47 CFR PART 15 C - BLUETOOTH

TEST REPORT

of

Car radio with CD player

Trade Name:	clarion
Brand Name:	clarion
Model Name:	CX501
Report No.:	SZ10070042E03
FCC ID.:	WY2PE3402BA
IC ID:	419C-CX501

prepared for

Clarion Co., Ltd.
8/F Xiamen Mail Processing Centre, No.275 Lujiang Road, Xiamen, China

prepared by

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Change History		
Issue	Date	Reason for change
1.0	September 30, 2010	First edition

1. TEST CERTIFICATION

Equipment under Test:	Car radio with CD player
Trade Name:	clarion
Brand Name:	clarion
Model Name:	CX501
FCC ID:	WY2PE3402BA
IC ID:	419C-CX501
Applicant:	Clarion Co., Ltd 8/F Xiamen Mail Processing Centre, No.275 Lujiang Road, Xiamen, China
Manufacturer:	Clarion Co., Ltd 8/F Xiamen Mail Processing Centre, No.275 Lujiang Road, Xiamen, China
Test Standards:	47 CFR Part 15 Subpart C
Test Date(s):	September 8, 2010 - September 29, 2010
Test Result:	PASS

*** We Hereby Certify That:**

The equipment under test was tested by Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory. The test data, data evaluation, test procedures and equipment configurations shown in this report were made in accordance with the requirement of related FCC/IC rules.

The test results of this report only apply for the tested sample equipment identified above. The test report shall be invalid without all the signatures of the test engineer, the reviewer and the approver.

Tested by: Cao Shaodong Dated: 2010.09.30
Cao Shaodong

Reviewed by: Ni Yong Dated: 2010.09.30
Ni Yong

Approved by: Shu Luan Dated: 2010.9.30
Shu Luan

2. GENERAL INFORMATION

2.1 EUT Description

EUT Type .....:	Car radio with CD player
Model Name .....:	CX501
Serial No. .....:	(n.a., marked #1 by test site)
Hardware Version .....:	039374000
Software Version .....:	(n.a)
Modulation Type.....:	Bluetooth: FHSS (GFSK(1Mbps), π/4-DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps))
Frequency .....:	The frequency range used is 2402MHz - 2480MHz (79 channels, at intervals of 1MHz); The frequency block is 2400MHz to 2483.5MHz.

Note 1: The EUT is a Car radio with CD player. 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.

2.2 Test Standards and Results

The objective of the report is to perform testing according to 47 CFR Part 15 Subpart C (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 7, June 2007	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.

2.3 Facilities and Accreditations

2.3.1 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.

2.3.2 Test Environment Conditions

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

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

3. 47 CFR PART 15C REQUIREMENTS

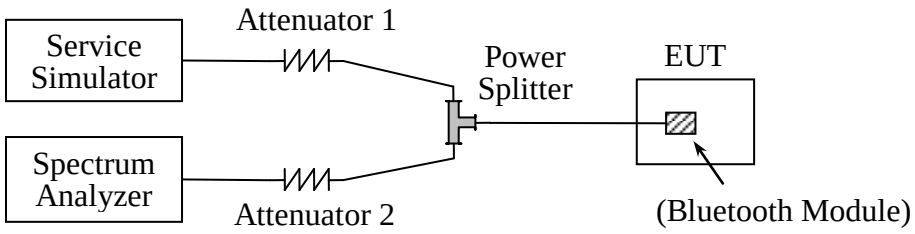
3.1 Number of Hopping Frequency

3.1.1 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.

3.1.2 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	Cal. Due
Service Simulator	Agilent	E5515C	GB43130131	2009.09	2year
Spectrum Analyzer	Agilent	E7405A	US44210471	2009.09	2year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Attenuator 1	Resnet	20dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)

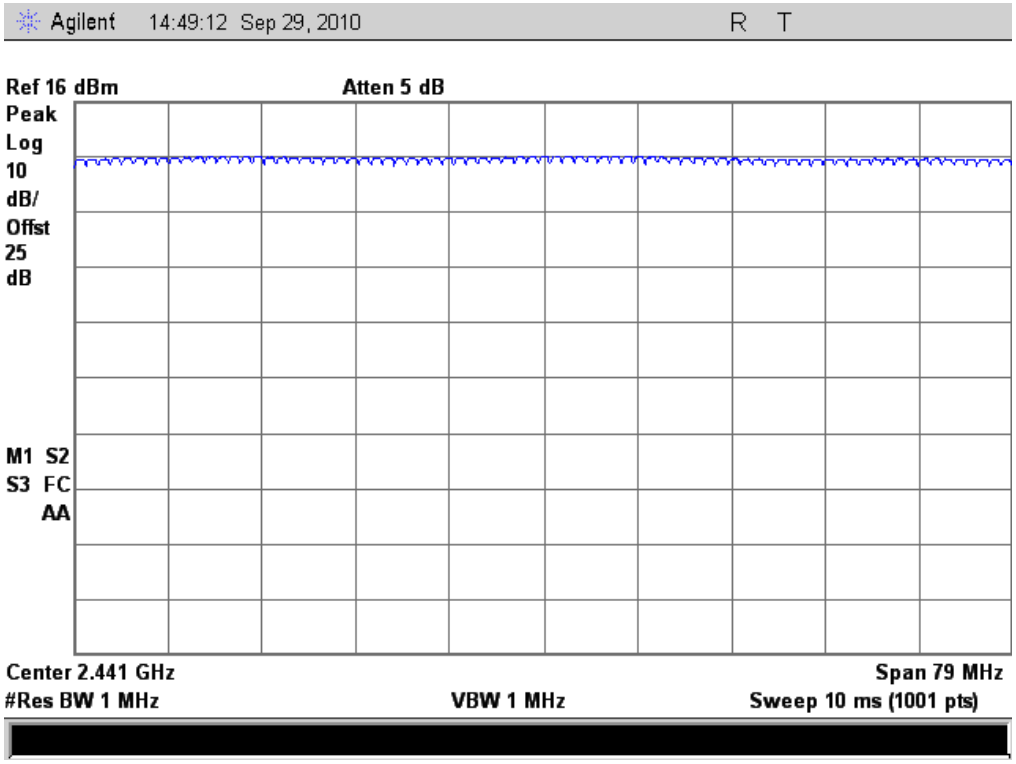
3.1.3 Test Result

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.

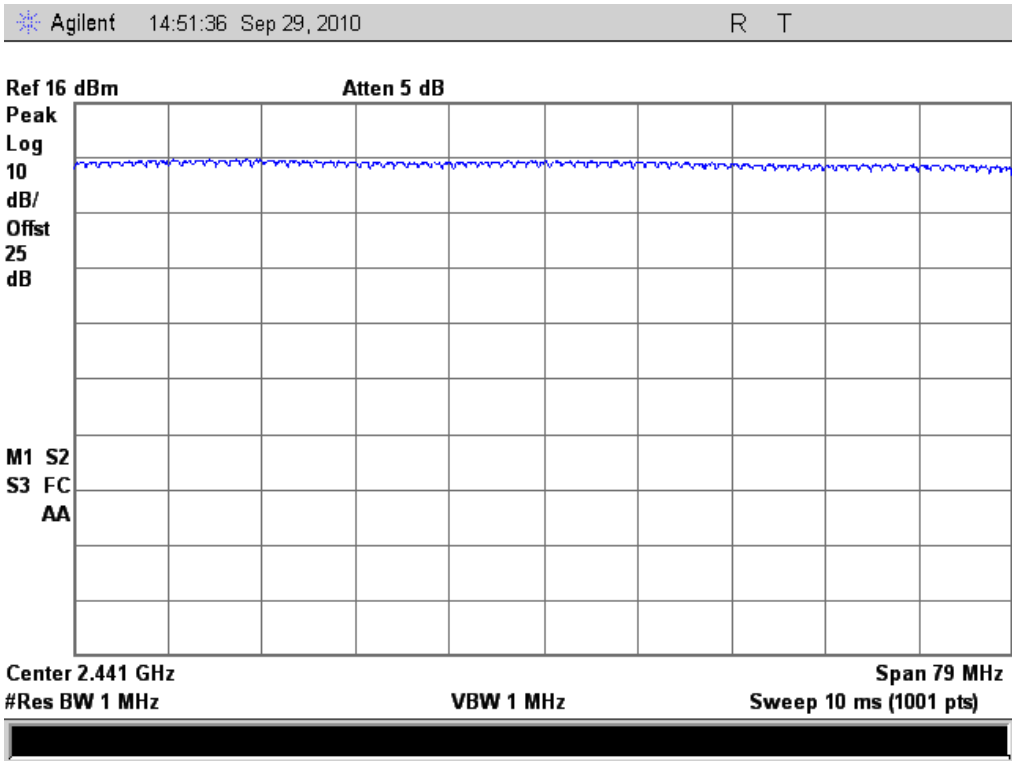
A. Test Verdict:

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

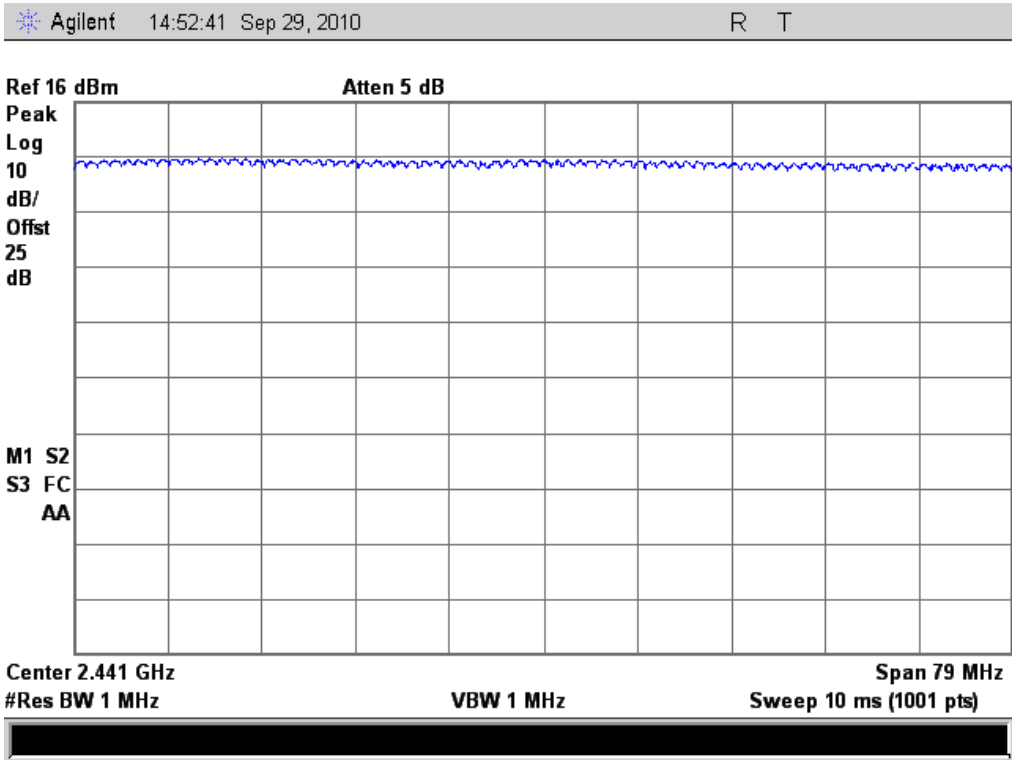
B. Test Plot:



(Plot A: 2402MHz to 2480MHz)



(Plot B: 2402MHz to 2480MHz)



(Plot C: 2402MHz to 2480MHz)

3.2 Peak Output Power

3.2.1 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.

3.2.2 Test Description

See section 3.1.2 of this report.

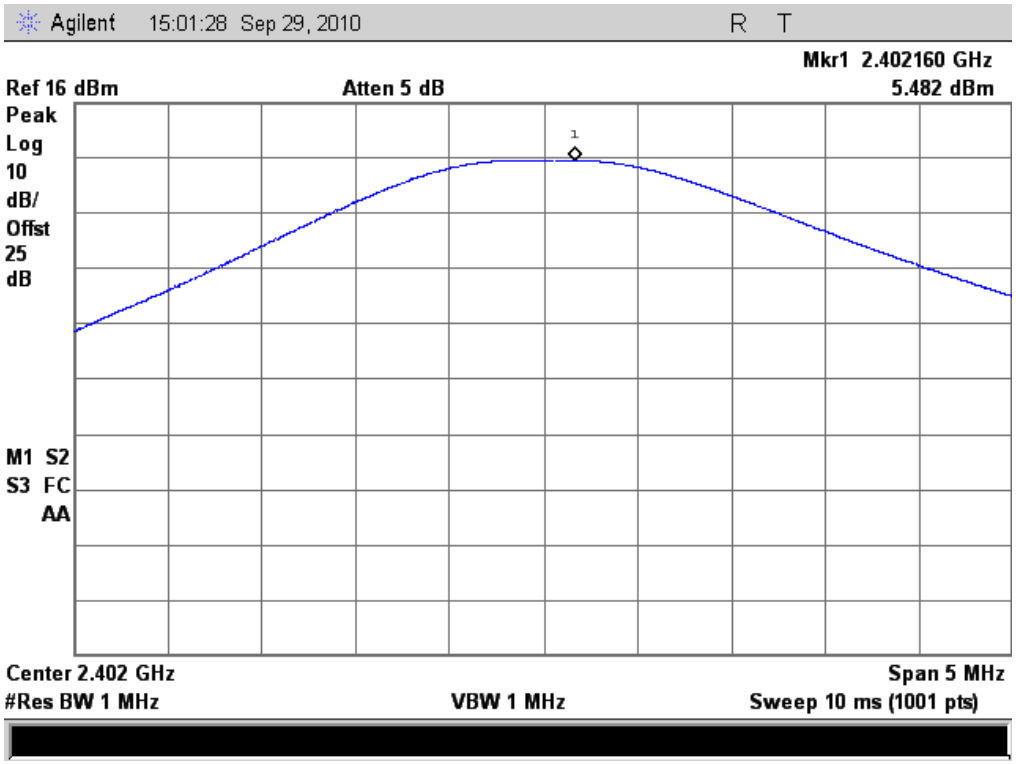
3.2.3 Test Result

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.

