Report No.:SZ11020021E03

47 CFR PART 15 C - BLUETOOTH

TEST REPORT

Issued to

TCT Mobile Limited

For

Bluetooth headset

Model Name:	one touch BH35
Brand Name:	Alcatel one touch
FCC ID:	RAD905
IC ID:	9238A-9002
Test Rule:	47 CFR Part 15 Subpart C RSS-GEN and RSS-210
Test date:	March 12, 2011 – March 18, 2011

by

Shenzhen Morlab Communications Technology Co., Ltd.

Tested by Wang Guoqiang	*Approved by* Shu Luan	*Review by* Huangpl
Wang Guoqiang	Shu Luan	Huang Pulong
Date 2011.03.23	*Date* 2011.3.23	*Date* 2011.03.23

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Change History		
Issue	Date	Reason for change
1.0	March 21, 2011	First edition

1. GENERAL INFORMATION

1.1 EUT Description

EUT Type ..... :	Bluetooth headset
Serial No. ..... :	(n.a, marked #1 by test site)
Hardware Version ..... :	V1.2
Software Version ..... :	V1.0
Applicant ..... :	TCT Mobile Limited 5F, E building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.
Manufacturer ..... :	Sunitec Enterprise Co., LTD. No.2,Qilin Road 2,Run Tang ind,Dan-keng Villange Fu Ming Community, Guan-Lan town, BaoAn District, Shenzhen Guangdong China
Frequency Range ..... :	The frequency range used is 2402MHz - 2480MHz (79 channels, at intervals of 1MHz); The frequency block is 2400MHz to 2483.5MHz.
Modulation Type..... :	Bluetooth: FHSS (GFSK(1Mbps), π /4-DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))
Power Supply ..... :	Battery Model Name: SL351223 Brand name: BYD Capacitance: 55mAh Rated voltage: 3.8V Manufacturer: BYD Manufacturer Address: No.3001, Hengping Road, Pingshan, Longgang, Shenzhen, P.R.China

Note 1: The EUT is a Bluetooth headset, it contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth Module is F(MHz)=2402+1*n (0<=n<=78). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 39 (2441MHz) and 78 (2480MHz).

Note 2: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

1.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C and RSS-210 (Bluetooth, 2.4GHz ISM band radiators) for the EUT FCC/IC ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-09 Edition)	Radio Frequency Devices
2	RSS-210: Issue 8, December 2010	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

Test detailed items/section required by FCC/IC rules and results are as below:

No.	Section in CFR 47	Section in RSS-GEN or RSS-210	Description	Result
1	15.247(a)	A8.1 (4)	Number of Hopping Frequency	PASS
2	15.247(b)	A8.4 (2)	Peak Output Power	PASS
3	15.247(a)	A8.1 (1)	20dB Bandwidth	PASS
4	15.247(a)	A8.1 (2)	Carrier Frequency Separation	PASS
5	15.247(a)	A8.1 (4)	Time of Occupancy (Dwell time)	PASS
6	15.247(c)	A8.5	Conducted Spurious Emission	PASS
7	15.247(c)	A8.5	Band Edge	PASS
8	15.207	7.2.2	Conducted Emission	N.A
9	15.209 15.247(c)	A8.5	Radiated Emission	PASS

NOTE:

The tests were performed according to the method of measurements prescribed in DA-00-705.

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L3572.

All measurement facilities used to collect the measurement data are located at 3/F, Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen, 518055 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22; the FCC registration number is 741109.

1.3.2 Test Environment Conditions

During the measurement, the environmental conditions were within the listed ranges:

Temperature (°C):	15 - 35
Relative Humidity (%):	30 -60
Atmospheric Pressure (kPa):	86-106

2. 47 CFR PART 15C REQUIREMENTS

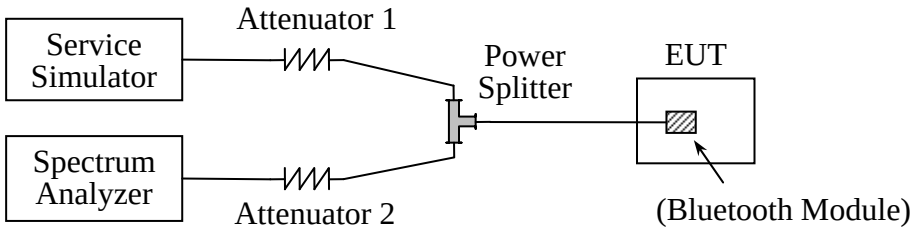
2.1 Number of Hopping Frequency

2.1.1 Requirement

According to FCC §15.247(a)(1)(iii) and RSS-210 A8.1 (4), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 75 hopping frequencies.

2.1.2 Test Description

A. Test Setup:



The Bluetooth Module of the EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the Bluetooth Service Simulator (SS) with Attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. During the measurement, the Bluetooth Module of the EUT is activated and controlled by the SS, and is set to operate under test mode transmitting 339 bytes DH5 packages at maximum power.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
Service Simulator	Agilent	E5515C	GB43130131	2010.09
Spectrum Analyzer	Agilent	E7405A	US44210471	2010.09
Power Splitter	Weinschel	1506A	NW521	(n.a.)
Attenuator 1	Resnet	20dB	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)

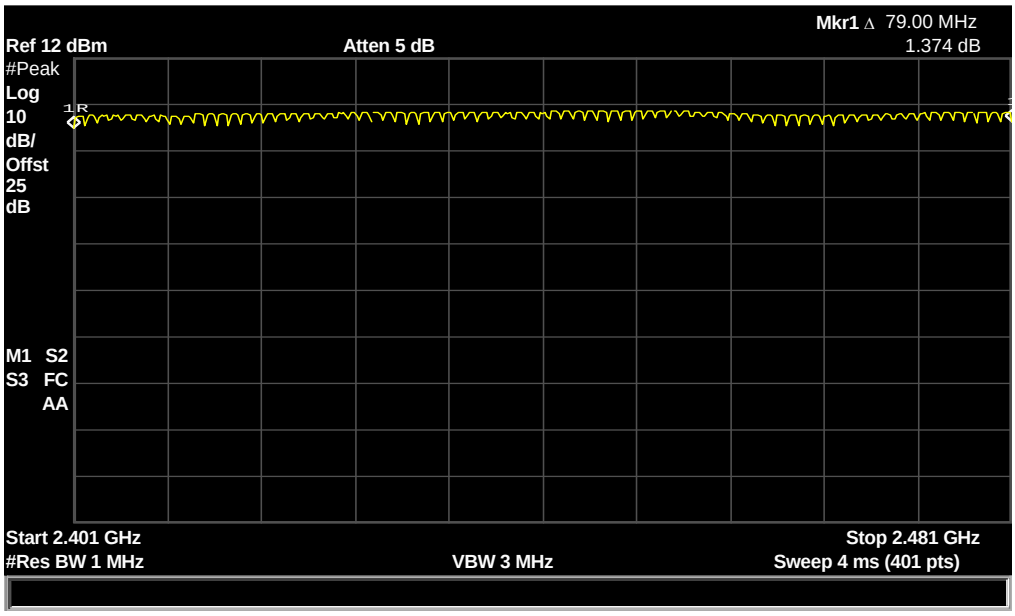
2.1.3 Test Result

The Bluetooth Module operates at hopping-on test mode; the frequencies number employed is counted to verify the Module's using the number of hopping frequency.

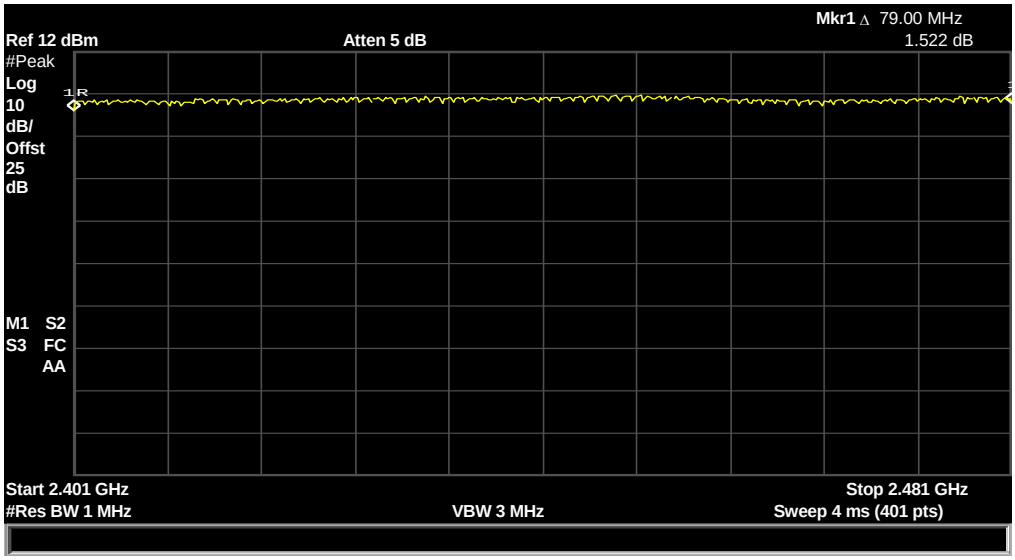
A. Test Verdict:

Test Mode	Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
GFSK	2400 - 2483.5	79	75	Plot A	PASS
π/4-DQPSK	2400 - 2483.5	79	75	Plot B	PASS
8-DPSK	2400 - 2483.5	79	75	Plot C	PASS

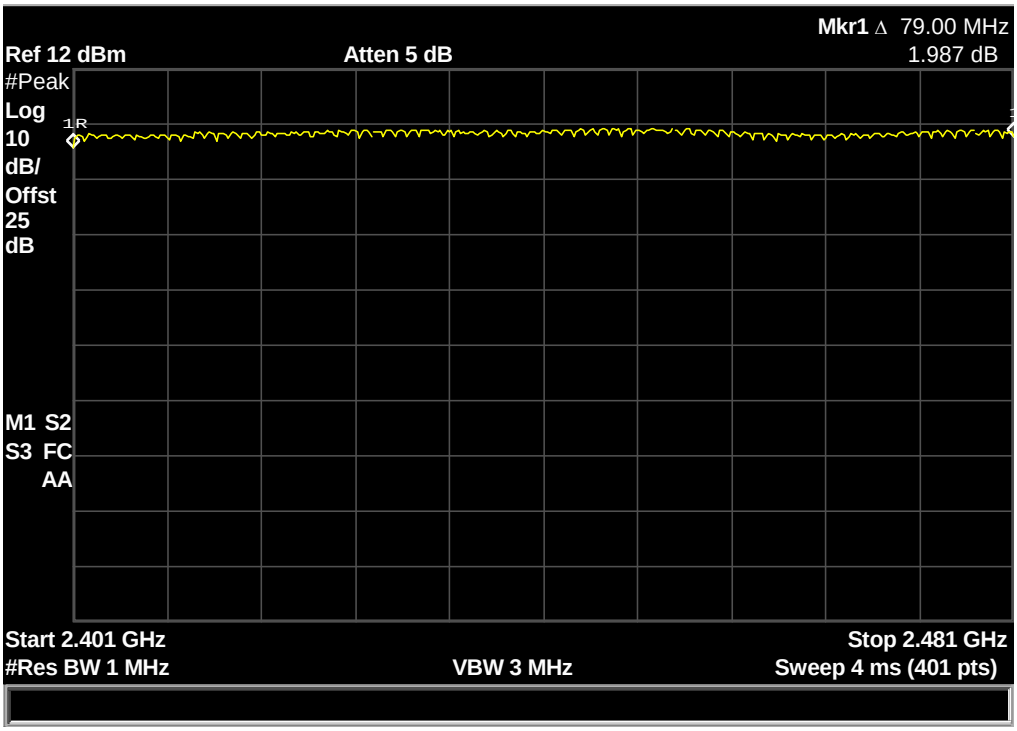
B. Test Plot:



(Plot A: GFSK)



(Plot B: π/4-DQPSK)


Mkr1 Δ 79.00 MHz
1.987 dB
Ref 12 dBm
Atten 5 dB
#Peak
Log
10
dB/
Offst
25
dB
1R
M1 S2
S3 FC
AA
Start 2.401 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 2.481 GHz
Sweep 4 ms (401 pts)

(Plot C: 8- DPSK)

2.2 Peak Output Power

2.2.1 Requirement

According to FCC §15.247(b)(1) and RSS-210 A8.4 (2), for frequency hopping systems that operates in the 2400MHz to 2483.5MHz band employing at least 75 hopping channels, the maximum peak output power of the intentional radiator shall not exceed 1Watt. For all other frequency hopping systems in the 2400MHz to 2483.5MHz band, it is 0.125Watts.

2.2.2 Test Description

See section 2.1.2 of this report.

2.2.3 Test Result

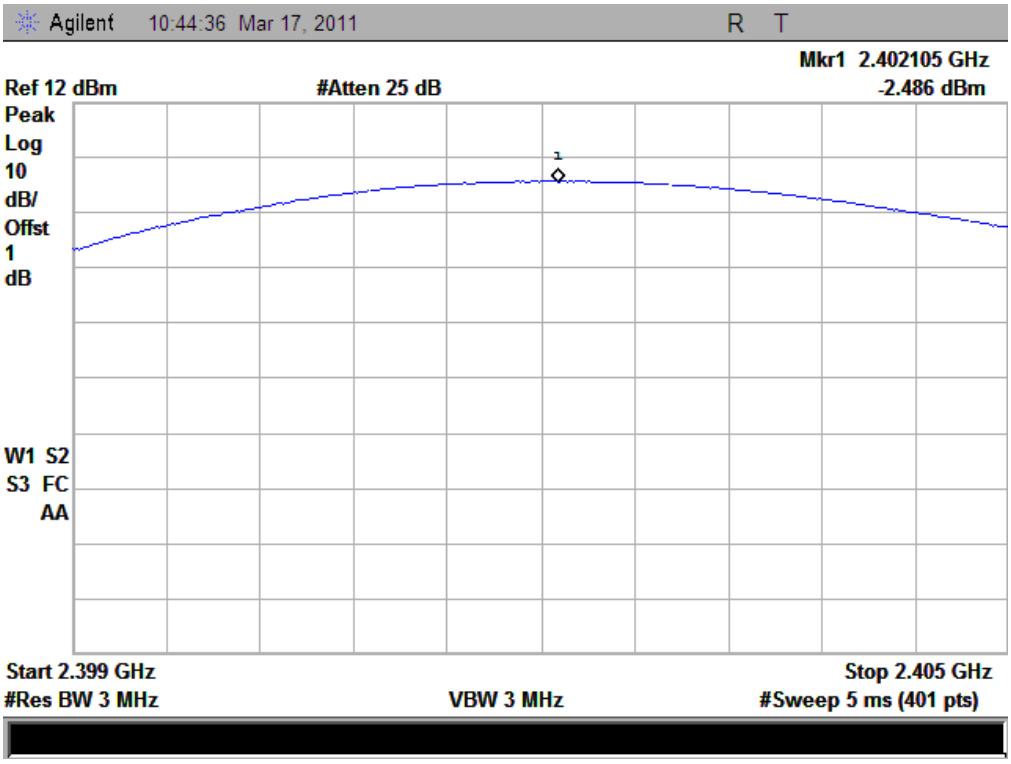
The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

A. Test Verdict:

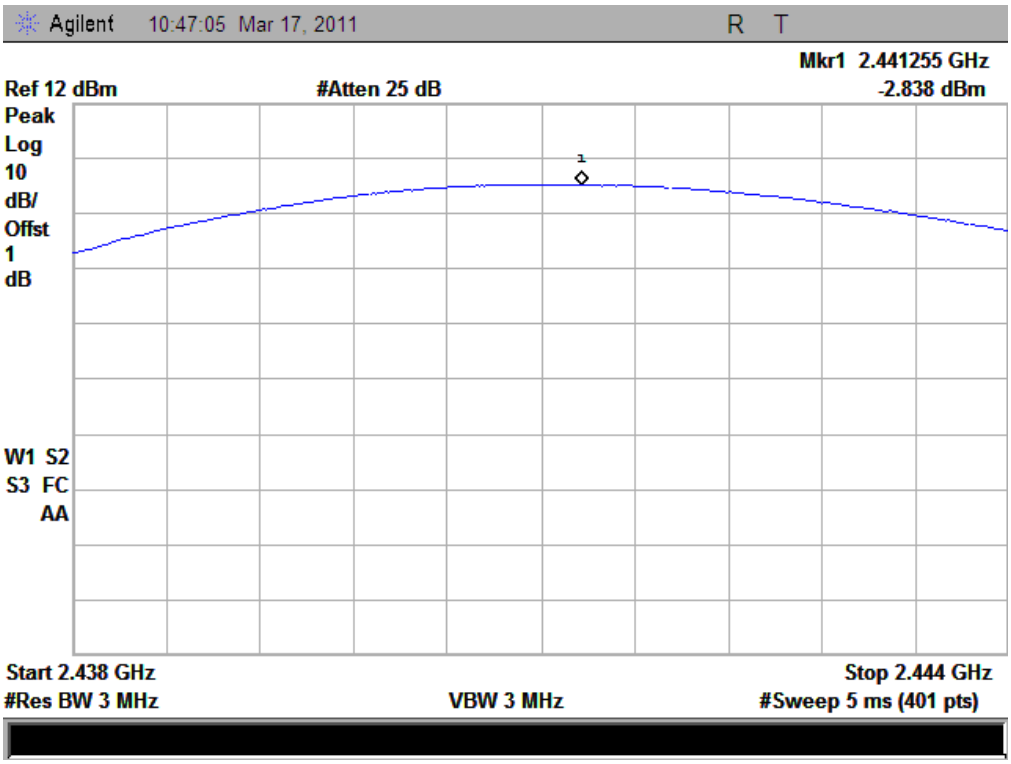
GFSK Mode

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	-2.486	0.000564	Plot A	30	1	PASS
39	2441	-2.838	0.00052	Plot B			PASS
78	2480	-3.82	0.000415	Plot C			PASS

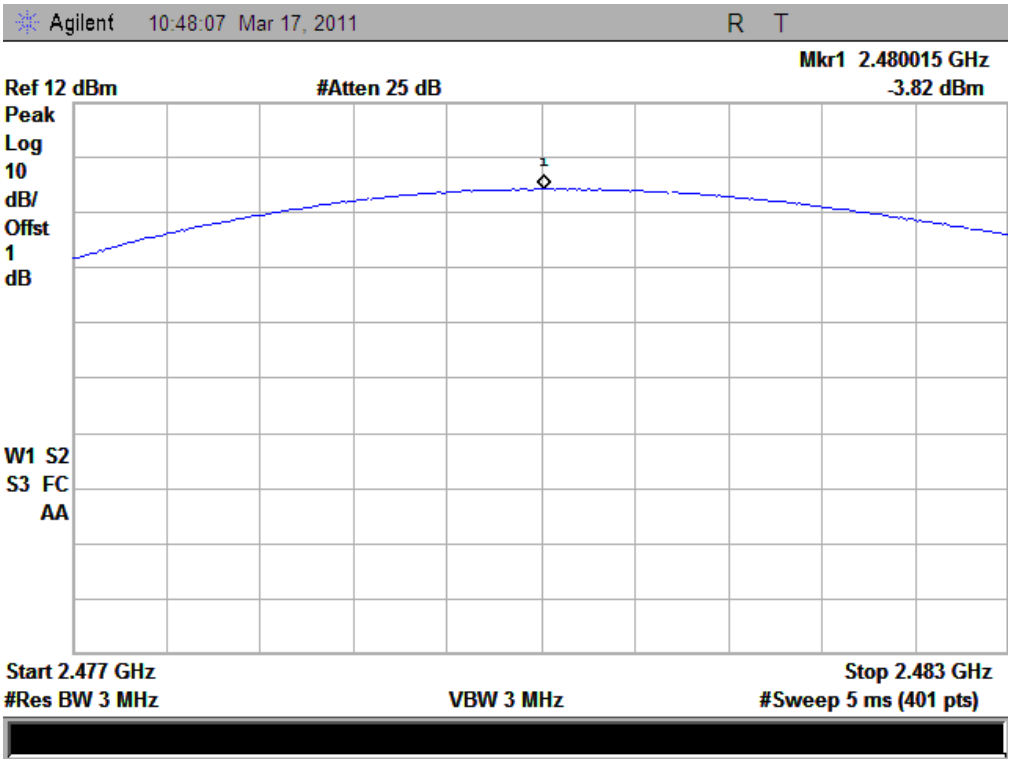
B. Test Plot:



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



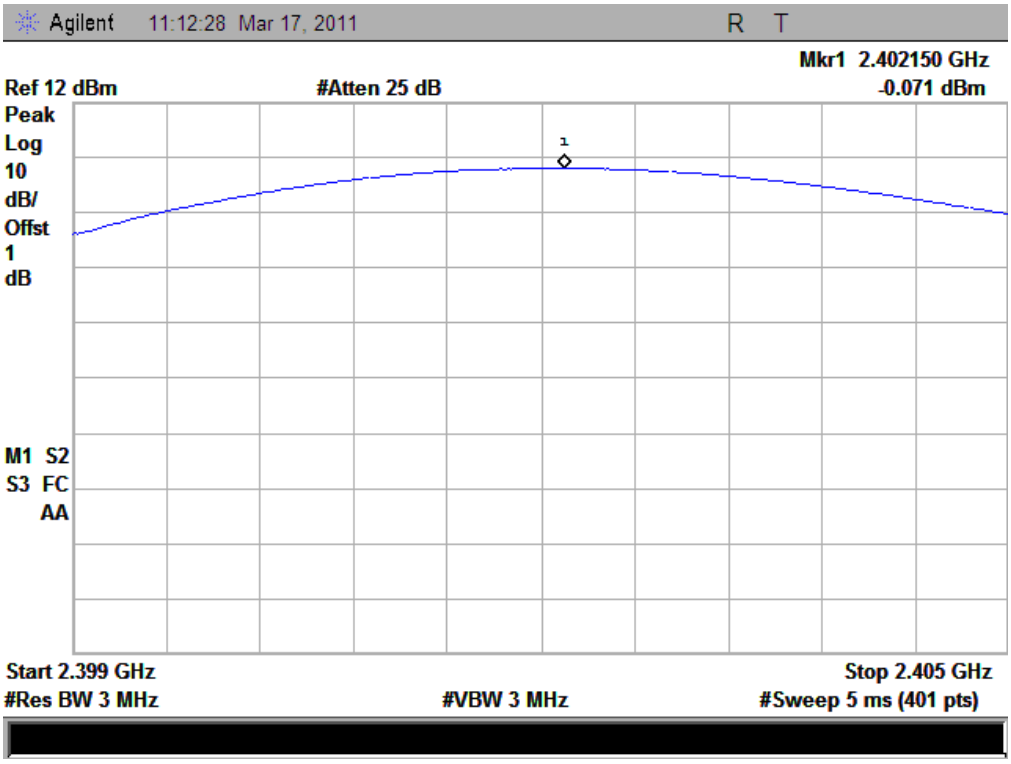
(Plot C: Channel = 2480)

C. Test Verdict:

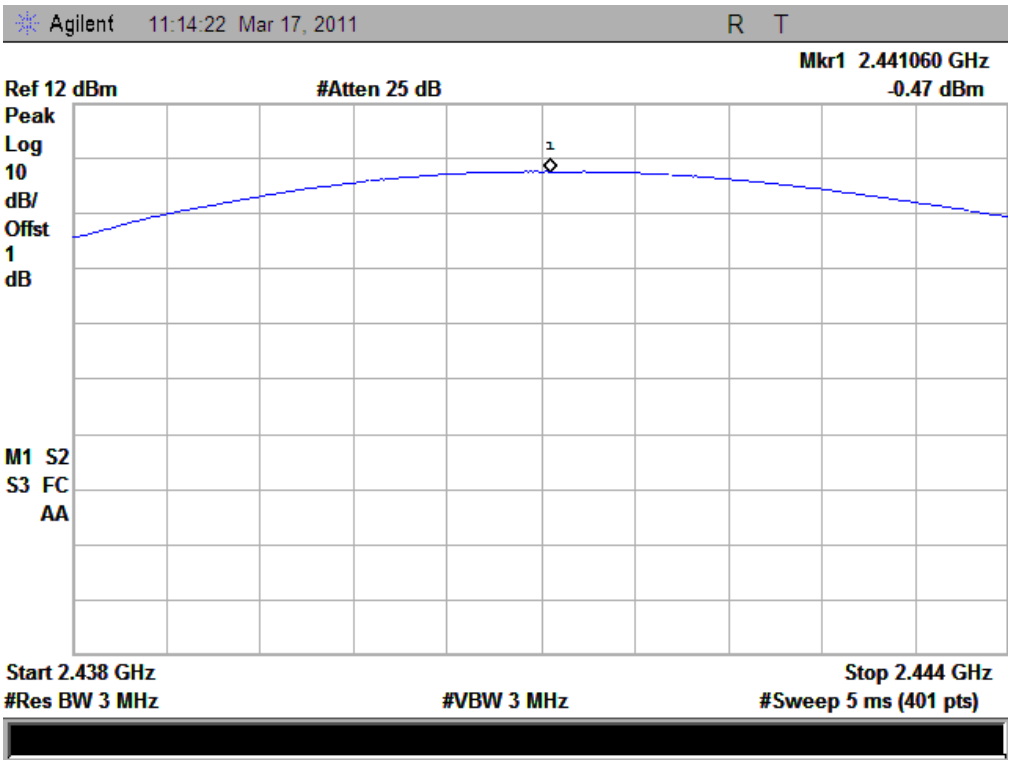
π/4-DQPSK Mode

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	-0.071	0.000984	Plot D	30	1	PASS
39	2441	-0.47	0.000897	Plot E			PASS
78	2480	-1.609	0.00069	Plot F			PASS

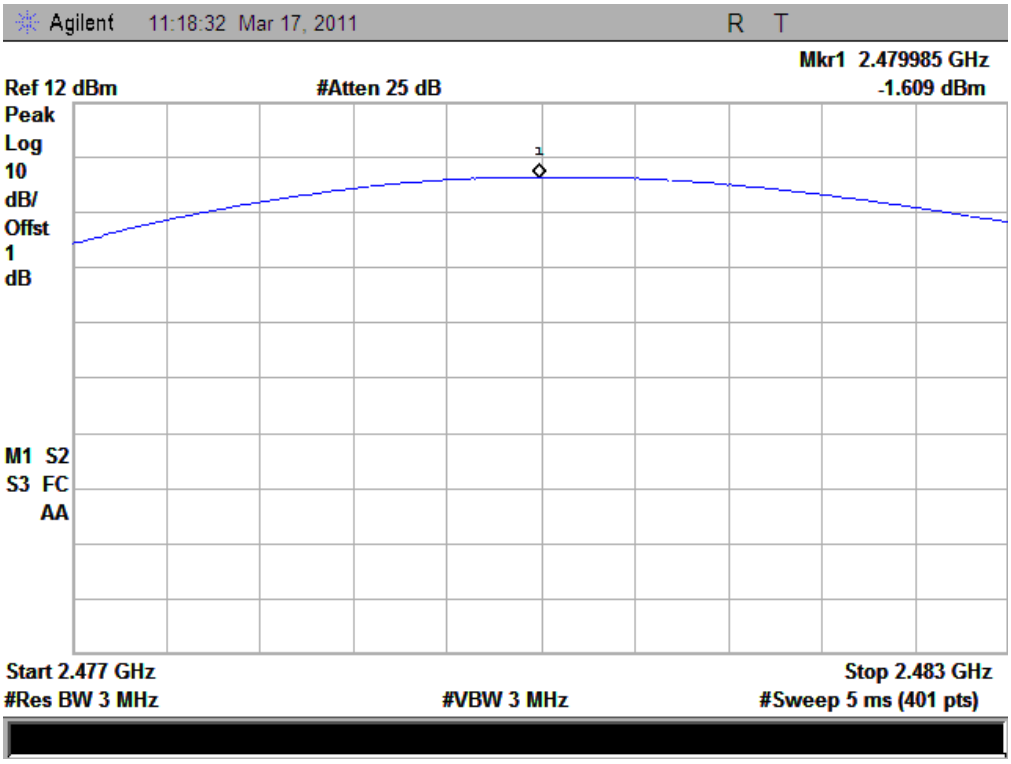
D. Test Plot:



(Plot D: Channel = 2402)



(Plot E: Channel = 2441)



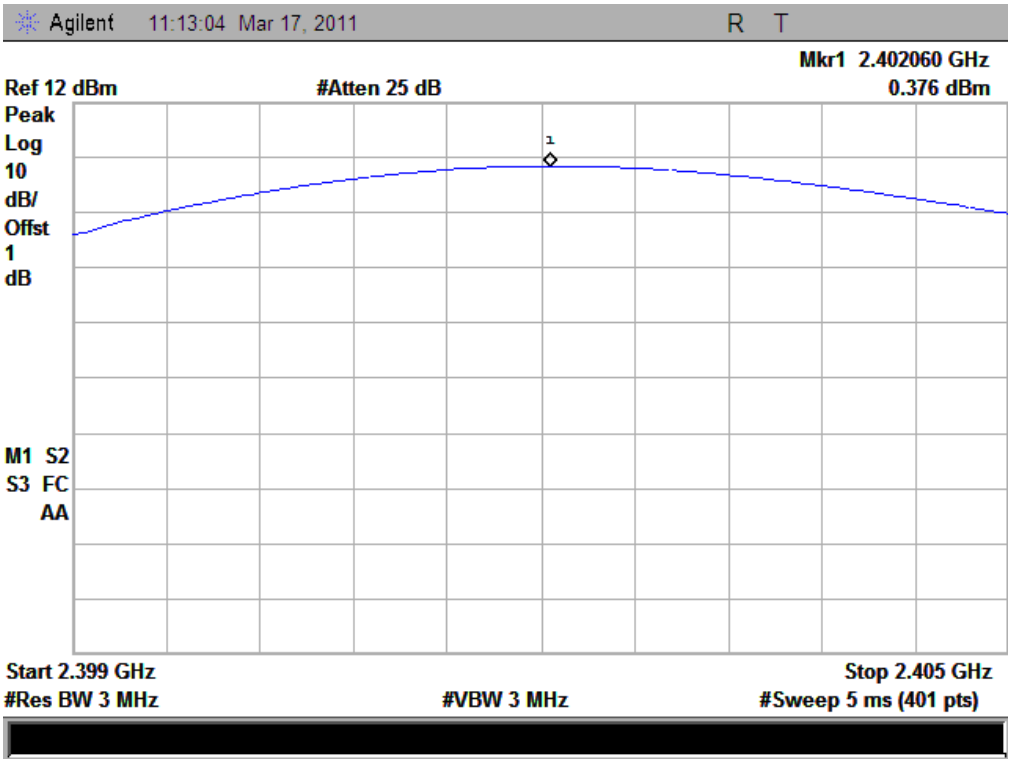
(Plot F: Channel = 2480)

E. Test Verdict:

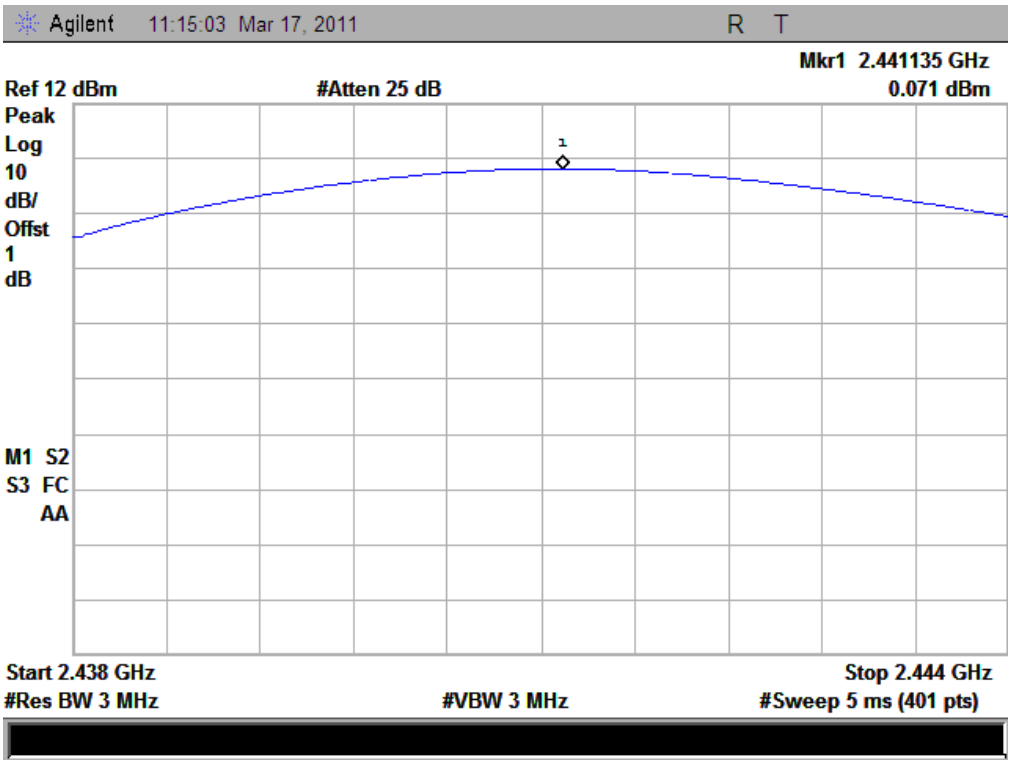
8-DPSK Mode

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	0.376	0.00109	Plot G	30	1	PASS
39	2441	0.071	0.001016	Plot H			PASS
78	2480	-1.184	0.000761	Plot I			PASS

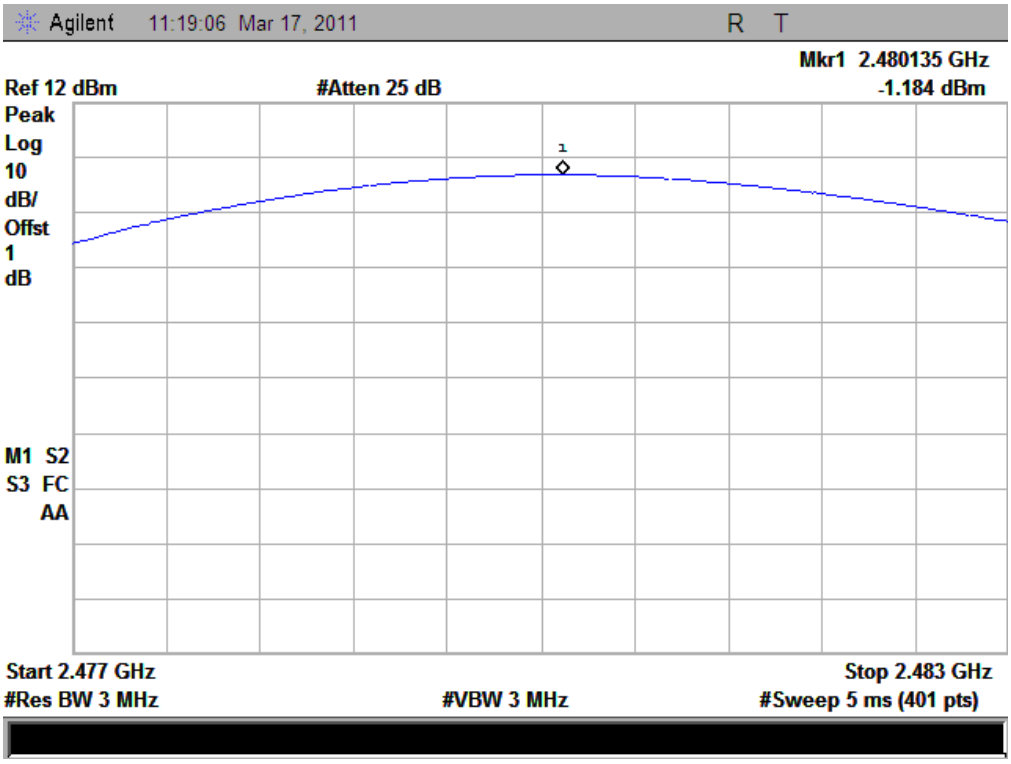
F. Test Plot:



(Plot G: Channel = 2402)



(Plot H: Channel = 2441)



(Plot I: Channel = 2480)

2.3 20dB Bandwidth

2.3.1 Definition

According to FCC §15.247(a)(1) and RSS-210 A8.1 (1), the 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth (10*log1% = 20dB) taking the total RF output power.

