APPLICATION CERTIFICATION
On Behalf of
Eastern Times Technology Co., Ltd.

Bluetooth 3.0 Keyboard
Model No.: ET-3788, ET-3782, ET-3783

FCC ID: TUV3788

Prepared for	:	Eastern Times Technology Co., Ltd.
Address	:	Building D, Nan An Industry Park, Youganpu Village Fenggang Town, Dongguan City, Guangdong, China
Prepared by	:	ACCURATE TECHNOLOGY CO. LTD
Address	:	F1, Bldg. A, Changyuan New Material Port, Keyuan Rd. Science & Industry Park, Nanshan, Shenzhen, Guangdong P.R. China Tel: (0755) 26503290 Fax: (0755) 26503396

Report Number	:	ATE20131724
Date of Test	:	August 12, 2013
Date of Report	:	August 22, 2013

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Description Page

Test Report Certification

Applicant	:	Eastern Times Technology Co., Ltd.
Manufacturer	:	Eastern Times Technology Co., Ltd.
EUT Description	:	Bluetooth 3.0 Keyboard

(A) MODEL NO.: ET-3788, ET-3782, ET-3783

(B) SERIAL NO.: N/A

(C) POWER SUPPLY: DC 3V ("AAA" batteries 2×)

(D) Measurement Procedure Used:

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

The device described above is tested by ACCURATE TECHNOLOGY CO. LTD to determ ine the maximum emission levels em anating from the device. The m aximum emission levels are compared to the FCC Part 15 Subpart C S ection 15.247 lim its. The m easurement results are contained in this test report and A CCURATE TECHNOLOGY CO. LTD is assum ed full responsibility for the accuracy and com pleteness 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 sam ple only. This report shall not be reproduced in part without written approval of ACCURATE TECHNOLOGY CO. LTD.

Date of Test : August 12, 2013

Prepared by : Bob Wang

(Engineer)

Approved & Authorized Signer :

(Manager)

1. GENERAL INFORMATION

1.1.Description of Device (EUT)

EUT	:	Bluetooth 3.0 Keyboard
Model Number	:	ET-3788, ET-3782, ET-3783 (Note: These samples are same except for the model number is difference. So we prepare the ET-3788 for FCC test.)
Frequency Band	:	2402MHz-2480MHz
Number of Channels	:	79
Modulation type	:	GFSK, Π/4-DQPSK, 8DPSK
Antenna Gain	:	0dBi
Antenna type	:	PCB Antenna
Power Supply	:	DC 3V ("AAA" batteries 2×)
Applicant	:	Eastern Times Technology Co., Ltd.
Address	:	Building D, Nan An Industry Park, Youganpu Village Fenggang Town, Dongguan City, Guangdong, China
Manufacturer	:	Eastern Times Technology Co., Ltd.
Address	:	Building D, Nan An Industry Park, Youganpu Village Fenggang Town, Dongguan City, Guangdong, China
Date of sample received	:	August 7, 2013
Date of Test	:	August 12, 2013

1.2.Description of Test Facility

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

1.3.Measurement Uncertainty

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

2. MEASURING DEVICE AND TEST EQUIPMENT

Table 1: List of Test and Measurement Equipment

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

3. OPERATION OF EUT DURING TESTING

3.1.Operating Mode

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

3.2.Configuration and peripherals

EUT

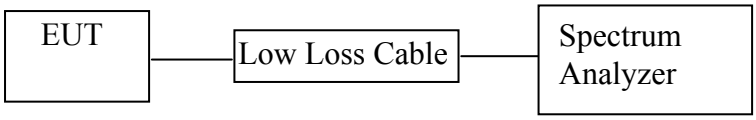
(EUT: Bluetooth 3.0 Keyboard)

4. TEST PROCEDURES AND RESULTS

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

5. 20DB BANDWIDTH TEST

5.1.Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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

Section 15.247(a)(1): Frequency hopping syst ems shall have hopping channel carrier frequencies separated by a m inimum 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 em ission measurement to m eet the com mission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

5.4.Operating Condition of EUT

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

5.4.2.Turn on the power of all equipment.

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

5.5.Test Procedure

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

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

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

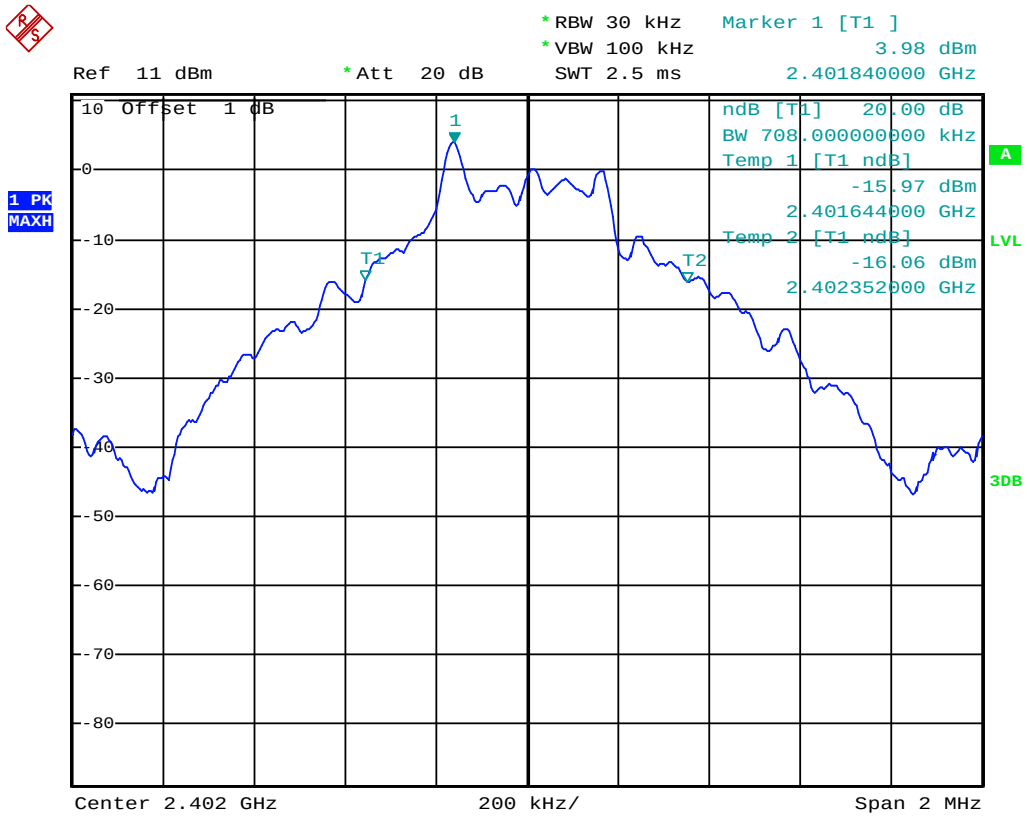
5.6.Test Result

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

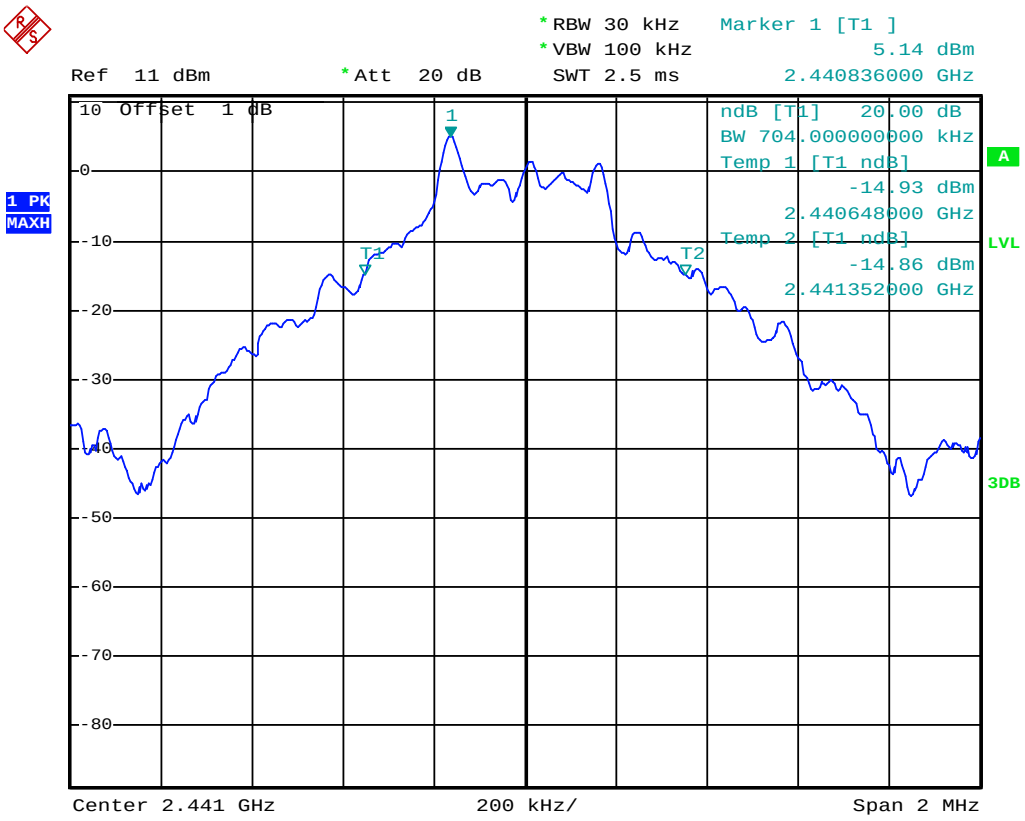
The spectrum analyzer plots are attached as below.

GFSK Mode

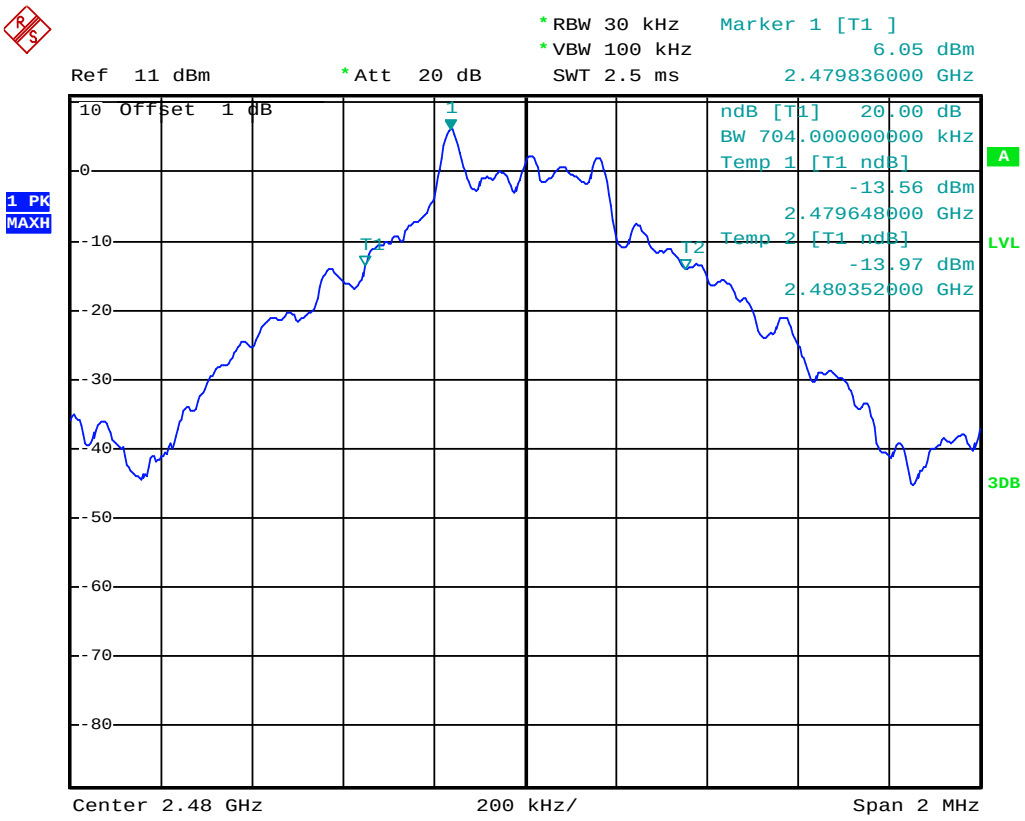
Low channel



Middle channel

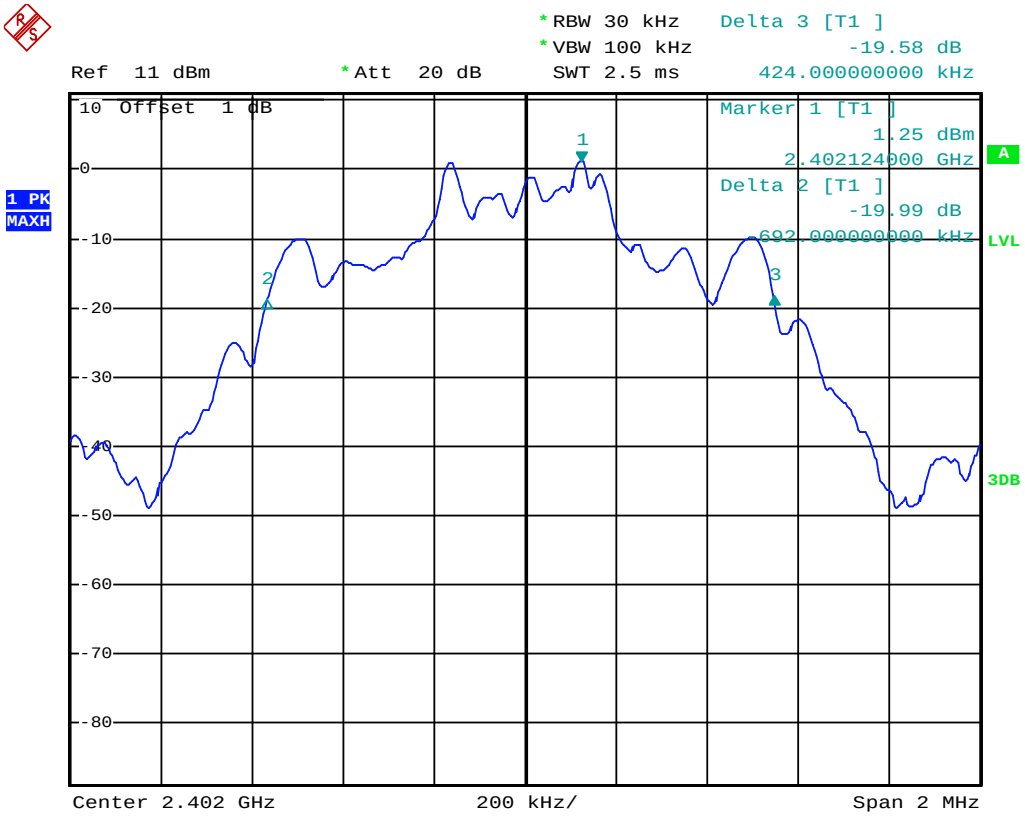


High channel

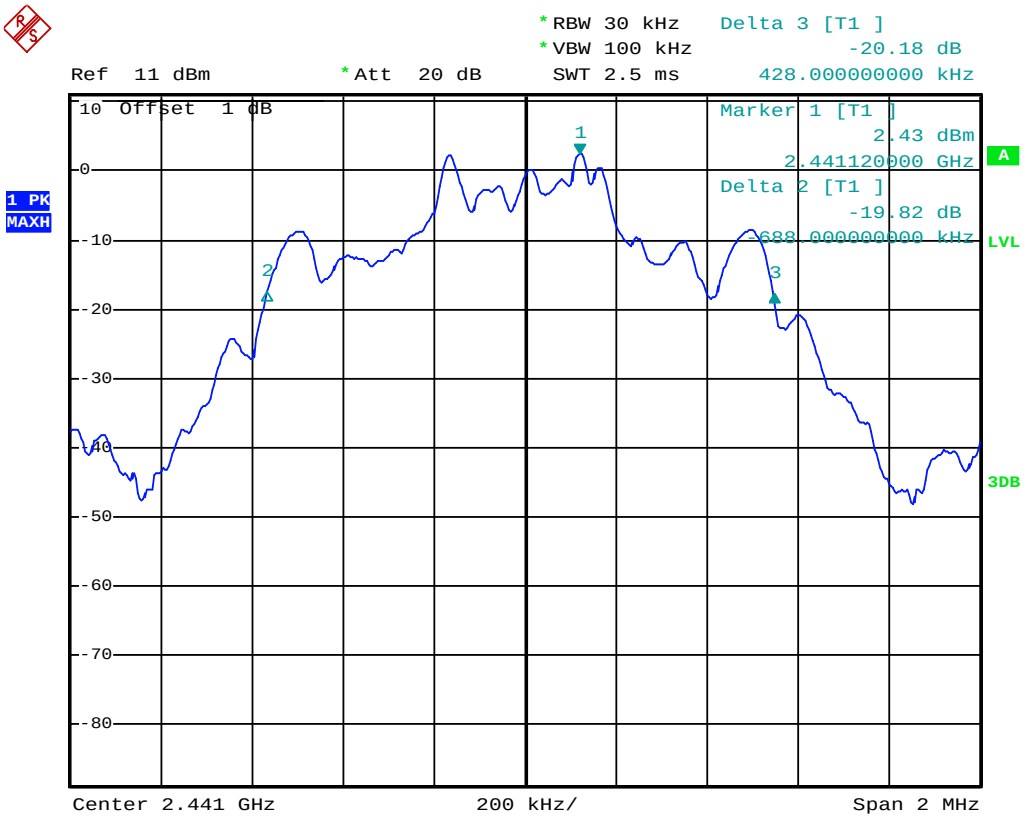


Π/4-DQPSK Mode

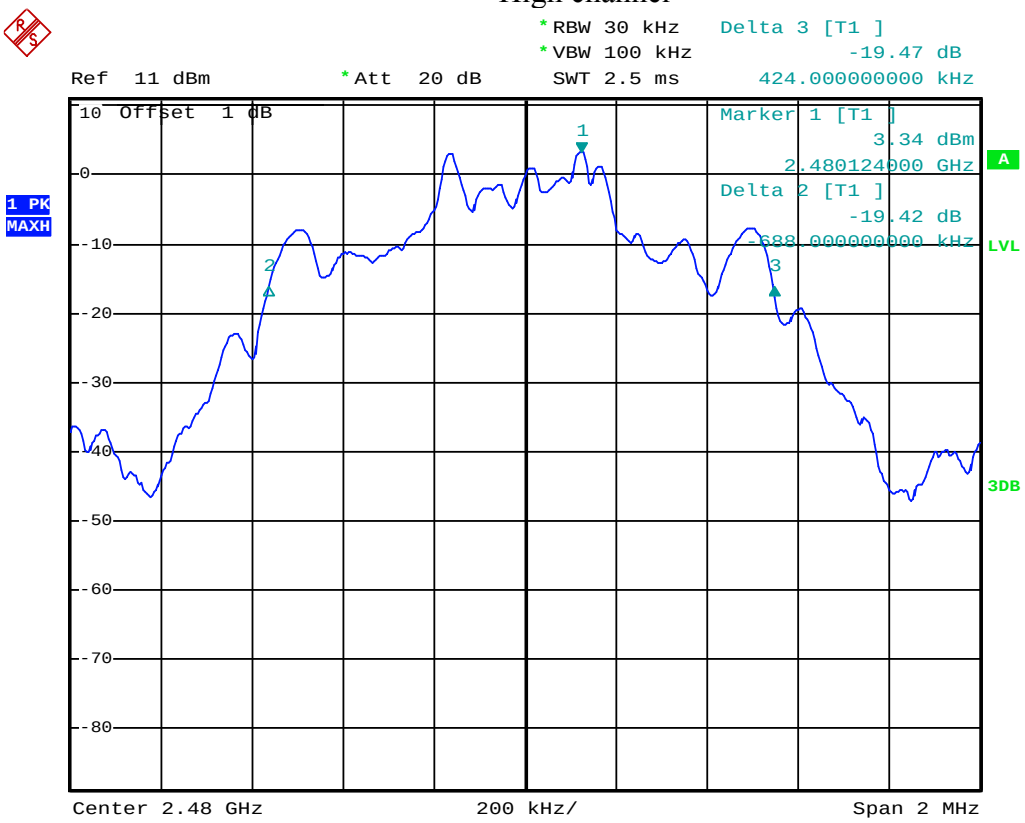
Low channel



Middle channel

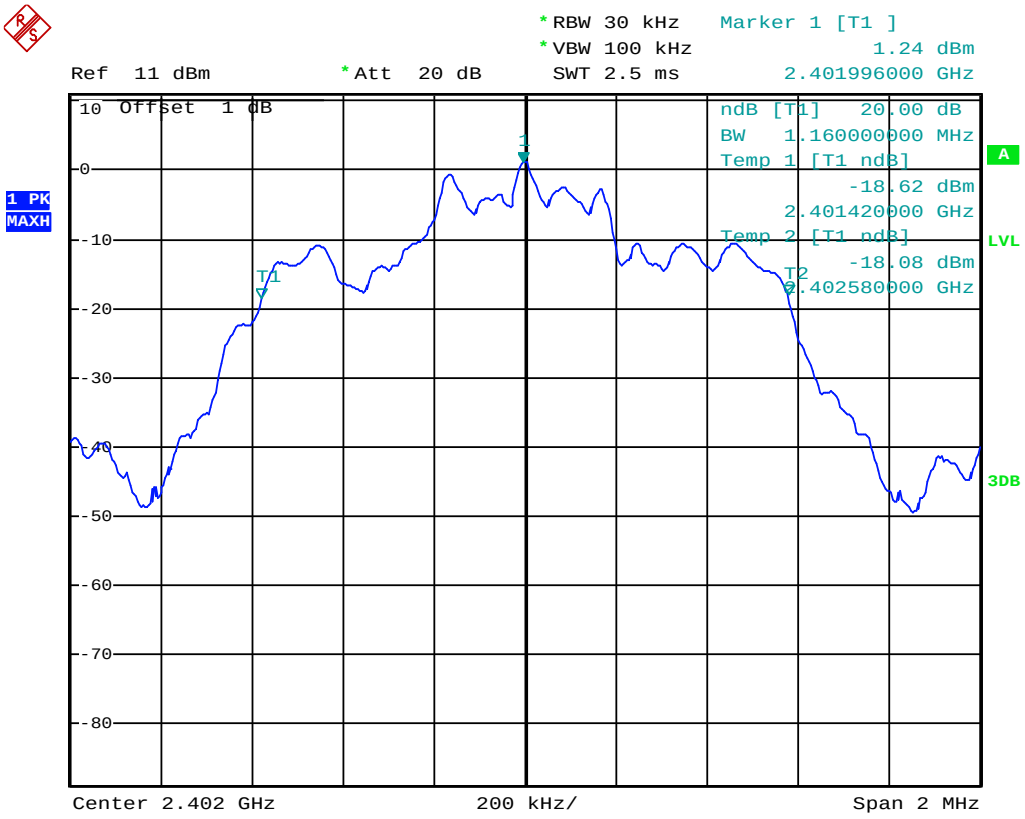


High channel

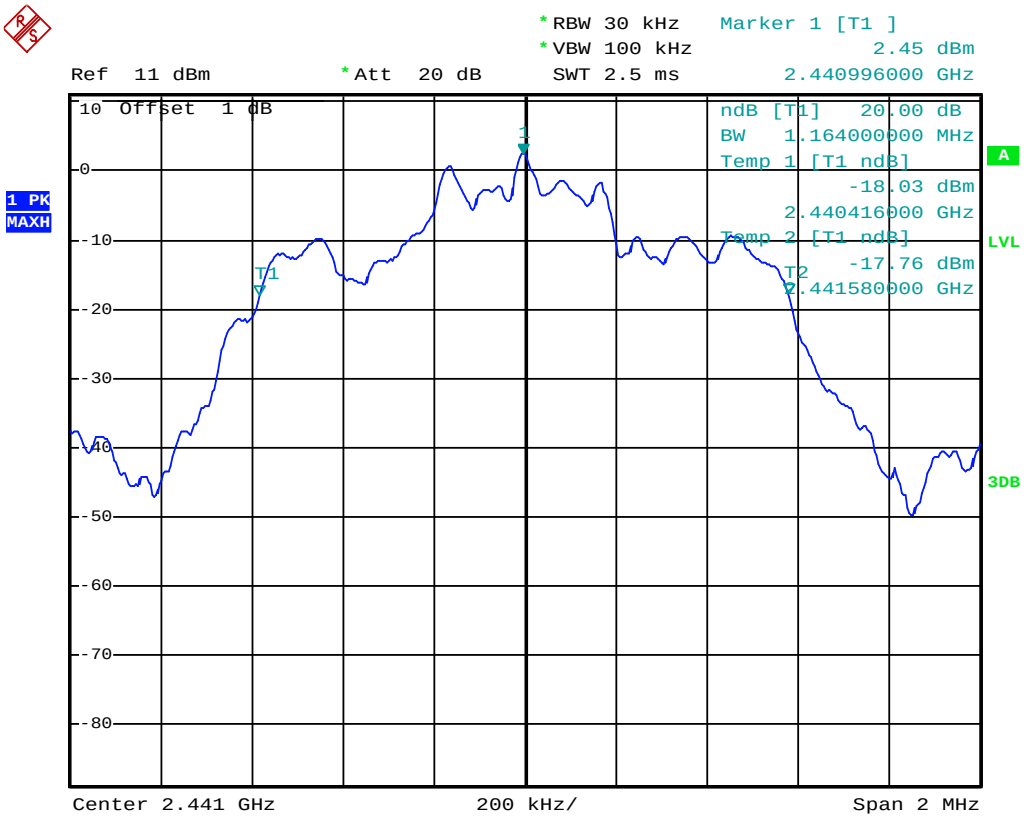


8DPSK Mode

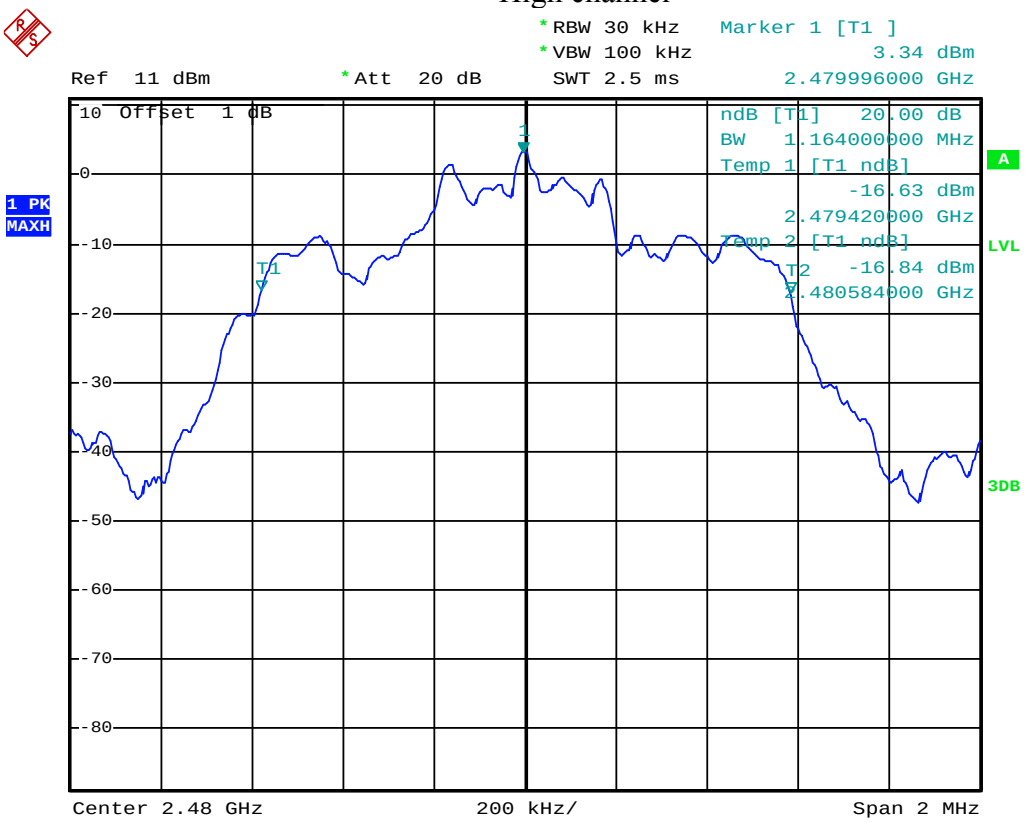
Low channel



Middle channel

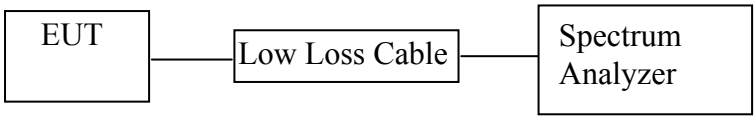


High channel



6. CARRIER FREQUENCY SEPARATION TEST

6.1.Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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

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

6.3.EUT Configuration on Measurement

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

6.4.Operating Condition of EUT

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

6.4.2.Turn on the power of all equipment.