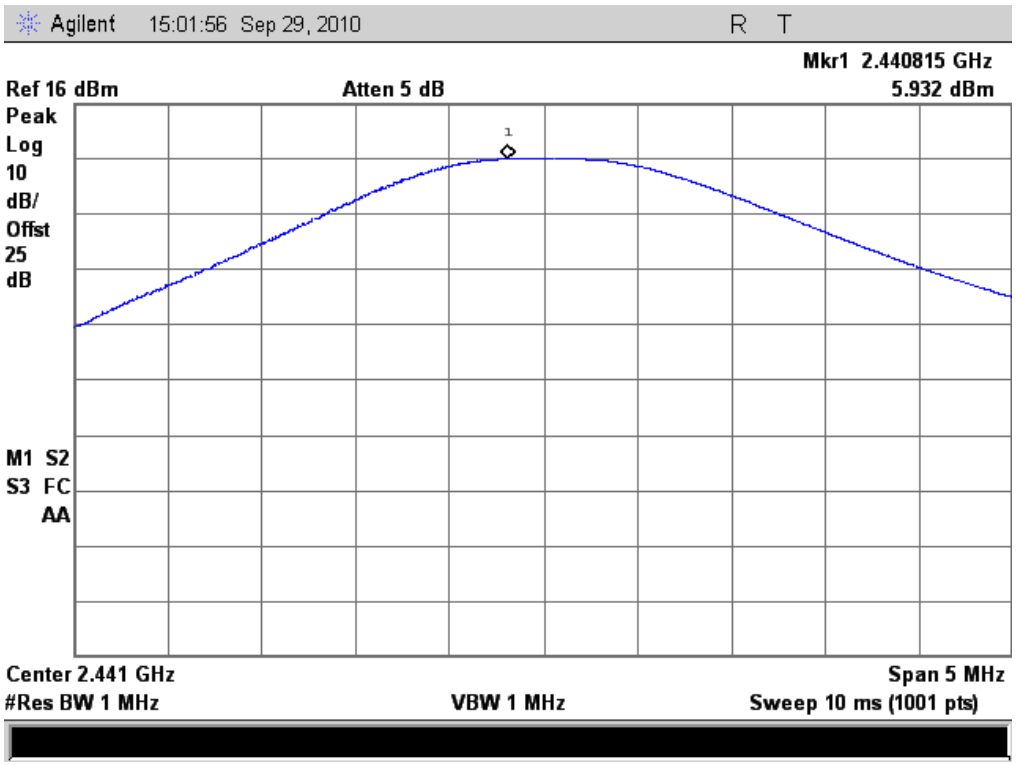
A. Test Verdict:

Test Mode	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
GFSK	2402	5.48	3.53E-3	Plot A	30	1	PASS
	2441	5.93	3.92E-3	Plot B			PASS
	2480	5.41	3.47E-3	Plot C			PASS
π/4-DQPSK	2402	5.75	3.75E-3	Plot D	30	1	PASS
	2441	5.91	3.90E-3	Plot E			PASS
	2480	5.02	3.18E-3	Plot F			PASS
8-DPSK	2402	5.99	3.97E-3	Plot G	30	1	PASS
	2441	6.16	4.13E-3	Plot H			PASS
	2480	5.38	3.45E-3	Plot I			PASS

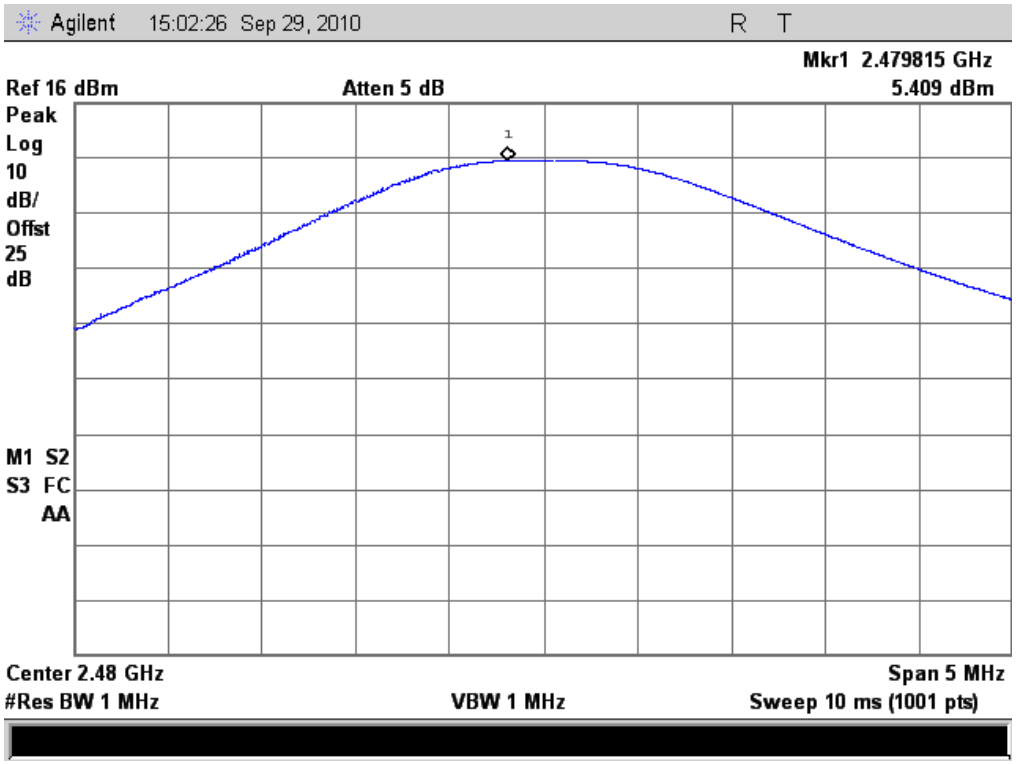
B. Test Plot:



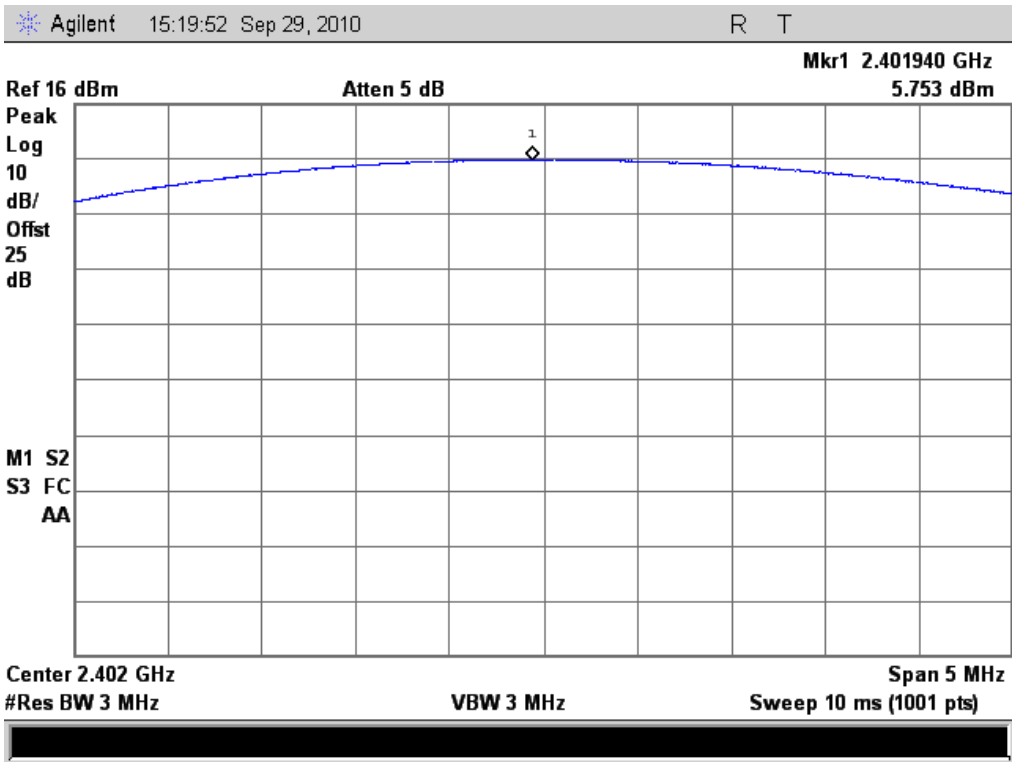
(Plot A: Channel = 2402)



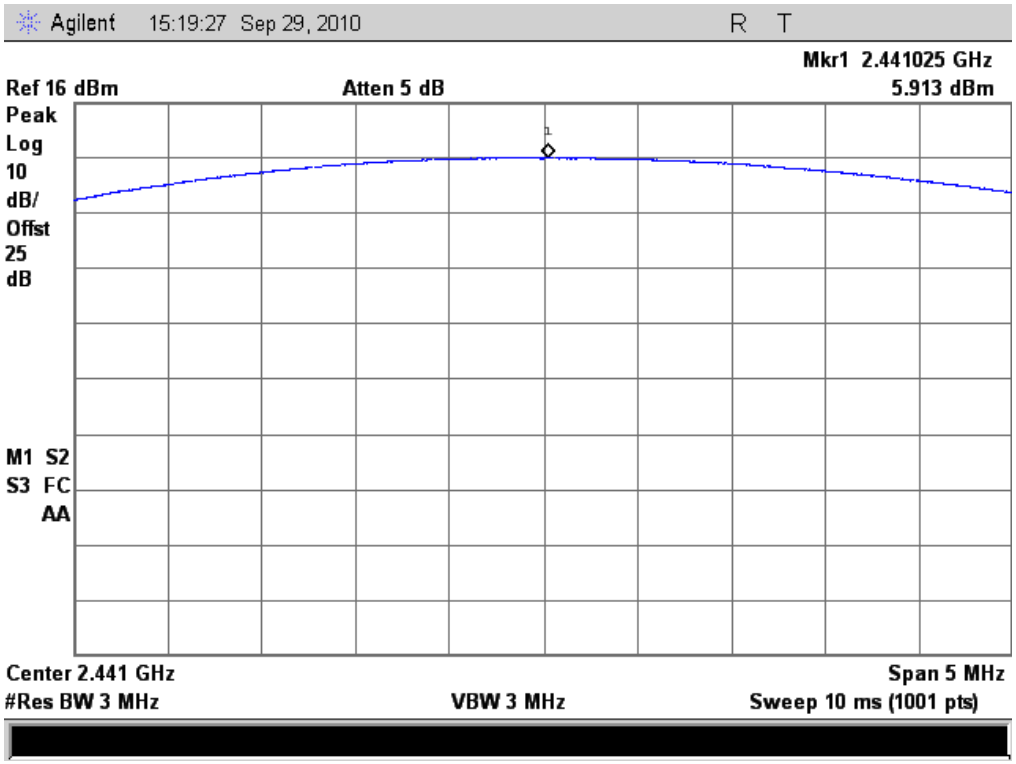
(Plot B: Channel = 2441)



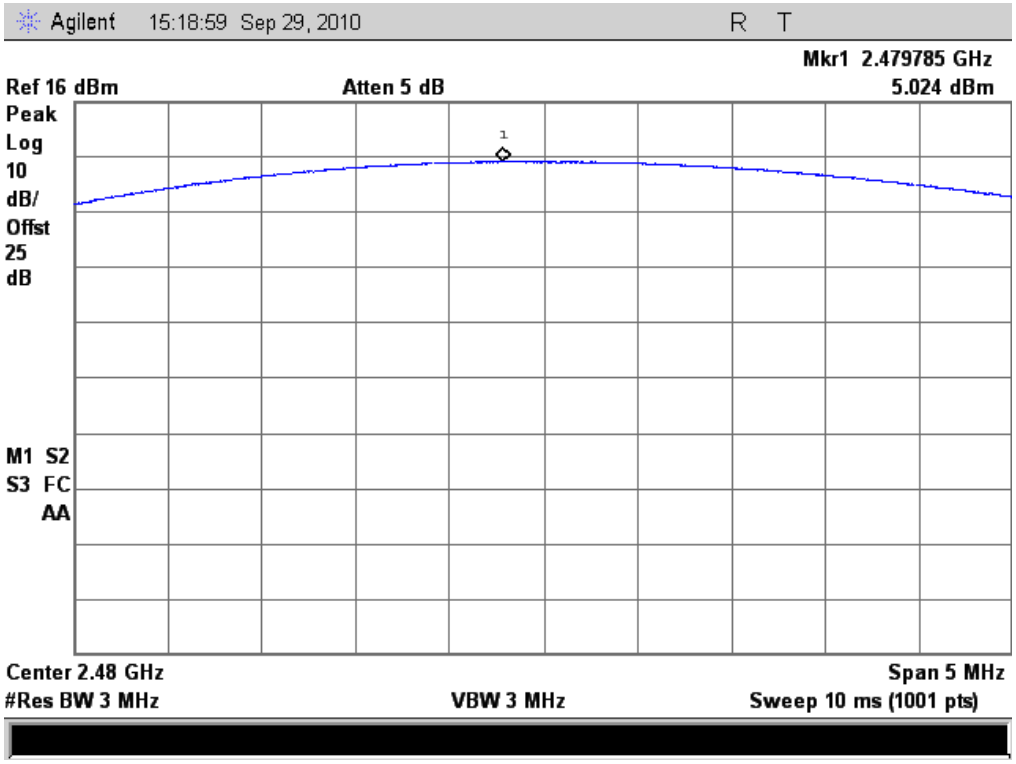
(Plot C: Channel = 2480)