2.3.2 Test Description

See section 2.1.2 of this report.

2.3.3 Test Result

The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

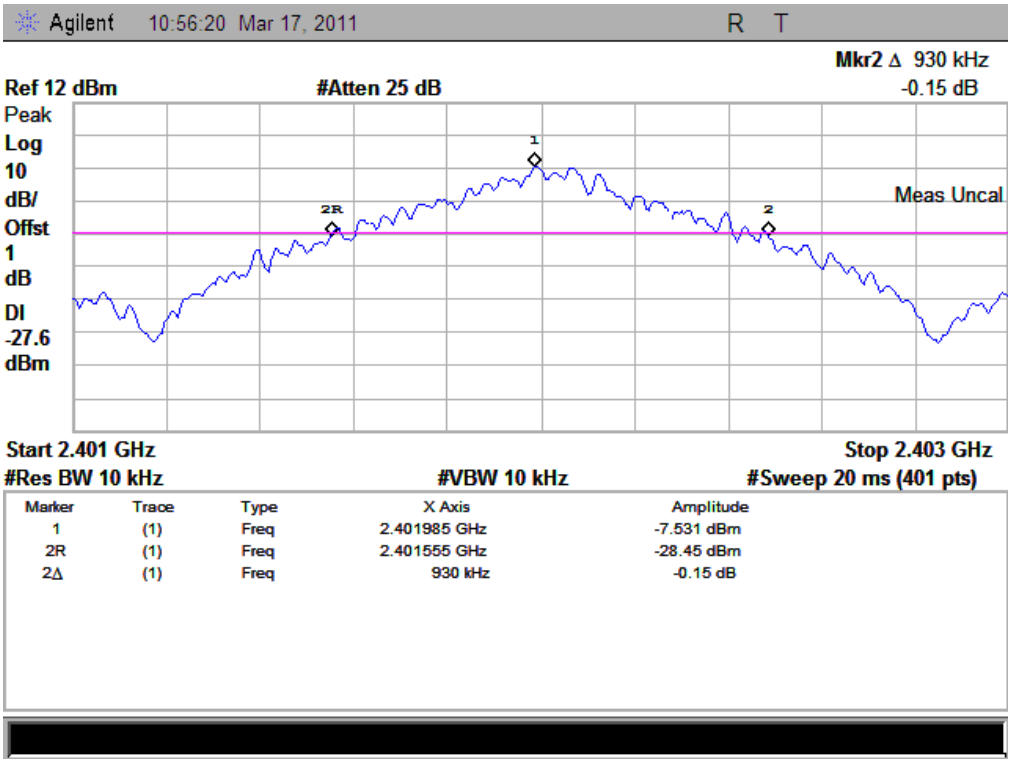
A. Test Verdict:

GFSK Mode

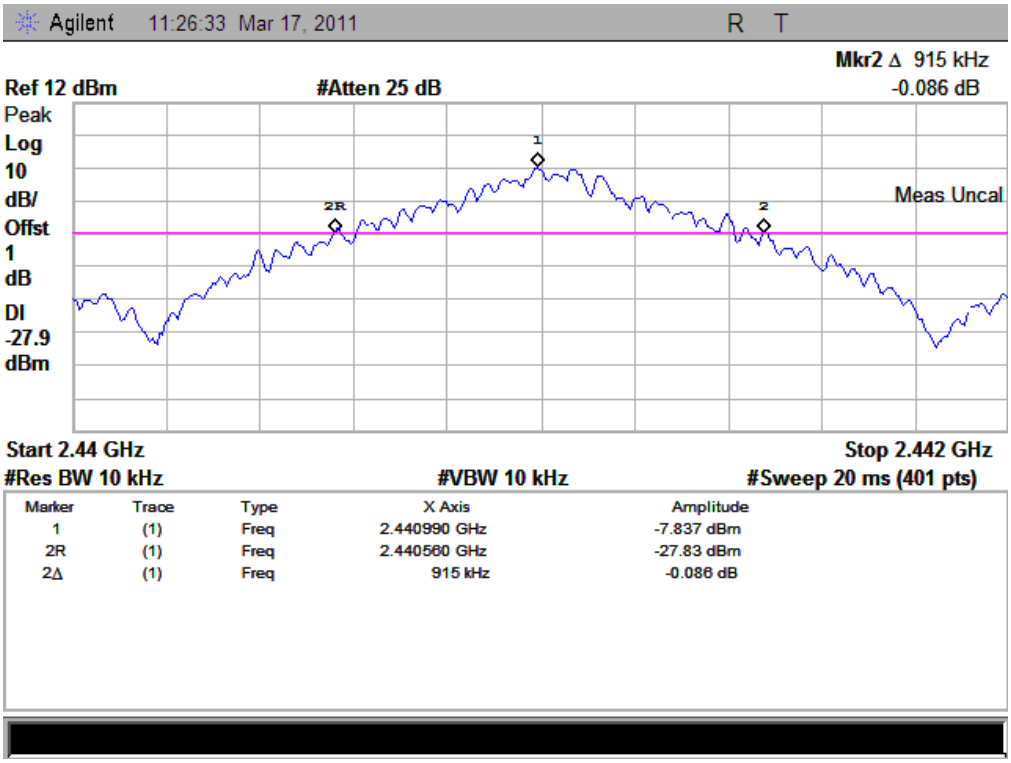
The maximum 20dB bandwidth measured is 930.00KHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (KHz)	Refer to Plot
0	2402	930.00	Plot A
39	2441	915.00	Plot B
78	2480	925.00	Plot C

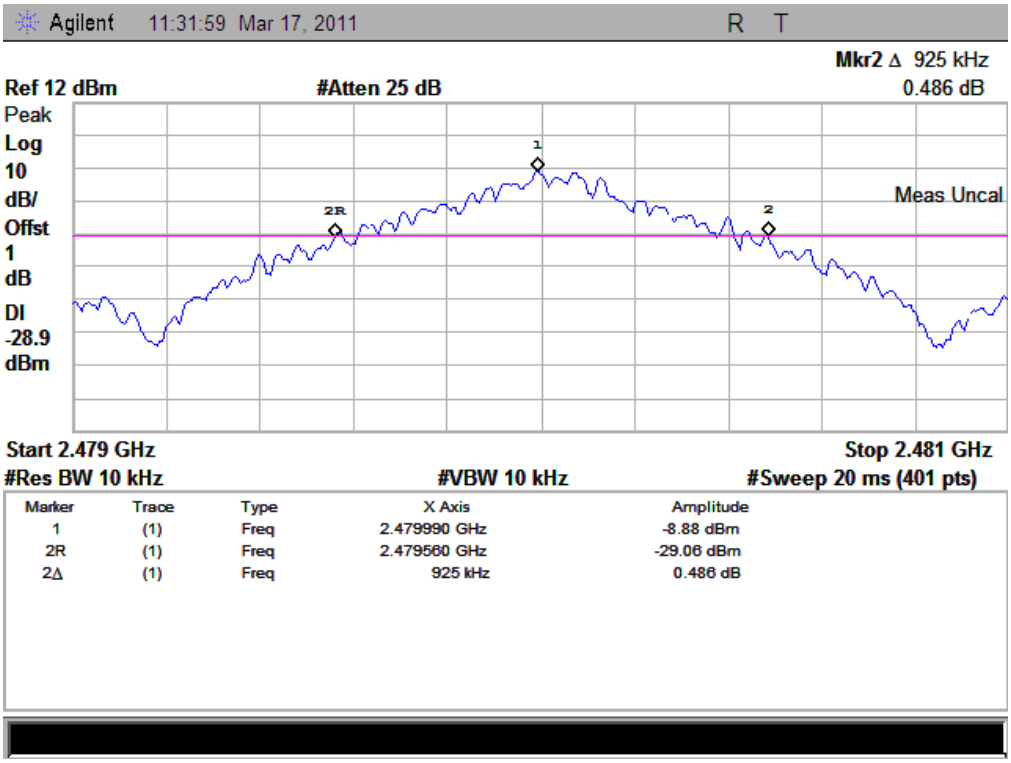
B. Test Plot:



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



(Plot C: Channel = 2480)

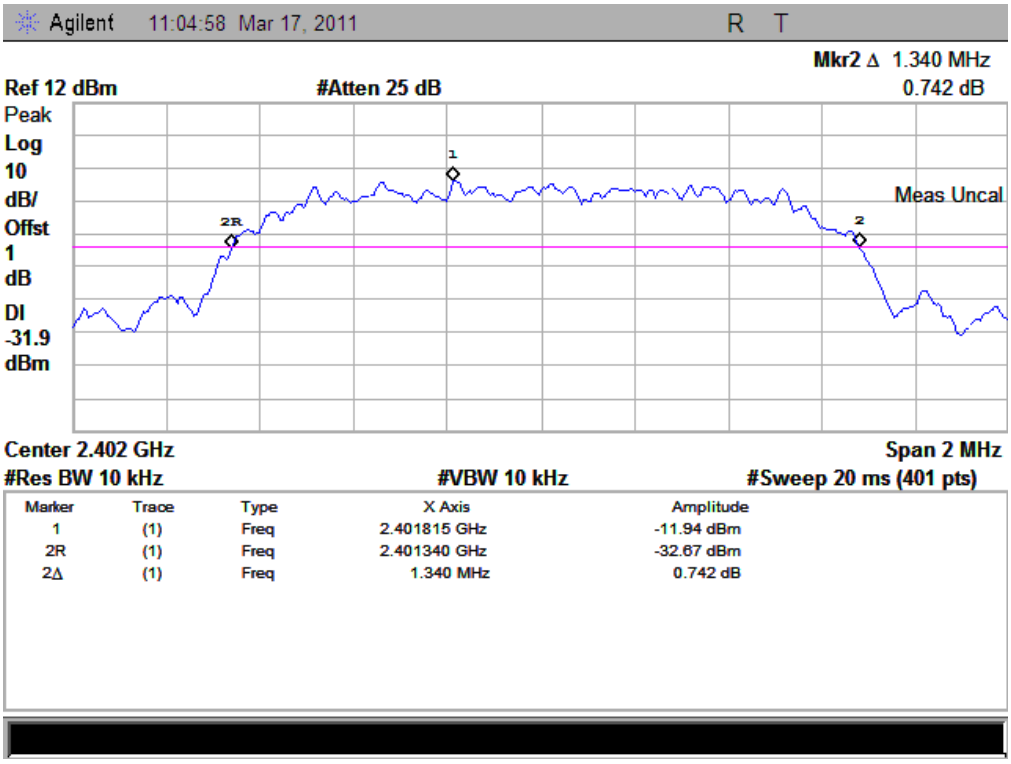
C. Test Verdict:

π/4-DQPSK Mode

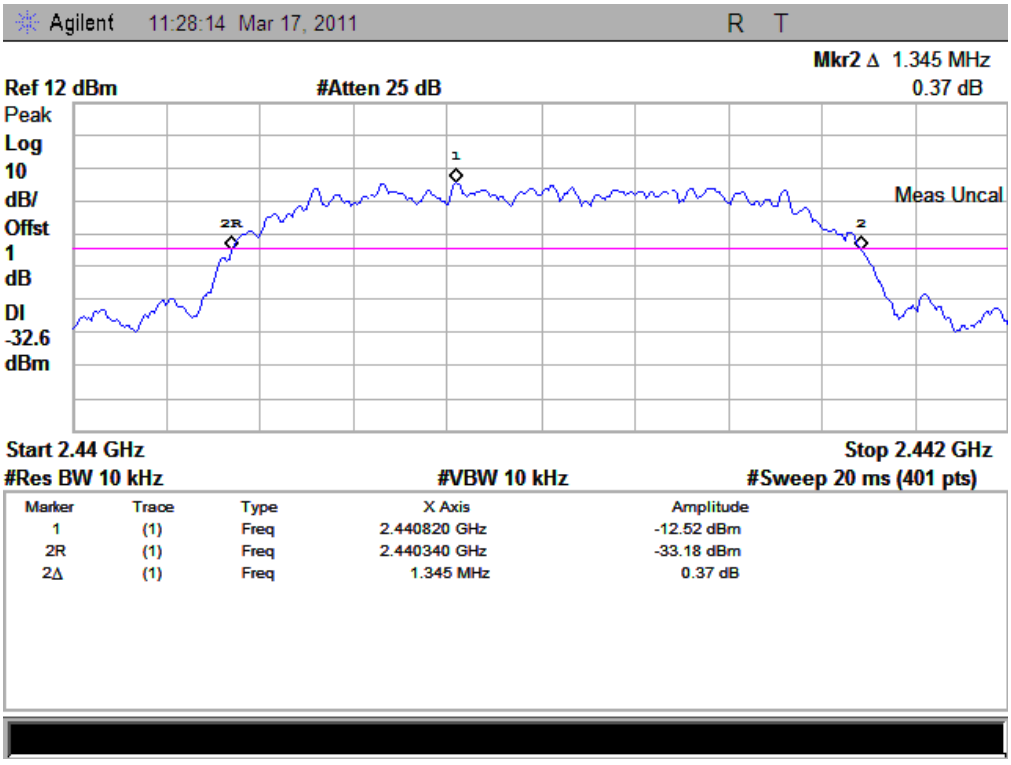
The maximum 20dB bandwidth measured is 1.345MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.340	Plot D
39	2441	1.345	Plot E
78	2480	1.340	Plot F

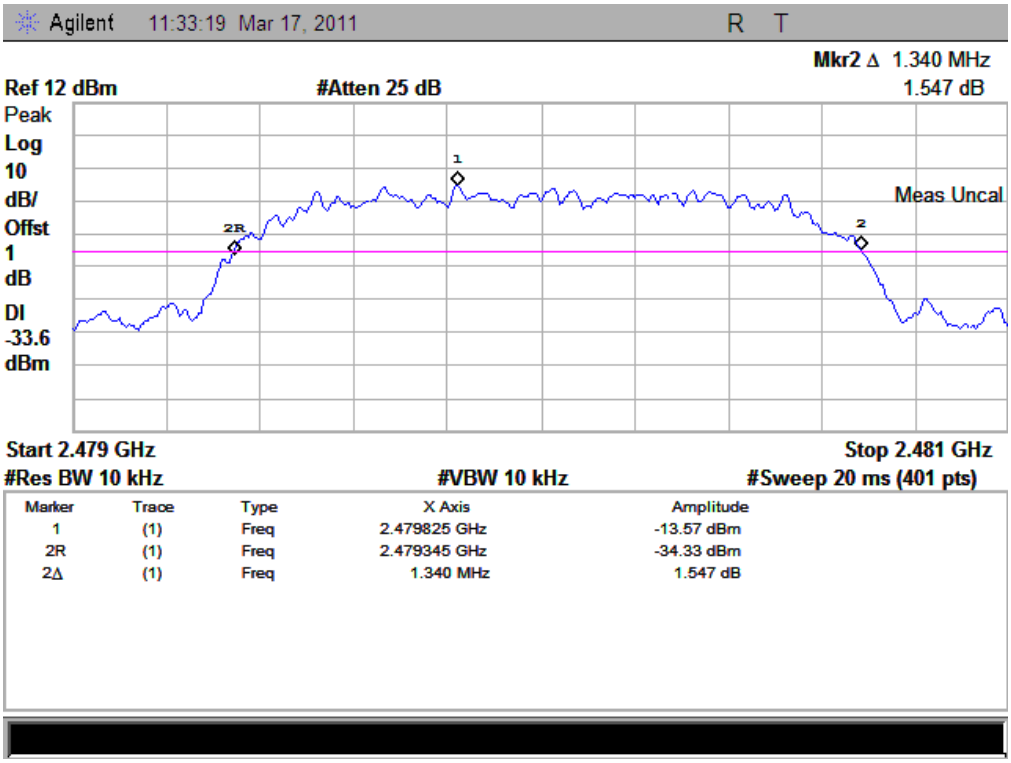
D. Test Plot:



(Plot D: Channel = 2402)



(Plot E: Channel = 2441)



(Plot F: Channel = 2480)

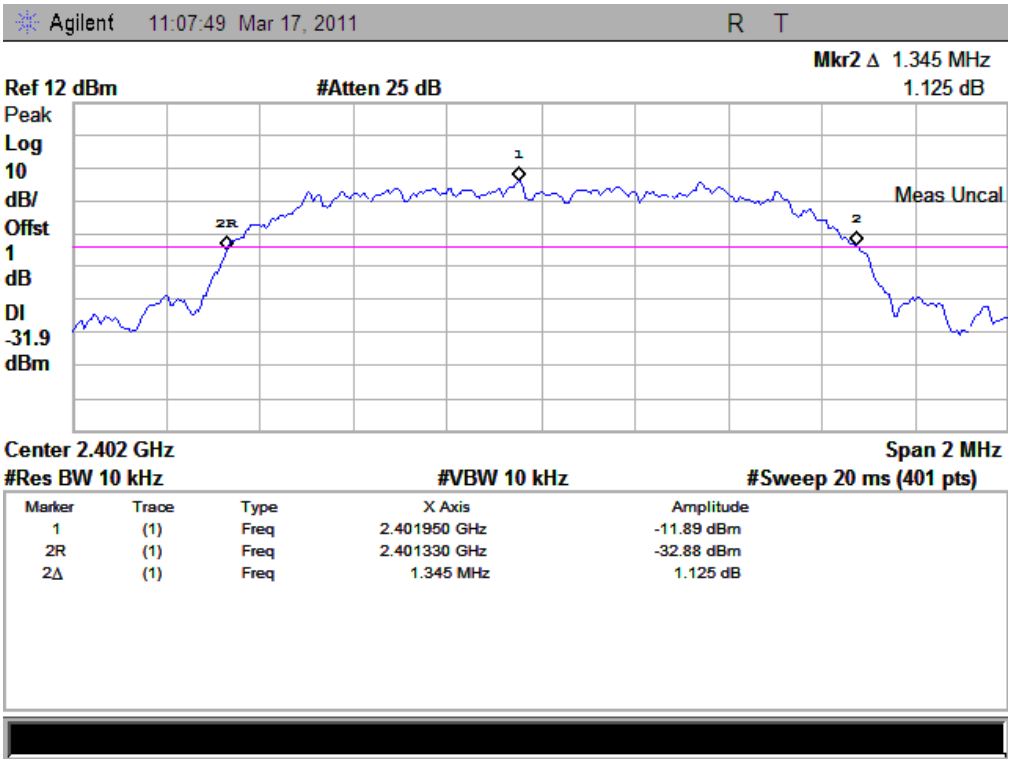
E. Test Verdict:

8-DPSK Mode

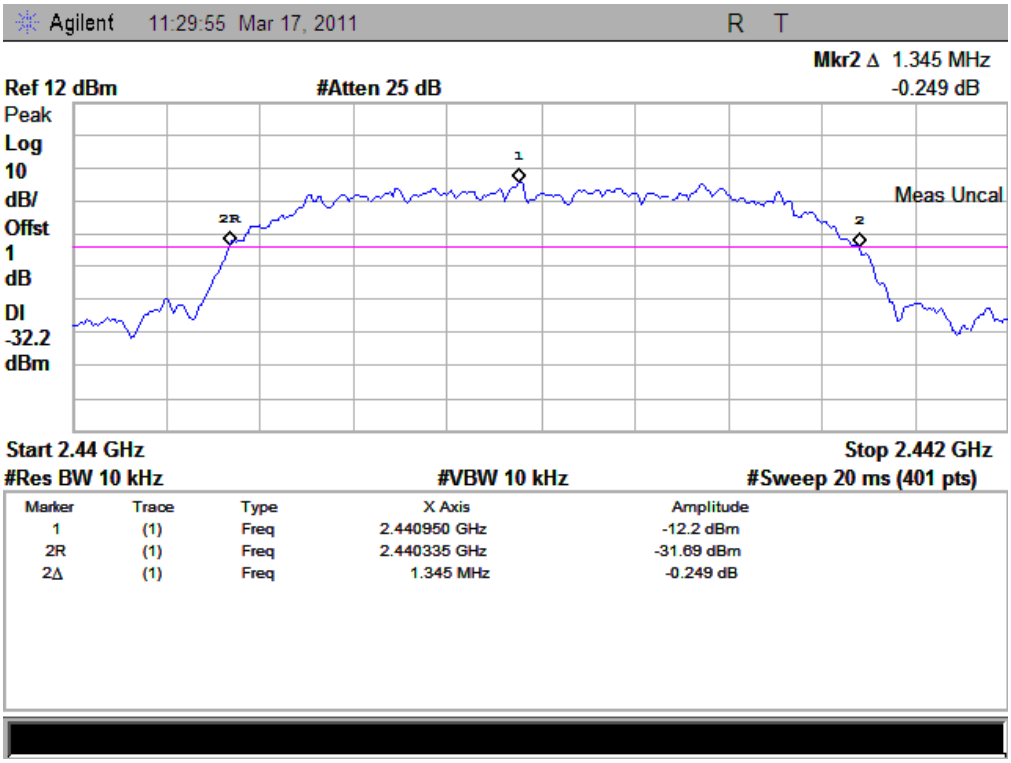
The maximum 20dB bandwidth measured is 1.345MHz according to the table below.

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.345	Plot G
39	2441	1.345	Plot H
78	2480	1.345	Plot I

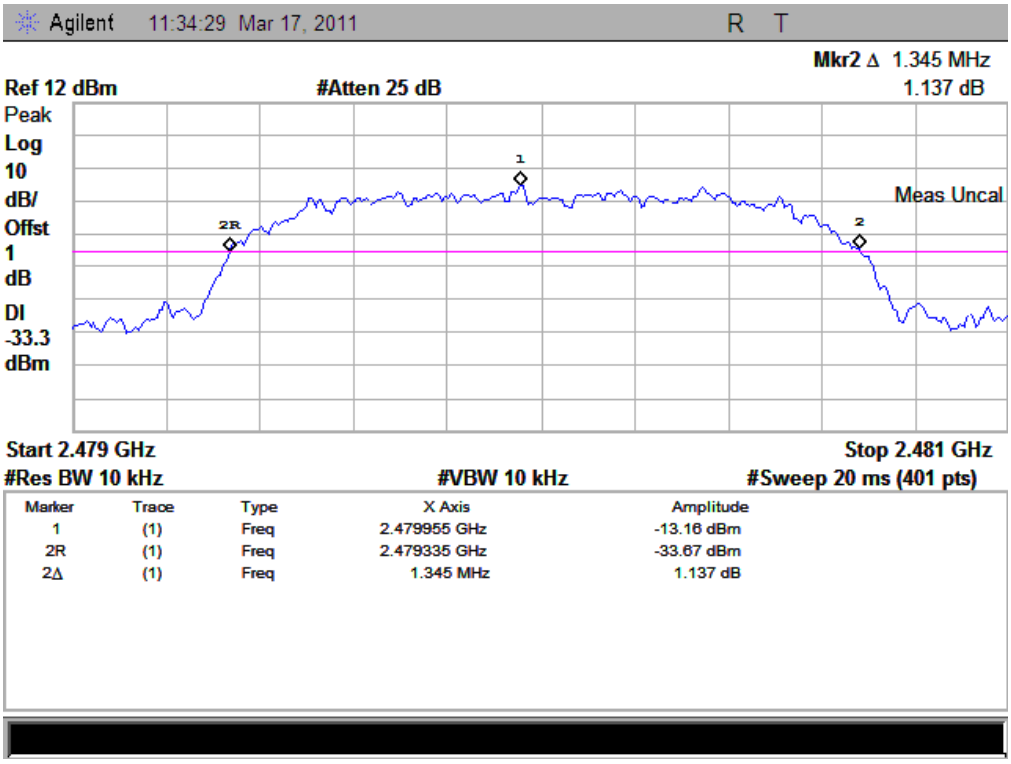
F. Test Plot:



(Plot G: Channel = 2402)



(Plot H: Channel = 2441)



(Plot I: Channel = 2480)

2.4 Carried Frequency Separation

2.4.1 Definition

According to FCC §15.247(a)(1) and RSS-210 A8.1 (2), frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

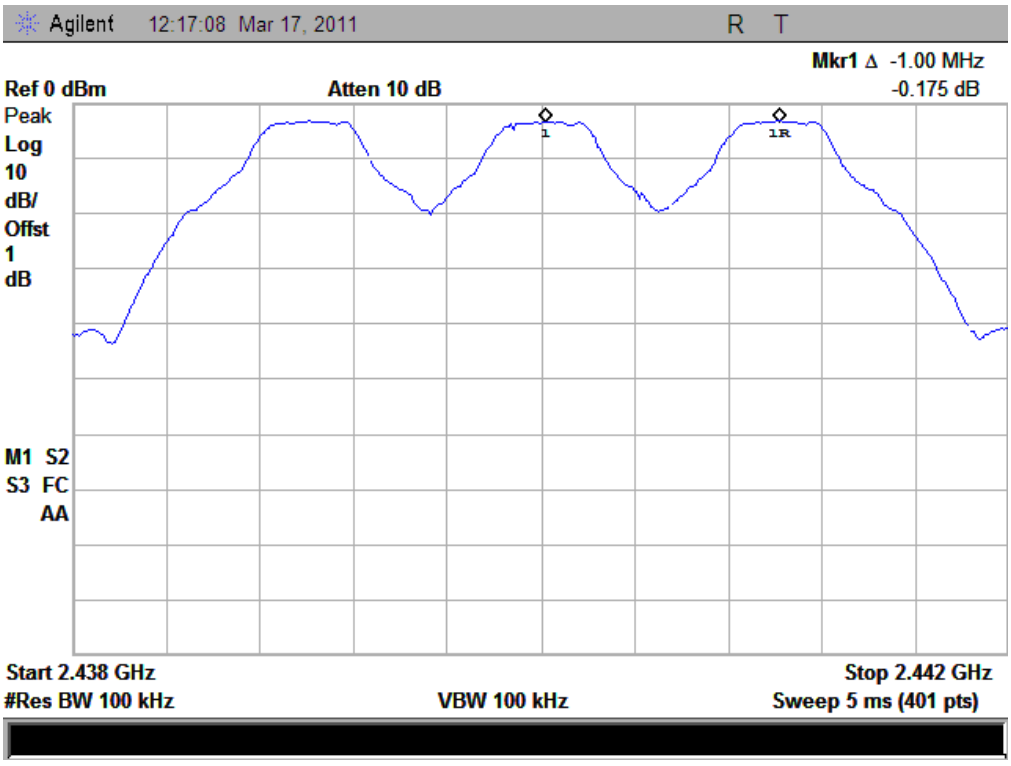
2.4.2 Test Description

See section 2.1.2 of this report.

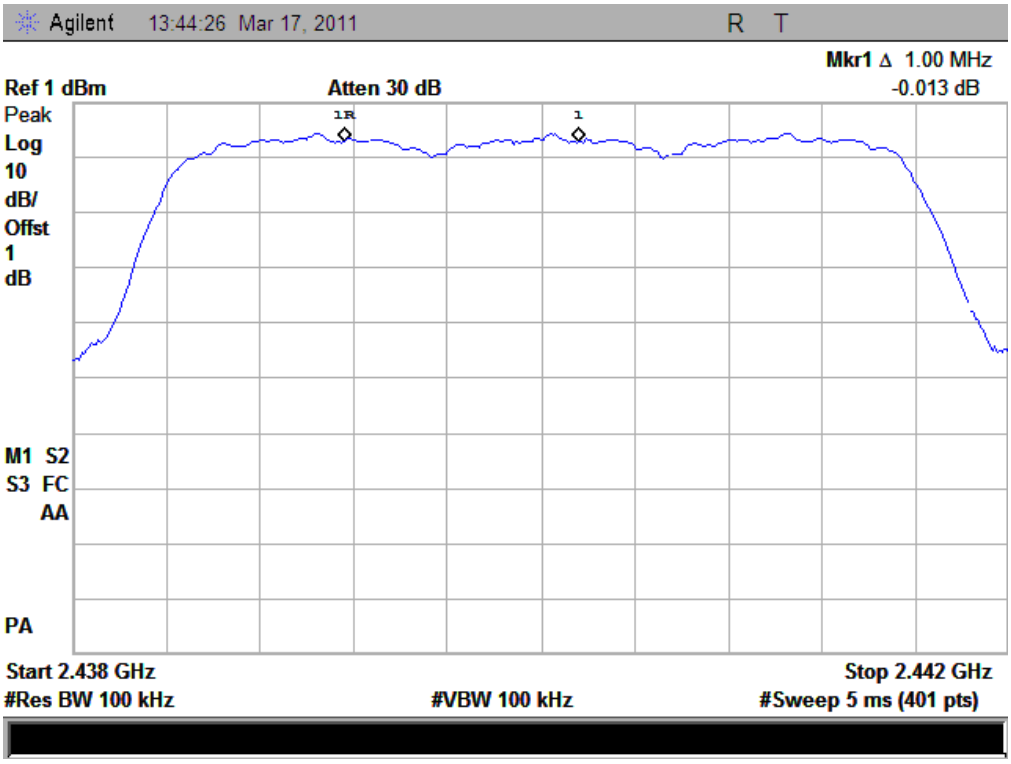
2.4.3 Test Result

The Bluetooth Module operates at hopping-on test mode.

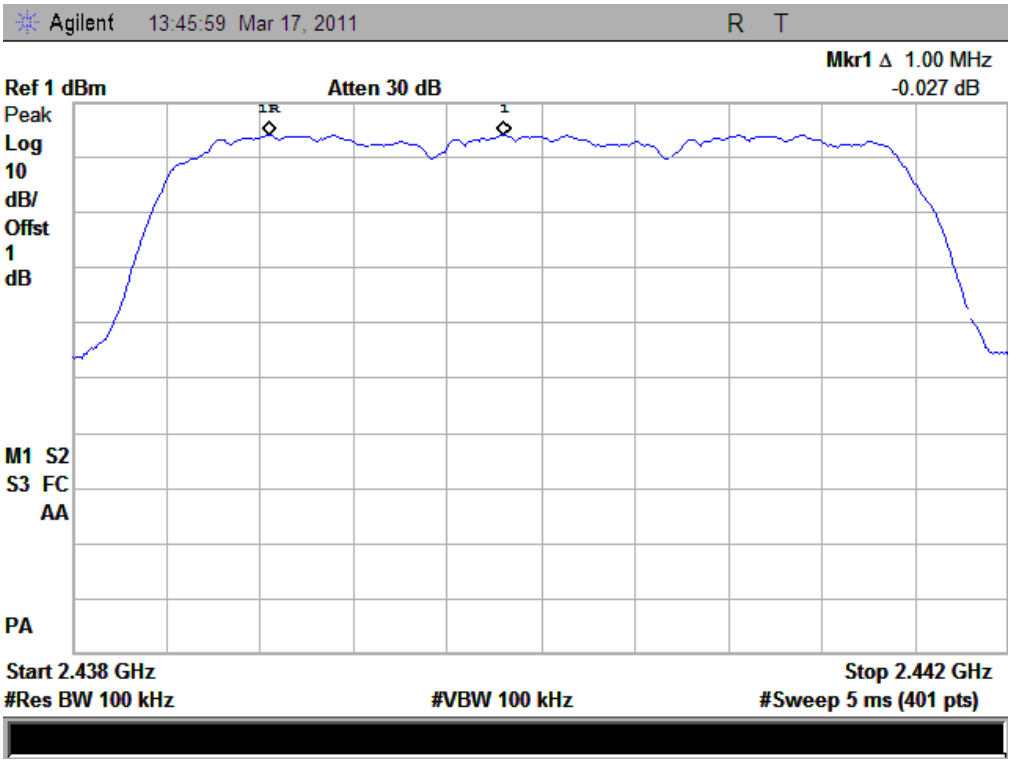
For any adjacent channels (e.g. the channel 39 and 40 as showed in the Plot A), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (930.00KHz for GFSK mode, 1.345MHz for π/4-DQPSK mode and 1.345MHz for 8-DPSK mode, refer to section 2.3.3), whichever is greater. So, the verdict is PASS.



(Plot A: GFSK)



(Plot B: π/4-DQPSK)



(Plot C: 8-DPSK)

2.5 Time of Occupancy (Dwell time)

2.5.1 Requirement

According to FCC §15.247(a)(1)(iii) and RSS-210 A8.1 (4), frequency hopping systems in the 2400 - 2483.5MHz band shall use at least 15 non-overlapping 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.

2.5.2 Test Description

See section 2.1.2 of this report.

