

APPLICATION CERTIFICATION FCC Part 15C
On Behalf of

Bulk Unlimited Corp

Stage Karaoke
Model No.: 2700

FCC ID: 2AE67-2700

Prepared for : Bulk Unlimited Corp
Address : 199 Lee Ave. Suite 464, Brooklyn, New York, United States
11211

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Report No. : ATE20172103
Date of Test : Oct. 26-Nov. 8, 2017
Date of Report : Nov. 10, 2017

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Test Report Certification

Applicant : Bulk Unlimited Corp
Manufacturer : Dynamic Scientific Ltd
EUT Description : Stage Karaoke
Model No. : 2700
Trade Name : Croove

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247: 2017
ANSI C63.10: 2013

The device described above is tested by Shenzhen 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 Shenzhen 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 Shenzhen Accurate Technology Co., Ltd.

Date of Test : Oct. 26-Nov. 8, 2017

Date of Report : Nov. 10, 2017

Prepared by :

Star Yang
(Star Yang, Engineer)

Approved & Authorized Signer :

Sean Liu
(Sean Liu, Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Model Number	:	2700
Bluetooth version	:	V 4.2 This report is for BT classic mode
Frequency Range	:	2402MHz-2480MHz
Number of Channels	:	79
Antenna Gain(Max)	:	0dBi
Antenna type	:	Integral antenna
Adapter Input Voltage	:	DC 3.7V (Powered by Lithium battery) or DC 5V (Powered by USB port)
Modulation mode	:	GFSK, $\pi/4$ DQPSK, 8DPSK
Applicant	:	Bulk Unlimited Corp
Address	:	199 Lee Ave. Suite 464, Brooklyn, New York, United States 11211
Manufacturer	:	Dynamic Scientific Ltd
Address	:	Room 04&05, 21/F, Canny Industrial Building, 33 San Po Kong, Kowloon, Hong Kong

1.2. Accessory and Auxiliary Equipment

N/A

1.3. Description of Test Facility

EMC Lab	:	Recognition of accreditation by Federal Communications Commission (FCC) The Designation Number is CN1189 The Registration Number is 708358 Listed by Innovation, Science and Economic Development Canada (ISED) The Registration Number is 5077A-2 Accredited by China National Accreditation Service for Conformity Assessment (CNAS) The Registration Number is CNAS L3193 Accredited by American Association for Laboratory Accreditation (A2LA) The Certificate Number is 4297.01
Name of Firm	:	Shenzhen Accurate Technology Co., Ltd.
Site Location	:	1/F., Building A, Changyuan New Material Port, Science & Industry Park, Nanshan District, Shenzhen, Guangdong, P.R. China

1.4. 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. 07, 2017	1 Year
EMI Test Receiver	Rohde&Schwarz	ESPI3	101526/003	Jan. 07, 2017	1 Year
Spectrum Analyzer	Agilent	E7405A	MY45115511	Jan. 07, 2017	1 Year
Pre-Amplifier	Rohde&Schwarz	CBLU118354 0-01	3791	Jan. 07, 2017	1 Year
Loop Antenna	Schwarzbeck	FMZB1516	1516131	Jan. 13, 2017	1 Year
Bilog Antenna	Schwarzbeck	VULB9163	9163-323	Jan. 13, 2017	1 Year
Horn Antenna	Schwarzbeck	BBHA9120D	9120D-655	Jan. 13, 2017	1 Year
Horn Antenna	Schwarzbeck	BBHA9170	9170-359	Jan. 13, 2017	1 Year
LISN	Rohde&Schwarz	ESH3-Z5	100305	Jan. 07, 2017	1 Year
LISN	Schwarzbeck	NSLK8126	8126431	Jan. 07, 2017	1 Year
Highpass Filter	Wainwright Instruments	WHKX3.6/18 G-10SS	N/A	Jan. 07, 2017	1 Year
Band Reject Filter	Wainwright Instruments	WRCG2400/2 485-2375/2510 -60/11SS	N/A	Jan. 07, 2017	1 Year

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

The mode is used: Transmitting mode

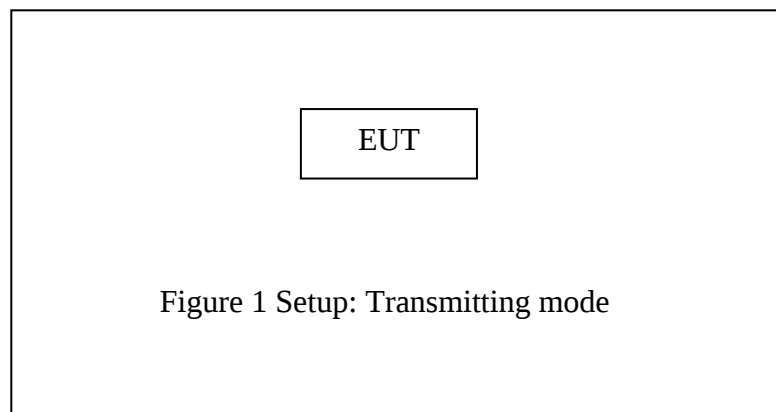
Low Channel: 2402MHz

Middle Channel: 2441MHz

High Channel: 2480MHz

Hopping

3.2.Configuration and peripherals

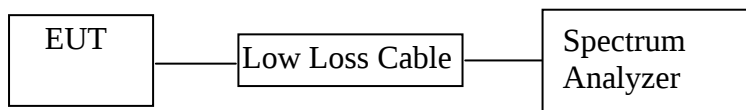


4. TEST PROCEDURES AND RESULTS

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: Stage Karaoke)

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 100 kHz and VBW to 300 kHz.

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

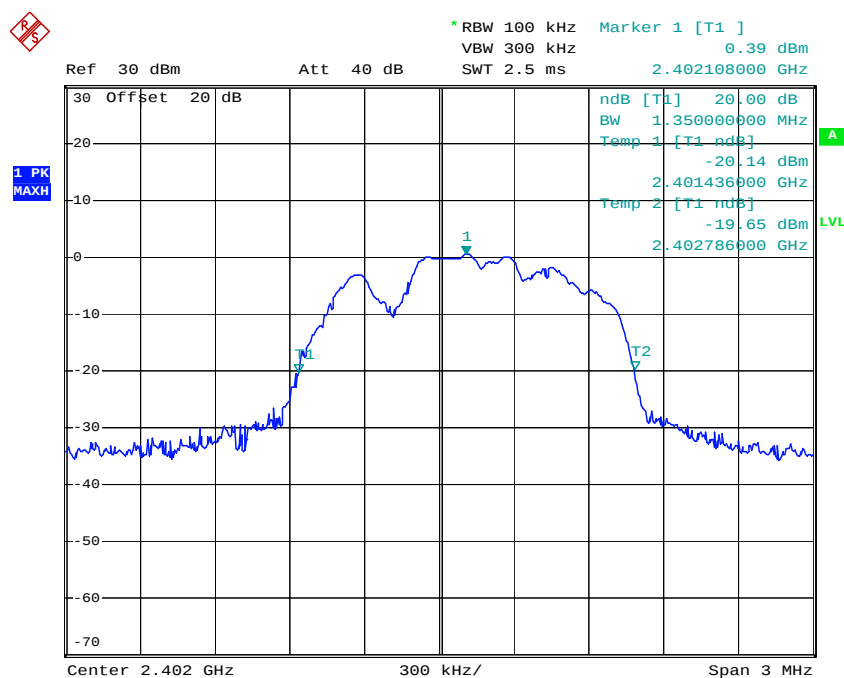
5.6. Test Result

Channel	Frequency (MHz)	GFSK 20dB Bandwidth (MHz)	Π/4-DQPSK 20dB Bandwidth (MHz)	8DPSK 20dB Bandwidth (MHz)	Result
Low	2402	1.350	1.122	1.296	Pass
Middle	2441	1.344	1.158	1.284	Pass
High	2480	1.152	1.248	1.302	Pass

The spectrum analyzer plots are attached as below.

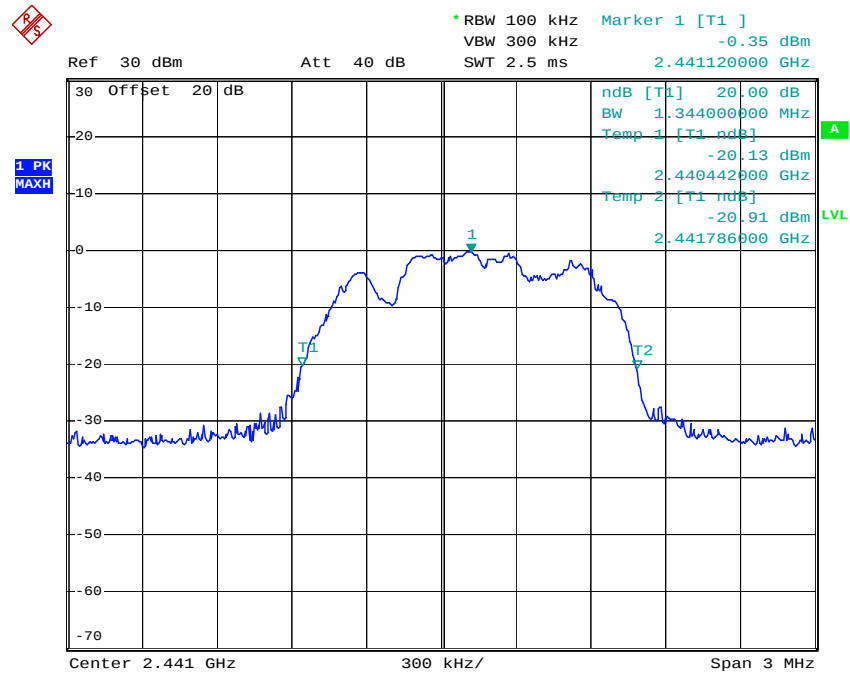
GFSK Mode

Low channel



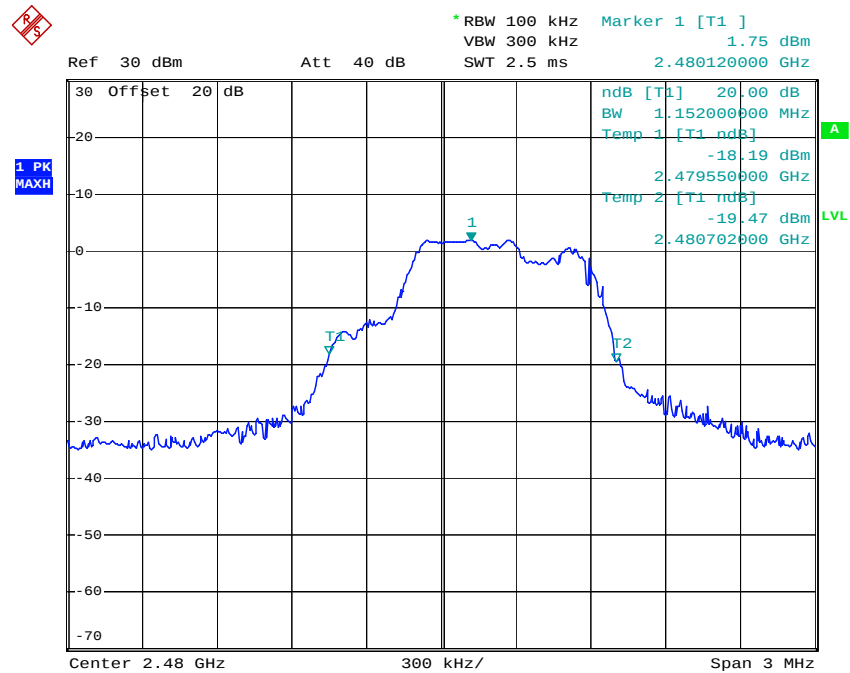
Comment A:
Date: 8.NOV.2017 10:09:11

Middle channel



Comment A:
Date: 8.NOV.2017 10:12:46

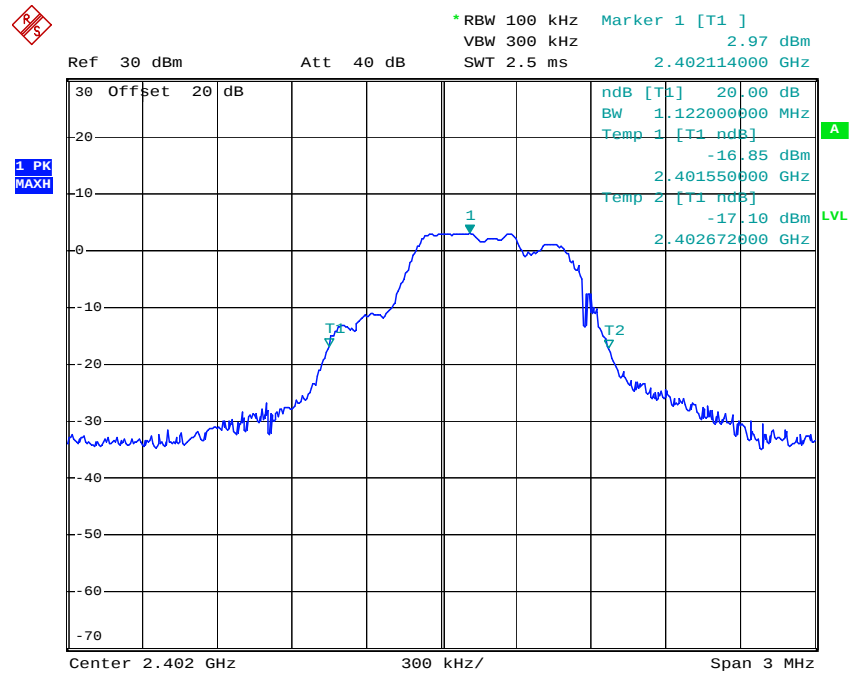
High channel



Comment A:
Date: 8.NOV.2017 10:16:20

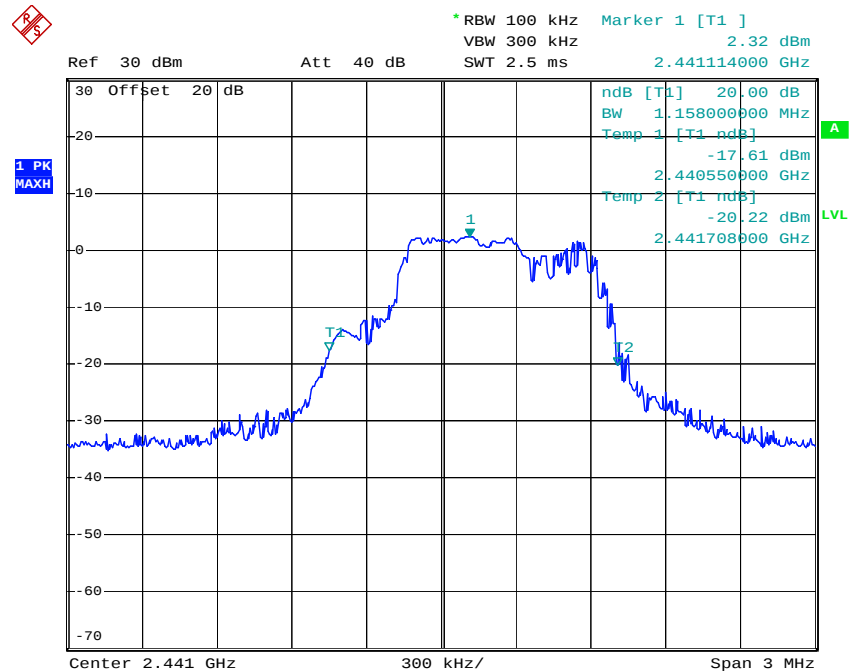
Π/4-DQPSK Mode

Low channel



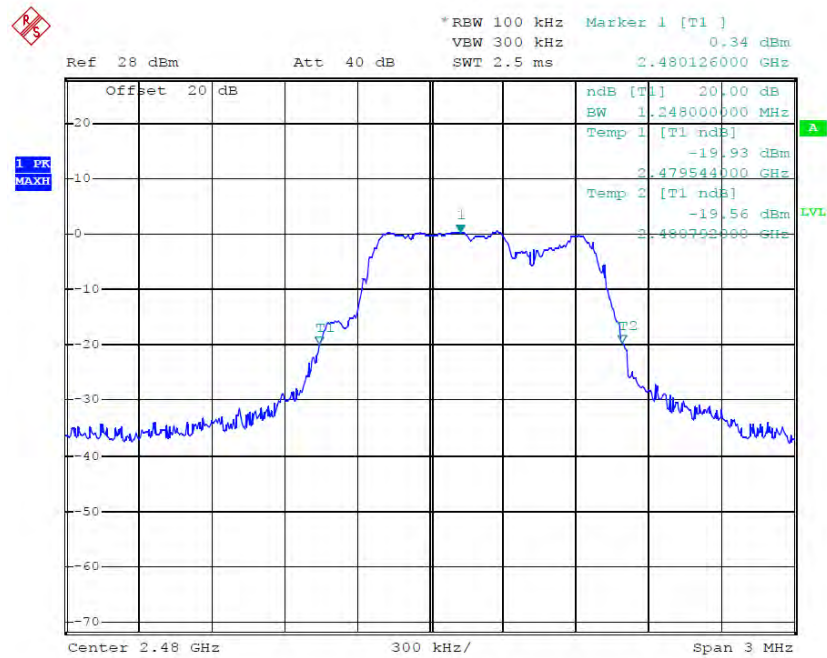
Comment A:
Date: 8.NOV.2017 09:56:55

Middle channel



Comment A:
Date: 8.NOV.2017 09:59:03

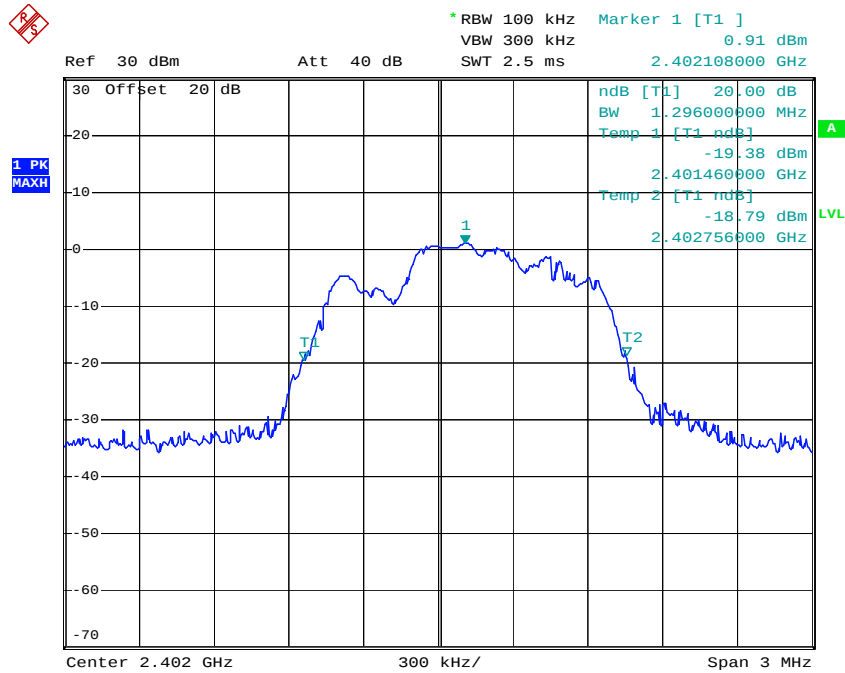
High channel



Comment A:
Date: 8.NOV.2017 10:03:09

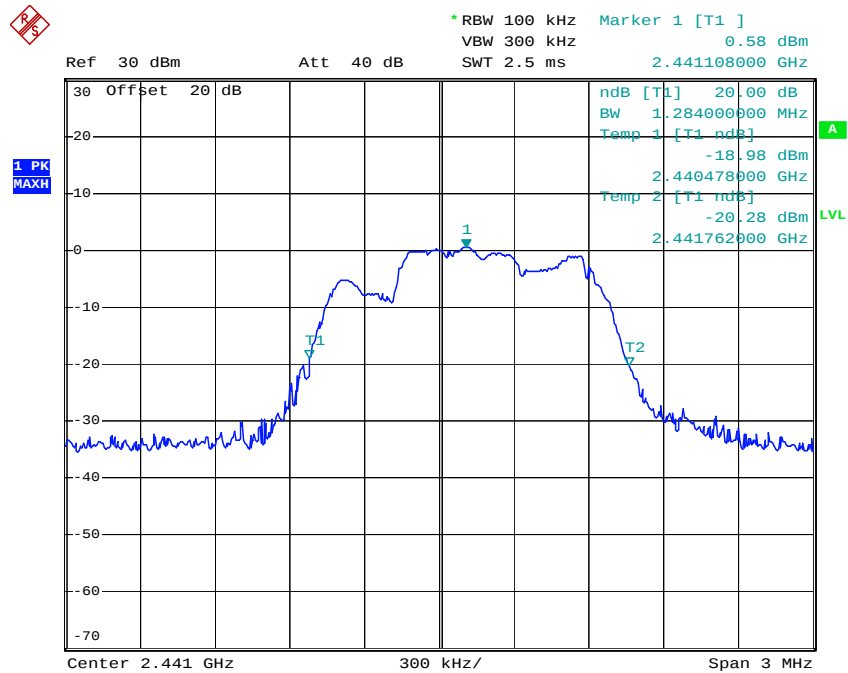
8DPSK Mode

Low channel



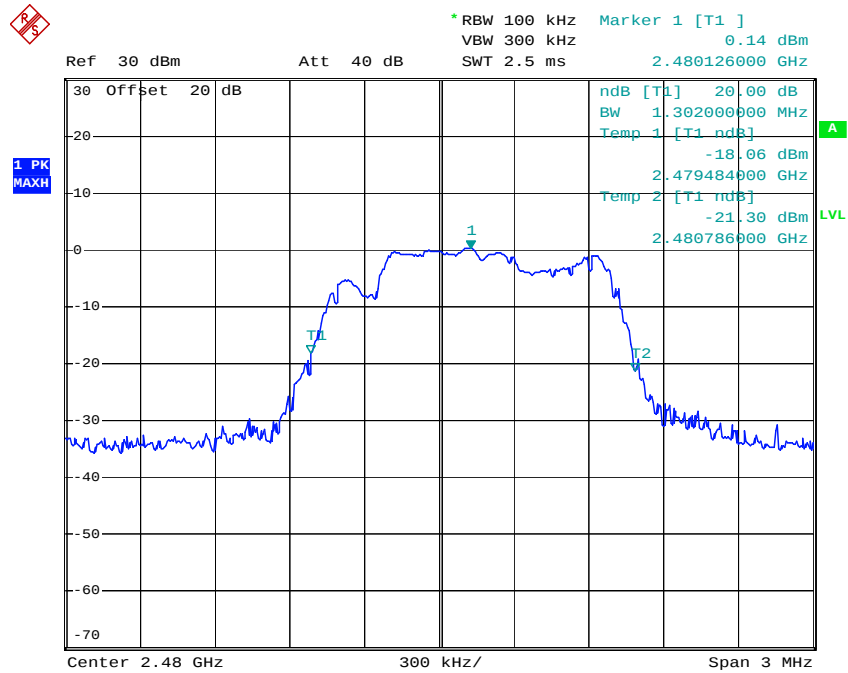
Comment A:
Date: 8.NOV.2017 10:07:57

Middle channel



Comment A:
Date: 8.NOV.2017 10:06:45

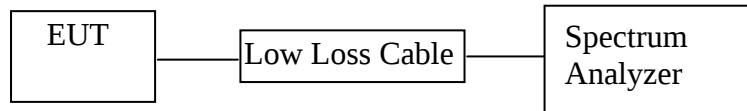
High channel



Comment A:
Date: 8.NOV.2017 10:04:38

6. CARRIER FREQUENCY SEPARATION TEST

6.1. Block Diagram of Test Setup



(EUT: Stage Karaoke)

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

Section 15.247(a)(1): Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudorandomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

6.3. EUT Configuration on Measurement

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

6.4. Operating Condition of EUT

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

6.4.2. Turn on the power of all equipment.

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

6.5.Test Procedure

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

6.5.2.Set RBW of spectrum analyzer to 30 kHz and VBW to 100 kHz. Adjust Span to 2MHz.

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	1.008	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

Π/4-DQPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	0.998	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2480			

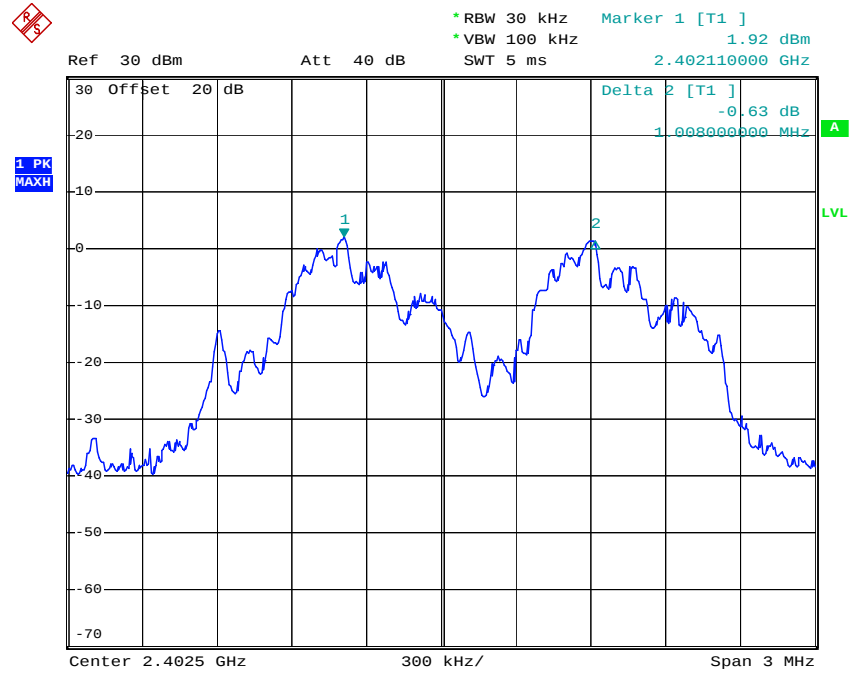
8DPSK

Channel	Frequency (MHz)	Channel Separation(MHz)	Limit (MHz)	Result
Low	2402	1.002	25KHz or 2/3*20dB bandwidth	PASS
	2403			
Middle	2440	1.008	25KHz or 2/3*20dB bandwidth	PASS
	2441			
High	2479	1.014	25KHz or 2/3*20dB bandwidth	PASS
	2480			

The spectrum analyzer plots are attached as below.