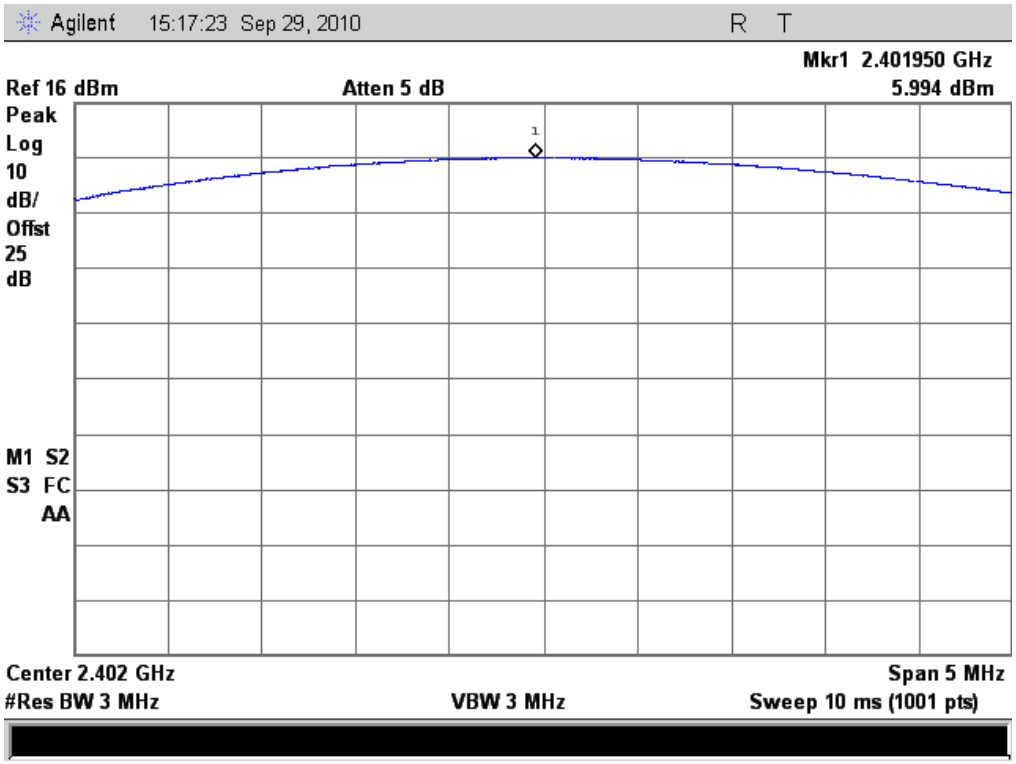
(Plot D: Channel = 2402)



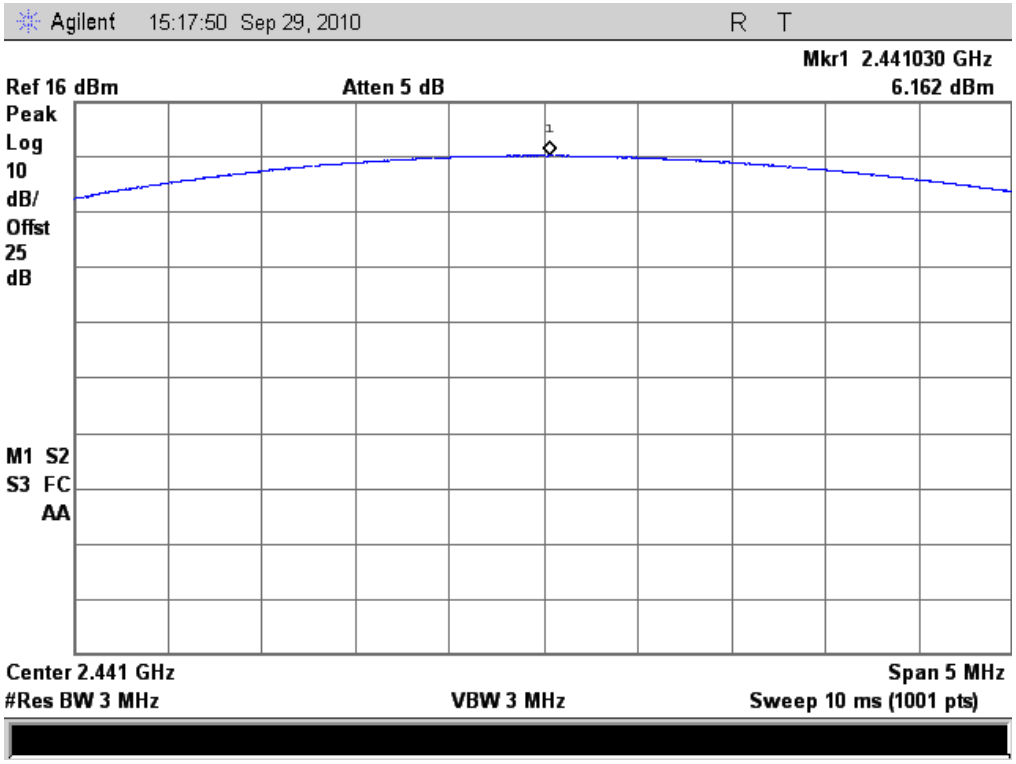
(Plot E: Channel = 2441)



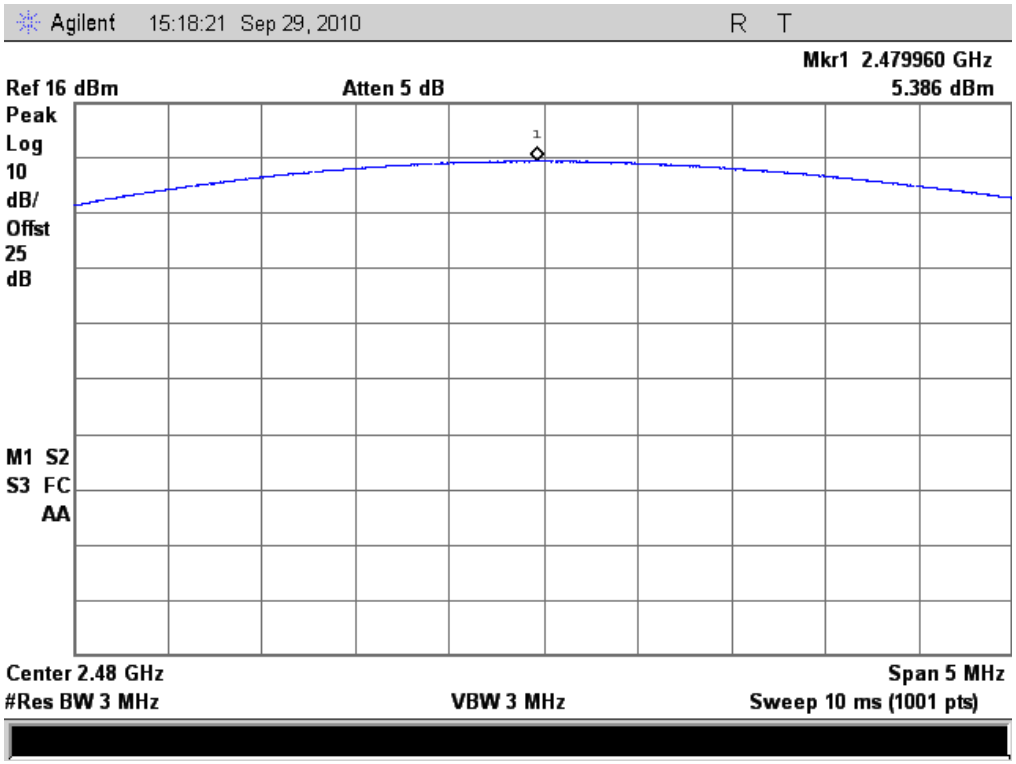
(Plot F: Channel = 2480)



(Plot G: Channel = 2402)



(Plot H: Channel = 2441)



(Plot I: Channel = 2480)

3.3 20dB Bandwidth

3.3.1 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.

3.3.2 Test Description

See section 3.1.2 of this report.

3.3.3 Test Result

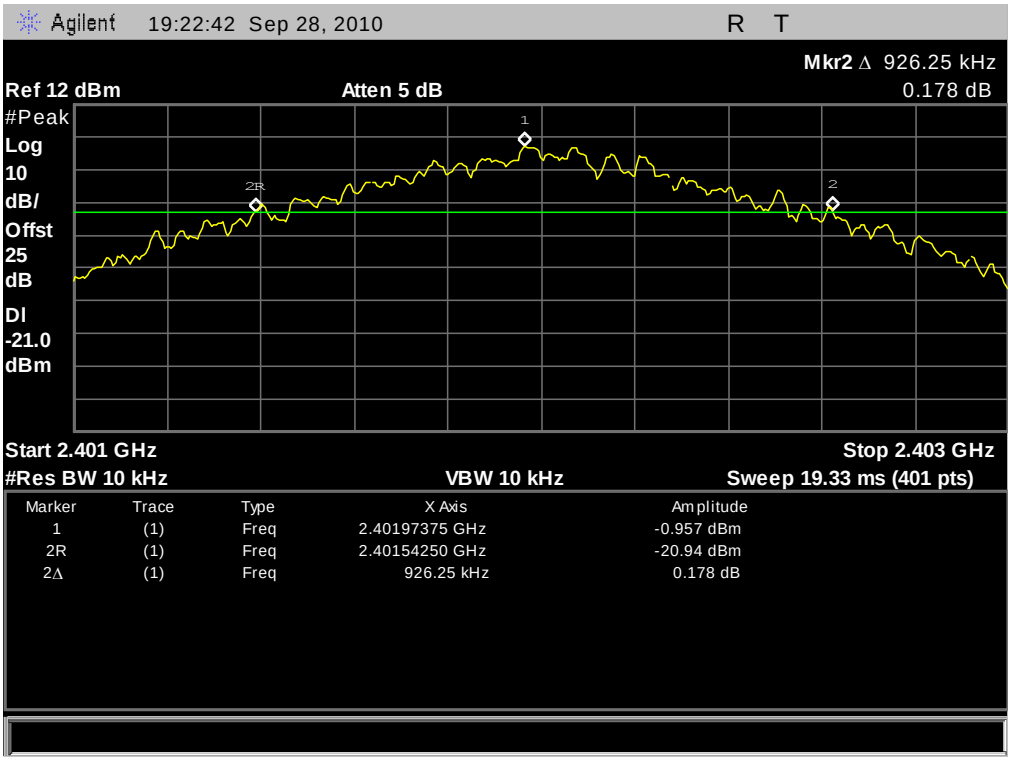
The Bluetooth Module operates at hopping-off test mode. The lowest, middle and highest channels are selected to perform testing to record the 20dB bandwidth of the Module.

A. GFSK:

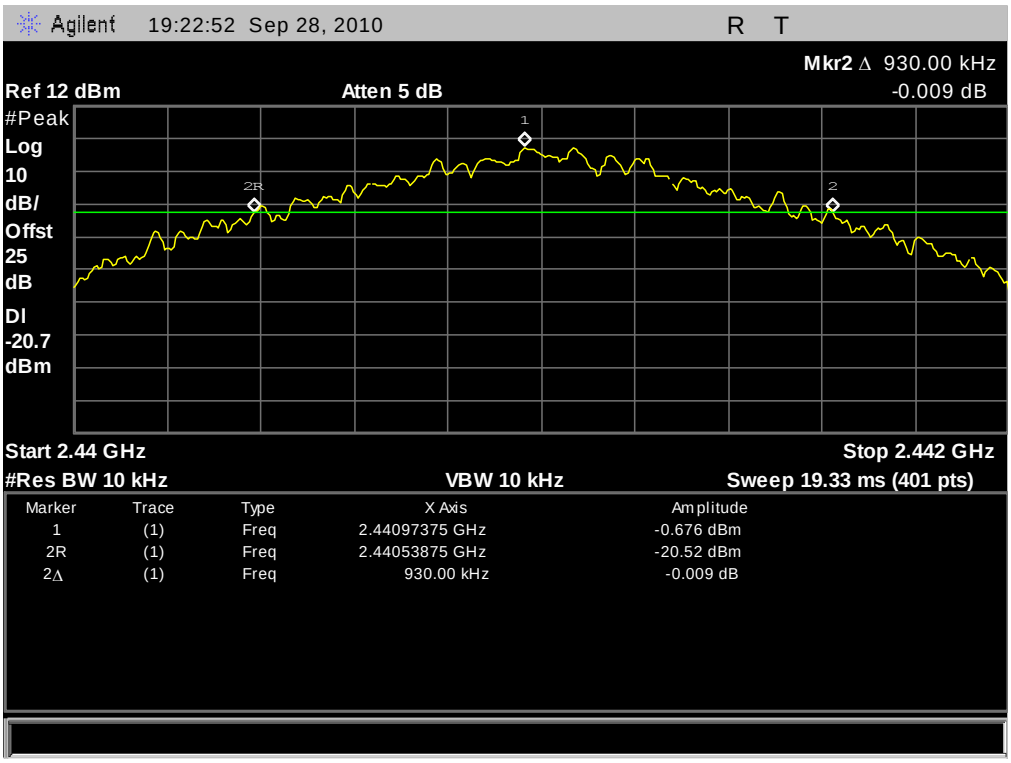
The maximum 20dB bandwidth measured is 930.00KHz according to the table below.