2.5.3 Test Result

The average time of occupancy on any channel within the Period can be calculated with formulas (for DH5 package type):

{Total of Dwell} = {Pulse Time} * (1600 / 6) / {Number of Hopping Frequency} * {Period}

{Period} = 0.4s * {Number of Hopping Frequency}

The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

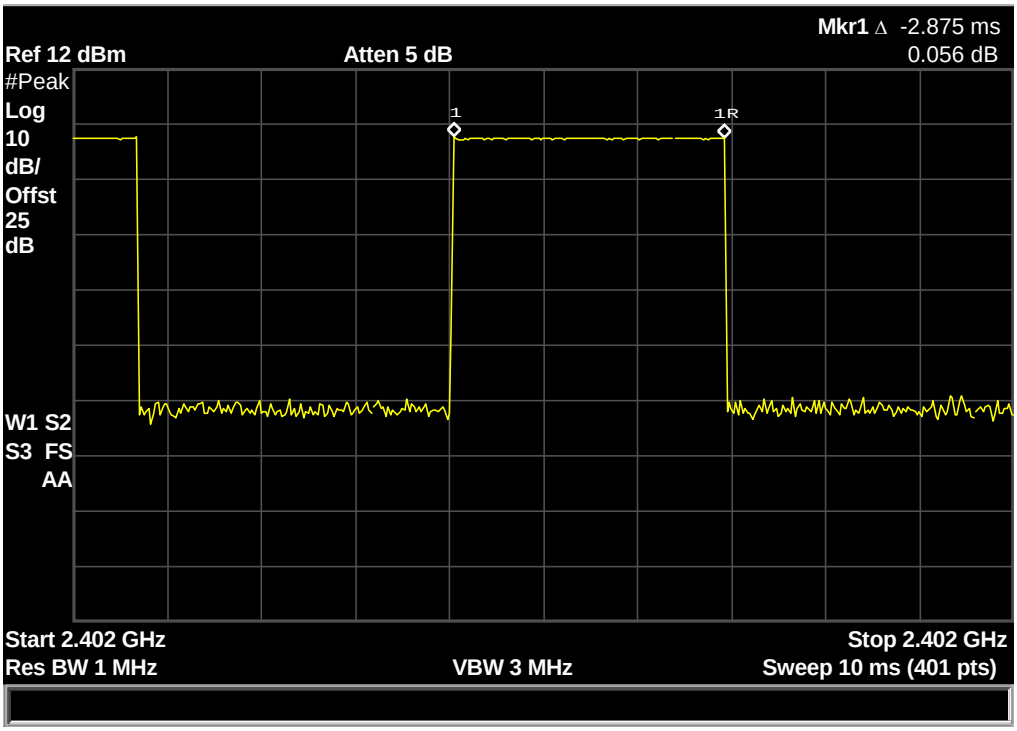
A. Test Verdict:

GFSK Mode

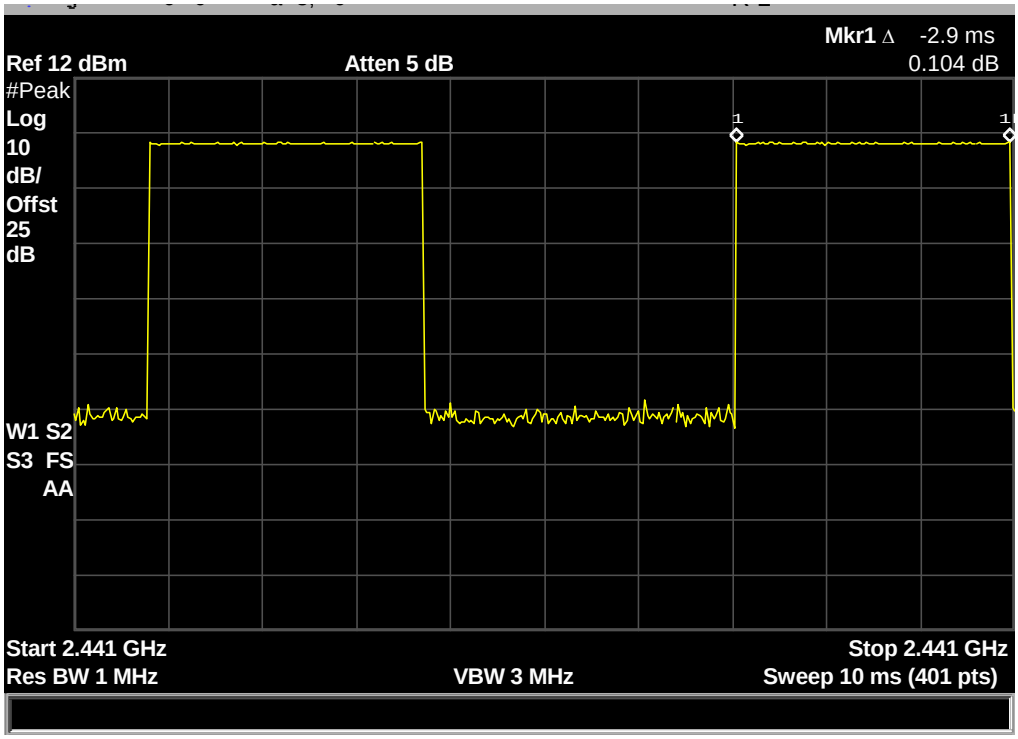
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.875	Plot A	306.667	400	PASS
39	2441	2.900	Plot B	309.333		PASS
78	2480	2.900	Plot C	309.333		PASS

B. Test Plot:

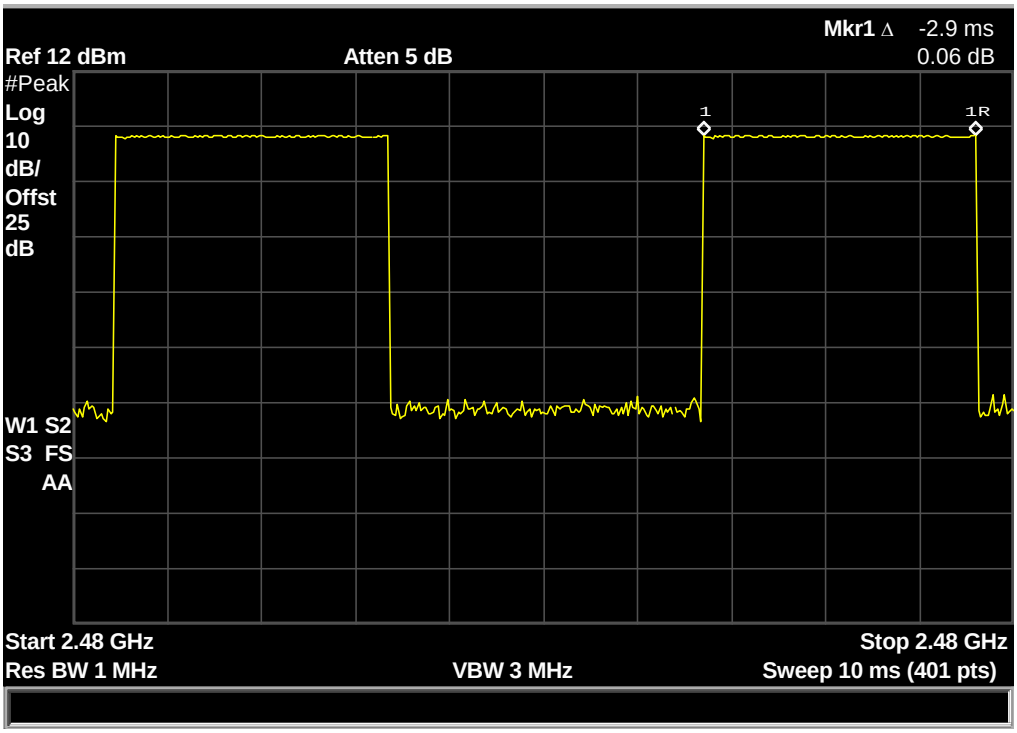
Note: the following plots record the Pulse Time of the Module carrier.



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



(Plot C: Channel = 2480)

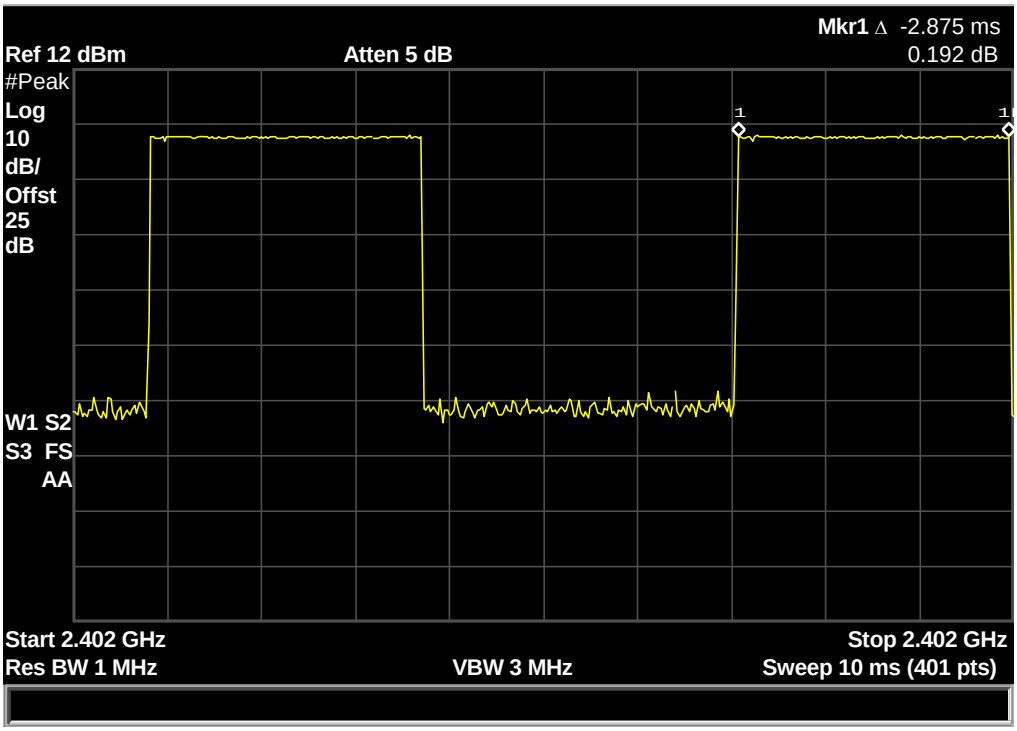
C. Test Verdict:

π/4-DQPSK Mode

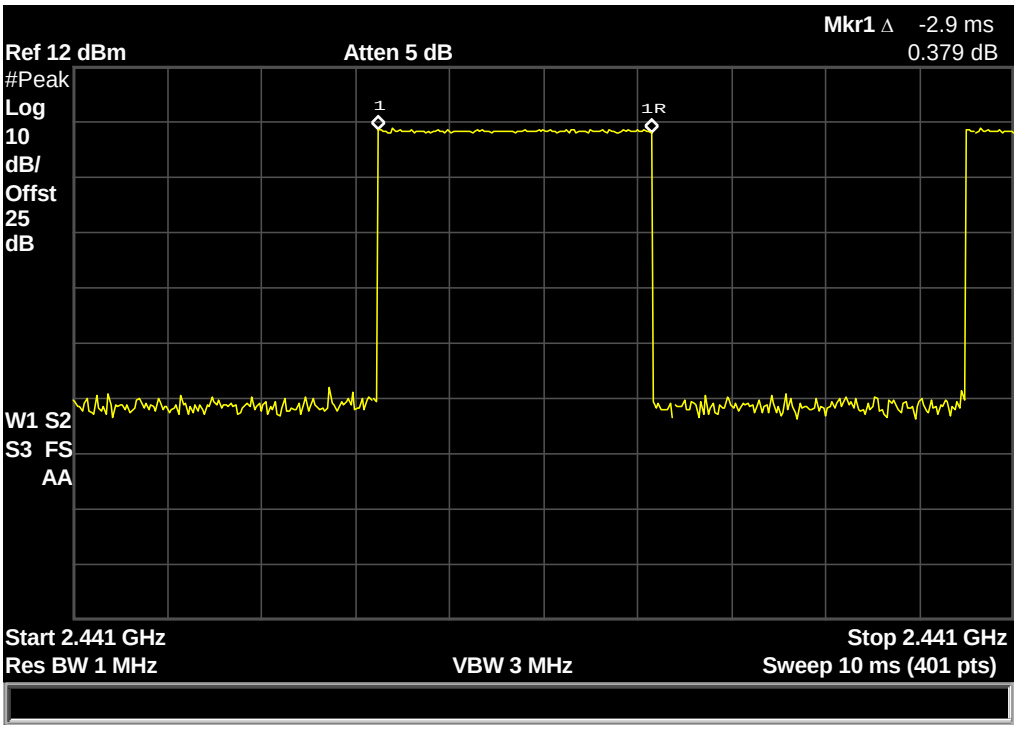
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.875	Plot D	306.667	400	PASS
39	2441	2.900	Plot E	309.333		PASS
78	2480	2.900	Plot F	309.333		PASS

D. Test Plot:

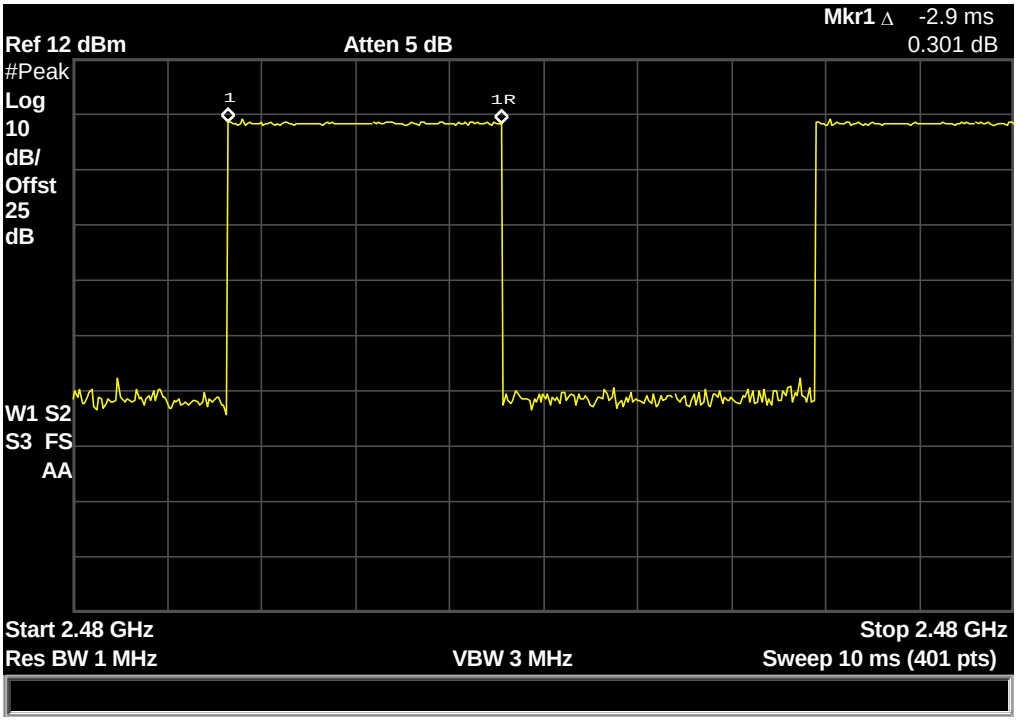
Note: the following plots record the Pulse Time of the Module carrier.



(Plot D: Channel = 2402)



(Plot E: Channel = 2441)



(Plot F: Channel = 2480)

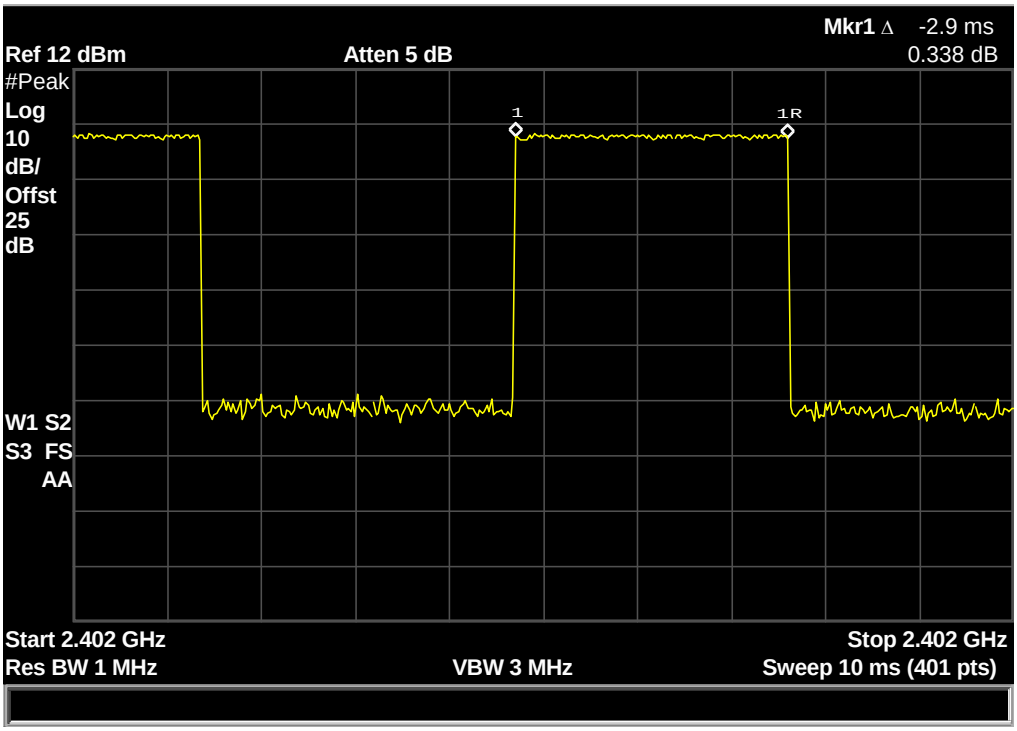
E. Test Verdict (8-DPSK mode):

8-DPSK Mode

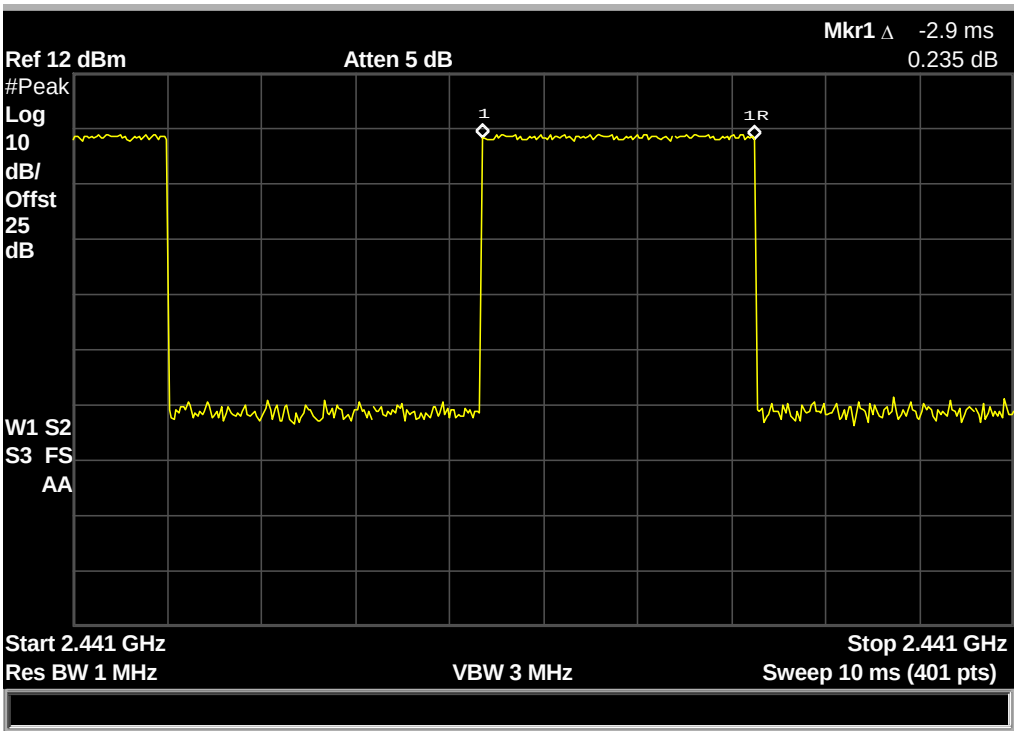
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.900	Plot G	309.333	400	PASS
39	2441	2.900	Plot H	309.333		PASS
78	2480	2.900	Plot I	309.333		PASS

F. Test Plot:

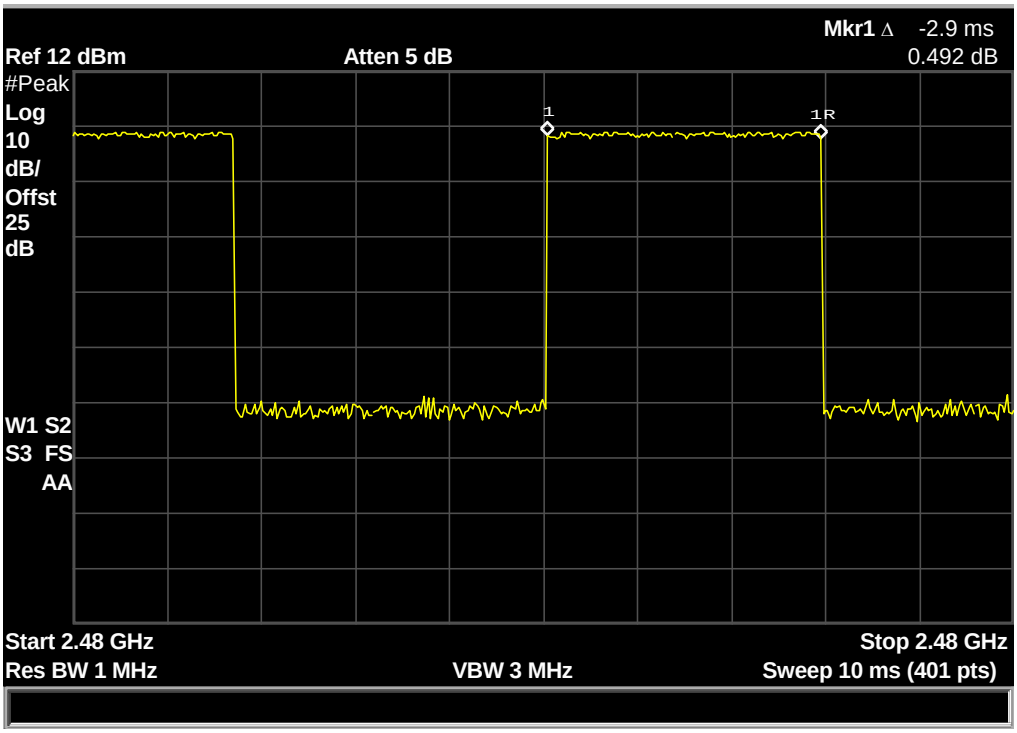
Note: the following plots record the Pulse Time of the Module carrier.



(Plot G: Channel = 2402)



(Plot H: Channel = 2441)



(Plot I: Channel = 2480)

2.6 Conducted Spurious Emissions

2.6.1 Requirement

According to FCC §15.247(c) and RSS-A8.5, in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.6.2 Test Description

See section 2.1.2 of this report.

2.6.3 Test Result

The Bluetooth Module operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

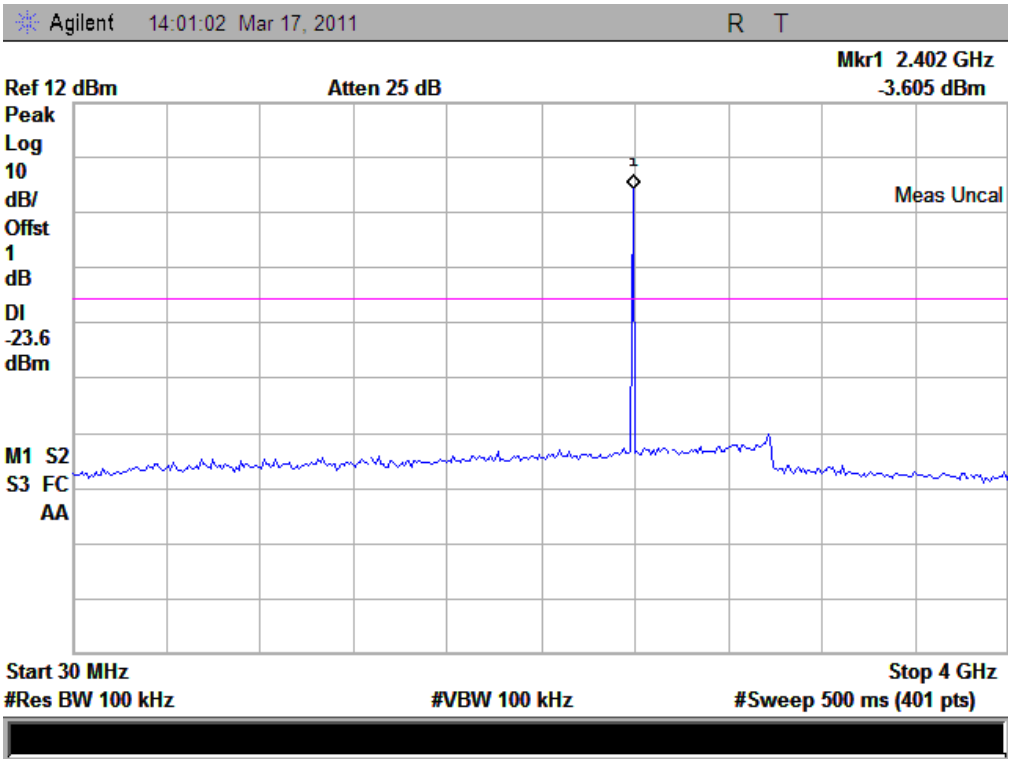
A. Test Verdict:

GFSK Mode

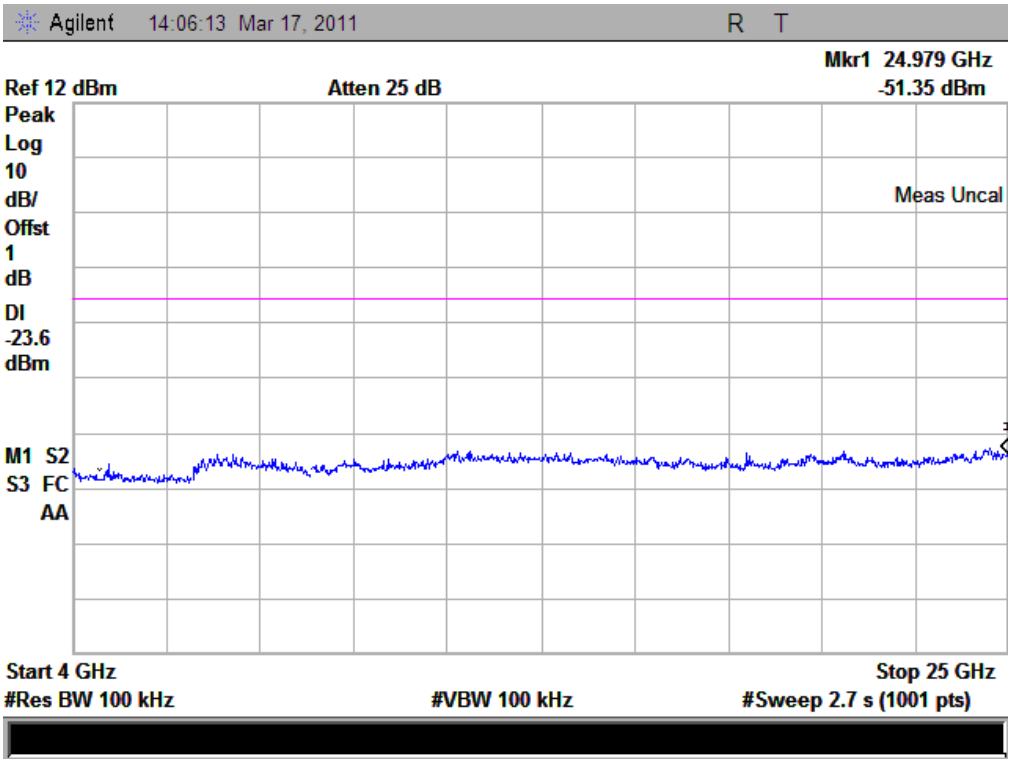
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-51.35	Plot A.1/A.2	-3.605	-23.6	PASS
39	2441	-52.7	Plot B.1/B.2	-3.578	-23.6	PASS
78	2480	-52.39	Plot C.1/C.2	-2.792	-22.8	PASS

B. Test Plot:

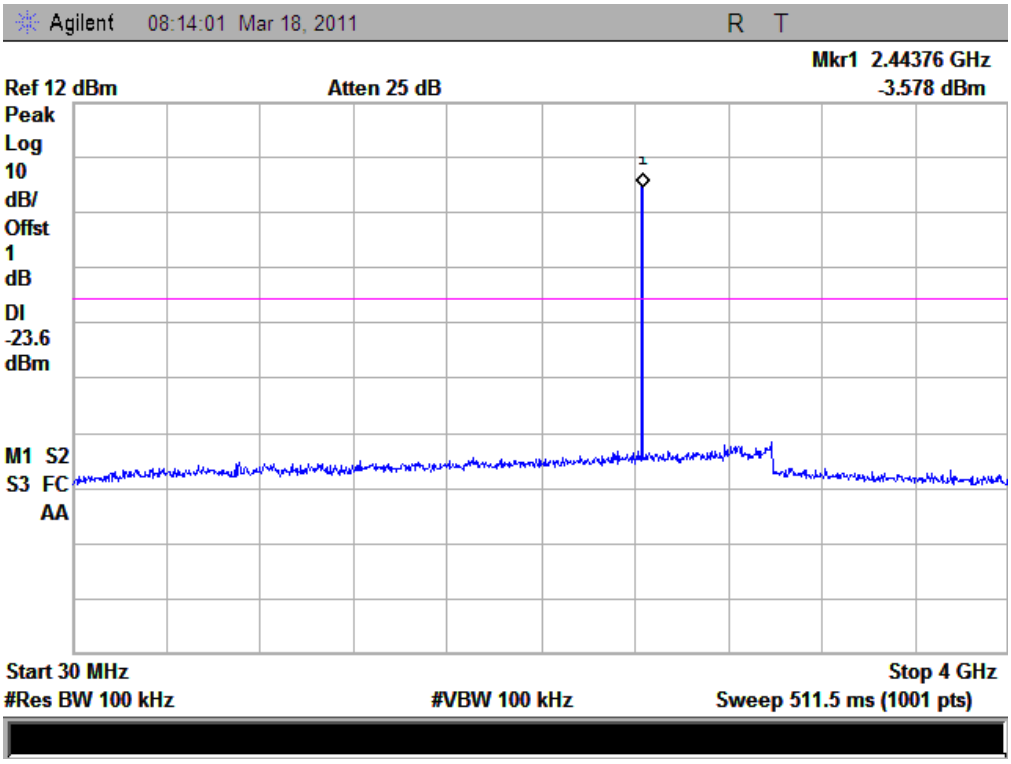
Note: the power of the Module transmitting frequency should be ignored.



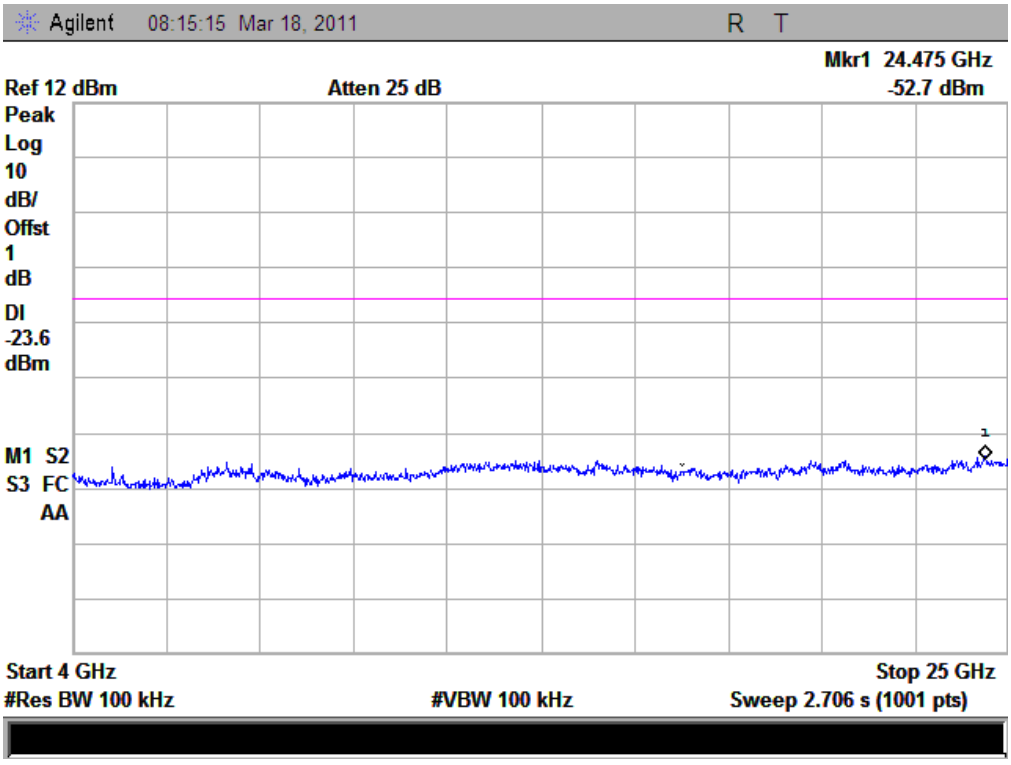
(Plot A.1: Channel = 0, 30MHz to 4GHz)



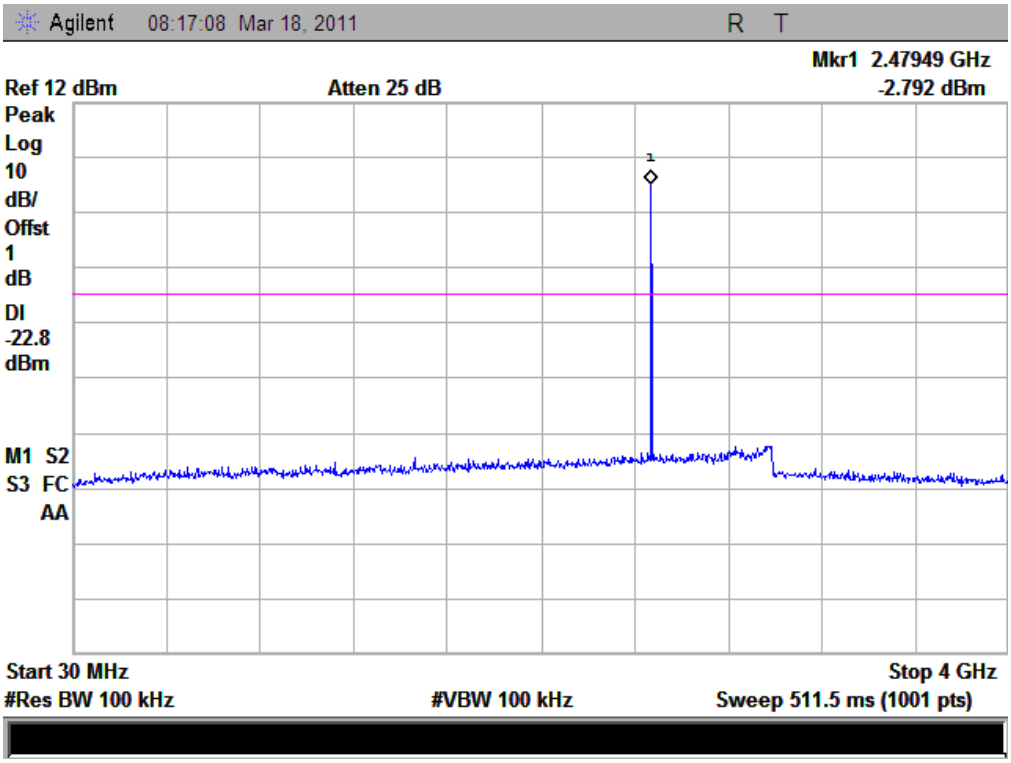
(Plot A.2: Channel = 0, 4GHz to 25GHz)



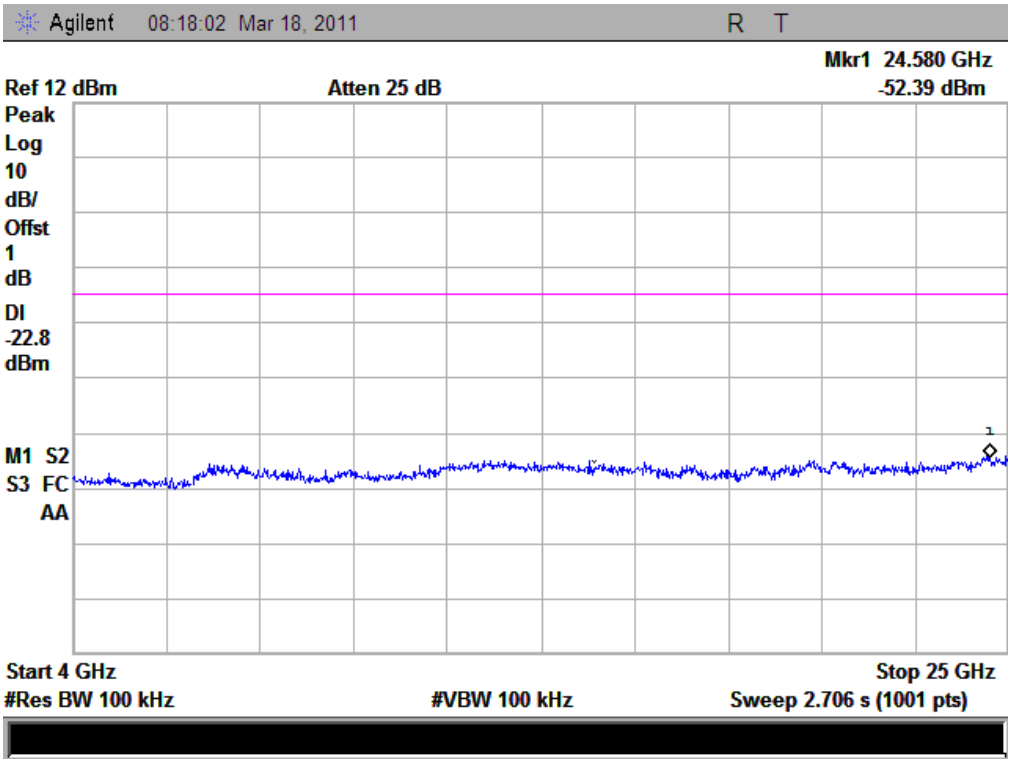
(Plot B.1: Channel = 39, 30MHz to 4GHz)



(Plot B.2: Channel = 39, 4GHz to 25GHz)



(Plot C.1: Channel = 78, 30MHz to 4GHz)



(Plot C.2: Channel = 78, 4GHz to 25GHz)

