Humidity: 52 %
 EUT: 15' rechargeable speaker
 M/N: PBX4000BAT
 Mode: $\pi/4$ DQPSK
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	2400.000	58.60	10.93	69.53	74.00	-4.47	peak		
2		2400.000	34.17	10.93	45.10	54.00	-8.90	AVG		

12. Antenna Port Emission

12.1 Test Equipment

Name of Equipment	Manufacturer	Model	Serial Number	Last Cal.	CAL DUE.
Spectrum Analyzer	Agilent	N9010A	My53470879	05/15/2016	05/14/2017

12.2 Measuring Instruments and setting

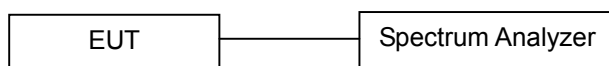
The following table is the setting of spectrum analyzer.

Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

12.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, mid, and hi channels, the limit was determined by attenuation 20dB of the RF peak power output.

12.4 Block Diagram of Test setup

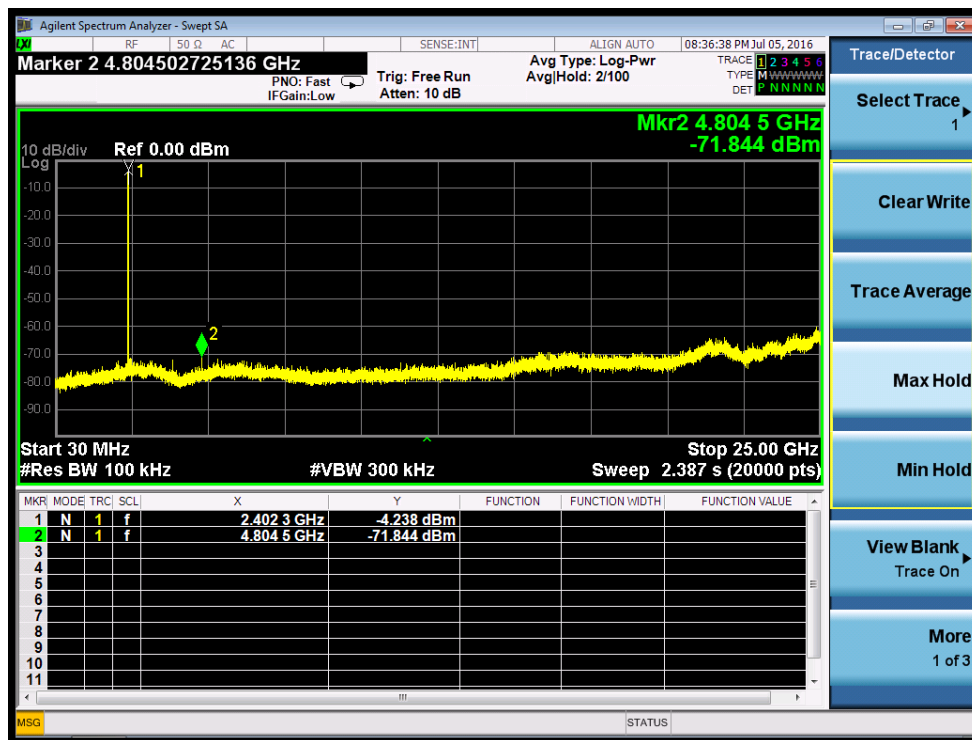


12.5 Test Result

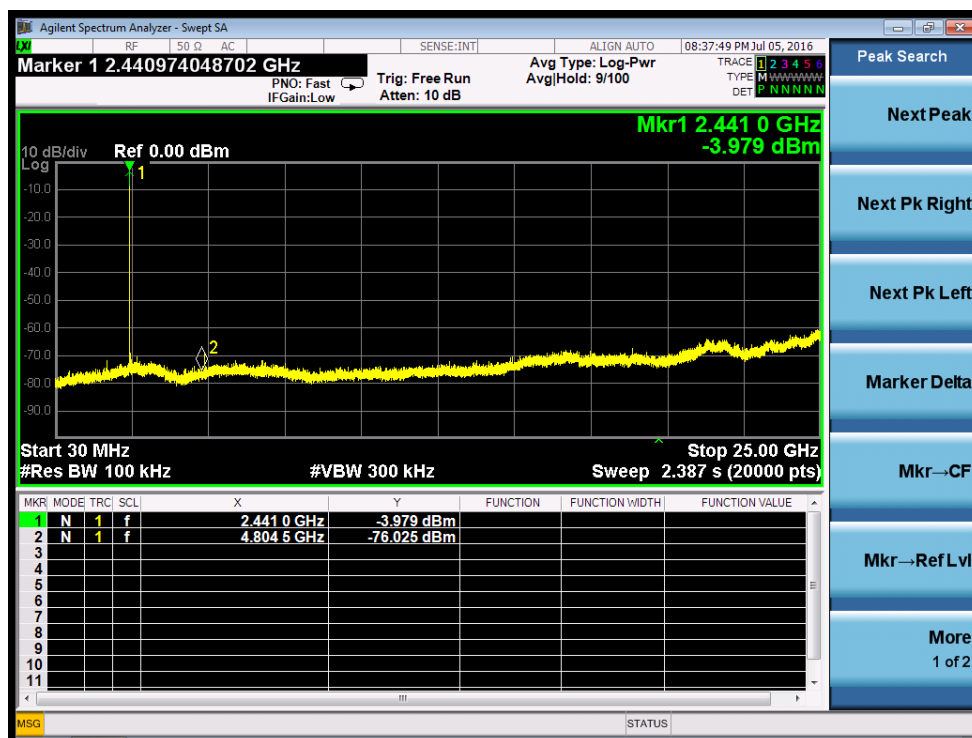
PASS.

(Bluetooth (GFSK, pi/4-DQPSK) mode have been tested, and the worst result(GFSK) was report as below.)

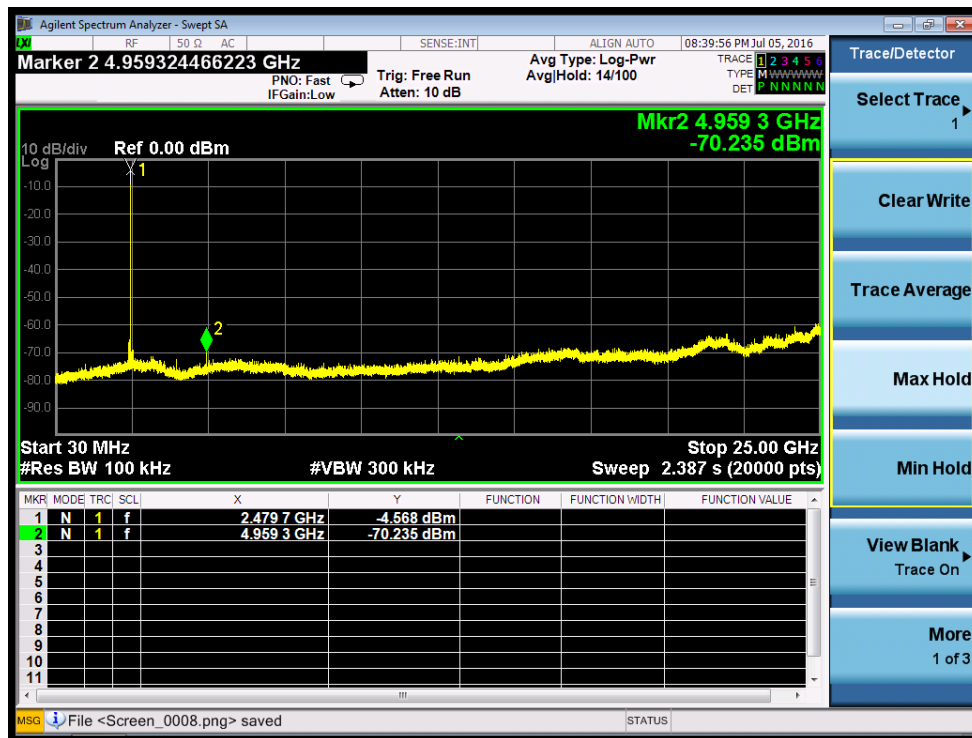
GFSK Mode: Low channel



GFSK Mode: Middle channel



GFSK Mode: High channel



13. Antenna Application

13.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.240.

FCC part 15C section 15.247 requirements:

Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

13.2 Result

The EUT's antenna integrated on PCB, The antenna's gain is 3.3dBi and meets the requirement

---The End---