Test Mode	Frequency (MHz)	20dB Bandwidth (KHz)	Refer to Plot
GFSK	2402	926.25	Plot A
	2441	930.00	Plot B
	2480	926.25	Plot C

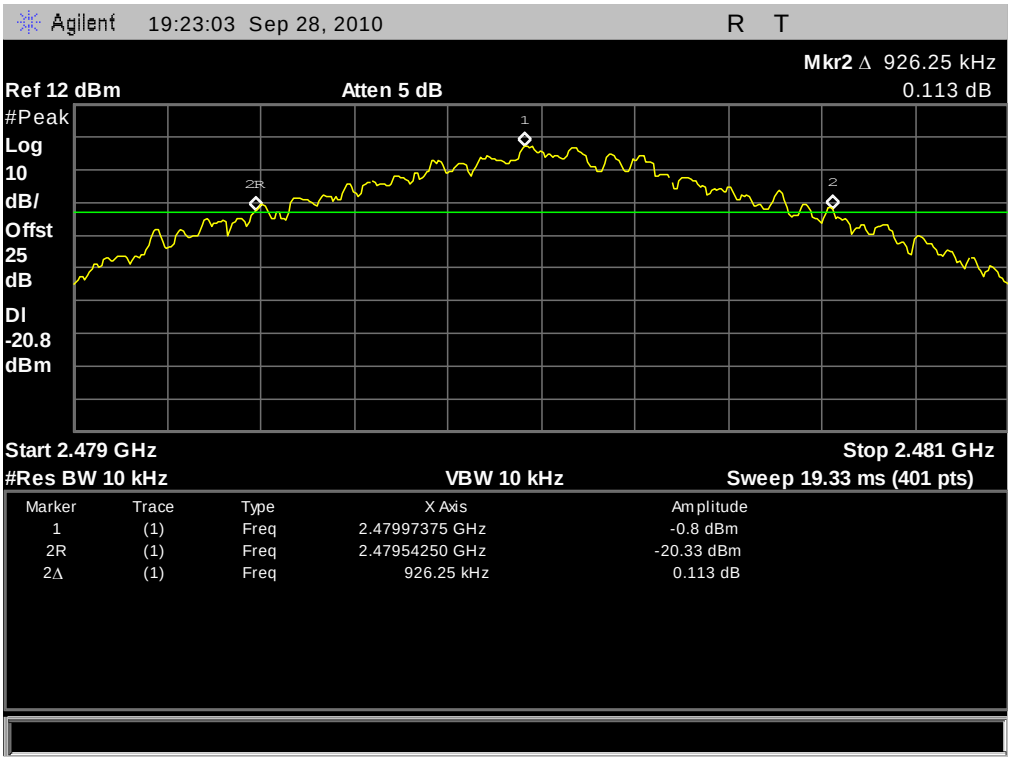
B. Test Plot:



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



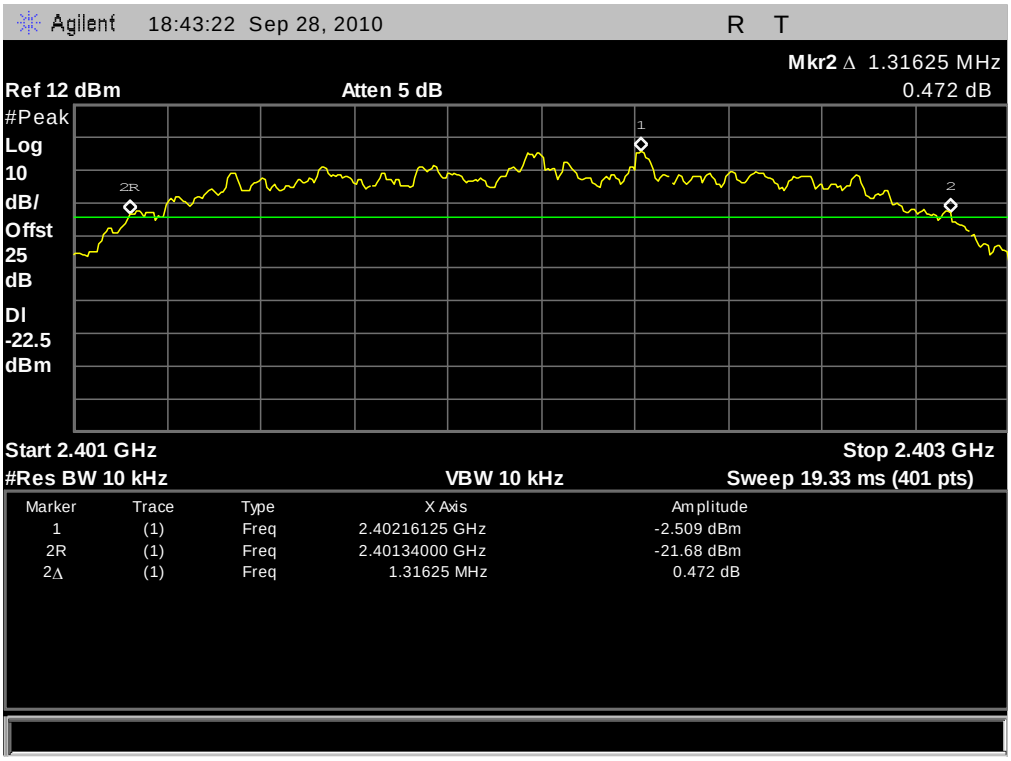
(Plot C: Channel = 2480)

A. π/4-DQPSK:

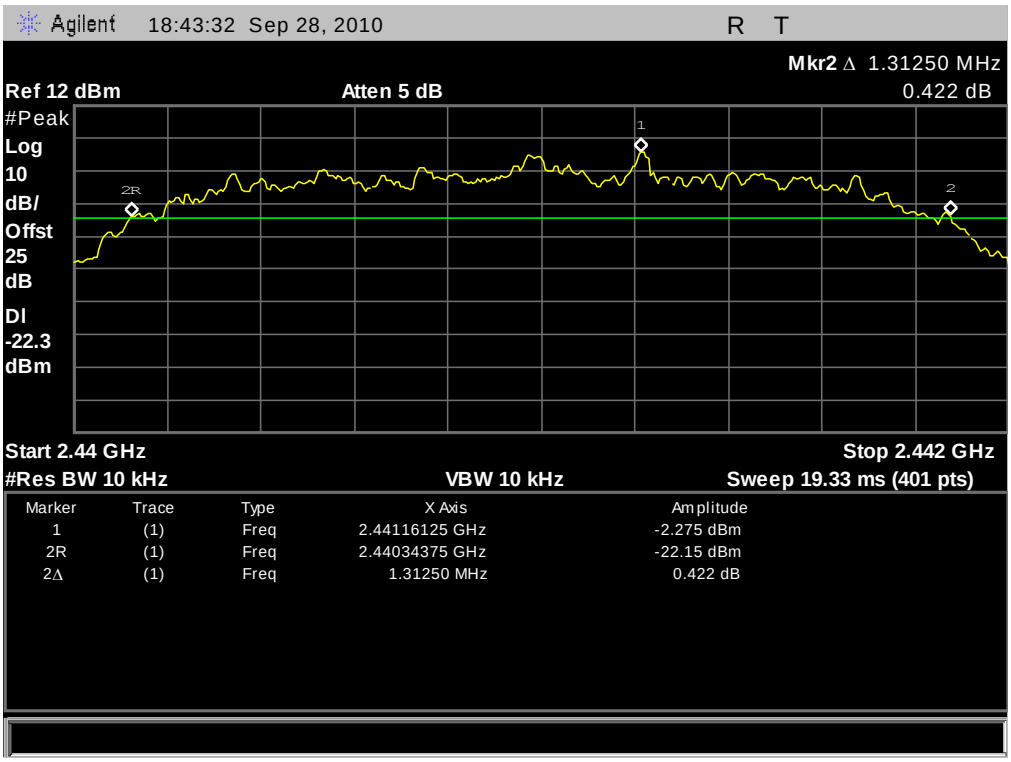
The maximum 20dB bandwidth measured is 1.316 MHz according to the table below.

Test Mode	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
π/4-DQPSK	2402	1.316	Plot A
	2441	1.313	Plot B
	2480	1.313	Plot C

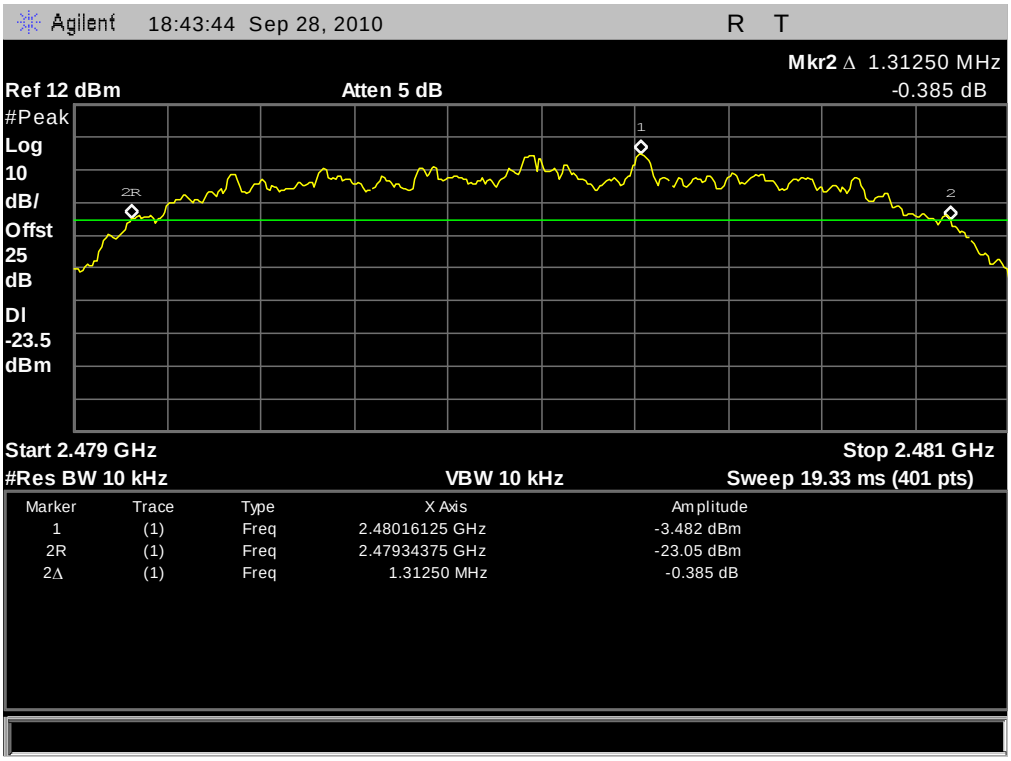
B. Test Plot:



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



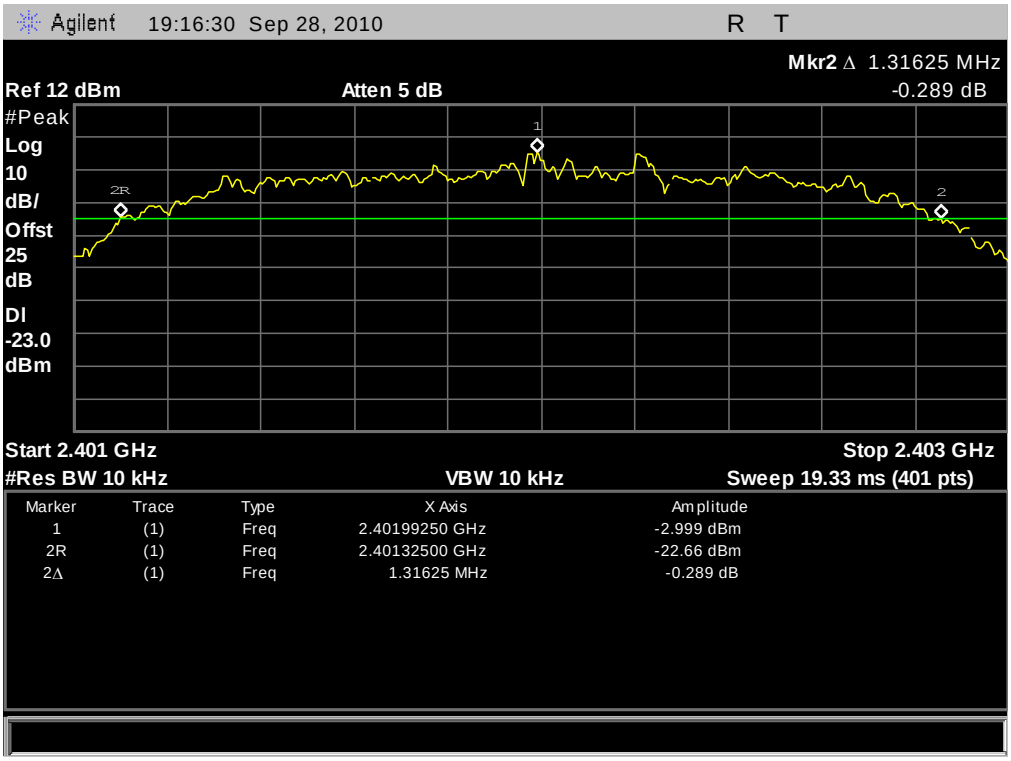
(Plot C: Channel = 2480)