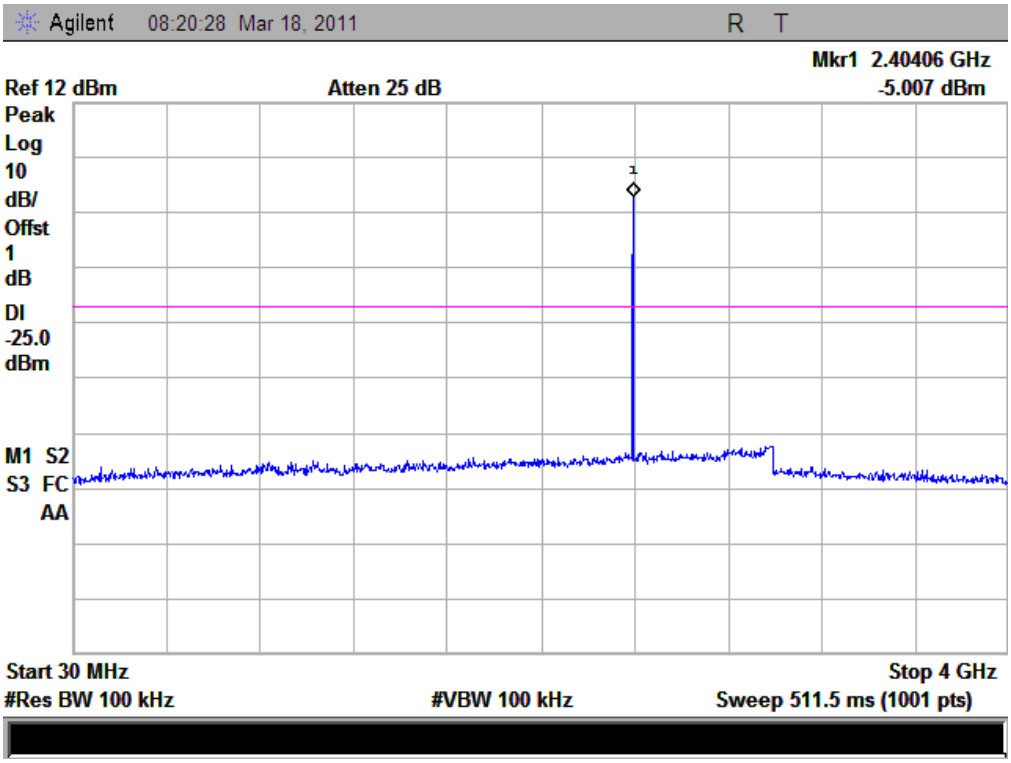
C. Test Verdict:

π/4-DQPSK Mode

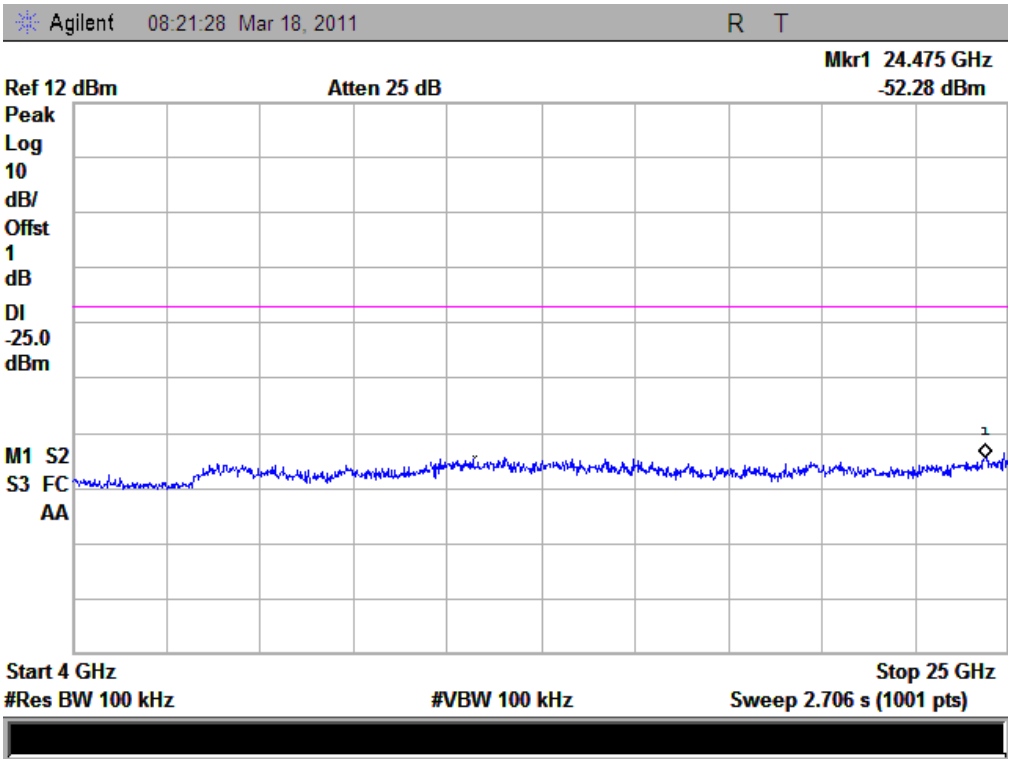
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-52.28	Plot D.1/D.2	-5.007	-25.0	PASS
39	2441	-51.84	Plot E.1/E.2	-5.204	-25.2	PASS
78	2480	-52.13	Plot F.1/F.2	-4.596	-24.6	PASS

D. Test Plot:

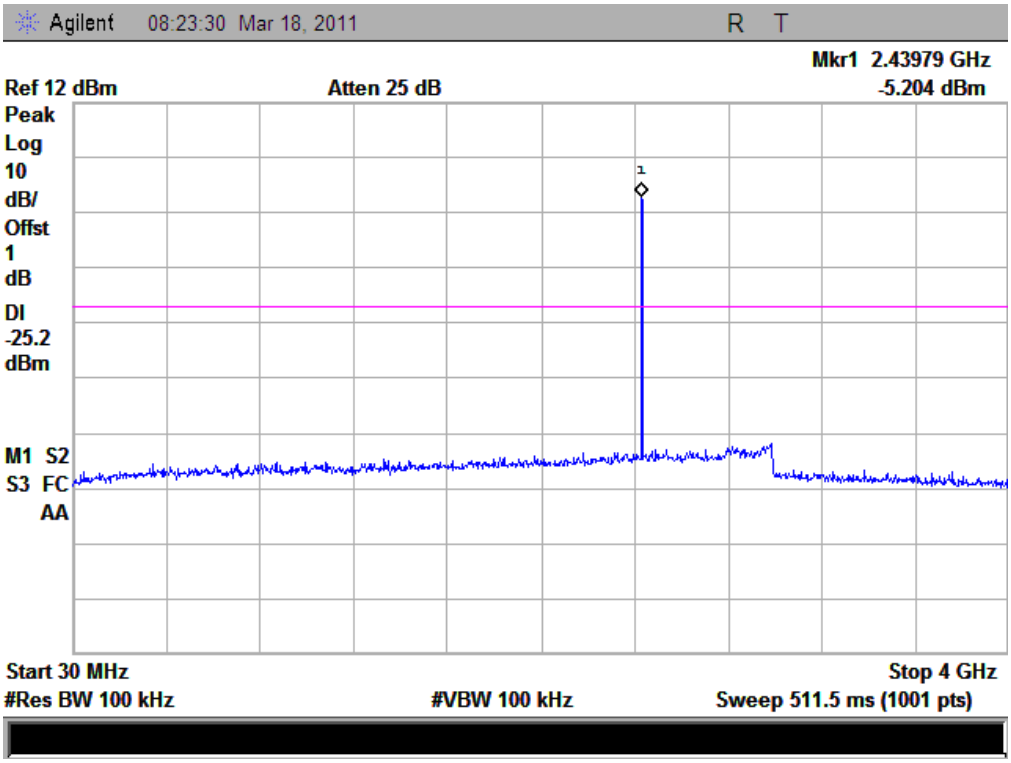
Note: the power of the Module transmitting frequency should be ignored.



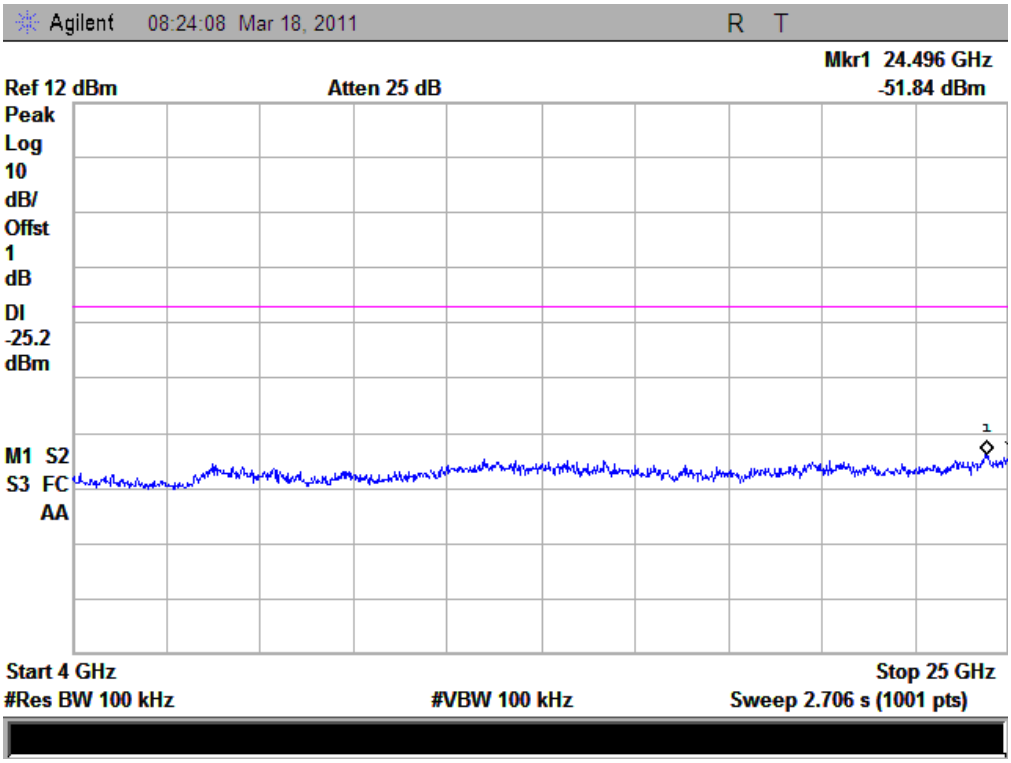
(Plot D.1: Channel = 0, 30MHz to 4GHz)



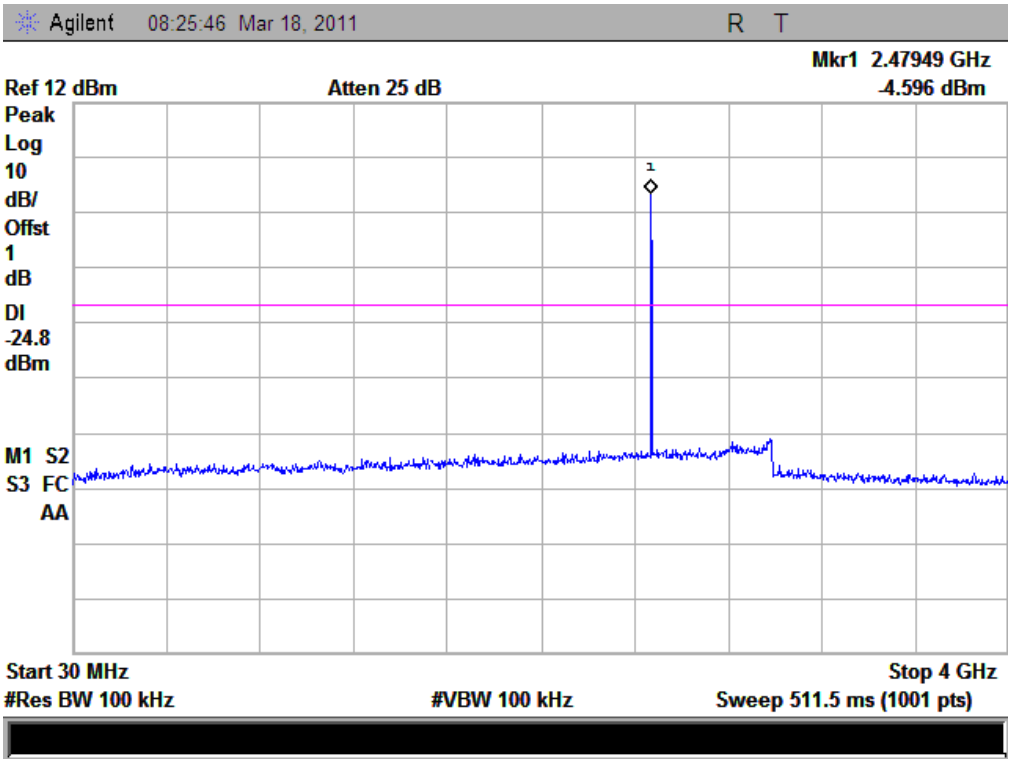
(Plot D.2: Channel = 0, 4GHz to 25GHz)



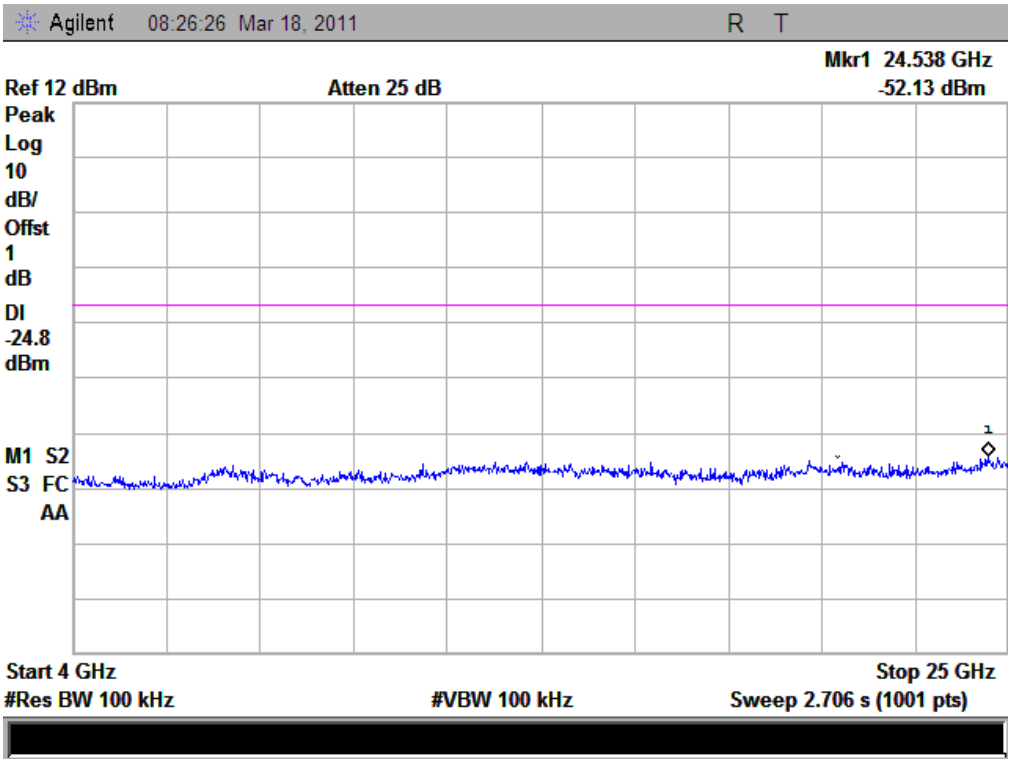
(Plot E.1: Channel = 39, 30MHz to 4GHz)



(Plot E.2: Channel = 39, 4GHz to 25GHz)



(Plot F.1: Channel = 78, 30MHz to 4GHz)



(Plot F.2: Channel = 78, 4GHz to 25GHz)

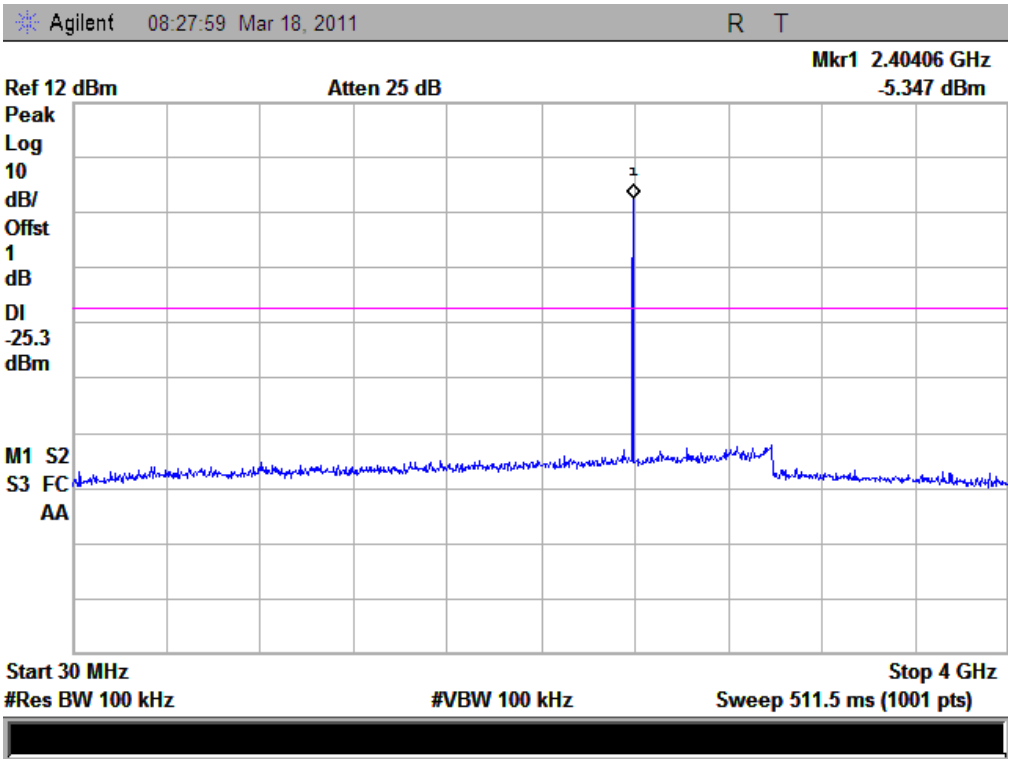
E. Test Verdict:

8-DPSK Mode

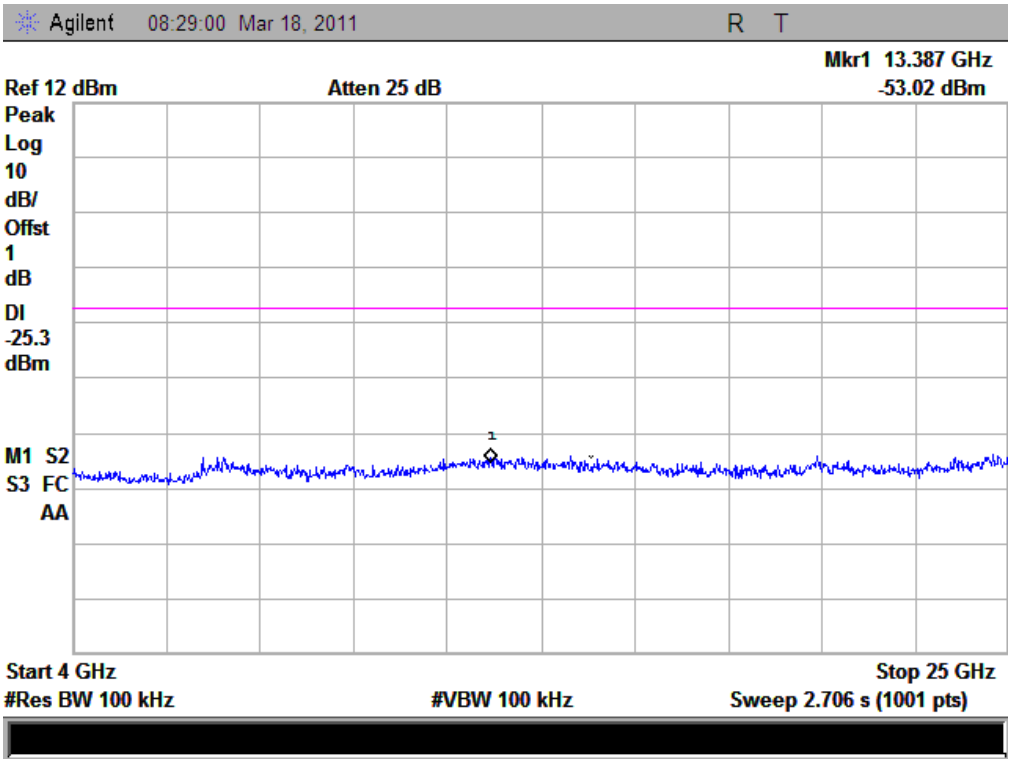
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-53.02	Plot G.1/G.2	-5.347	-25.3	PASS
39	2441	-52.25	Plot H.1/H.2	-4.249	-24.2	PASS
78	2480	-51.94	Plot I.1/I.2	-3.592	-23.6	PASS

F. Test Plot:

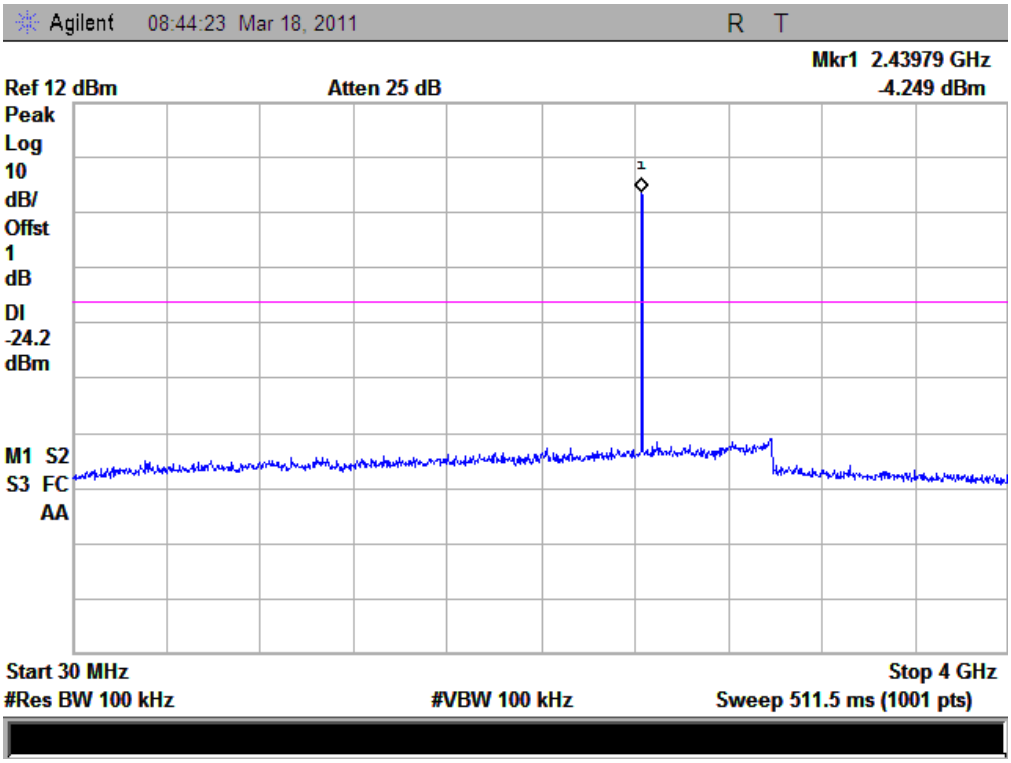
Note: the power of the Module transmitting frequency should be ignored.



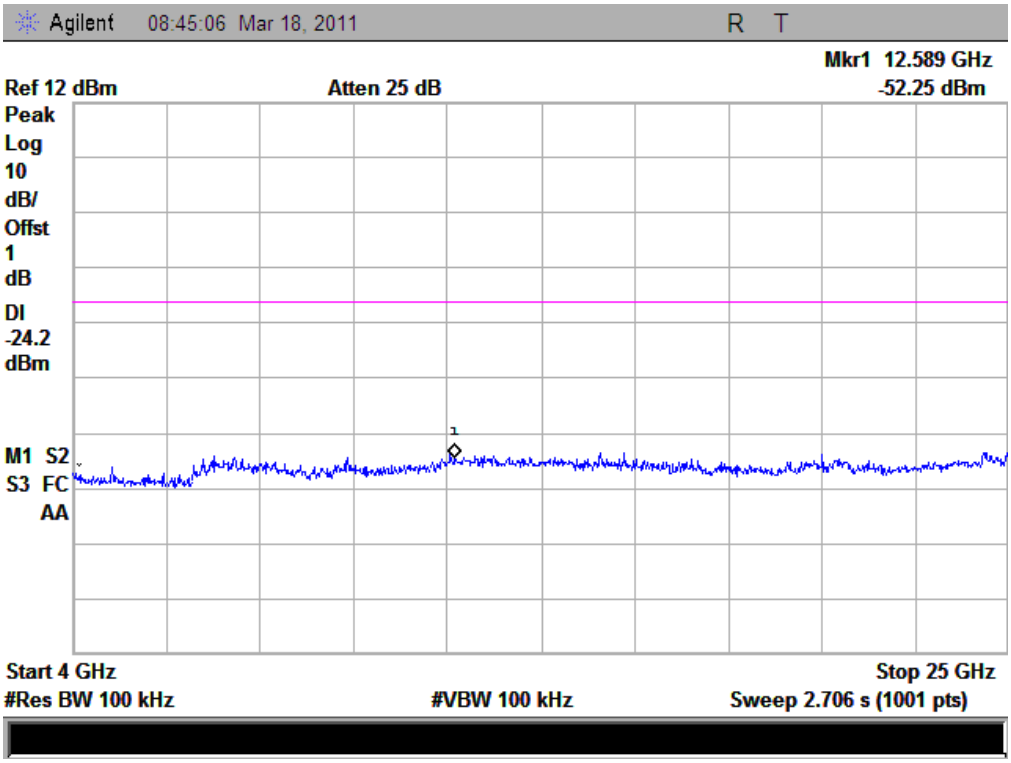
(Plot G.1: Channel = 0, 30MHz to 4GHz)



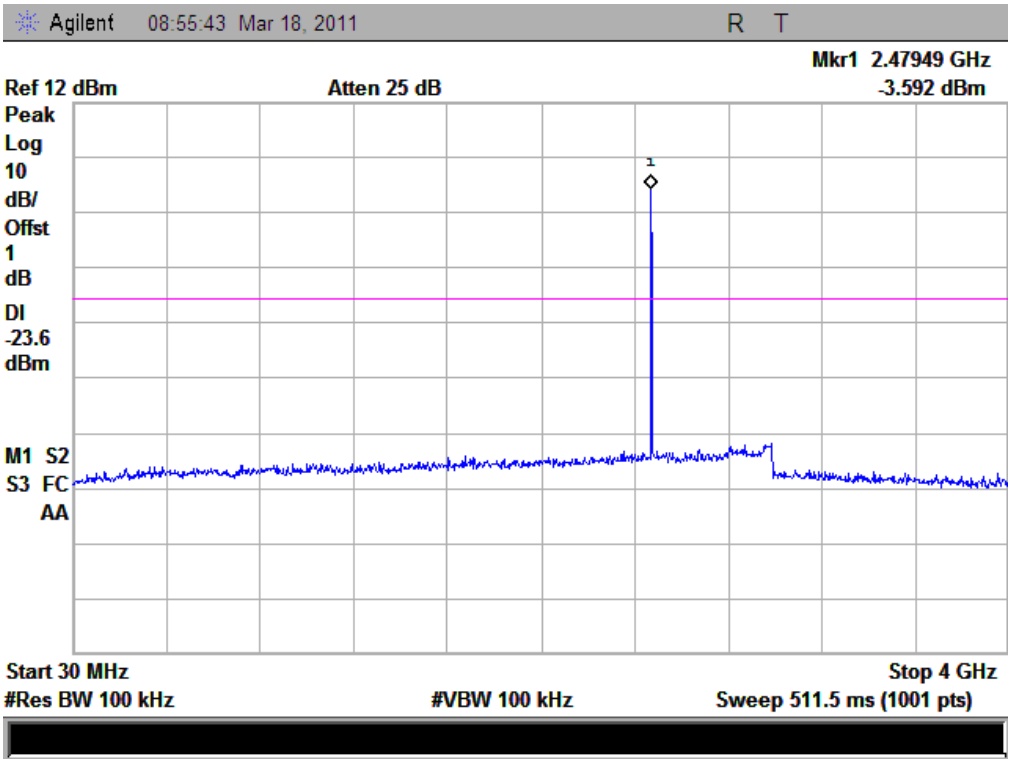
(Plot G.2: Channel = 0, 4GHz to 25GHz)



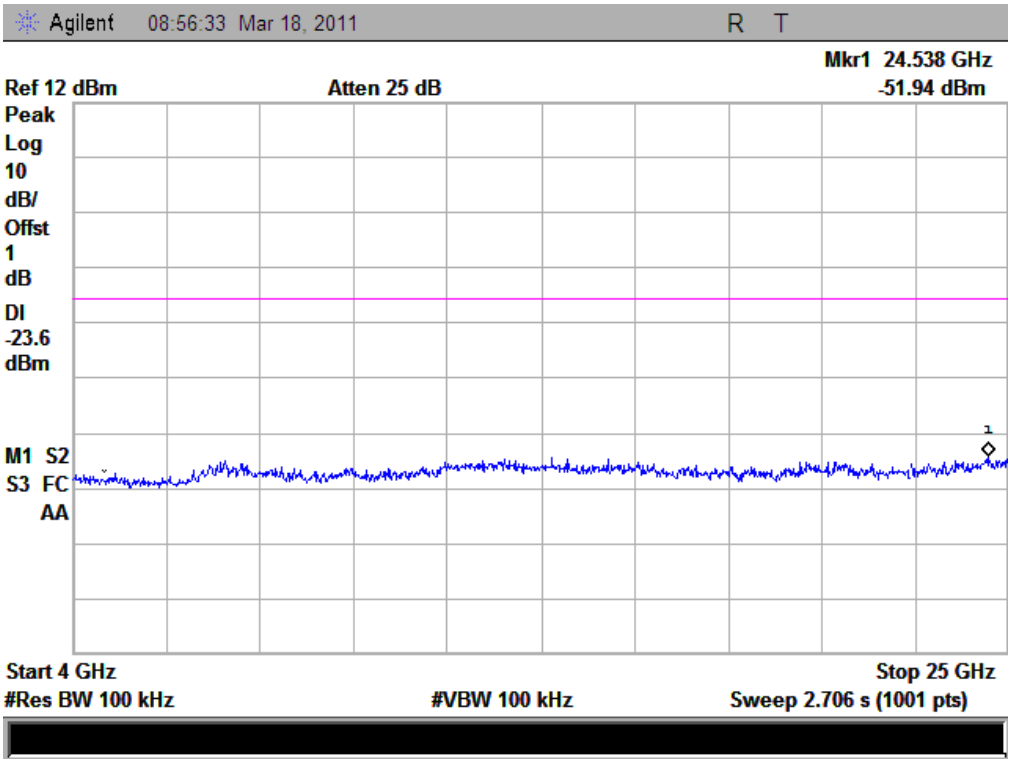
(Plot H.1: Channel = 39, 30MHz to 4GHz)



(Plot H.2: Channel = 39, 4GHz to 25GHz)



(Plot I.1: Channel = 78, 30MHz to 4GHz)



(Plot I.2: Channel = 78, 4GHz to 25GHz)

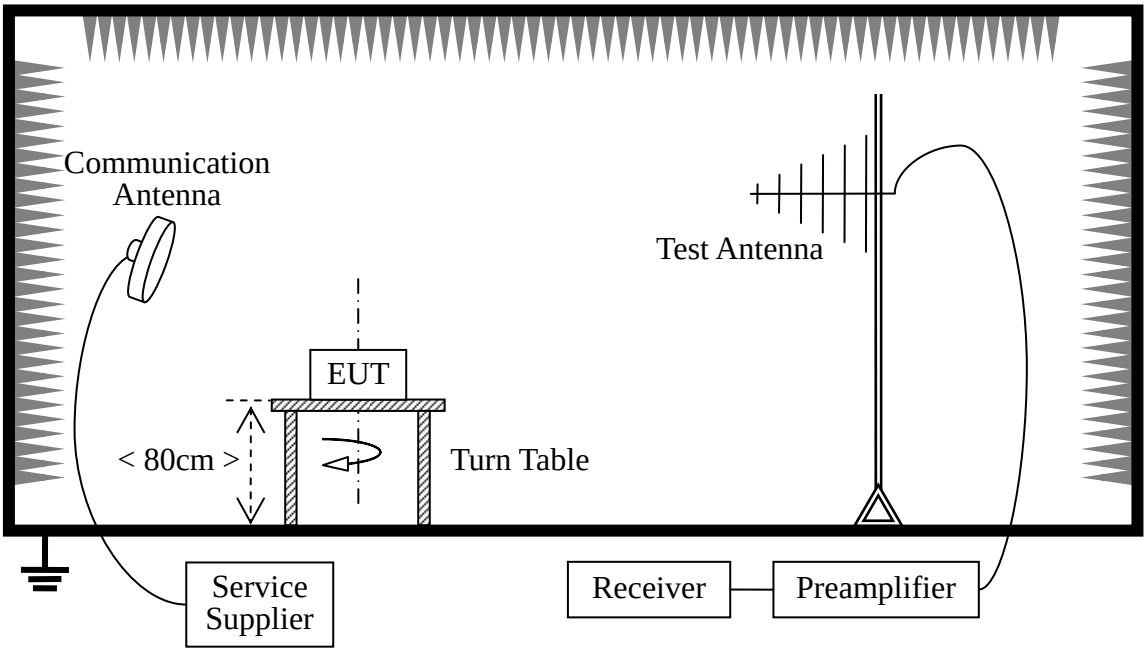
2.7 Band Edge

2.7.1 Requirement

According to FCC section 15.247(c) and RSS- A8.5, in any 100kHz 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 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.7.2 Test Description

A. Test Setup:



The Bluetooth Module of the EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Bluetooth Module is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

For the Test Antenna:

Horn Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength..