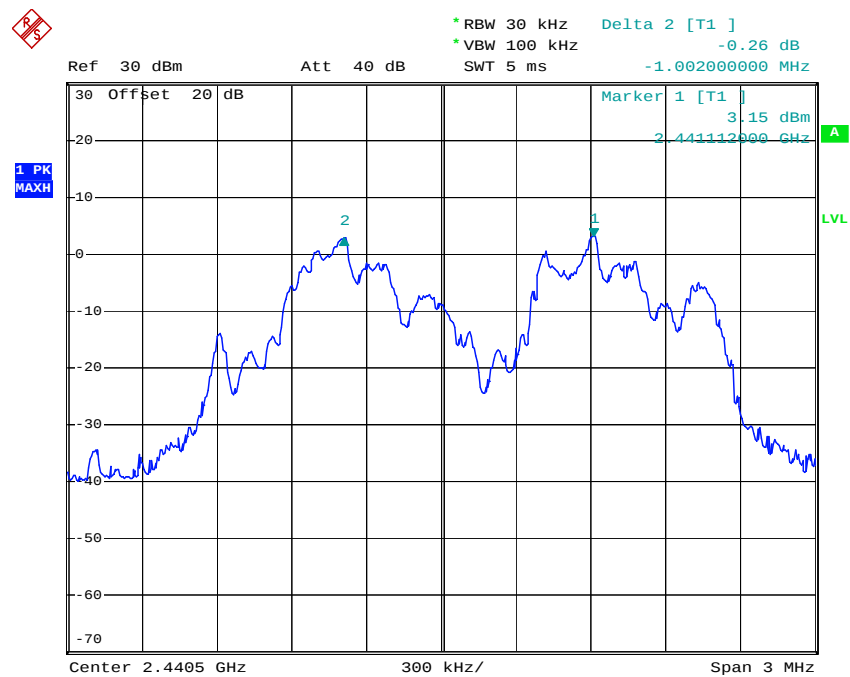
GFSK Mode

Low channel



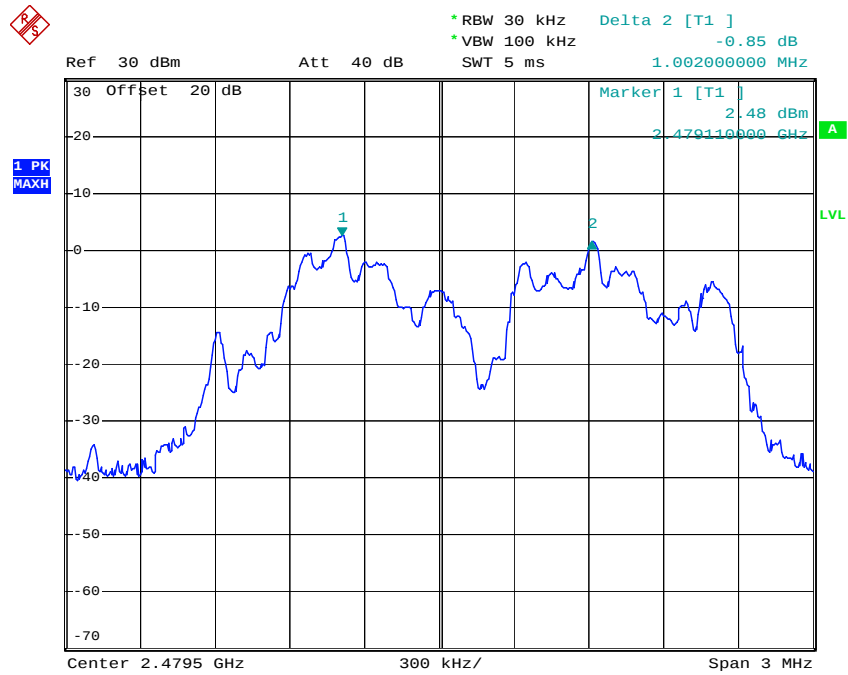
Comment A:
Date: 8.NOV.2017 10:39:48

Middle channel



Comment A:
Date: 8.NOV.2017 10:38:16

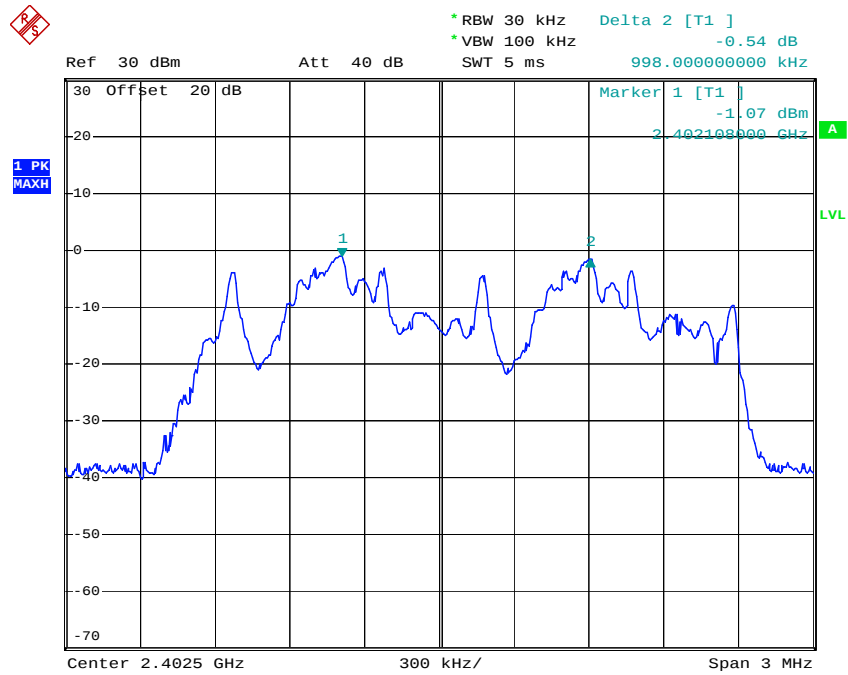
High channel



Comment A:
Date: 8.NOV.2017 10:36:56

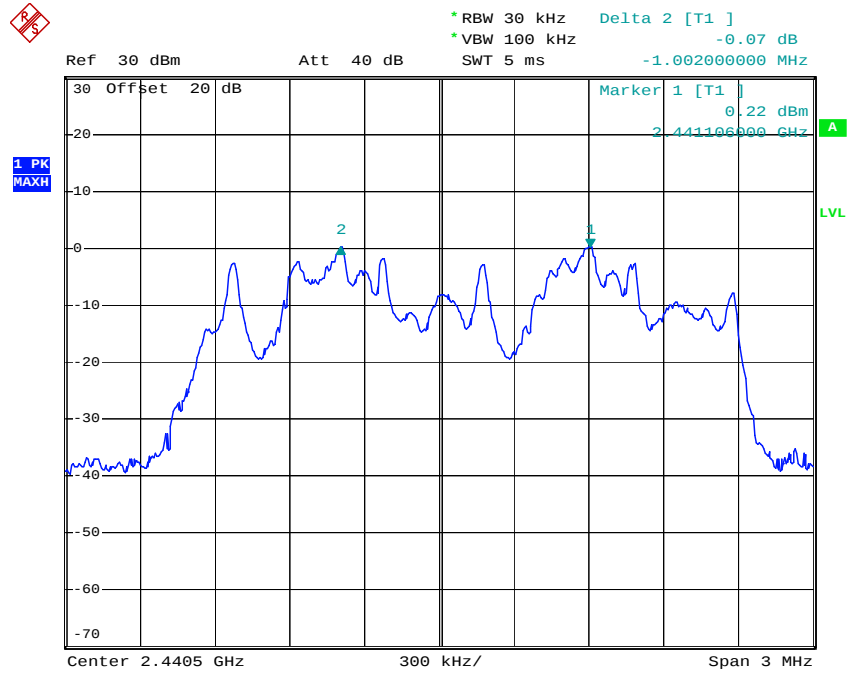
Π/4-DQPSK Mode

Low channel



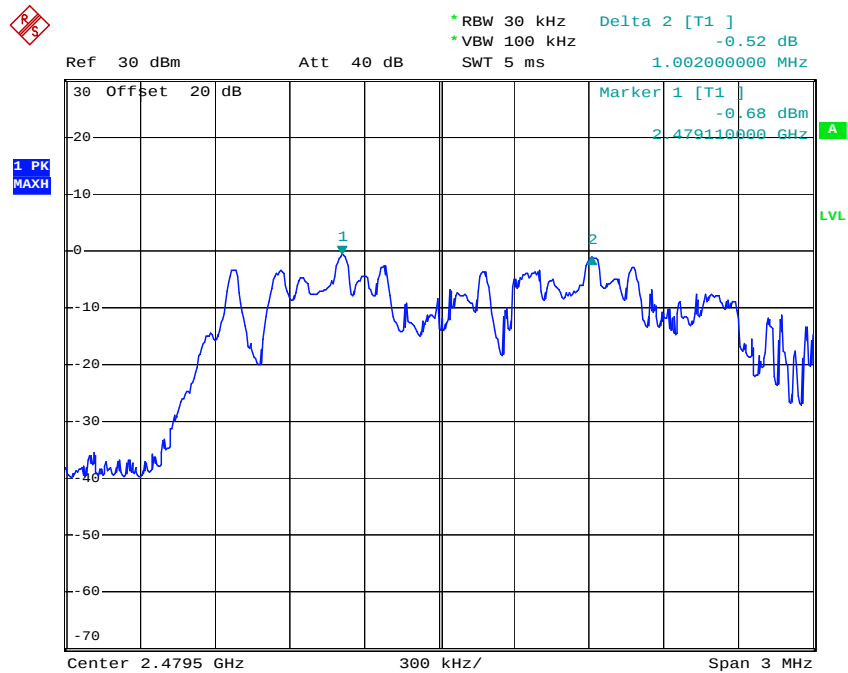
Comment A:
Date: 8.NOV.2017 10:31:48

Middle channel



Comment A:
Date: 8.NOV.2017 10:33:48

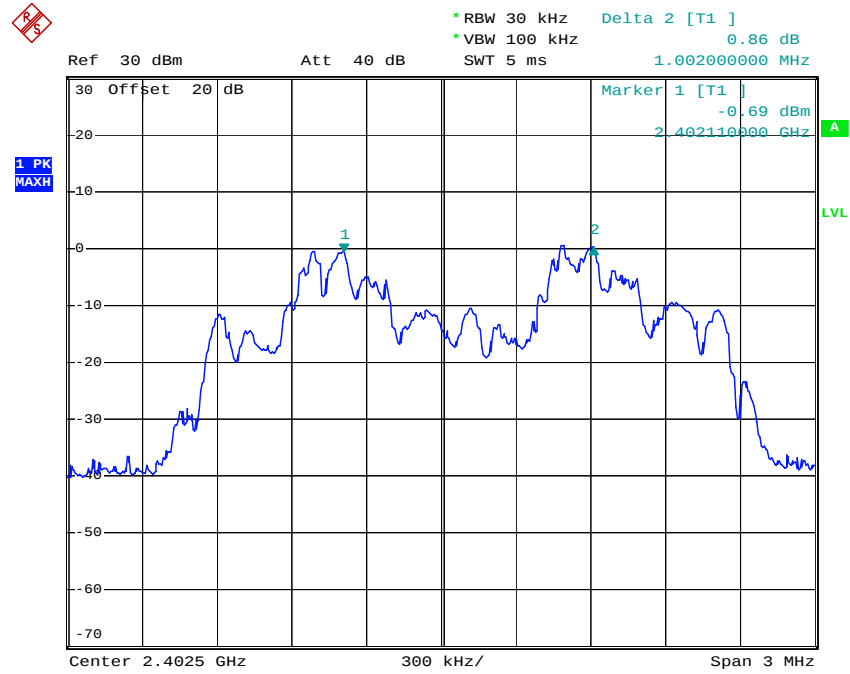
High channel



Comment A:
Date: 8.NOV.2017 10:35:32

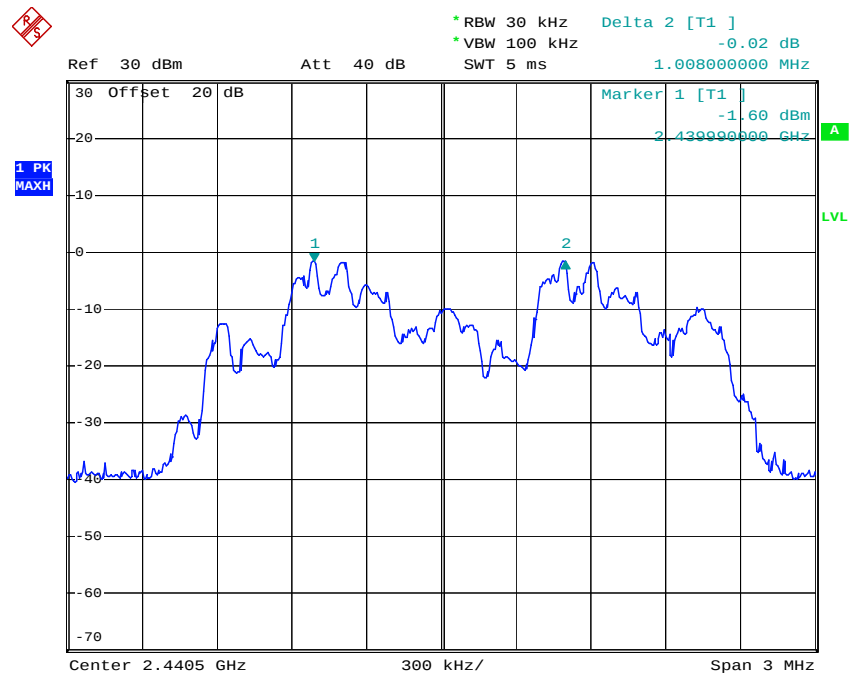
8DPSK Mode

Low channel



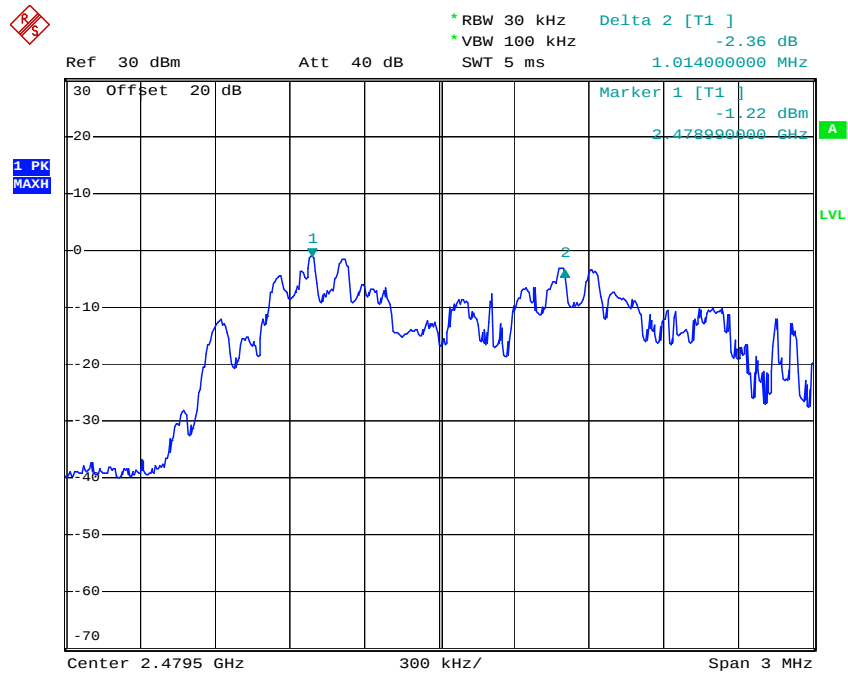
Comment A:
Date: 8.NOV.2017 10:40:56

Middle channel



Comment A:
Date: 8.NOV.2017 10:42:55

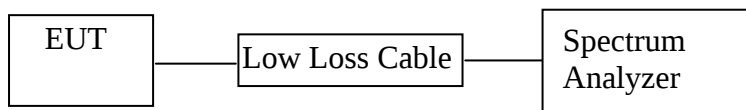
High channel



Comment A:
 Date: 8.NOV.2017 10:44:21

7. NUMBER OF HOPPING FREQUENCY TEST

7.1. Block Diagram of Test Setup



(EUT: Stage Karaoke)

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 RBW=100 kHz, VBW=300 kHz.

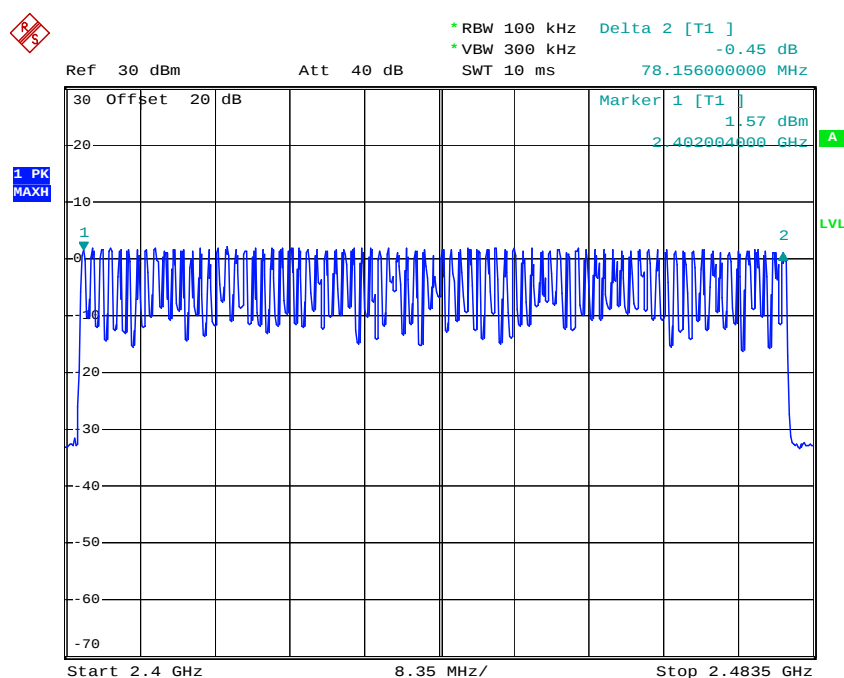
7.5.3. Max hold, view and count how many channel in the band.

7.6.Test Result

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

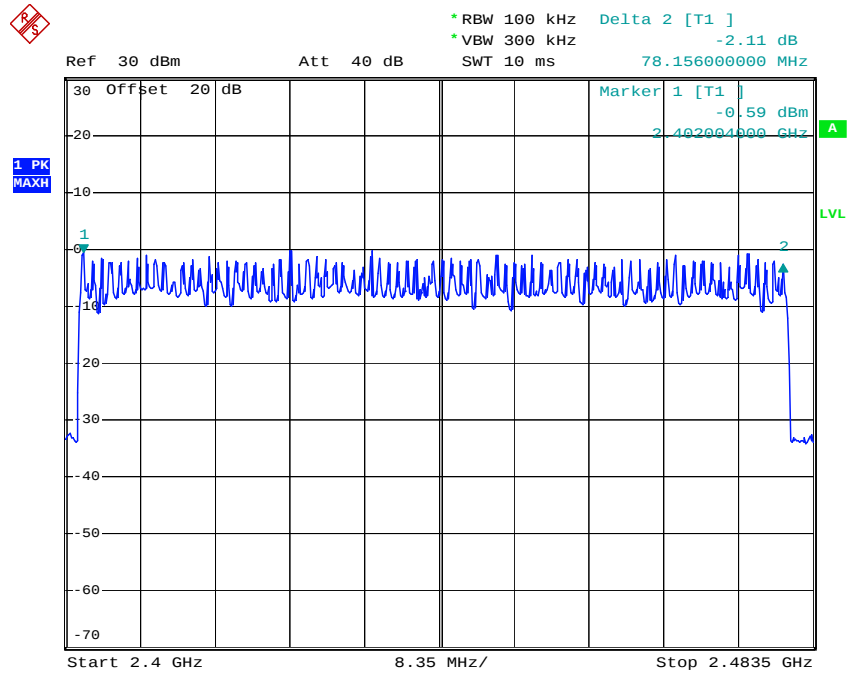
The spectrum analyzer plots are attached as below.

Number of hopping channels(GFSK)



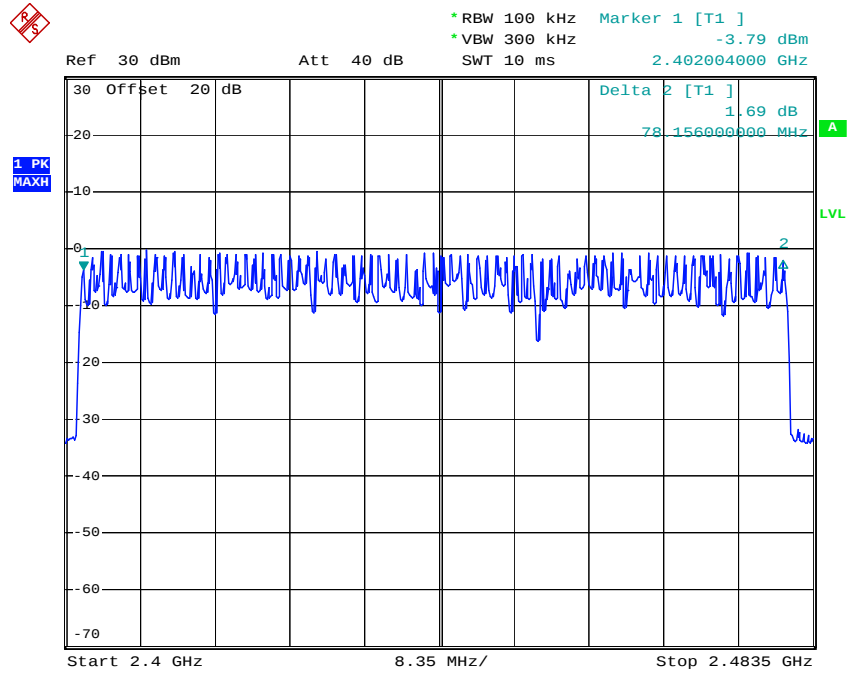
Comment A:
Date: 8.NOV.2017 11:02:34

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



Comment A:
Date: 8.NOV.2017 11:04:32

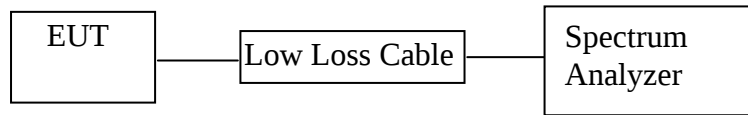
Number of hopping channels(8DPSK)



Comment A:
Date: 8.NOV.2017 11:08:23

8. DWELL TIME TEST

8.1. Block Diagram of Test Setup



(EUT: Stage Karaoke)

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

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

8.3. EUT Configuration on Measurement

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

8.4. Operating Condition of EUT

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

8.4.2. Turn on the power of all equipment.

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

8.5. Test Procedure

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

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

8.5.3. Set the spectrum analyzer as RBW=1MHz, VBW=3MHz, Span=0Hz, Adjust Sweep=5ms, 10ms, 15ms. Get the pulse time.

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

8.6. Test Result

GFSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.507	162.24	400
	2441	0.507	162.24	400
	2480	0.507	162.24	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	1.783	285.28	400
	2441	1.783	285.28	400
	2480	1.783	285.28	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	3.080	328.53	400
	2441	3.058	326.19	400
	2480	3.051	325.44	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

II/4-DQPSK

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.522	167.04	400
	2441	0.522	167.04	400
	2480	0.522	167.04	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	1.797	287.52	400
	2441	1.797	287.52	400
	2480	1.783	285.28	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	3.044	324.69	400
	2441	3.036	323.84	400
	2480	3.036	323.84	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

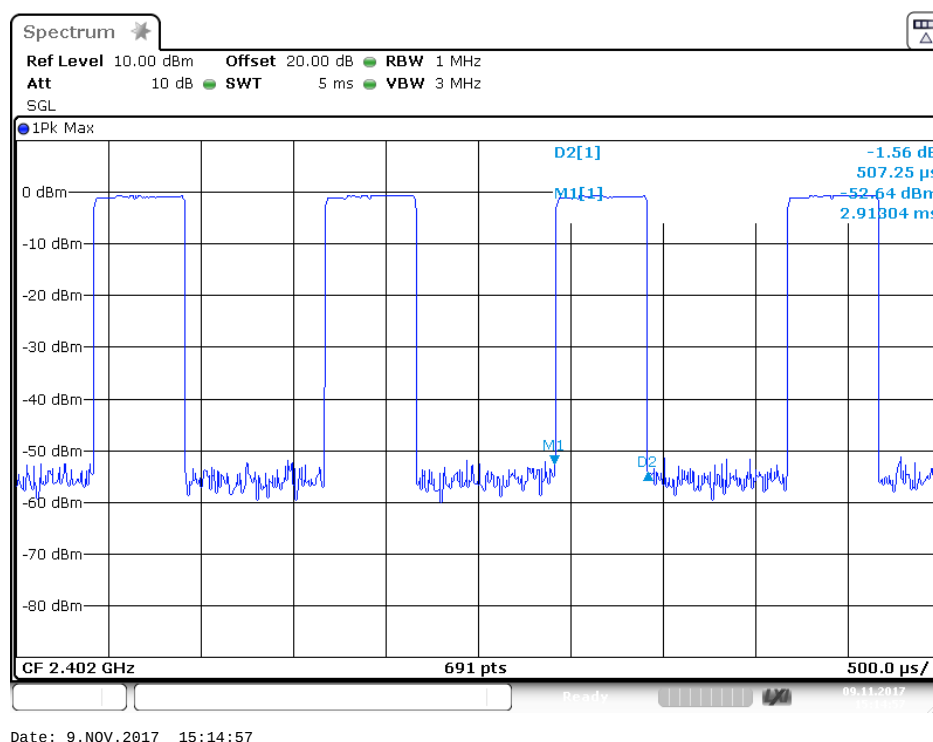
8DPSK Mode

Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.522	167.04	400
	2441	0.522	167.04	400
	2480	0.522	167.04	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	1.942	310.72	400
	2441	1.790	286.40	400
	2480	1.783	285.28	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(4 \times 79)) \times 31.6$				
DH5	2402	3.044	324.69	400
	2441	3.065	326.93	400
	2480	3.044	324.69	400
A period transmit time = $0.4 \times 79 = 31.6$ Dwell time = pulse time $\times (1600/(6 \times 79)) \times 31.6$				

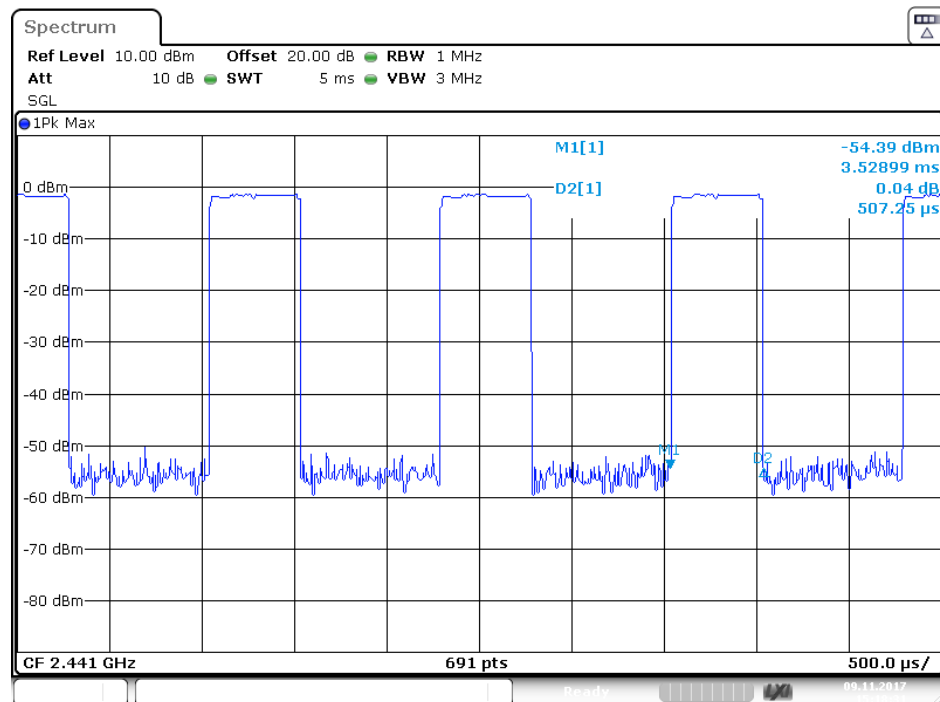
The spectrum analyzer plots are attached as below.