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

6.5.Test Procedure

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

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

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

6.5.4.Measurement the channel separation

6.6.Test Result

GFSK

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

Π/4-DQPSK

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

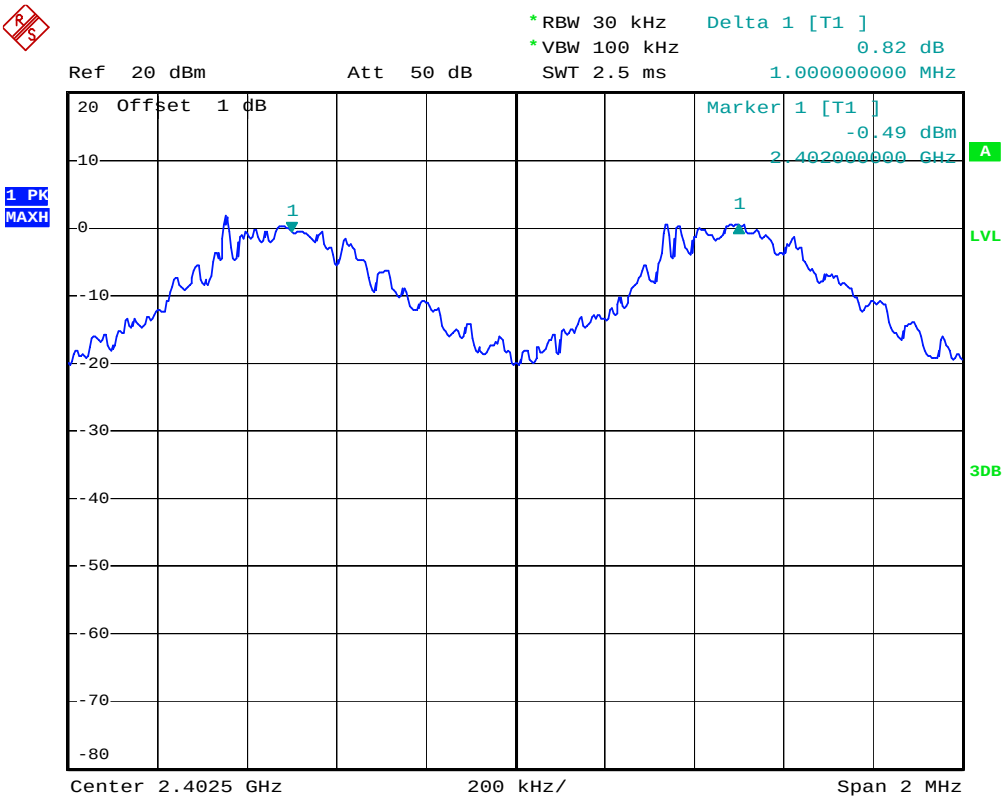
8QPSK

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

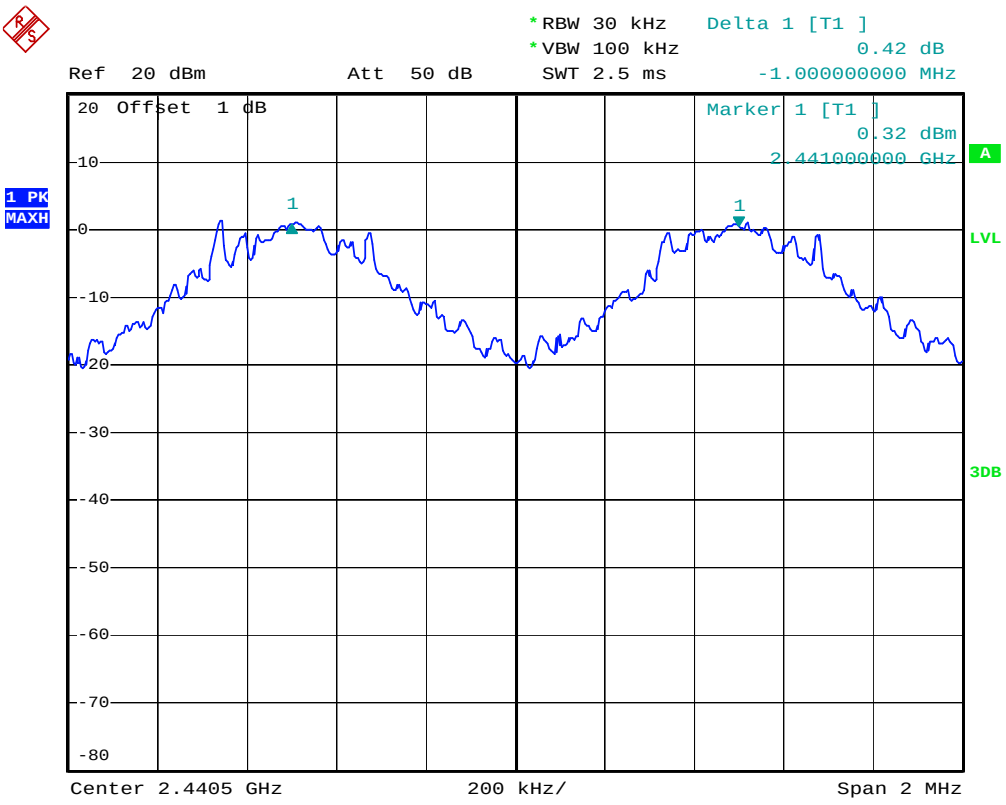
The spectrum analyzer plots are attached as below.

GFSK Mode

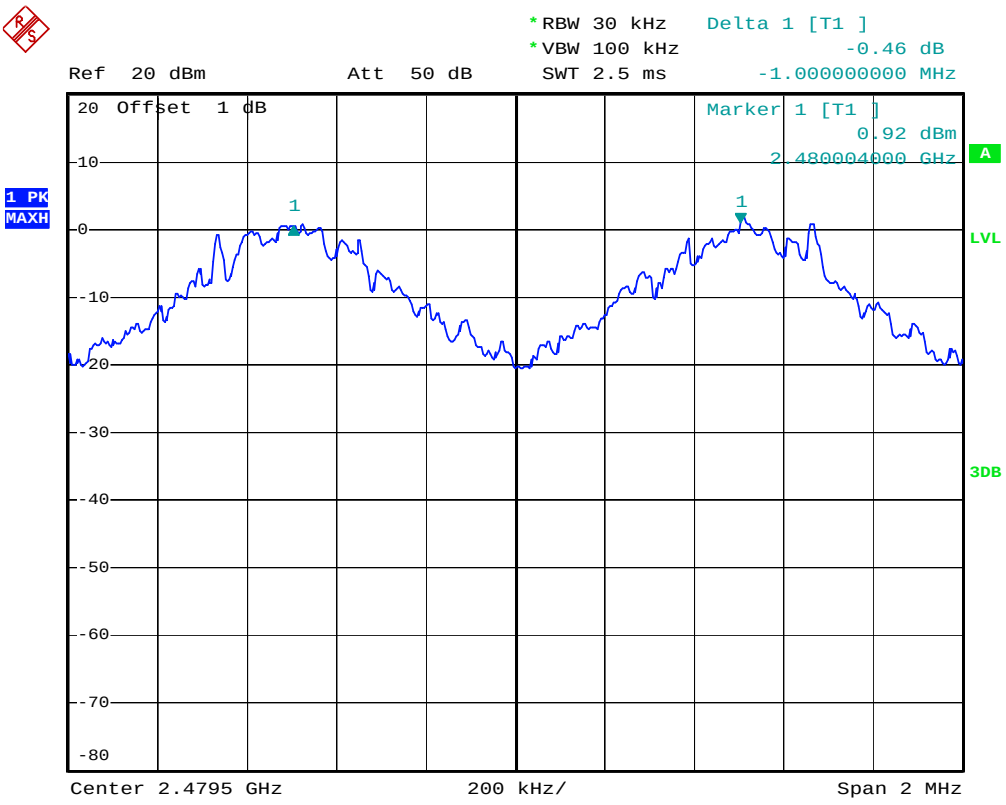
Low channel



Middle channel

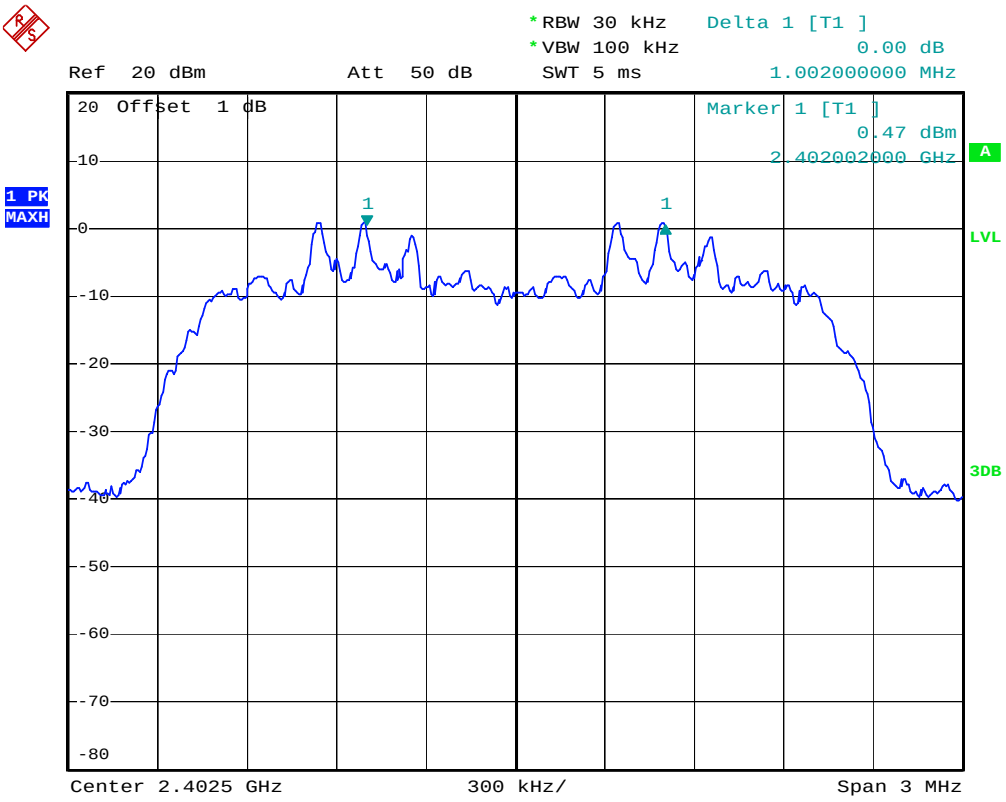


High channel

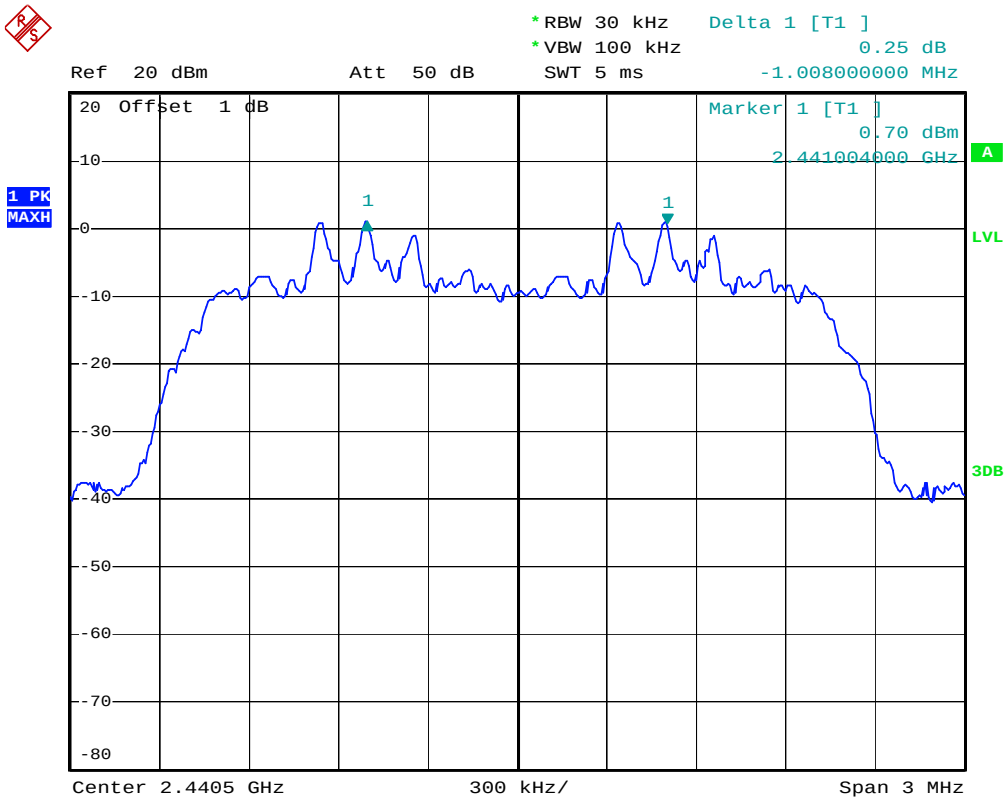


Π/4-DQPSK Mode

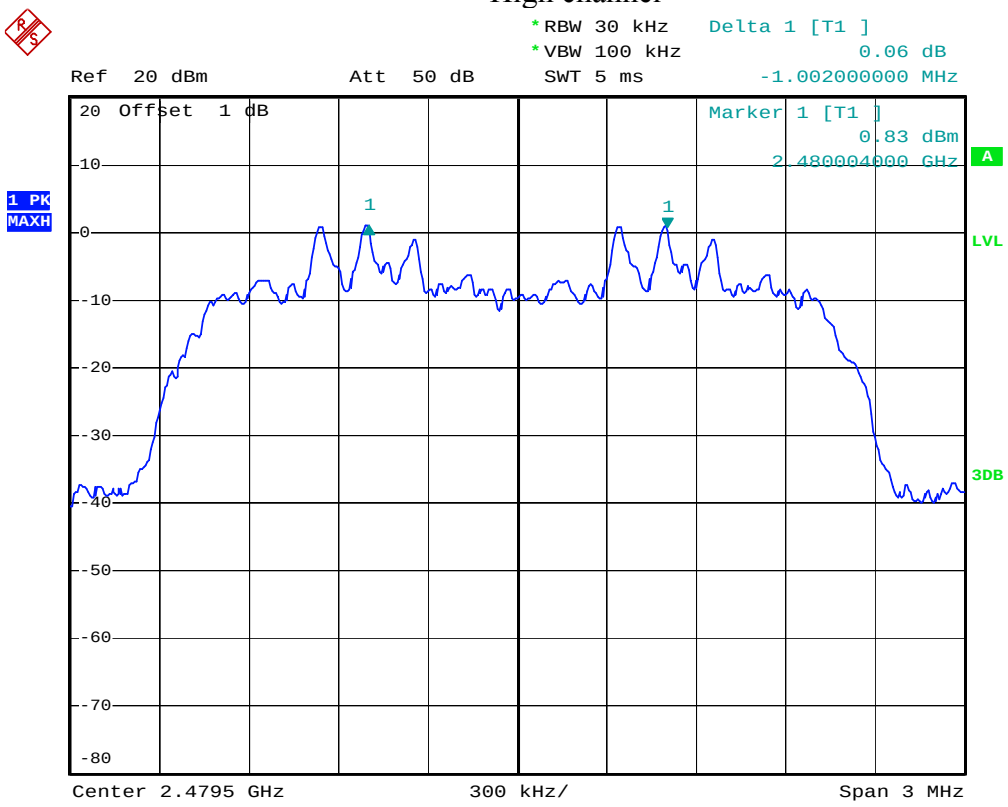
Low channel



Middle channel

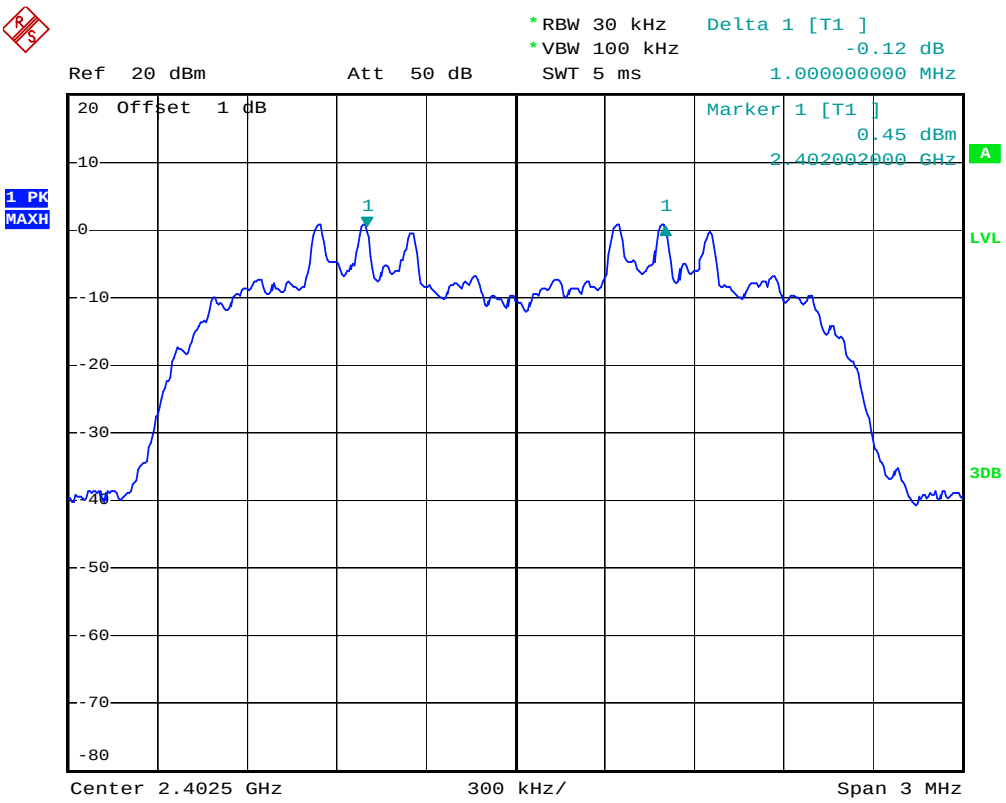


High channel

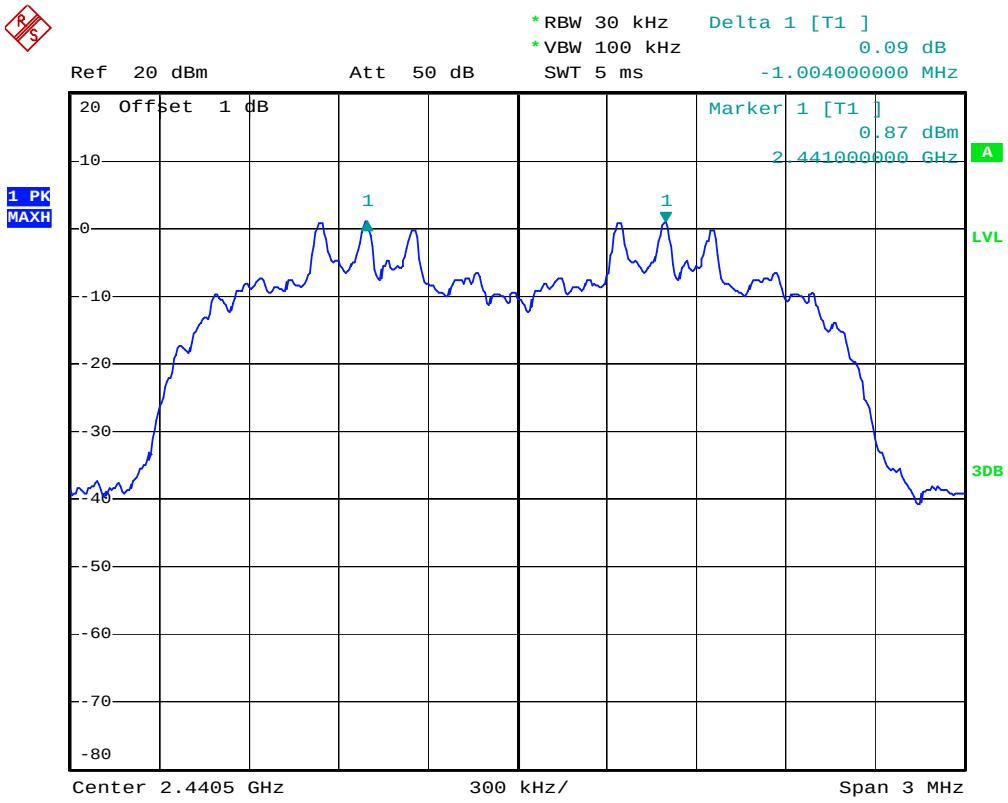


8DPSK Mode

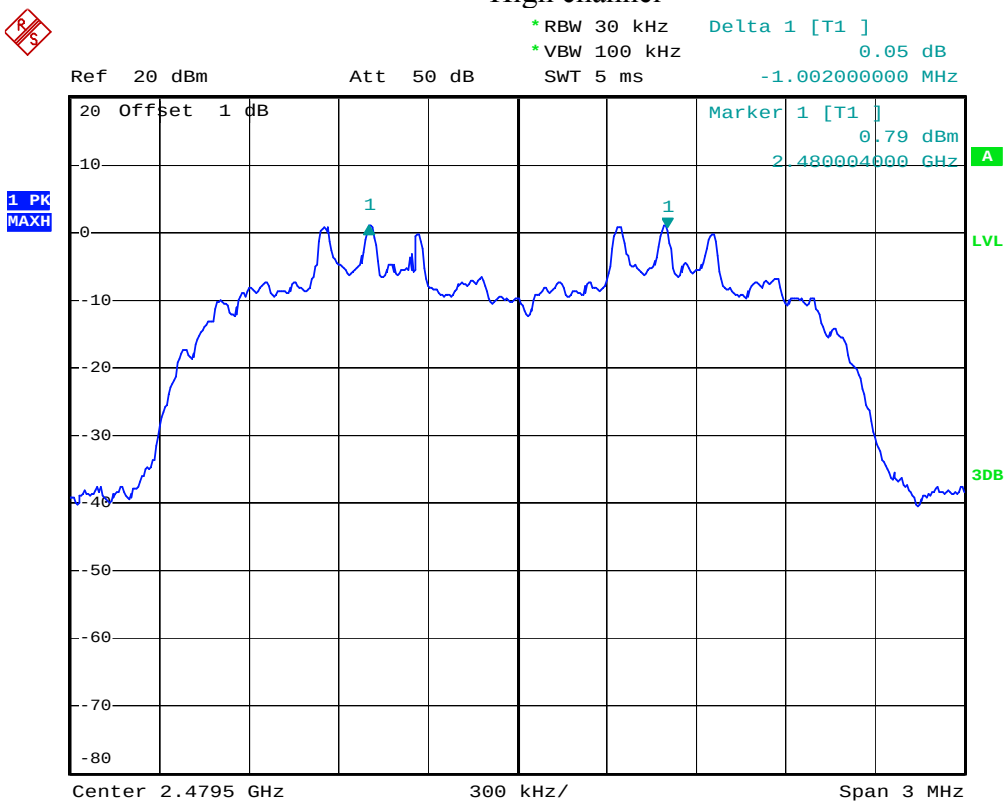
Low channel



Middle channel

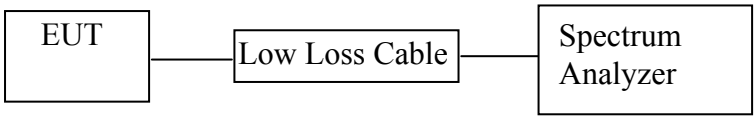


High channel



7. NUMBER OF HOPPING FREQUENCY TEST

7.1.Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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 em ission measurement to m eet the com mission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

7.4.Operating Condition of EUT

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

7.4.2.Turn on the power of all equipment.

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

7.5.Test Procedure

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

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

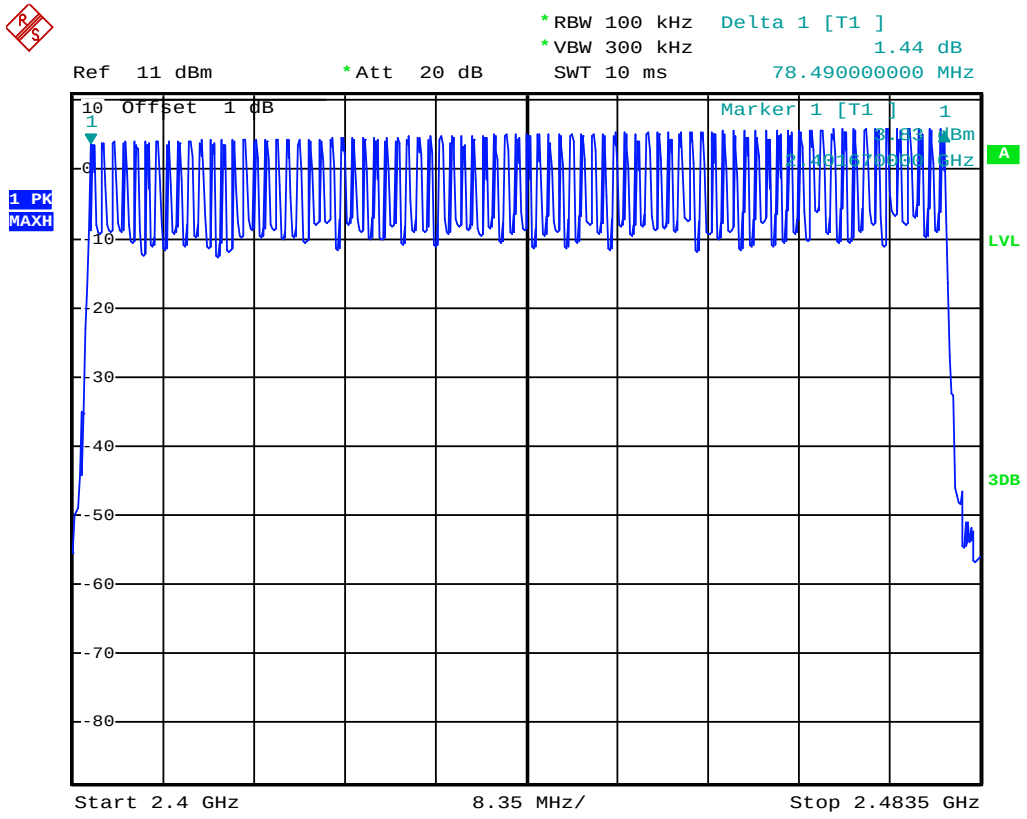
7.5.3.Max hold, view and count how many channel in the band.

7.6.Test Result

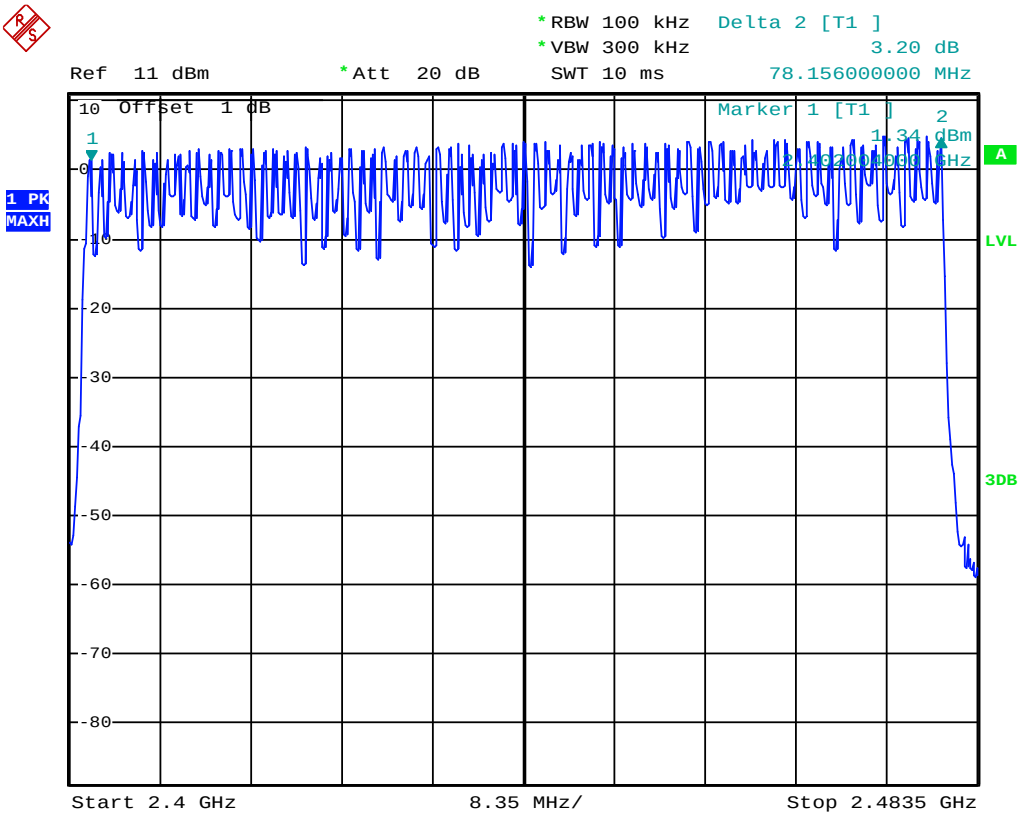
Total number of hopping channel	Measurement result(CH)	Limit(CH)
	79	⩾15

The spectrum analyzer plots are attached as below.