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
System Simulator	R&S	CMU200	100448	2010.9
Receiver	Agilent	E7405A	US44210471	2010.9
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2010.9
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2010.9

2.7.3 Test Result

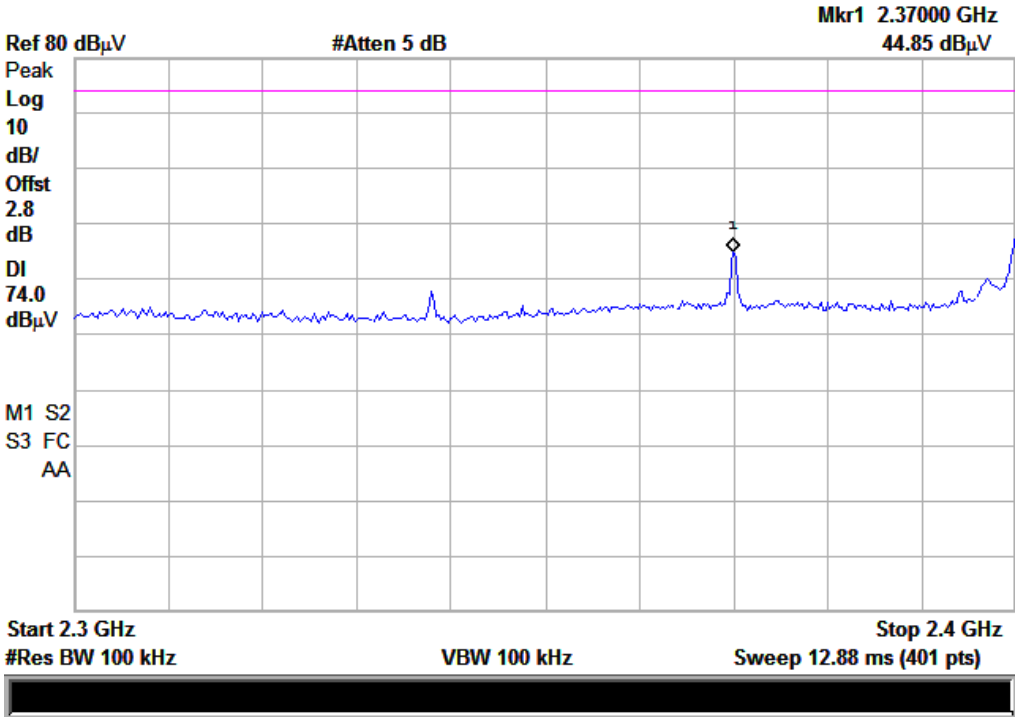
The Bluetooth Module operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

A. Test Verdict:

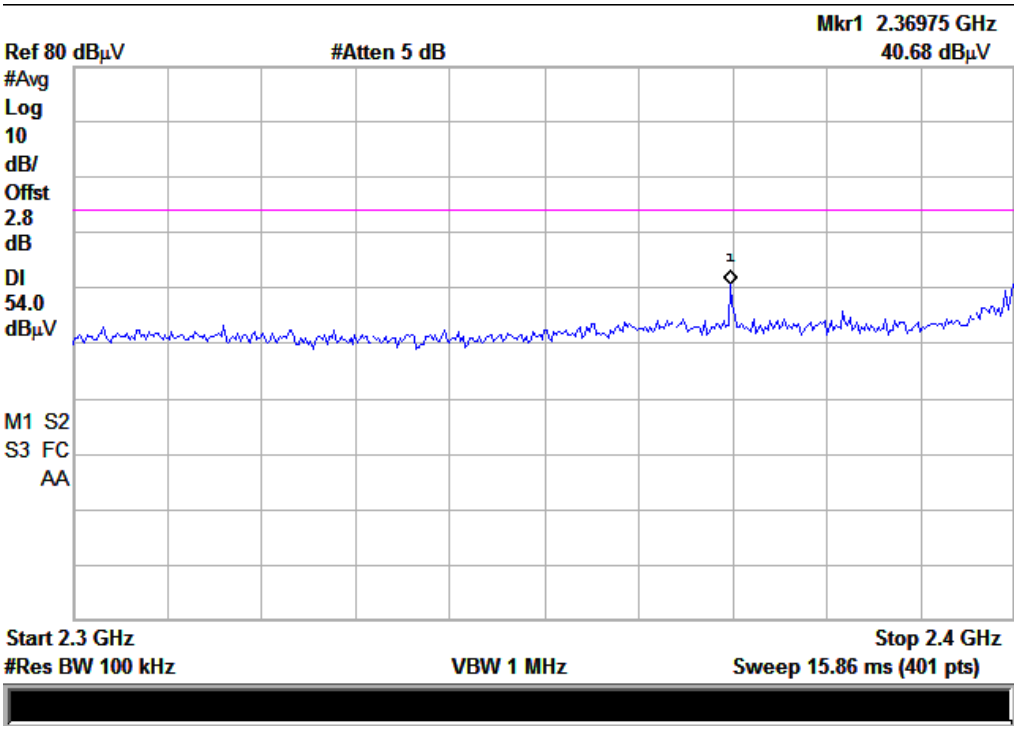
GFSK Mode

Channel	Frequency (MHz)	Max. Emission in the Restricted Bands (dBμV/m)		Limit (dBμV/m)		Verdict
		PK	AV	PK	AV	
0	2402	44.85	40.68	74	54	PASS
78	2480	39.56	38.84	74	54	PASS

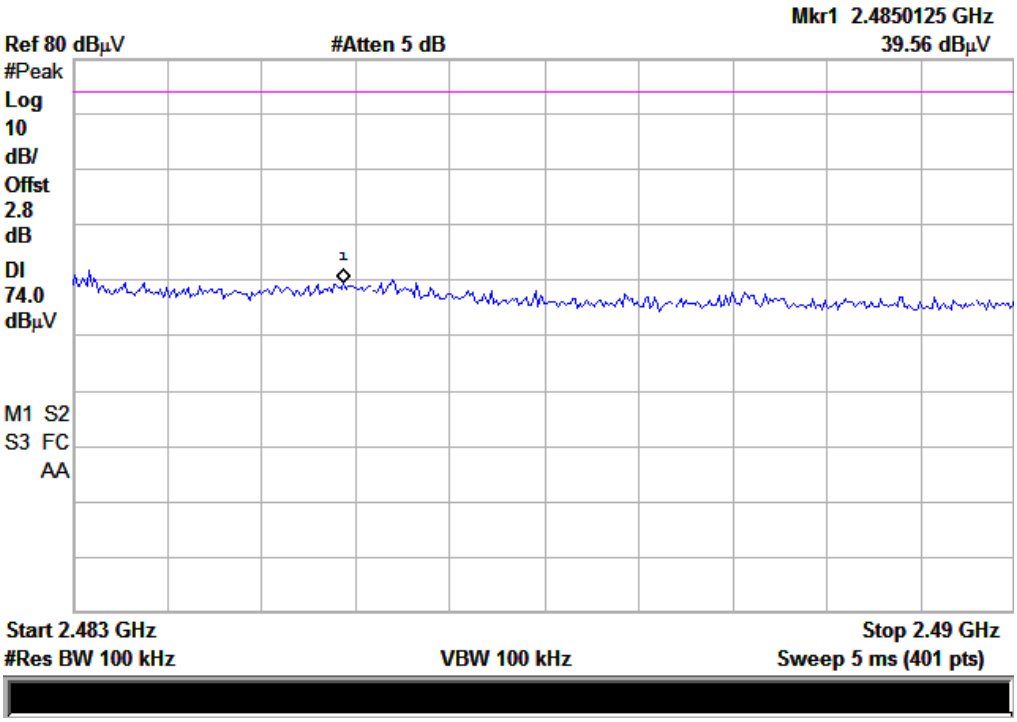
B. Test Plot:



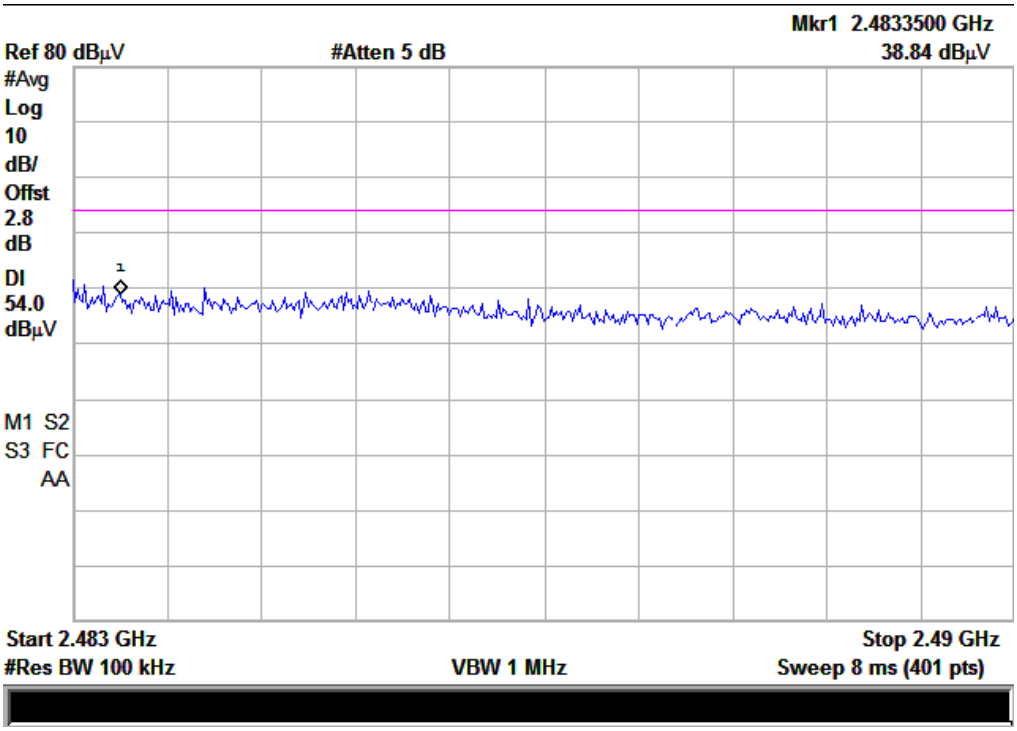
(Plot A1: Channel = 0 PEAK)



(Plot A2: Channel = 0 AVERAGE)



(Plot B1: Channel = 78 PEAK)



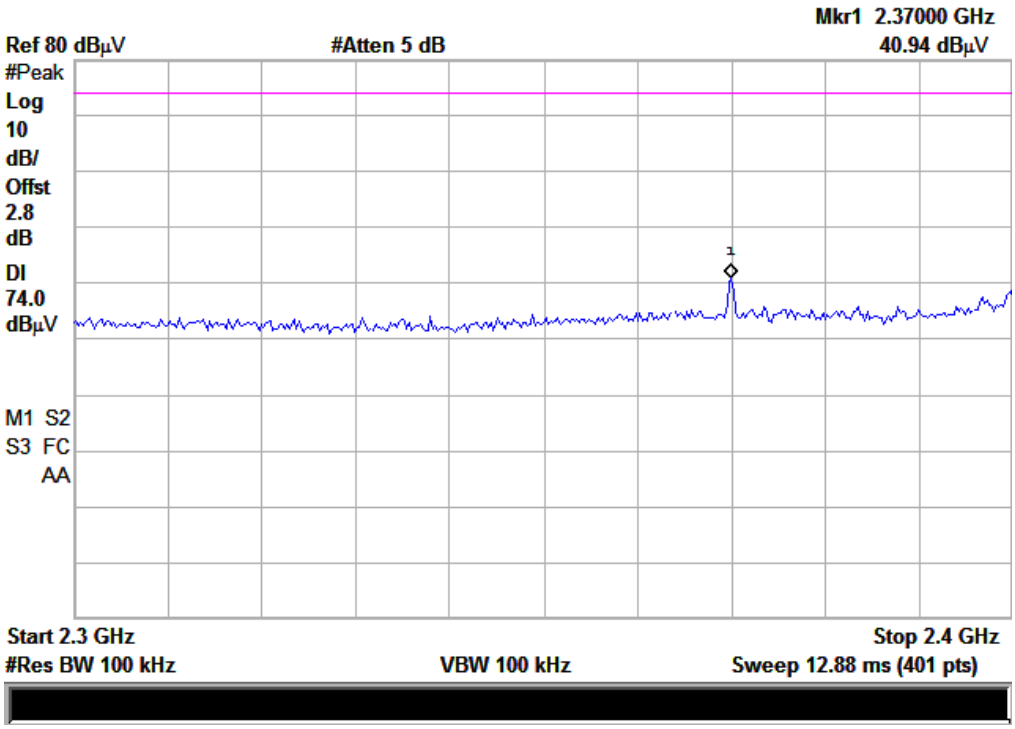
(Plot B2: Channel = 78 AVERAGE)

A. Test Verdict:

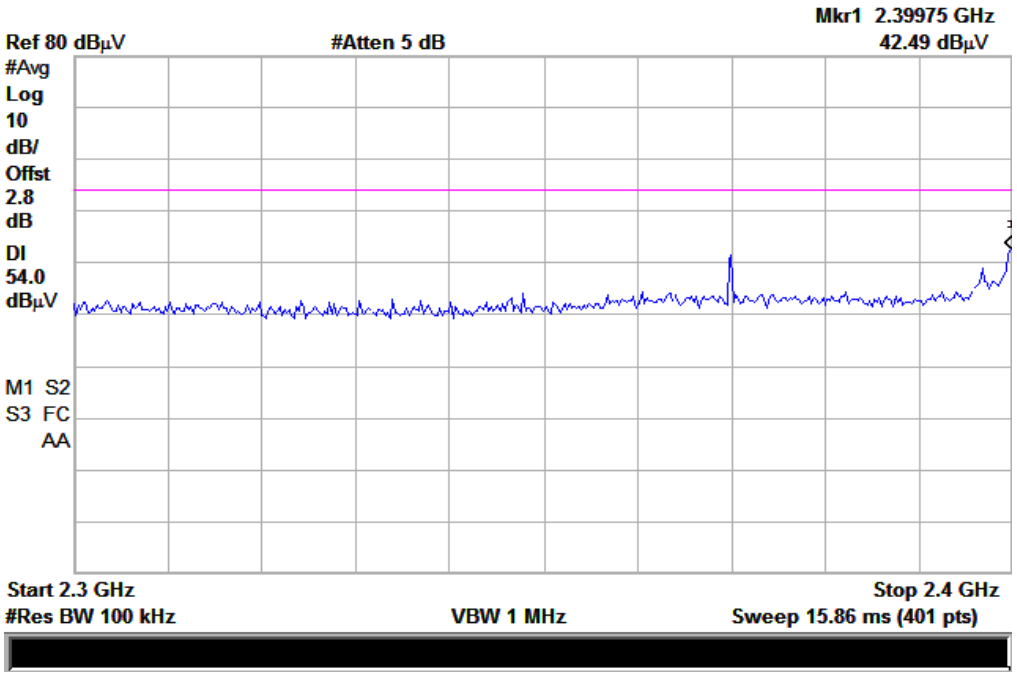
π/4-DQPSK Mode

Channel	Frequency (MHz)	Max. Emission in the Restricted Bands (dBμV/m)		Limit (dBμV/m)		Verdict
		PK	AV	PK	AV	
0	2402	40.94	42.49	74	54	PASS
78	2480	39.53	42.44	74	54	PASS

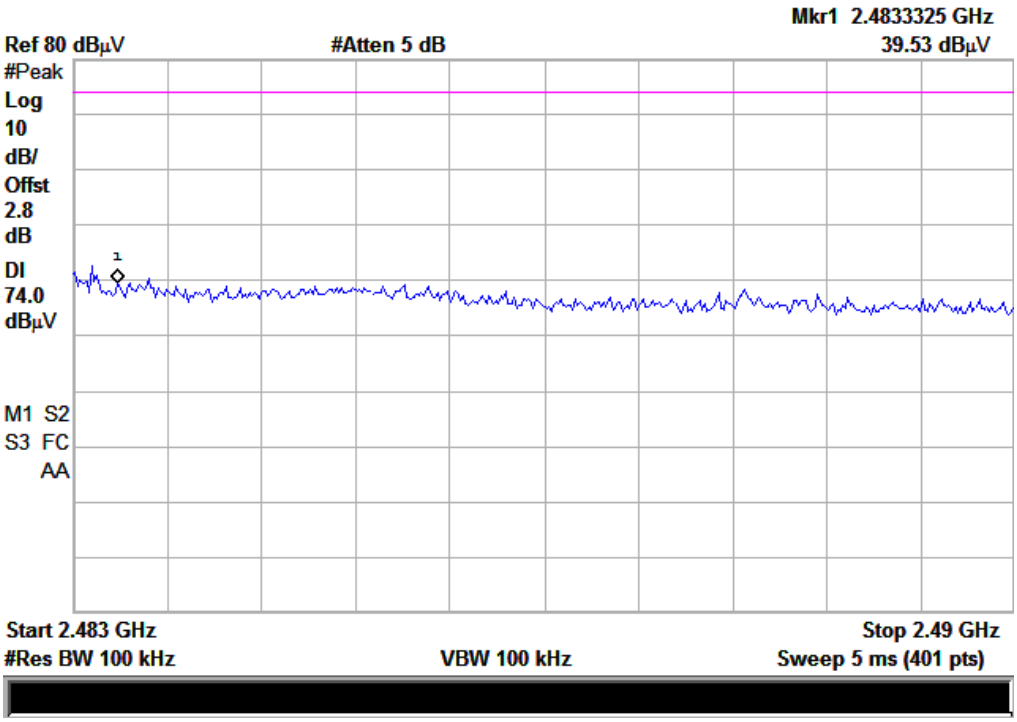
B. Test Plot:



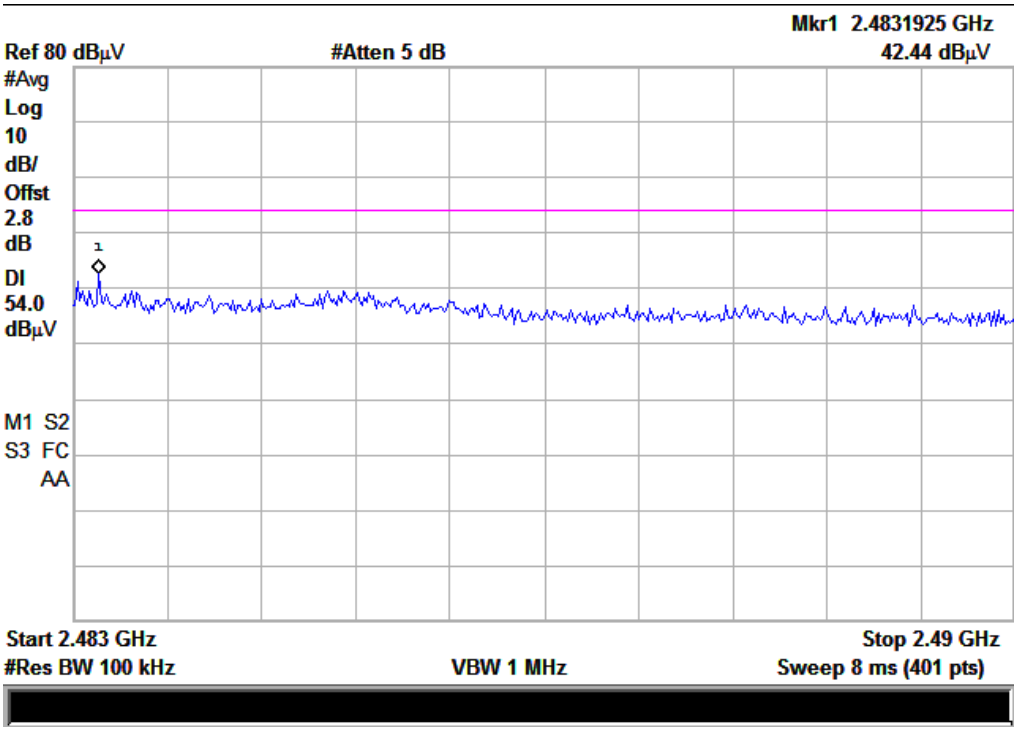
(Plot A1: Channel = 0 PEAK)



(Plot A2: Channel = 0 AVERAGE)



(Plot B1: Channel = 78 PEAK)



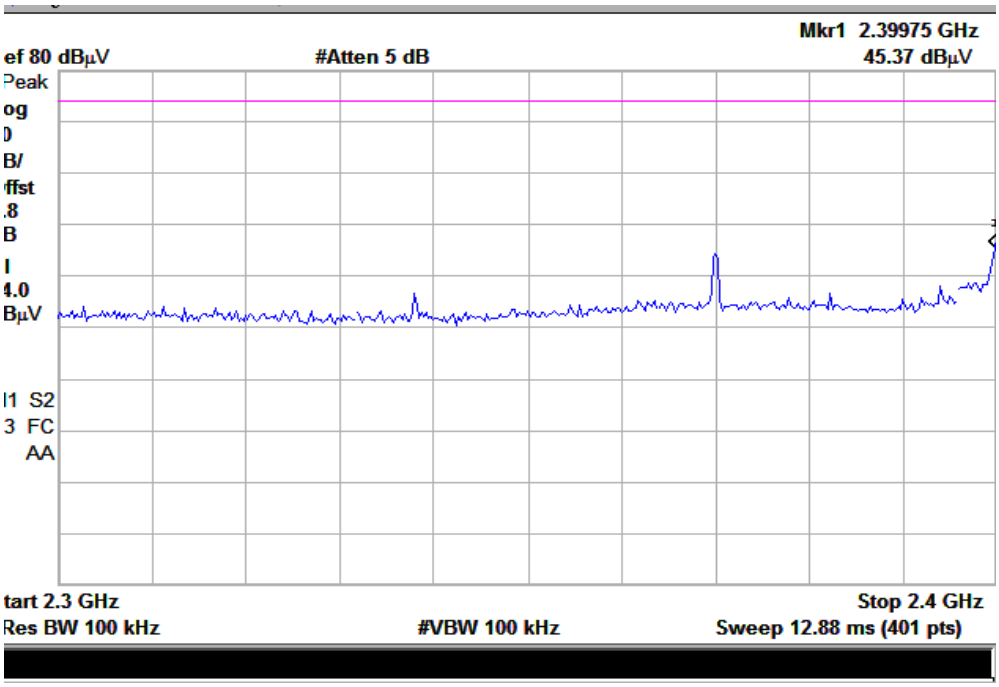
(Plot B2: Channel = 78 AVERAGE)

A. Test Verdict:

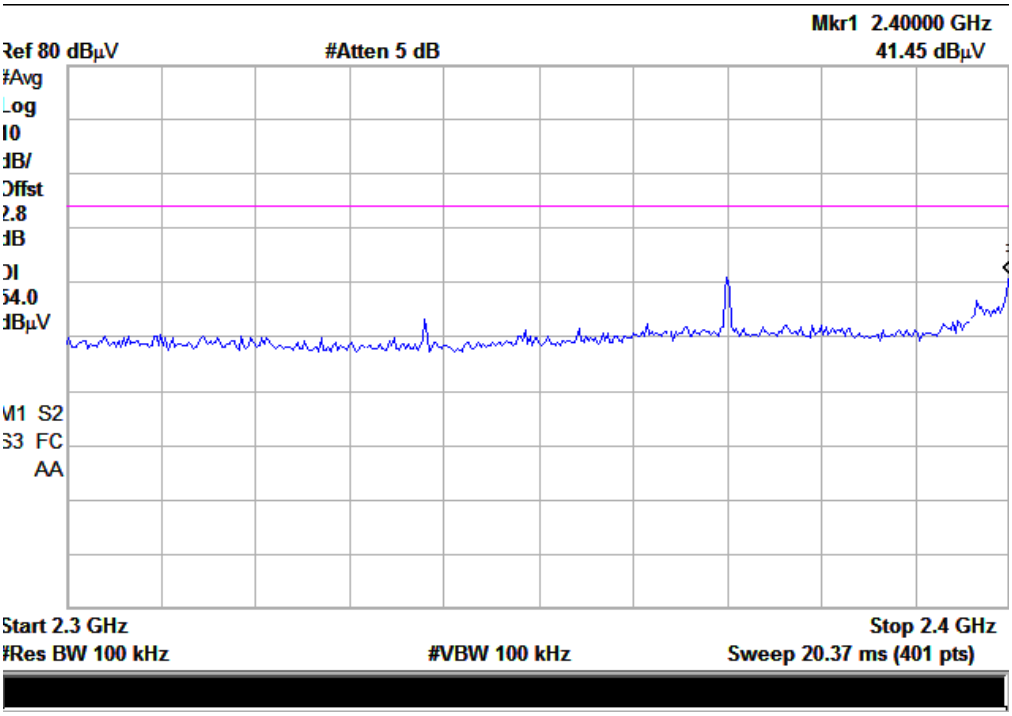
8-DPSK Mode

Channel	Frequency (MHz)	Max. Emission in the Restricted Bands (dBµV/m)		Limit (dBµV/m)		Verdict
		PK	AV	PK	AV	
0	2402	45.37	41.45	74	54	PASS
78	2480	40.78	39.00	74	54	PASS

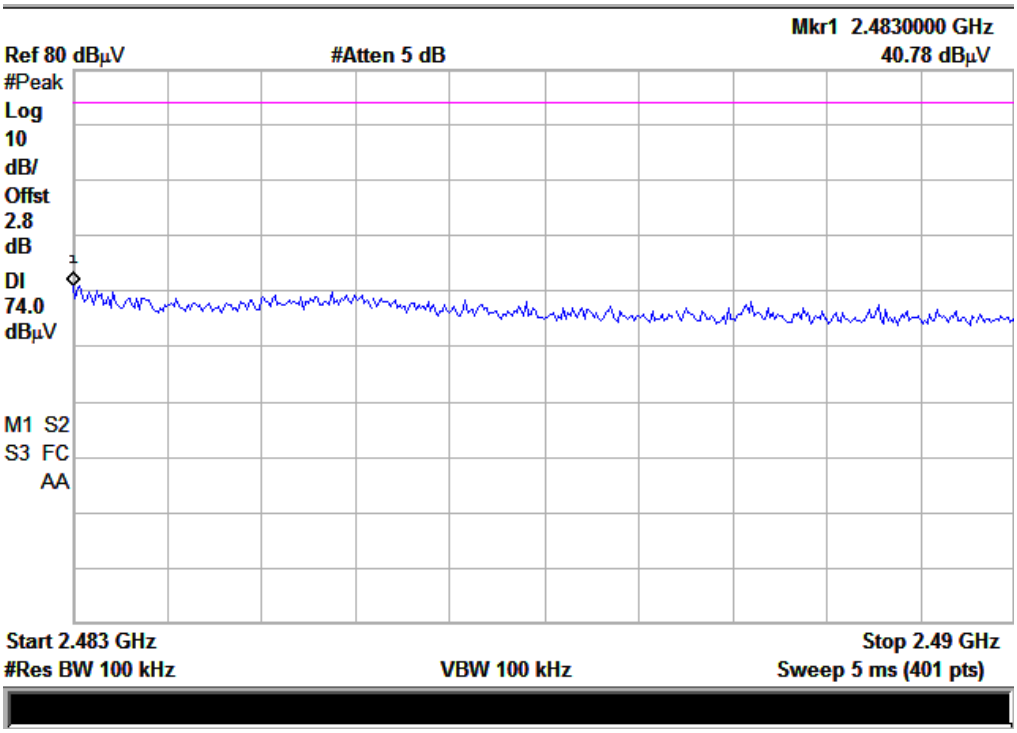
B. Test Plot:



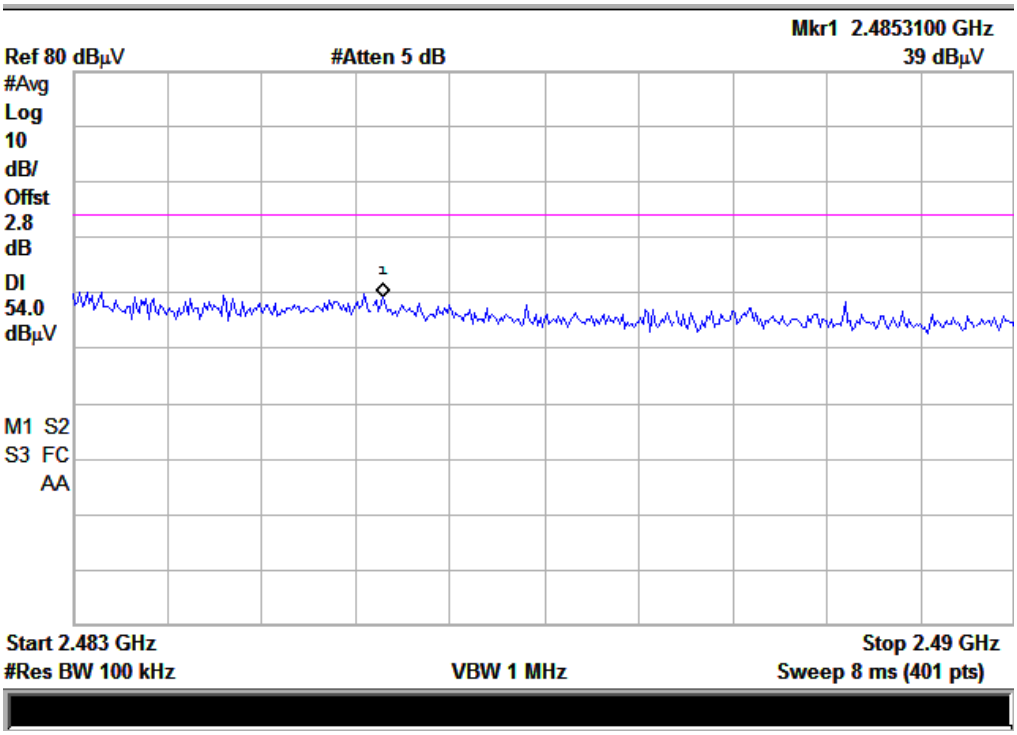
(Plot A1: Channel = 0 PEAK)



(Plot A2: Channel = 0 AVERAGE)



(Plot B1: Channel = 78 PEAK)



(Plot B2: Channel = 78 AVERAGE)

2.8 Conducted Emission

The test is not applicable, because the EUT is not switched, contains no switches, does not include inductive loads.

2.9 Radiated Emission

2.9.1 Requirement

According to FCC section 15.247(c) and RSS-A8.5, radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

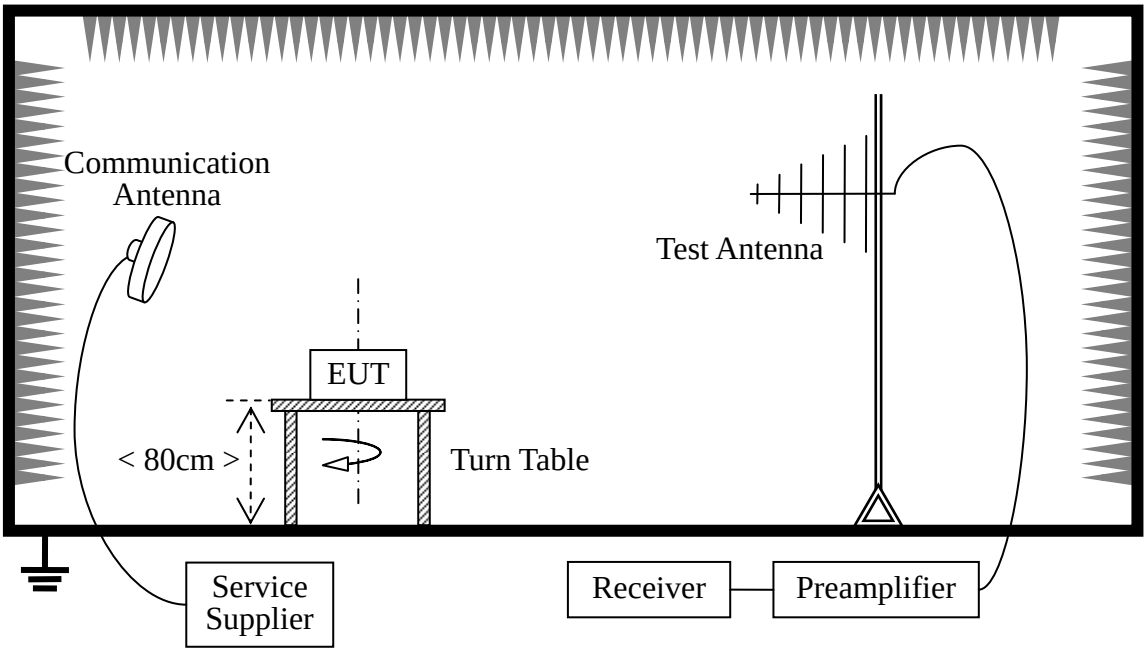
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)	Detector
30 - 88	100	3	QP
88 - 216	150	3	QP
216 - 960	200	3	QP
960 - 1000	500	3	QP
Above 1000	500	3	AV

In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

2.9.2 Test Description

A. Test Setup:



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2003). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

The Bluetooth Module of the EUT is powered by the Battery. The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading. During the measurement, the Bluetooth Module is activated and controlled by the Bluetooth Service Supplier (SS) via a Common Antenna, and is set to operate under hopping-on test mode transmitting 339 bytes DH5 packages at maximum power.

For the Test Antenna: In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength, the azimuth range of turntable was 0^o to 360^o, the receive antenna has two polarizations horizontal and vertical. When doing measurements above 1GHz, the EUT was placed within the 3dB beam width range of the horn antenna, and the EUT was tested in 3 orthogonal positions as recommended in ANSI C63.4 for Radiated Emissions and the worst-case data was presented.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date
System Simulator	R&S	CMU200	100448	2010.9
Receiver	Agilent	E7405A	US44210471	2010.9
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2010.9
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2010.9
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2010.9
Test Antenna - circular	R&S	AC004R1	0749.3000.03	2010.9

2.9.3 Test Result

GFSK Mode:

A. Test Verdict for Harmonics:

The Fundamental Emissions

The field strength of {Fundamental Emission} listed below is recorded, and used in the next table.

Channel	Frequency (MHz)	Antenna Polarization	Refer to Plot
0	2402	Horizontal	Plot A.1
		Vertical	Plot A.2
39	2441	Horizontal	Plot B.1
		Vertical	Plot B.2
78	2480	Horizontal	Plot C.1

Channel	Frequency (MHz)	Antenna Polarization	Refer to Plot
		Vertical	Plot C.2

Note: Following is the plots for emission measurement; please note that marked spikes near 2400MHz with circle should be ignored because they are Bluetooth carrier frequency.