GFSK Mode

DH1 Low channel

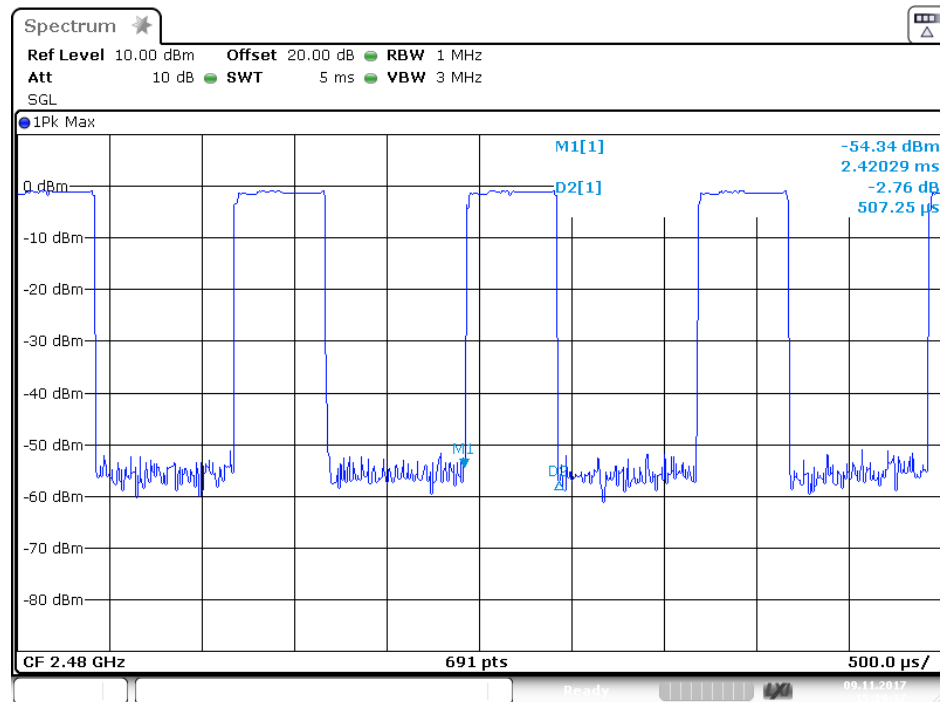


DH1 Middle channel



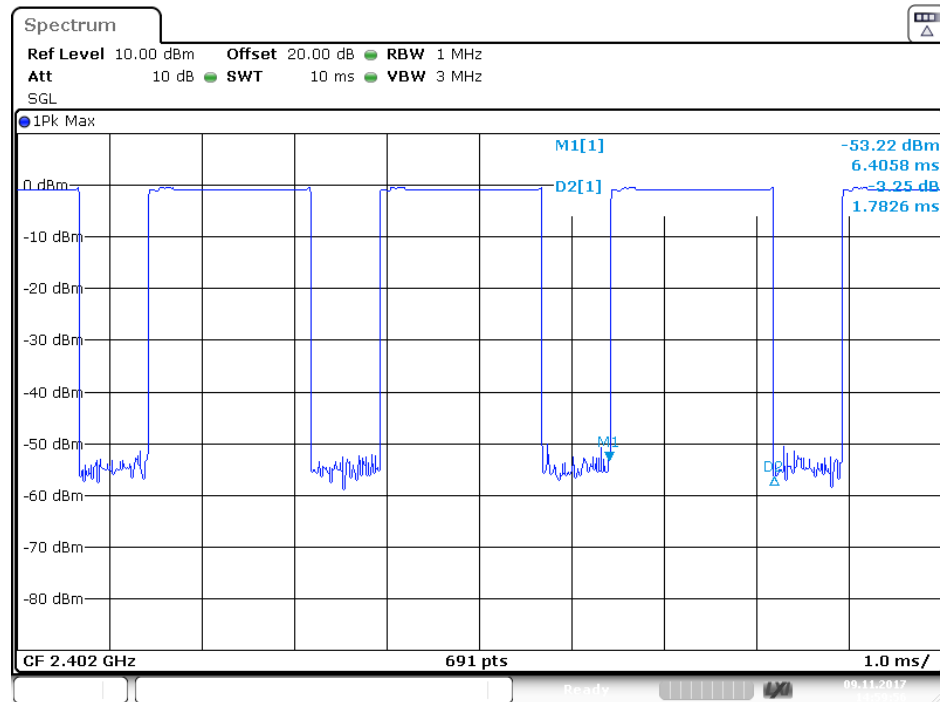
Date: 9.NOV.2017 15:18:31

DH1 High channel



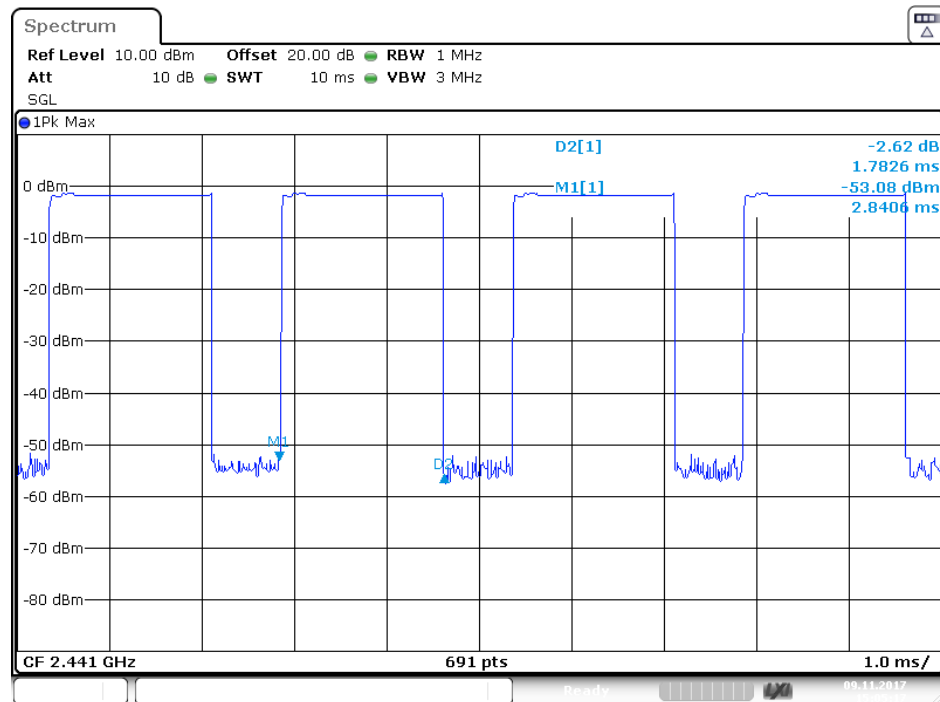
Date: 9.NOV.2017 15:19:37

DH3 Low channel



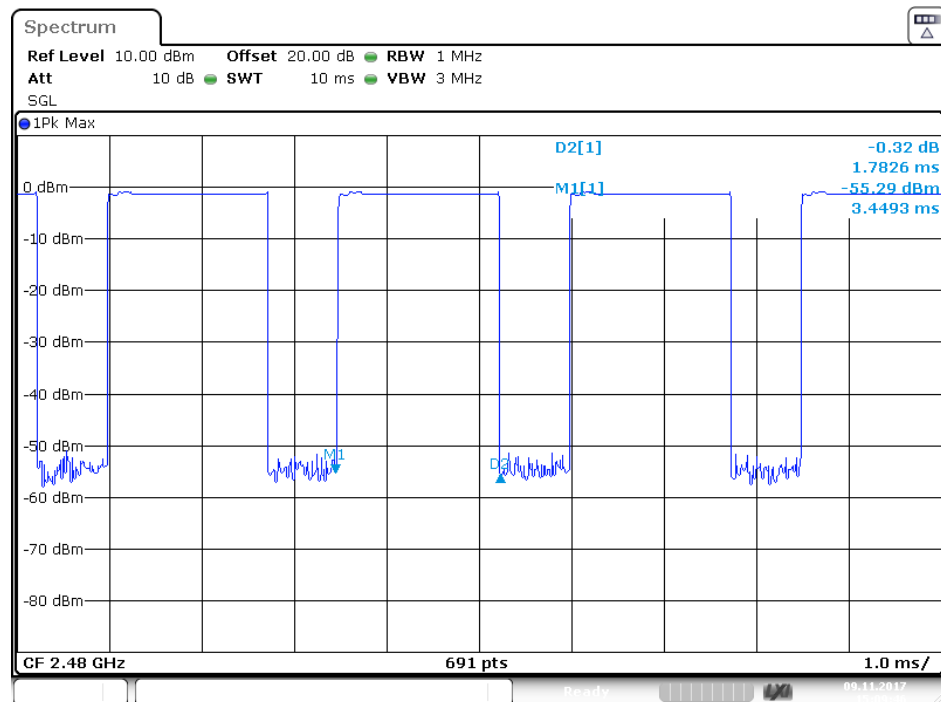
Date: 9.NOV.2017 14:59:56

DH3 Middle channel



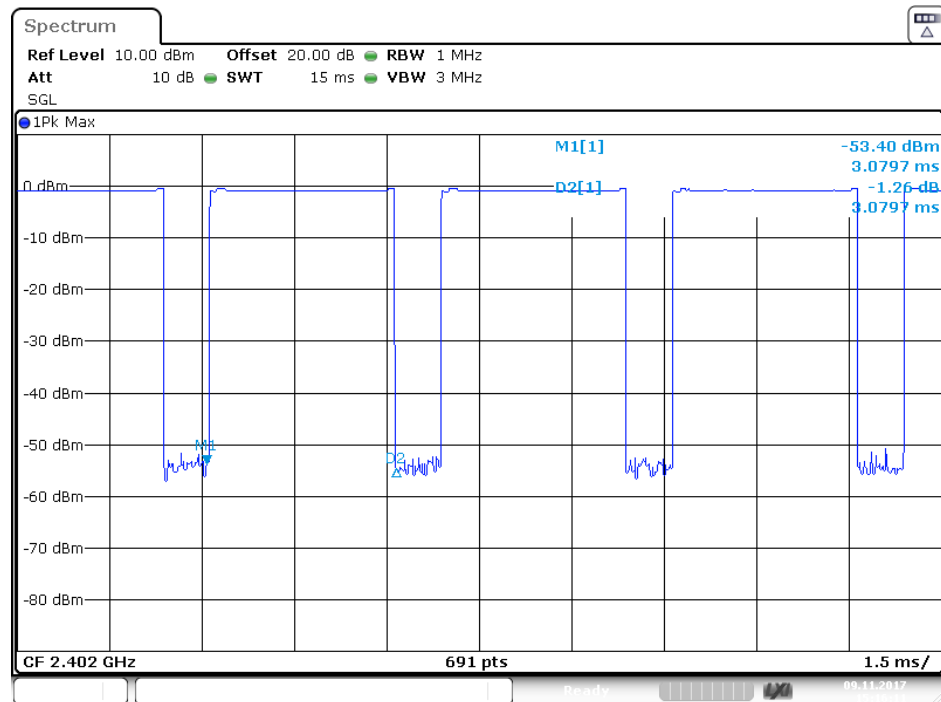
Date: 9.NOV.2017 15:05:17

DH3 High channel



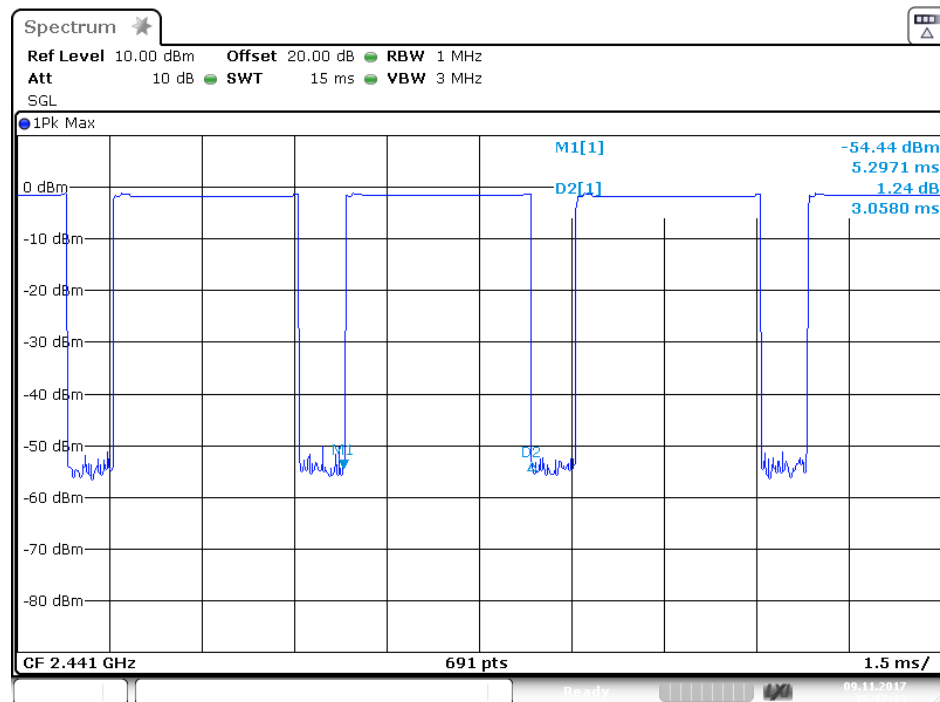
Date: 9.NOV.2017 15:09:46

DH5 Low channel



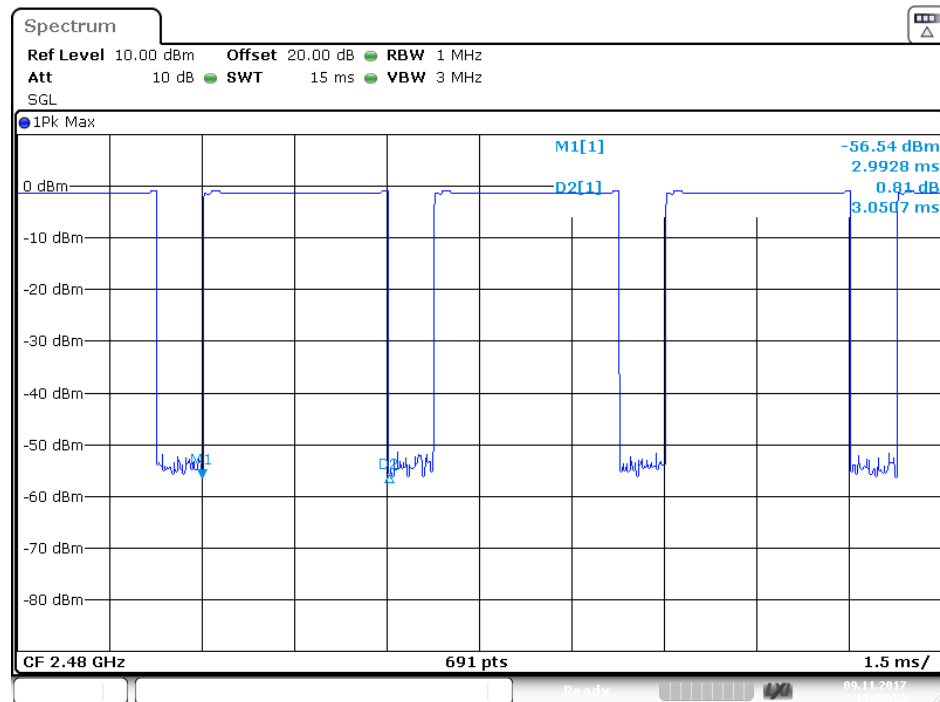
Date: 9.NOV.2017 15:16:11

DH5 Middle channel



Date: 9.NOV.2017 15:17:13

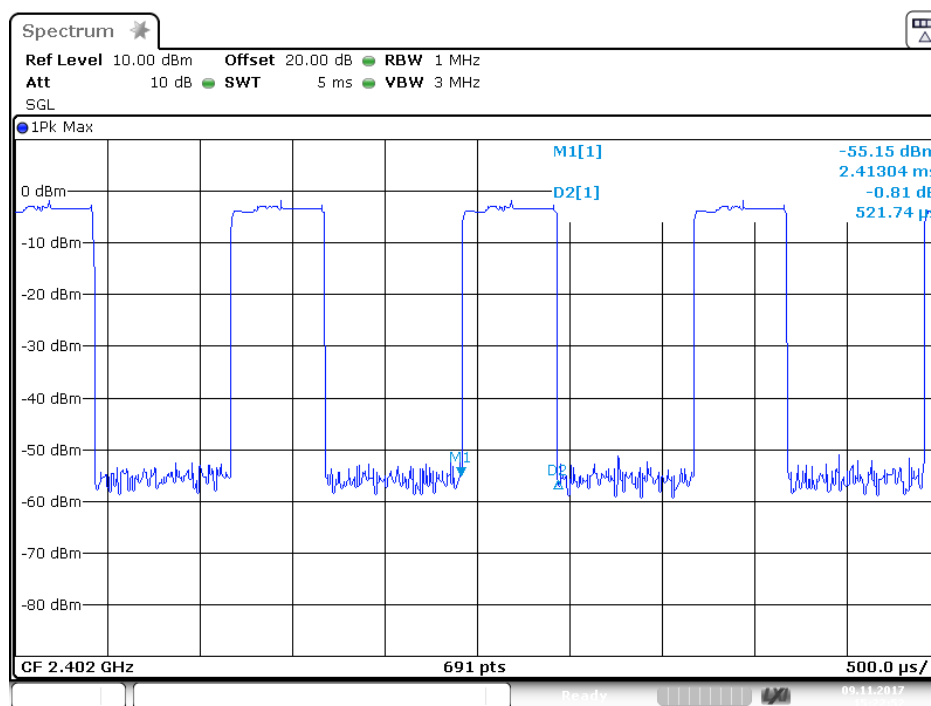
DH5 High channel



Date: 9.NOV.2017 15:20:52

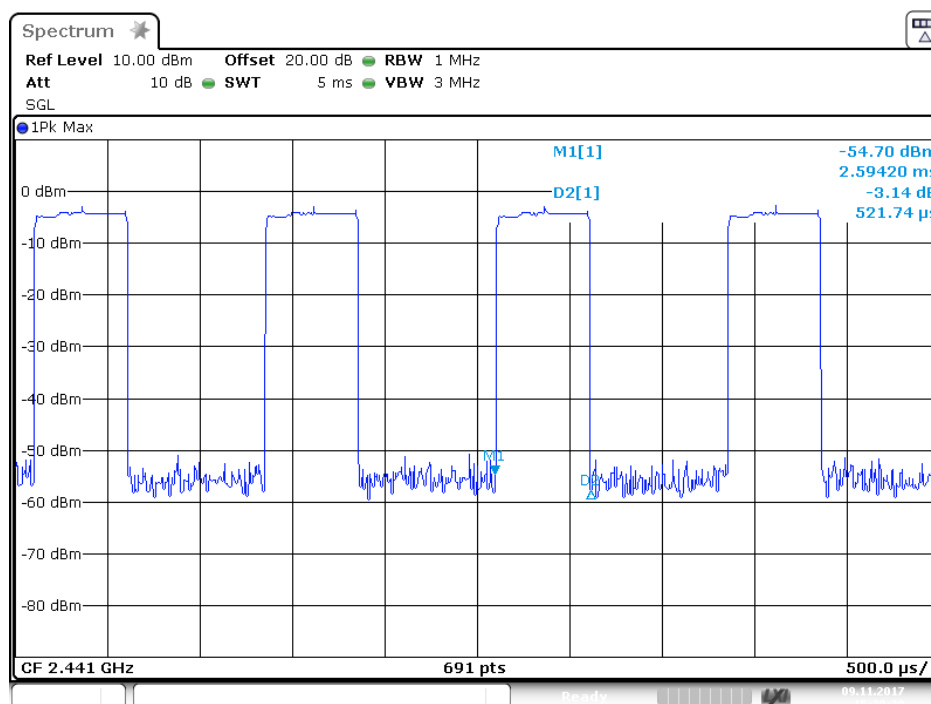
Π/4-DQPSK

2DH1 Low channel



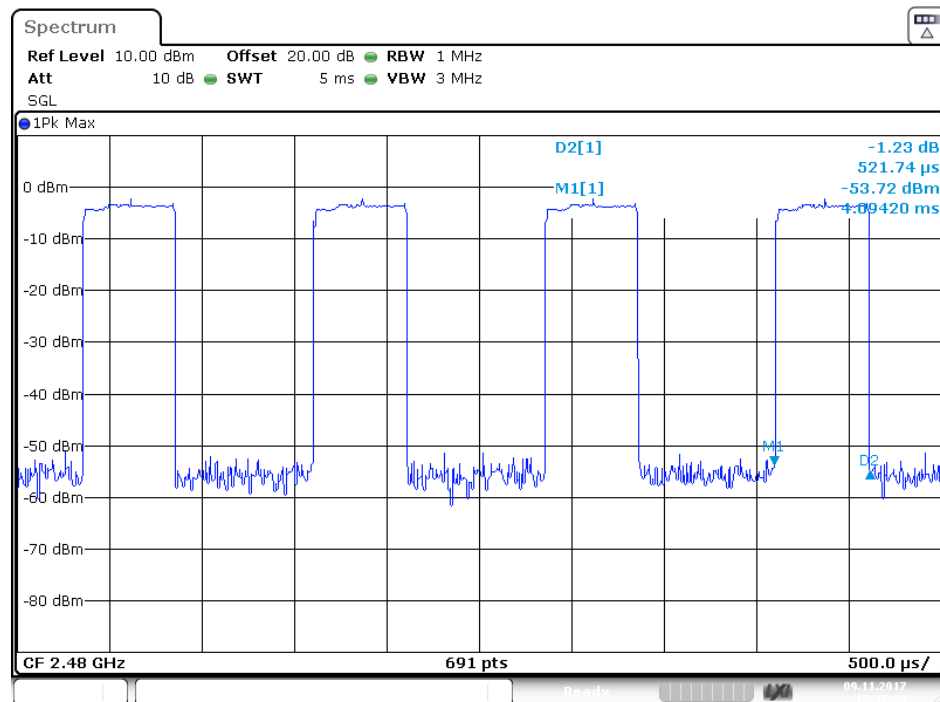
Date: 9.NOV.2017 15:22:53

2DH1 Middle channel



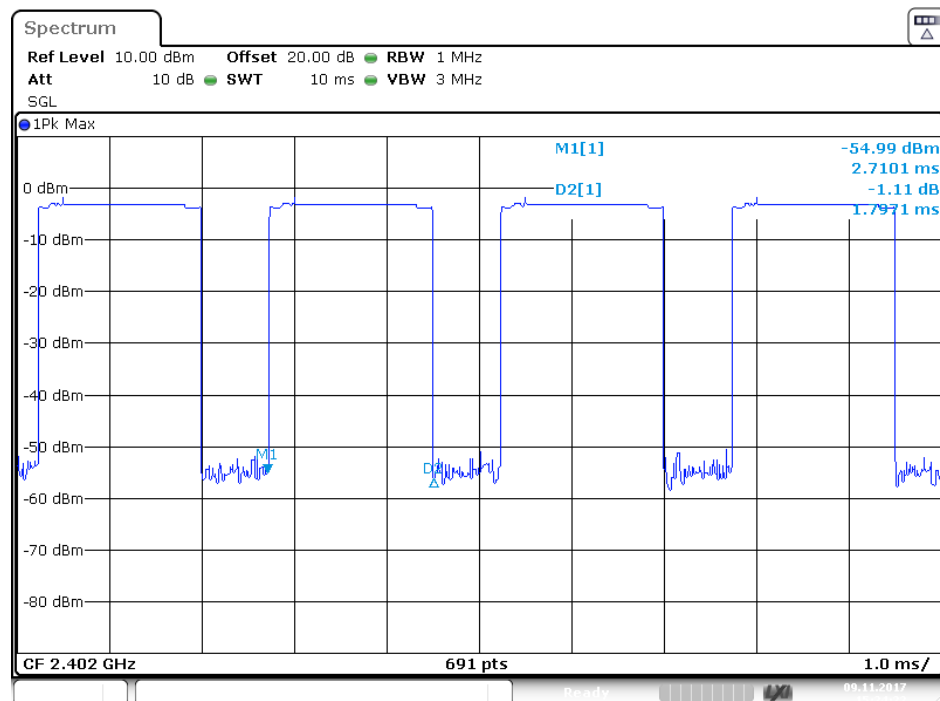
Date: 9.NOV.2017 15:29:39

2DH1 High channel



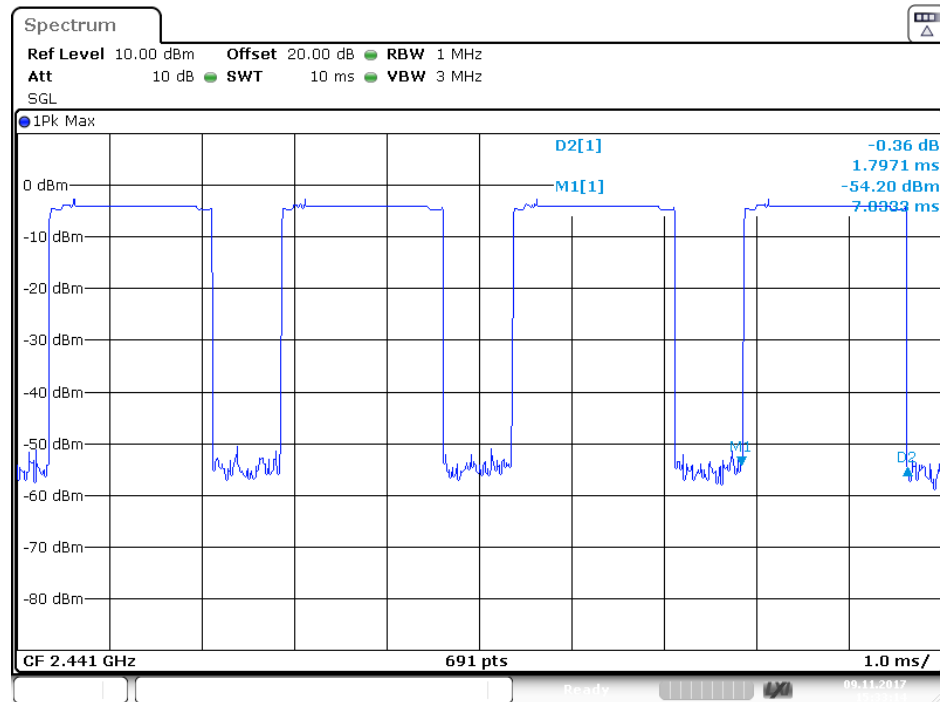
Date: 9.NOV.2017 15:47:35

2DH3 Low channel



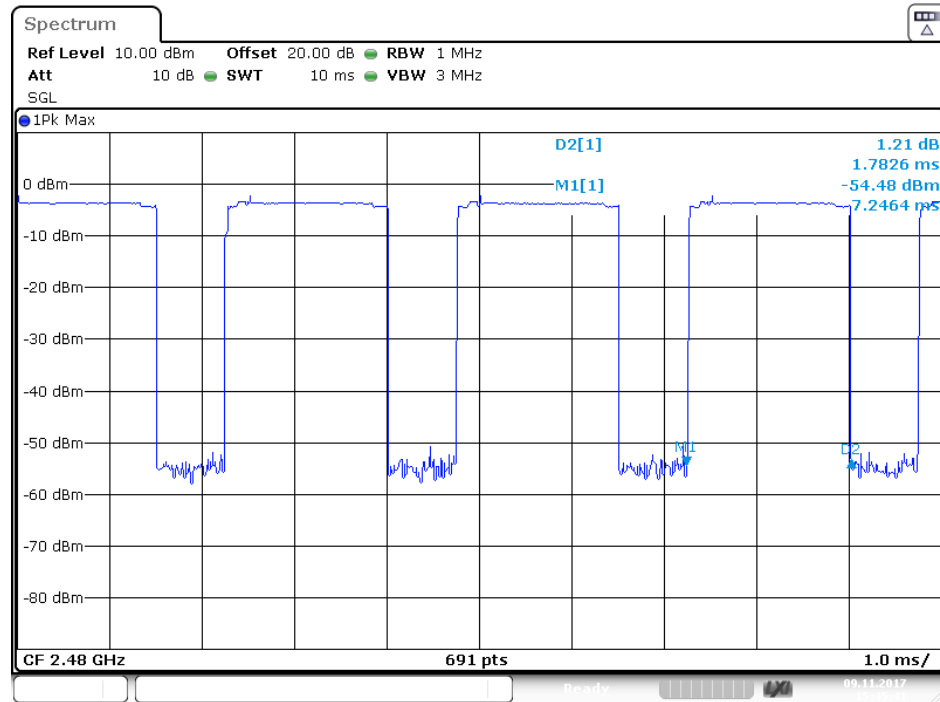
Date: 9.NOV.2017 15:24:22

2DH3 Middle channel



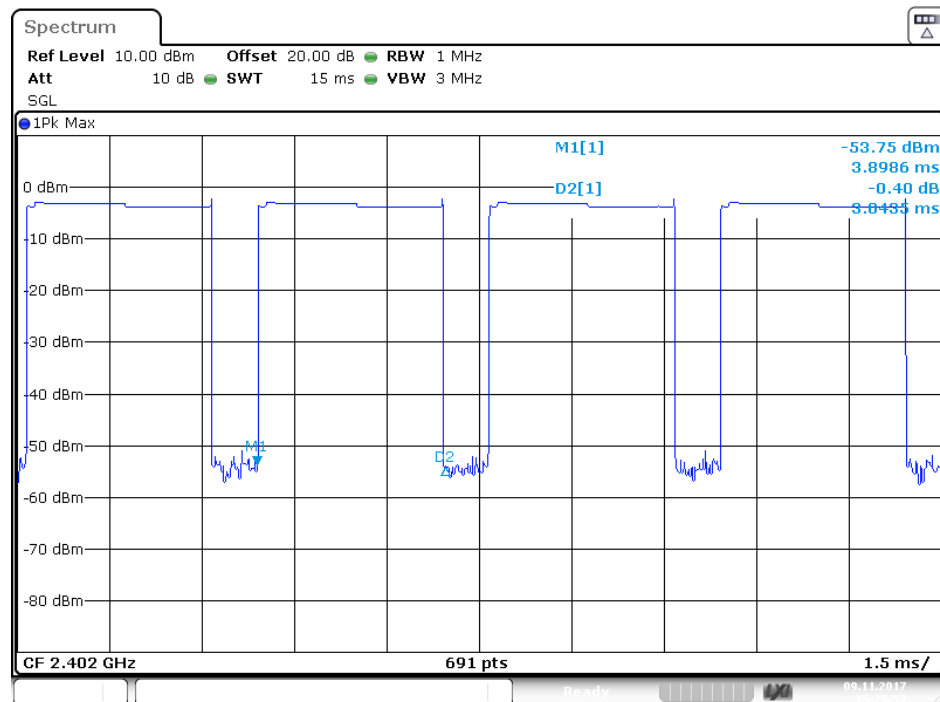
Date: 9.NOV.2017 15:33:15

2DH3 High channel

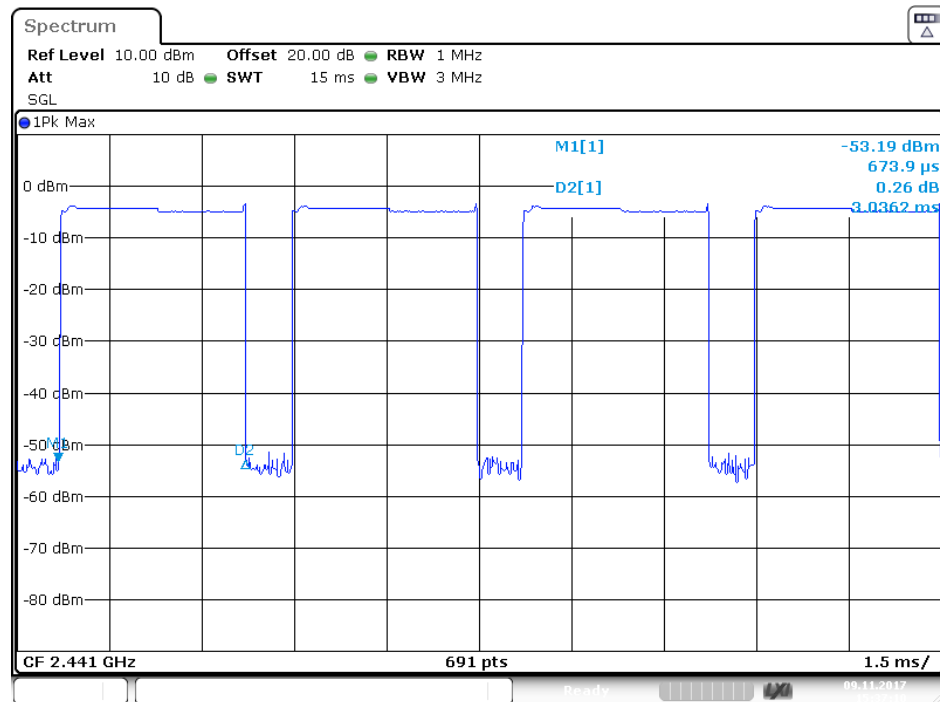


Date: 9.NOV.2017 15:45:41

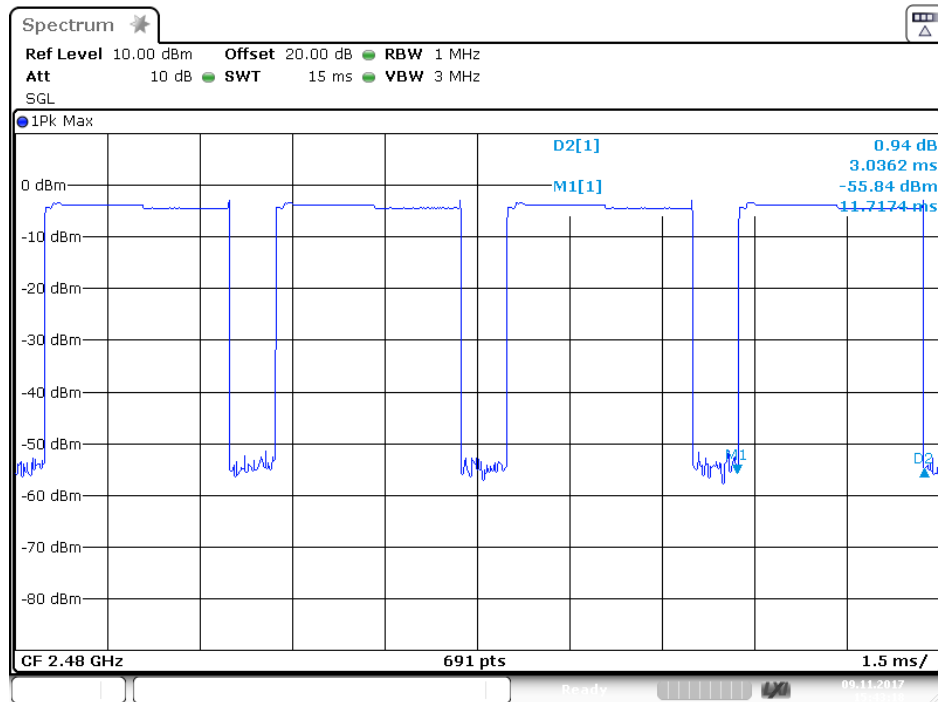
2DH5 Low channel



2DH5 Middle channel



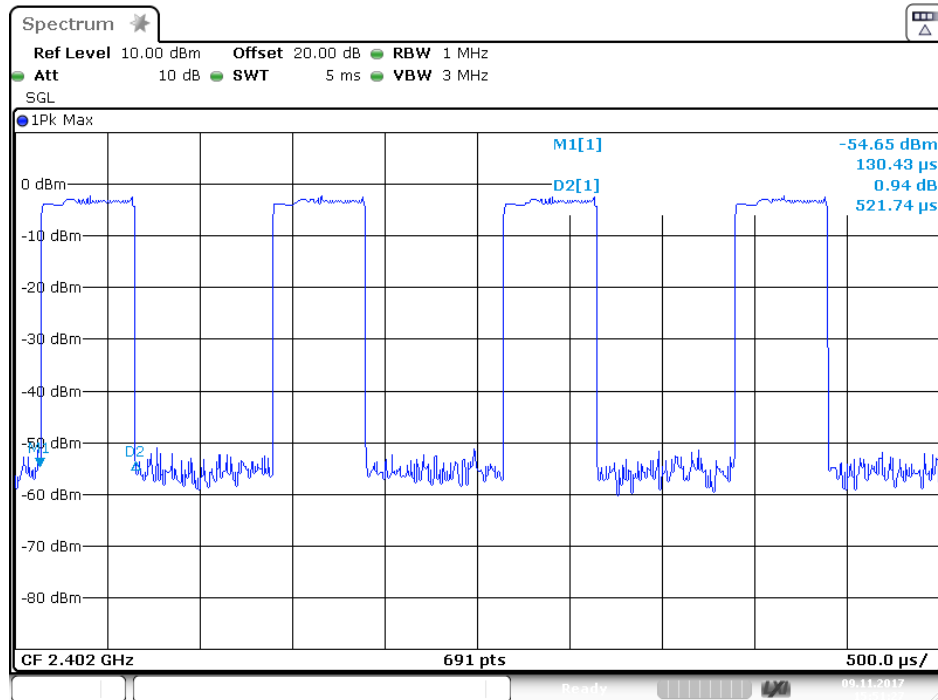
2DH5 High channel



Date: 9.NOV.2017 15:43:18

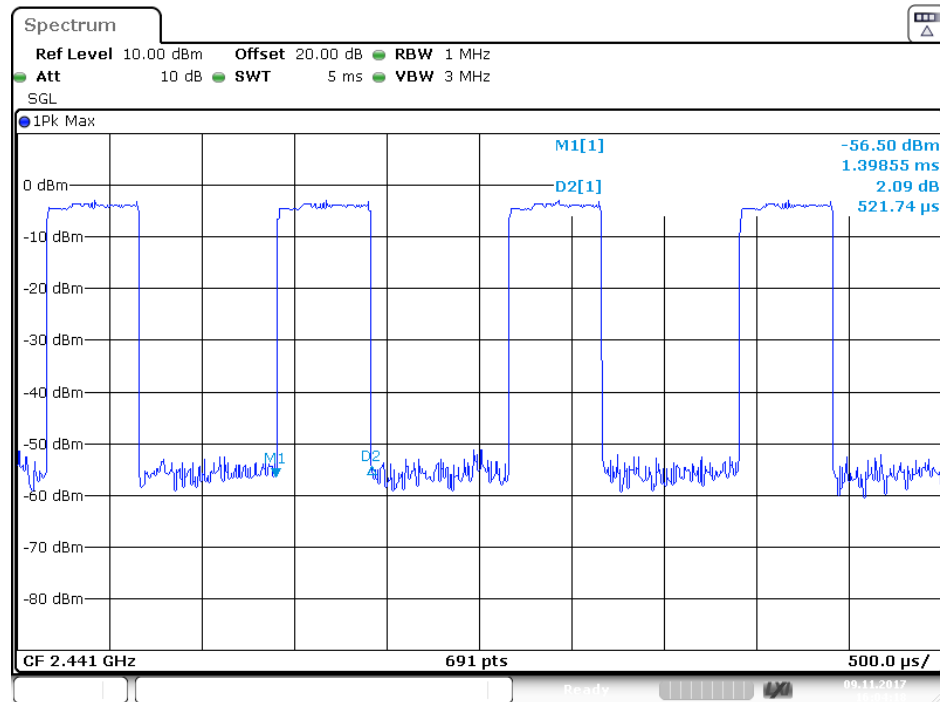
8DPSK Mode

3DH1 Low channel



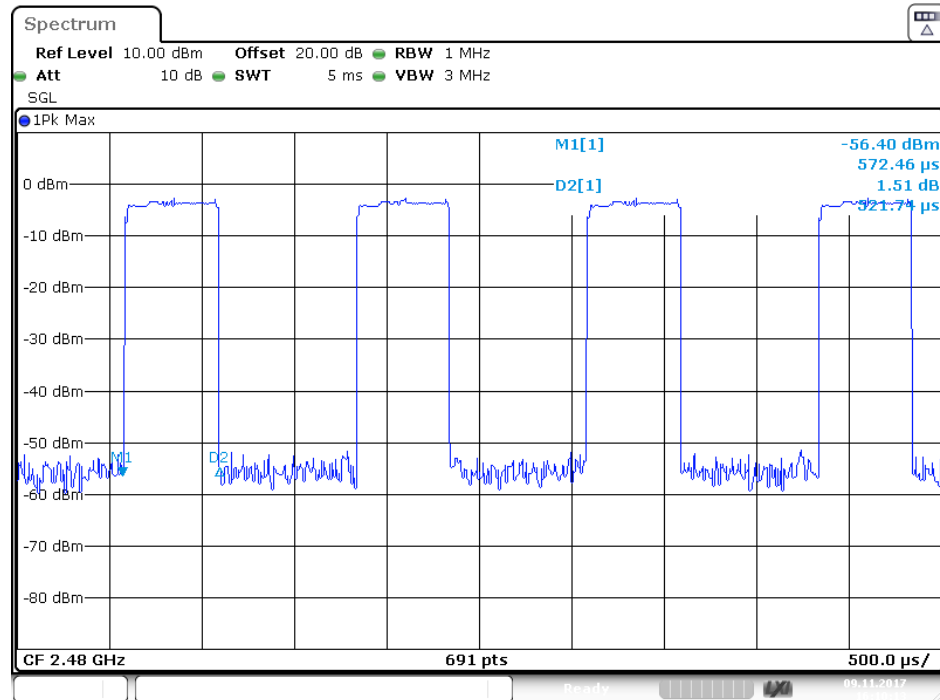
Date: 9.NOV.2017 15:51:27

3DH1 Middle channel



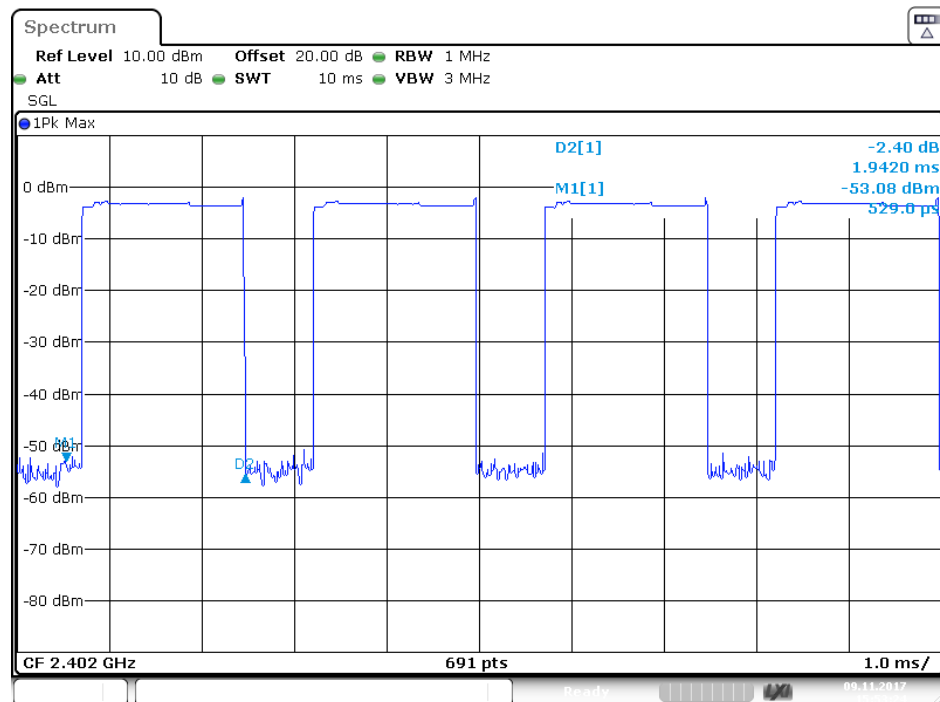
Date: 9.NOV.2017 16:04:19

3DH1 High channel



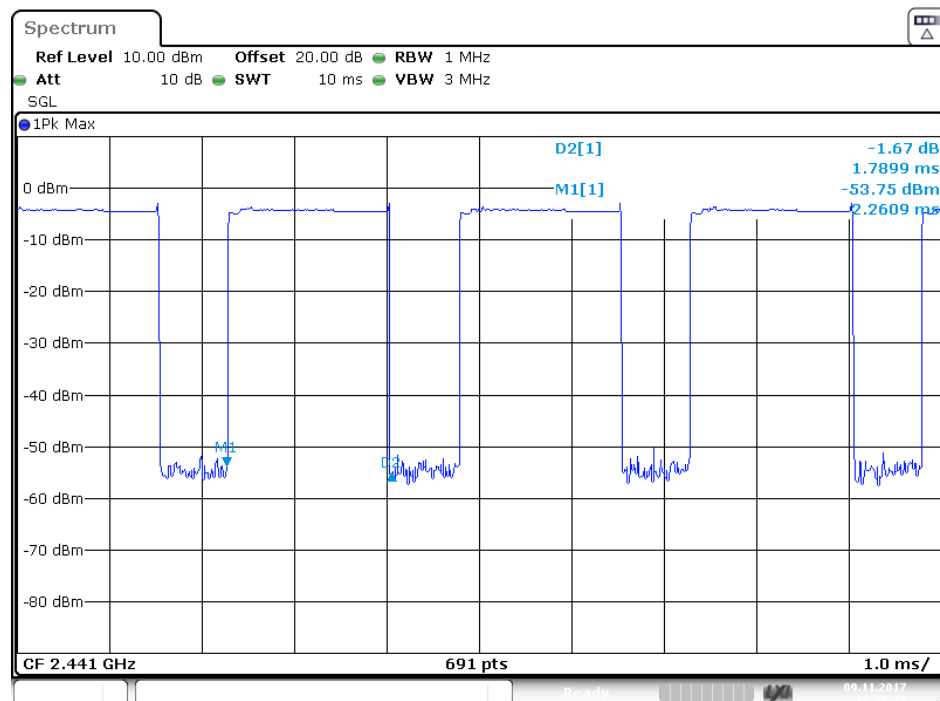
Date: 9.NOV.2017 16:10:13

3DH3 Low channel



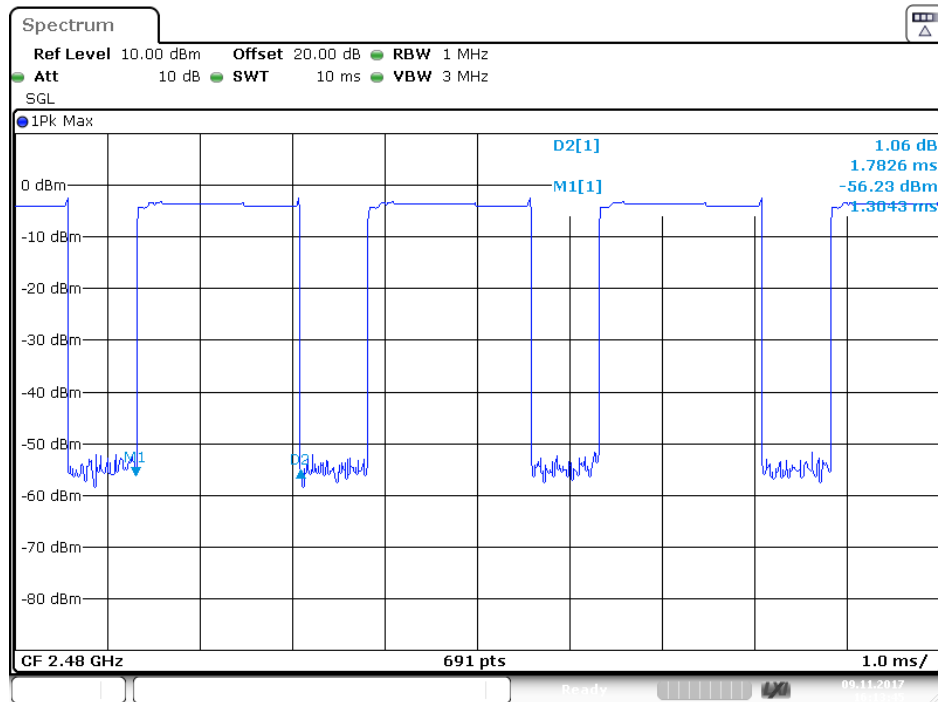
Date: 9.NOV.2017 15:53:24

3DH3 Middle channel

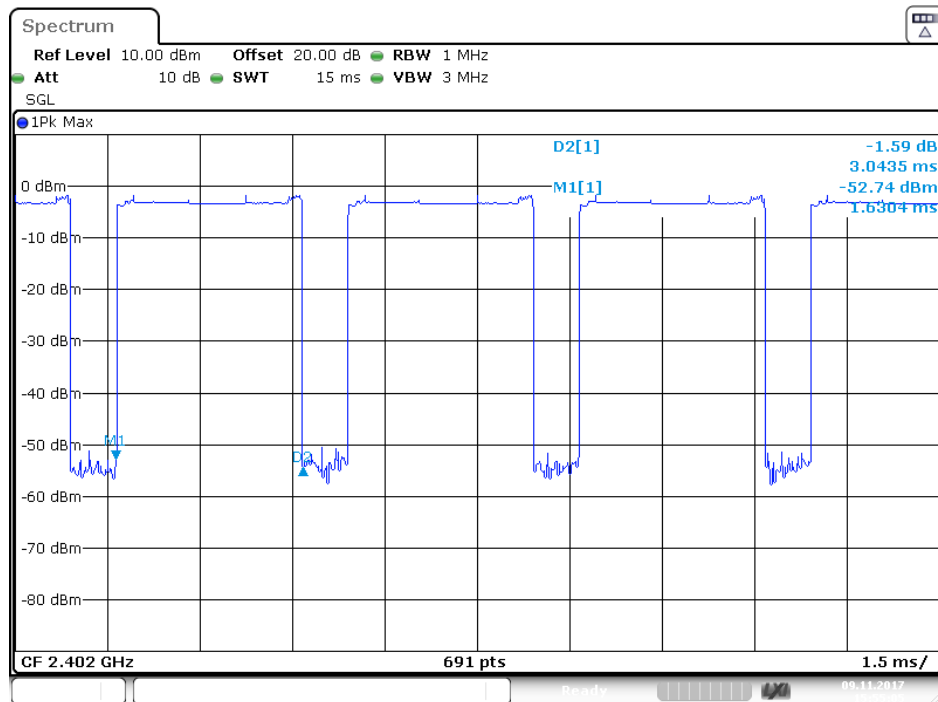


Date: 9.NOV.2017 16:02:29

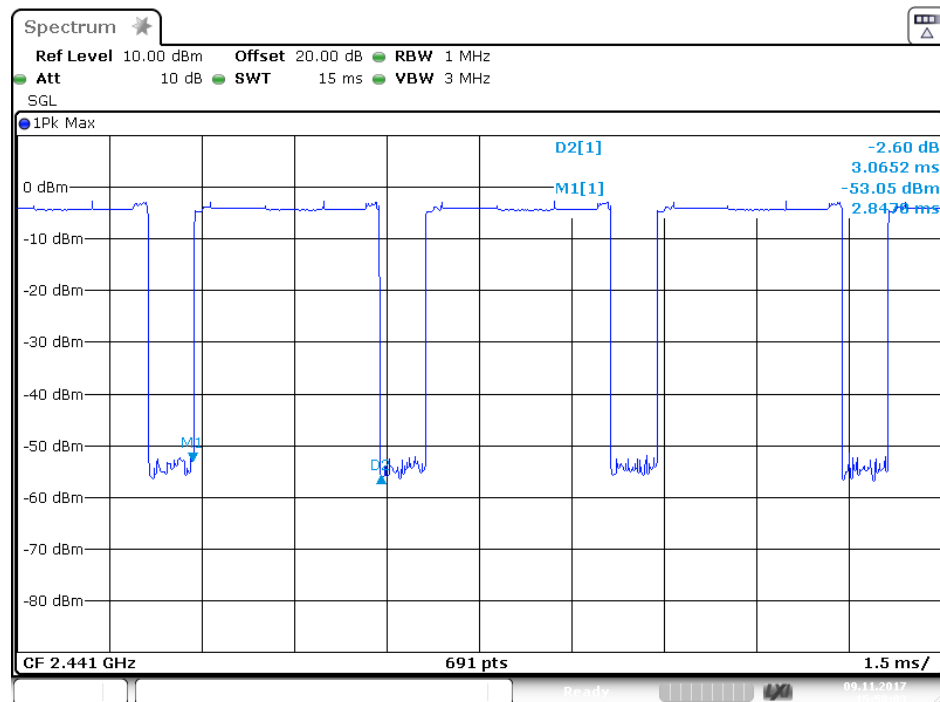
3DH3 High channel