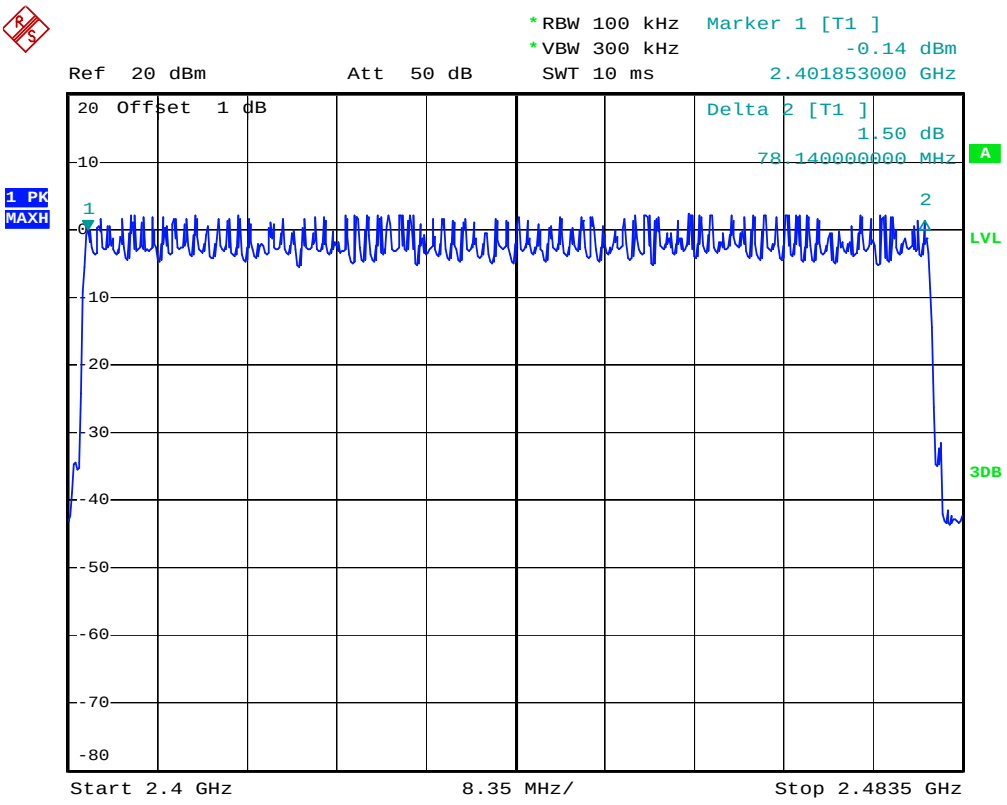
Number of hopping channels(GFSK)



Number of hopping channels(Π/4-DQPSK)

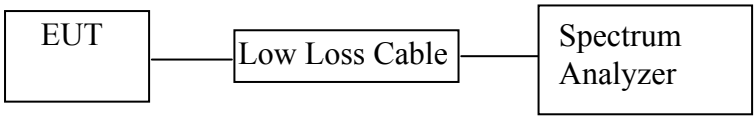


Number of hopping channels(8QPSK)



8. DWELL TIME TEST

8.1.Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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

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

8.3.EUT Configuration on Measurement

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

8.4.Operating Condition of EUT

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

8.4.2.Turn on the power of all equipment.

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

8.5.Test Procedure

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

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

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

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

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

8.6.Test Result

GFSK Mode

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

Π/4-DQPSK

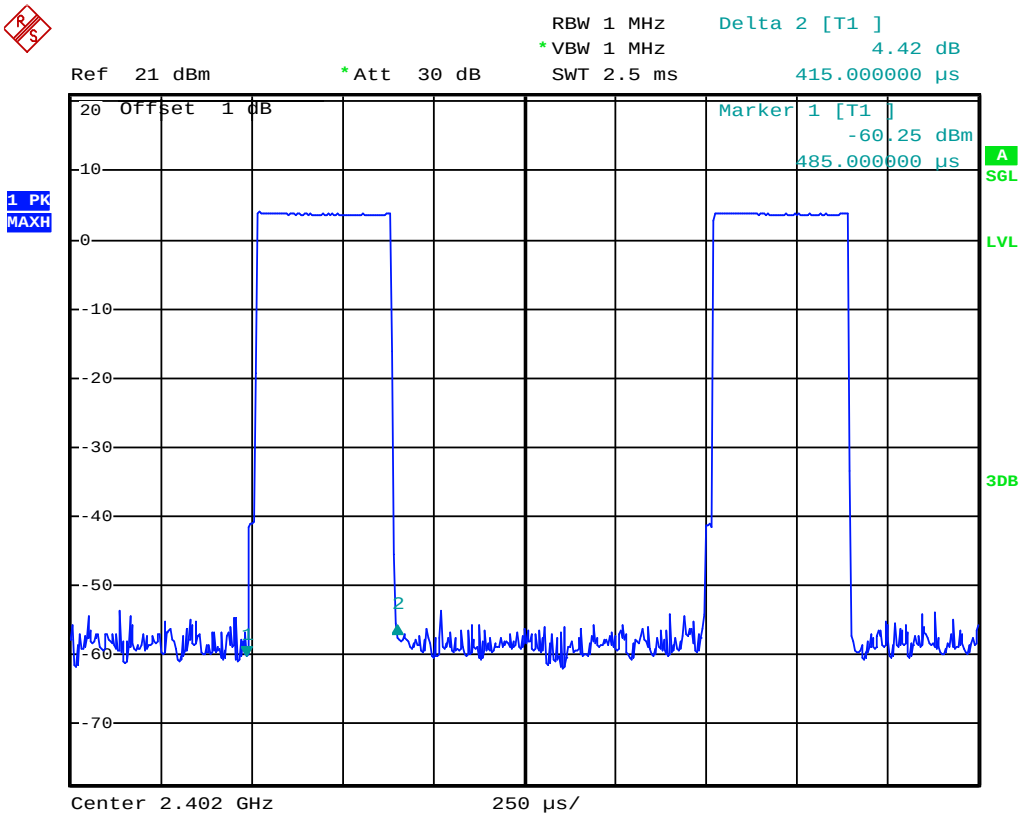
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.415	132.80	400
	2441	0.420	134.40	400
	2480	0.420	134.40	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.695	271.20	400
	2441	1.695	271.20	400
	2480	1.695	271.20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

8QPSK Mode

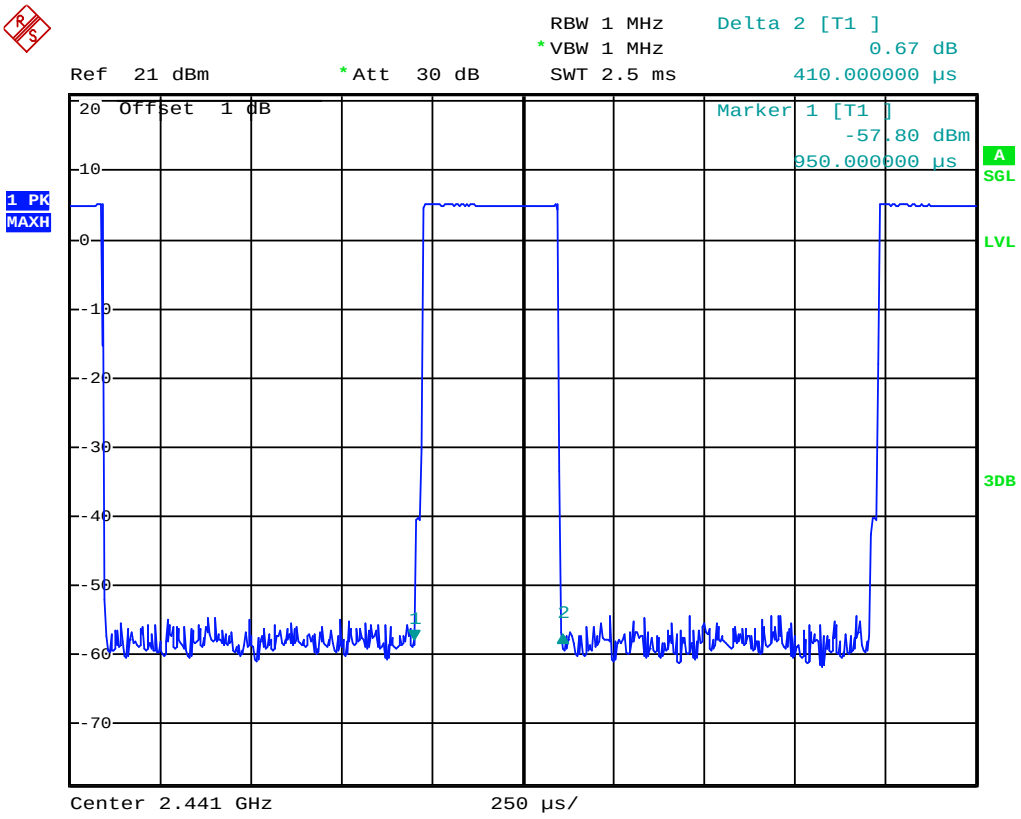
Mode	Channel Frequency (MHz)	Pulse Time (ms)	Dwell Time (ms)	Limit (ms)
DH1	2402	0.420	134.40	400
	2441	0.420	134.40	400
	2480	0.420	134.40	400
A period transmit time = 0.4 × 79 = 31.6 Dwell time = pulse time × (1600/(2*79))×31.6				
DH3	2402	1.680	268.80	400
	2441	1.680	268.80	400
	2480	1.695	271.20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

The spectrum analyzer plots are attached as below.