The un-wanted Emissions:

Test result of channel: 0 (2402MHz)

Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
240.5 M	28.79	46	-17.21	100	77	Horizontel
448.1 M	27.82	46	-18.18	100	55	Horizontel
1603 M	40.04	54	-13.96	100	74	Horizontel
2500 M	48.59	54	-5.41	100	340	Horizontel
3715 M	46.92	54	-7.08	100	292	Horizontel
7990 M	44.91	54	-9.09	100	360	Horizontel
66.9 M	29.78	40	-10.22	100	2	Vertical
240.5 M	28.05	46	-17.95	100	35	Vertical
960.2 M	36	54	-18	100	0	Vertical
1603 M	38.57	54	-15.43	100	116	Vertical
2928 M	48.1	54	-5.9	100	316	Vertical
8125 M	44.05	54	-9.95	100	360	Vertical

Test result of channel: 39 (2442MHz)

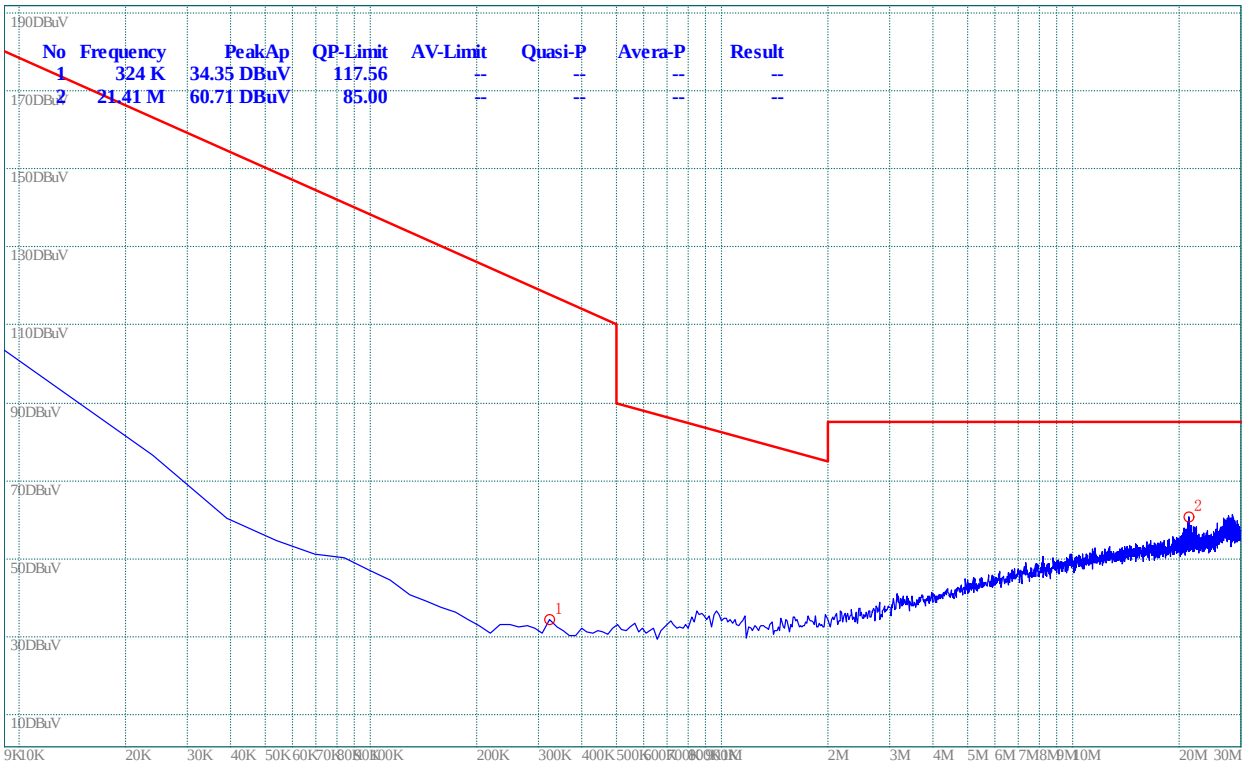
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
66.9 M	24.23	40	-15.77	100	57	Horizontel
240.5 M	27.9	46	-18.1	100	18	Horizontel
379.2 M	31.62	46	-14.38	100	2	Horizontel
720.6 M	29.92	46	-16.08	100	40	Horizontel
2793 M	48.97	54	-5.03	100	70	Horizontel
6572 M	44.7	54	-9.3	100	0	Horizontel
66.9 M	29.41	40	-10.59	100	2	Vertical
240.5 M	27.53	46	-18.47	100	10	Vertical
960.2 M	35.1	54	-18.9	100	21	Vertical
1627 M	37.82	54	-16.18	100	22	Vertical
2590 M	48.72	54	-5.28	100	44	Vertical
7945 M	44.81	54	-9.19	100	19	Vertical

Test result of channel: 78 (2480MHz)

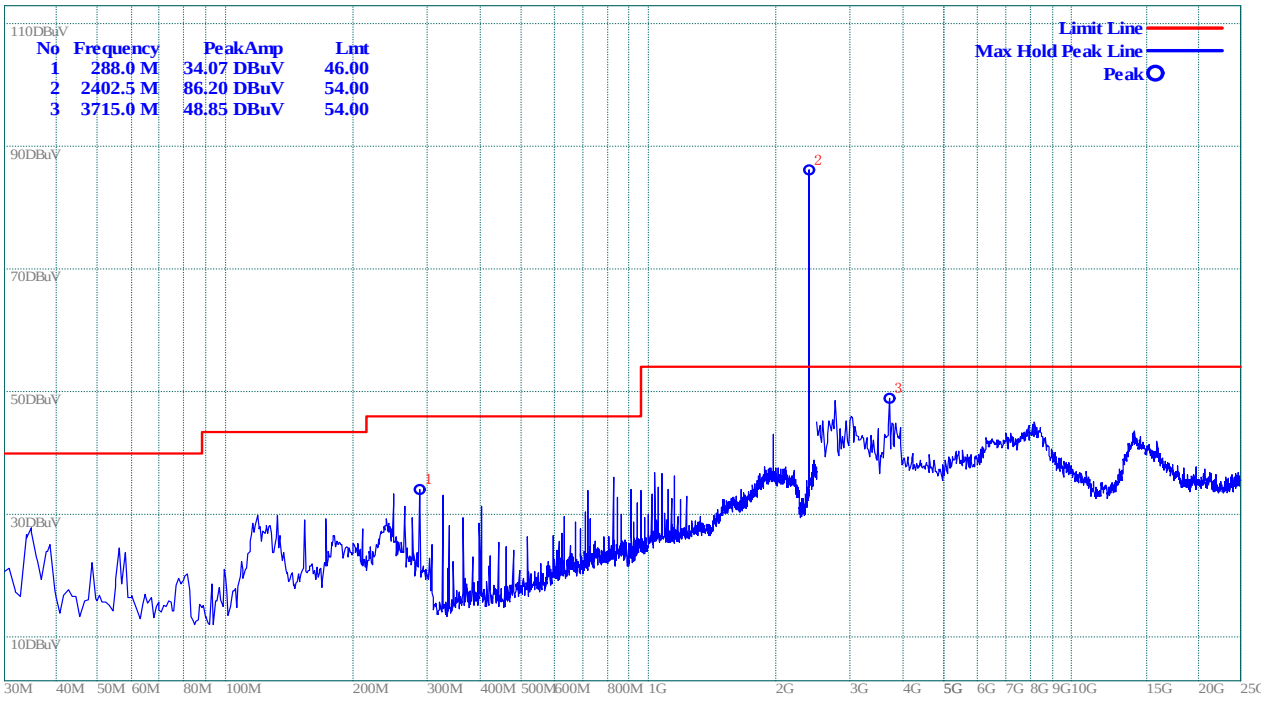
Frequency (MHz)	PK Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
36.8 M	25.22	40	-14.78	100	308	Horizontel
240.5 M	30.37	46	-15.63	100	268	Horizontel
598.4 M	36.58	46	-9.42	100	207	Horizontel
2793 M	46.13	54	-7.87	100	315	Horizontel
8777 M	44.24	54	-9.76	100	315	Horizontel
36.8 M	25.44	40	-14.56	100	11	Vertical
66.9 M	30.9	40	-9.1	100	0	Vertical
240.5 M	27.12	46	-18.88	100	0	Vertical
960.2 M	35.09	54	-18.91	100	2	Vertical
2928 M	45.6	54	-8.4	100	19	Vertical
8035 M	44.05	54	-9.95	94	94	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

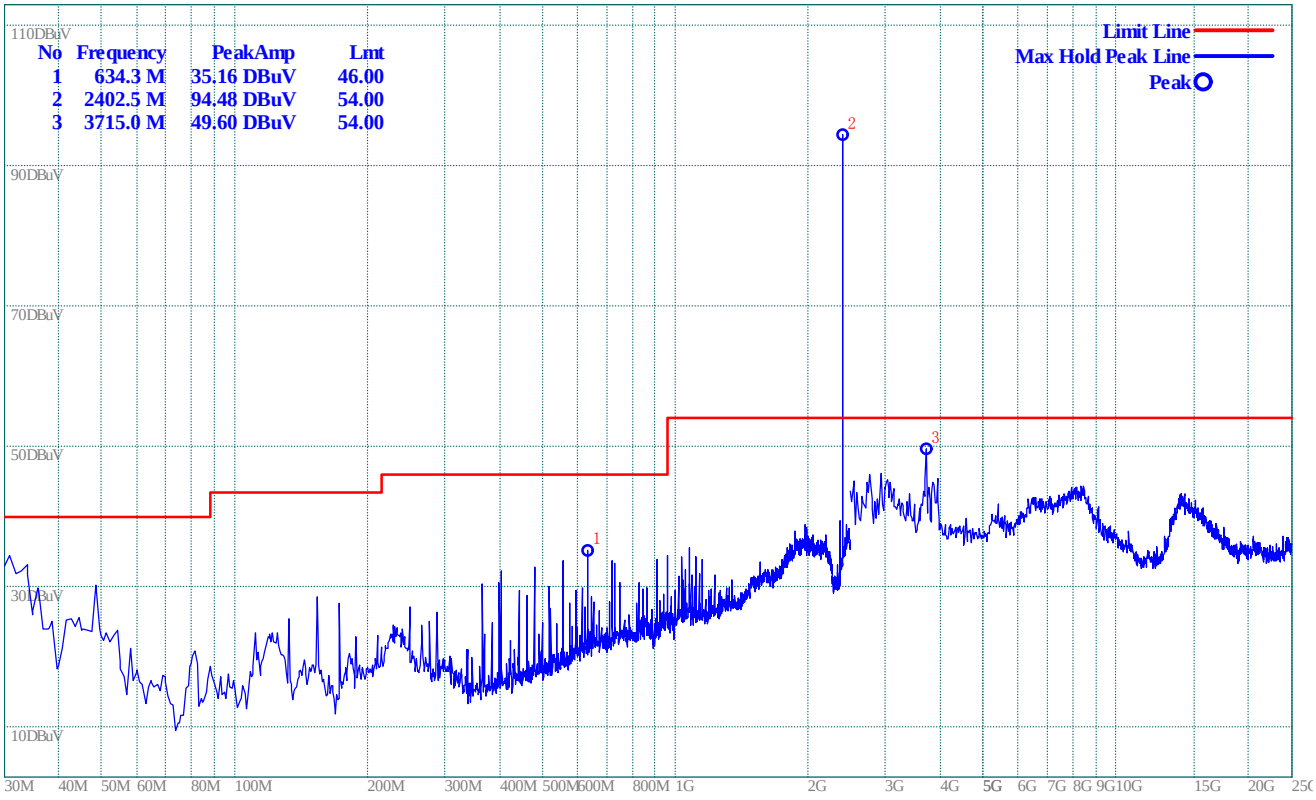
Plots for Channel = 0



(Plot A.0: 9kHz to 30MHz)

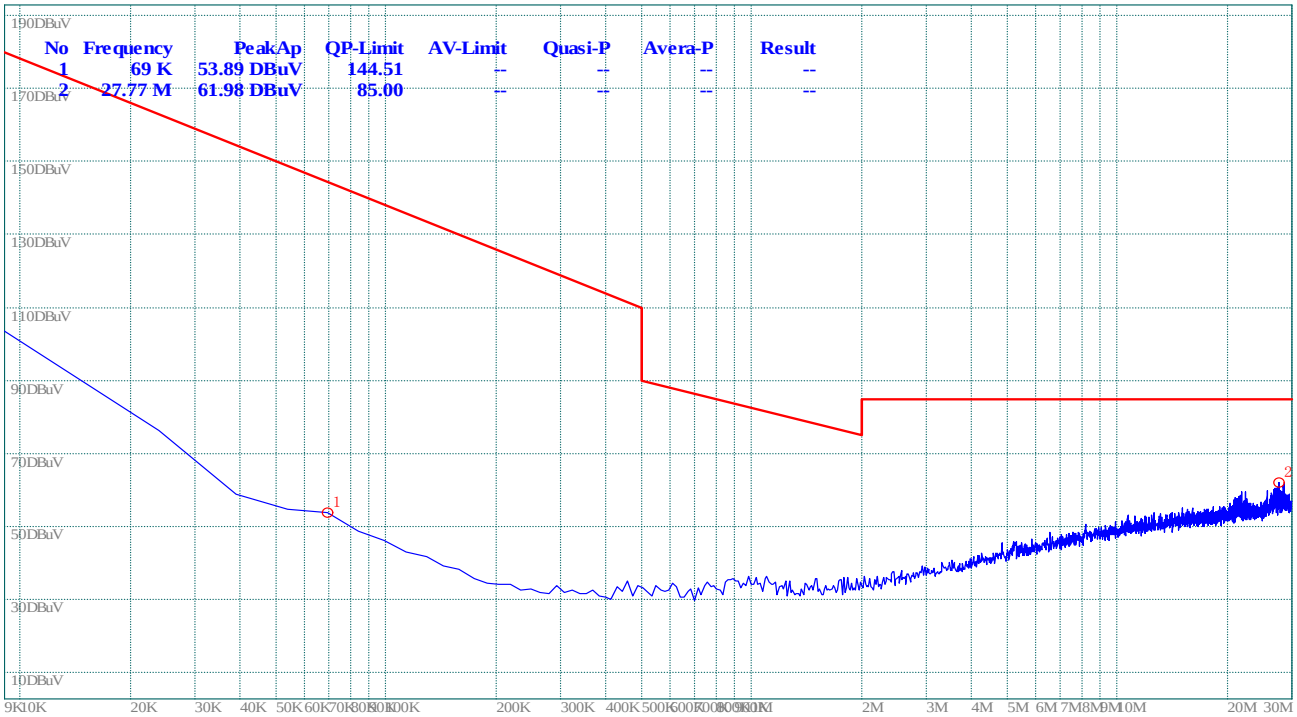


(Plot A.1: Antenna Horizonta)

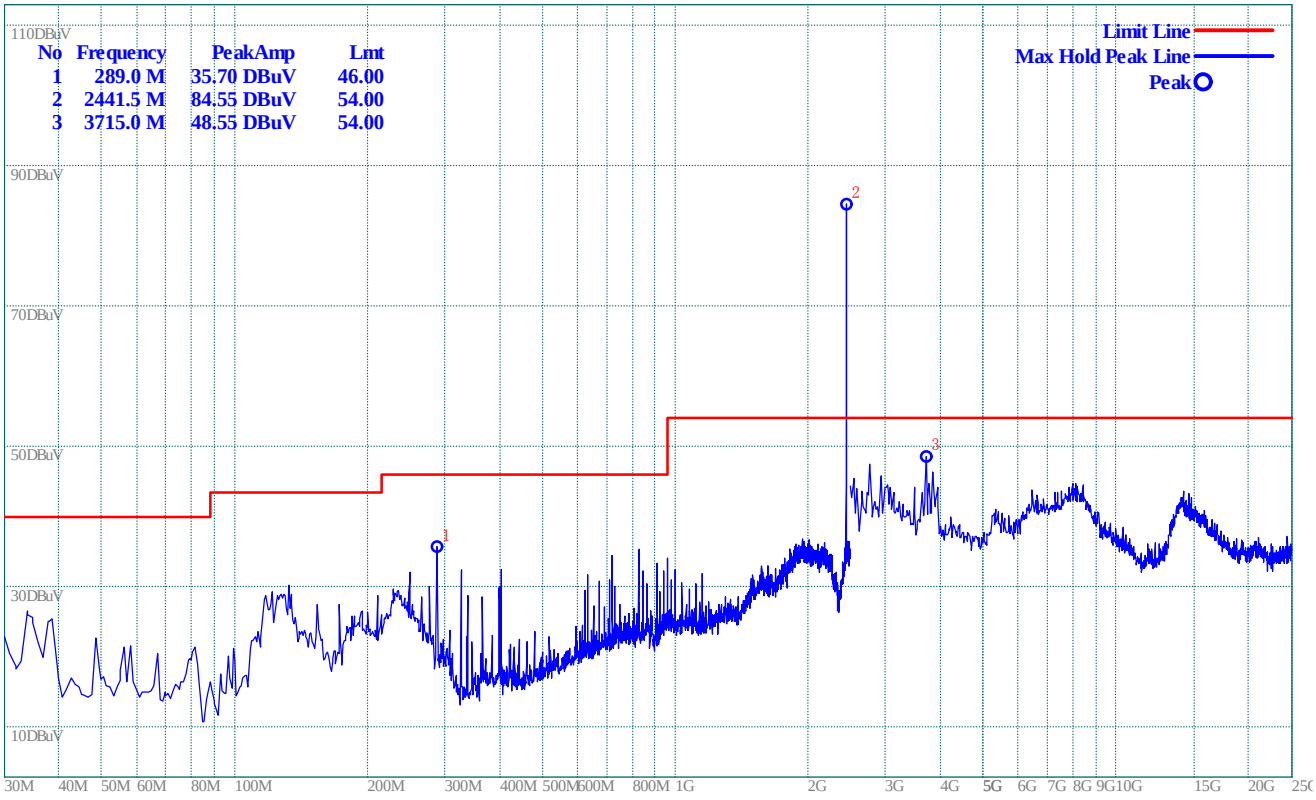


(Plot A.2: Antenna Vertical)

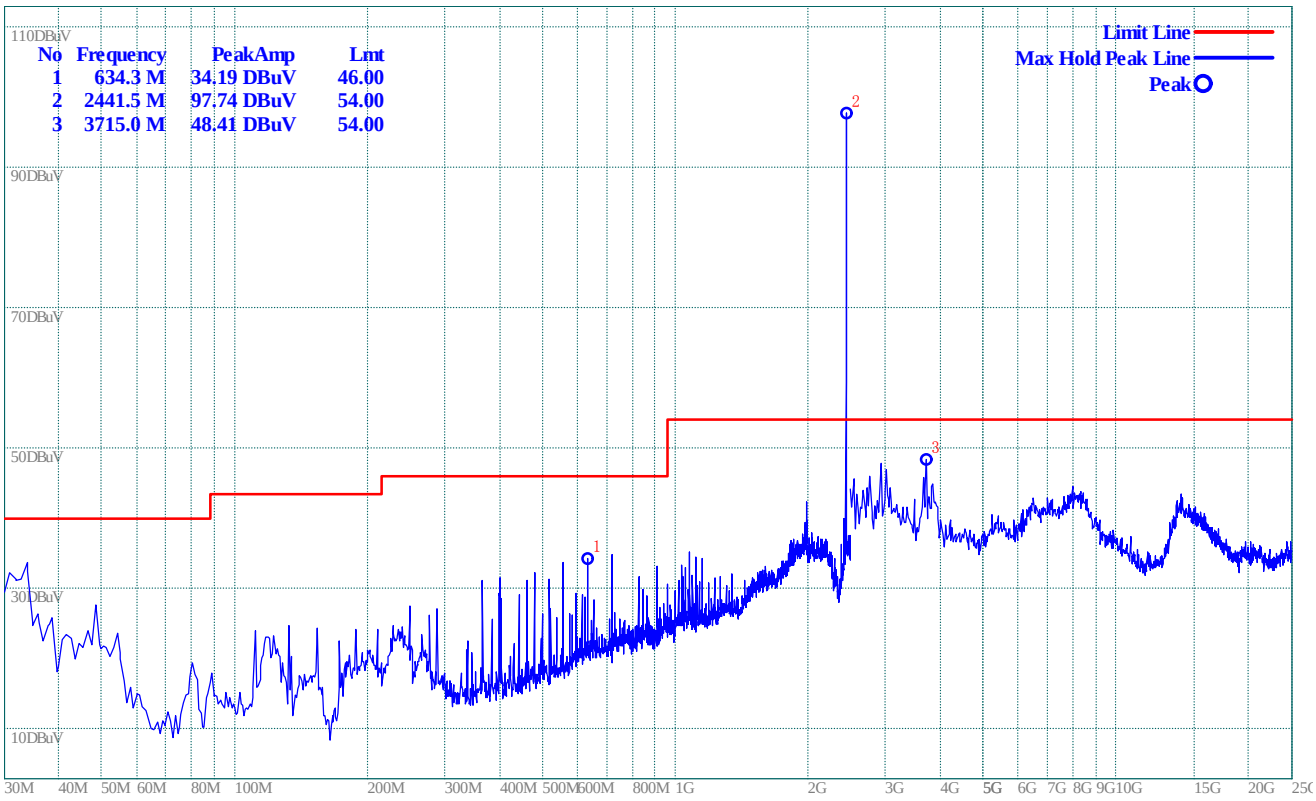
Plot for Channel = 39



(Plot B.0: 9kHz to 30MHz)

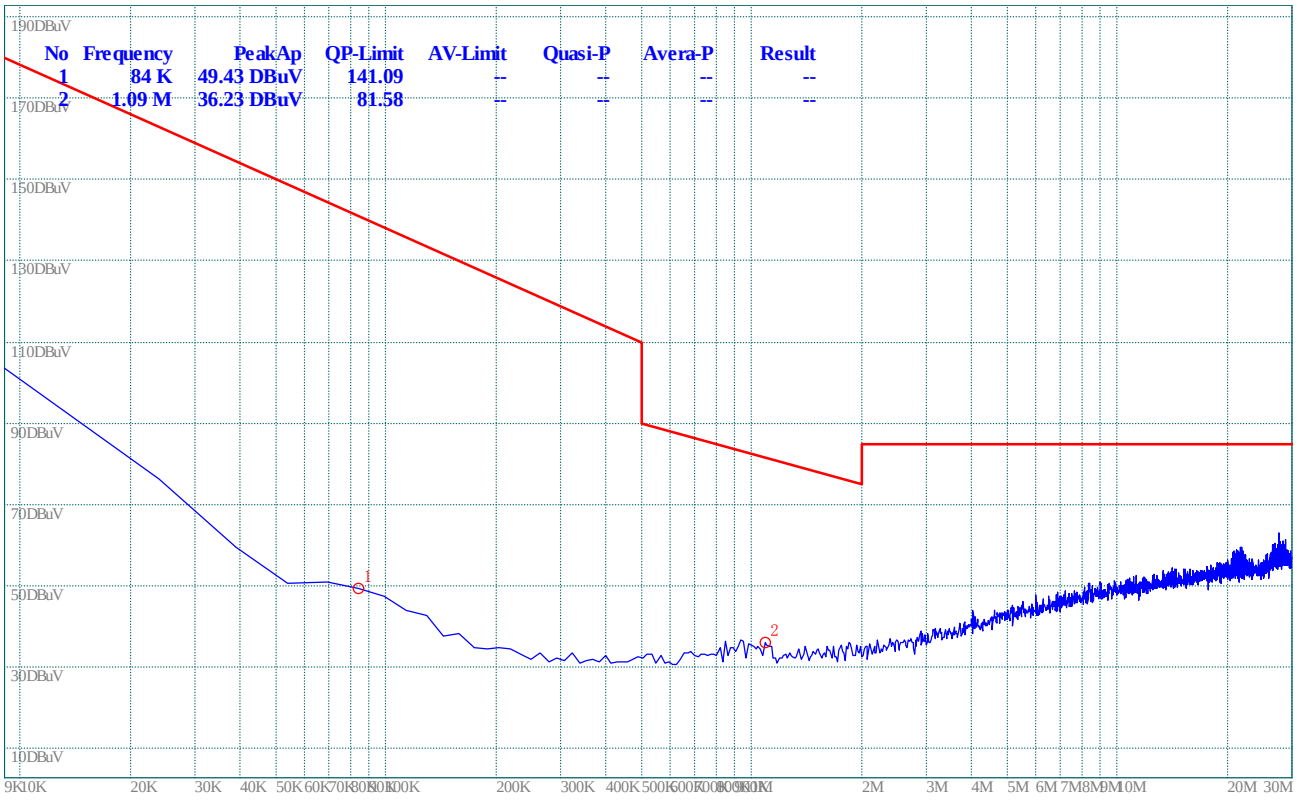


(Plot B.1: Antenna Horizontal)

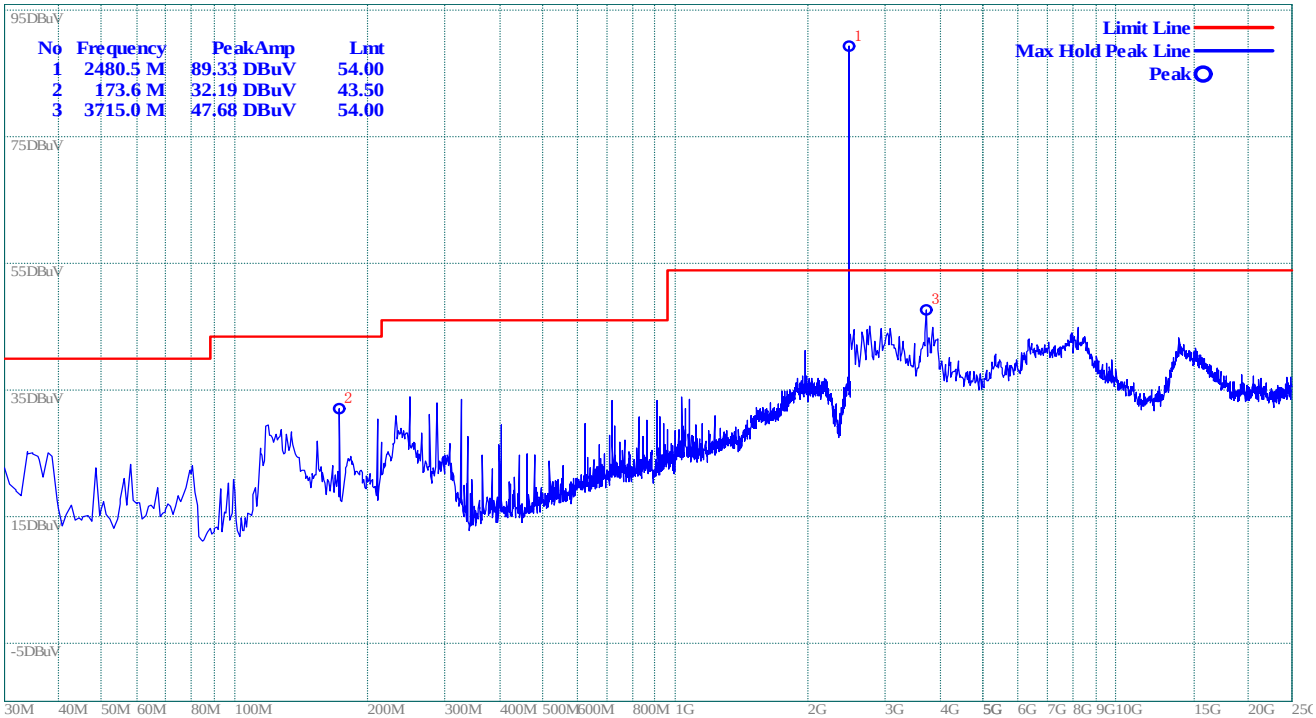


(Plot B.2: Antenna Vertical)

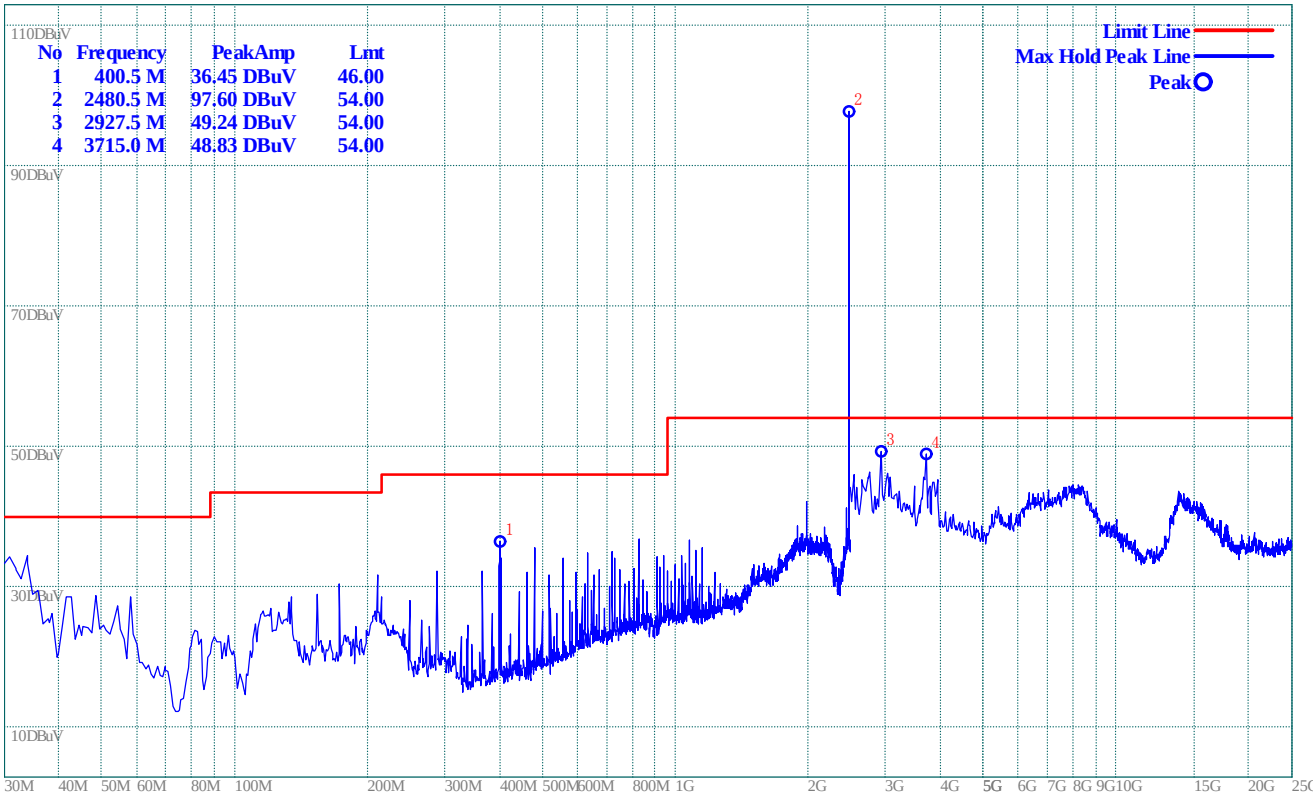
Plot for Channel = 78



(Plot C.0: 9kHz to 30MHz)



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

π/4-DQPSK Mode:

A. Test Verdict for Harmonics:

The Fundamental Emissions

The field strength of {Fundamental Emission} listed below is recorded, and used in the next table.

Channel	Frequency (MHz)	Antenna Polarization	Refer to Plot
0	2402	Horizontal	Plot A.1
		Vertical	Plot A.2
39	2441	Horizontal	Plot B.1
		Vertical	Plot B.2
78	2480	Horizontal	Plot C.1
		Vertical	Plot C.2

Note: Following is the plots for emission measurement; please note that marked spikes near 2400MHz with circle should be ignored because they are Bluetooth carrier frequency.

The un-wanted Emissions:

Test result of channel: 0 (2402MHz)

Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
208.5 M	31.6	43.5	-11.9	100	206	Horizontel
912.7 M	34.94	46	-11.06	100	94	Horizontel
52.3 M	32.11	40	-7.89	100	73	Vertical
912.7 M	33.93	46	-12.07	100	359	Vertical

Test result of channel: 39 (2442MHz)

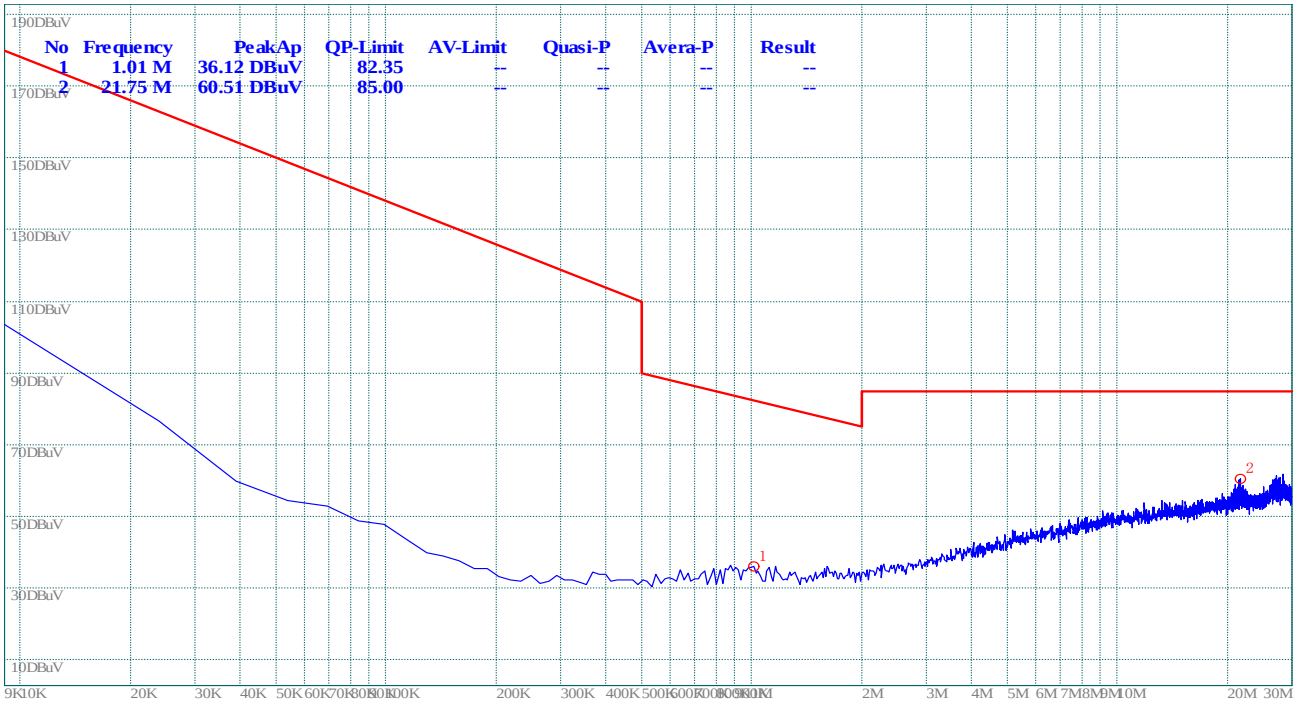
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
208.5 M	24.5	43.5	-19	100	0	Horizontel
912.7 M	32.49	46	-13.51	100	34	Horizontel
208.5 M	23.41	43.5	-20.09	100	111	Vertical
912.7 M	32.97	46	-13.03	100	325	Vertical

Test result of channel: 78 (2480MHz)

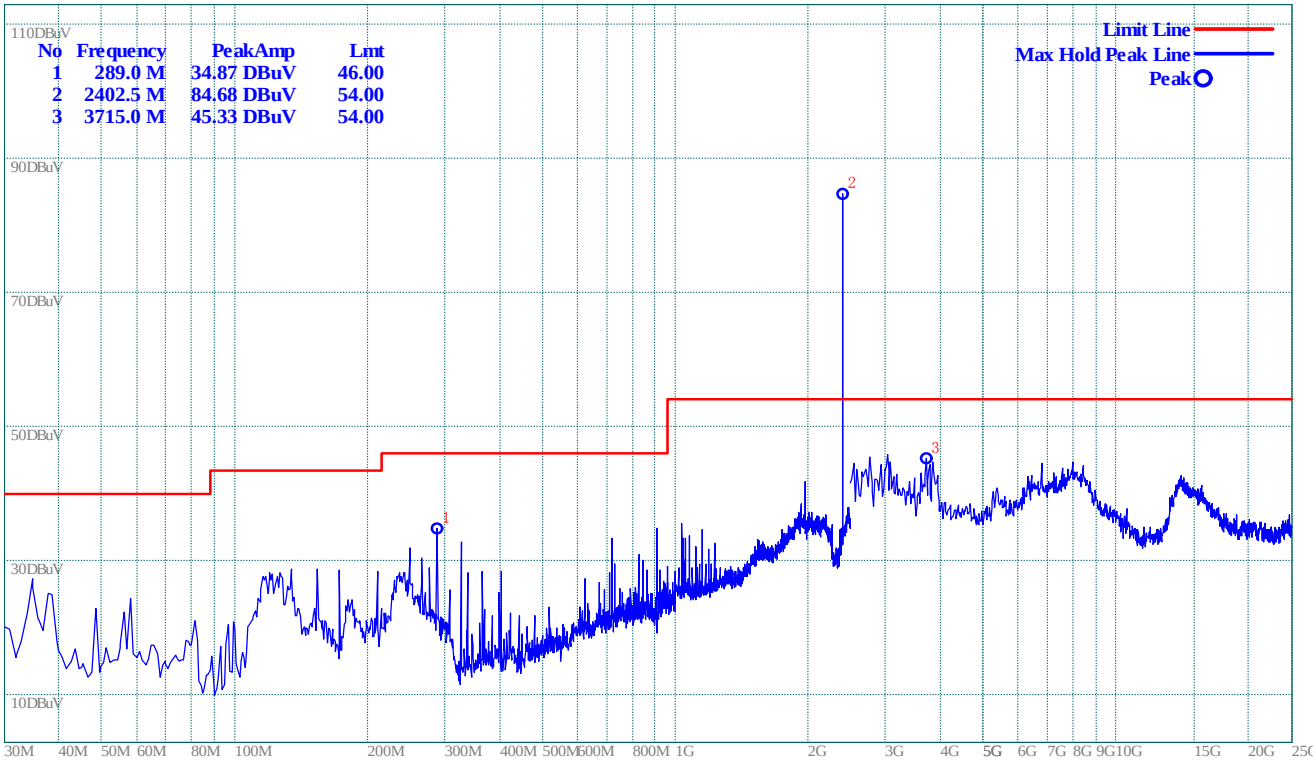
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
208.5 M	30.38	43.5	-13.12	100	203	Horizontel
912.7 M	34.18	46	-11.82	100	152	Horizontel
31.0 M	35.96	40	-4.04	100	357	Vertical
240.5 M	23.34	46	-22.66	100	306	Vertical
624.6 M	30.8	46	-15.2	100	306	Vertical
2.793 G	47.89	54	-6.11	100	271	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