3DH5 Low channel

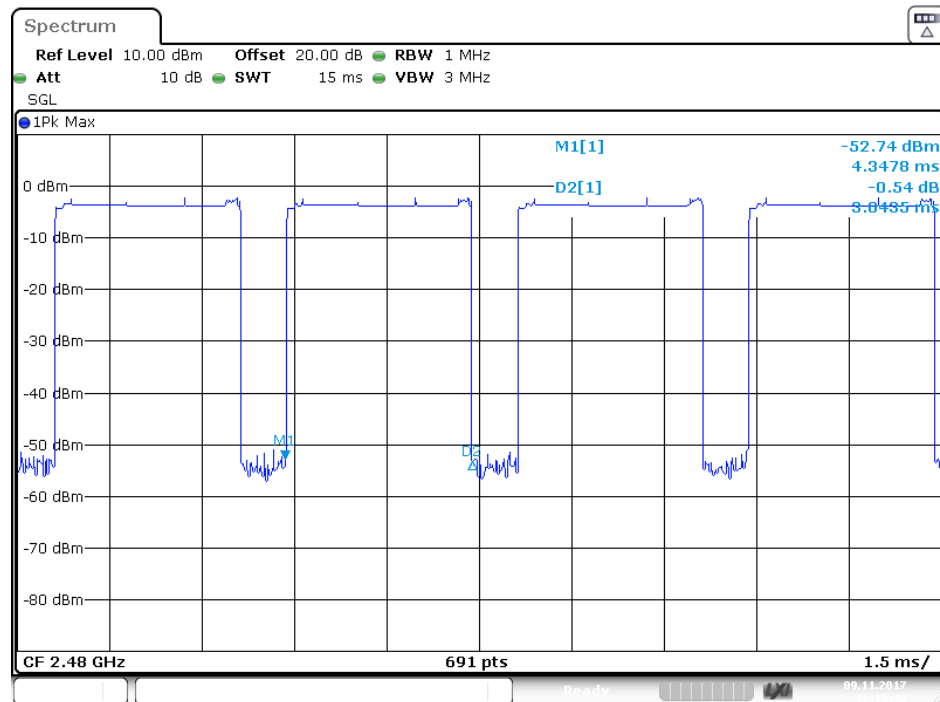


3DH5 Middle channel



Date: 9.NOV.2017 15:58:03

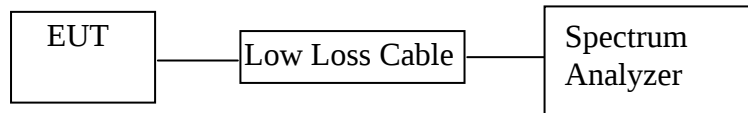
3DH5 High channel



Date: 9.NOV.2017 16:15:42

9. MAXIMUM PEAK OUTPUT POWER TEST

9.1. Block Diagram of Test Setup



(EUT: Stage Karaoke)

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 3MHz and VBW to 3MHz.

9.5.3. Measurement the maximum peak output power.

9.6. Test Result

GFSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	0.98/0.0013	21 / 0.125
Middle	2441	1.75/0.0015	21 / 0.125
High	2480	1.61/0.0014	21 / 0.125

II/4-DQPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	3.29/0.0021	21 / 0.125
Middle	2441	2.89/0.0019	21 / 0.125
High	2480	2.63/0.0018	21 / 0.125

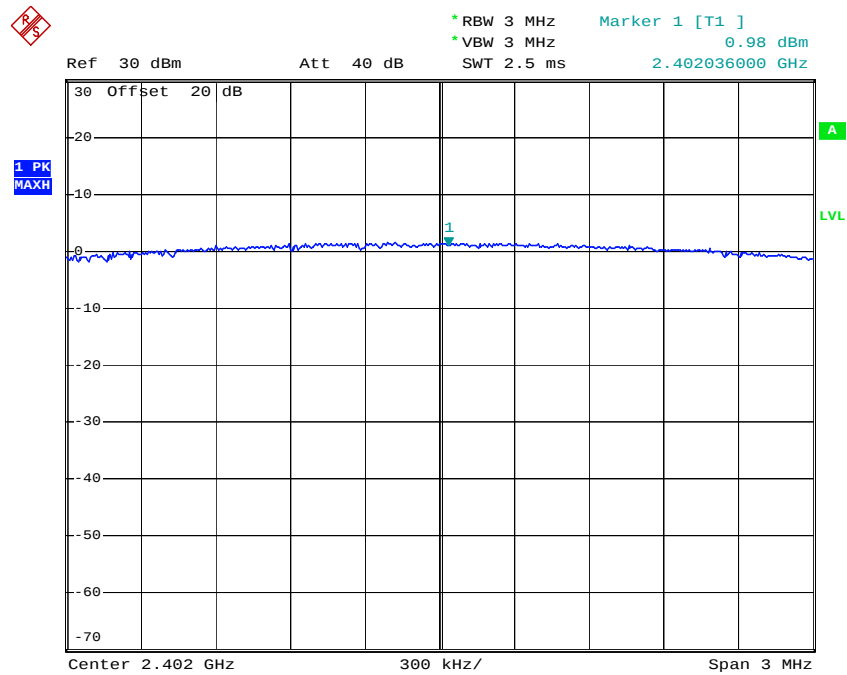
8DPSK Mode

Channel	Frequency (MHz)	Peak Output Power (dBm/W)	Limits dBm / W
Low	2402	2.13/0.0016	21 / 0.125
Middle	2441	0.97/0.0013	21 / 0.125
High	2480	0.67/0.0012	21 / 0.125

The spectrum analyzer plots are attached as below.

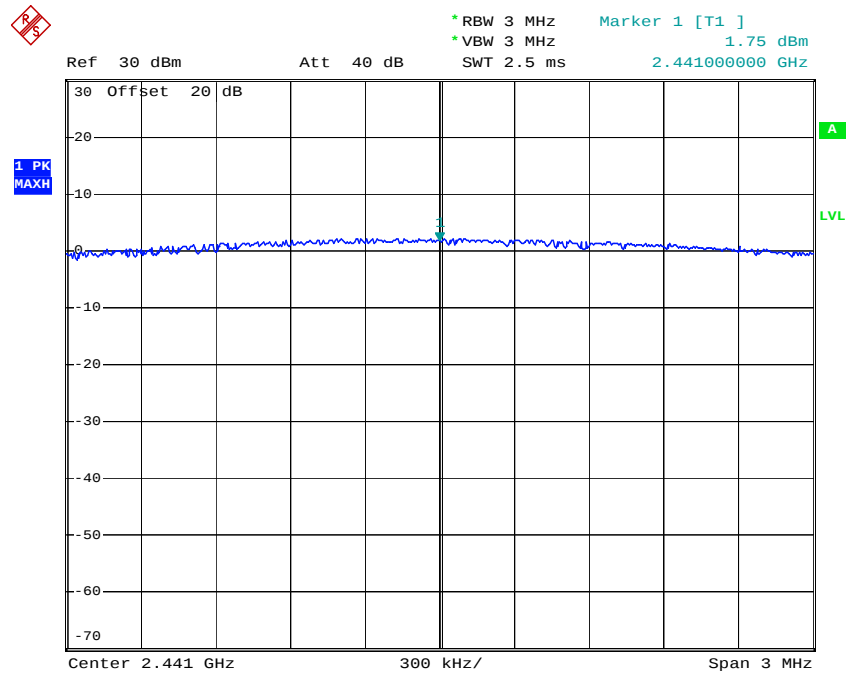
GFSK Mode

Low channel



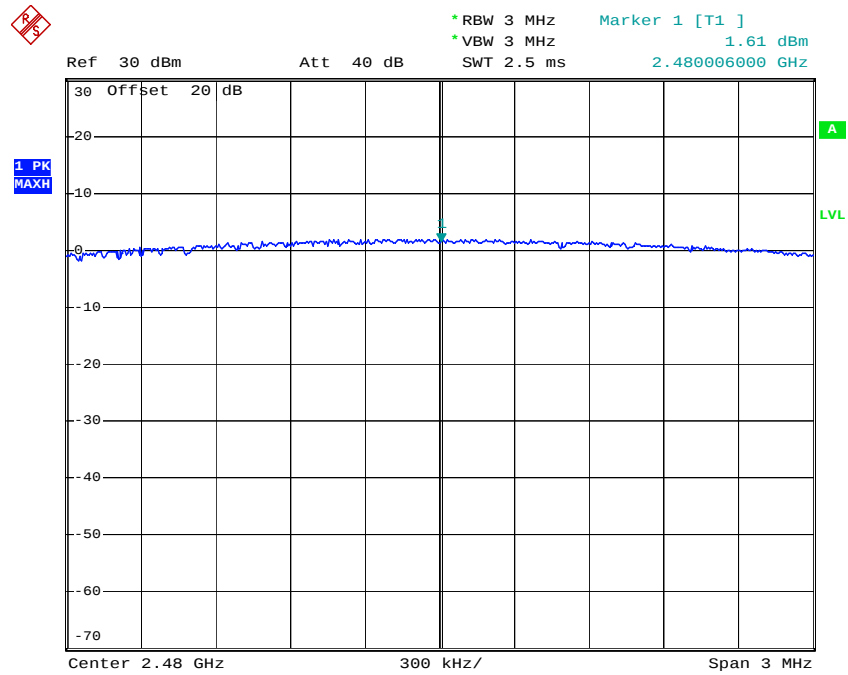
Comment A:
Date: 8.NOV.2017 10:20:42

Middle channel



Comment A:
Date: 8.NOV.2017 10:21:31

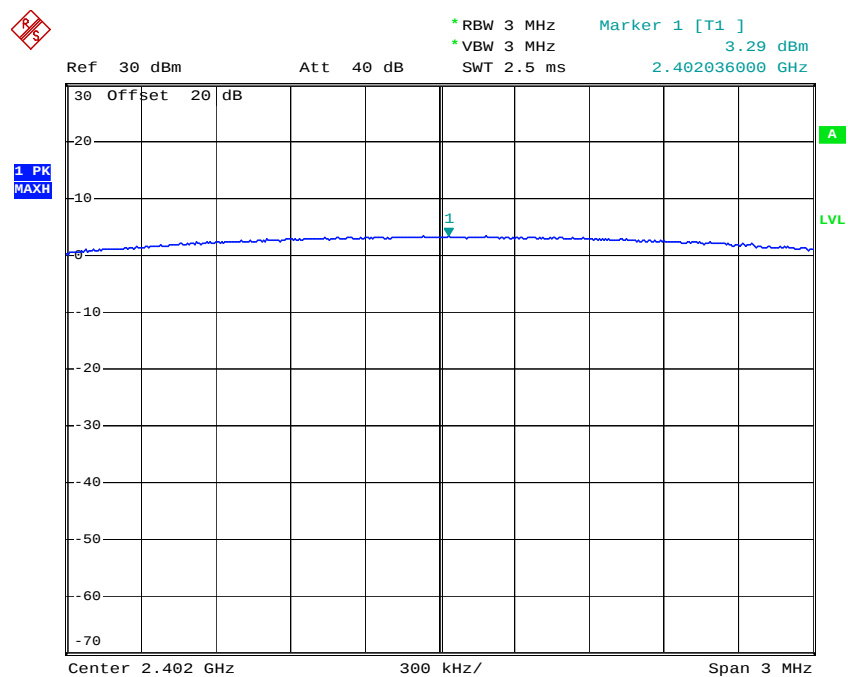
High channel



Comment A:
Date: 8.NOV.2017 10:22:35

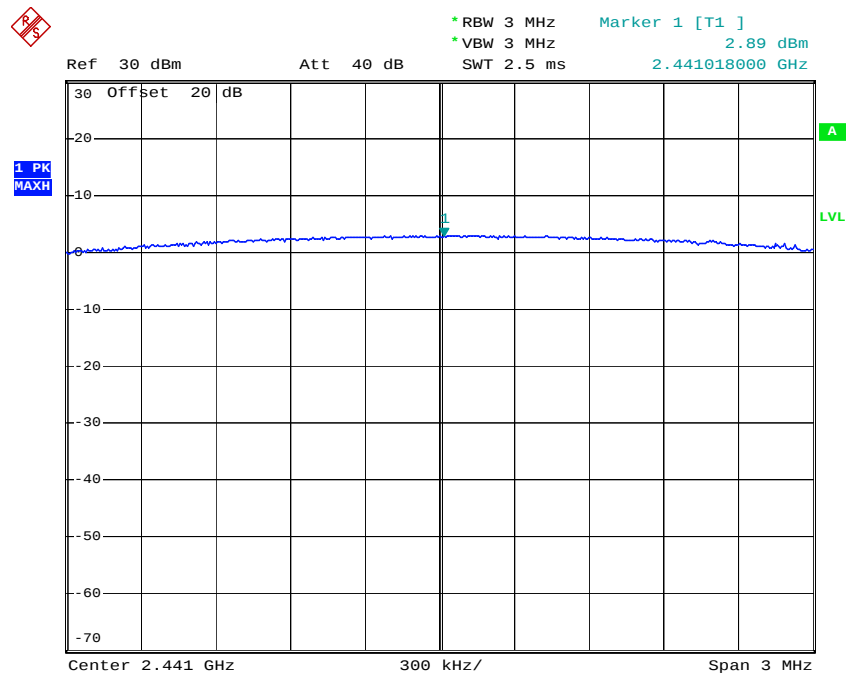
Π/4-DQPSK Mode

Low channel



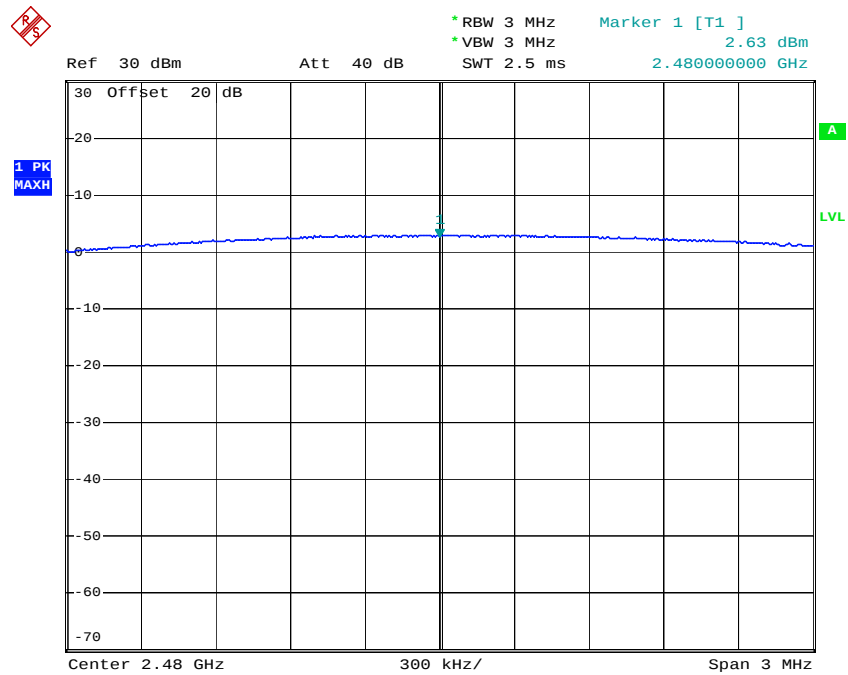
Comment A:
Date: 8.NOV.2017 10:19:35

Middle channel



Comment A:
Date: 8.NOV.2017 10:18:57

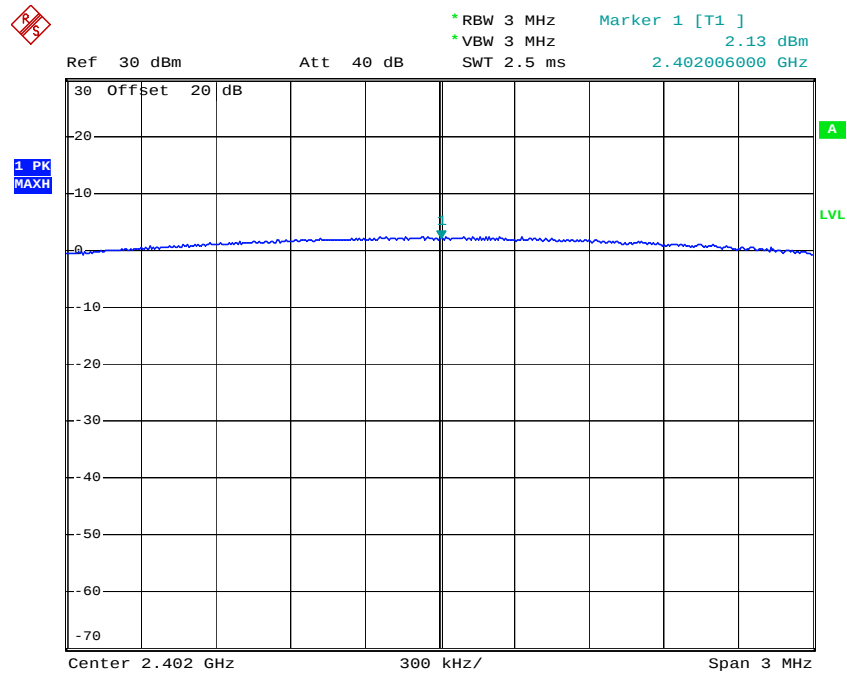
High channel



Comment A:
Date: 8.NOV.2017 10:18:05

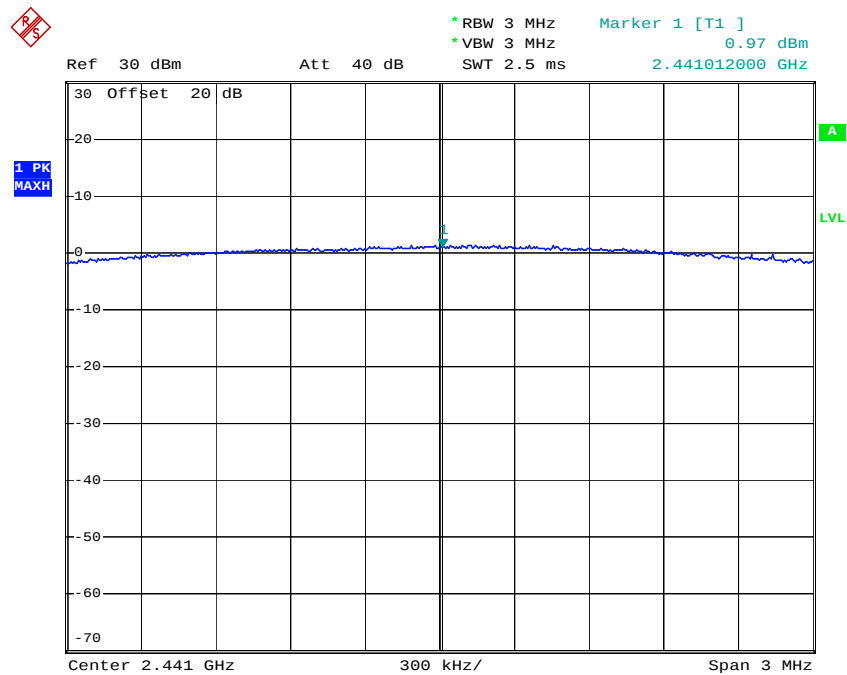
8DPSK Mode

Low channel



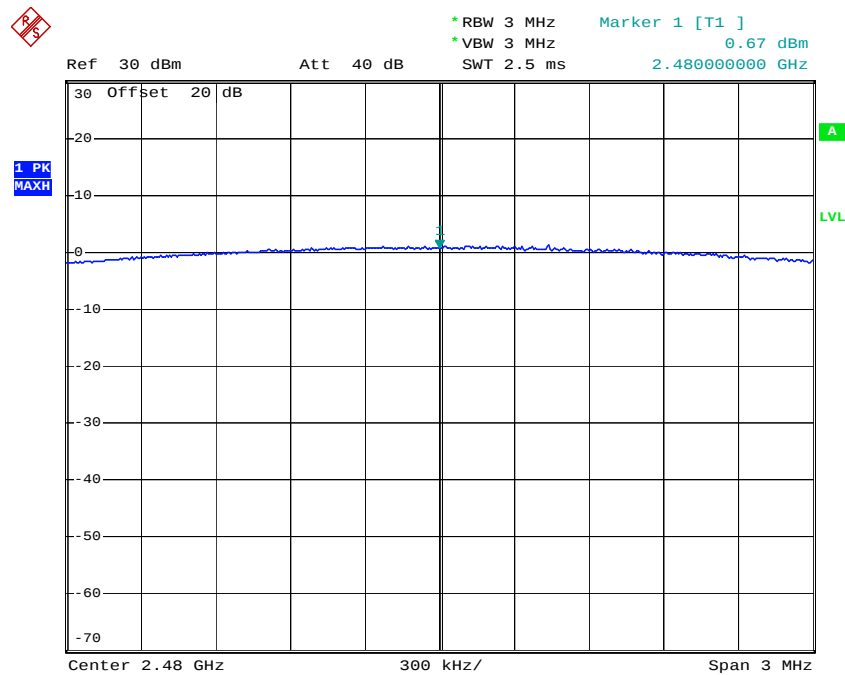
Comment A:
Date: 8.NOV.2017 10:26:22

Middle channel



Comment A:
Date: 8.NOV.2017 10:24:53

High channel

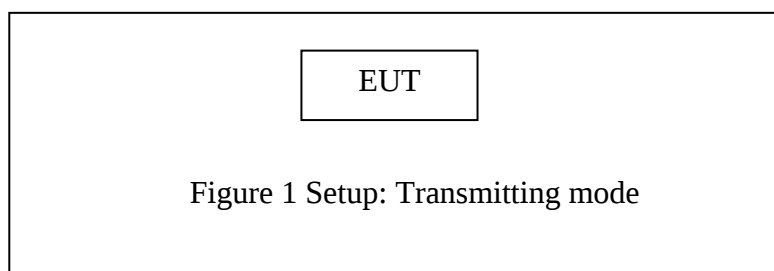


Comment A:
Date: 8.NOV.2017 10:24:05

10.RADIATED EMISSION TEST

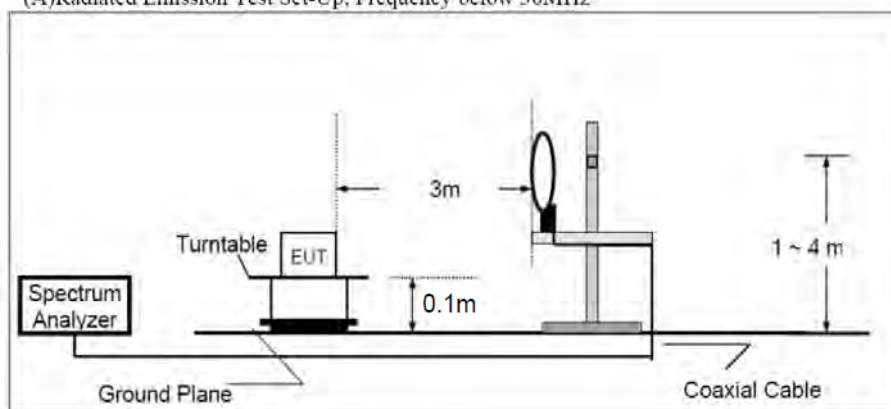
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and peripherals