A. 8-DPSK:

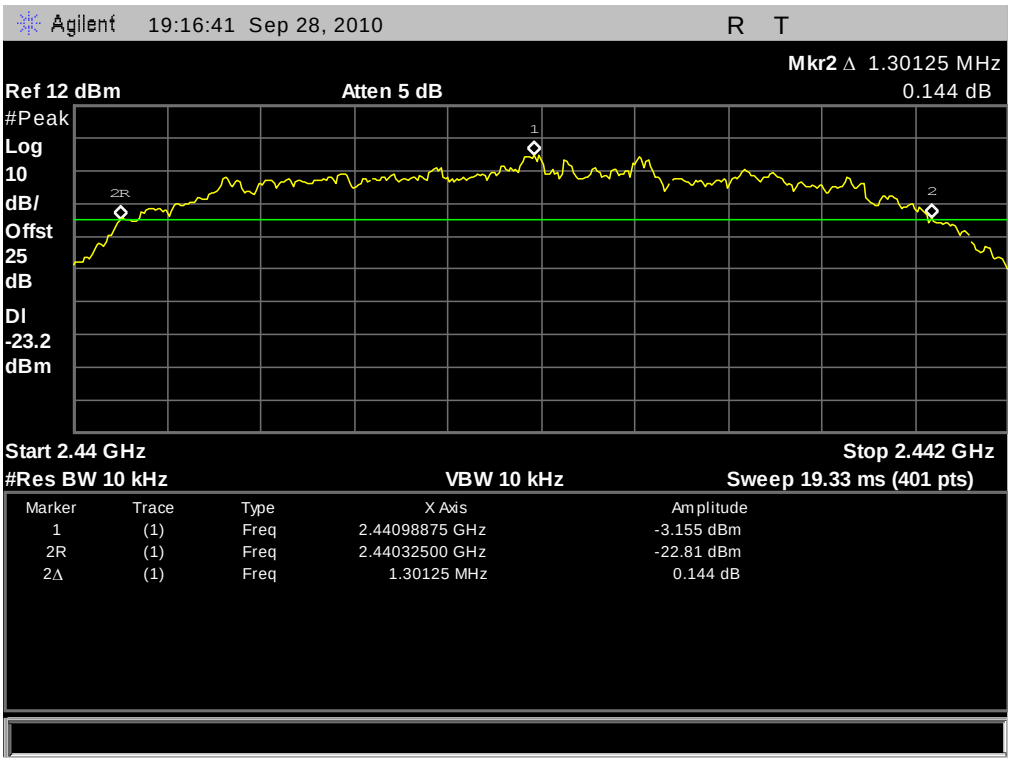
The maximum 20dB bandwidth measured is 1.316 MHz according to the table below.

Test Mode	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
8-DPSK	2402	1.316 MHz	Plot A
	2441	1.301 MHz	Plot B
	2480	1.301 MHz	Plot C

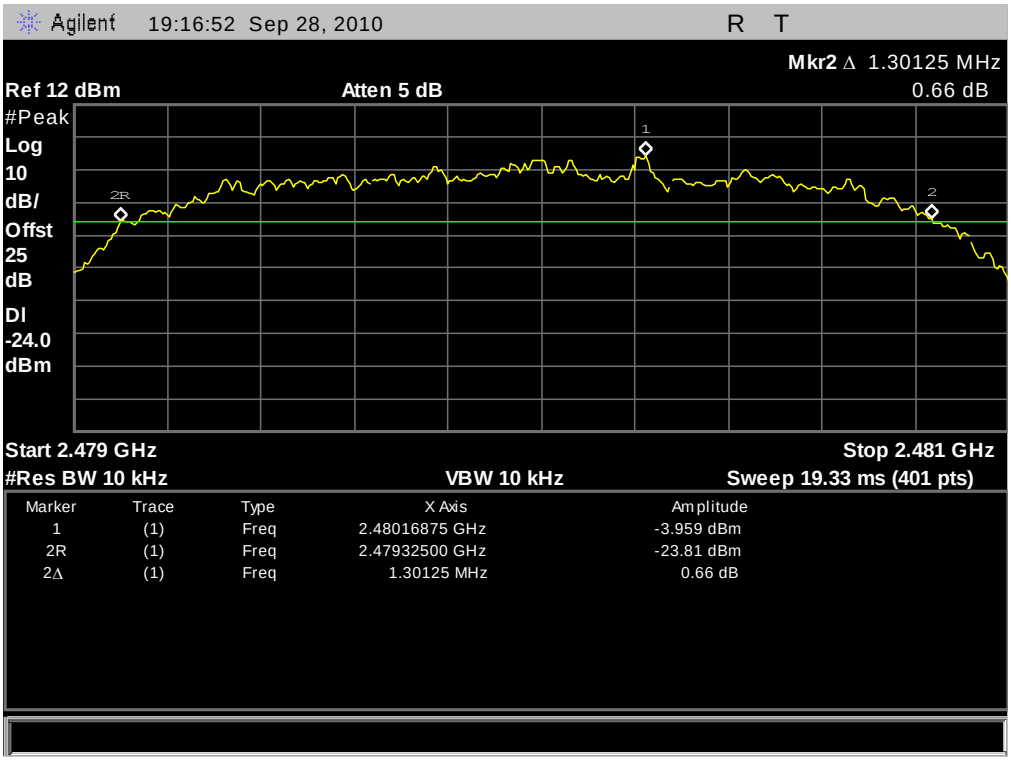
B. Test Plot:



(Plot A: Channel = 2402)



(Plot B: Channel = 2441)



(Plot C: Channel = 2480)

3.4 Carried Frequency Separation

3.4.1 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.

3.4.2 Test Description

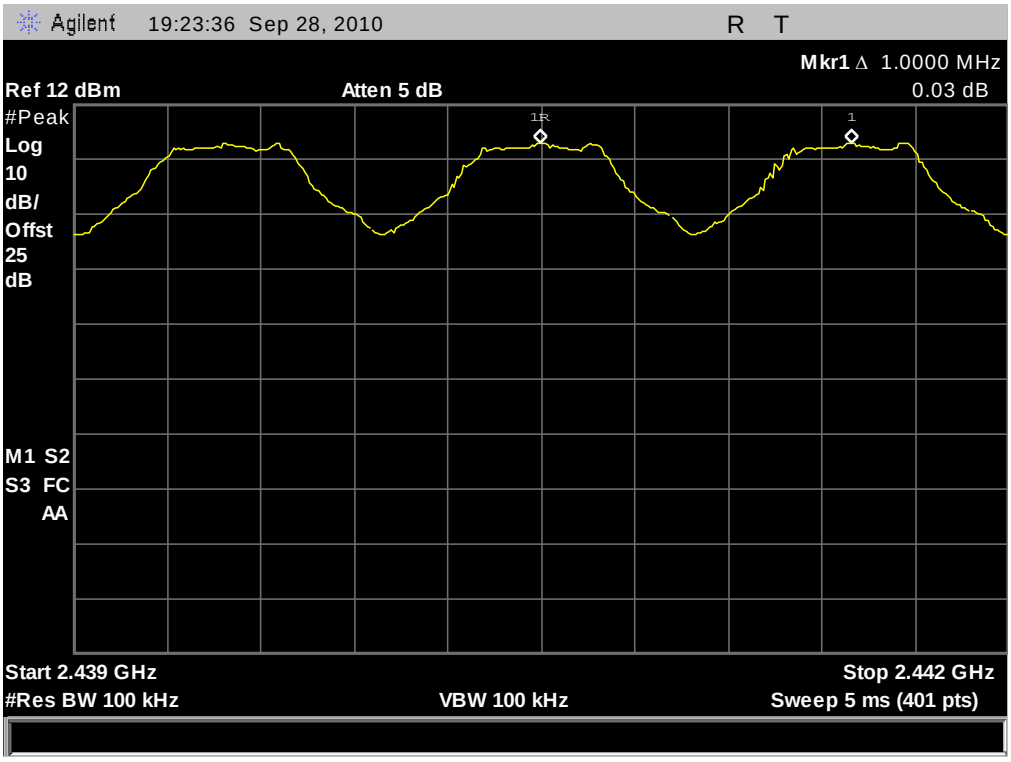
See section 3.1.2 of this report.

3.4.3 Test Result

A. GFSK:

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, refer to section 3.3.3), whichever is greater. So, the verdict is PASS.

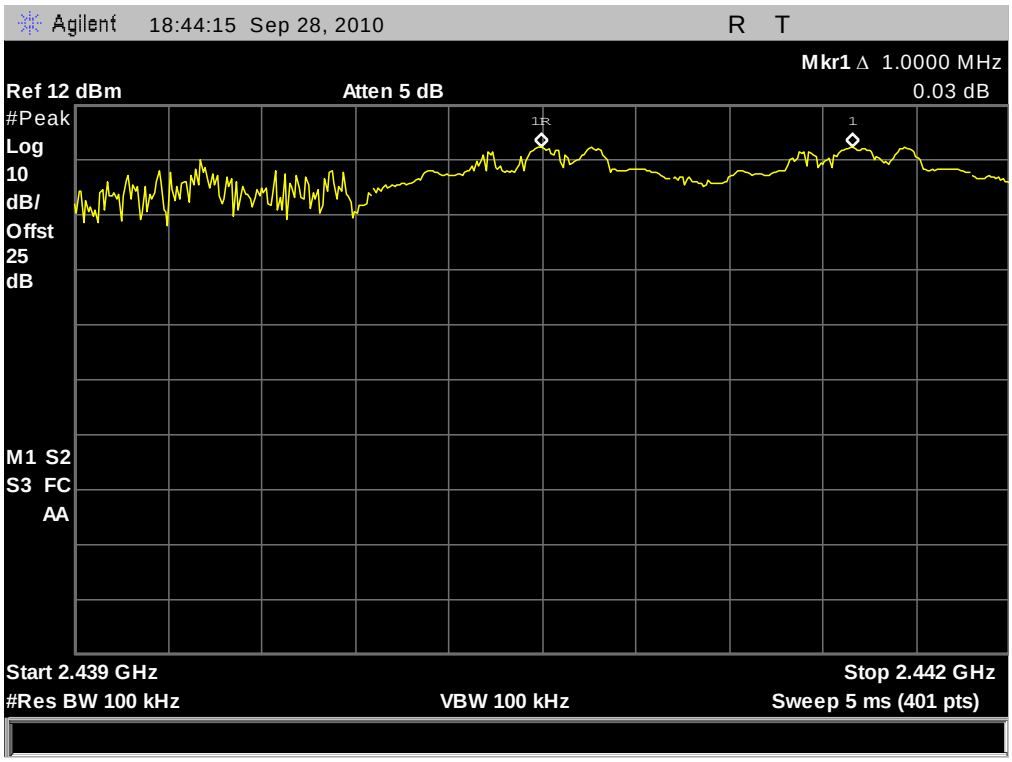


(Plot A: Carried Frequency Separation)

B. π/4-DQPSK:

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 (1.316MHz, refer to section 3.3.3), whichever is greater. So, the verdict is PASS.

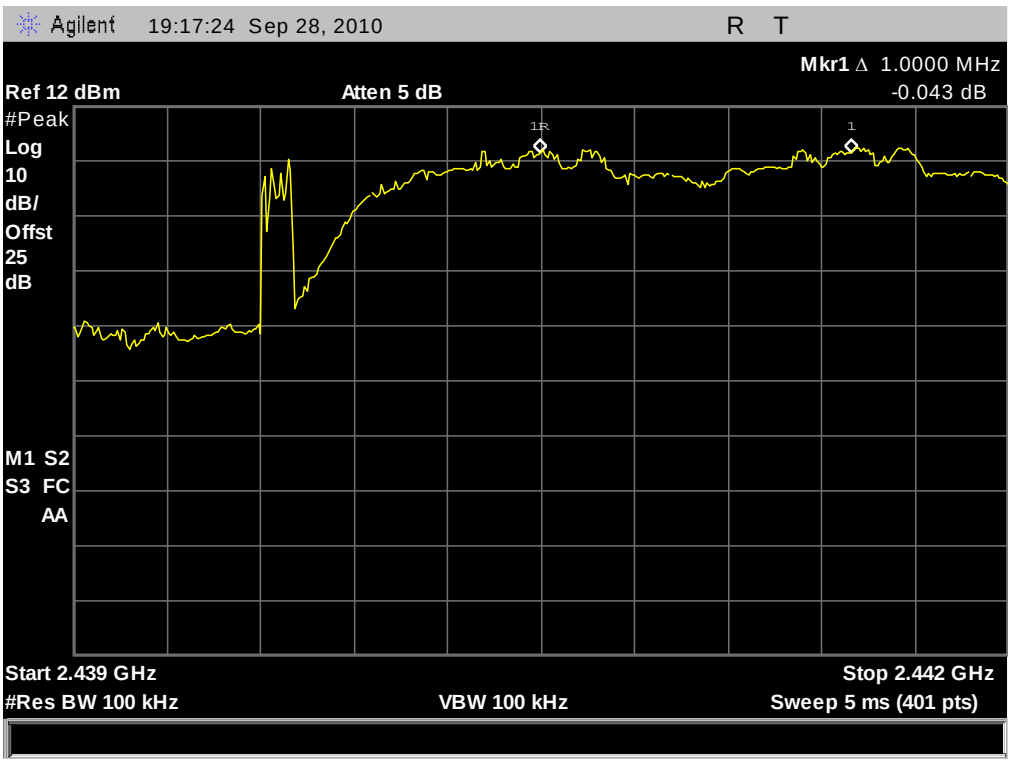


(Plot A: Carried Frequency Separation)

C. 8-DPSK:

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 (1.316MHz, refer to section 3.3.3), whichever is greater. So, the verdict is PASS.