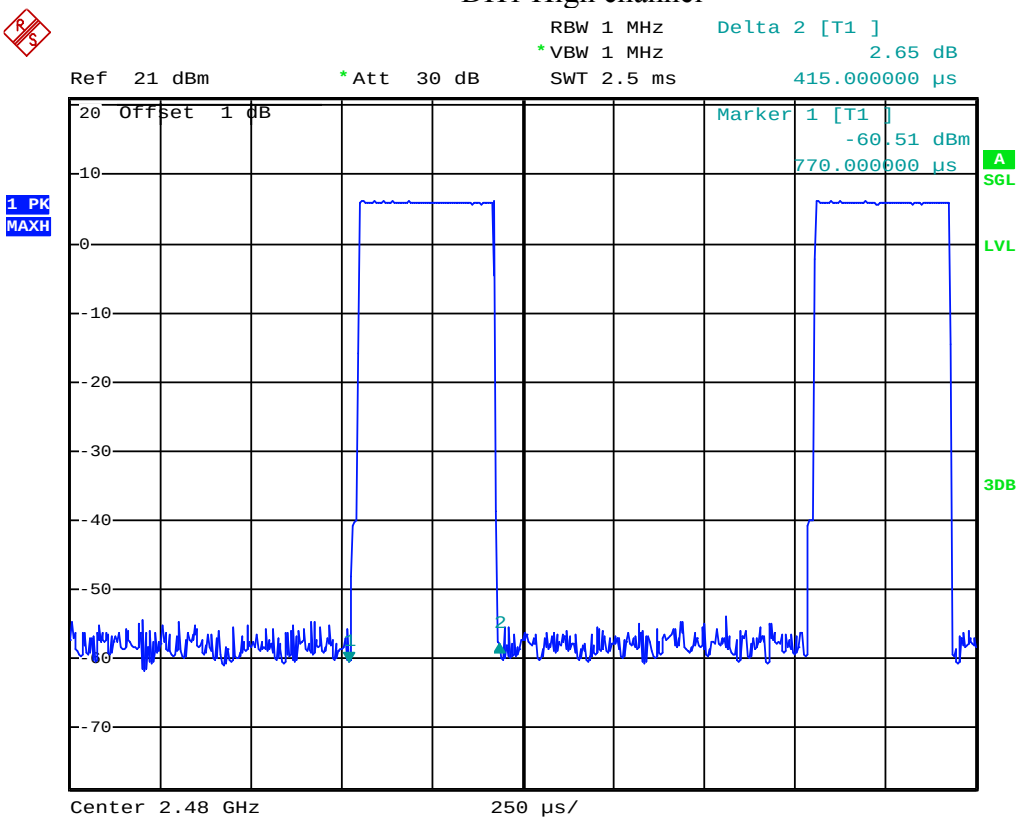
DH1 Low channel



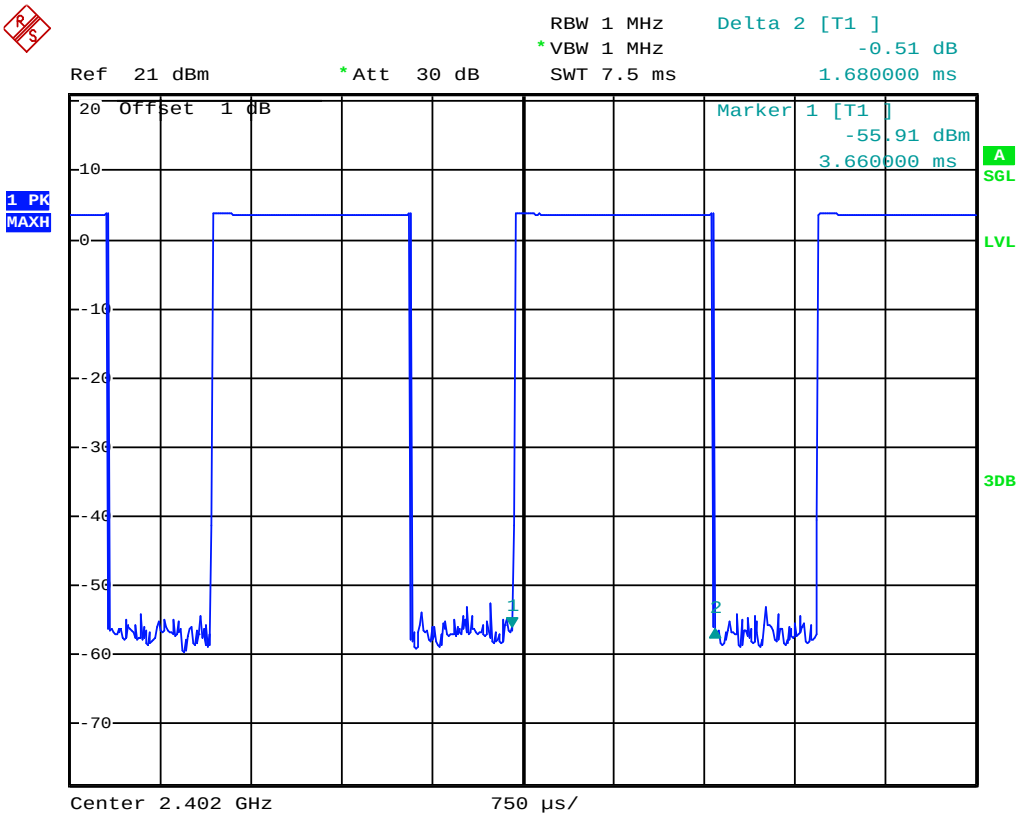
DH1 Middle channel



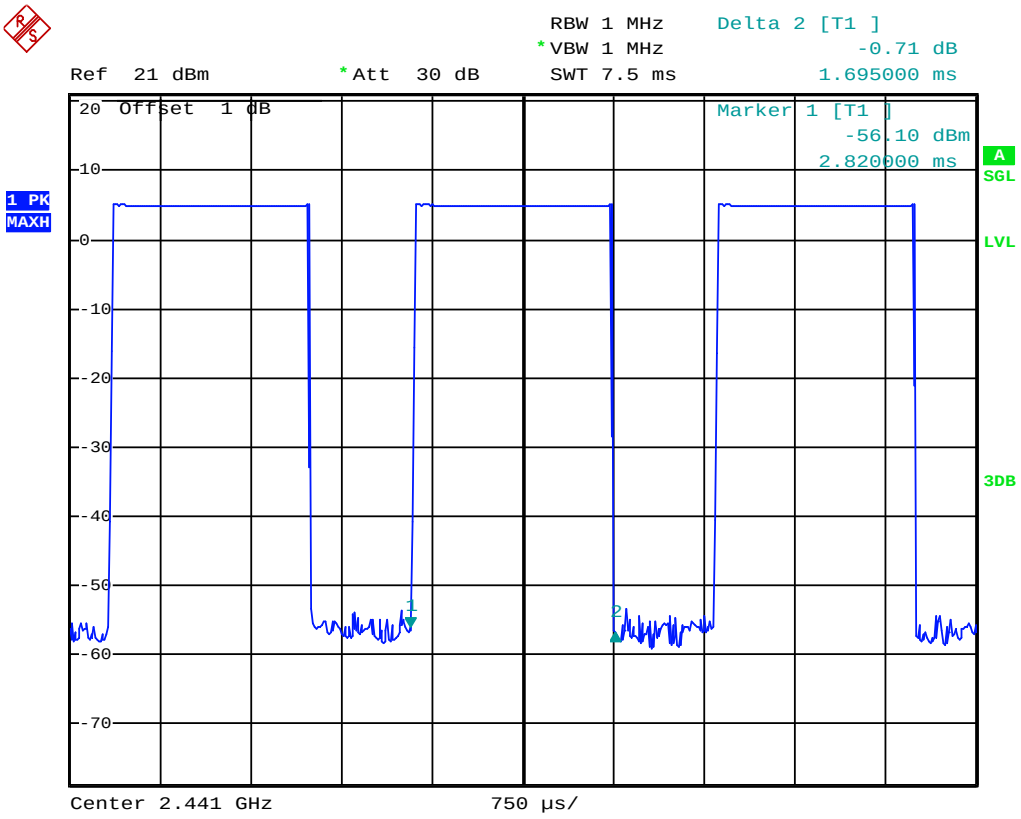
DH1 High channel



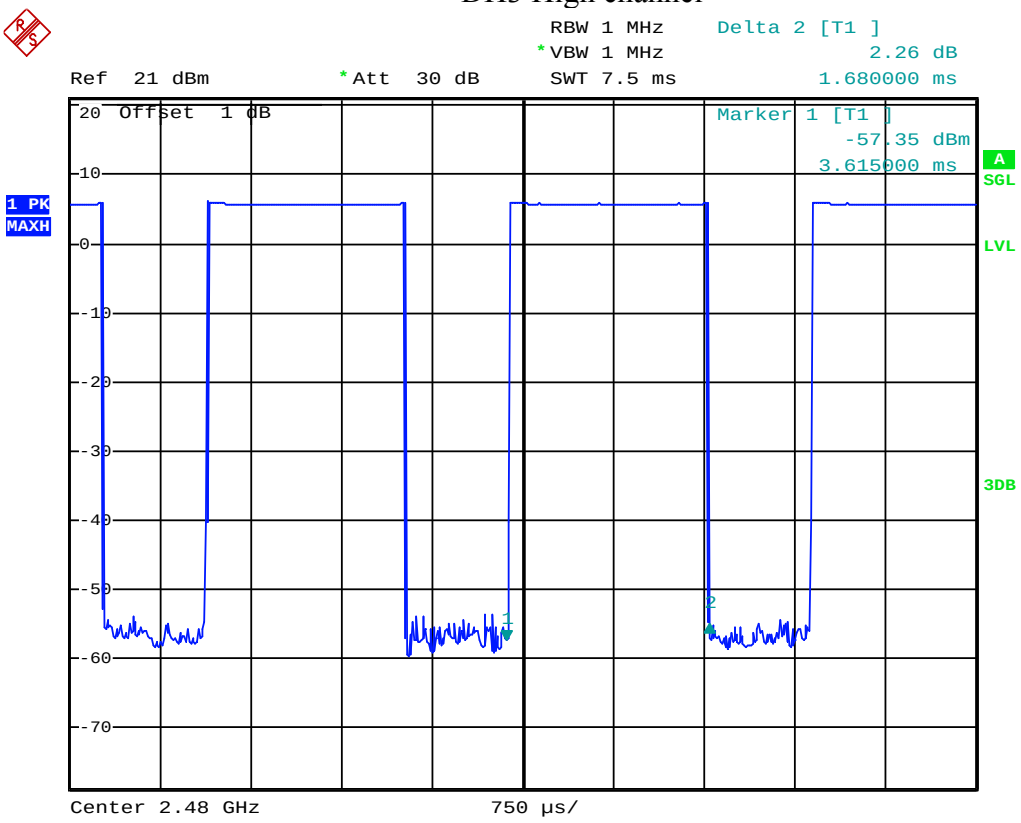
DH3 Low channel



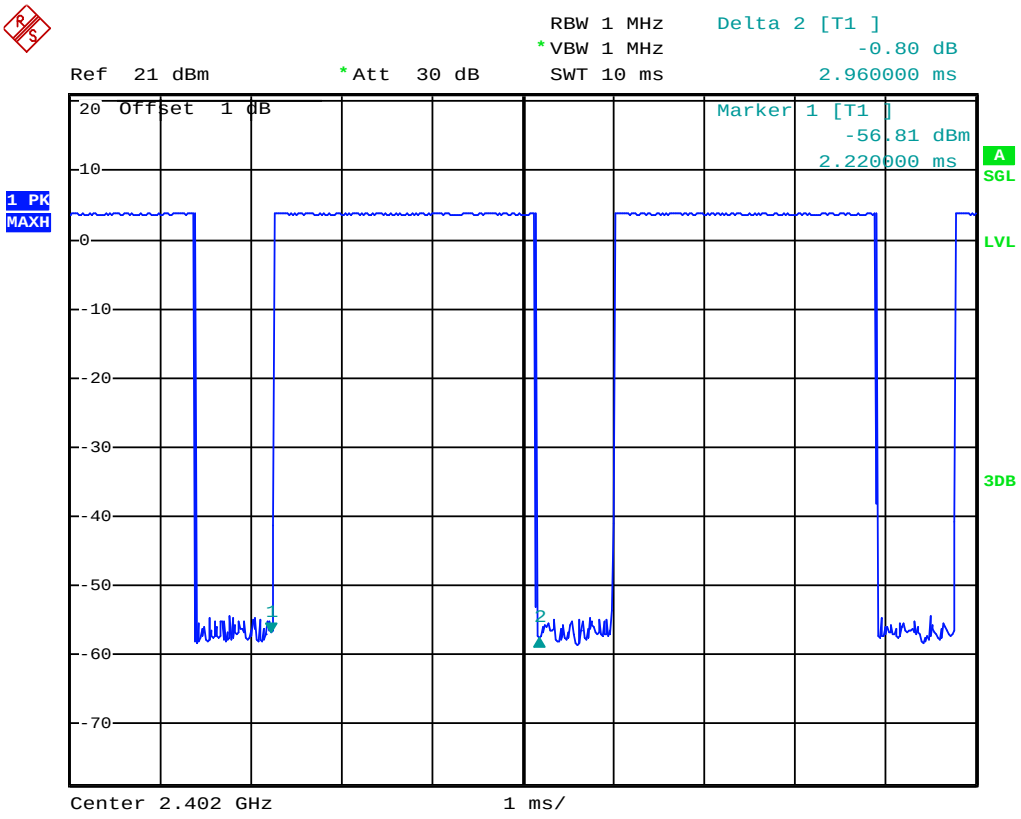
DH3 Middle channel



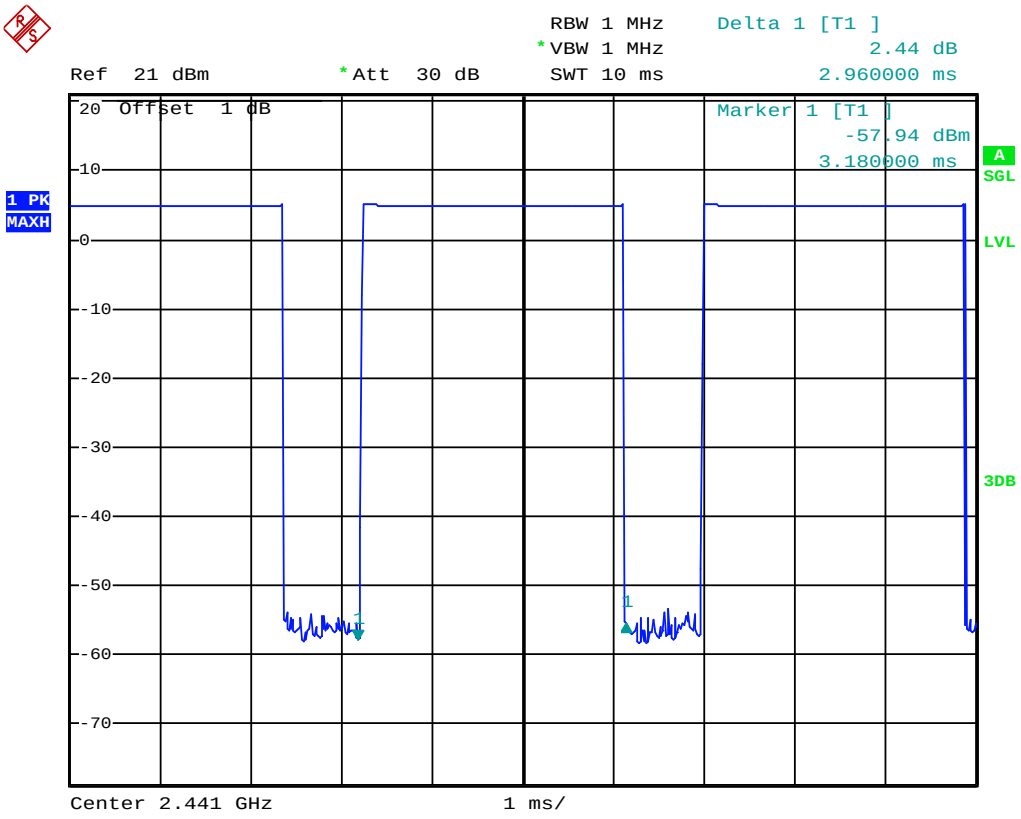
DH3 High channel



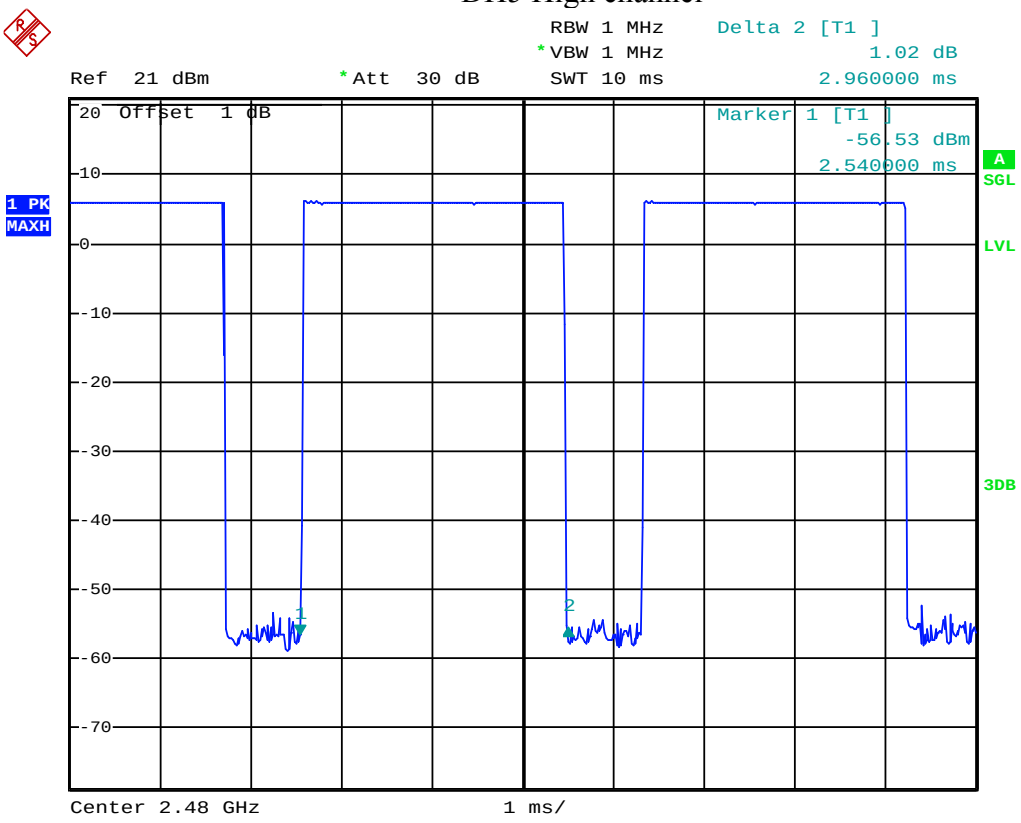
DH5 Low channel



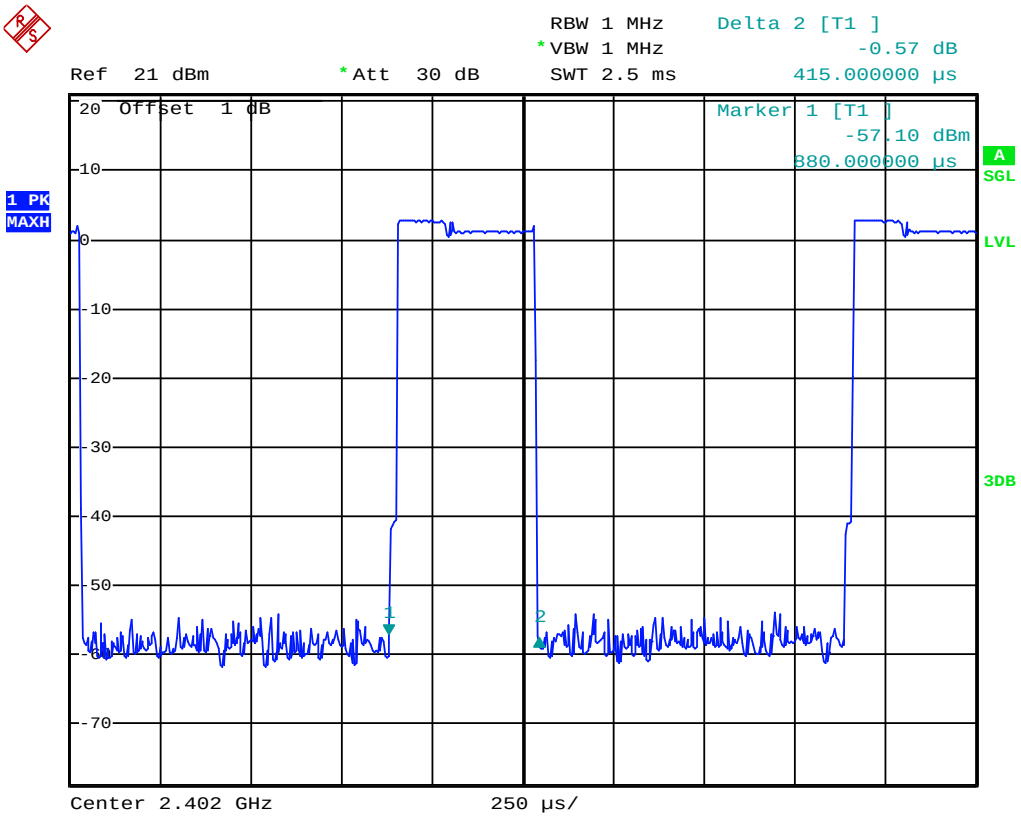
DH5 Middle channel



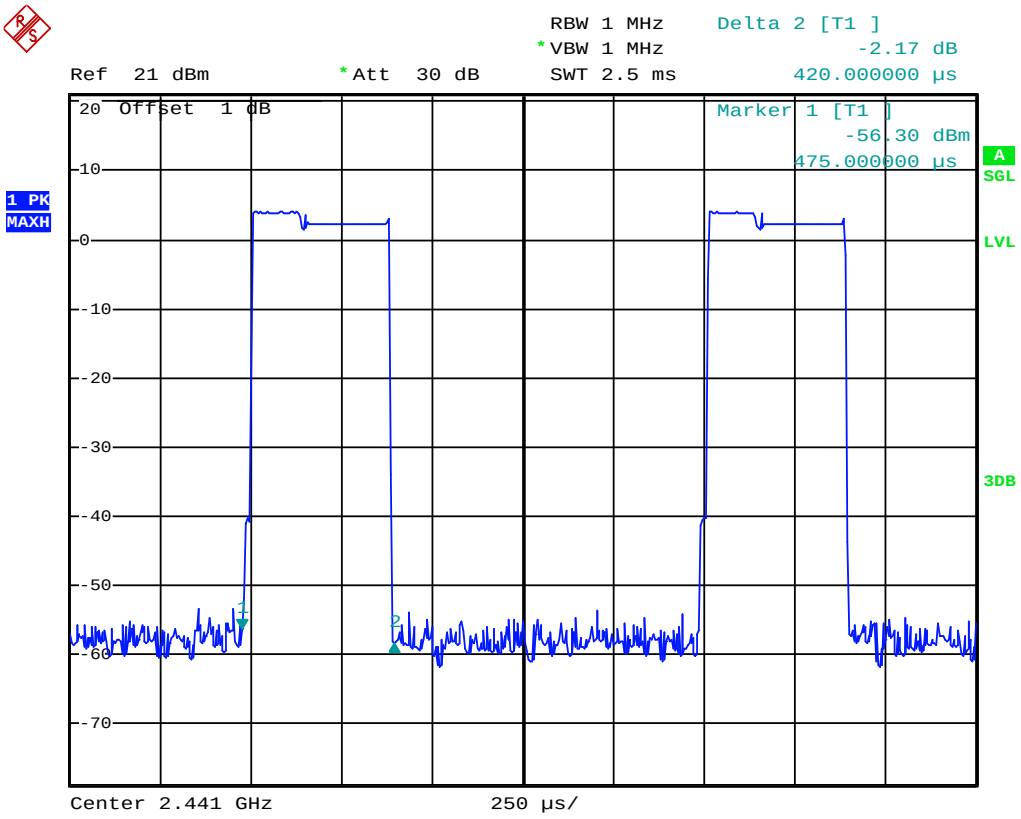
DH5 High channel



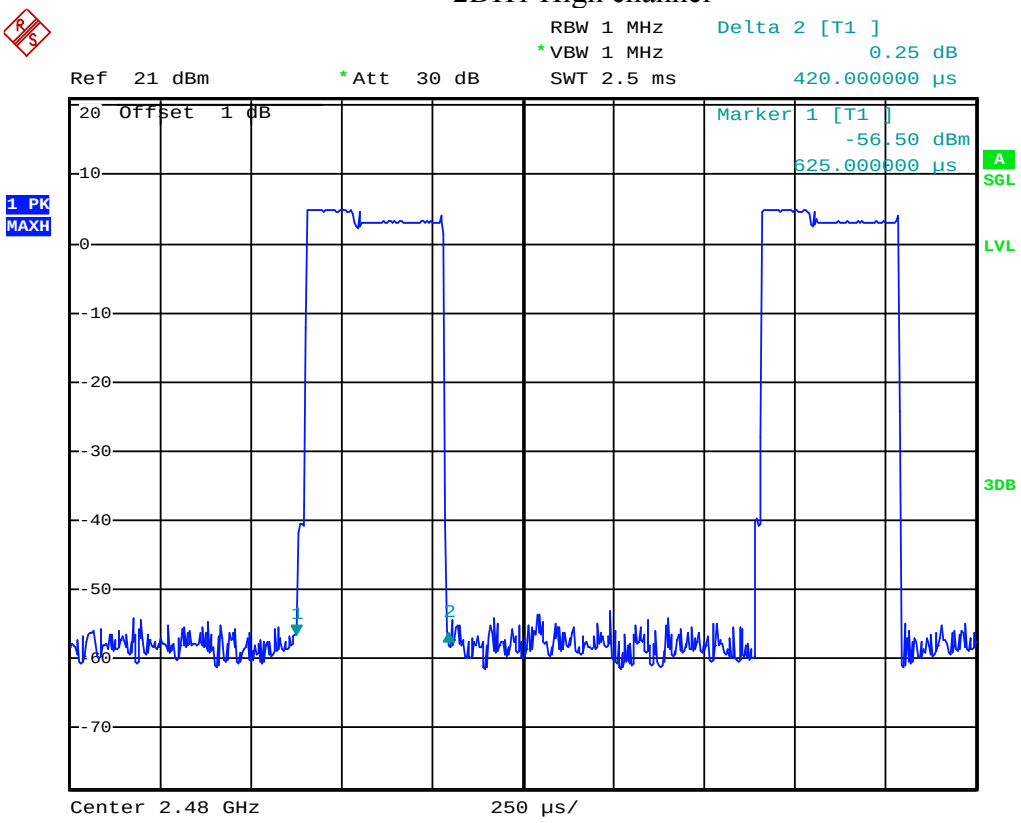
2DH1 Low channel



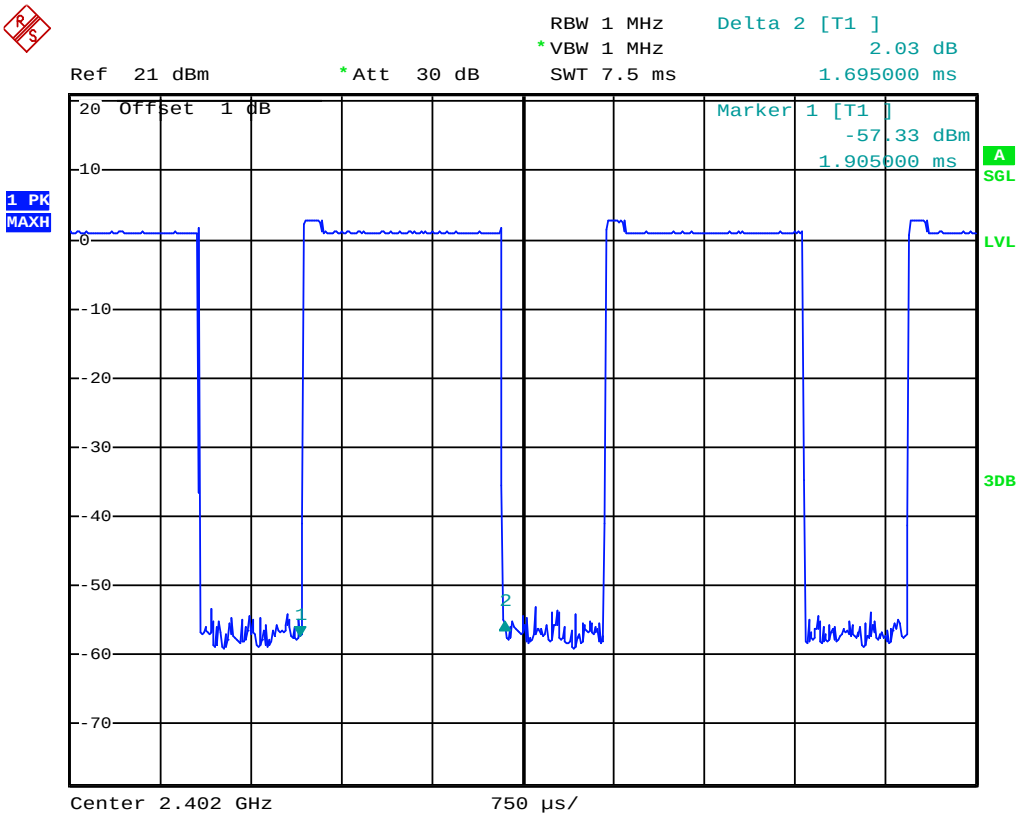
2DH1 Middle channel



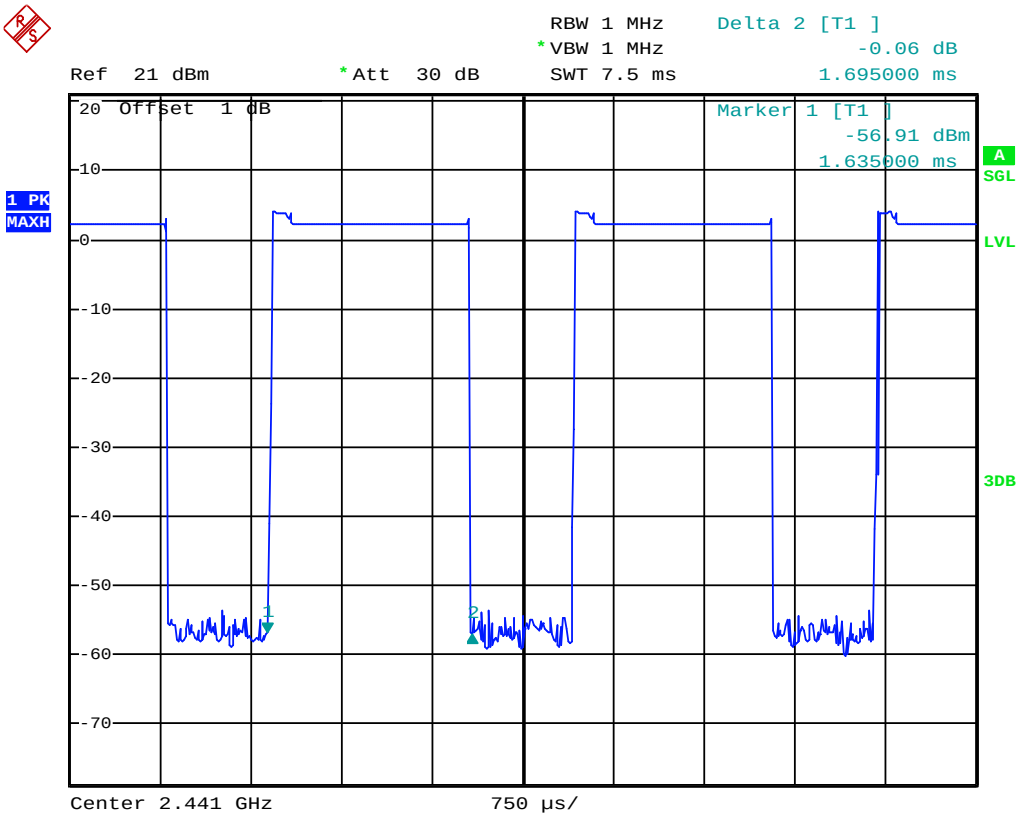
2DH1 High channel



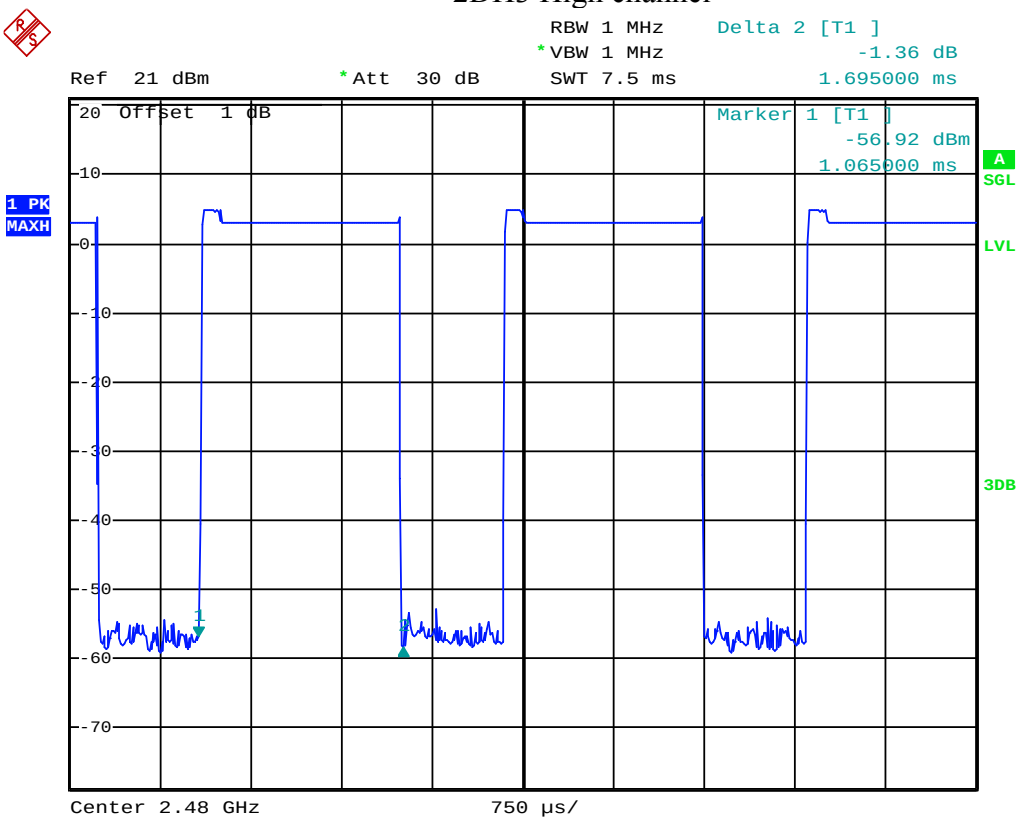
2DH3 Low channel



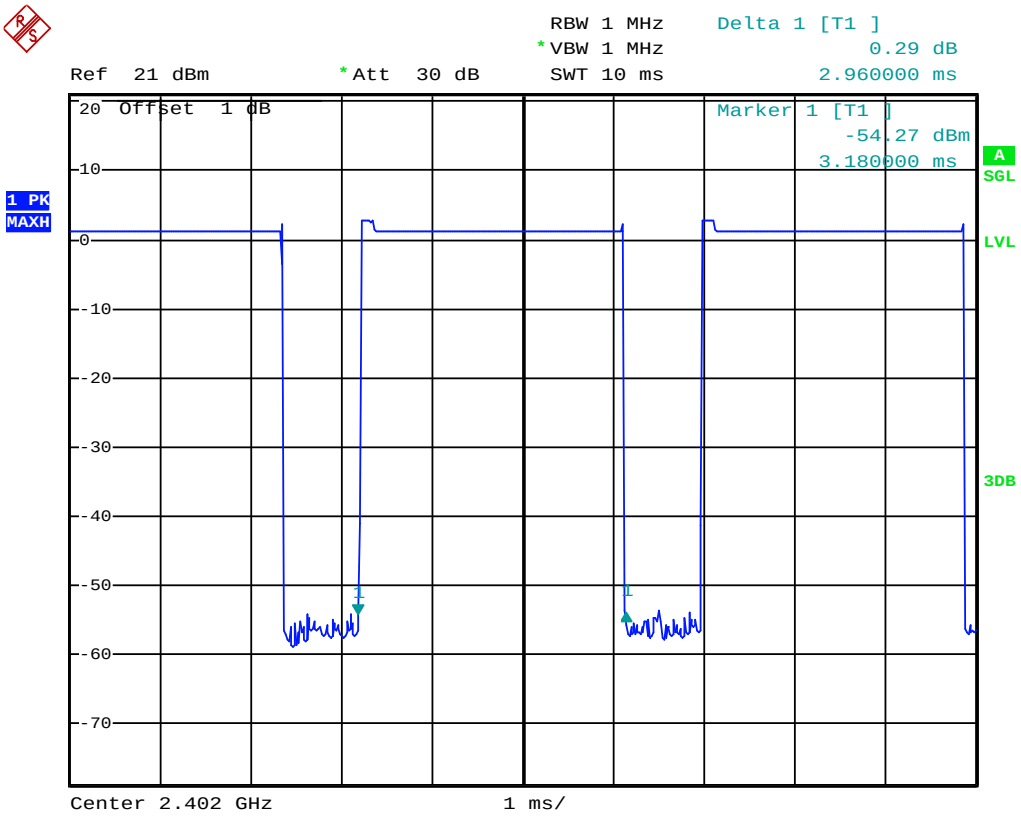
2DH3 Middle channel



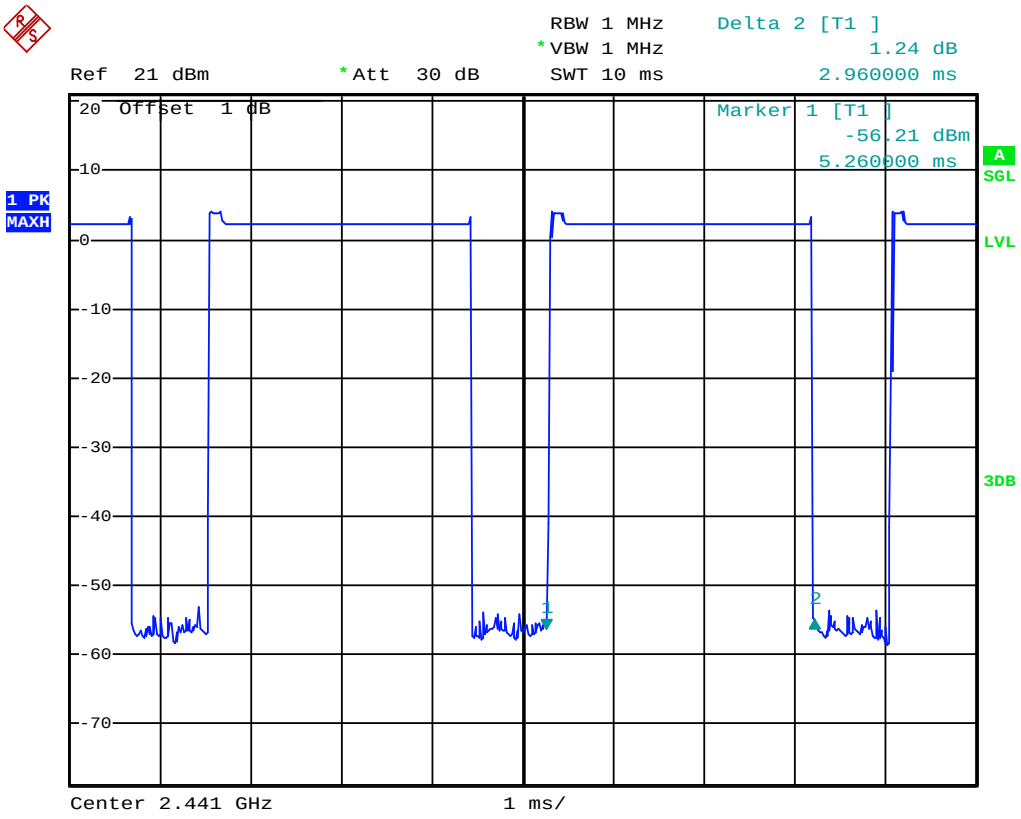
2DH3 High channel



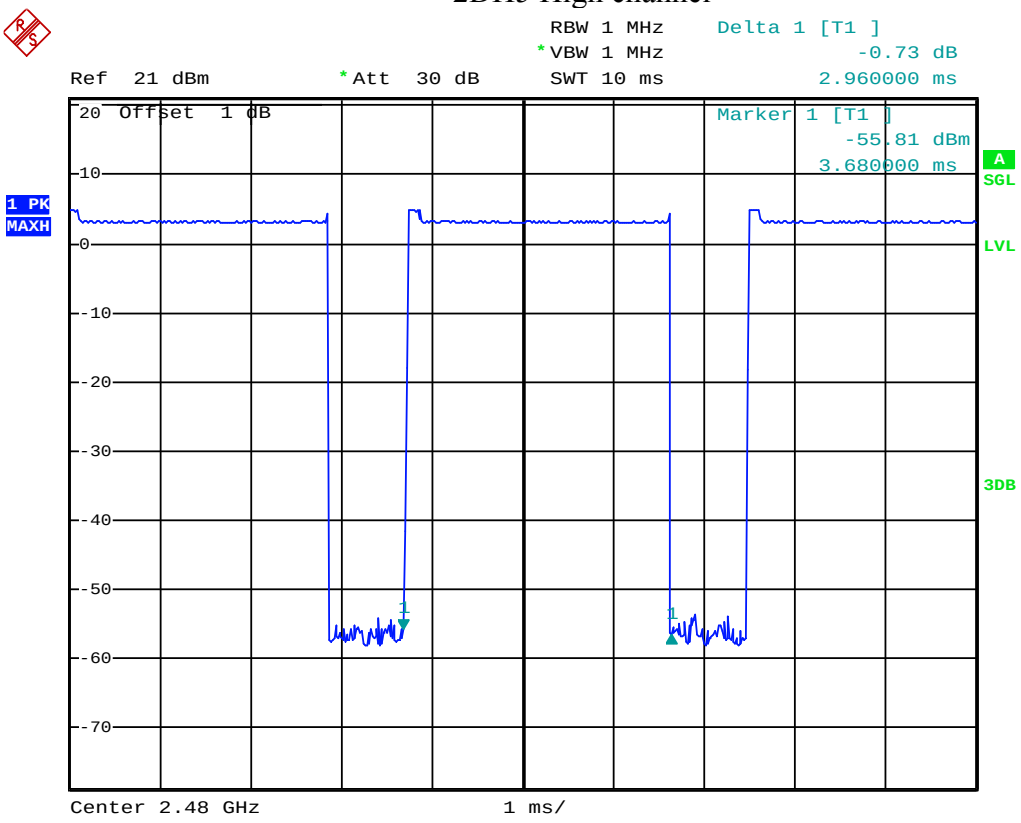
2DH5 Low channel



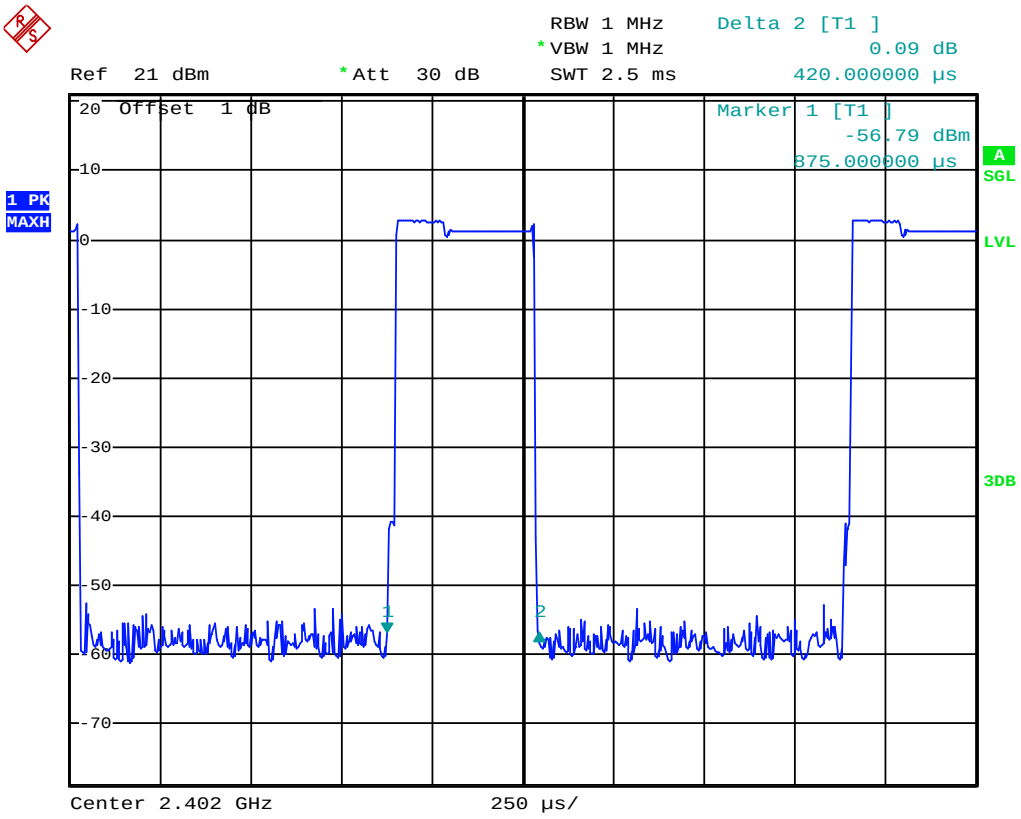
2DH5 Middle channel



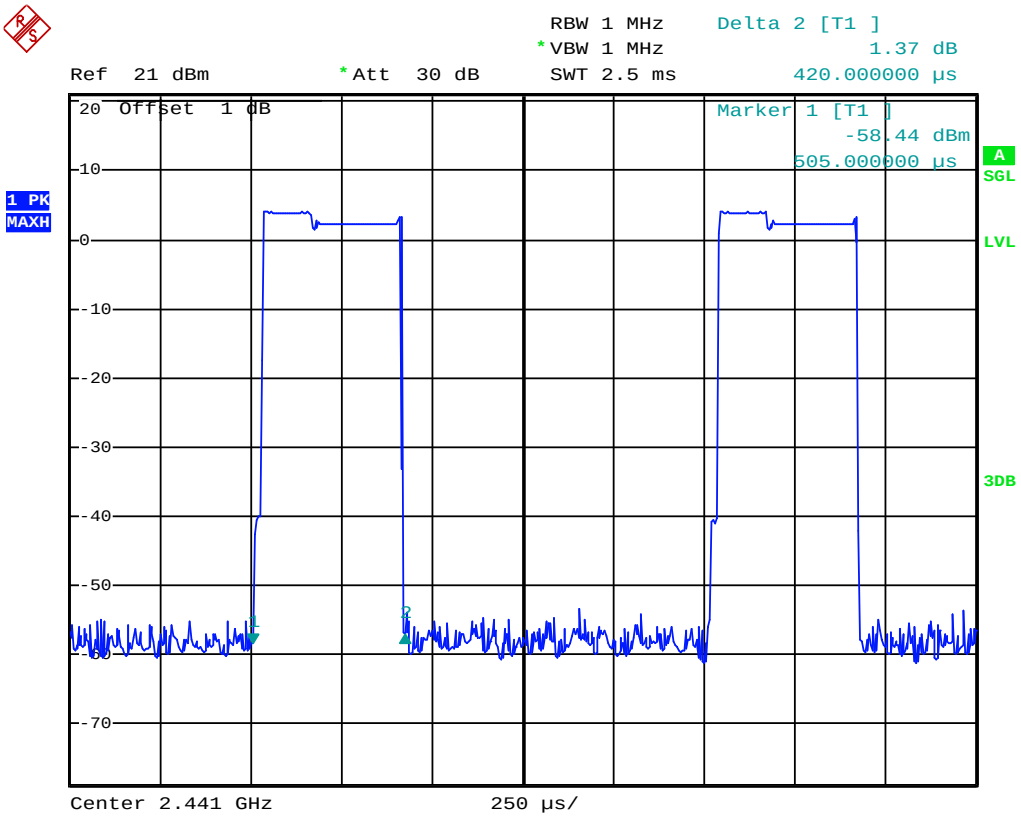
2DH5 High channel



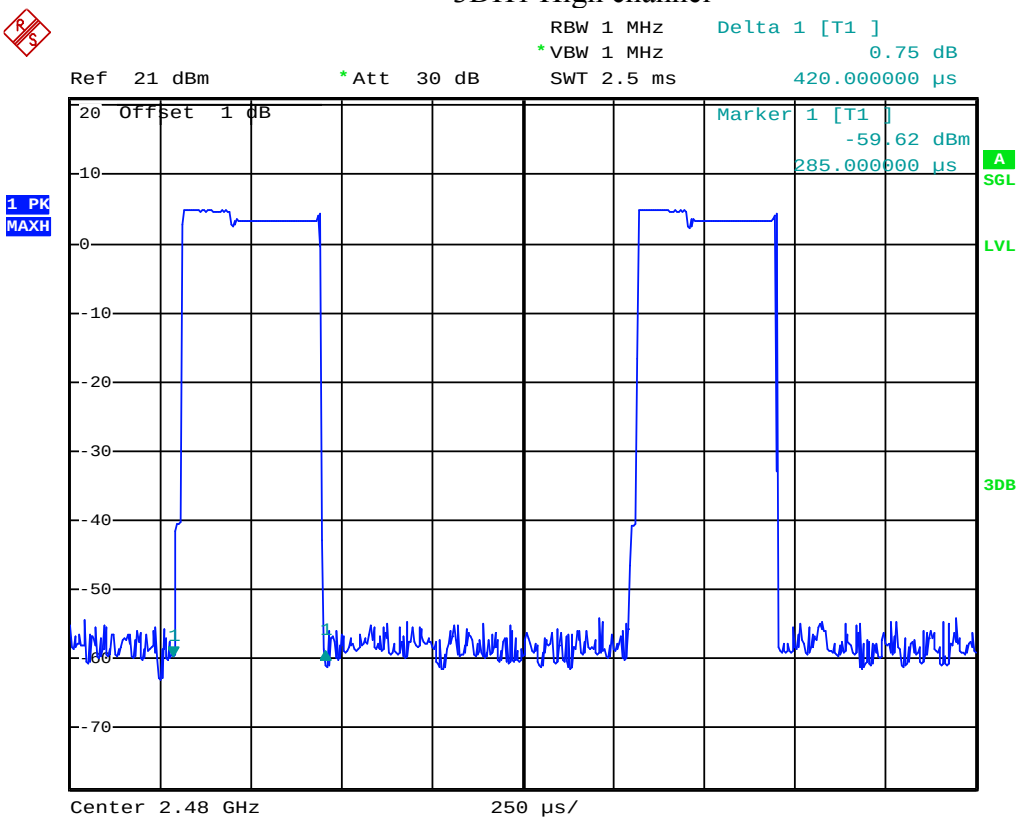
3DH1 Low channel



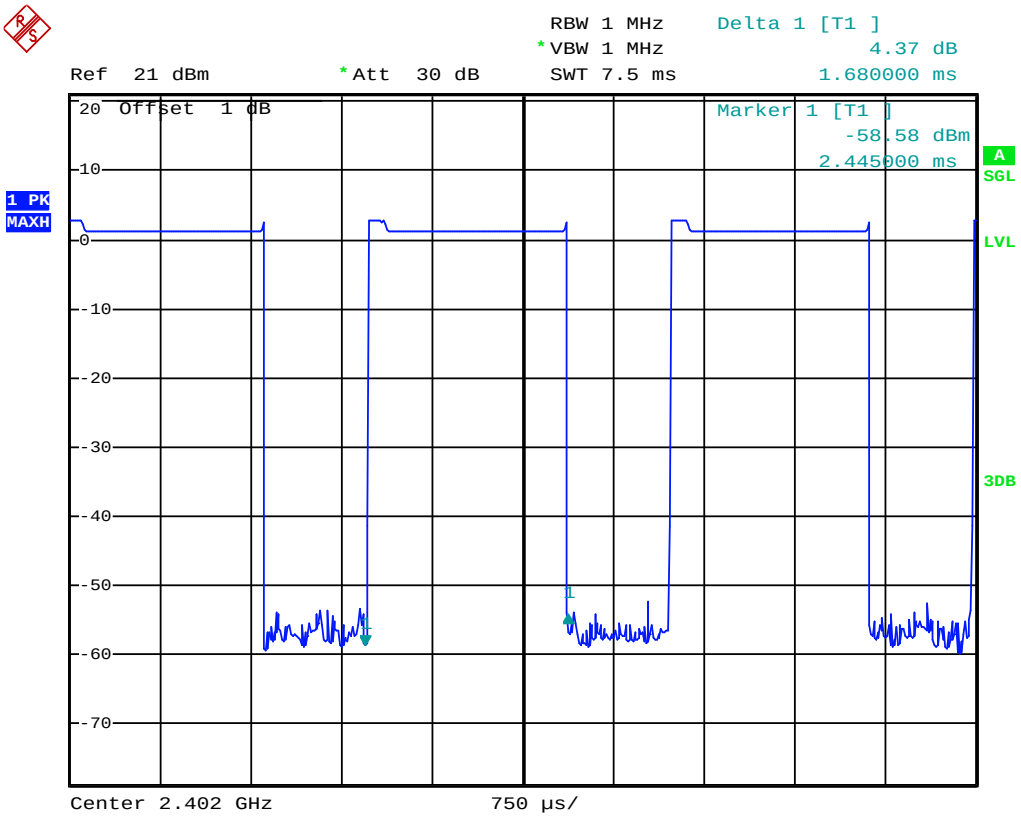
3DH1 Middle channel



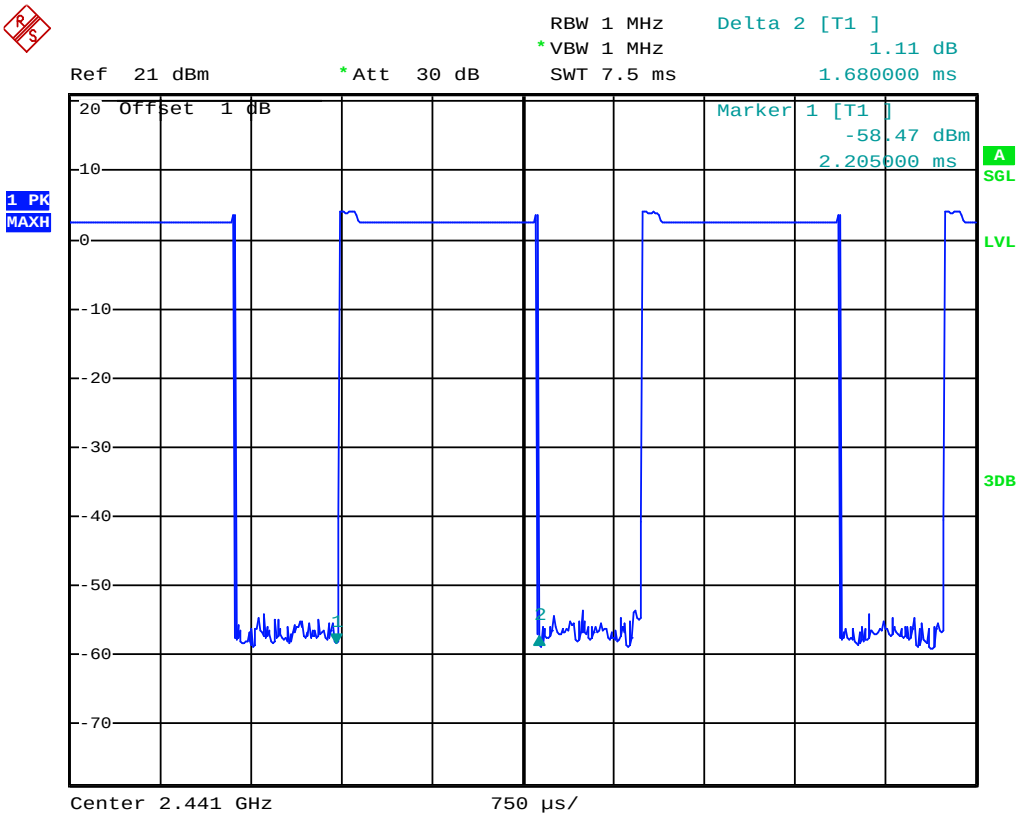
3DH1 High channel



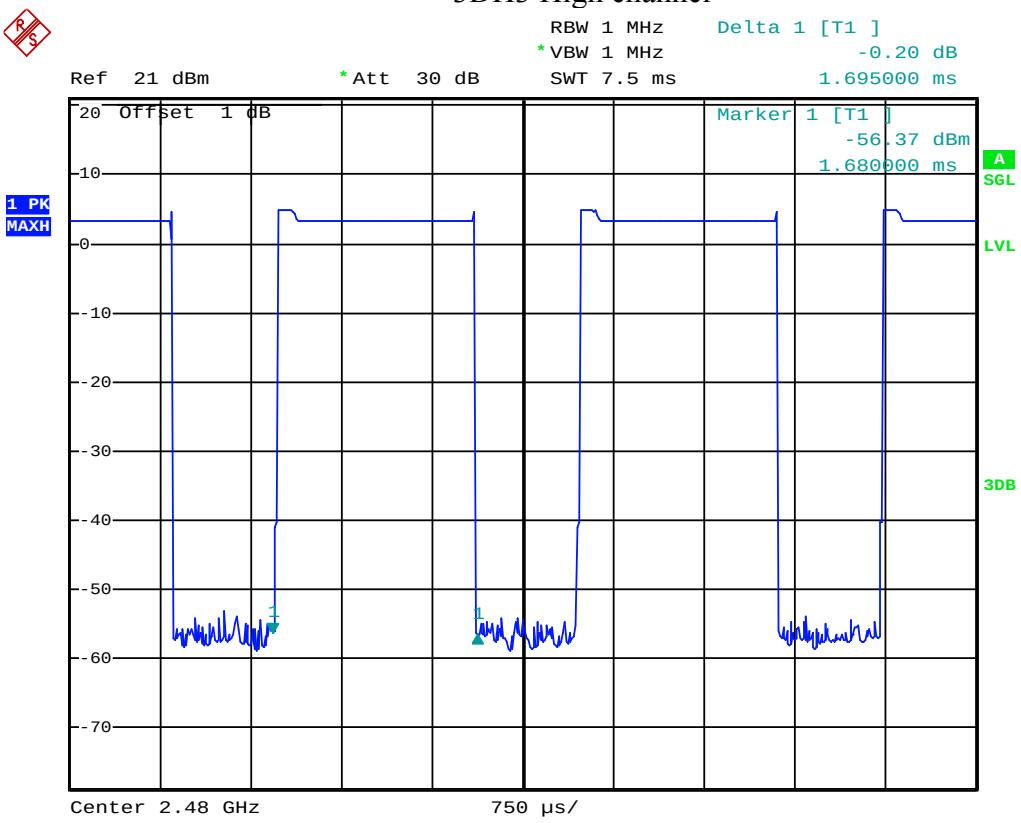
3DH3 Low channel



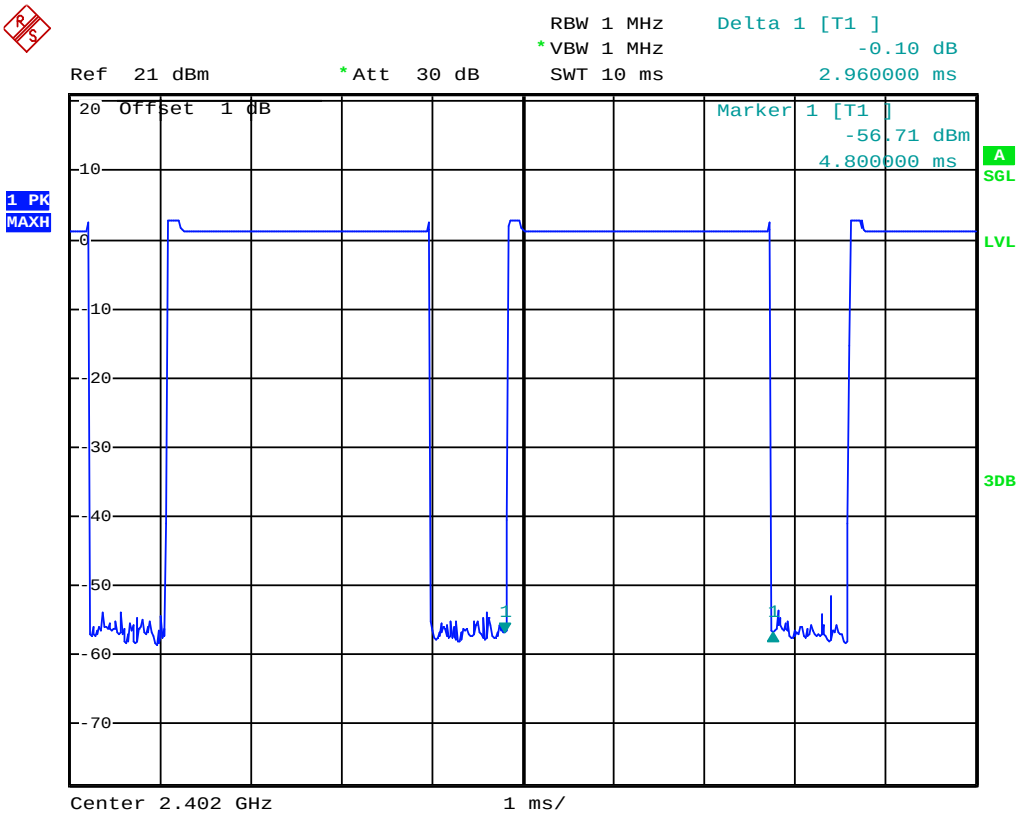
3DH3 Middle channel