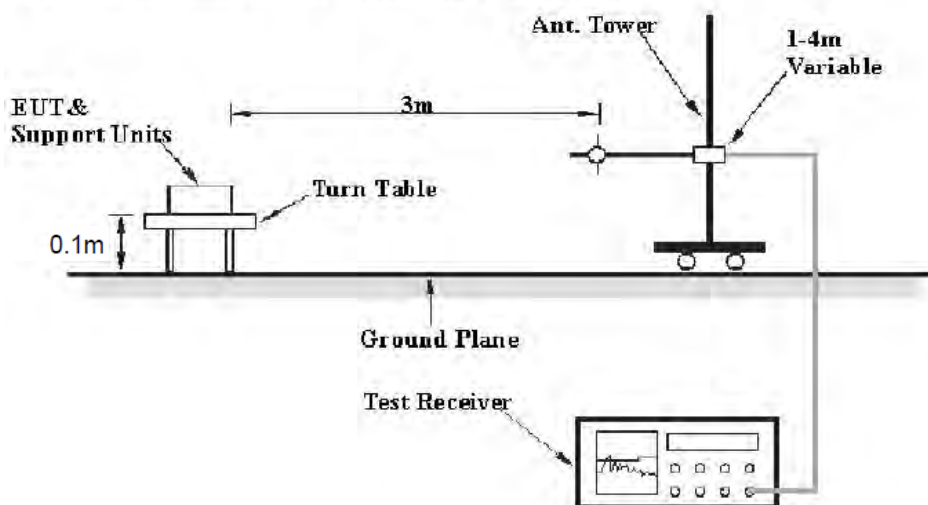


10.1.2.Semi-Anechoic Chamber Test Setup Diagram

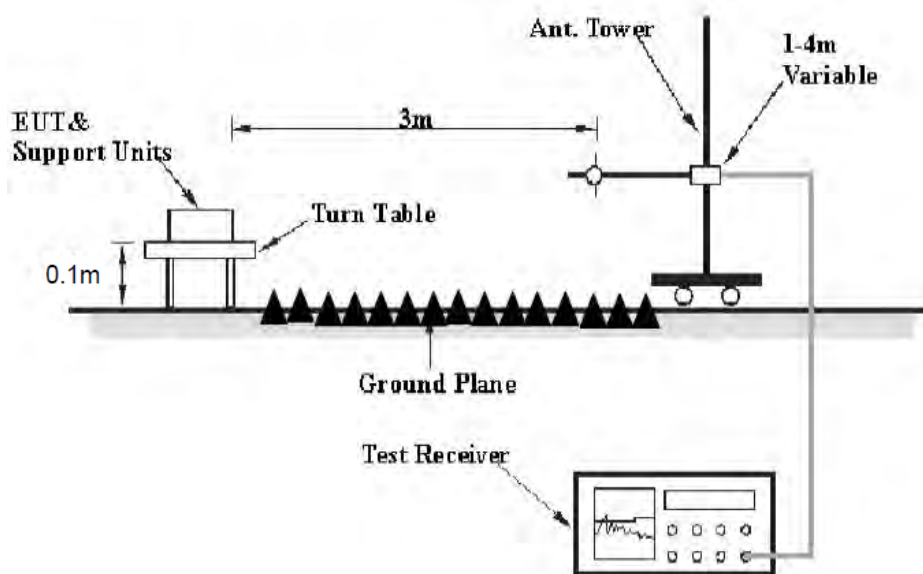
(A) Radiated Emission Test Set-Up, Frequency below 30MHz



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



(C) Radiated Emission Test Set-Up, Frequency above 1GHz



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 is 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. Operating Condition of EUT

10.5.1. Setup the EUT and simulator as shown as Section 10.1.

10.5.2. Turn on the power of all equipment.

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

10.6. Test Procedure

The EUT and its simulators are placed on a turntable, which is 0.1 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

10.7.Data Sample

Frequency (MHz)	Reading (dB μ v)	Factor (dB/m)	Result (dB μ v/m)	Limit (dB μ v/m)	Margin (dB)	Remark
X.XX	48.69	-13.35	35.34	46	-10.66	QP

Frequency(MHz) = Emission frequency in MHz

Reading(dB μ v) = Uncorrected Analyzer/Receiver reading

Factor (dB/m) = Antenna factor + Cable Loss – Amplifier gain

Result(dB μ v/m) = Reading(dB μ v) + Factor(dB/m)

Limit (dB μ v/m) = Limit stated in standard

Margin (dB) = Result(dB μ v/m) - Limit (dB μ v/m)

QP = Quasi-peak Reading

Calculation Formula:

Margin(dB) = Result (dB μ V/m)–Limit(dB μ V/m)

Result(dB μ V/m)= Reading(dB μ V)+ Factor(dB/m)

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit.

10.8.The Field Strength of Radiation Emission Measurement Results

PASS.

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 test frequency is from 30MHz to 25GHz, The 18-25GHz emissions are not reported, because the levels are too low against the limit.

Below 1GHz



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: frank2017 #1353
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2402MHz(GFSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 17/10/30/
Time: 9/40/57
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	44.6550	53.48	-18.86	34.62	40.00	-5.38	QP	200	197	
2	108.1294	58.67	-22.15	36.52	43.50	-6.98	QP	200	138	
3	125.7056	60.15	-22.05	38.10	43.50	-5.40	QP	200	75	
4	150.7238	60.15	-22.29	37.86	43.50	-5.64	QP	200	158	
5	259.8150	56.15	-17.55	38.60	46.00	-7.40	QP	200	154	
6	297.4168	54.46	-15.82	38.64	46.00	-7.36	QP	200	287	



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Fax:+86-0755-26503396

Job No.: frank2017 #1354

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2402MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

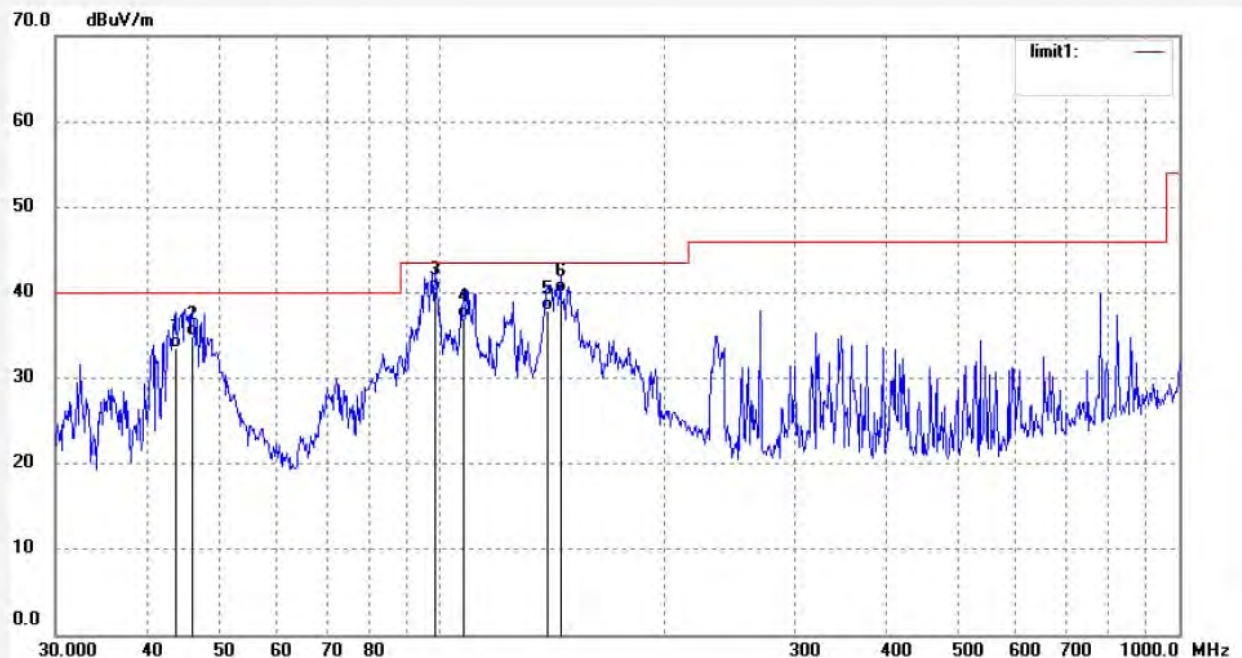
Date: 17/10/30/

Time: 9/41/19

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	43.6323	52.15	-18.70	33.45	40.00	-6.55	QP	100	153	
2	46.0561	54.15	-19.31	34.84	40.00	-5.16	QP	100	147	
3	98.1782	62.45	-22.36	40.09	43.50	-3.41	QP	100	213	
4	107.2977	59.34	-22.30	37.04	43.50	-6.46	QP	100	325	
5	139.5207	60.18	-22.30	37.88	43.50	-5.62	QP	100	247	
6	145.0141	62.34	-22.37	39.97	43.50	-3.53	QP	100	338	



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Job No.: frank2017 #1356

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2441MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

Date: 17/10/30/

Time: 9/41/52

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	44.8278	52.74	-18.90	33.84	40.00	-6.16	QP	200	164	
2	106.0618	53.15	-22.53	30.62	43.50	-12.88	QP	200	247	
3	126.6803	56.34	-22.08	34.26	43.50	-9.24	QP	200	327	
4	151.8925	53.18	-22.19	30.99	43.50	-12.51	QP	200	144	
5	255.8325	55.15	-17.80	37.35	46.00	-8.65	QP	200	134	
6	271.0899	55.45	-17.03	38.42	46.00	-7.58	QP	200	135	



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Job No.: frank2017 #1355

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2441MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

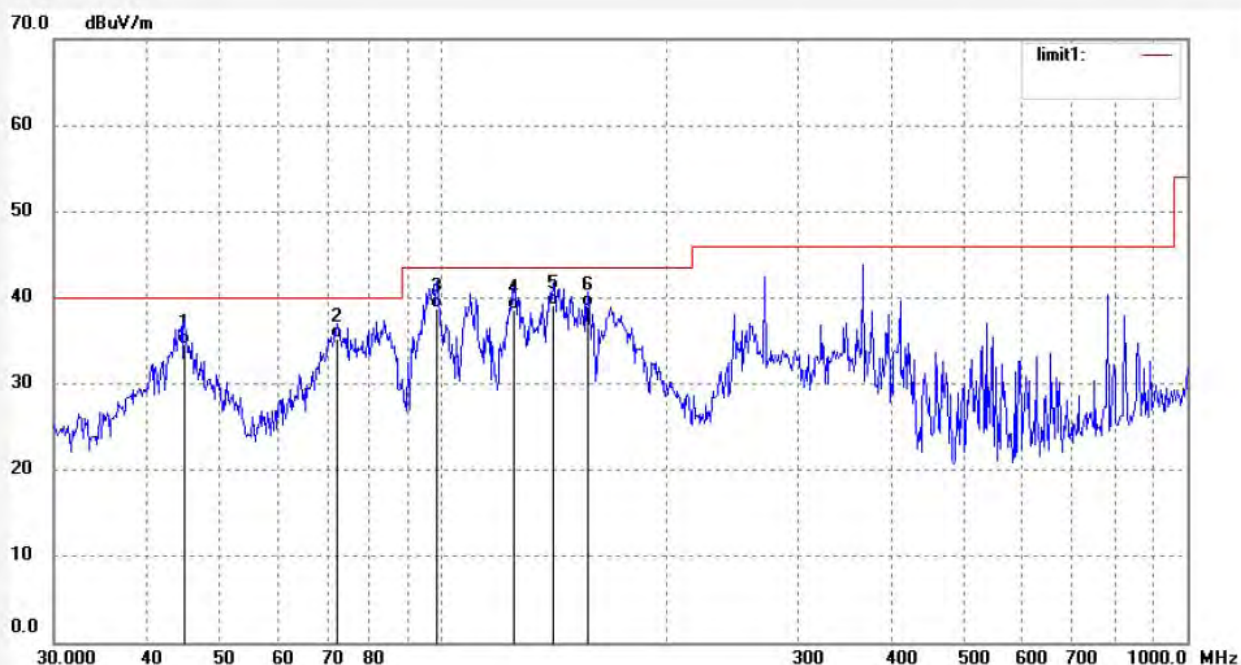
Date: 17/10/30/

Time: 9/41/30

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	45.0013	53.48	-18.92	34.56	40.00	-5.44	QP	100	324	
2	72.0841	57.46	-22.17	35.29	40.00	-4.71	QP	100	225	
3	98.1782	61.20	-22.36	38.84	43.50	-4.66	QP	100	155	
4	124.7385	60.67	-22.03	38.64	43.50	-4.86	QP	100	325	
5	140.6024	61.48	-22.32	39.16	43.50	-4.34	QP	100	95	
6	156.6585	60.65	-21.74	38.91	43.50	-4.59	QP	100	165	



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

Job No.: frank2017 #1357
Standard: FCC Class B 3M Radiated
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2480MHz(GFSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 17/10/30/
Time: 9/42/01
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	44.4829	52.15	-18.84	33.31	40.00	-6.69	QP	250	153	
2	106.8841	54.15	-22.38	31.77	43.50	-11.73	QP	200	323	
3	121.4116	57.15	-21.95	35.20	43.50	-8.30	QP	250	58	
4	126.6803	56.30	-22.08	34.22	43.50	-9.28	QP	200	189	
5	149.5643	56.10	-22.35	33.75	43.50	-9.75	QP	200	167	
6	271.0899	57.32	-17.03	40.29	46.00	-5.71	QP	200	199	



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Job No.: frank2017 #1358

Standard: FCC Class B 3M Radiated

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

Date: 17/10/30/

Time: 9/42/28

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	44.4829	53.88	-18.84	35.04	40.00	-4.96	QP	200	133	
2	95.1914	60.78	-21.95	38.83	43.50	-4.67	QP	200	215	
3	108.5480	58.12	-22.07	36.05	43.50	-7.45	QP	200	325	
4	124.7385	61.12	-22.03	39.09	43.50	-4.41	QP	200	224	
5	140.6024	60.16	-22.32	37.84	43.50	-5.66	QP	200	148	
6	150.7238	60.12	-22.29	37.83	43.50	-5.67	QP	200	327	

Above 1GHz



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Job No.: frank2017 #1444

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2402MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

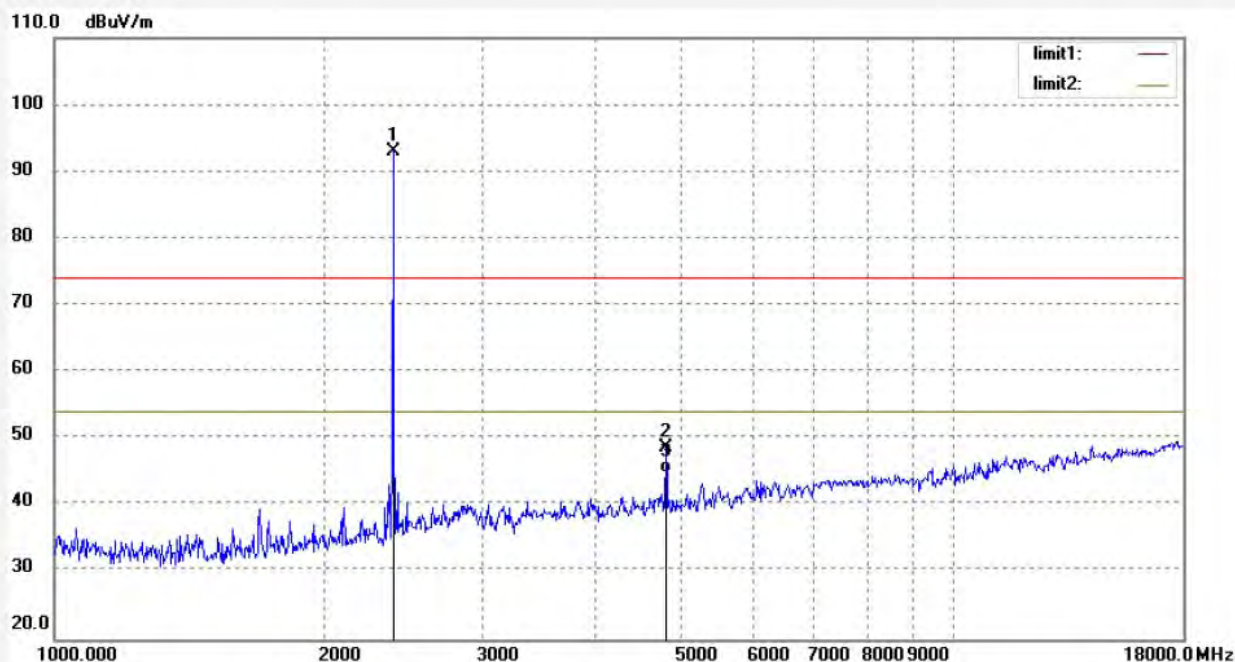
Date: 2017/11/04

Time: 15:58:53

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.019	97.07	-4.01	93.06			peak			
2	4804.373	45.08	3.70	48.78	74.00	-25.22	peak			
3	4804.373	41.23	3.70	44.93	54.00	-9.07	AVG	150	321	

Note: Average measurement with peak detection at No.3



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Job No.: frank2017 #1445

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2402MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

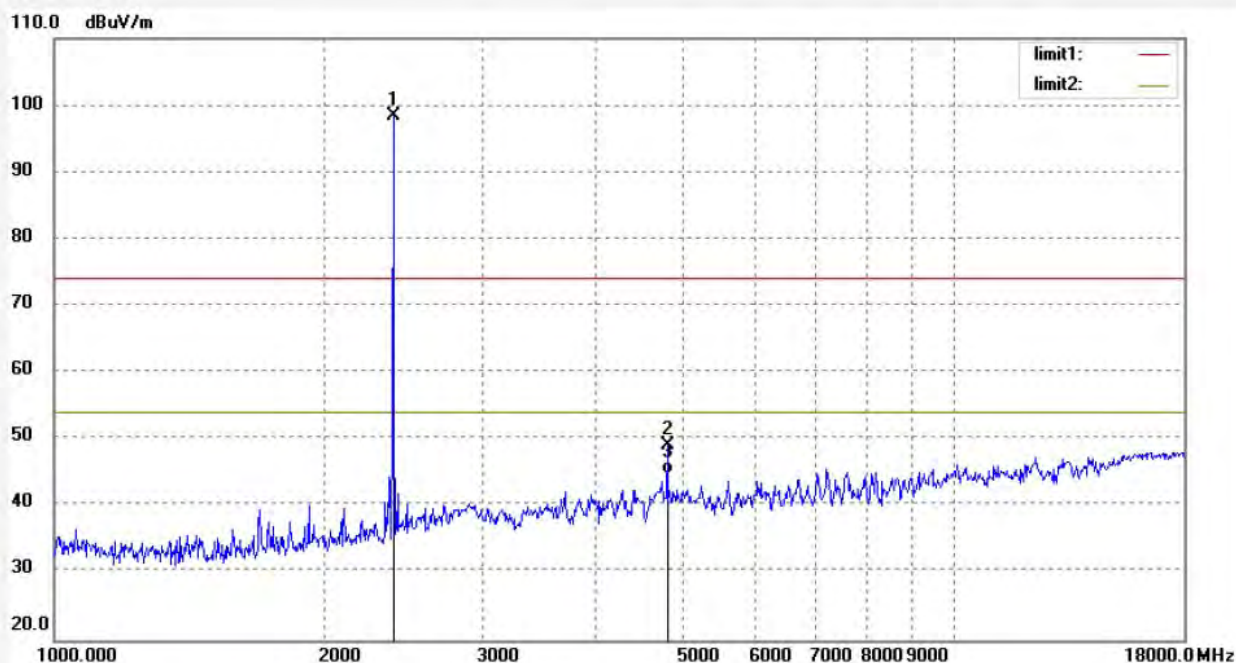
Date: 2017/11/04

Time: 15:58:59

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2402.019	102.39	-4.01	98.38			peak			
2	4804.328	45.35	3.75	49.10	74.00	-24.90	peak			
3	4804.328	41.21	3.75	44.96	54.00	-9.04	AVG	150	312	

Note: Average measurement with peak detection at No.3



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Job No.: frank2017 #1447

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2441MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

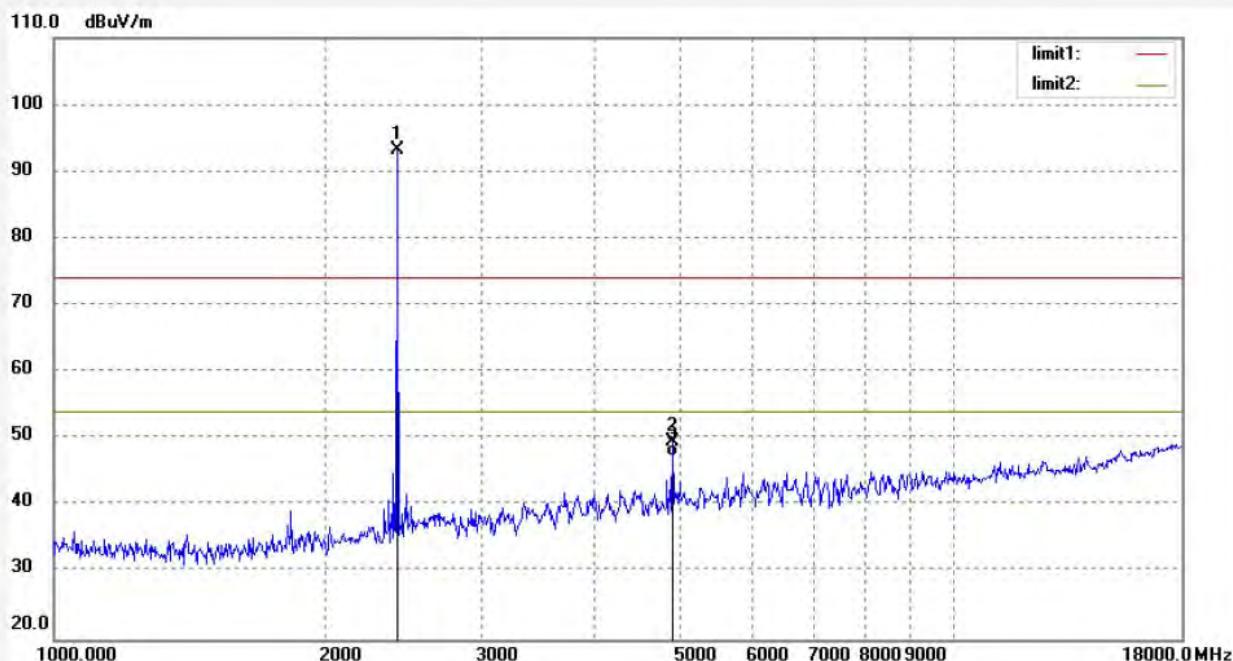
Date: 2017/11/04

Time: 16:00:39

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.200	97.06	-3.87	93.19			peak			
2	4882.017	45.44	4.11	49.55	74.00	-24.45	peak			
3	4882.017	43.12	4.11	47.23	54.00	-6.77	AVG	250	315	

Note: Average measurement with peak detection at No.3



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Job No.: frank2017 #1446

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2441MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

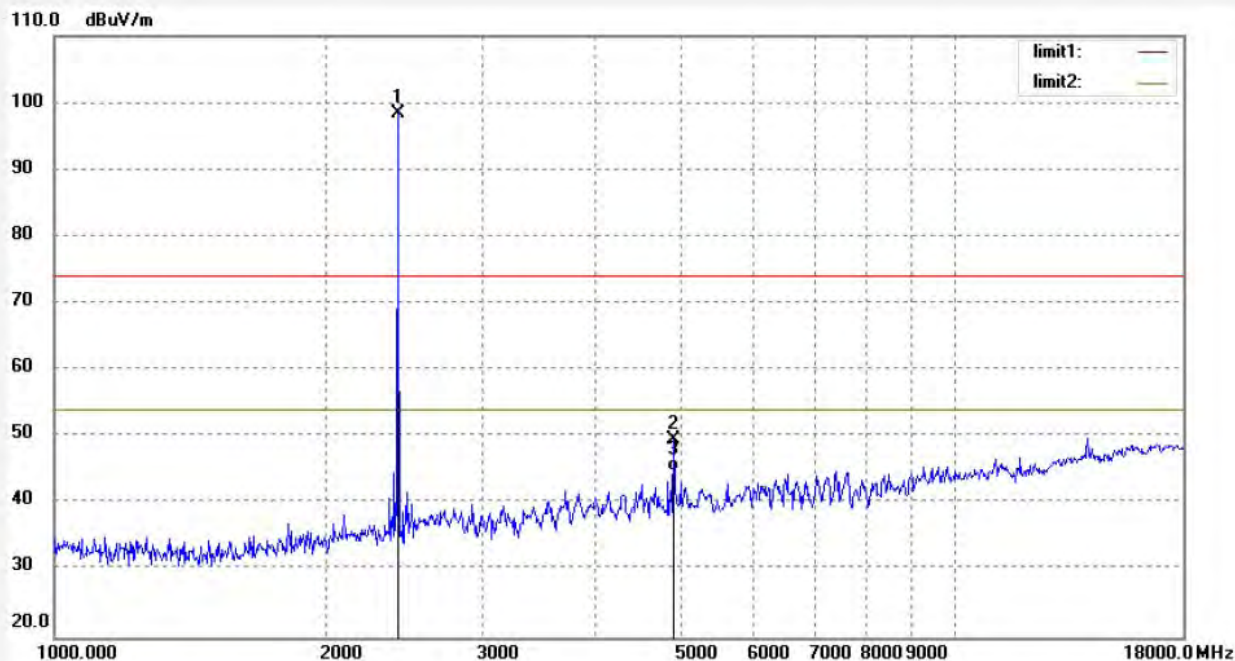
Date: 2017/11/04

Time: 16:00:31

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2441.100	102.28	-3.87	98.41			peak			
2	4882.017	45.44	4.11	49.55	74.00	-24.45	peak			
3	4882.017	40.65	4.11	44.76	54.00	-9.24	AVG	250	43	

Note: Average measurement with peak detection at No.3



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Fax:+86-0755-26503396

Job No.: frank2017 #1448

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

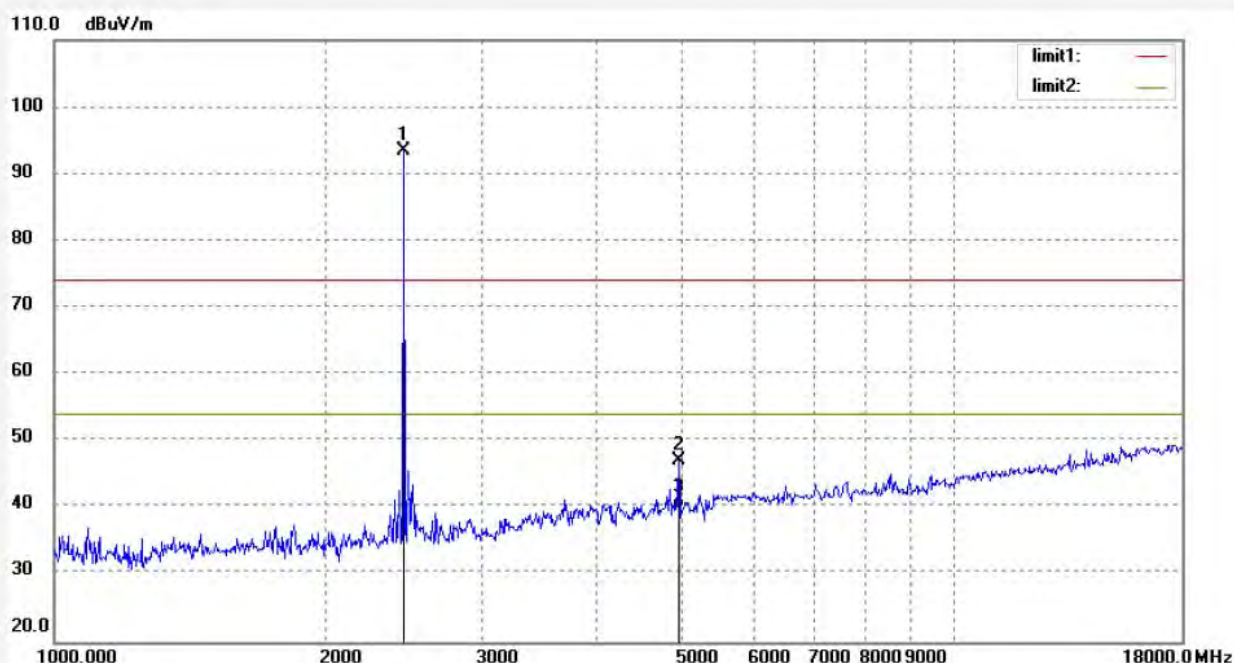
Date: 2017/11/04

Time: 16:01:41

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	97.17	-3.67	93.50			peak			
2	4960.546	42.61	4.42	47.03	74.00	-26.97	peak			
3	4960.546	35.45	4.42	39.87	54.00	-14.13	AVG	250	135	

Note: Average measurement with peak detection at No.3



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Job No.: frank2017 #1449

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

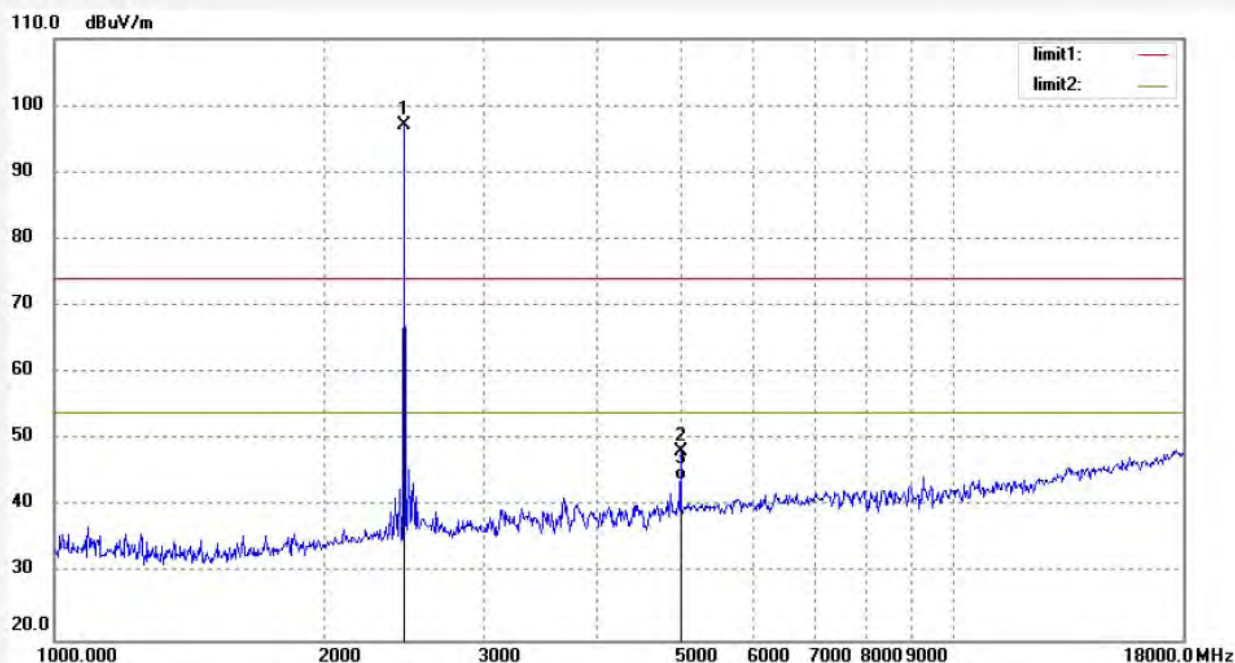
Date: 2017/11/04

Time: 16:01:50

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2480.034	100.68	-3.67	97.01			peak			
2	4960.197	43.65	4.49	48.14	74.00	-25.86	peak			
3	4960.197	39.45	4.49	43.94	54.00	-10.06	AVG	150	133	

Note: Average measurement with peak detection at No.3

11.BAND EDGE COMPLIANCE TEST

11.1.Block Diagram of Test Setup



(EUT: Stage Karaoke)

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.