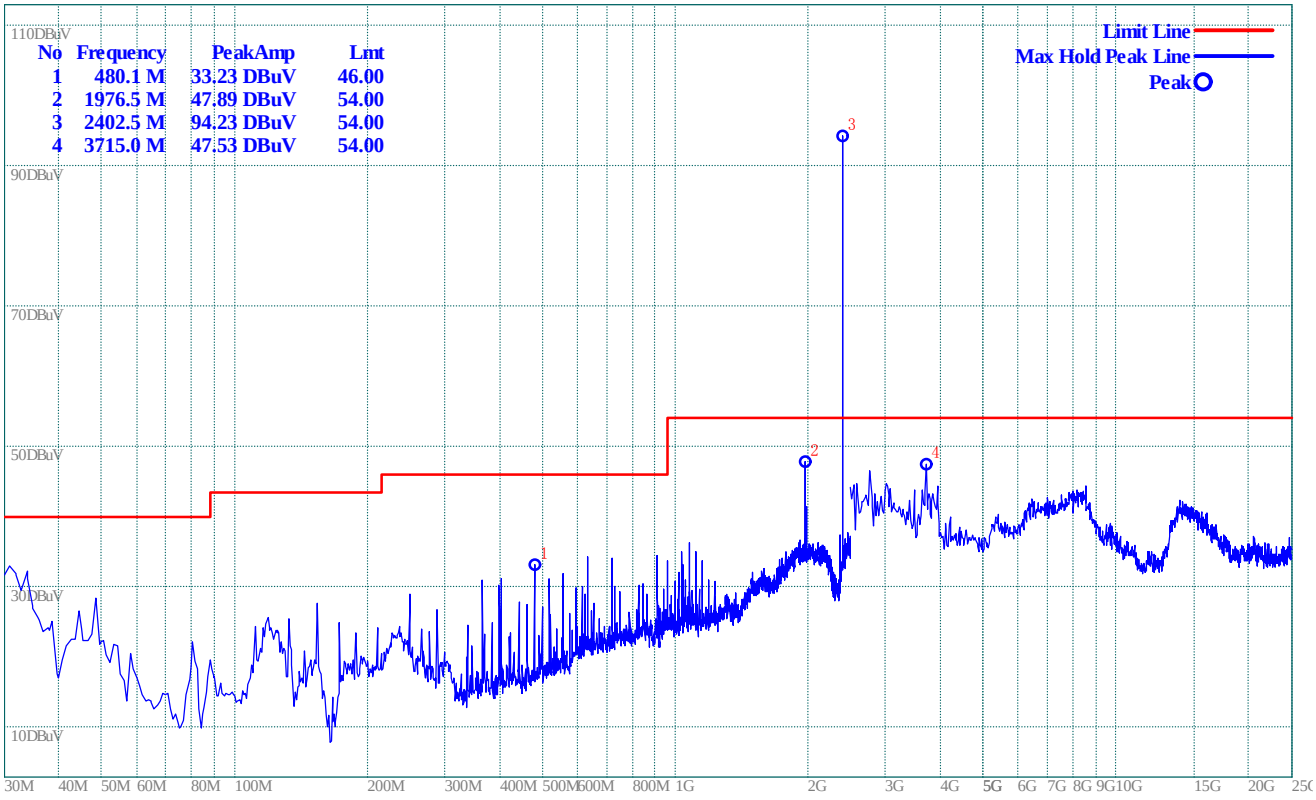
Plots for Channel = 0



(Plot A.0: 9kHz to 30MHz)

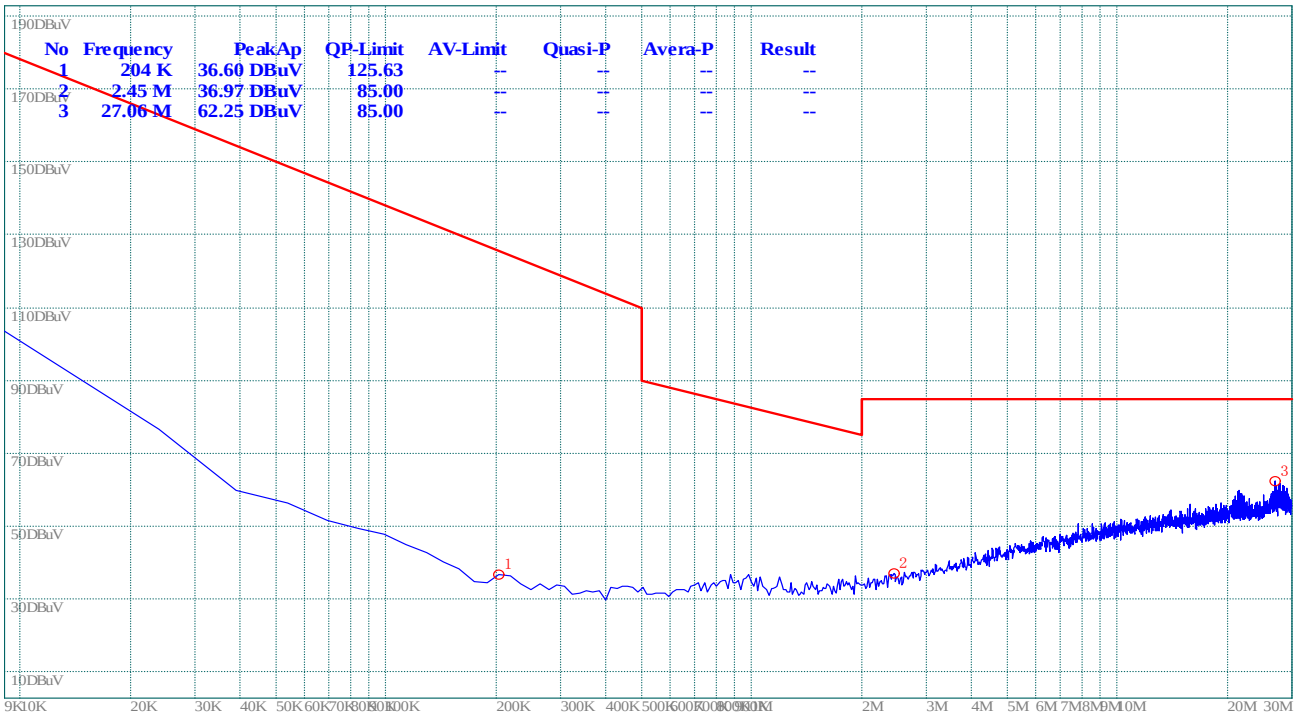


(Plot A.1: Antenna Horizonta)

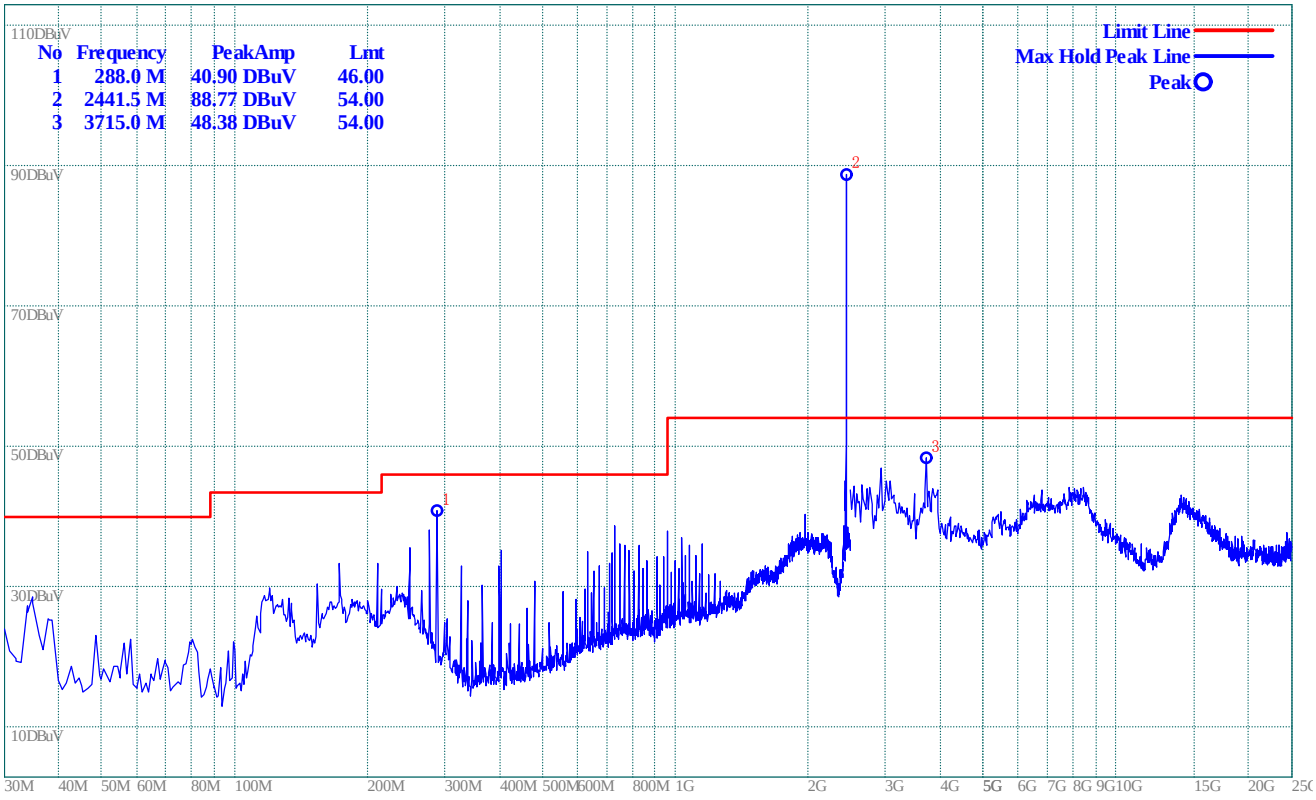


(Plot A.2: Antenna Vertical)

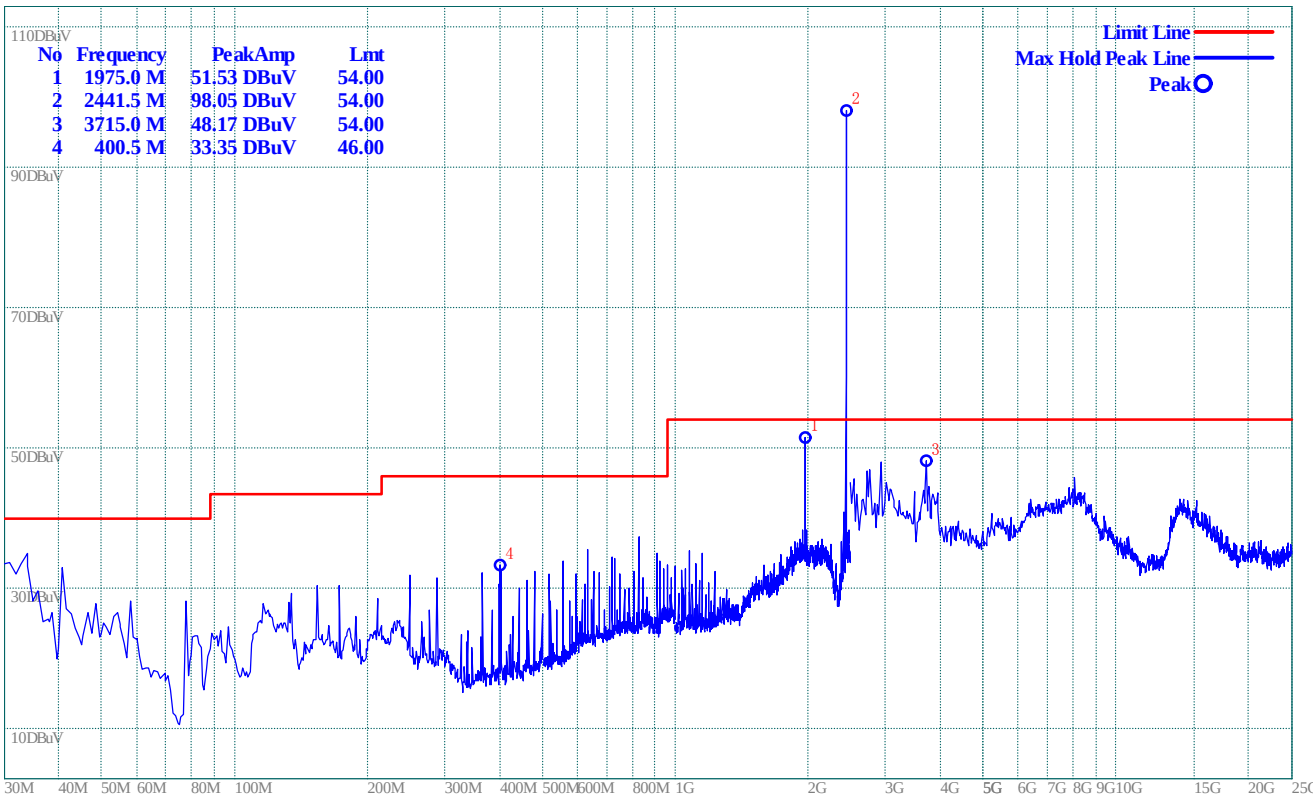
Plot for Channel = 39



(Plot B.0: 9kHz to 30MHz)

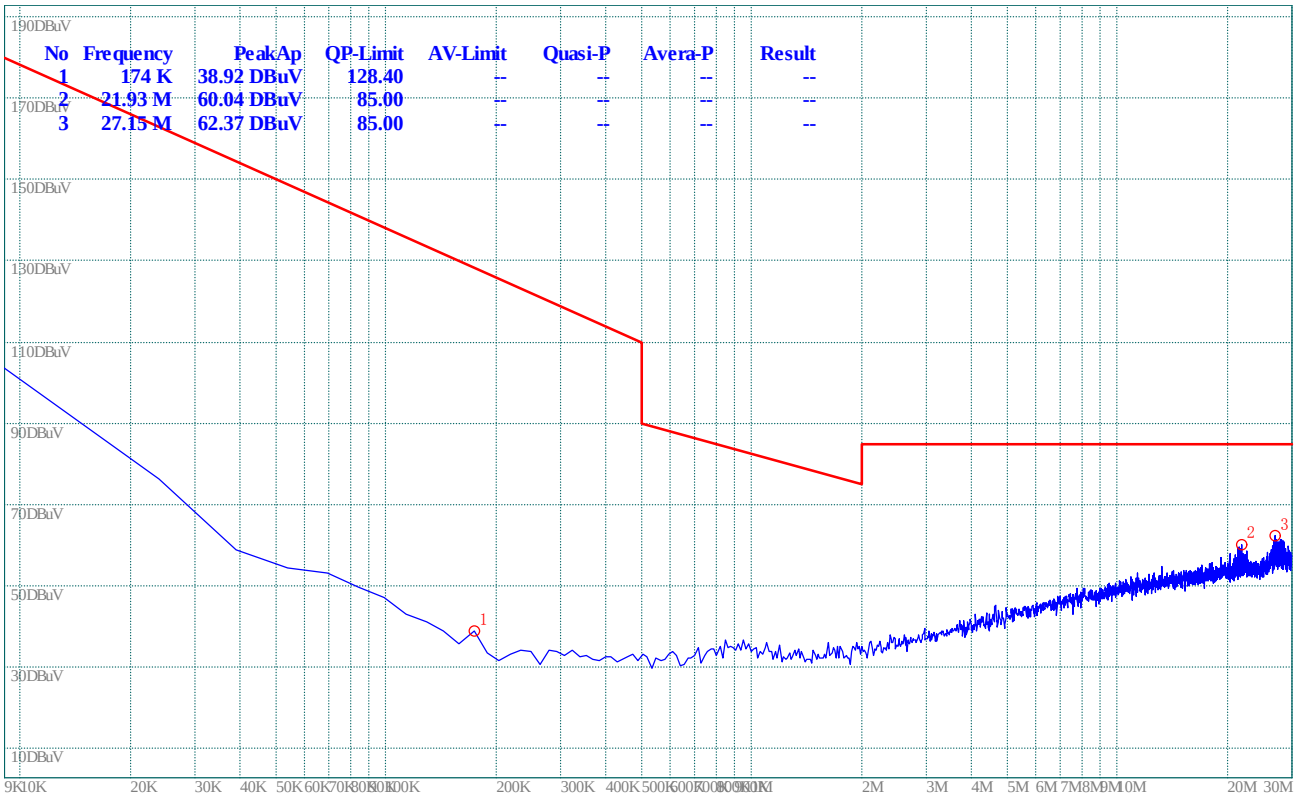


(Plot B.1: Antenna Horizontal)

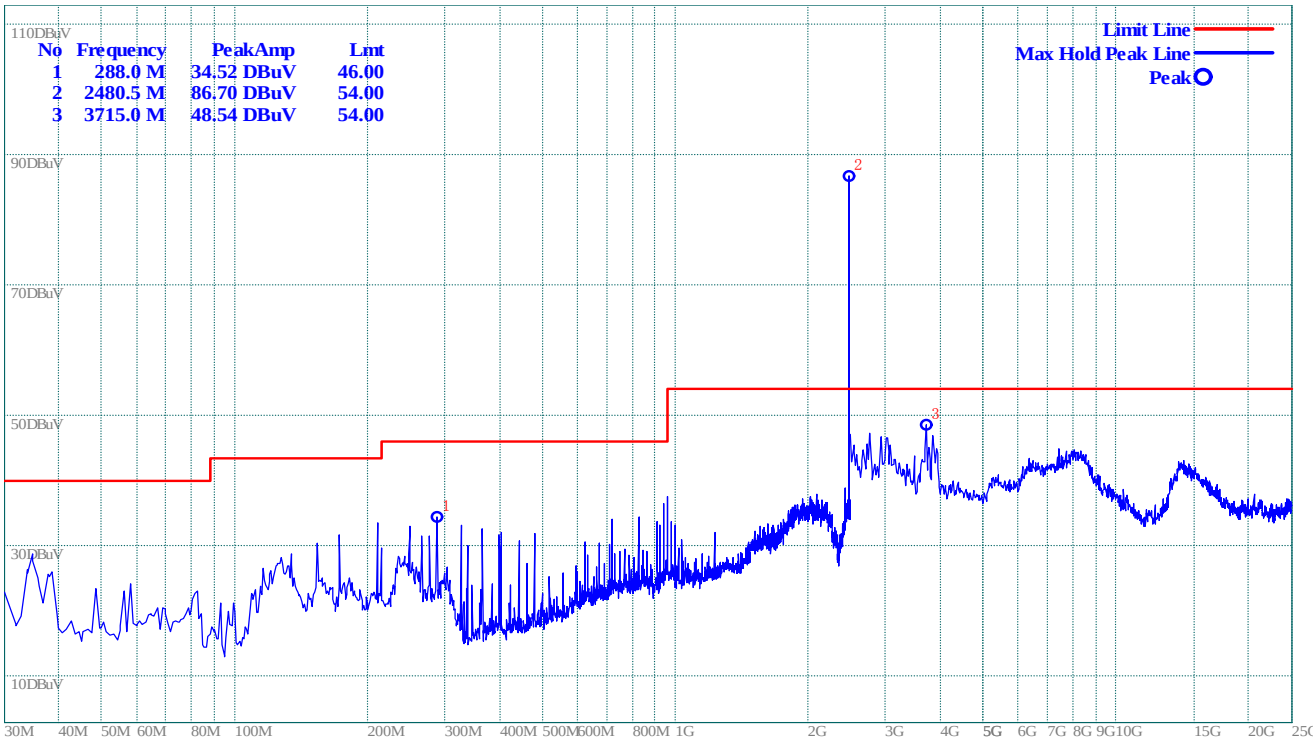


(Plot B.2: Antenna Vertical)

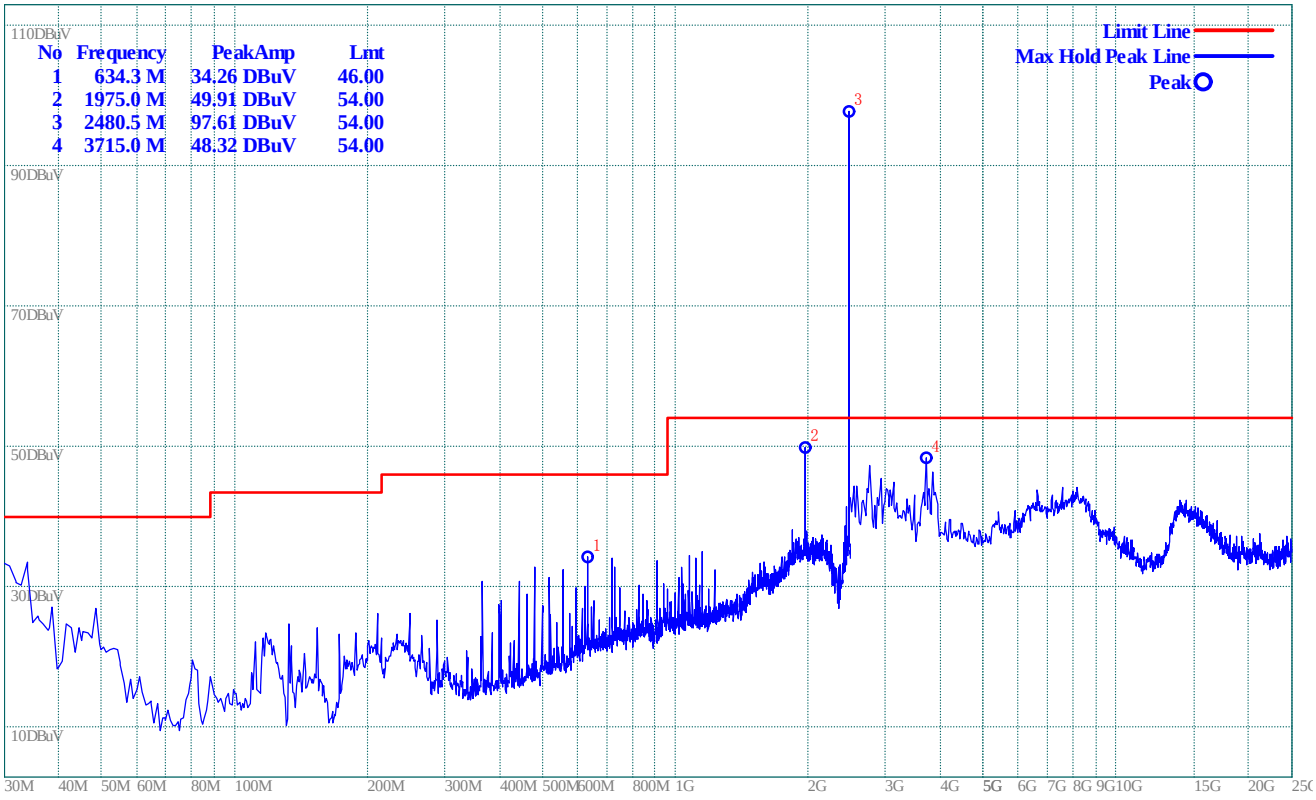
Plot for Channel = 78



(Plot C.0: 9kHz to 30MHz)



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

8-DPSK Mode:

A. Test Verdict for Harmonics:

The Fundamental Emissions

The field strength of {Fundamental Emission} listed below is recorded, and used in the next table.

Channel	Frequency (MHz)	Antenna Polarization	Refer to Plot
0	2402	Horizontal	Plot A.1
		Vertical	Plot A.2
39	2441	Horizontal	Plot B.1
		Vertical	Plot B.2
78	2480	Horizontal	Plot C.1
		Vertical	Plot C.2

Note: Following is the plots for emission measurement; please note that marked spikes near 2400MHz with circle should be ignored because they are Bluetooth carrier frequency.

The un-wanted Emissions:

Test result of channel: 0 (2402MHz)

Frequency (MHz)	PK Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Azimuth (deg)	Height (cm)	Antenna Polarization
265.8	31.8	46	-14.2	120	189	Horizontal
4804	34.7	54	-19.3	110	360	Horizontal
7206	36.2	54	-17.8	100	353	Horizontal
9608	37.5	54	-16.5	100	38	Horizontal
24020	51.2	54	-2.8	100	260	Horizontal
38.9	26.1	40	-13.9	120	180	Vertical
705	32.7	46	-13.3	140	145	Vertical
7206	36.3	54	-17.7	100	246	Vertical
9608	35.8	54	-18.2	100	350	Vertical
24020	50.6	54	-3.4	100	360	Vertical

Test result of channel: 39 (2442MHz)

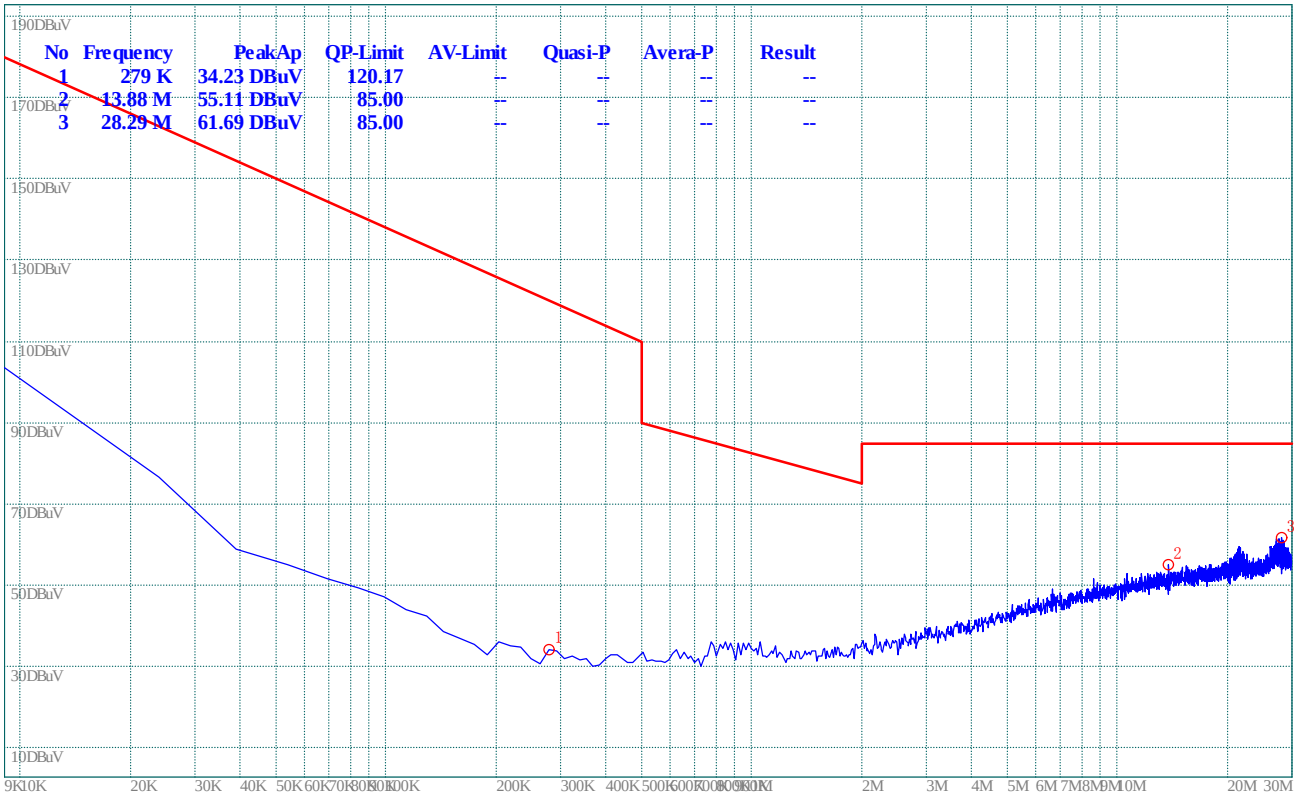
Frequency (MHz)	PK Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
208.5 M	24.5	43.5	-19	100	0	Horizontel
912.7 M	32.49	46	-13.51	100	34	Horizontel
208.5 M	23.41	43.5	-20.09	100	111	Vertical
912.7 M	32.97	46	-13.03	100	325	Vertical

Test result of channel: 78 (2480MHz)

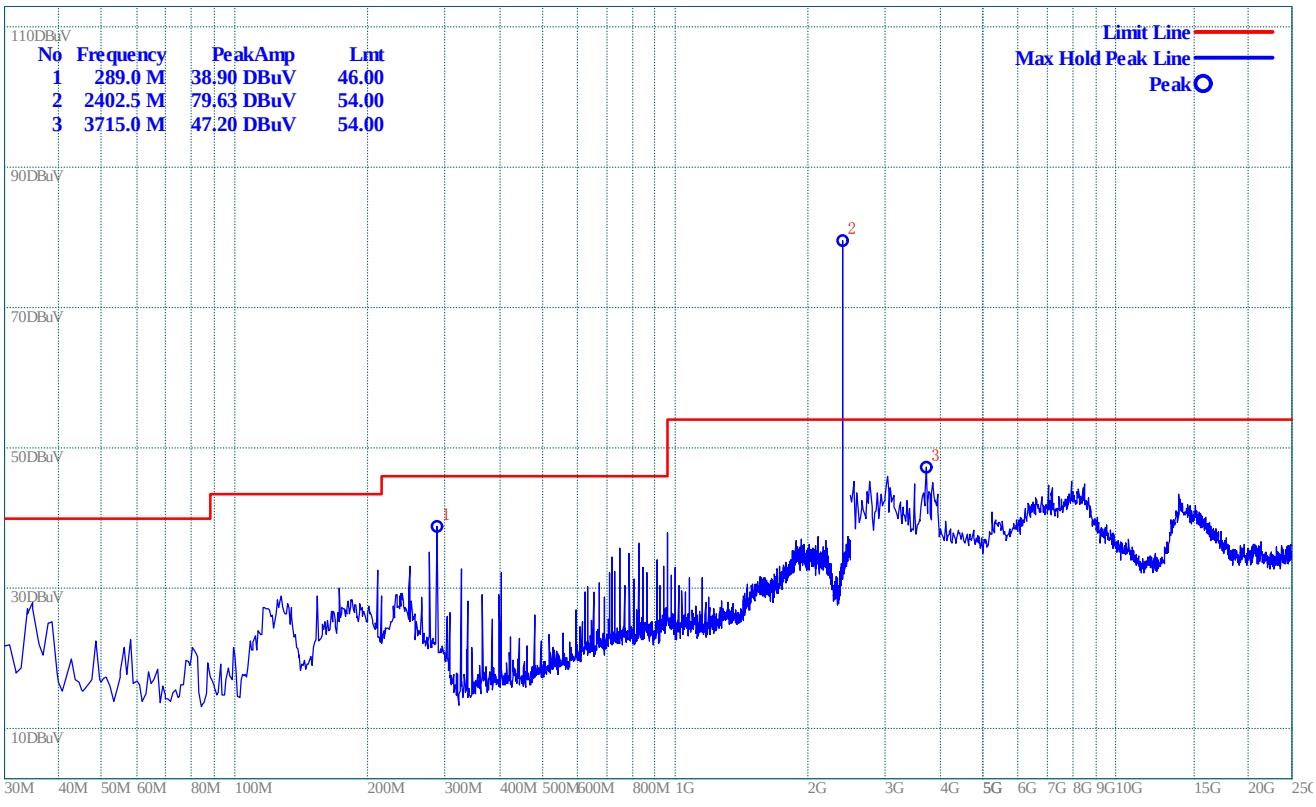
Frequency (MHz)	PK Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
208.5 M	30.38	43.5	-13.12	100	203	Horizontel
912.7 M	34.18	46	-11.82	100	152	Horizontel
31.0 M	35.96	40	-4.04	100	357	Vertical
240.5 M	23.34	46	-22.66	100	306	Vertical
624.6 M	30.8	46	-15.2	100	306	Vertical
2.793 G	47.89	54	-6.11	100	271	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

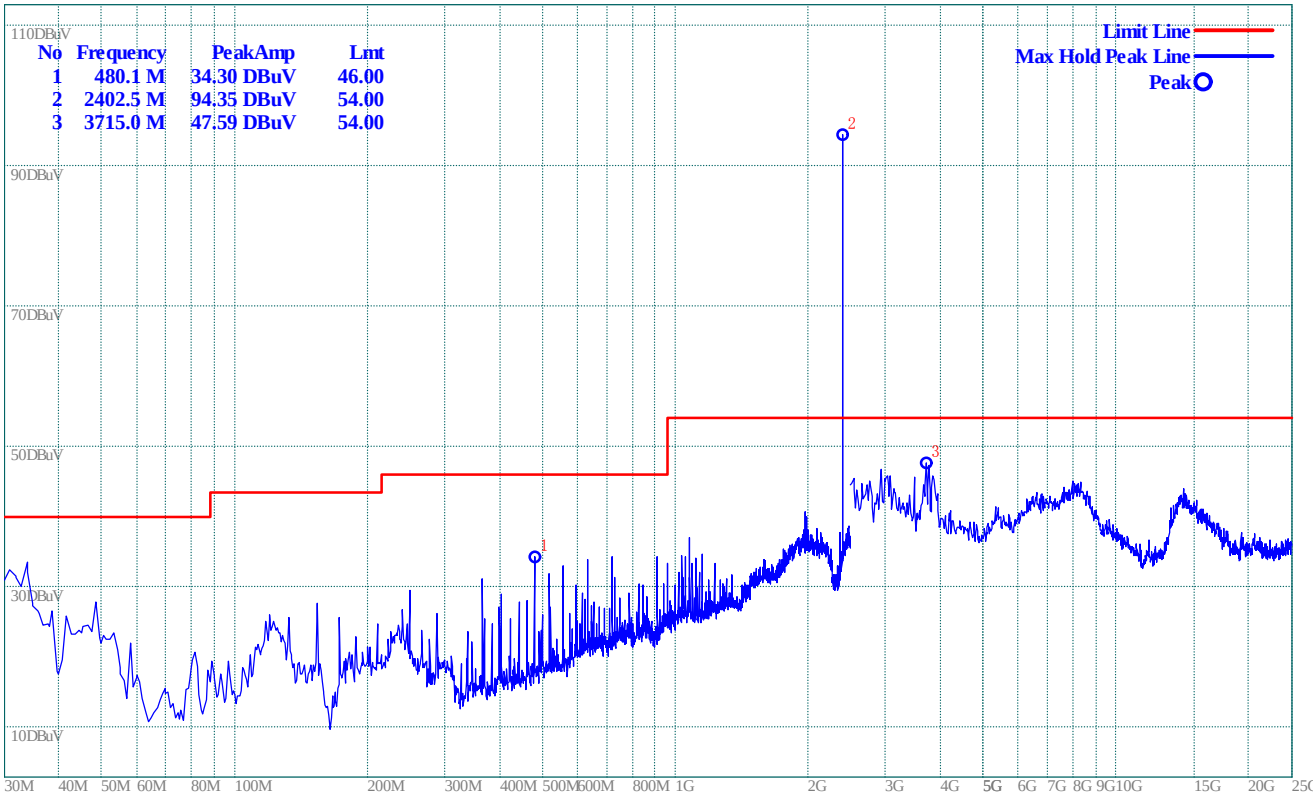
Plots for Channel = 0



(Plot A.0: 9kHz to 30MHz)

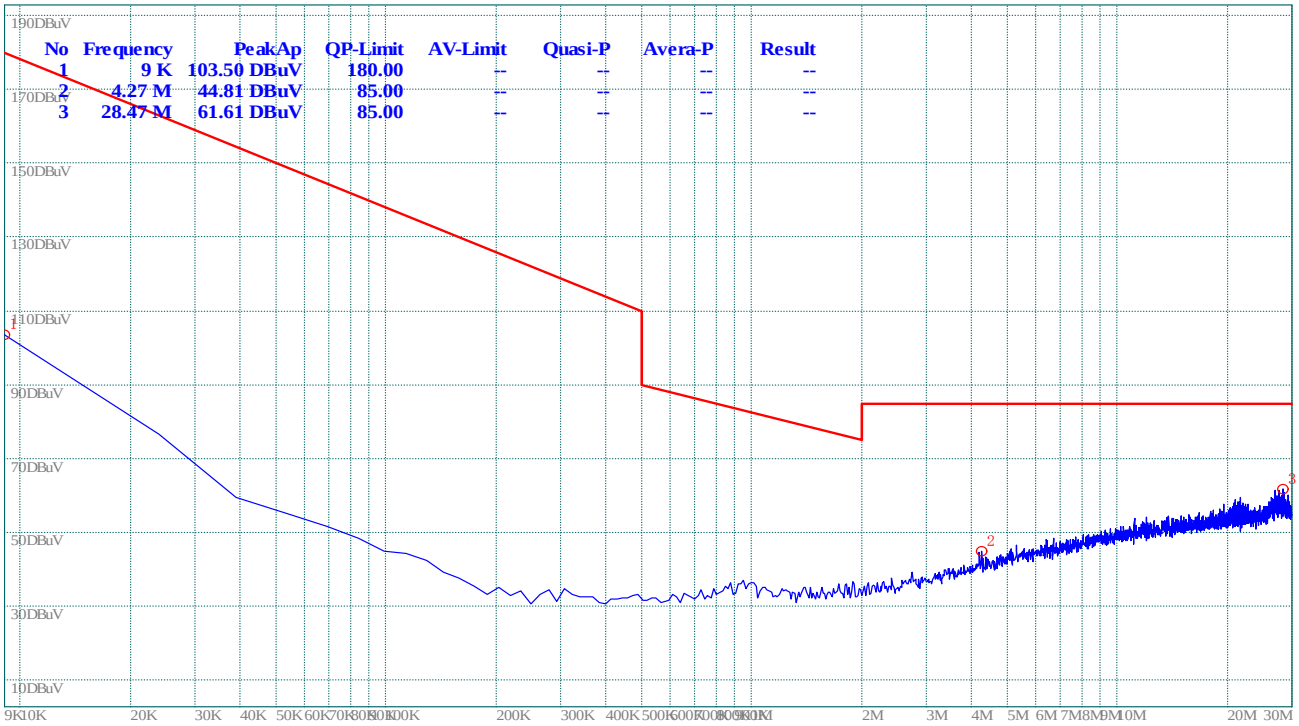


(Plot A.1: Antenna Horizonta)