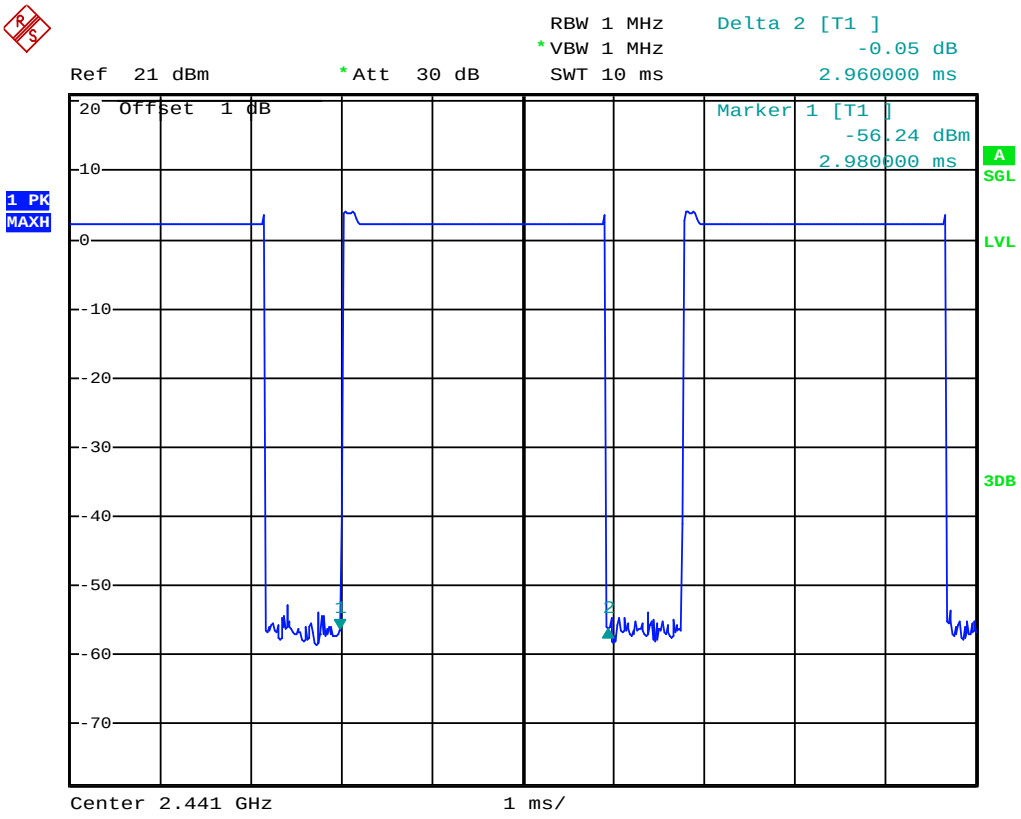
3DH3 High channel



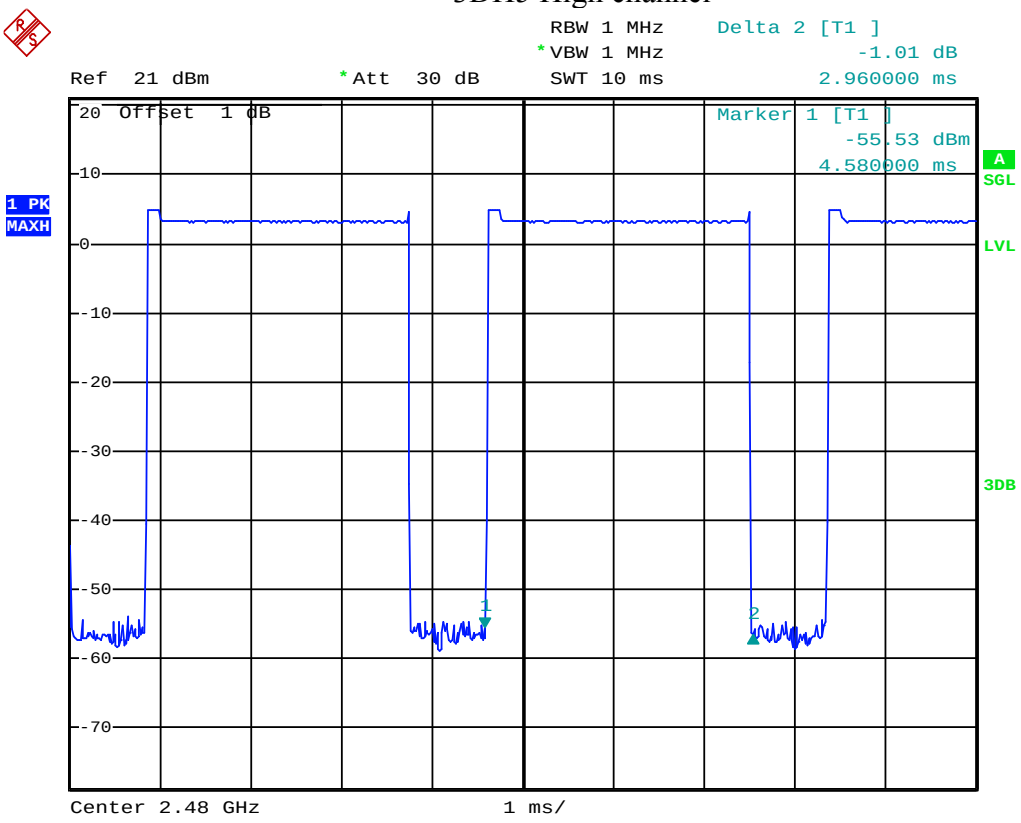
3DH5 Low channel



3DH5 Middle channel

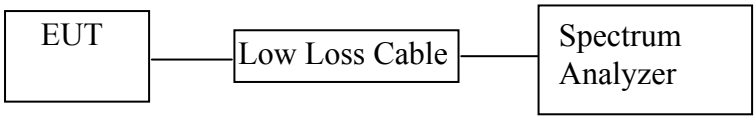


3DH5 High channel



9. MAXIMUM PEAK OUTPUT POWER TEST

9.1.Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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

Section 15.247(b)(1): For frequency hoppi ng 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 system s in the 2400-2483.5 MHz band: 0.125 watts.

9.3.EUT Configuration on Measurement

The equipment are installed on the em ission Measurement to m eet the com mission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

9.4.Operating Condition of EUT

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

9.4.2.Turn on the power of all equipment.

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

9.5.Test Procedure

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

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

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

9.5.4.Measurement the maximum peak output power.

9.6.Test Result

GFSK Mode

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

Π/4-DQPSK Mode

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

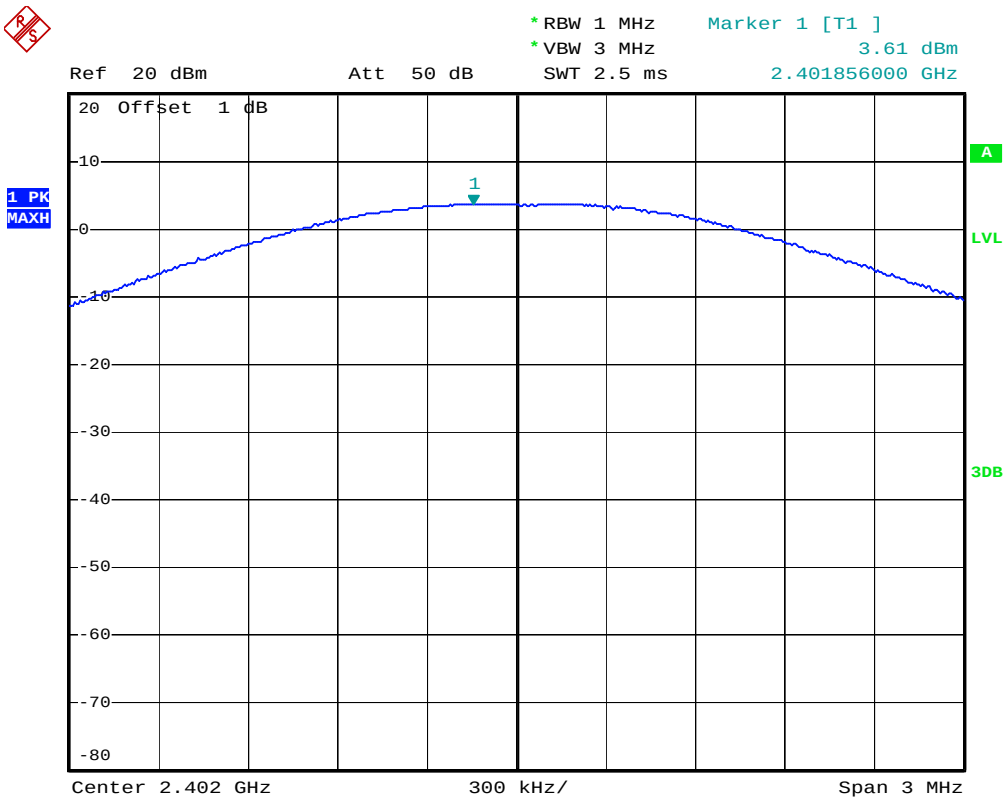
8QPSK Mode

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

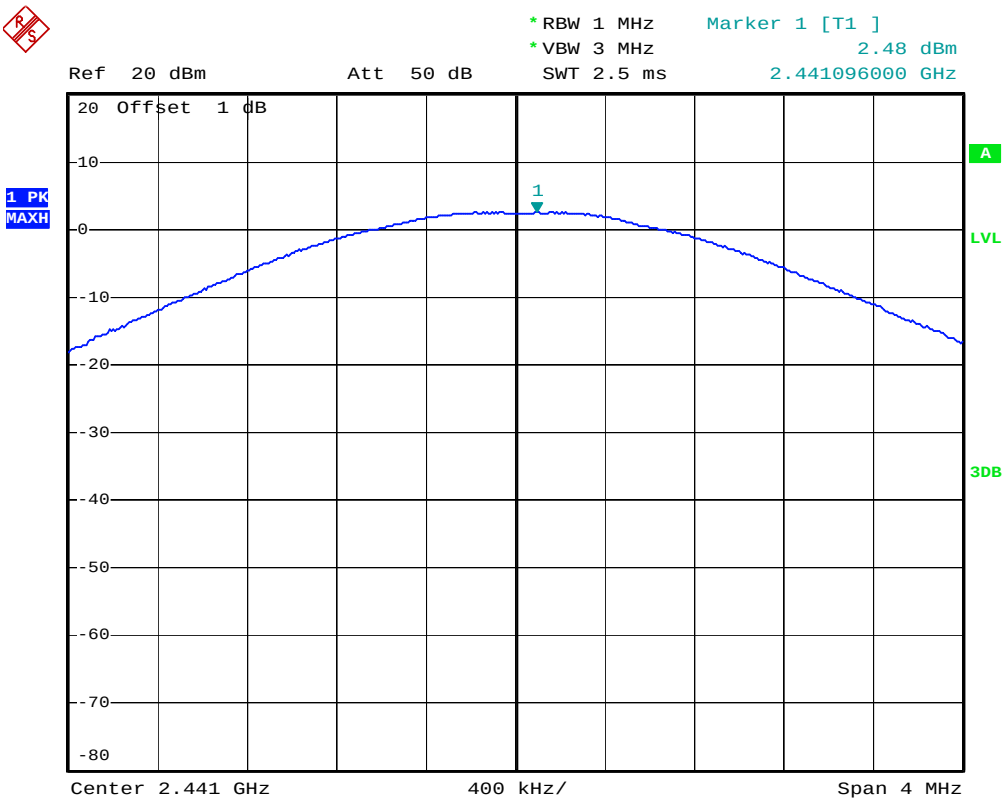
The spectrum analyzer plots are attached as below.