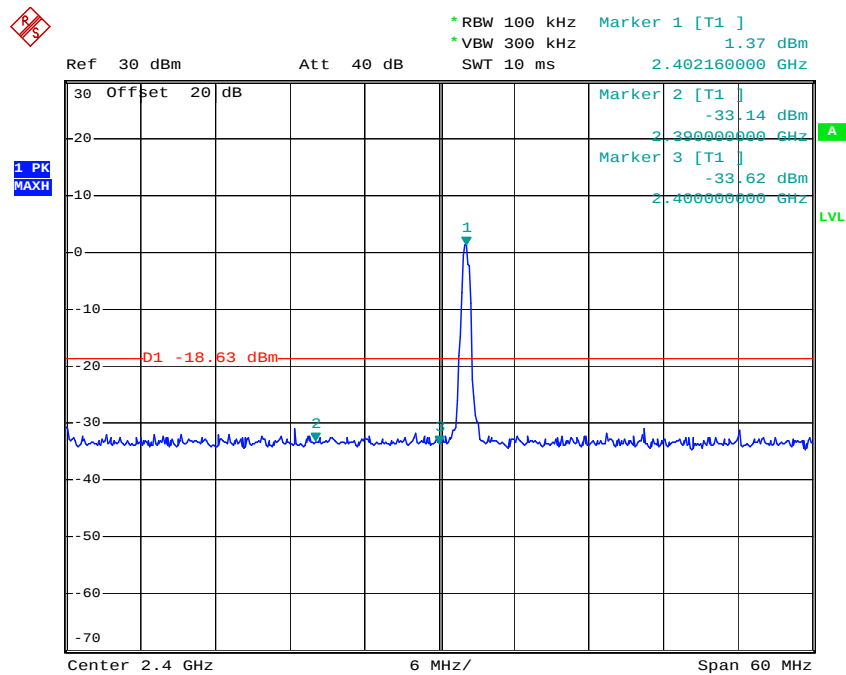
11.5.2. Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

11.5.3. The band edges was measured and recorded.

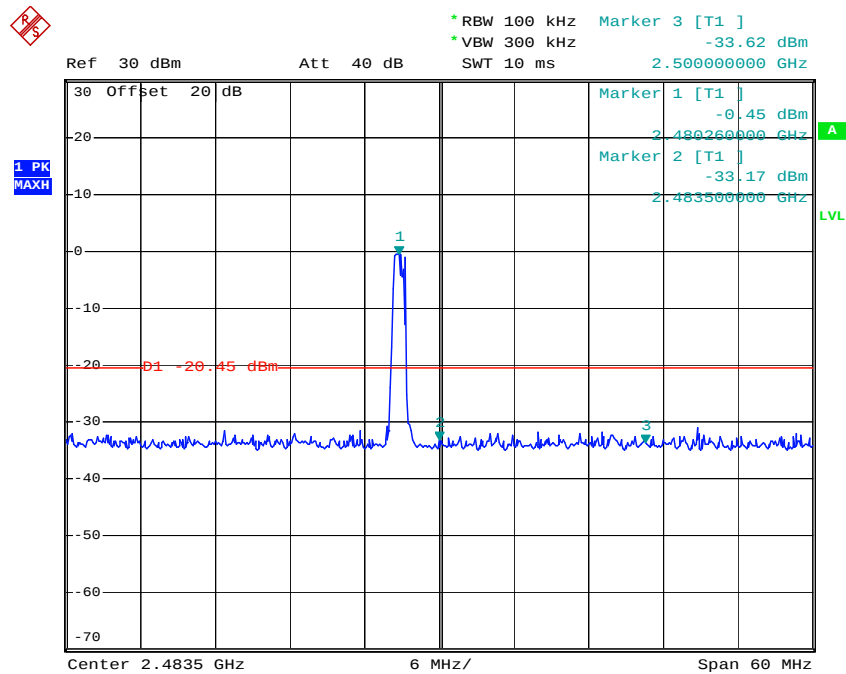
11.6. Test Result

Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK Mode		
2400.00	32.25	> 20dBc
2483.50	32.72	> 20dBc
Π/4-DQPSK Mode		
2400.00	33.24	> 20dBc
2483.50	30.34	> 20dBc
8DPSK Mode		
2400.00	32.60	> 20dBc
2483.50	32.00	> 20dBc

GFSK Mode

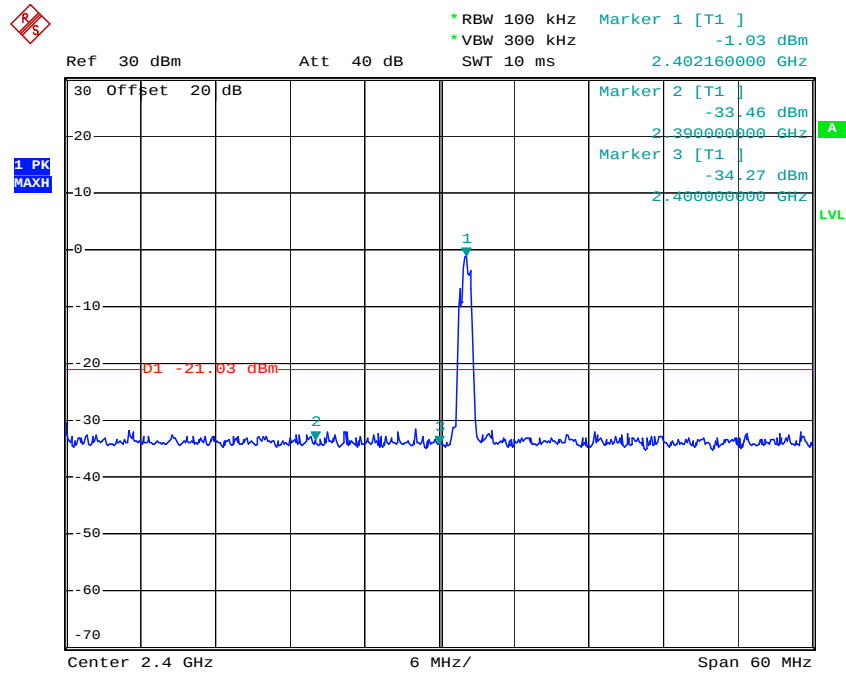


Comment A:
Date: 8.NOV.2017 10:54:47

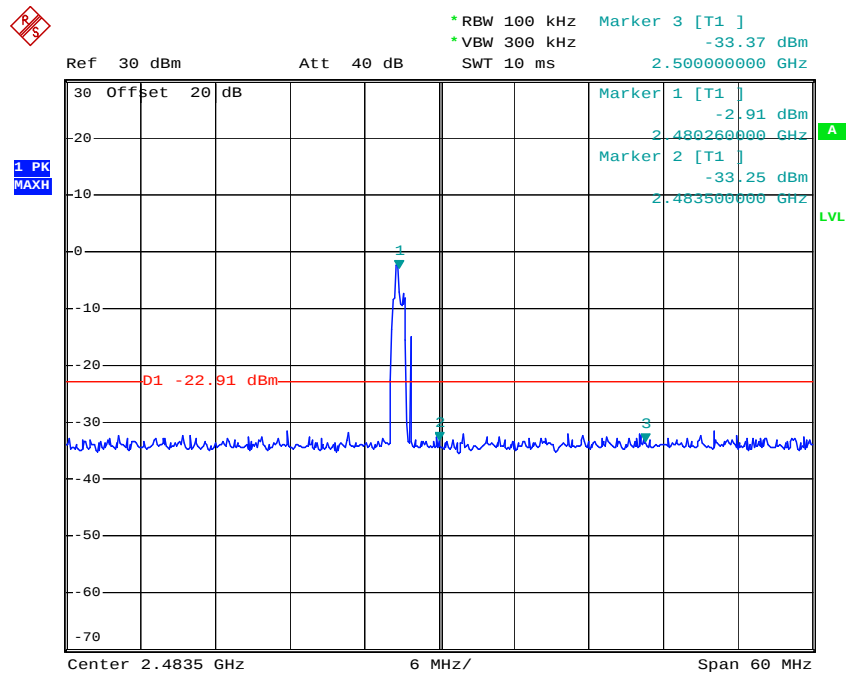


Comment A:
Date: 8.NOV.2017 10:53:16

Π/4-DQPSK Mode

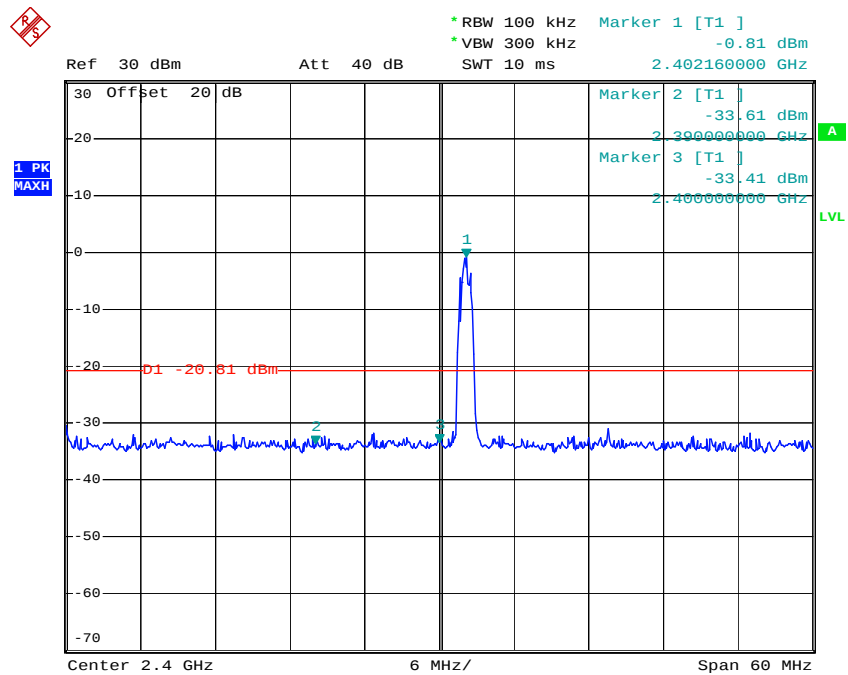


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Date: 8.NOV.2017 10:55:45

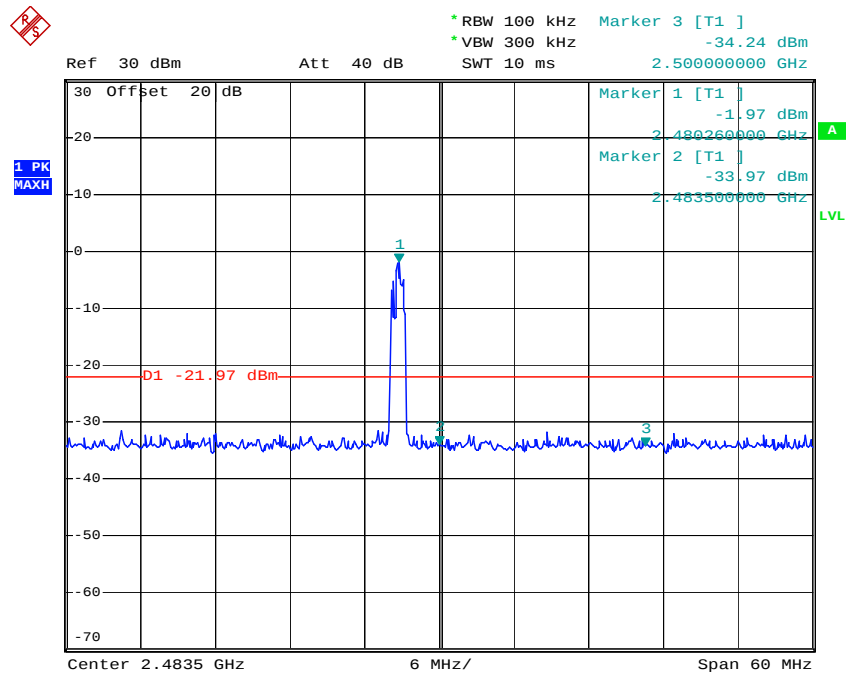


Comment A:
Date: 8.NOV.2017 10:49:54

8DPSK Mode



Comment A:
Date: 8.NOV.2017 10:56:57



Comment A:
Date: 8.NOV.2017 10:50:52

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.

Test Procedure:

The EUT and its simulators are placed on a turntable, which is 0.1 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 bi-log 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 EUT location must be manipulated according to ANSI C63.10:2013 on radiated emission measurement. The EUT was tested in 3 orthogonal planes.

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

We select 2402MHz, 2480MHz TX frequency to transmit(Hopping off mode).

We select 2402-2480MHz TX frequency to transmit(Hopping on mode).

During the radiated emission test, the spectrum analyzer was set with the following configurations:

- 1.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for peak measurement with peak detector at frequency above 1GHz.
- 2.The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average measurement with peak detection at frequency above 1GHz.
- 3.All modes of operation were investigated and the worst-case emissions are reported.

Non-hopping mode



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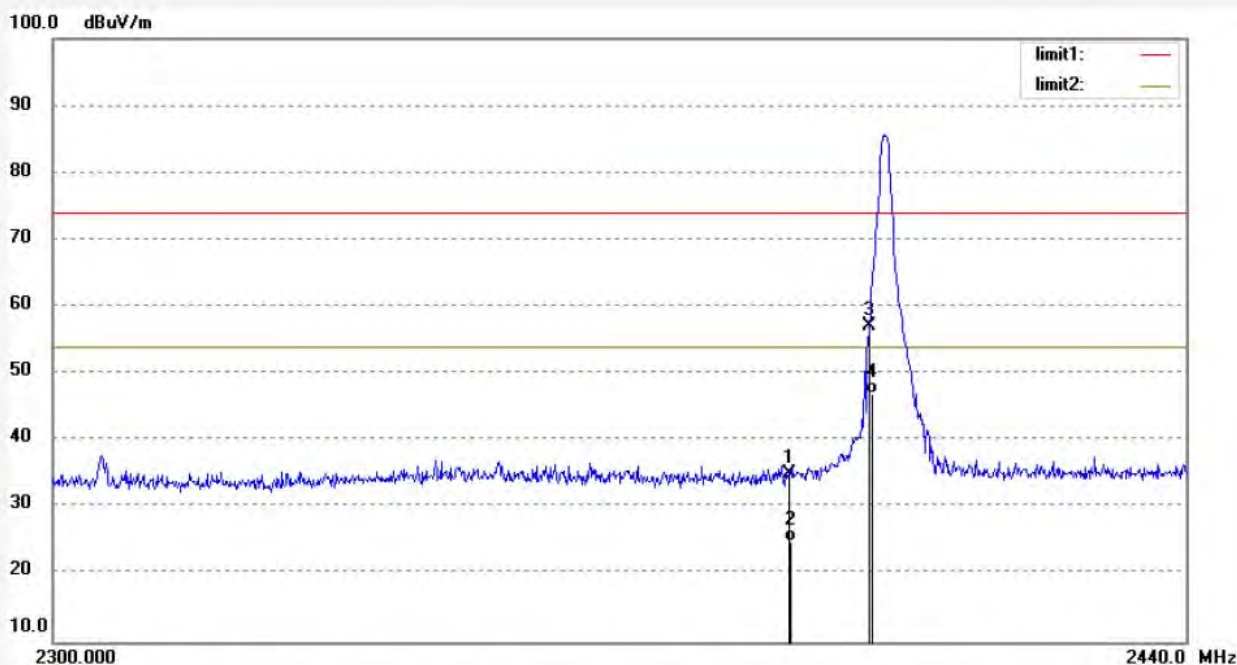
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
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Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: frank2017 #864
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2402MHz(GFSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 13/42/04
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	40.93	-5.89	35.04	74.00	-38.96	peak			
2	2390.000	30.93	-5.89	25.04	54.00	-28.96	AVG			
3	2400.000	62.97	-5.80	57.17	74.00	-16.83	peak			
4	2400.000	52.87	-5.80	47.07	54.00	-6.93	AVG			

Note: Average measurement with peak detection at No.2&4



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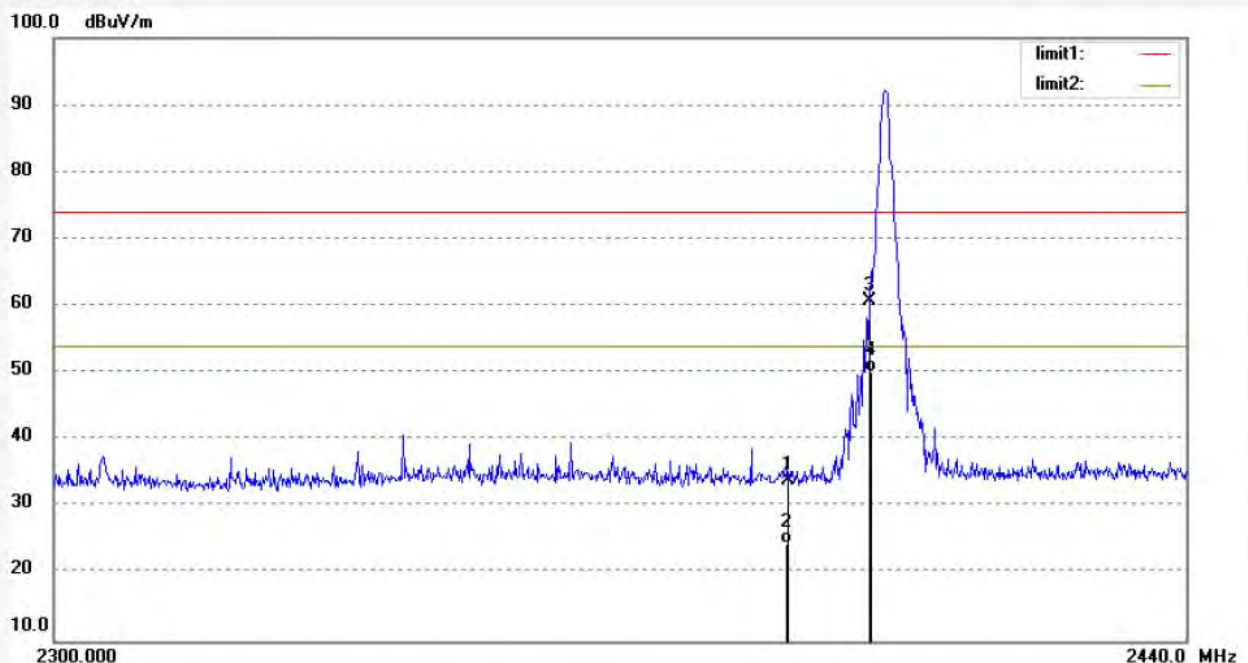
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #863
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2402MHz(GFSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 13/39/33
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	39.87	-5.89	33.98	74.00	-40.02	peak			
2	2390.000	30.46	-5.89	24.57	54.00	-29.43	AVG			
3	2400.000	66.62	-5.80	60.82	74.00	-13.18	peak			
4	2400.000	56.01	-5.80	50.21	54.00	-3.79	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #861

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

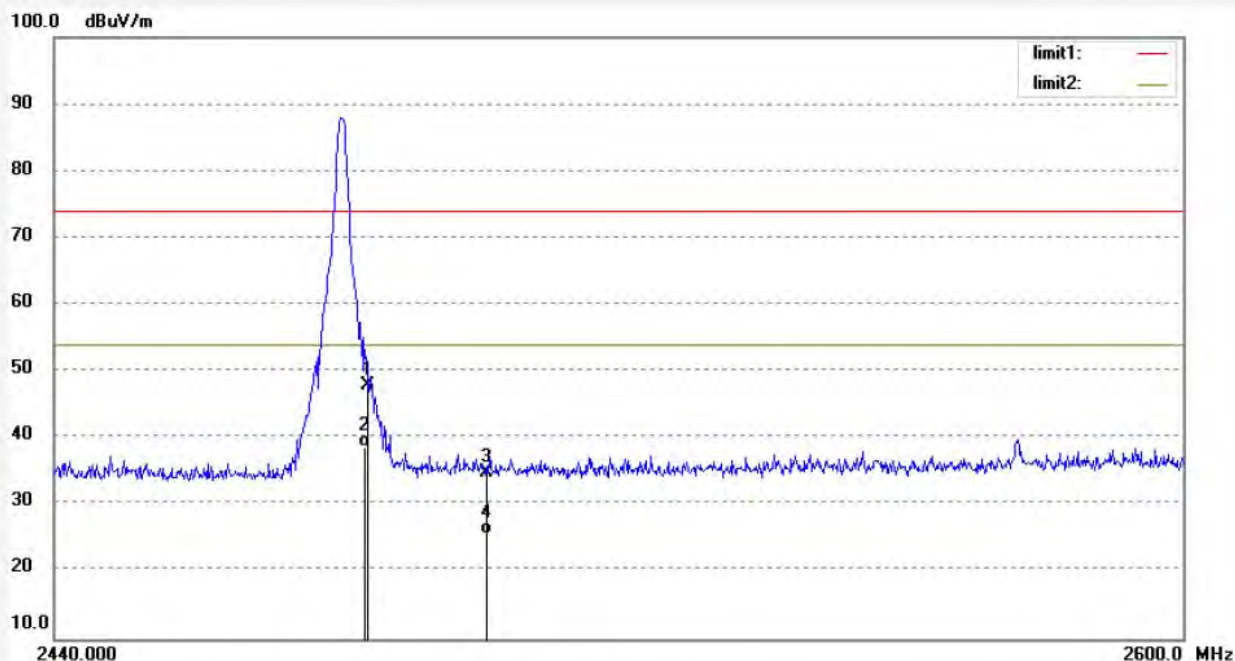
Date: 2017/11/04

Time: 13/33/55

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



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	53.42	-5.51	47.91	74.00	-26.09	peak			
2	2483.500	44.15	-5.51	38.64	54.00	-15.36	AVG			
3	2500.000	40.35	-5.50	34.85	74.00	-39.15	peak			
4	2500.000	31.22	-5.50	25.72	54.00	-28.28	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #862

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

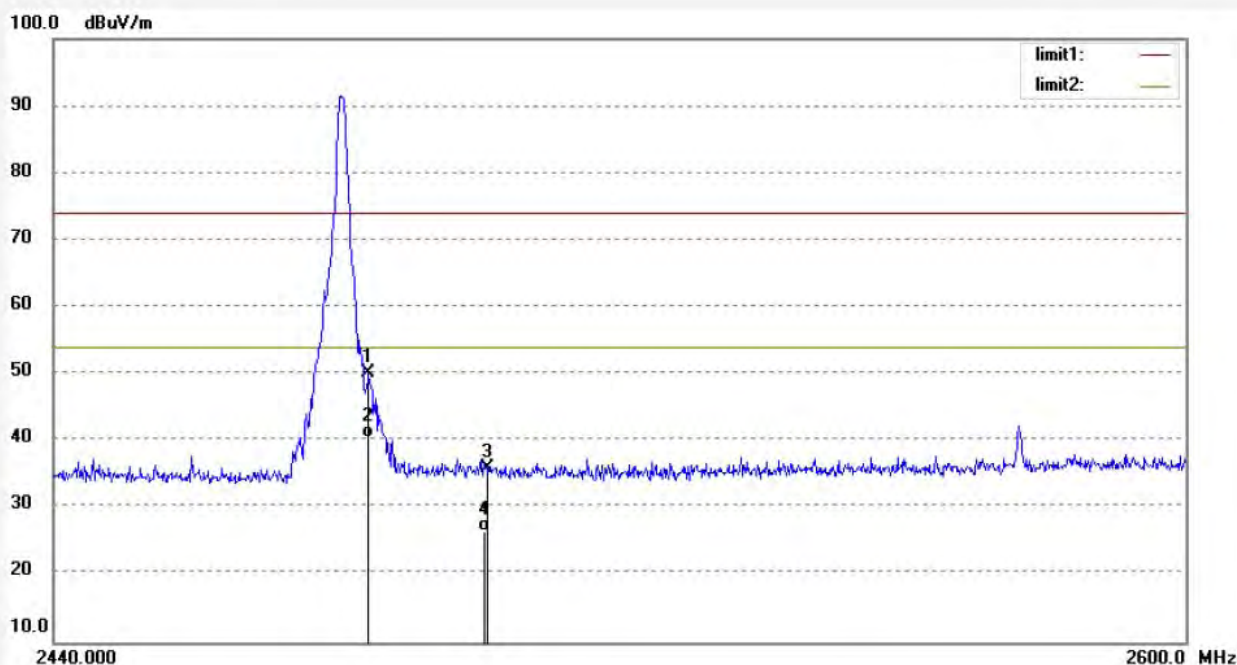
Date: 2017/11/04

Time: 13/36/27

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



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	55.73	-5.51	50.22	74.00	-23.78	peak			
2	2483.500	45.91	-5.51	40.40	54.00	-13.60	AVG			
3	2500.000	41.48	-5.50	35.98	74.00	-38.02	peak			
4	2500.000	32.03	-5.50	26.53	54.00	-27.47	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #857

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2402MHz($\pi/4$ DQPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

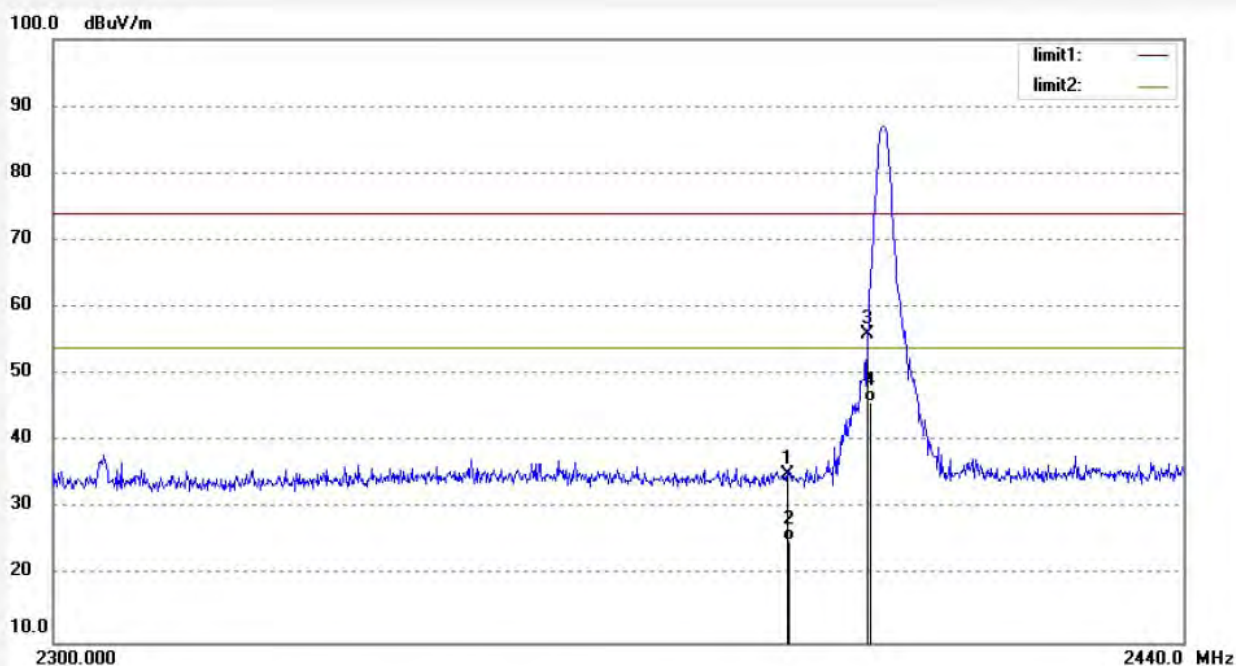
Date: 2017/11/04

Time: 13/23/37

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.05	-5.89	35.16	74.00	-38.84	peak			
2	2390.000	31.06	-5.89	25.17	54.00	-28.83	AVG			
3	2400.000	61.86	-5.80	56.06	74.00	-17.94	peak			
4	2400.000	51.73	-5.80	45.93	54.00	-8.07	AVG			