(Plot A: Carried Frequency Separation)

3.5 Time of Occupancy (Dwell time)

3.5.1 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.

3.5.2 Test Description

See section 3.1.2 of this report.

3.5.3 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}

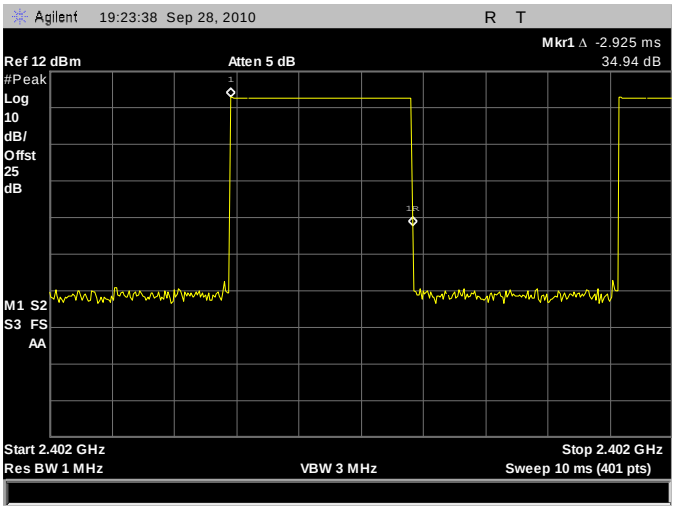
The lowest, middle and highest channels are selected to perform testing to record the dwell time of each occupation measured in this channel, which is called Pulse Time here.

A. Test Verdict:

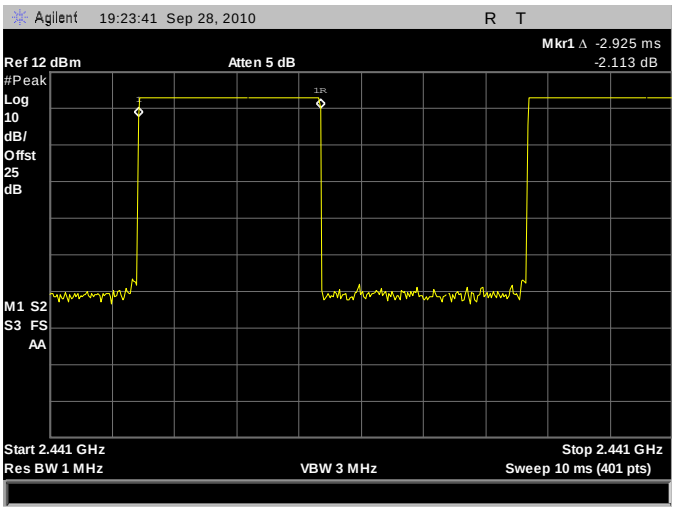
Test Mode	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
GFSK	2402	2.925	Plot A	312.00	400	PASS
	2441	2.925	Plot B	312.00		PASS
	2480	2.925	Plot C	312.00		PASS
π/4-DQPSK	2402	2.925	Plot D	312.00	400	PASS
	2441	2.925	Plot E	312.00		PASS
	2480	2.925	Plot F	312.00		PASS
8-DPSK	2402	2.925	Plot G	312.00	400	PASS
	2441	2.925	Plot H	312.00		PASS
	2480	2.925	Plot I	312.00		PASS

B. Test Plot:

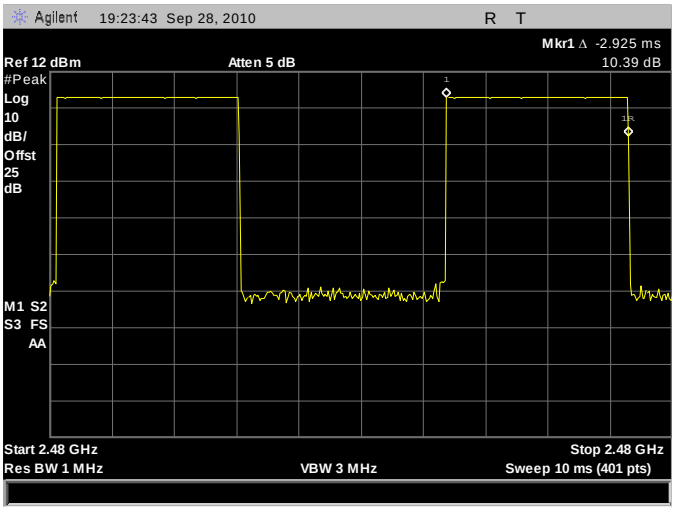
Note: the following plots record the Pulse Time of the Module carrier.



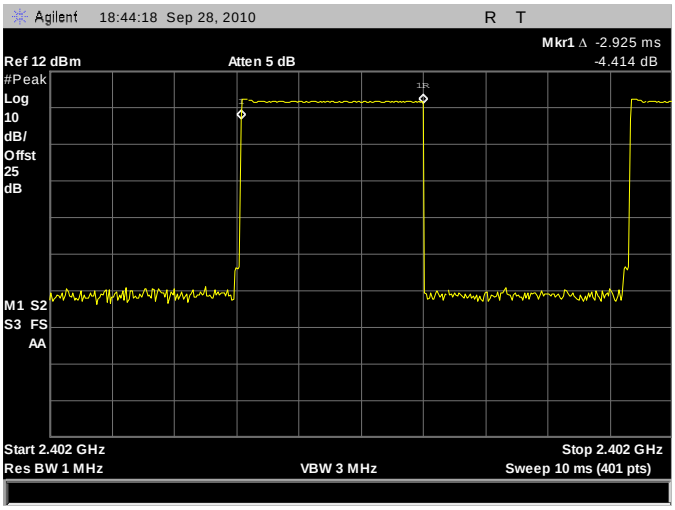
(Plot A: Channel = 2402)



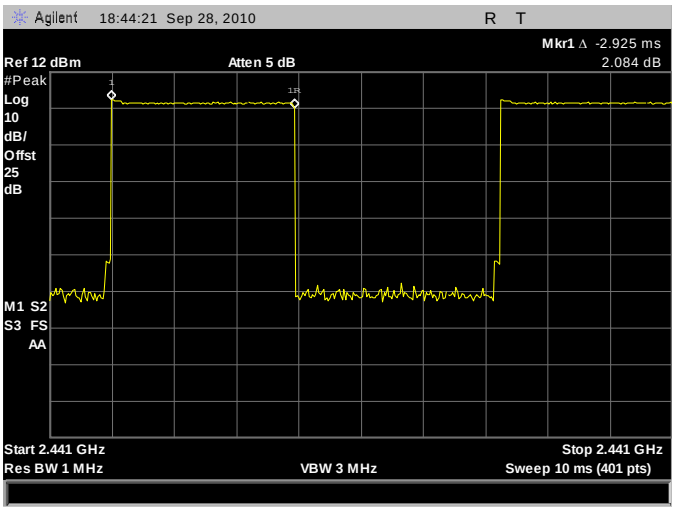
(Plot B: Channel = 2441)



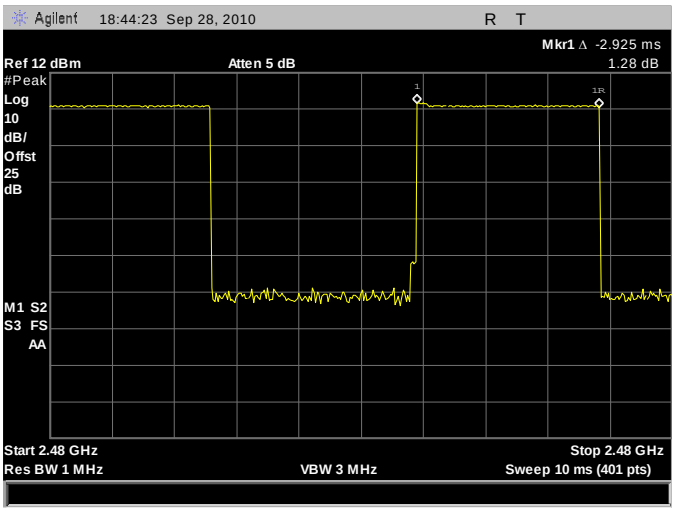
(Plot C: Channel = 2480)



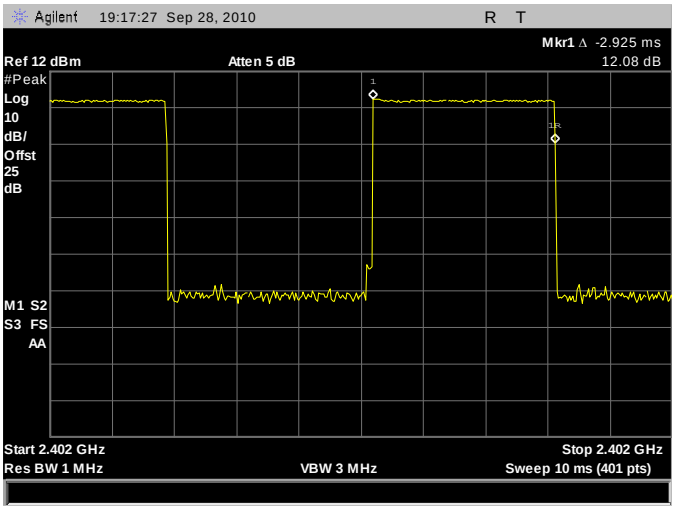
(Plot D: Channel = 2402)



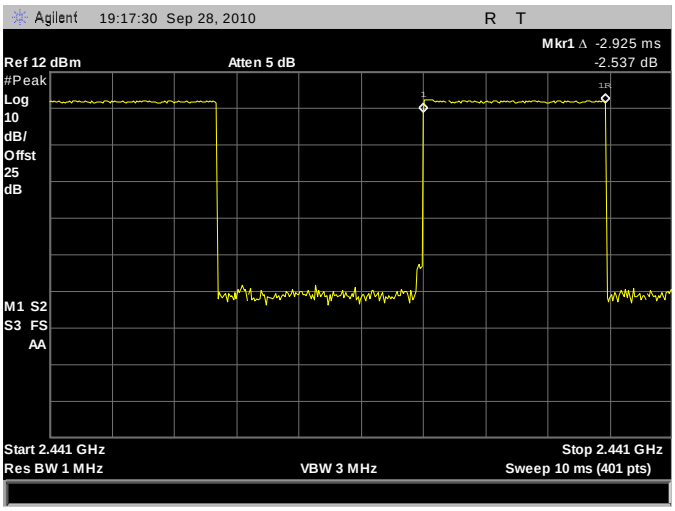
(Plot E: Channel = 2441)



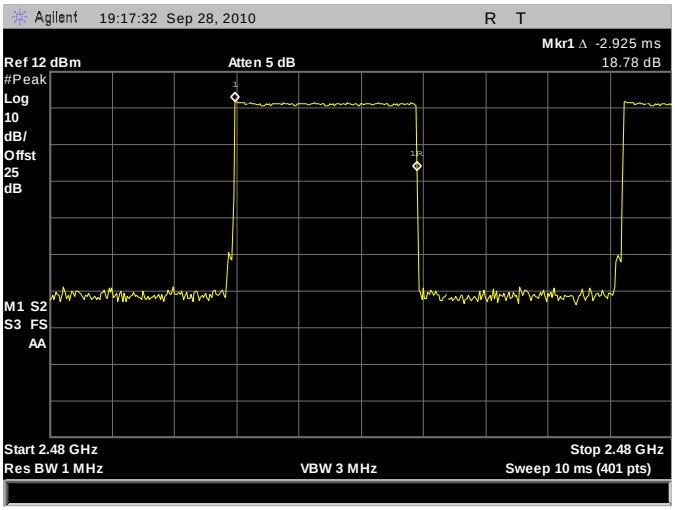
(Plot F: Channel = 2480)



(Plot G: Channel = 2402)



(Plot H: Channel = 2441)



(Plot I: Channel = 2480)

3.6 Conducted Spurious Emissions

3.6.1 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.

3.6.2 Test Description

See section 3.1.2 of this report.