GFSK Mode

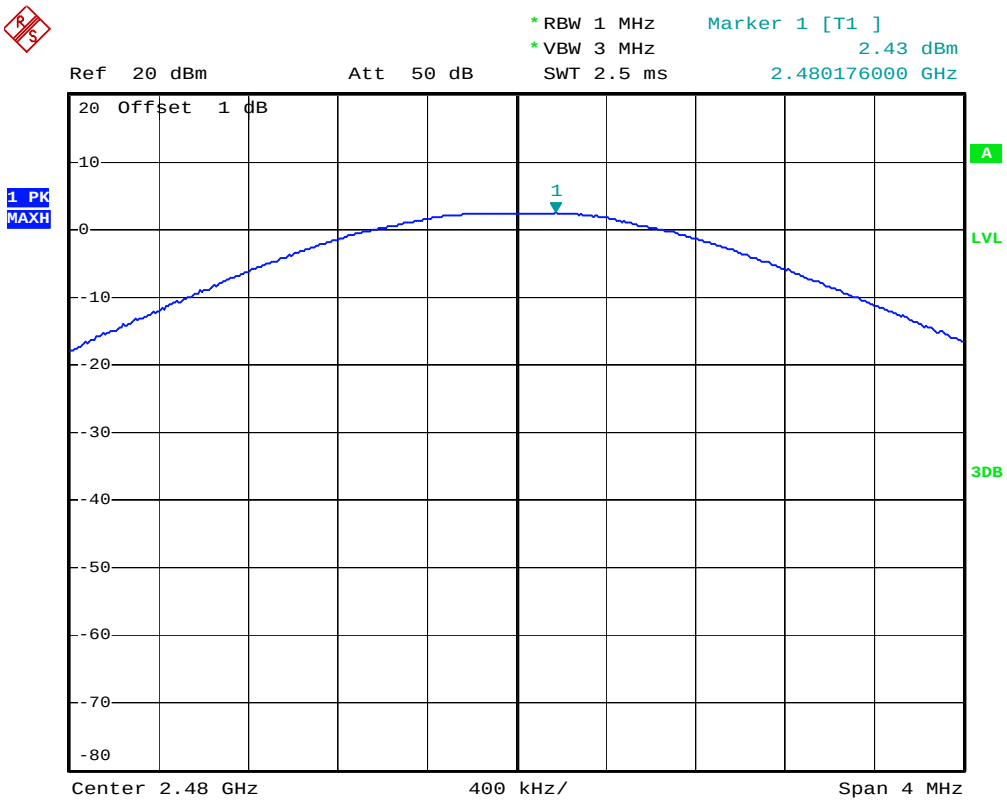
Low channel



Middle channel

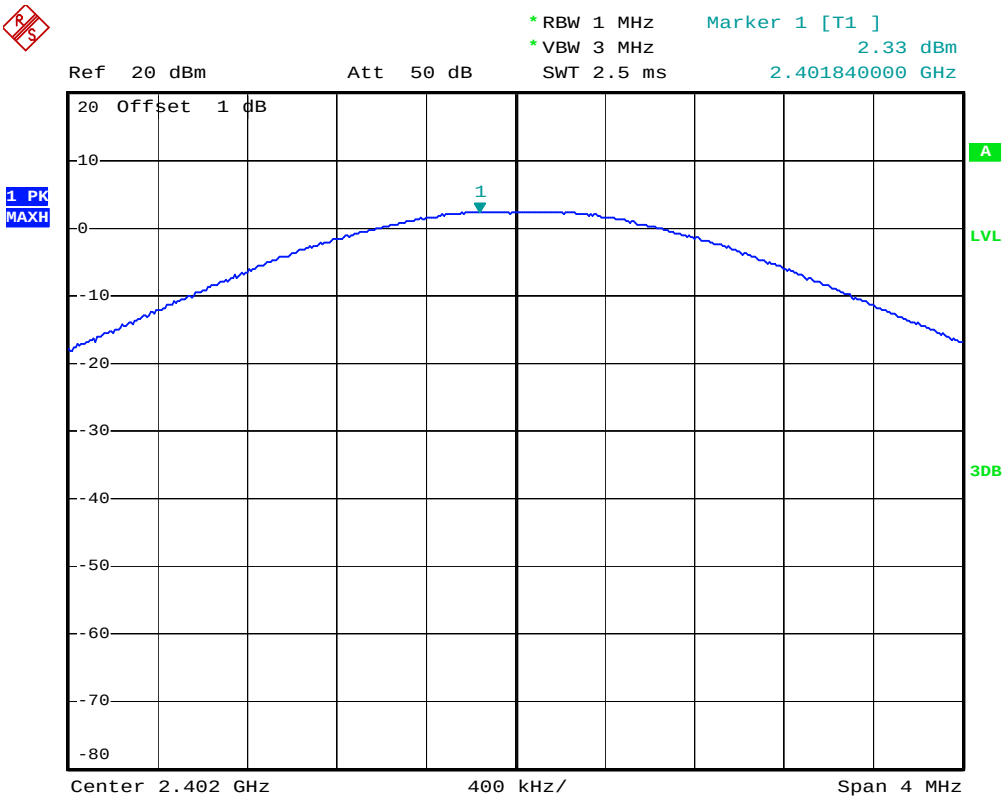


High channel

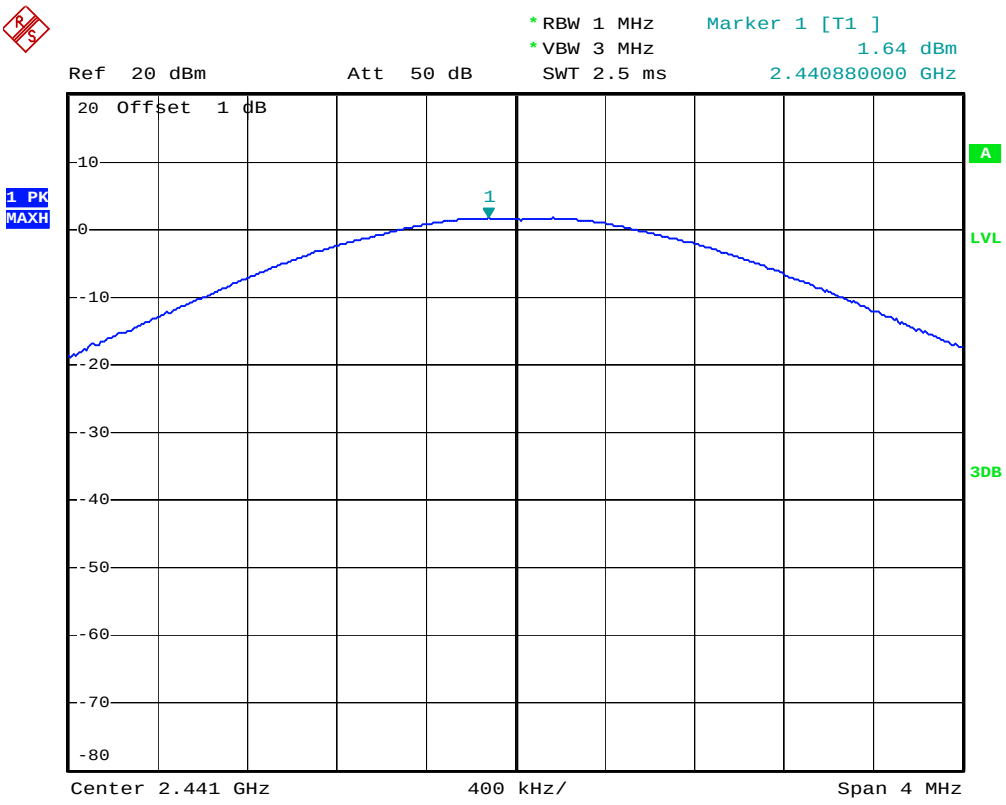


Π/4-DQPSK Mode

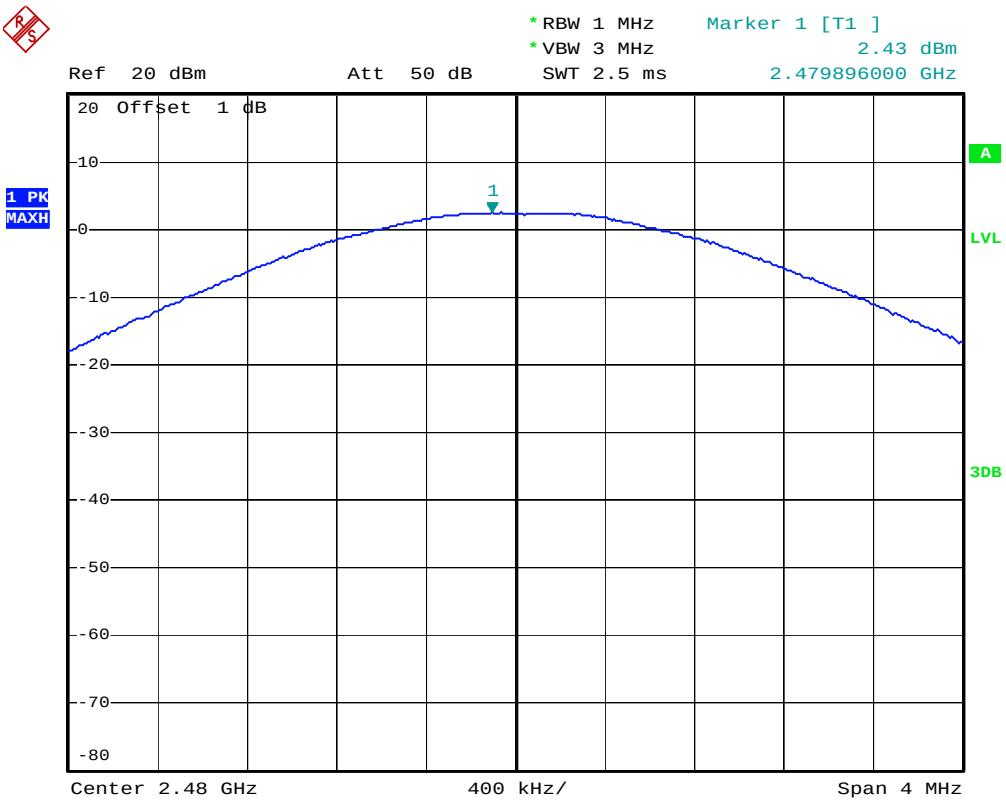
Low channel



Middle channel

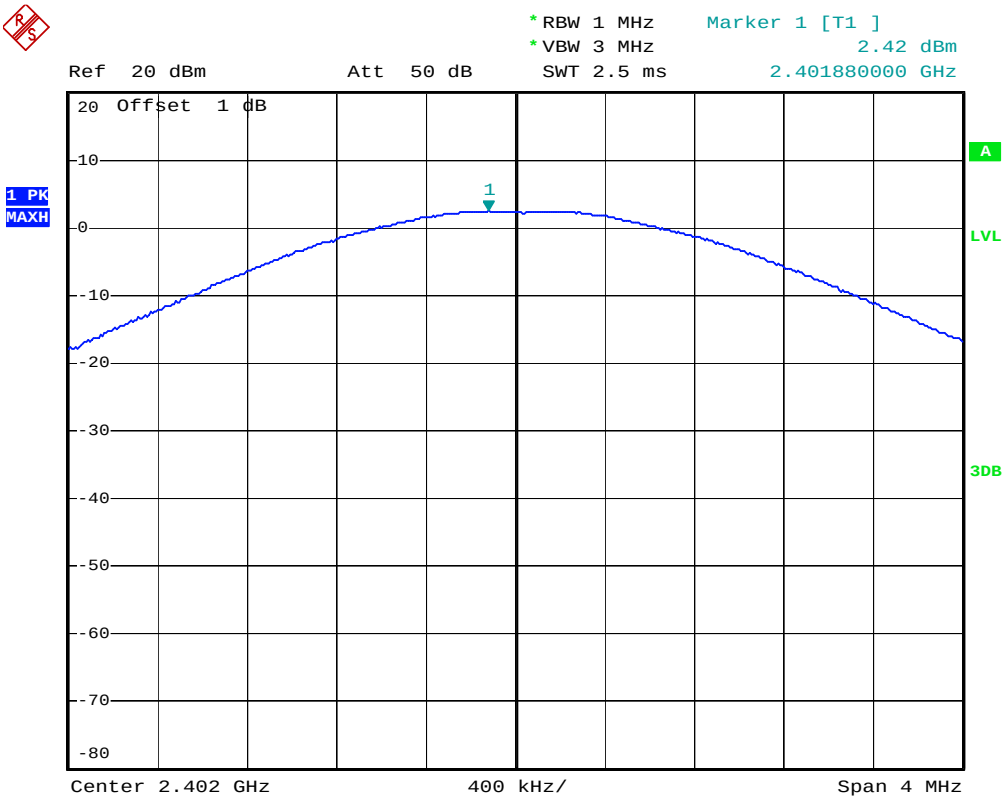


High channel

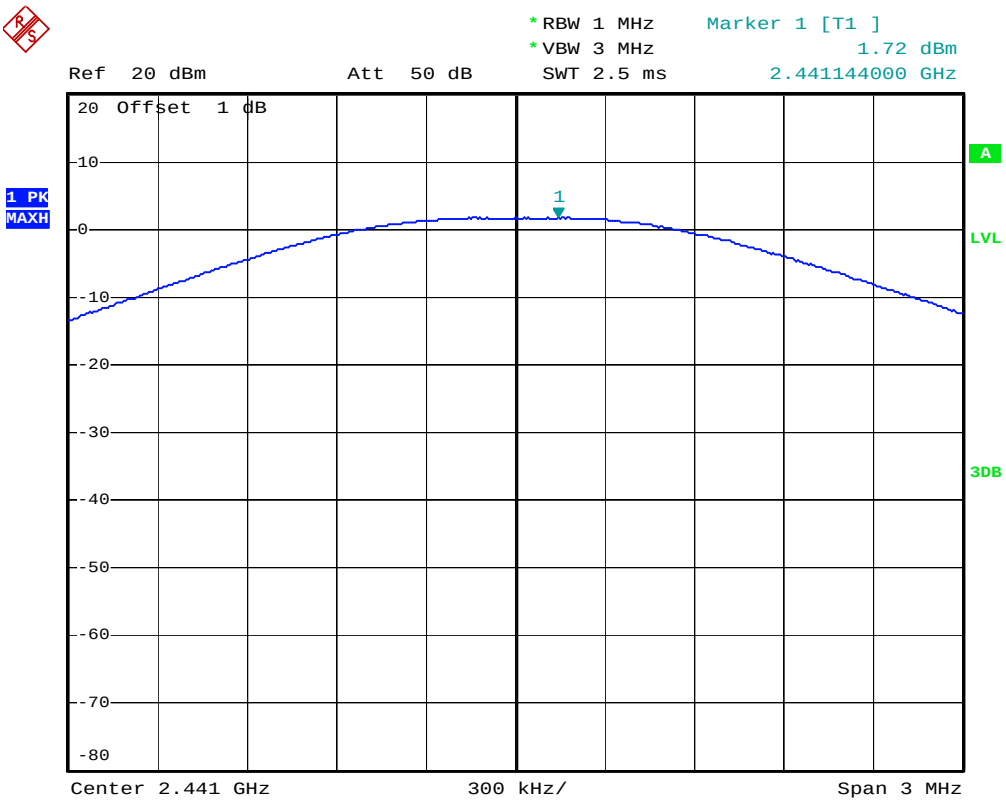


8QPSK Mode

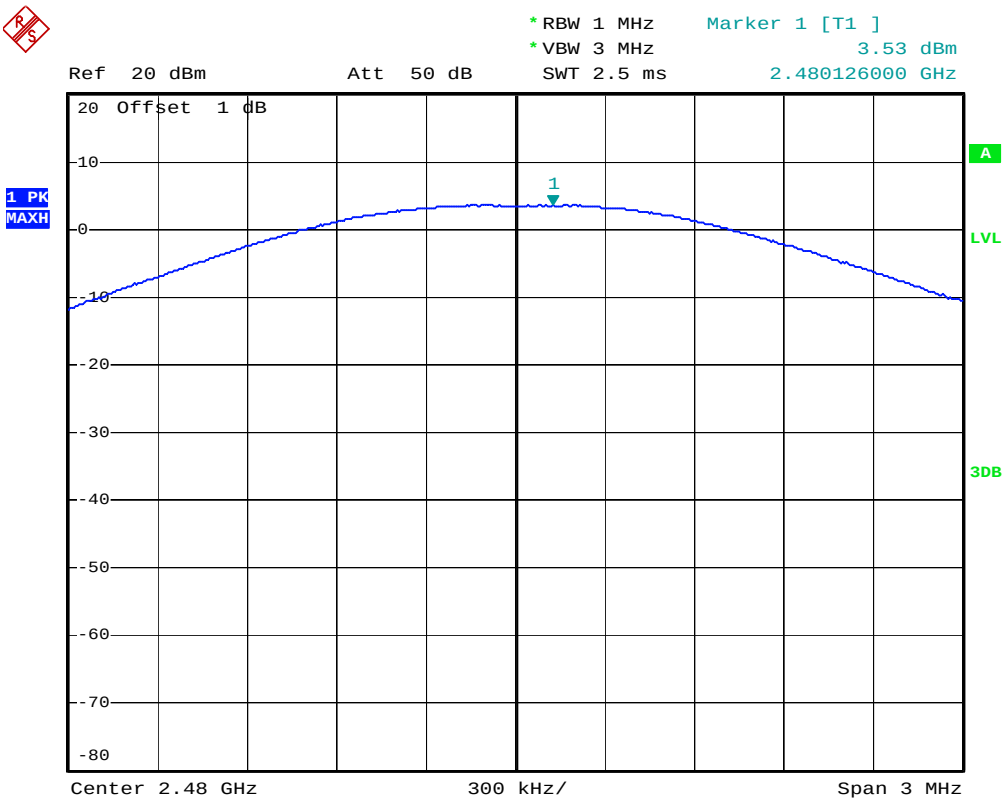
Low channel



Middle channel



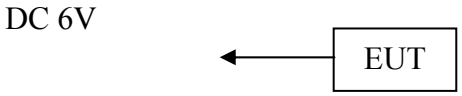
High channel



10.RADIATED EMISSION TEST

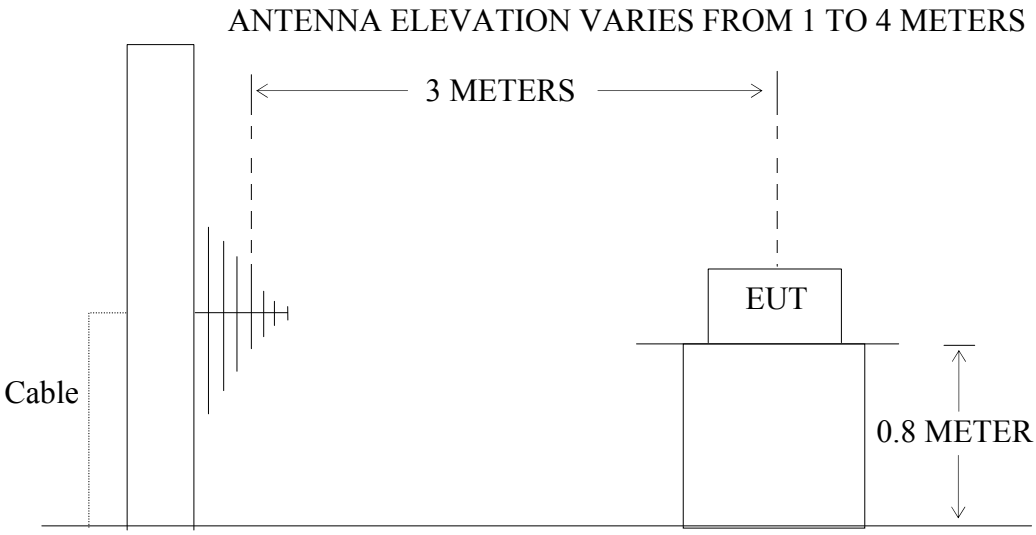
10.1.Block Diagram of Test Setup

10.1.1.Block diagram of connection between the EUT and simulators



(EUT: Bluetooth 3.0 Keyboard)

10.1.2.Anechoic Chamber Test Setup Diagram



(EUT: Bluetooth 3.0 Keyboard)

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 m odulated intentional radiator is operating, the radio frequency power that is produced by the intenti onal radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the ba nd that contains the highest level of the desired power, based on either an RF conducte d or a radiated m easurement, provided the transmitter demonstrates compliance with the peak conducted power lim its. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a tim e interval, as perm itted 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), m ust also comply with the radiated emission limits specified in Section 15.209(a).

10.3.Restricted bands of operation

10.3.1.FCC Part 15.205 Restricted bands of operation

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

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

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

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

10.4.Configuration of EUT on Measurement

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

10.5.Test Procedure

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

10.6.The Field Strength of Radiation Emission Measurement Results

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

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

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

ACCURATE TECHNOLOGY CO., LTD.
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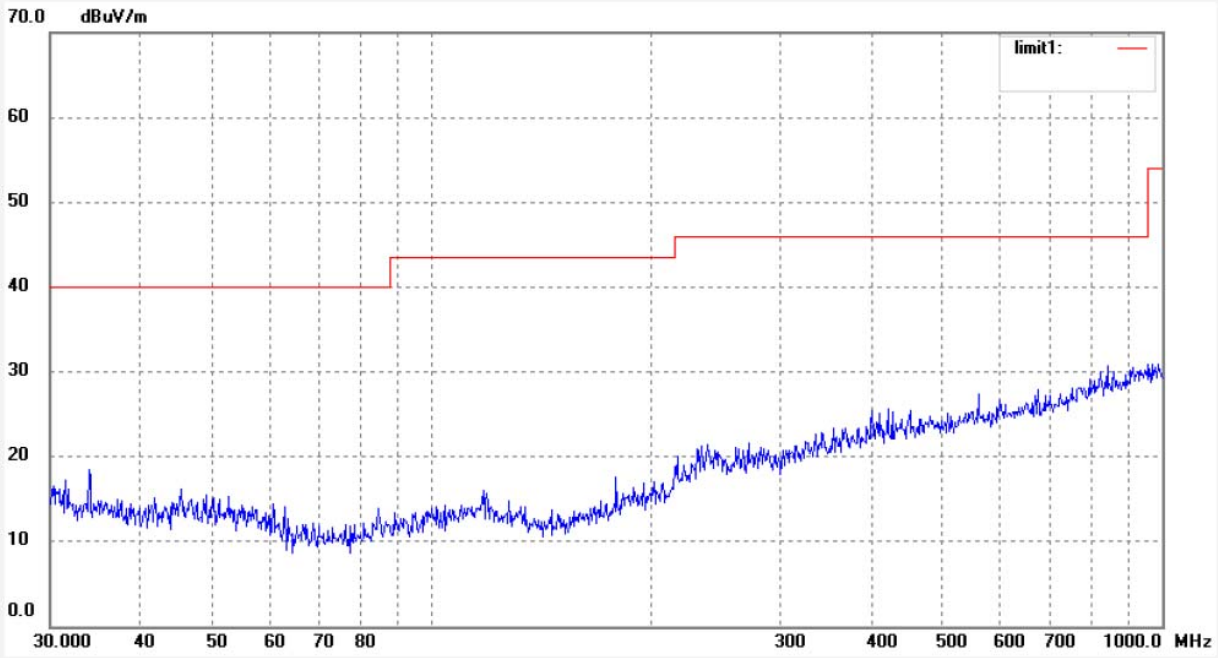
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #5011	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:12:14
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

ACCURATE TECHNOLOGY CO., LTD.
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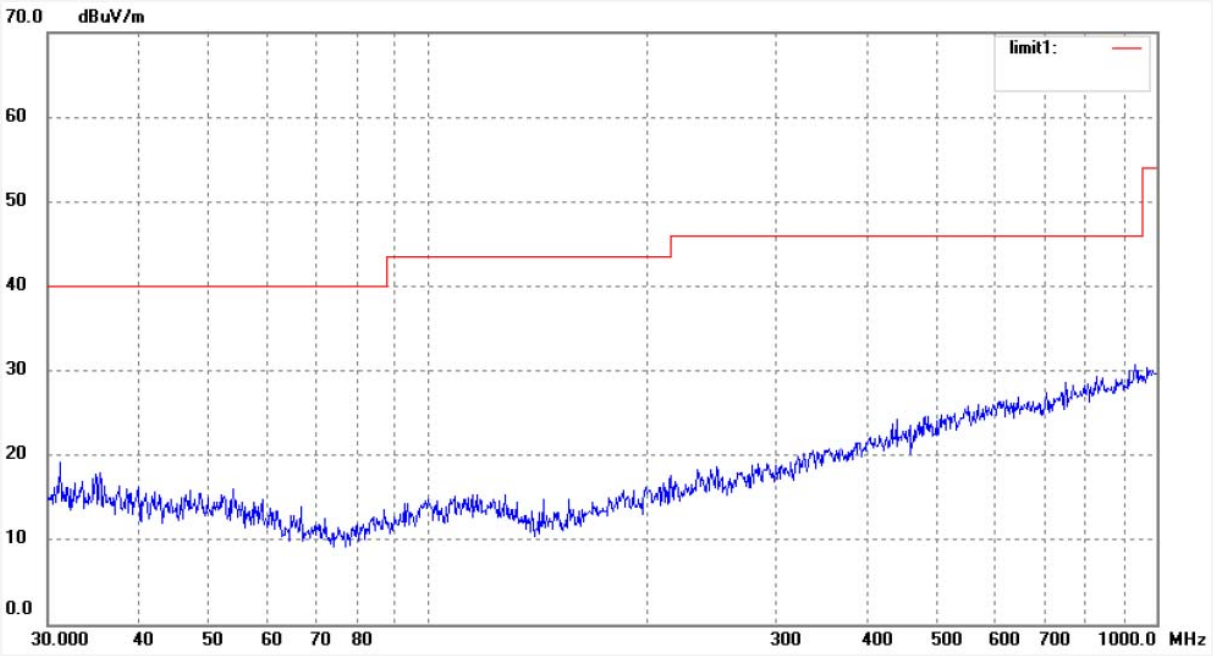
Science & Industry Park,Nanshan Shenzhen,P.R.China
Site: 2# Chamber
Tel:+86-0755-26503290
Fax:+86-0755-26503396

Job No.: STAR #5012	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:16:53
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

ACCURATE TECHNOLOGY CO., LTD.
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Site: 2# Chamber
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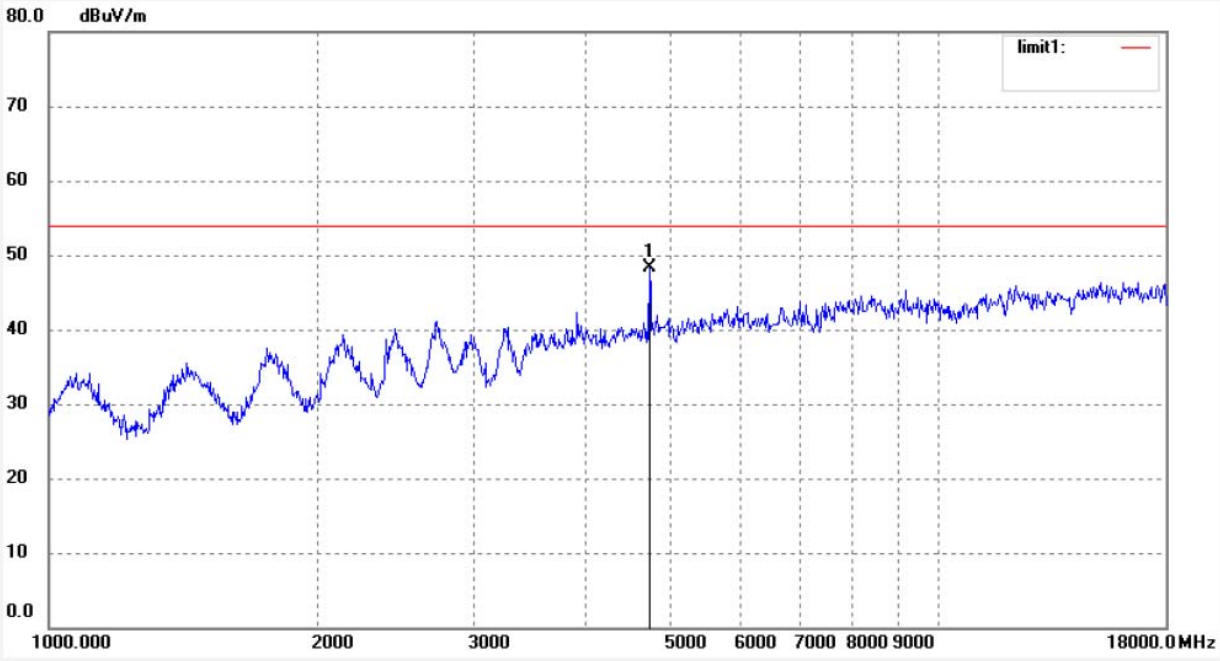
Fax:+86-0755-26503396

Job No.: STAR #5001	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:04:37
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.000	49.00	-0.71	48.29	54.00	-5.71	peak			