Note: Average measurement with peak detection at No.2&4



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Site: 1# Chamber

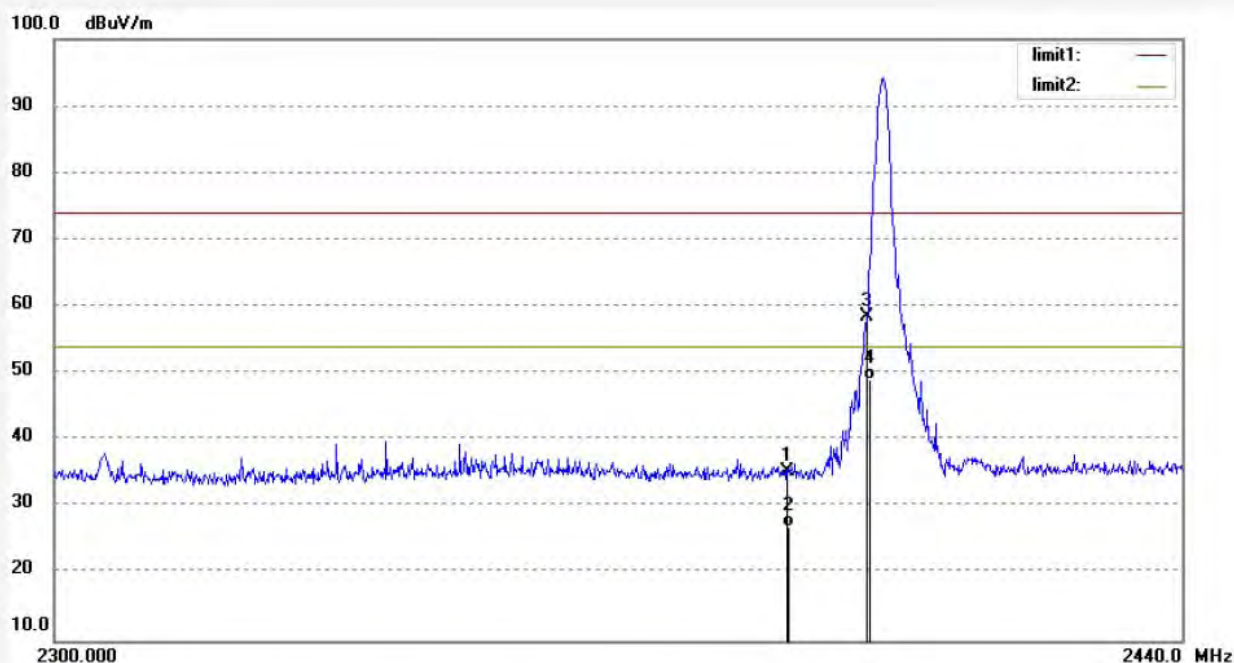
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #858
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2402MHz($\pi/4$ DQPSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 13/25/22
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	41.23	-5.89	35.34	74.00	-38.66	peak			
2	2390.000	32.79	-5.89	26.90	54.00	-27.10	AVG			
3	2400.000	64.36	-5.80	58.56	74.00	-15.44	peak			
4	2400.000	54.82	-5.80	49.02	54.00	-4.98	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #860

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz($\pi/4$ DQPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

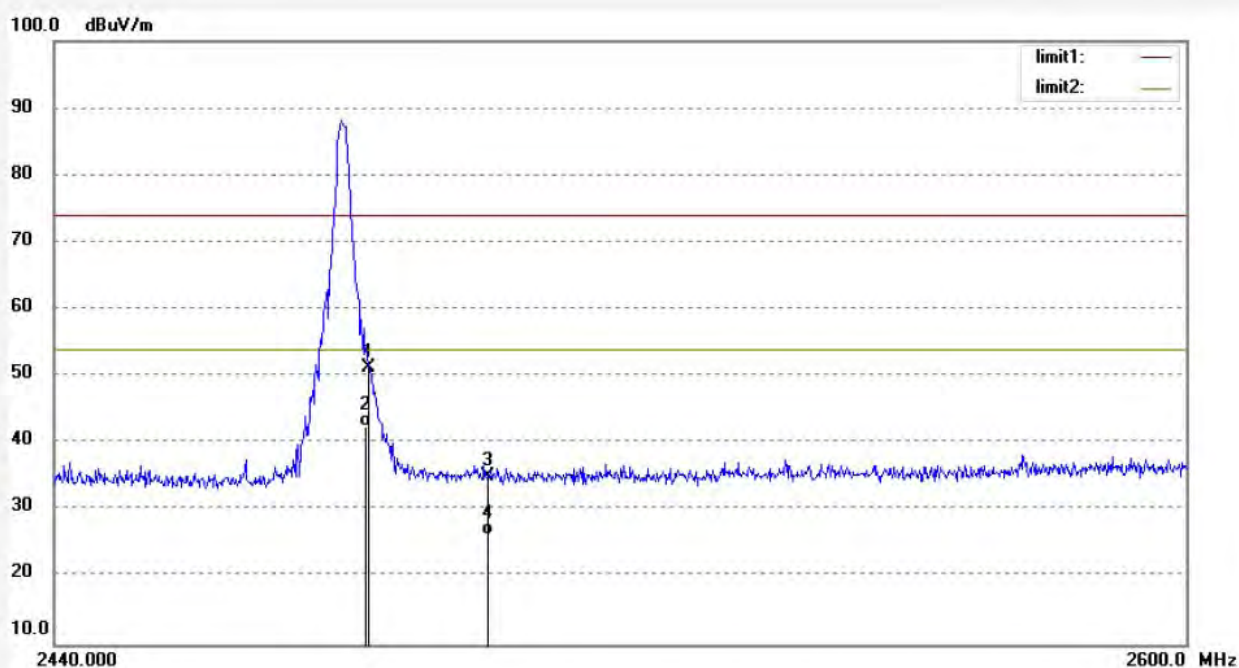
Date: 2017/11/04

Time: 13/30/35

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



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	56.89	-5.51	51.38	74.00	-22.62	peak			
2	2483.500	47.95	-5.51	42.44	54.00	-11.56	AVG			
3	2500.000	40.51	-5.50	35.01	74.00	-38.99	peak			
4	2500.000	31.79	-5.50	26.29	54.00	-27.71	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

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Job No.: frank2017 #859

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz($\pi/4$ DQPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

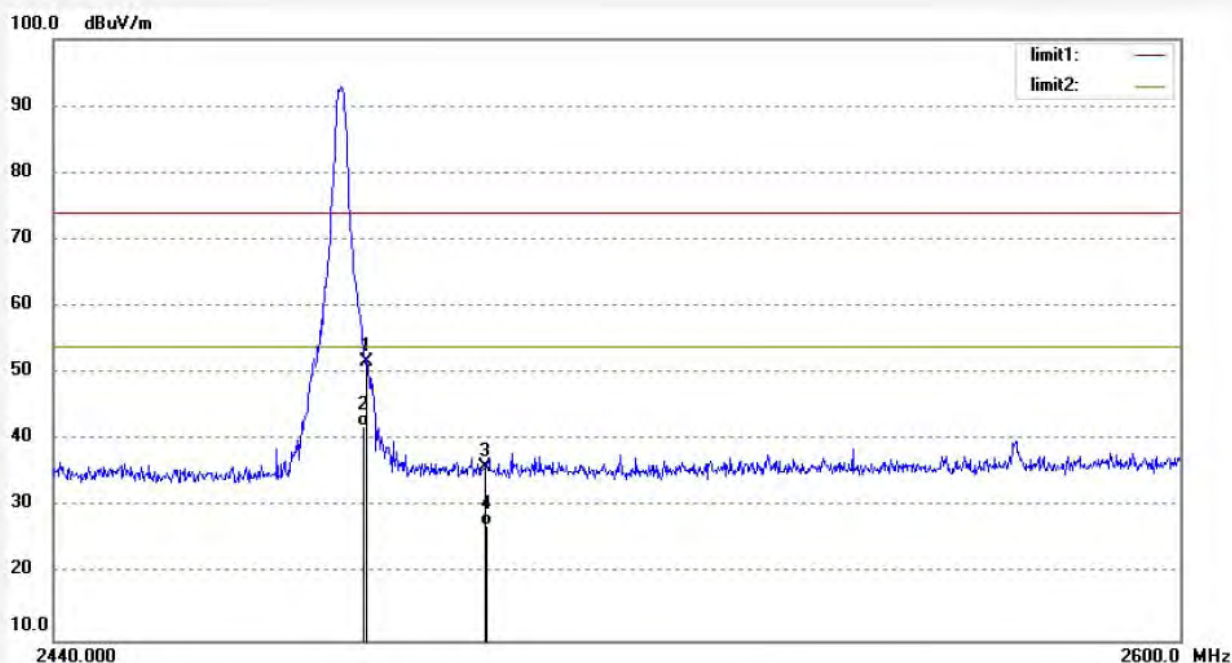
Date: 2017/11/04

Time: 13/28/49

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



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	57.34	-5.51	51.83	74.00	-22.17	peak			
2	2483.500	47.62	-5.51	42.11	54.00	-11.89	AVG			
3	2500.000	41.56	-5.50	36.06	74.00	-37.94	peak			
4	2500.000	32.74	-5.50	27.24	54.00	-26.76	AVG			

Note: Average measurement with peak detection at No.2&4



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Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #856

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2402MHz(8DPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

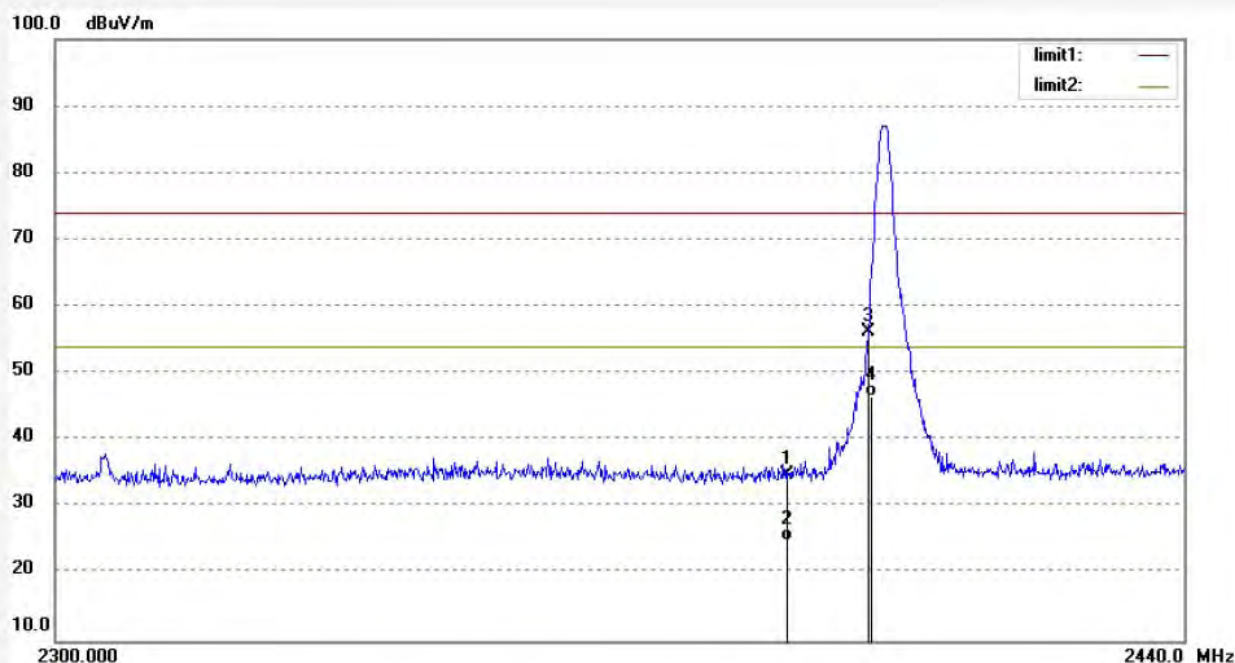
Date: 2017/11/04

Time: 13/19/56

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	40.69	-5.89	34.80	74.00	-39.20	peak			
2	2390.000	30.95	-5.89	25.06	54.00	-28.94	AVG			
3	2400.000	62.06	-5.80	56.26	74.00	-17.74	peak			
4	2400.000	52.34	-5.80	46.54	54.00	-7.46	AVG			

Note: Average measurement with peak detection at No.2&4



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Site: 1# Chamber

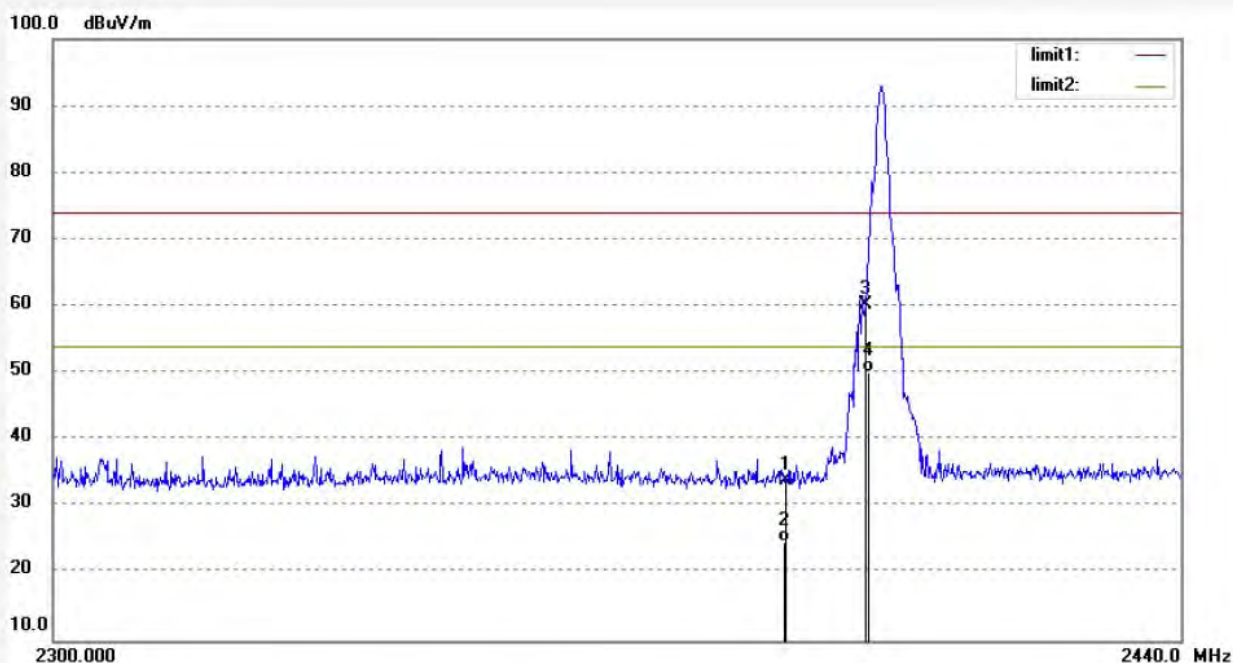
Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #855
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2402MHz(8DPSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 13/17/10
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	39.95	-5.89	34.06	74.00	-39.94	peak			
2	2390.000	30.64	-5.89	24.75	54.00	-29.25	AVG			
3	2400.000	66.04	-5.80	60.24	74.00	-13.76	peak			
4	2400.000	56.02	-5.80	50.22	54.00	-3.78	AVG			

Note: Average measurement with peak detection at No.2&4



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #853

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: TX 2480MHz(8DPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

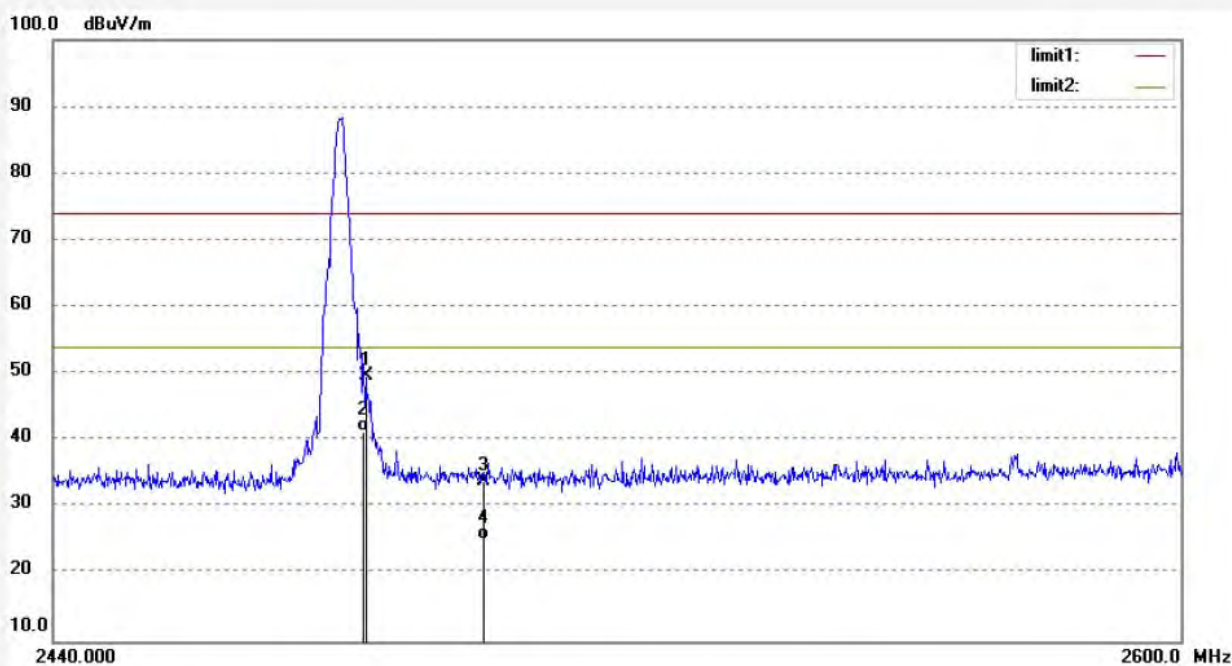
Date: 2017/11/04

Time: 13/12/12

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



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	55.29	-5.51	49.78	74.00	-24.22	peak			
2	2483.500	46.83	-5.51	41.32	54.00	-12.68	AVG			
3	2500.000	39.41	-5.50	33.91	74.00	-40.09	peak			
4	2500.000	30.67	-5.50	25.17	54.00	-28.83	AVG			

Note: Average measurement with peak detection at No.2&4



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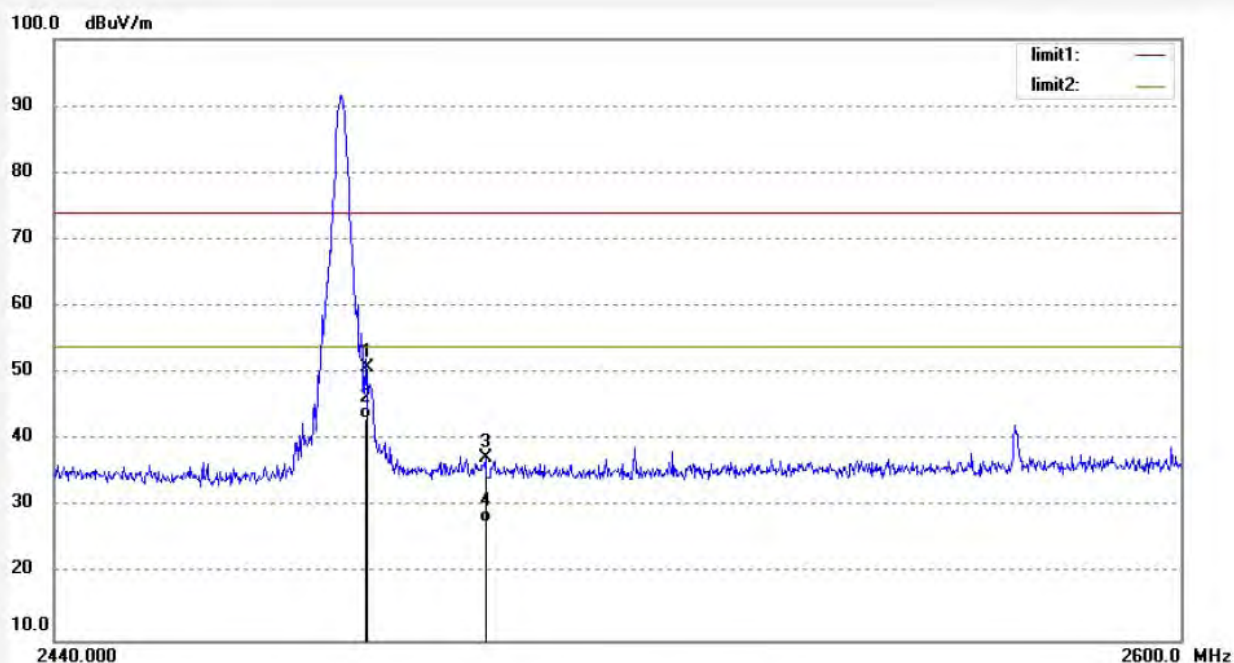
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: frank2017 #854
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: TX 2480MHz(8DPSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 13/14/21
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



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	56.31	-5.51	50.80	74.00	-23.20	peak			
2	2483.500	48.72	-5.51	43.21	54.00	-10.79	AVG			
3	2500.000	42.85	-5.50	37.35	74.00	-36.65	peak			
4	2500.000	33.16	-5.50	27.66	54.00	-26.34	AVG			

Note: Average measurement with peak detection at No.2&4

Hopping mode



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F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #1470

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: HOOPING(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

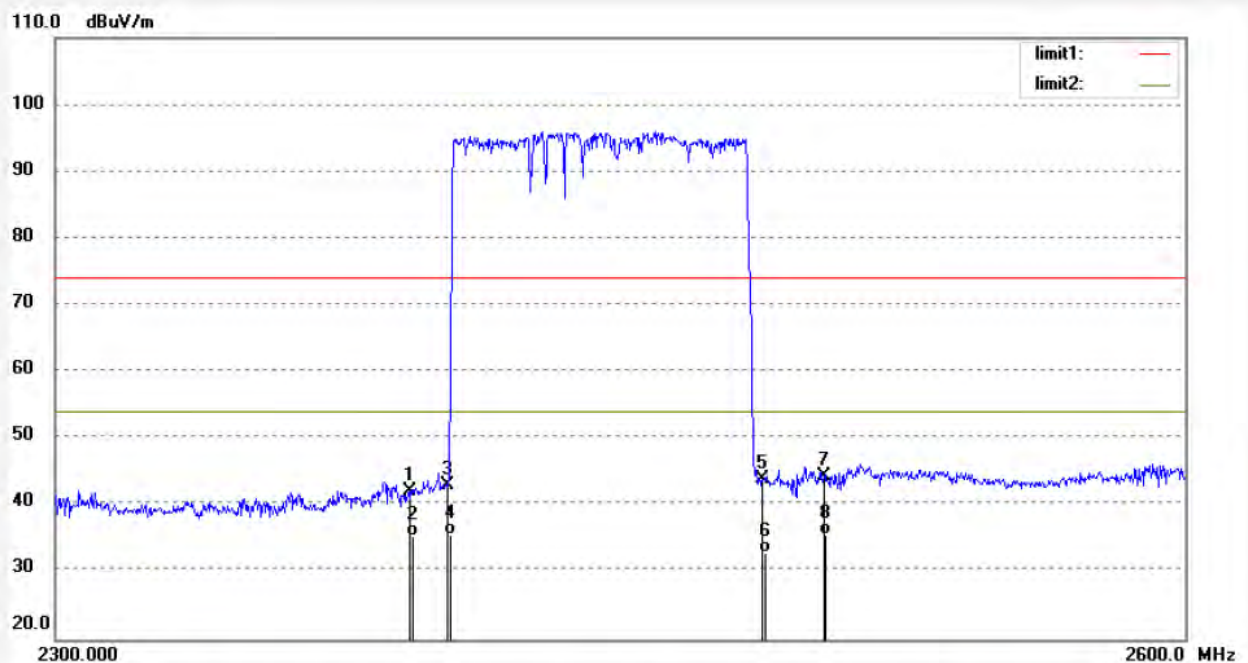
Date: 2017/11/04

Time: 16:13:48

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	46.11	-3.96	42.15	74.00	-31.85	peak			
2	2390.000	39.45	-3.96	35.49	54.00	-18.51	AVG	250	198	
3	2400.000	46.90	-3.91	42.99	74.00	-31.01	peak			
4	2400.000	39.45	-3.91	35.54	54.00	-18.46	AVG	200	360	
5	2483.500	47.44	-3.50	43.94	74.00	-30.06	peak			
6	2483.500	36.45	-3.50	32.95	54.00	-21.05	AVG	200	145	
7	2500.000	47.87	-3.42	44.45	74.00	-29.55	peak			
8	2500.000	39.15	-3.42	35.73	54.00	-18.27	AVG	250	153	

Note: Average measurement with peak detection at No.2&4&6&8



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #1471

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: HOOPING(GFSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

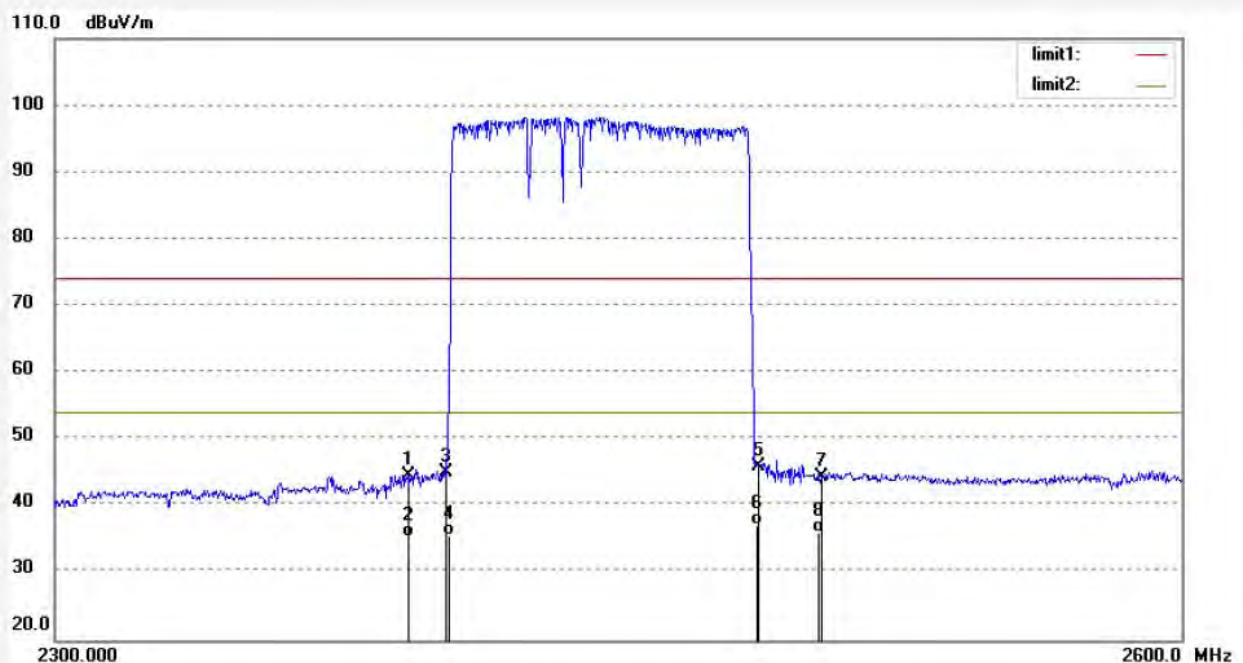
Date: 2017/11/04

Time: 16:13:57

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	48.61	-3.96	44.65	74.00	-29.35	peak			
2	2390.000	39.48	-3.96	35.52	54.00	-18.48	AVG	250	348	
3	2400.000	48.90	-3.91	44.99	74.00	-29.01	peak			
4	2400.000	39.45	-3.91	35.54	54.00	-18.46	AVG	200	121	
5	2483.500	49.44	-3.50	45.94	74.00	-28.06	peak			
6	2483.500	40.78	-3.50	37.28	54.00	-16.72	AVG	200	248	
7	2500.000	47.87	-3.42	44.45	74.00	-29.55	peak			
8	2500.000	39.45	-3.42	36.03	54.00	-17.97	AVG	150	113	

Note: Average measurement with peak detection at No.2&4&6&8



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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #1473

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: HOOPING($\pi/4$ DQPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

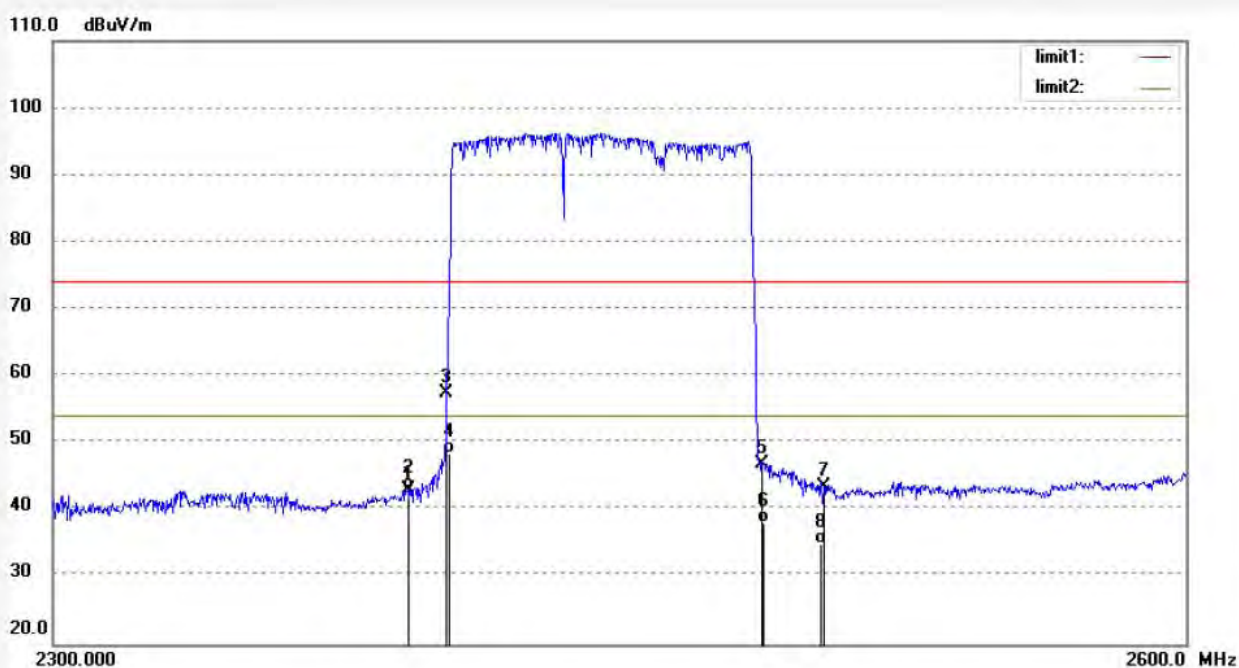
Date: 2017/11/04

Time: 16:14:24

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	47.11	-3.96	43.15	74.00	-30.85	peak			
2	2390.000	47.11	-3.96	43.15	54.00	-10.85	AVG	200	125	
3	2400.000	61.40	-3.91	57.49	74.00	-16.51	peak			
4	2400.000	52.45	-3.91	48.54	54.00	-5.46	AVG	200	43	
5	2483.500	50.44	-3.50	46.94	74.00	-27.06	peak			
6	2483.500	41.65	-3.50	38.15	54.00	-15.85	AVG	200	154	
7	2500.000	46.87	-3.42	43.45	74.00	-30.55	peak			
8	2500.000	38.45	-3.42	35.03	54.00	-18.97	AVG	250	273	

Note: Average measurement with peak detection at No.2&4&6&8



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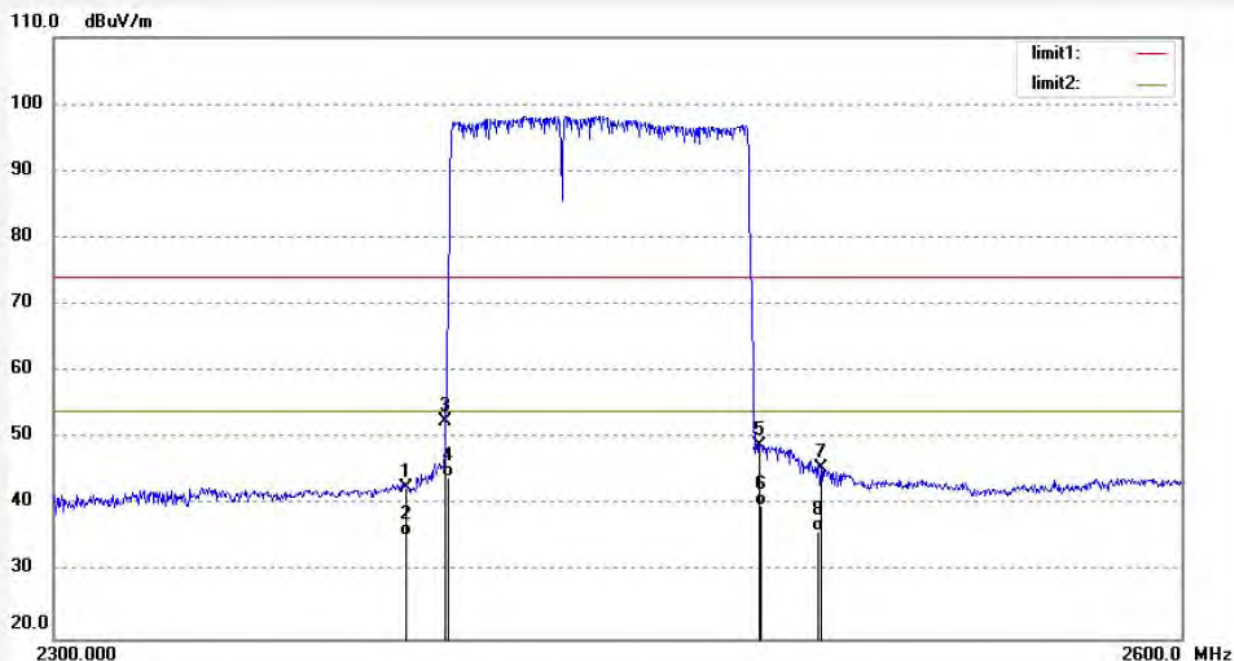
F1,Bldg,A,Changyuan New Material Port Keyuan Rd,
Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: frank2017 #1472
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 25 C / 55 %
EUT: Stage Karaoke
Mode: HOOPING($\pi/4$ DQPSK)
Model: 2700
Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical
Power Source: AC 120V/60Hz
Date: 2017/11/04
Time: 16:14:16
Engineer Signature: Frank
Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	46.61	-3.96	42.65	74.00	-31.35	peak			
2	2390.000	39.45	-3.96	35.49	54.00	-18.51	AVG	150	153	
3	2400.000	56.40	-3.91	52.49	74.00	-21.51	peak			
4	2400.000	48.15	-3.91	44.24	54.00	-9.76	AVG	250	45	
5	2483.500	52.44	-3.50	48.94	74.00	-25.06	peak			
6	2483.500	43.45	-3.50	39.95	54.00	-14.05	AVG	150	322	
7	2500.000	48.87	-3.42	45.45	74.00	-28.55	peak			
8	2500.000	39.48	-3.42	36.06	54.00	-17.94	AVG	150	157	

Note: Average measurement with peak detection at No.2&4&6&8



ACCURATE TECHNOLOGY CO., LTD.