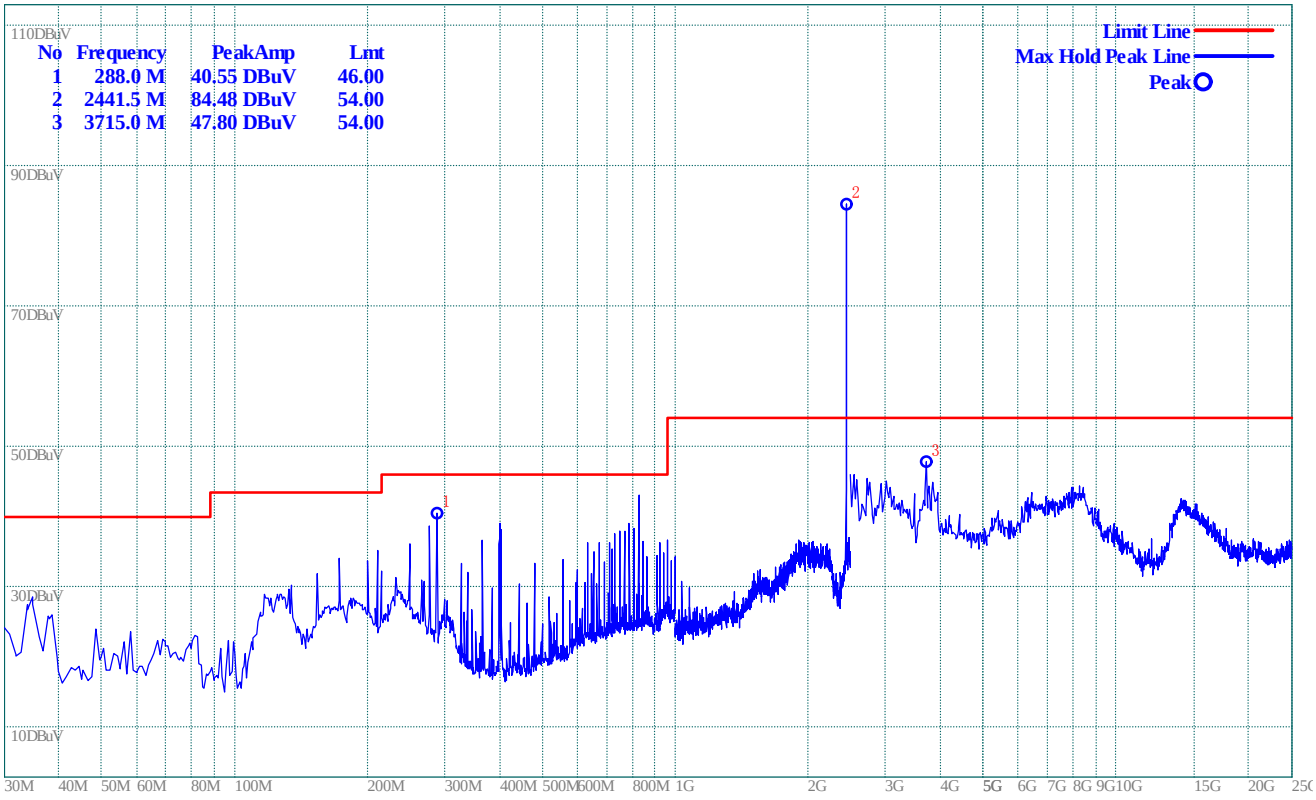


(Plot A.2: Antenna Vertical)

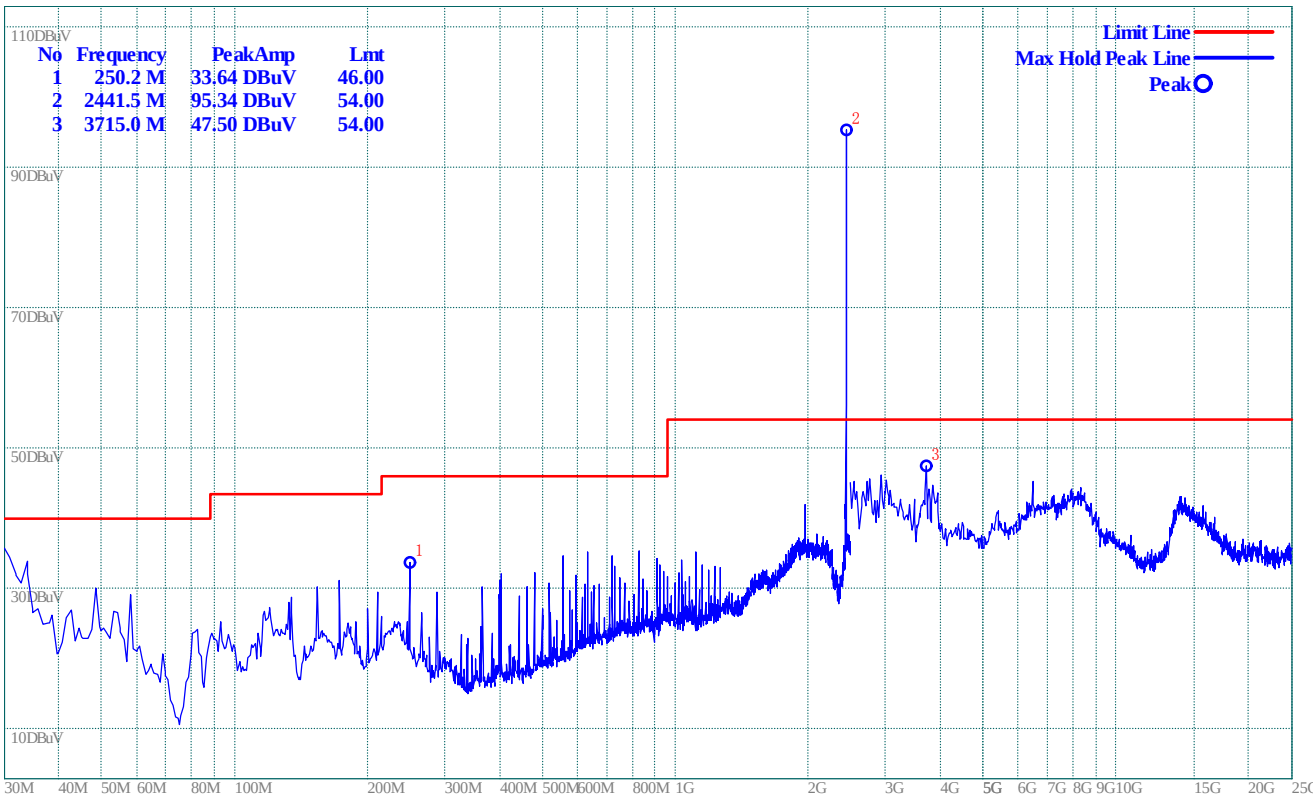
Plot for Channel = 39



(Plot B.0: 9kHz to 30MHz)

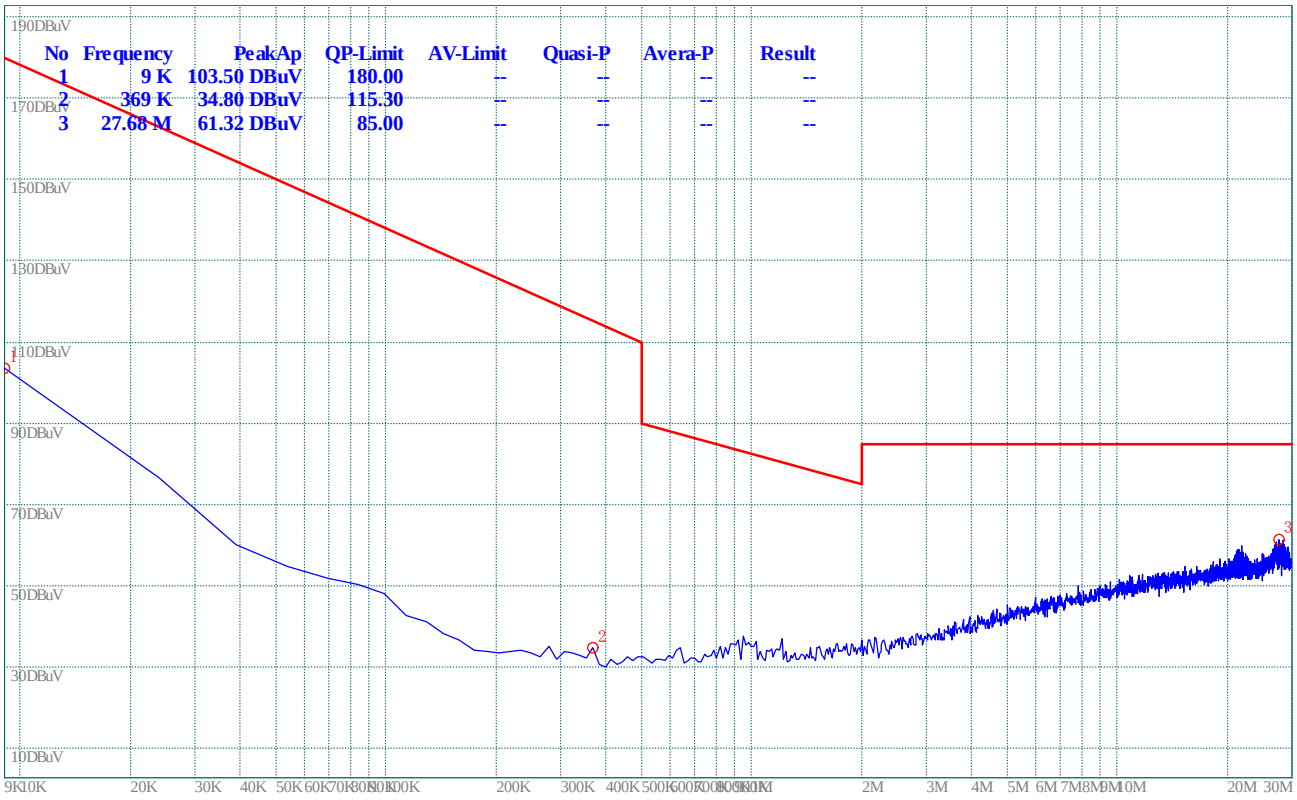


(Plot B.1: Antenna Horizontal)

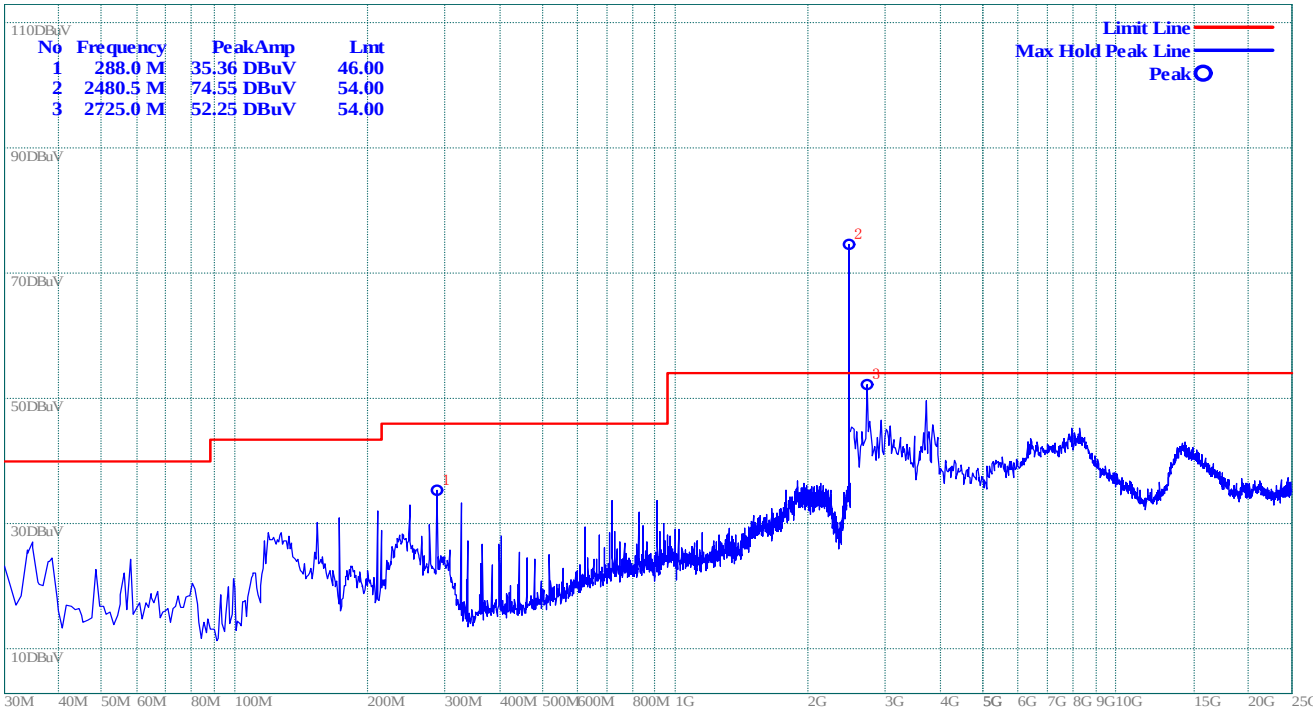


(Plot B.2: Antenna Vertical)

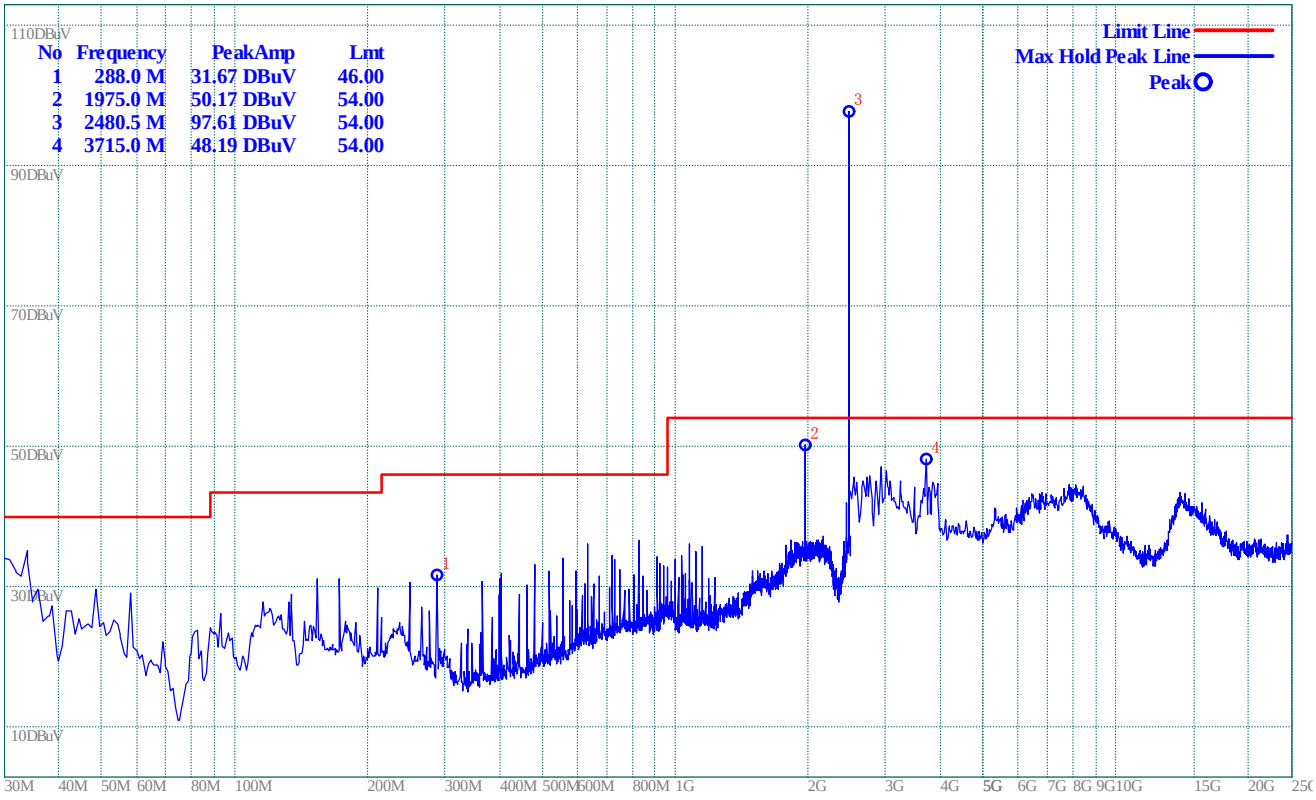
Plot for Channel = 78



(Plot C.0: 9kHz to 30MHz)



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

Receiver Mode:

A. Test Verdict for Harmonics:

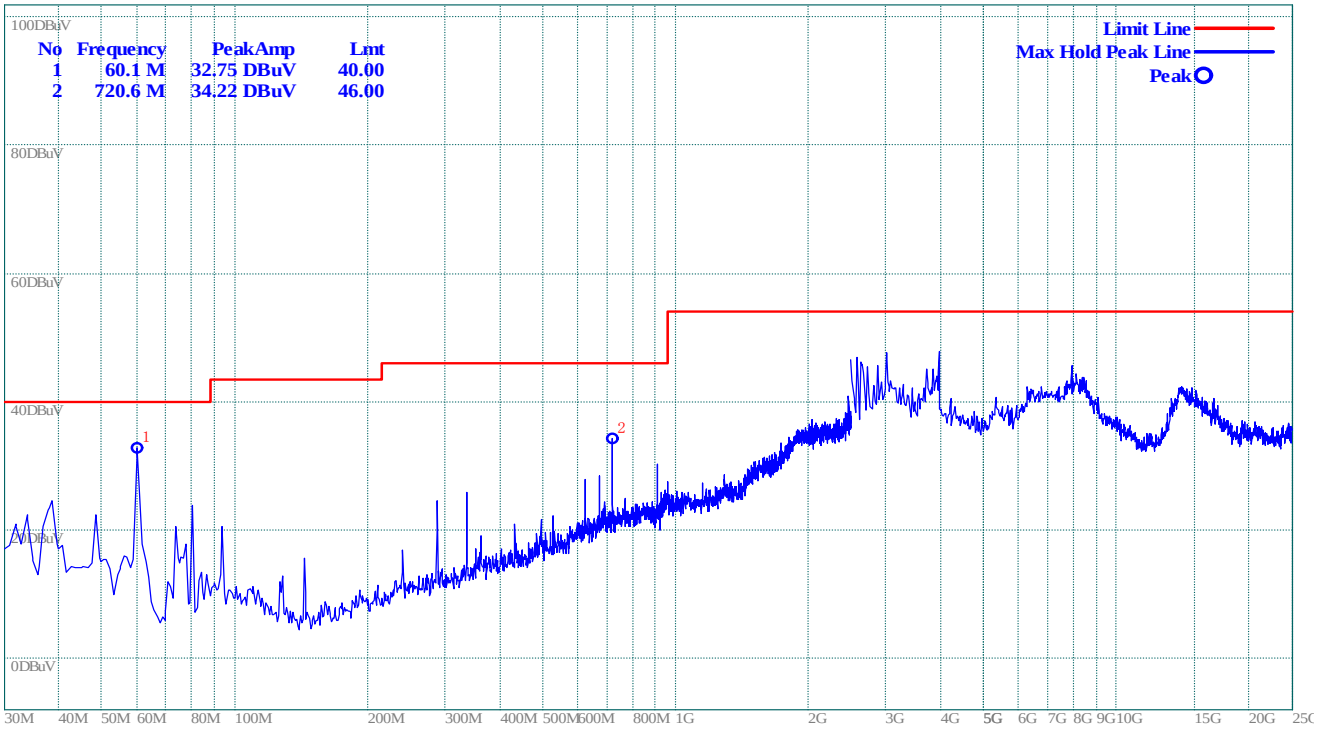
The Fundamental Emissions

The field strength of {Fundamental Emission} listed below is recorded, and used in the next table.

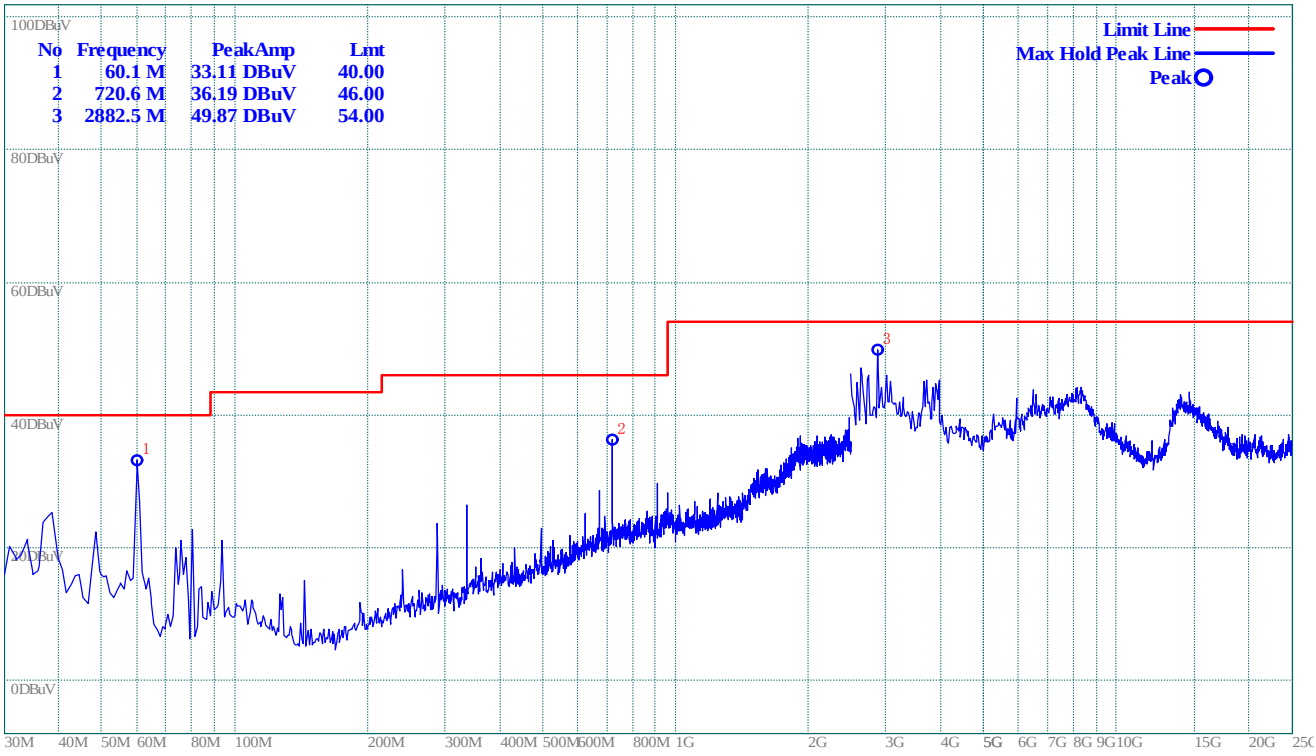
Channel	Frequency (MHz)	Fundamental Emission (dBμV/m)		Antenna Polarization	Refer to Plot
		PK	AV		
0	2402	34.22	--	Horizontal	Plot A.1
		49.87	--	Vertical	Plot A.2
39	2441	51.33	--	Horizontal	Plot B.1
		50.44	--	Vertical	Plot B.2
78	2480	47.50	--	Horizontal	Plot C.1
		50.77	--	Vertical	Plot C.2

B. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0

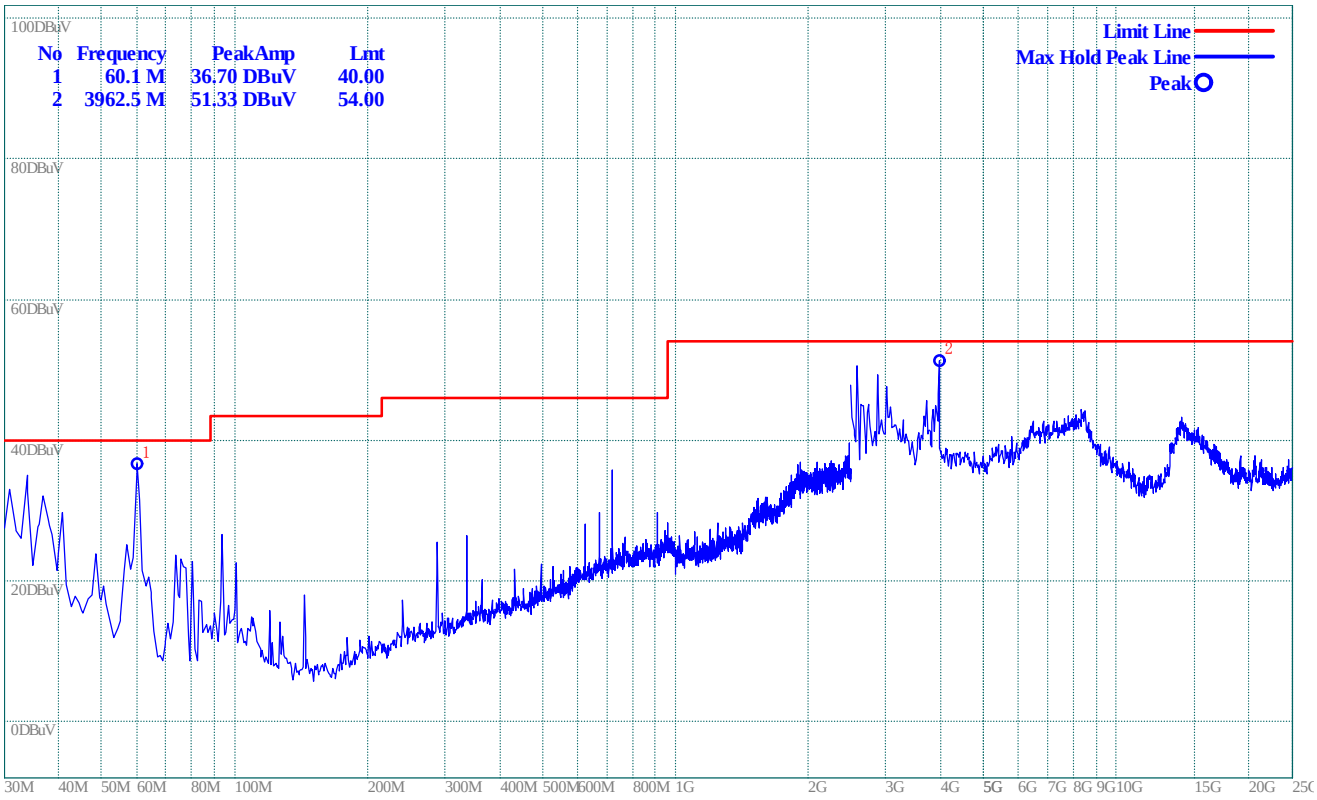


(Plot A.1: Antenna Horizontal)

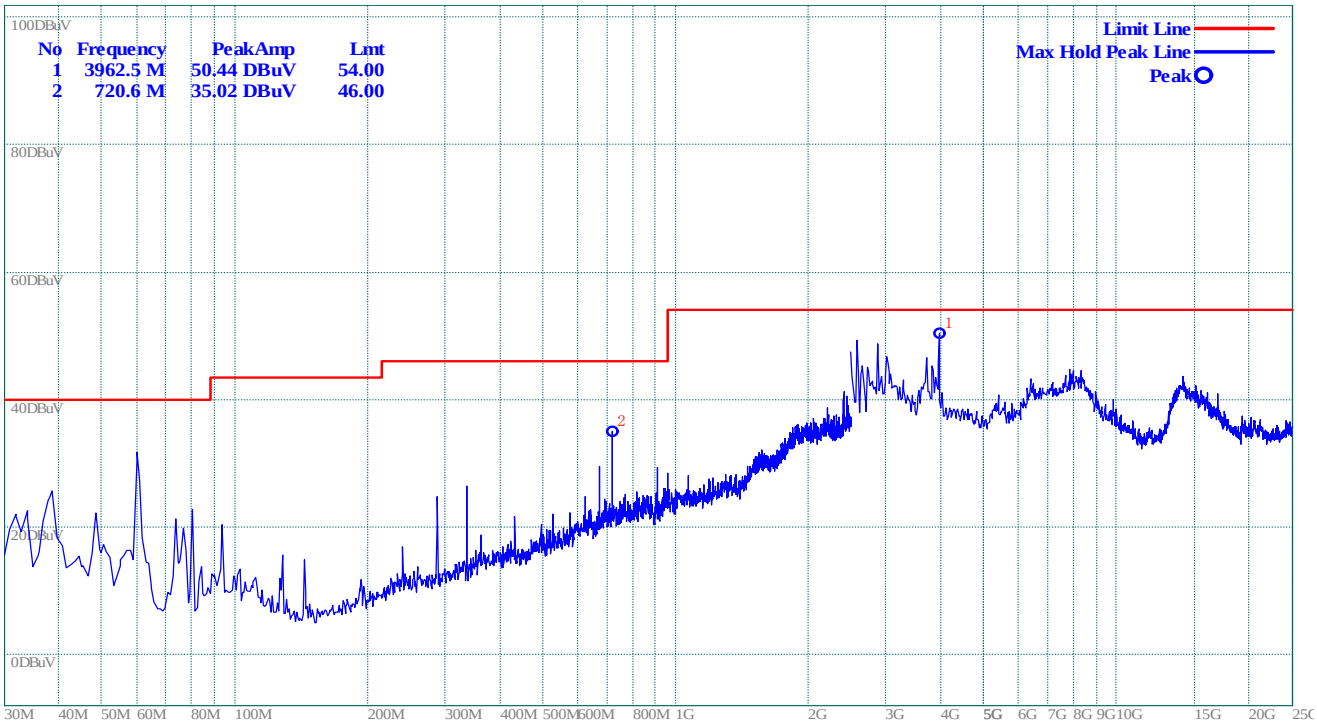


(Plot A.2: Antenna Vertical)

Plot for Channel = 39

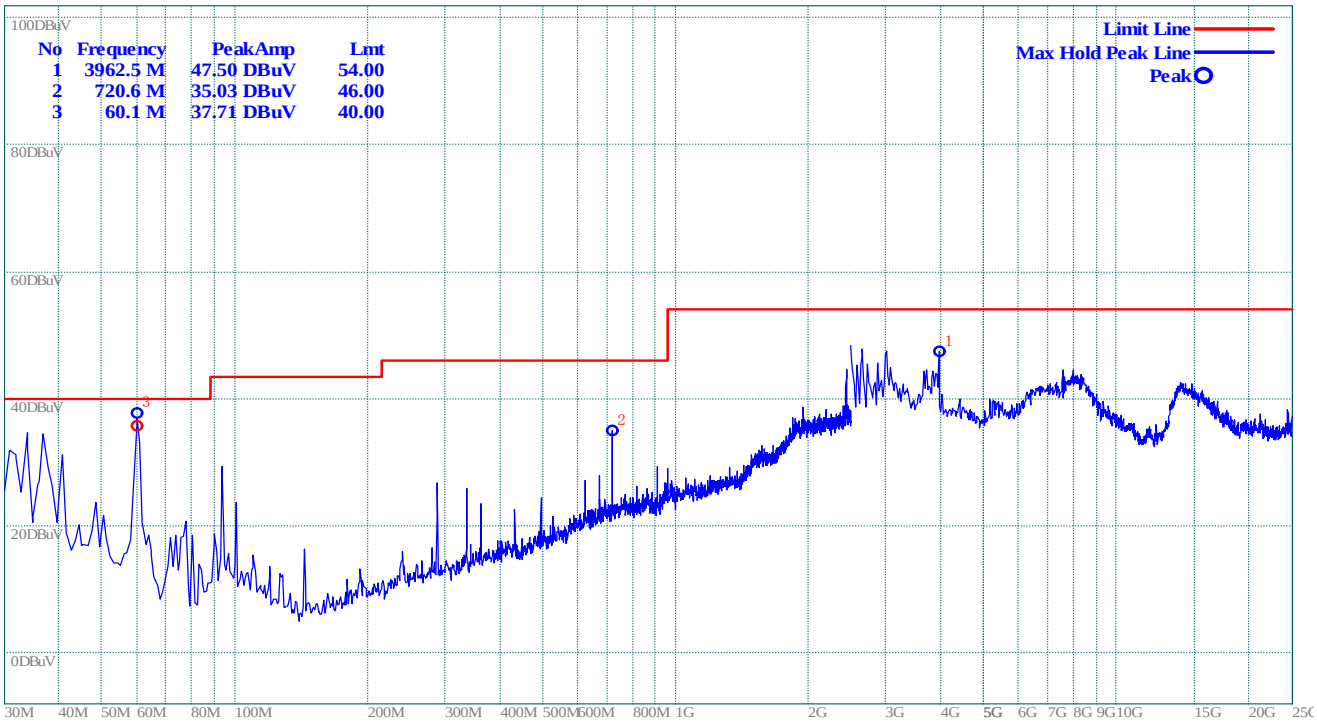


(Plot B.1: Antenna Horizontal)

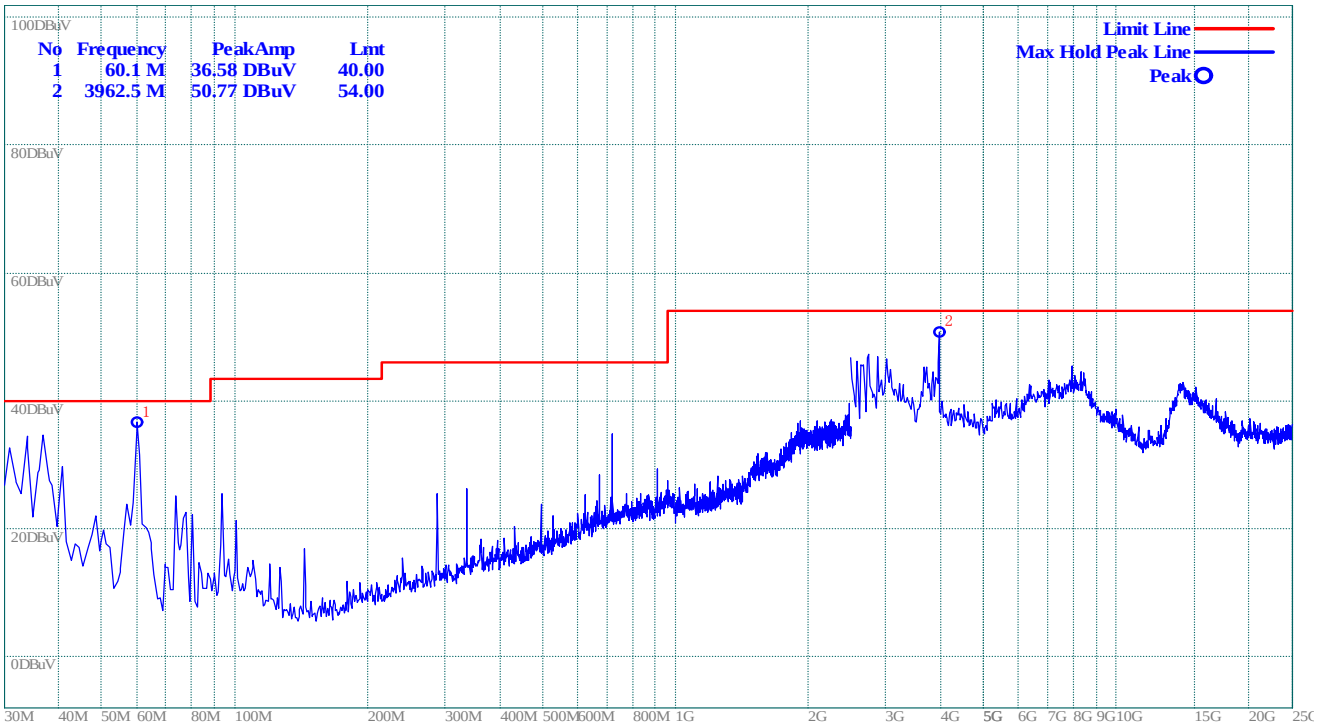


(Plot B.2: Antenna Vertical)

Plot for Channel = 78



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

** END OF REPORT **