3.6.3 Test Result

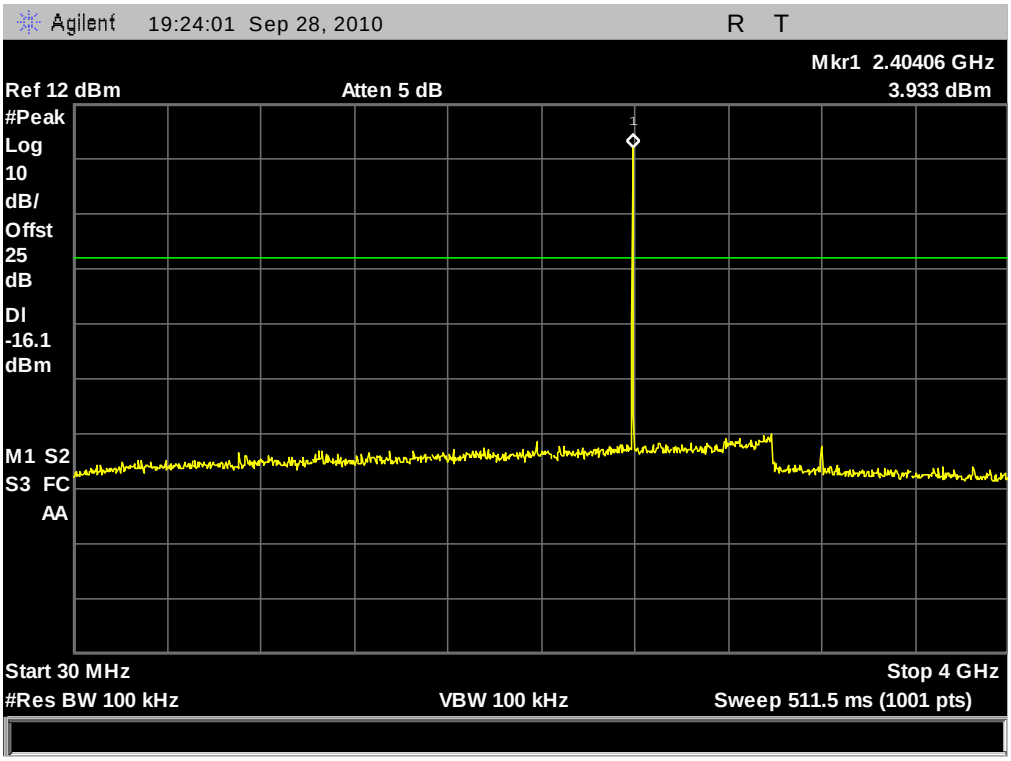
The Bluetooth Module operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

A. Test Verdict:

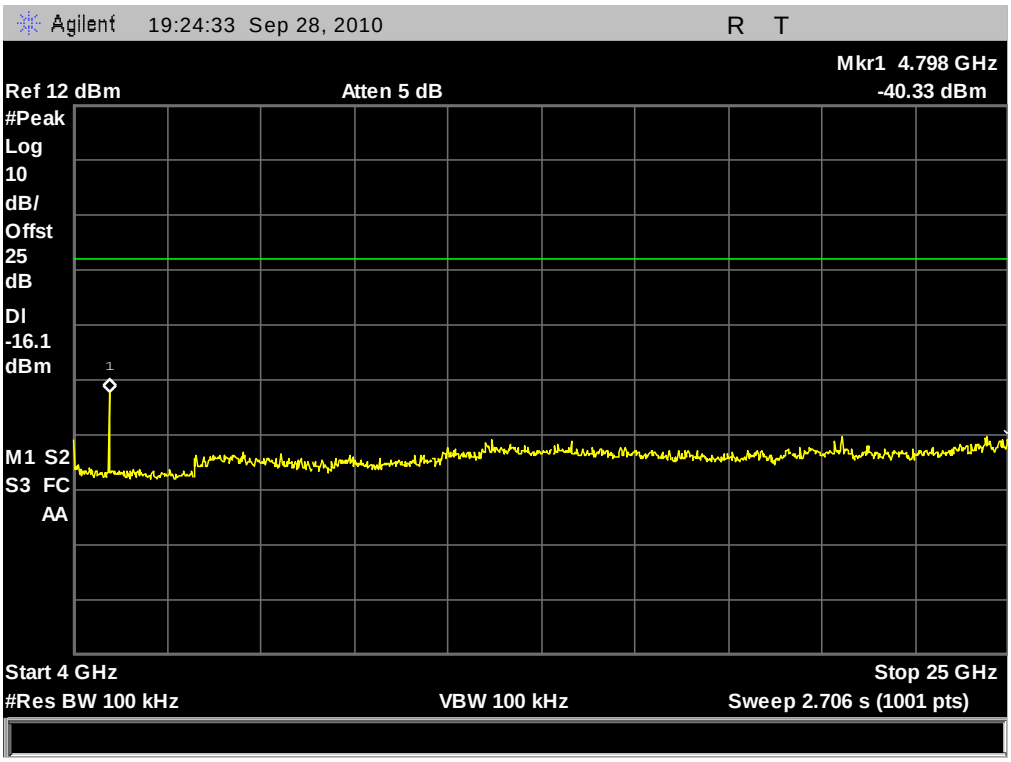
Test Mode	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
GFSK	2402	-40.33	Plot A.1/A.2	3.933	-16.1	PASS
	2441	-41.58	Plot B.1/B.2	4.759	-15.2	PASS
	2480	-37.12	Plot C.1/C.2	4.862	-15.1	PASS
π/4-DQPSK	2402	-48.25	Plot D.1/D.2	0.441	-19.6	PASS
	2441	-48.44	Plot E.1/E.2	1.228	-18.8	PASS
	2480	-49.03	Plot F.1/F.2	-0.105	-20.1	PASS
8-DPSK	2402	-48.59	Plot G.1/G.2	1.606	-18.4	PASS
	2441	-46.31	Plot H.1/H.2	3.619	-16.4	PASS
	2480	-48.28	Plot I.1/I.2	-0.7	-20.7	PASS

B. Test Plot:

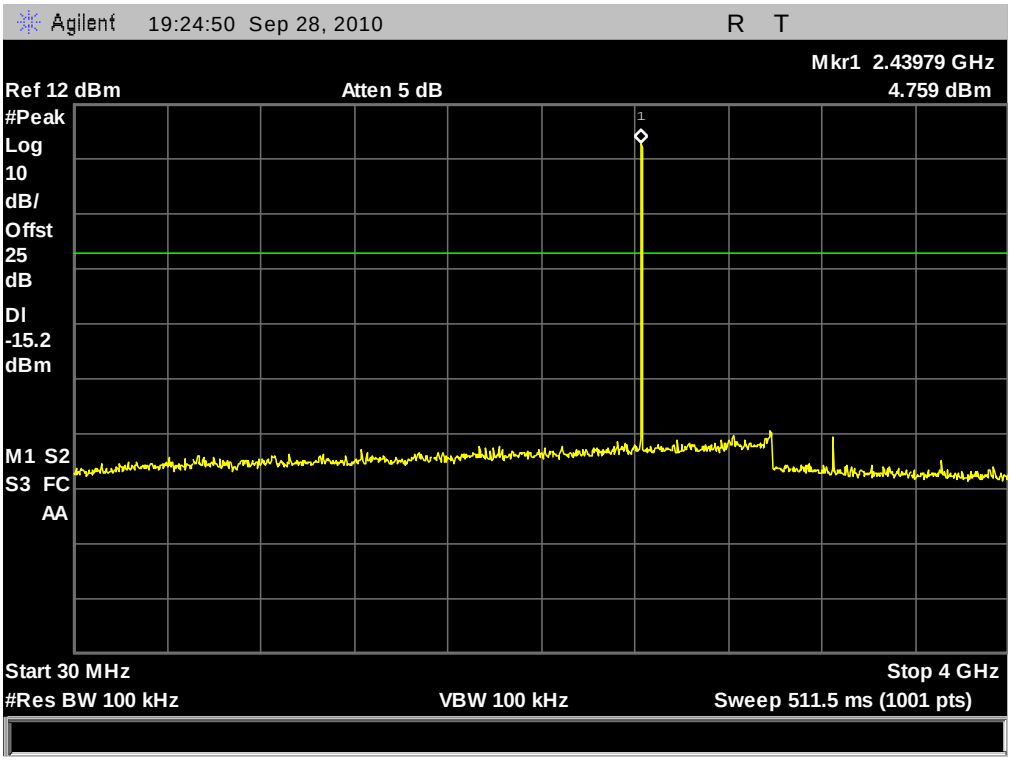
Note: the power of the Module transmitting frequency should be ignored.



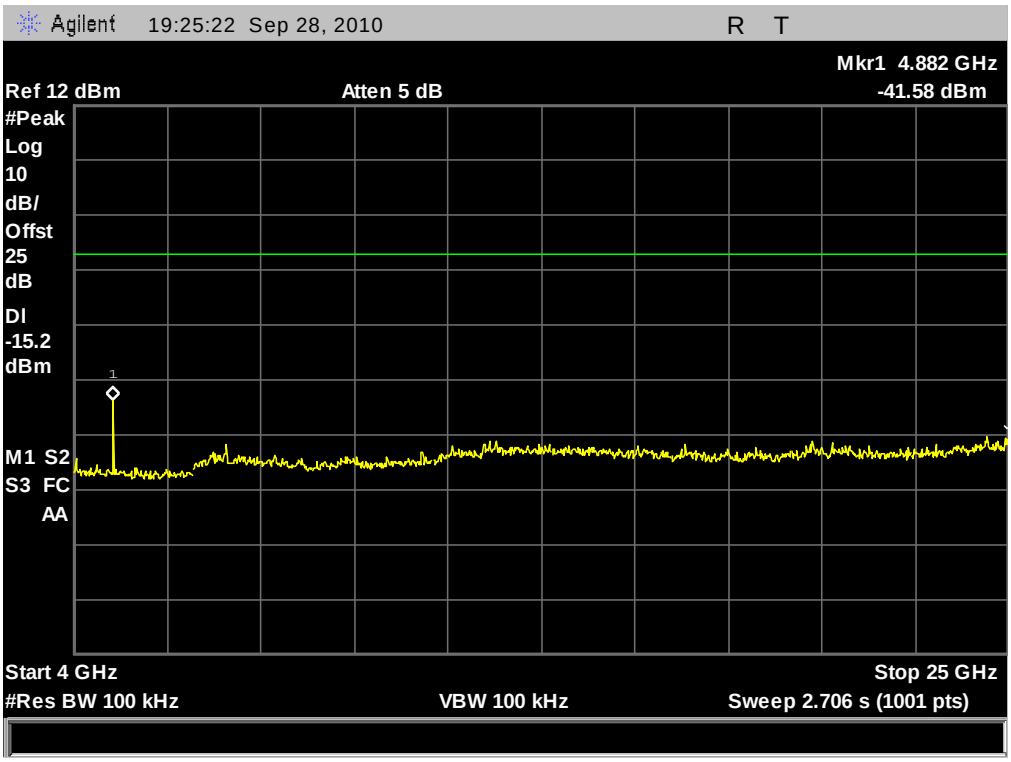
(Plot A.1: Channel = 0, 30MHz to 4GHz)



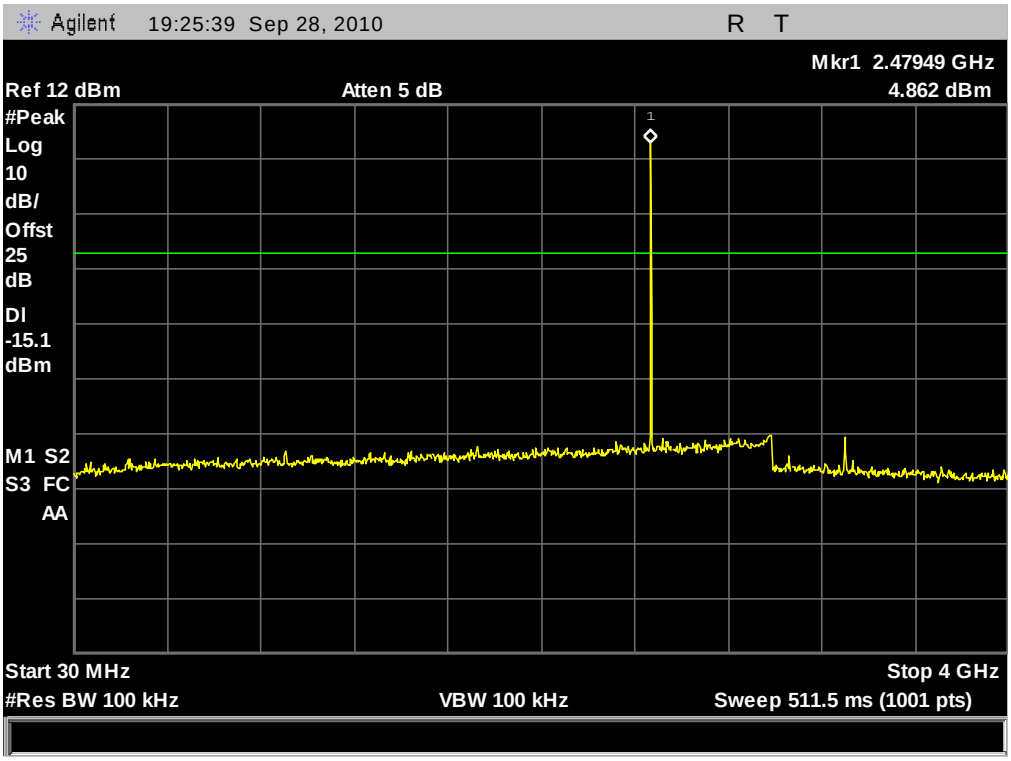
(Plot A.2: Channel = 0, 4GHz to 25GHz)