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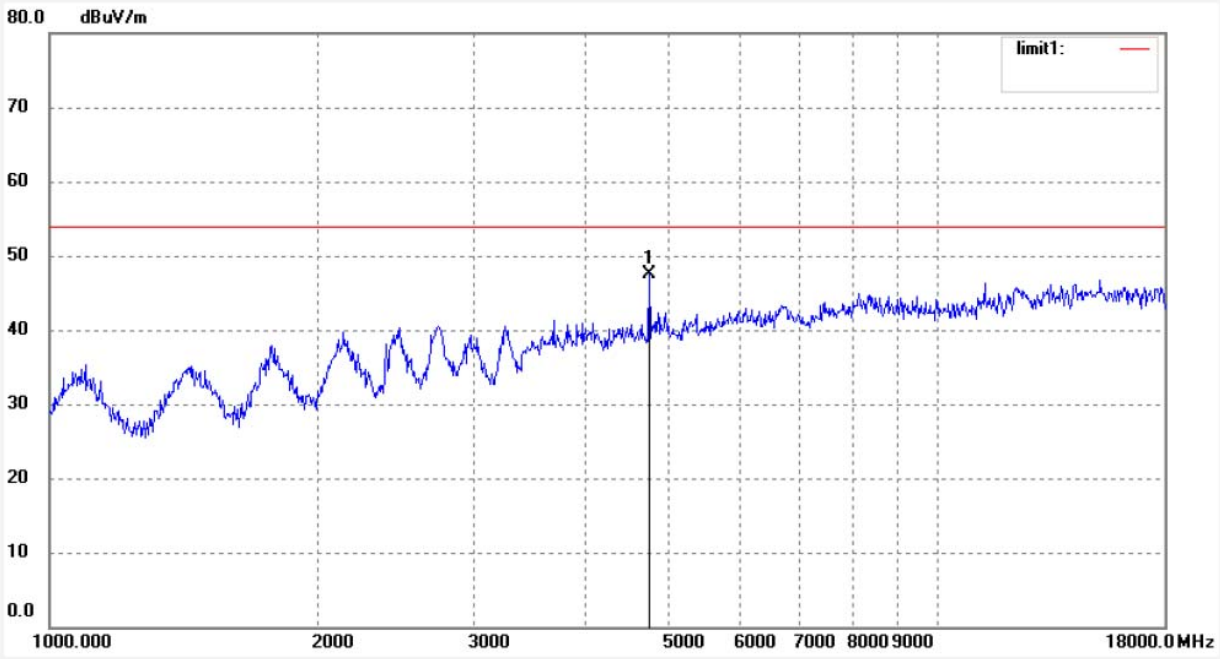
Job No.: STAR #5002	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:08:10
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2402MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4804.000	48.30	-0.71	47.59	54.00	-6.41	peak			

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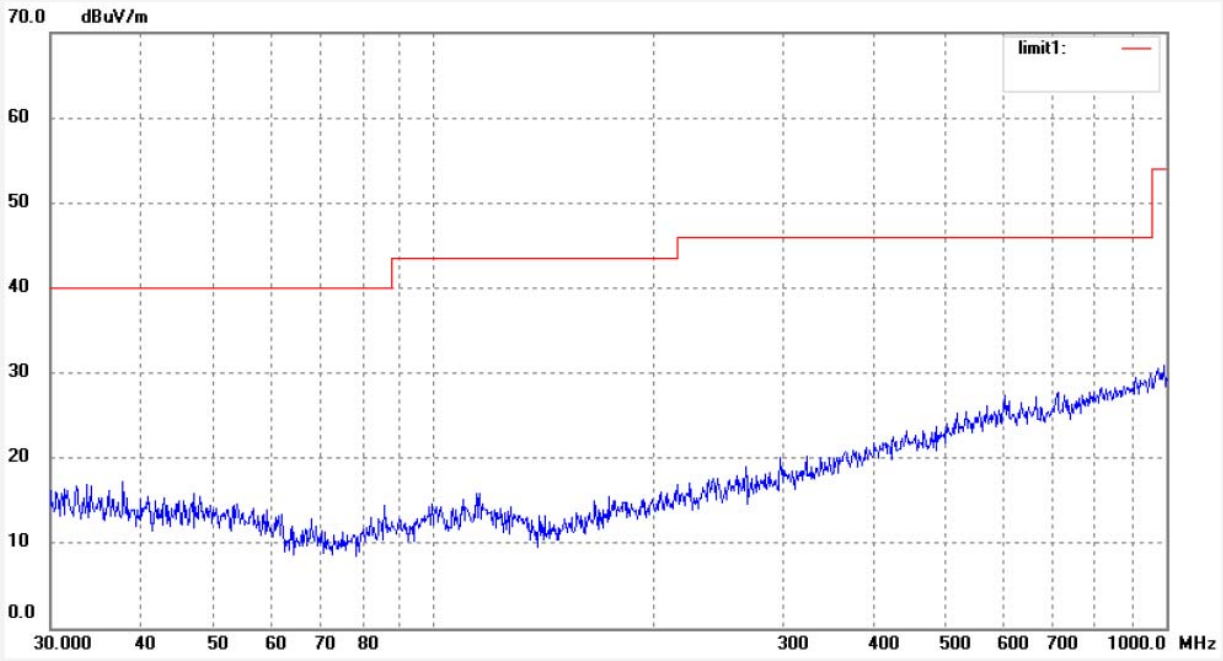
Job No.: STAR #5013	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:20:14
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

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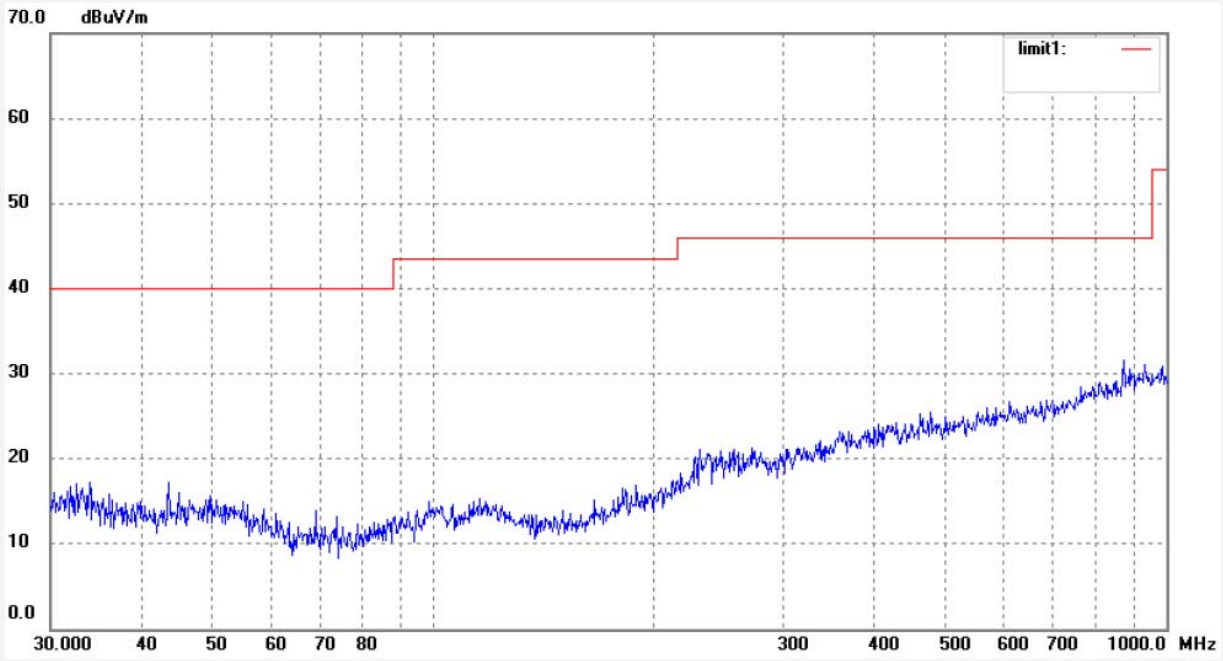
Job No.: STAR #5014	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:23:45
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

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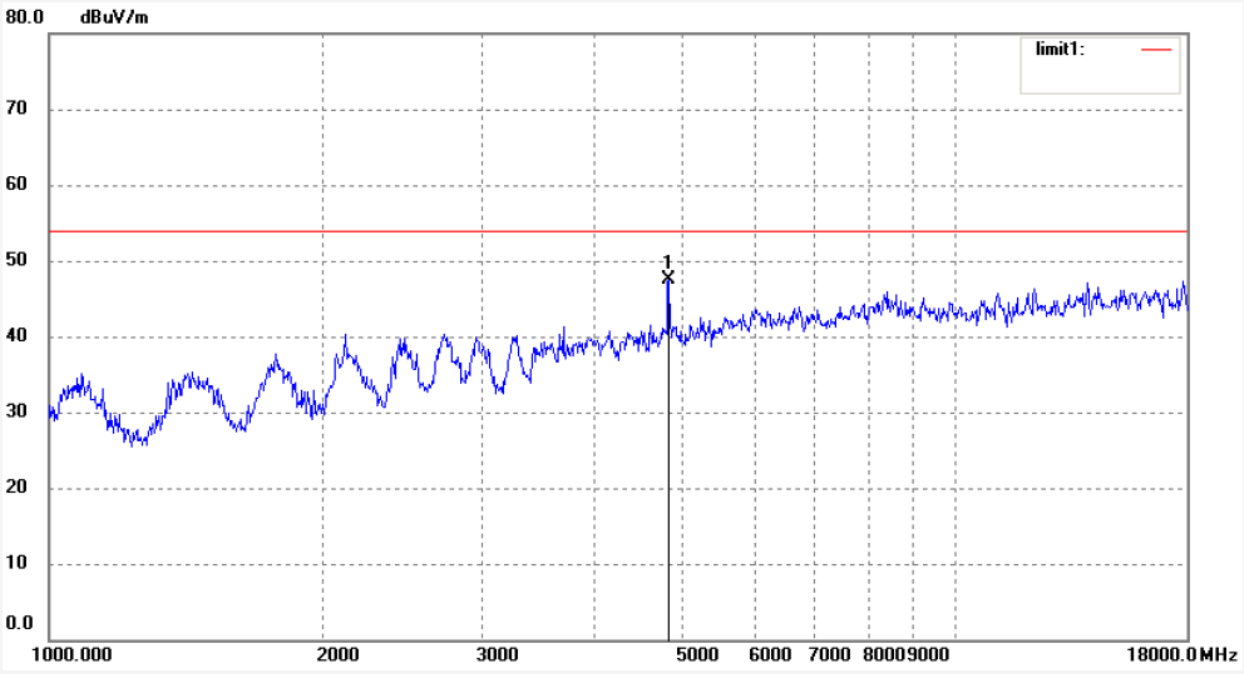
Job No.: STAR #5003	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:11:53
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.000	47.71	-0.15	47.56	54.00	-6.44	peak			

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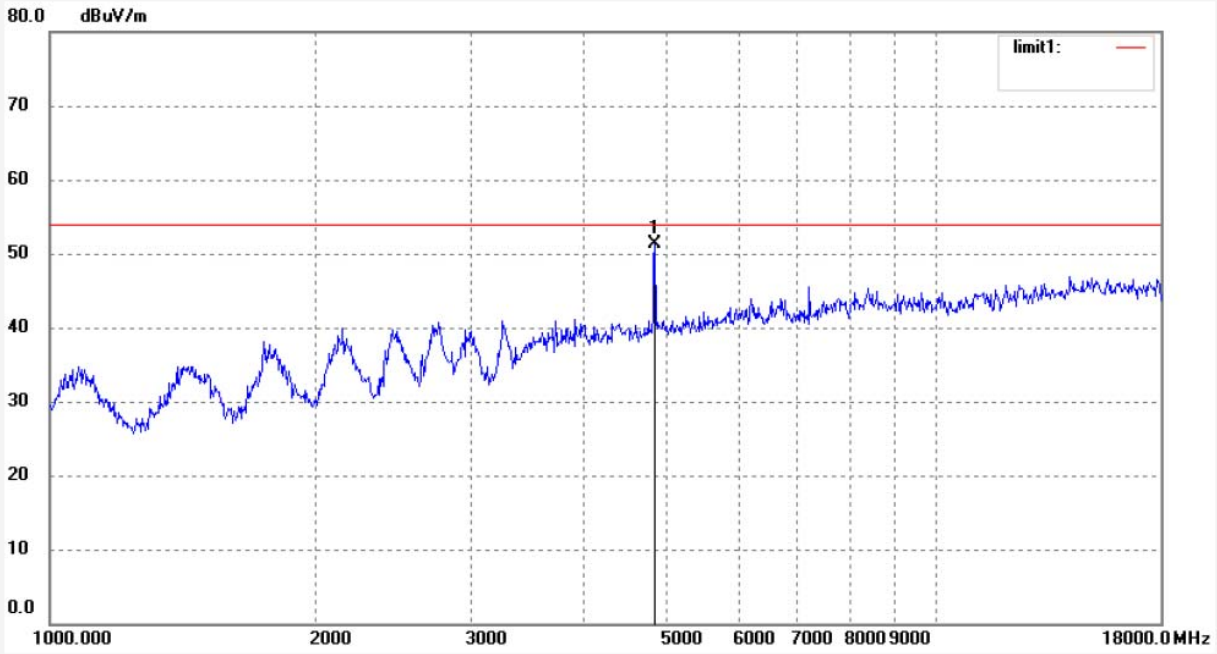
Job No.: STAR #5004	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:15:13
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2441MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4882.000	51.39	-0.15	51.24	54.00	-2.76	peak			

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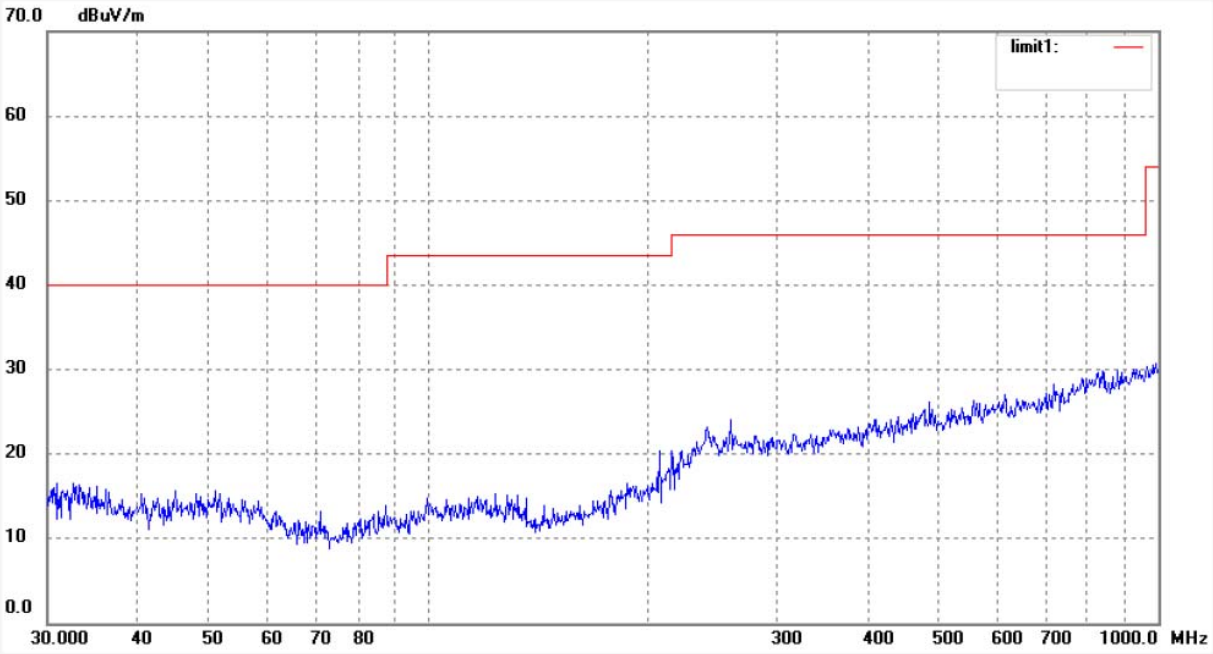
Job No.: STAR #5015	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:27:15
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

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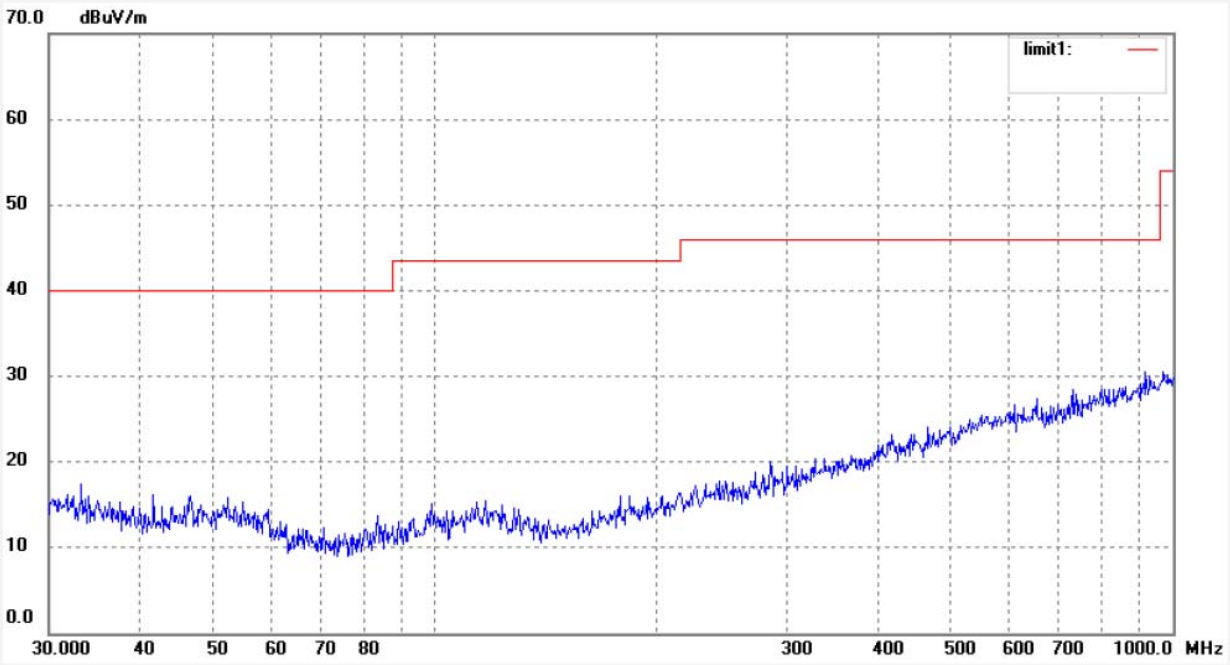
Job No.: STAR #5016	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:30:43
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



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

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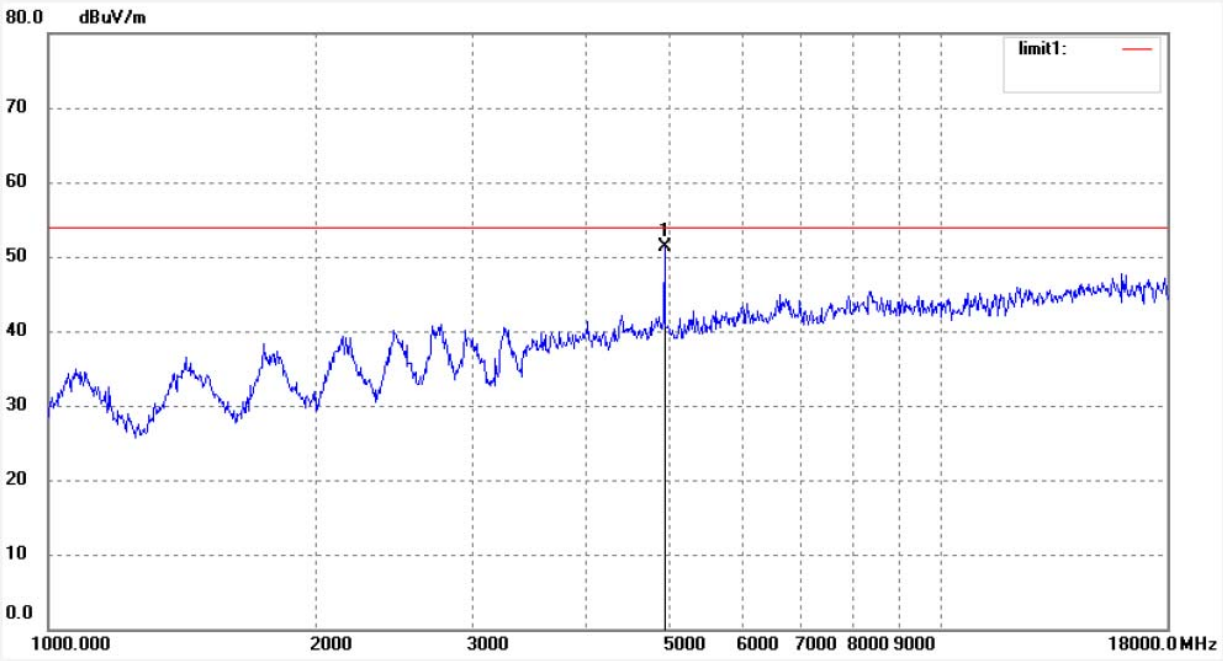
Job No.: STAR #5005	Polarization: Vertical
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:18:19
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4960.000	50.97	0.30	51.27	54.00	-2.73	peak			

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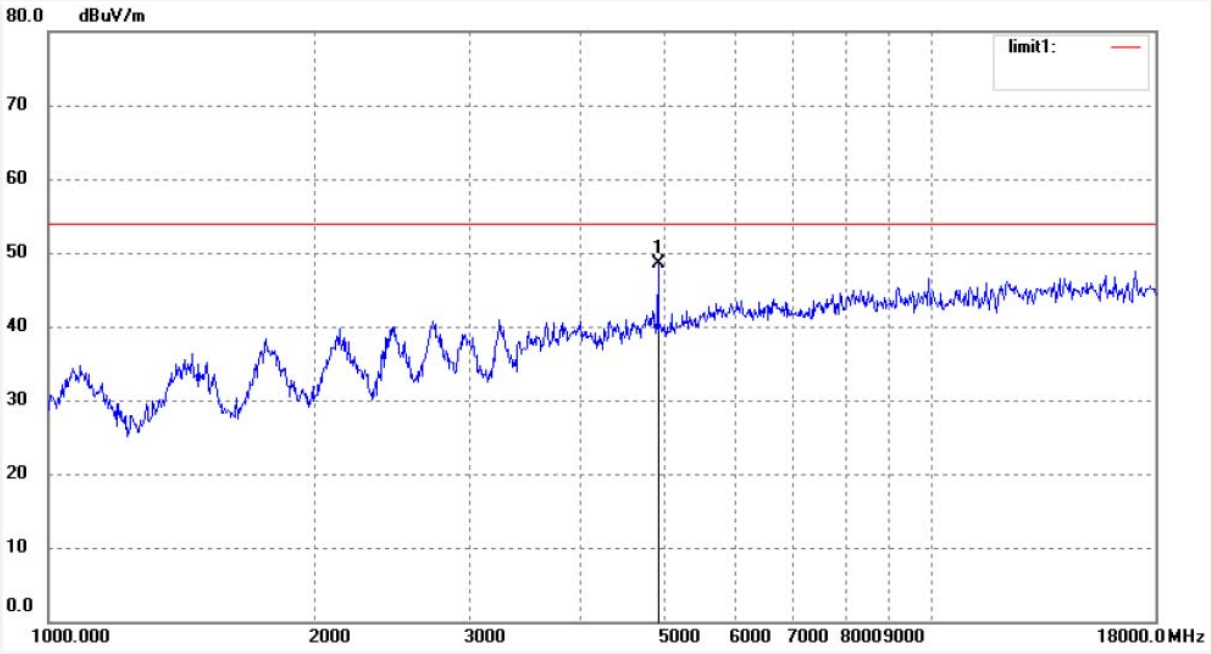
Job No.: STAR #5006	Polarization: Horizontal
Standard: FCC Class B 3M Radiated	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:22:37
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern Times	

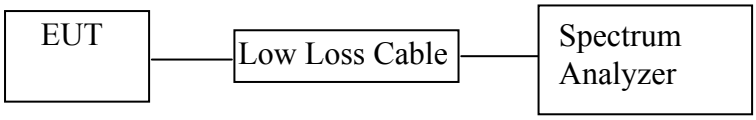
Note: Report No.:ATE20131724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	4960.000	48.30	0.30	48.60	54.00	-5.40	peak			

11. BAND EDGE COMPLIANCE TEST

11.1. Block Diagram of Test Setup



(EUT: Bluetooth 3.0 Keyboard)

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 m odulated intentional radiator is operating, the radio frequency power that is produced by the intenti onal radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the ba nd that contains the highest level of the desired power, based on either an RF conducte d or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power lim its. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as perm itted 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), m ust 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 em ission Measurement to m eet the com mission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

11.4. Operating Condition of EUT

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

11.4.2. Turn on the power of all equipment.

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

11.5.Test Procedure

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

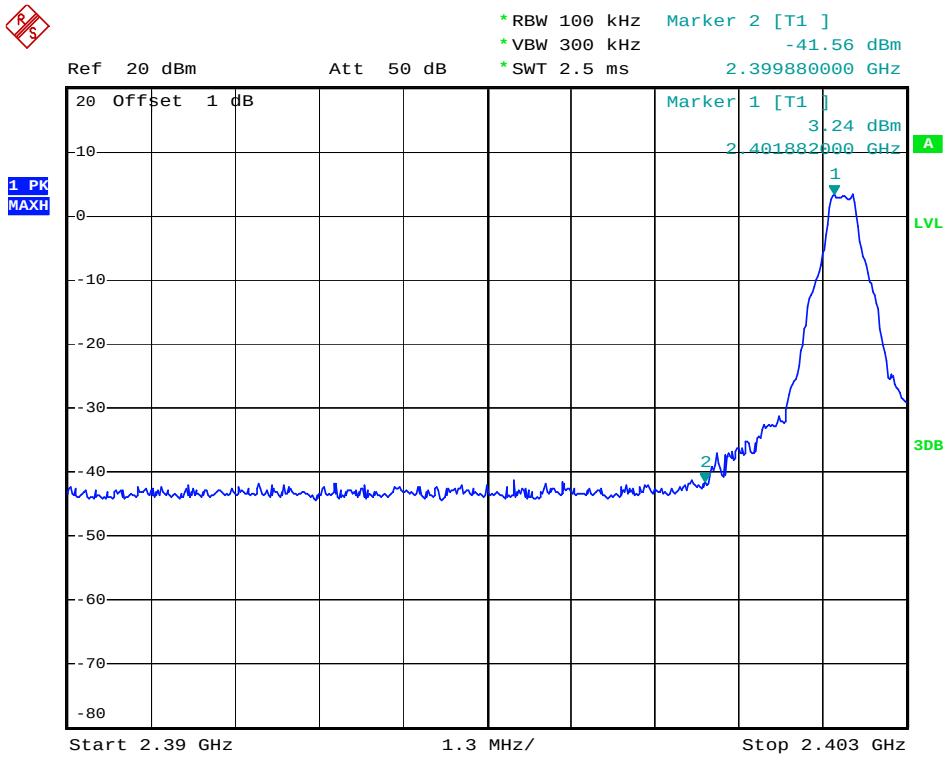
11.5.2.Set RBW of spectrum analyzer to 100 kHz and VBW to 300 kHz with convenient frequency span including 100 kHz bandwidth from band edge.