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Science & Industry Park,Nanshan Shenzhen,P.R.China

Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #1476

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: HOOPING(8DPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Horizontal

Power Source: AC 120V/60Hz

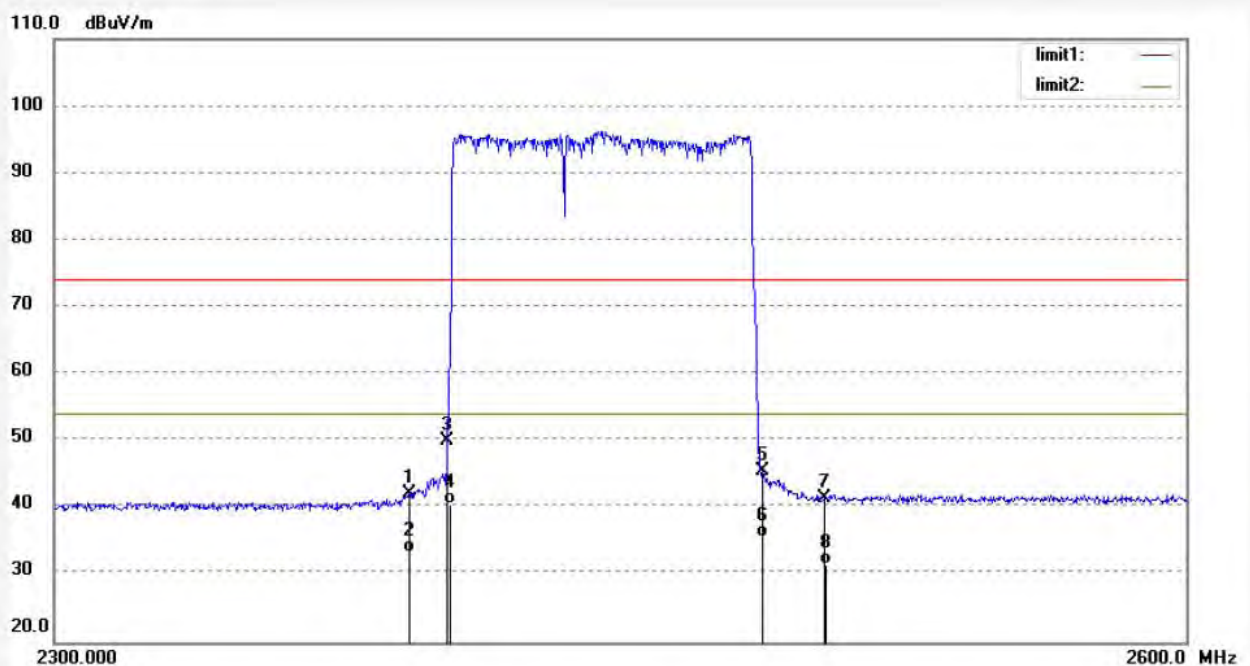
Date: 2017/11/04

Time: 16:14:38

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	46.11	-3.96	42.15	74.00	-31.85	peak			
2	2390.000	37.45	-3.96	33.49	54.00	-20.51	AVG	250	327	
3	2400.000	53.90	-3.91	49.99	74.00	-24.01	peak			
4	2400.000	44.45	-3.91	40.54	54.00	-13.46	AVG	250	198	
5	2483.500	48.94	-3.50	45.44	74.00	-28.56	peak			
6	2483.500	39.15	-3.50	35.65	54.00	-18.35	AVG	300	79	
7	2500.000	44.87	-3.42	41.45	74.00	-32.55	peak			
8	2500.000	35.12	-3.42	31.70	54.00	-22.30	AVG	200	168	

Note: Average measurement with peak detection at No.2&4&6&8



ACCURATE TECHNOLOGY CO., LTD.

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Site: 1# Chamber

Tel:+86-0755-26503290

Fax:+86-0755-26503396

Job No.: frank2017 #1475

Standard: FCC PK

Test item: Radiation Test

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

EUT: Stage Karaoke

Mode: HOOPING(8DPSK)

Model: 2700

Manufacturer: Dynamic Scientific Ltd

Polarization: Vertical

Power Source: AC 120V/60Hz

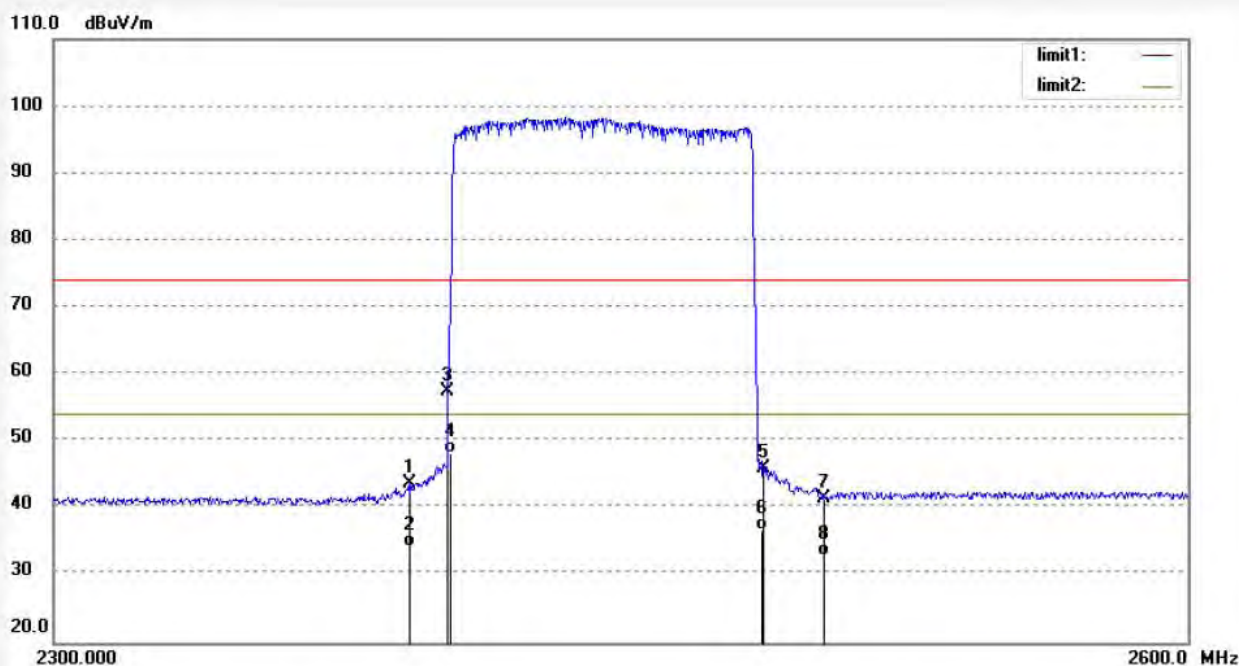
Date: 2017/11/04

Time: 16:14:43

Engineer Signature: Frank

Distance: 3m

Note: Report NO.:ATE20172103



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2390.000	47.61	-3.96	43.65	74.00	-30.35	peak			
2	2390.000	38.15	-3.96	34.19	54.00	-19.81	AVG	150	133	
3	2400.000	61.40	-3.91	57.49	74.00	-16.51	peak			
4	2400.000	52.12	-3.91	48.21	54.00	-5.79	AVG	150	248	
5	2483.500	49.44	-3.50	45.94	74.00	-28.06	peak			
6	2483.500	40.35	-3.50	36.85	54.00	-17.15	AVG	150	348	
7	2500.000	44.87	-3.42	41.45	74.00	-32.55	peak			
8	2500.000	36.34	-3.42	32.92	54.00	-21.08	AVG	150	12	

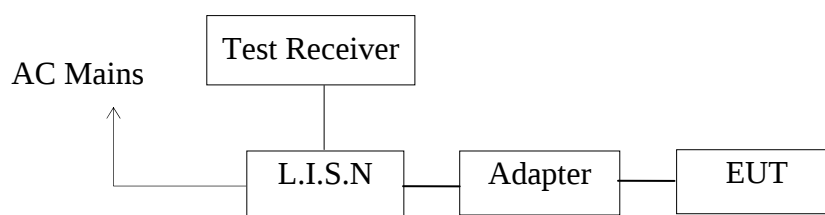
Note: Average measurement with peak detection at No.2&4&6&8

12.AC POWER LINE CONDUCTED EMISSION FOR FCC PART

15 SECTION 15.207(A)

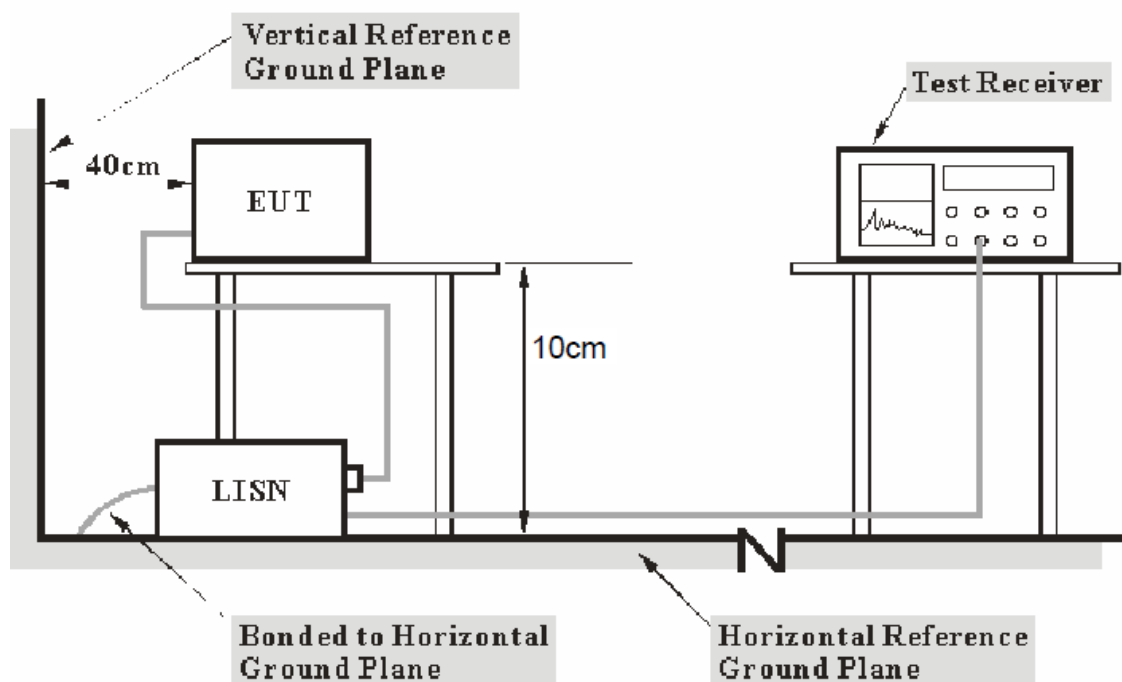
12.1.Block Diagram of Test Setup

12.1.1.Block diagram of connection between the EUT and simulators



(EUT: Stage Karaoke)

12.1.2.Test System Setup



- Note:**
1. Support units were connected to second LISN.
 2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

12.2.Power Line Conducted Emission Measurement Limits

Frequency (MHz)	Limit dB(μ V)	
	Quasi-peak Level	Average Level
0.15 - 0.50	66.0 – 56.0 *	56.0 – 46.0 *
0.50 - 5.00	56.0	46.0
5.00 - 30.00	60.0	50.0
NOTE1: The lower limit shall apply at the transition frequencies.		
NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.		

12.3.Configuration of EUT on Measurement

The equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.

12.4.Operating Condition of EUT

12.4.1.Setup the EUT and simulator as shown as Section 12.1.

12.4.2.Turn on the power of all equipment.

12.4.3.Let the EUT work in test mode and measure it.

12.5.Test Procedure

The EUT is put on the plane 0.1m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10: 2013 on Conducted Emission Measurement.

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

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

12.6.Data Sample

Frequency (MHz)	Transducer value (dB)	QuasiPeak Level (dBμV)	Average Level (dBμV)	QuasiPeak Limit (dBμV)	Average Limit (dBμV)	QuasiPeak Margin (dB)	Average Margin (dB)	Remark (Pass/Fail)
X.XX	10.5	51.1	34.2	56.0	46.0	4.9	11.8	Pass

Frequency(MHz) = Emission frequency in MHz

Transducer value(dB) = Insertion loss of LISN + Cable Loss

Level(dBμV) = Quasi-peak Reading/Average Reading + Transducer value

Limit (dBμV) = Limit stated in standard

Margin = Limit (dBμV) - Level (dBμV)

Calculation Formula:

Margin = Limit (dBμV) - Level (dBμV)

12.7.Power Line Conducted Emission Measurement Results

PASS.

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

Maximizing procedure was performed on the six (6) highest emissions of the EUT.
Emissions attenuated more than 20 dB below the permissible value are not reported.

All data was recorded in the Quasi-peak and average detection mode.

The spectral diagrams are attached as below.

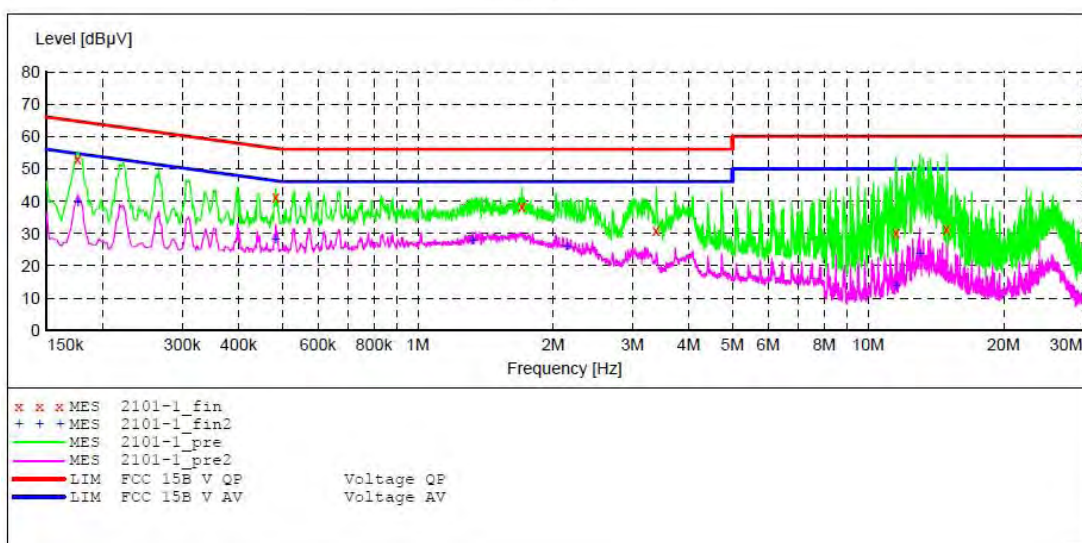
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: Stage Karaoke M/N:2700
 Manufacturer: Dynamic Scientific Ltd
 Operating Condition: Charging with BT communication
 Test Site: 1#Shielding Room
 Operator: Frank
 Test Specification: L 120V/60Hz
 Comment: Report NO.:ATE20172103
 Start of Test: 2017-10-26 / 17:09:48

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: "2101-1_fin"

2017-10-26 17:12

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.176000	53.00	10.8	65	11.7	QP	L1	GND
0.484000	41.20	11.0	56	15.1	QP	L1	GND
1.704000	38.40	11.2	56	17.6	QP	L1	GND
3.385000	31.00	11.4	56	25.0	QP	L1	GND
11.540000	30.30	11.6	60	29.7	QP	L1	GND
14.920000	31.30	11.6	60	28.7	QP	L1	GND

MEASUREMENT RESULT: "2101-1_fin2"

2017-10-26 17:12

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.176000	39.80	10.8	55	14.9	AV	L1	GND
0.484000	28.40	11.0	46	17.9	AV	L1	GND
1.324000	28.00	11.2	46	18.0	AV	L1	GND
2.145000	26.10	11.3	46	19.9	AV	L1	GND
11.540000	14.00	11.6	50	36.0	AV	L1	GND
13.035000	24.10	11.6	50	25.9	AV	L1	GND

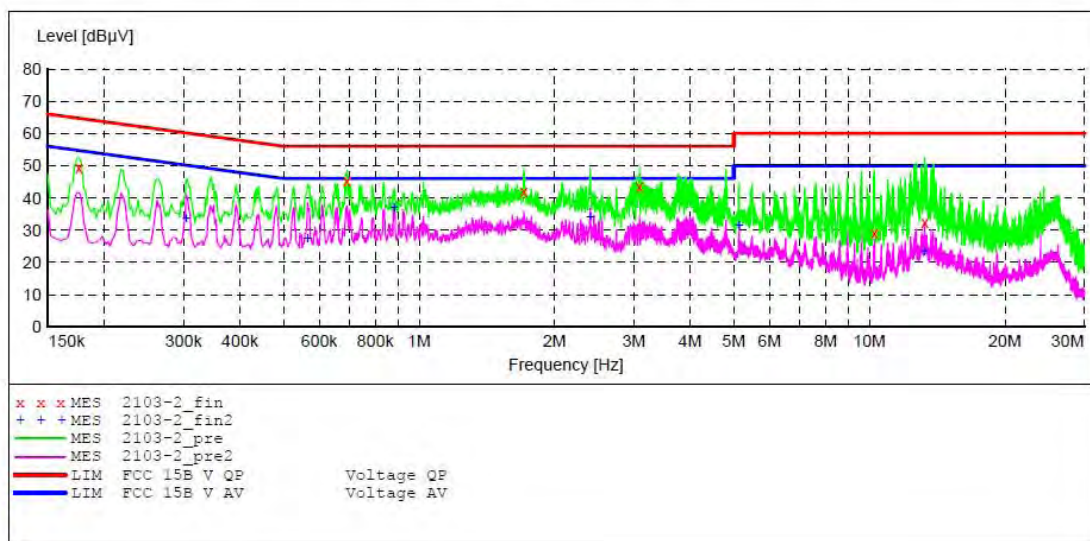
ACCURATE TECHNOLOGY CO., LTD

CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: Stage Karaoke M/N:2700
 Manufacturer: Dynamic Scientific Ltd
 Operating Condition: Charging with BT communication
 Test Site: 1#Shielding Room
 Operator: Frank
 Test Specification: N 120V/60Hz
 Comment: Report NO.:ATE20172103
 Start of Test: 2017-10-26 / 17:13:07

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: "2103-2_fin"

2017-10-26 17:15

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.176000	49.50	10.8	65	15.2	QP	N	GND
0.692000	45.50	11.1	56	10.5	QP	N	GND
1.710000	42.00	11.2	56	14.0	QP	N	GND
3.085000	43.40	11.3	56	12.6	QP	N	GND
10.260000	29.10	11.6	60	30.9	QP	N	GND
13.270000	32.50	11.6	60	27.5	QP	N	GND

MEASUREMENT RESULT: "2103-2_fin2"

2017-10-26 17:15

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
0.304000	34.00	10.9	50	16.1	AV	N	GND
0.566000	27.60	11.0	46	18.4	AV	N	GND
0.880000	37.10	11.1	46	8.9	AV	N	GND
2.400000	34.20	11.3	46	11.8	AV	N	GND
5.140000	31.70	11.4	50	18.3	AV	N	GND
13.270000	23.70	11.6	50	26.3	AV	N	GND

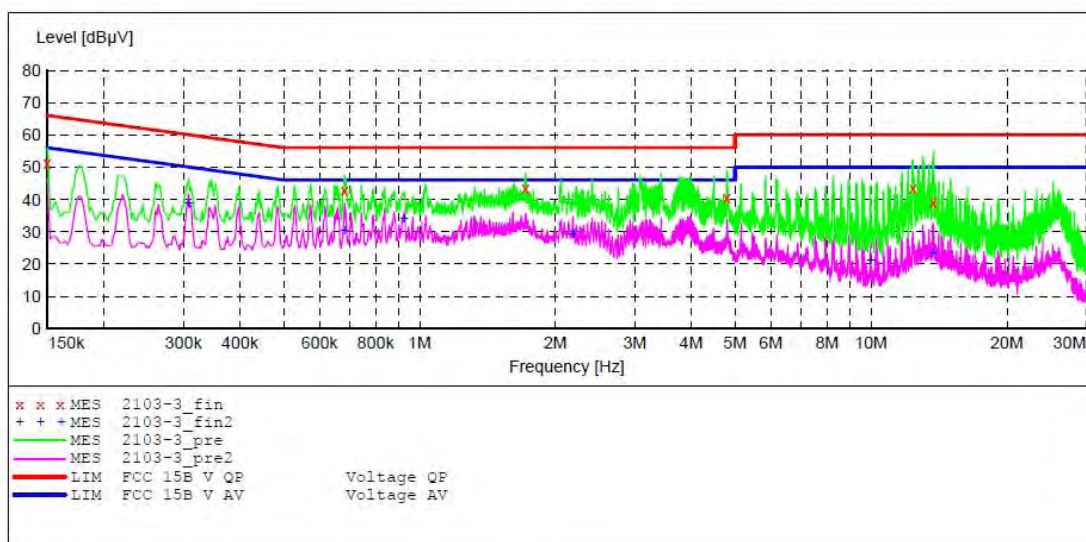
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: Stage Karaoke M/N:2700
 Manufacturer: Dynamic Scientific Ltd
 Operating Condition: Charging with BT communication
 Test Site: 1#Shielding Room
 Operator: Frank
 Test Specification: N 240V/60Hz
 Comment: Report NO.:ATE20172103
 Start of Test: 2017-10-26 / 17:16:13

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: "2103-3_fin"

2017-10-26 17:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.150000	51.40	10.8	66	14.6	QP	N	GND
0.682000	42.70	11.1	56	13.3	QP	N	GND
1.718000	43.40	11.2	56	12.6	QP	N	GND
4.795000	40.60	11.4	56	15.4	QP	N	GND
12.400000	43.60	11.6	60	16.4	QP	N	GND
13.735000	39.20	11.6	60	20.8	QP	N	GND

MEASUREMENT RESULT: "2103-3_fin2"

2017-10-26 17:18

Frequency MHz	Level dBuV	Transd dB	Limit dBuV	Margin dB	Detector	Line	PE
0.308000	39.00	10.9	50	11.0	AV	N	GND
0.682000	30.80	11.1	46	15.2	AV	N	GND
0.926000	34.30	11.1	46	11.7	AV	N	GND
2.185000	29.50	11.3	46	16.5	AV	N	GND
9.970000	21.60	11.6	50	28.4	AV	N	GND
13.700000	23.60	11.6	50	26.4	AV	N	GND

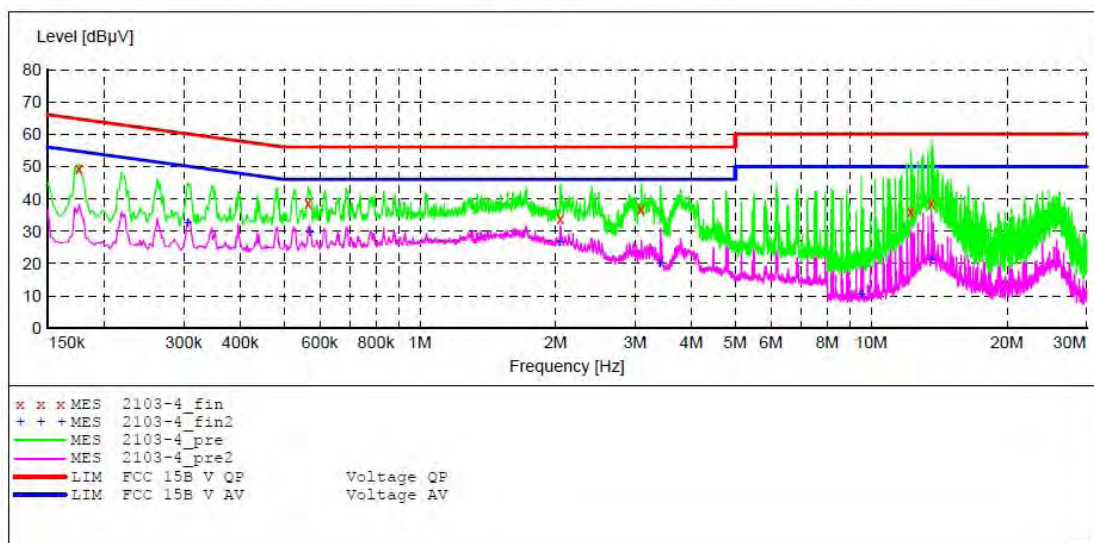
ACCURATE TECHNOLOGY CO.,LTD

CONDUCTED EMISSION STANDARD FCC PART15 B

EUT: Stage Karaoke M/N:2700
 Manufacturer: Dynamic Scientific Ltd
 Operating Condition: Charging with BT communication
 Test Site: 1#Shielding Room
 Operator: Frank
 Test Specification: L 240V/60Hz
 Comment: Report NO.:ATE20172103
 Start of Test: 2017-10-26 / 17:19:17

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: "2103-4_fin"

2017-10-26 17:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.176000	49.20	10.8	65	15.5	QP	L1	GND
0.566000	38.70	11.0	56	17.3	QP	L1	GND
2.050000	34.00	11.3	56	22.0	QP	L1	GND
3.095000	36.70	11.3	56	19.3	QP	L1	GND
12.250000	36.00	11.6	60	24.0	QP	L1	GND
13.620000	38.60	11.6	60	21.4	QP	L1	GND

MEASUREMENT RESULT: "2103-4_fin2"

2017-10-26 17:22

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.306000	32.70	10.9	50	17.4	AV	L1	GND
0.570000	29.90	11.0	46	16.1	AV	L1	GND
2.050000	26.90	11.3	46	19.1	AV	L1	GND
3.415000	20.20	11.4	46	25.8	AV	L1	GND
9.515000	10.80	11.6	50	39.2	AV	L1	GND
13.610000	21.50	11.6	50	28.5	AV	L1	GND

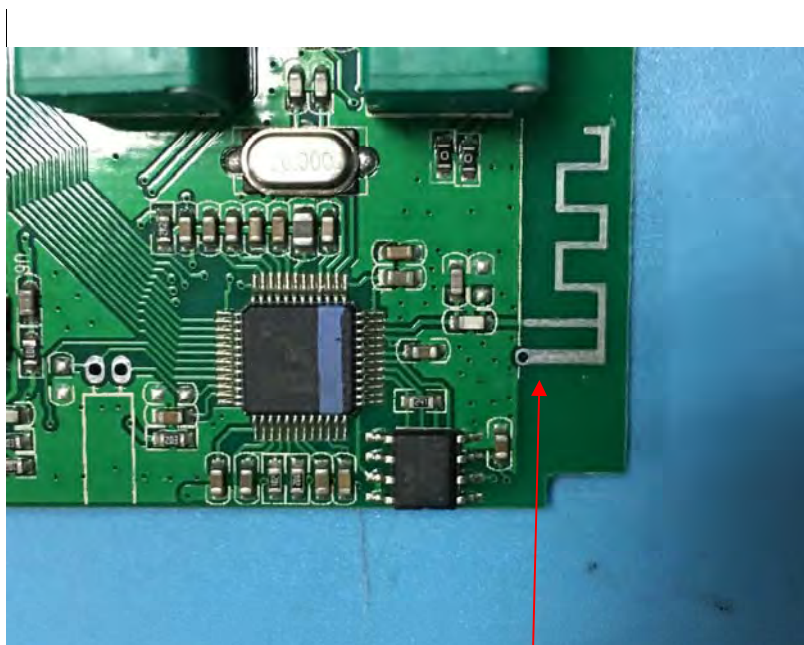
13.ANTENNA REQUIREMENT

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

Device is equipped with permanent attached antenna, which isn't displaced by other antenna. The Max Antenna gain of EUT is 0 dBi. Therefore, the equipment complies with the antenna requirement of Section 15.203.



Antenna

***** End of Test Report *****