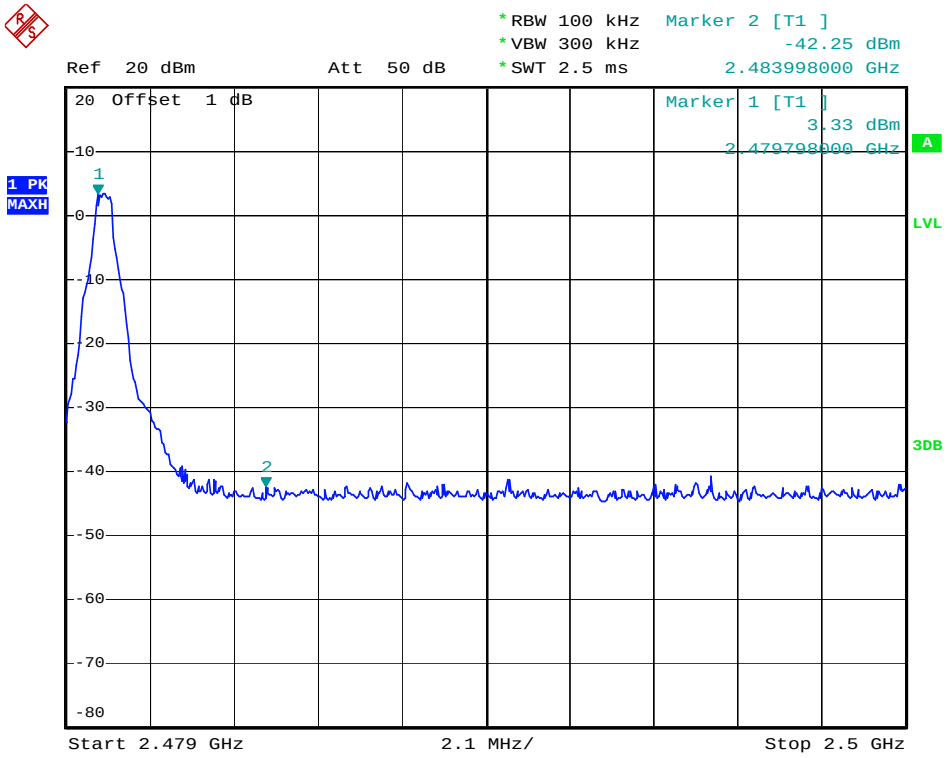
11.5.3.The band edges was measured and recorded.

11.6.Test Result

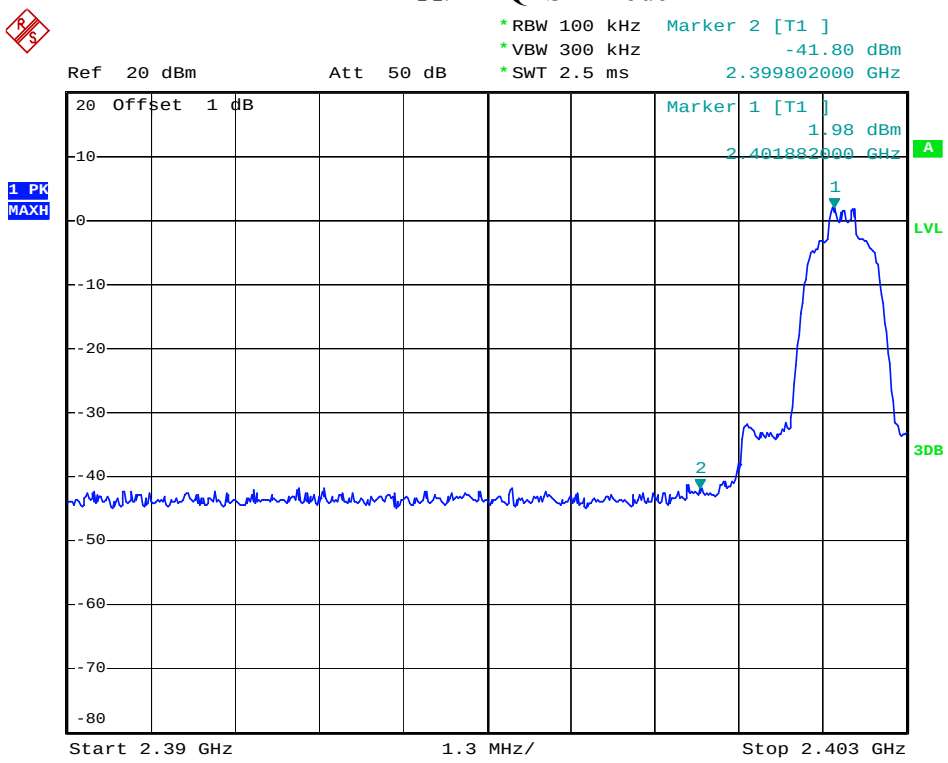
Frequency (MHz)	Result of Band Edge (dBc)	Limit of Band Edge (dBc)
GFSK		
2399.880	44.80	> 20dBc
2483.998	45.58	> 20dBc
Π/4-DQPSK Mode		
2399.802	43.79	> 20dBc
2484.838	44.09	> 20dBc
8QPSK		
2399.750	43.26	> 20dBc
2483.788	44.32	> 20dBc

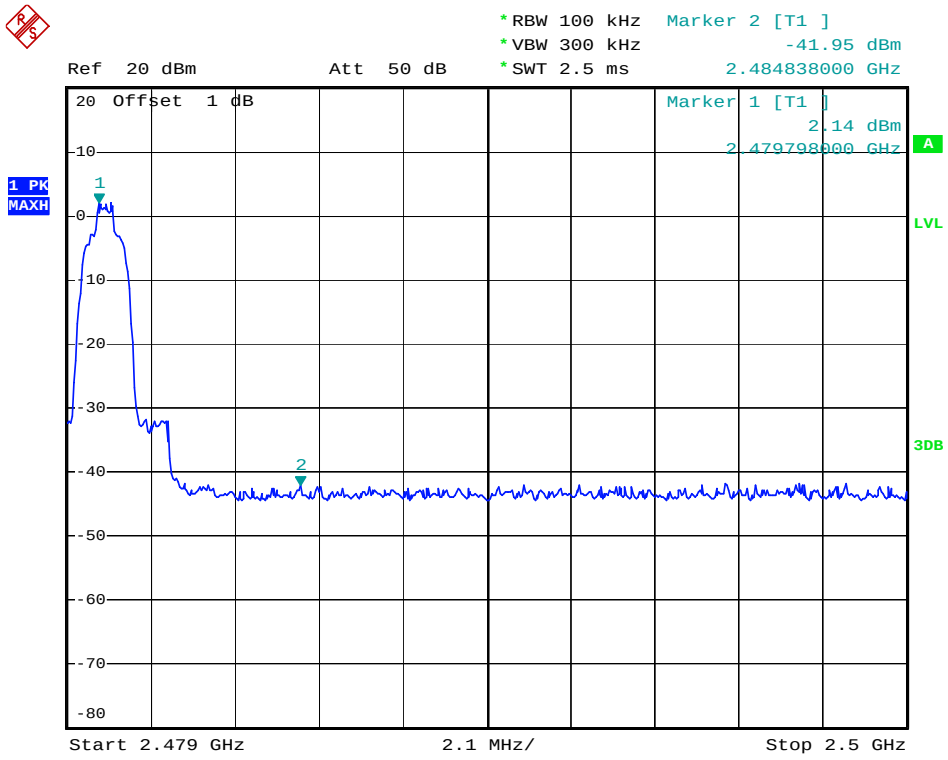
GFSK


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

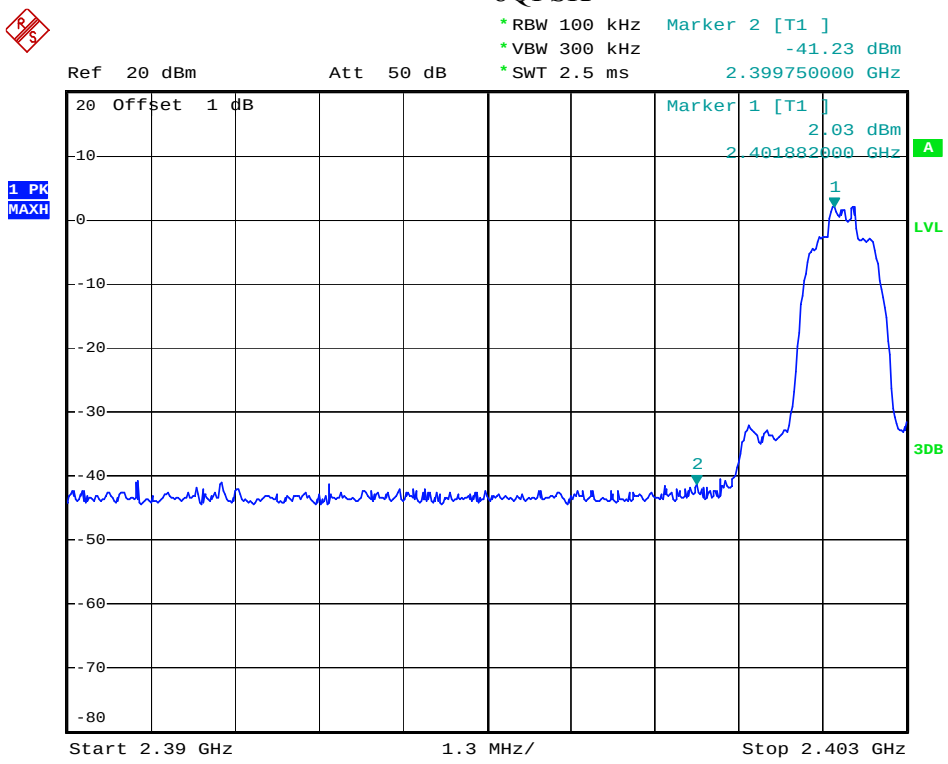

*RBW 100 kHz
*VBW 300 kHz
*SWT 2.5 ms
Marker 2 [T1]
-42.25 dBm
2.483998000 GHz
Ref 20 dBm
Att 50 dB
20 Offset 1 dB
Marker 1 [T1]
3.33 dBm
2.479798000 GHz
1 PK
MAXH
A
LVL
3DB
10
0
-10
-20
-30
-40
-50
-60
-70
-80
Start 2.479 GHz
2.1 MHz/
Stop 2.5 GHz

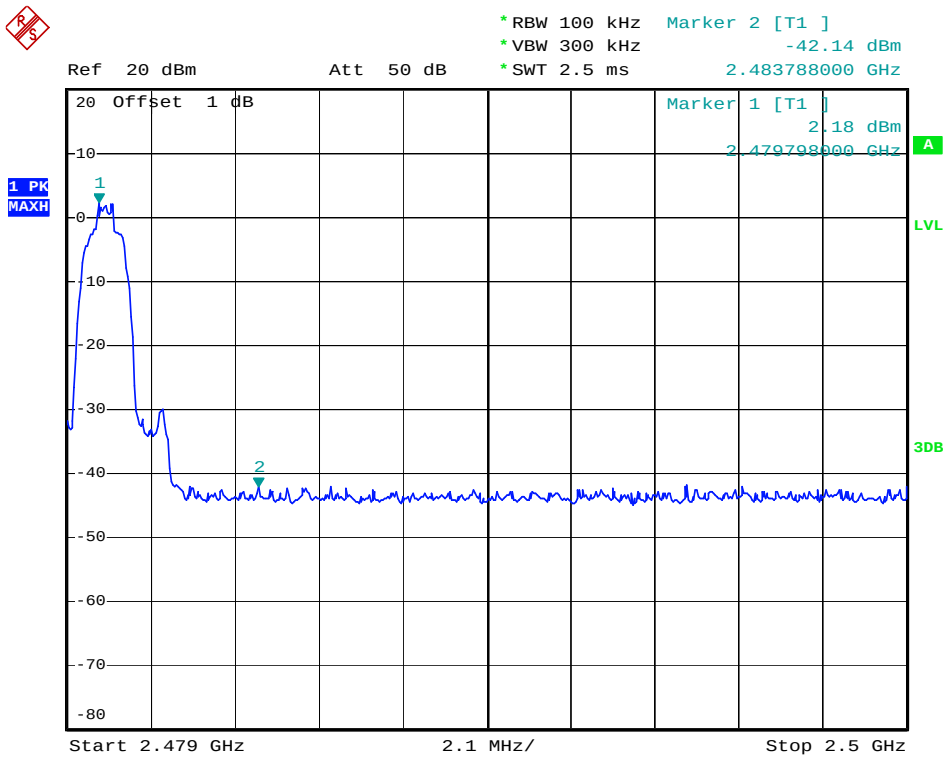
Π/4-DQPSK Mode




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

8QPSK


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


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

Radiated Band Edge Result

Note:

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

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

Non-hopping mode

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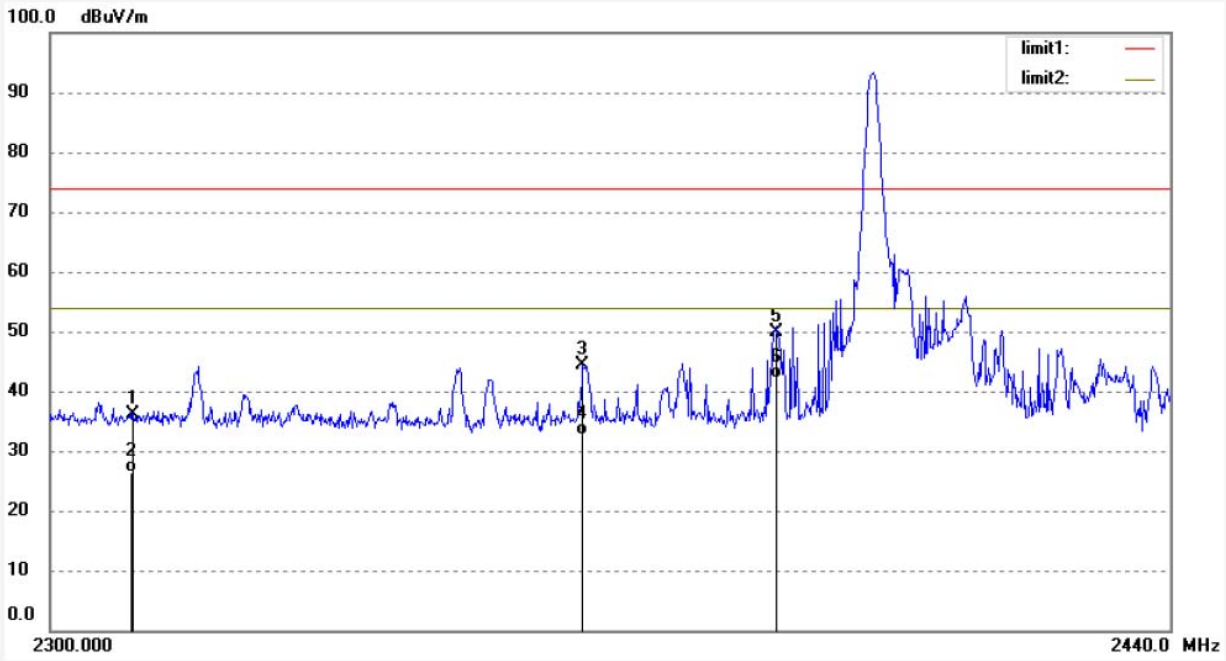
Job No.: STAR #5010
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Bluetooth 3.0 Keyboard
Mode: TX 2402MHz(GFSK)
Model: ET-3788
Manufacturer: Eastern

Polarization: Horizontal
Power Source: DC 3V
Date: 2013/08/12
Time: 15:08:58
Engineer Signature:
Distance: 3m

Note: Report No.:ATE201231724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	43.84	-7.81	36.03	74.00	-37.97	peak			
2	2310.000	34.28	-7.81	26.47	54.00	-27.53	AVG			
3	2365.602	51.96	-7.69	44.27	74.00	-29.73	peak			
4	2365.602	40.28	-7.69	32.59	54.00	-21.41	AVG			
5	2390.000	57.45	-7.53	49.92	74.00	-24.08	peak			
6	2390.000	49.70	-7.53	42.17	54.00	-11.83	AVG			

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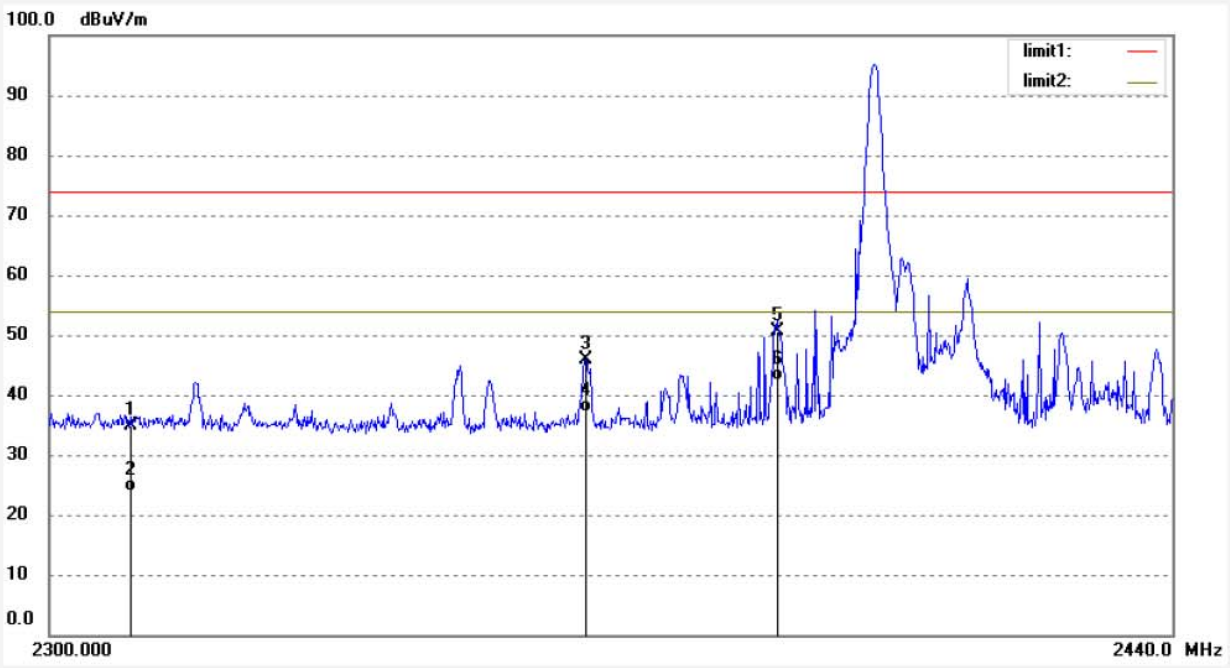
Job No.: STAR #5009	Polarization: Vertical
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:07:35
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2402MHz(GFSK)	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern	

Note: Report No.:ATE201231724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	42.74	-7.81	34.93	74.00	-39.07	peak			
2	2310.000	31.58	-7.81	23.77	54.00	-30.23	AVG			
3	2365.882	53.59	-7.69	45.90	74.00	-28.10	peak			
4	2365.882	44.87	-7.69	37.18	54.00	-16.82	AVG			
5	2390.000	58.23	-7.53	50.70	74.00	-23.30	peak			
6	2390.000	50.00	-7.53	42.47	54.00	-11.53	AVG			

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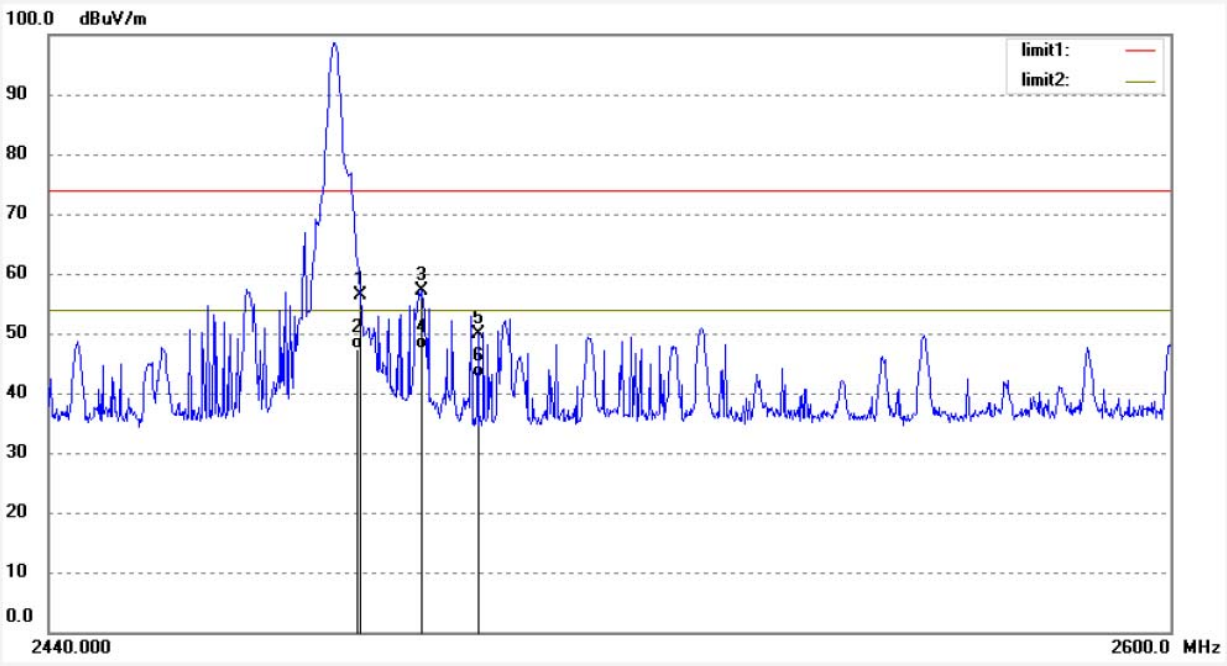
Job No.: STAR #5008	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 15:01:01
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz(GFSK)	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern	

Note: Report No.:ATE201231724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	63.76	-7.37	56.39	74.00	-17.61	peak			
2	2483.500	54.73	-7.37	47.36	54.00	-6.64	AVG			
3	2492.102	64.63	-7.39	57.24	74.00	-16.76	peak			
4	2492.102	54.70	-7.39	47.31	54.00	-6.69	AVG			
5	2500.000	57.25	-7.40	49.85	74.00	-24.15	peak			
6	2500.000	50.04	-7.40	42.64	54.00	-11.36	AVG			

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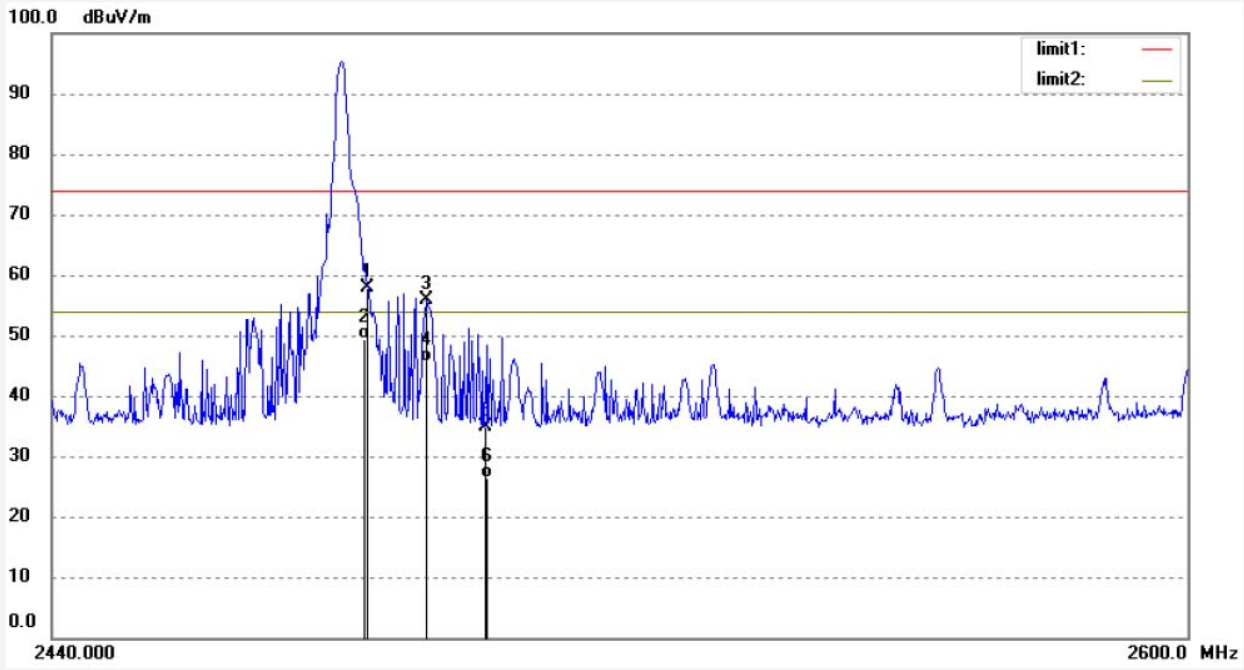
Fax:+86-0755-26503396

Job No.: STAR #5007	Polarization: Horizontal
Standard: FCC PK	Power Source: DC 3V
Test item: Radiation Test	Date: 2013/08/12
Temp.(C)/Hum.(%) 23 C / 48 %	Time: 14:59:42
EUT: Bluetooth 3.0 Keyboard	Engineer Signature:
Mode: TX 2480MHz(GFSK)	Distance: 3m
Model: ET-3788	
Manufacturer: Eastern	

Note: Report No.:ATE201231724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2483.500	65.37	-7.37	58.00	74.00	-16.00	peak			
2	2483.500	56.70	-7.37	49.33	54.00	-4.67	AVG			
3	2491.785	63.16	-7.39	55.77	74.00	-18.23	peak			
4	2491.785	53.00	-7.39	45.61	54.00	-8.39	AVG			
5	2500.000	42.40	-7.40	35.00	74.00	-39.00	peak			
6	2500.000	33.86	-7.40	26.46	54.00	-27.54	AVG			

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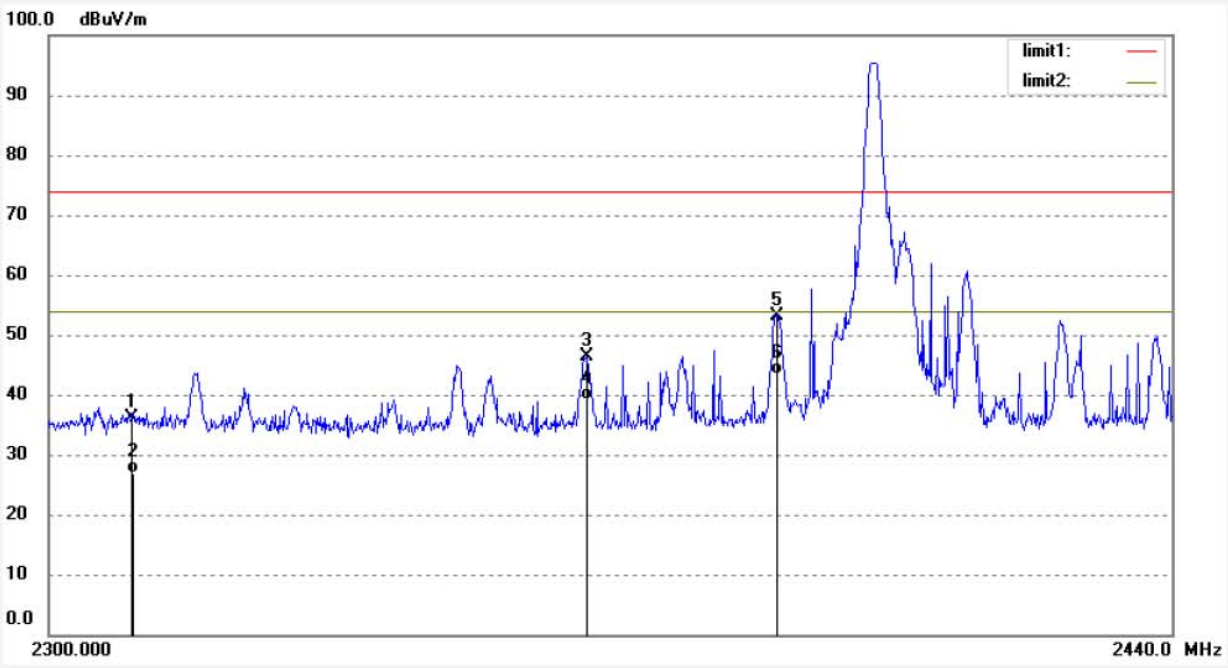
Job No.: STAR #5065
Standard: FCC PK
Test item: Radiation Test
Temp.(C)/Hum.(%) 23 C / 48 %
EUT: Bluetooth 3.0 Keyboard
Mode: TX 2402MHz(PI/4DQPSK)
Model: ET-3788
Manufacturer: Eastern Times

Polarization: Vertical
Power Source: DC 3V
Date: 2013/08/12
Time: 15:53:46
Engineer Signature:
Distance: 3m

Note: Report No.:ATE201231724



No.	Freq. (MHz)	Reading (dBuV/m)	Factor (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Degree (deg.)	Remark
1	2310.000	43.85	-7.81	36.04	74.00	-37.96	peak			
2	2310.000	34.73	-7.81	26.92	54.00	-27.08	AVG			
3	2366.022	54.02	-7.69	46.33	74.00	-27.67	peak			
4	2366.022	46.70	-7.69	39.01	54.00	-14.99	AVG			
5	2390.000	60.55	-7.53	53.02	74.00	-20.98	peak			
6	2390.000	50.99	-7.53	43.46	54.00	-10.54	AVG			