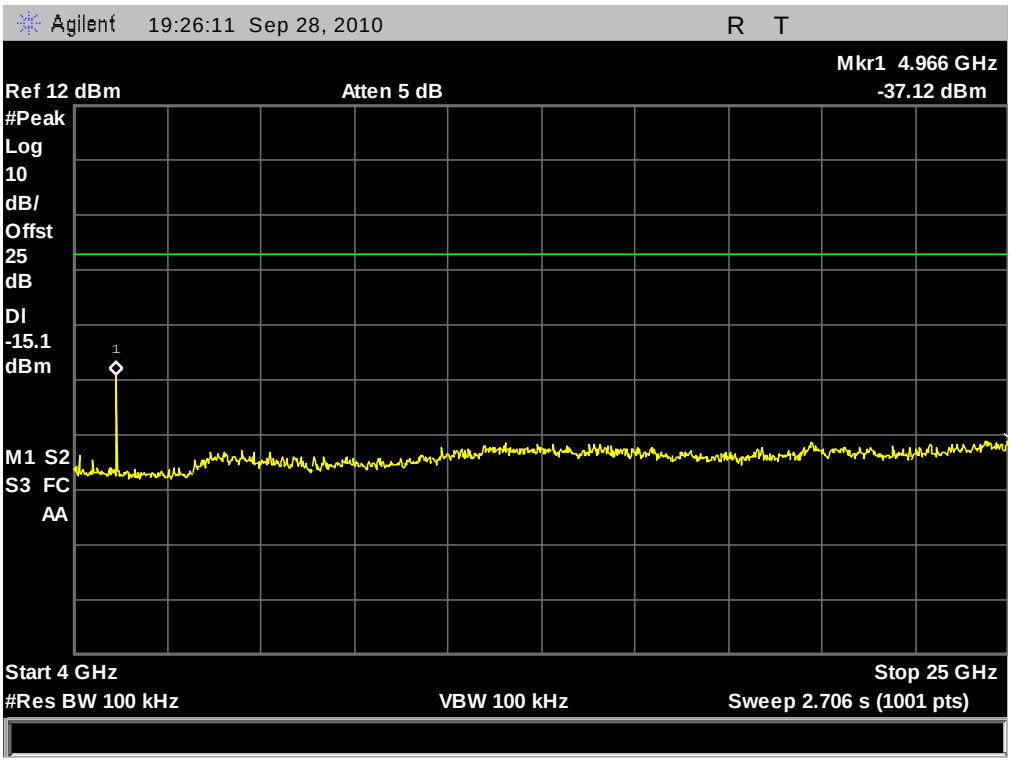
(Plot B.1: Channel = 39, 30MHz to 4GHz)



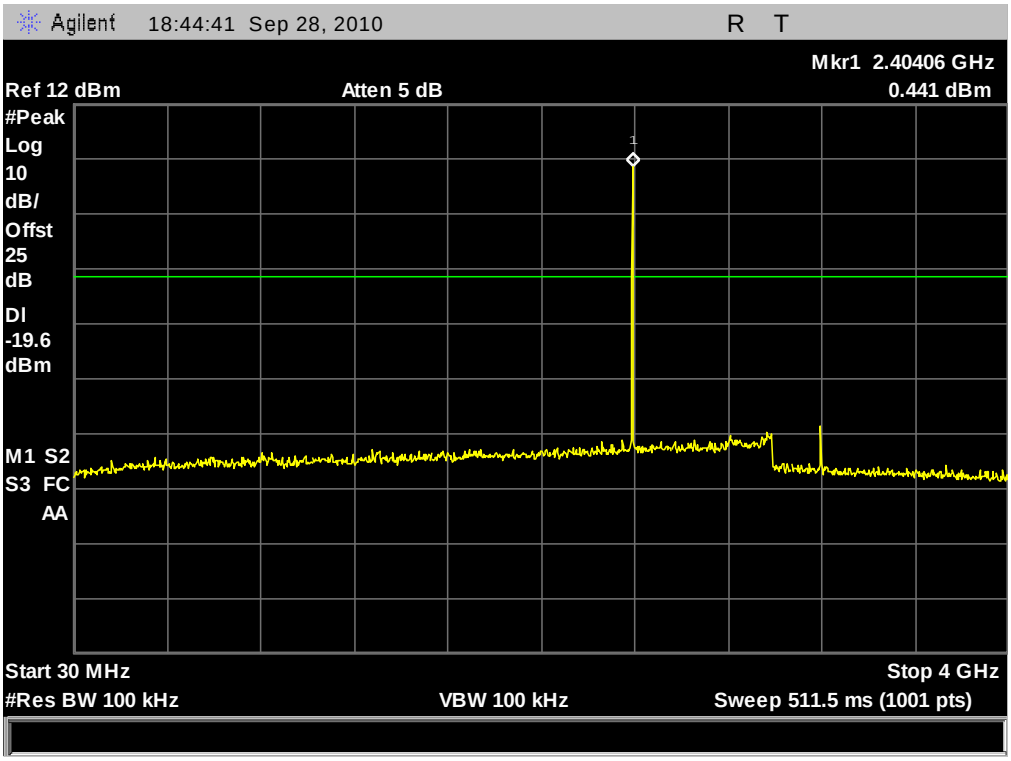
(Plot B.2: Channel = 39, 4GHz to 25GHz)



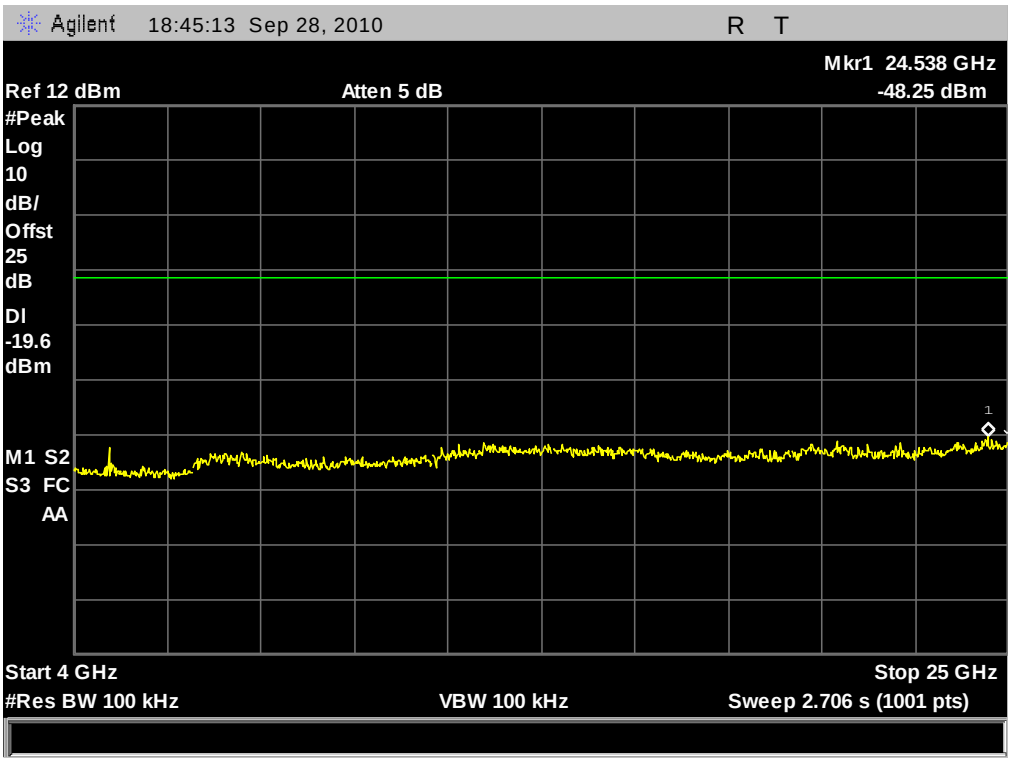
(Plot C.1: Channel = 78, 30MHz to 4GHz)



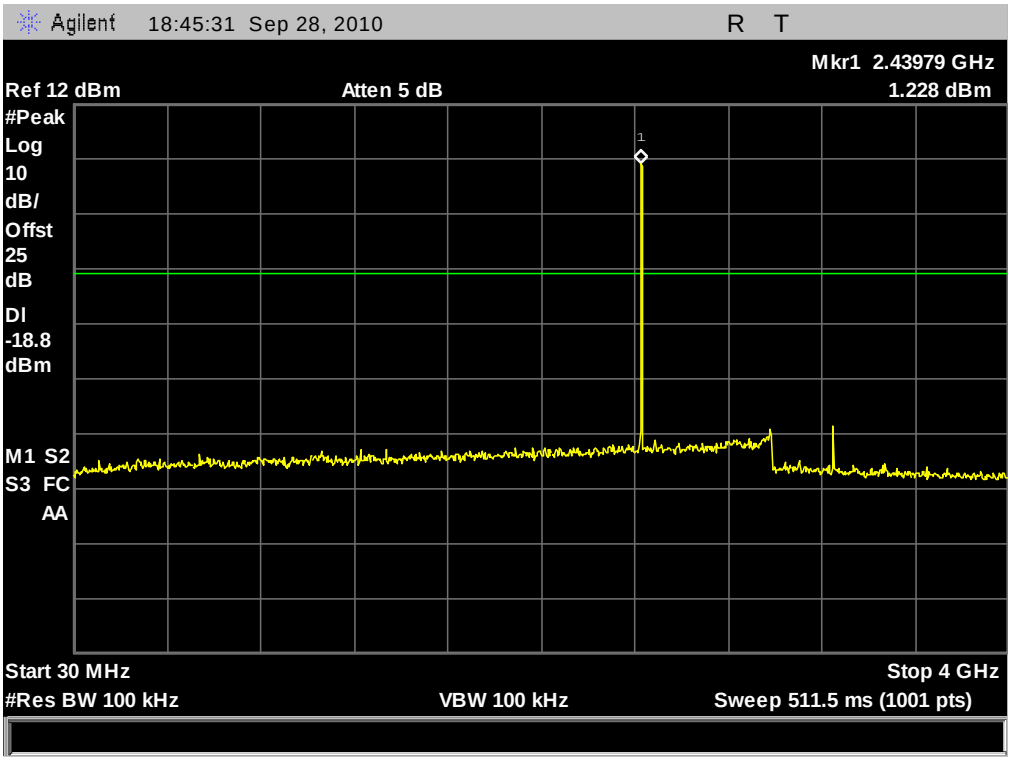
(Plot C.2: Channel = 78, 4GHz to 25GHz)



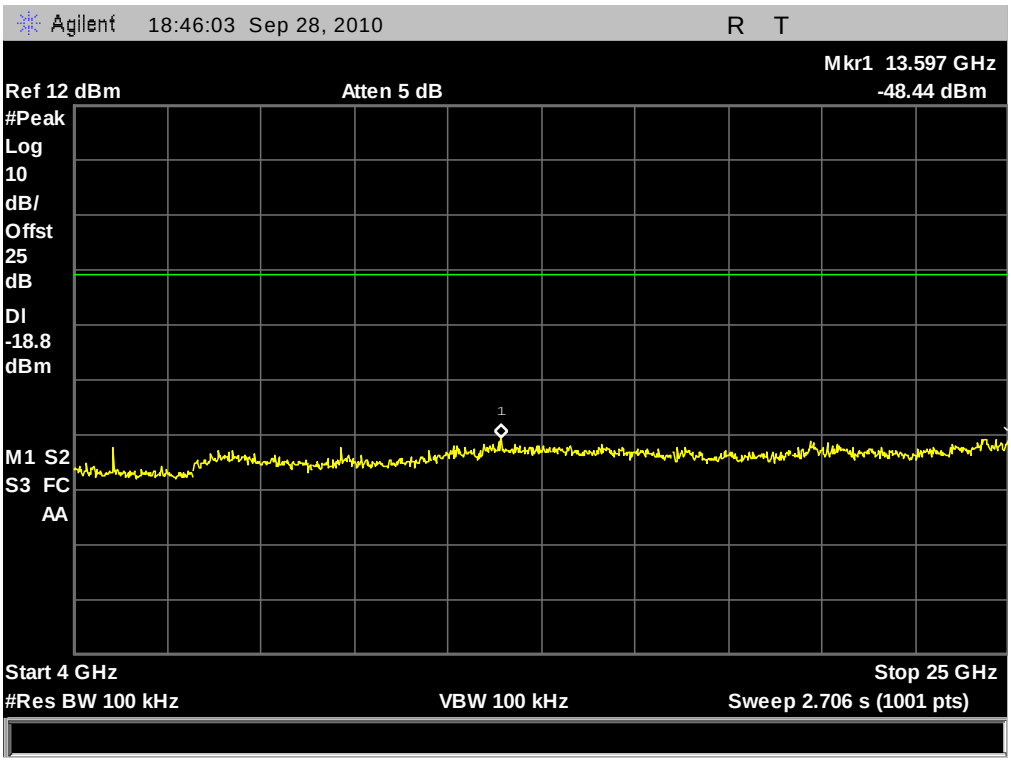
(Plot D.1: Channel = 0, 30MHz to 4GHz)



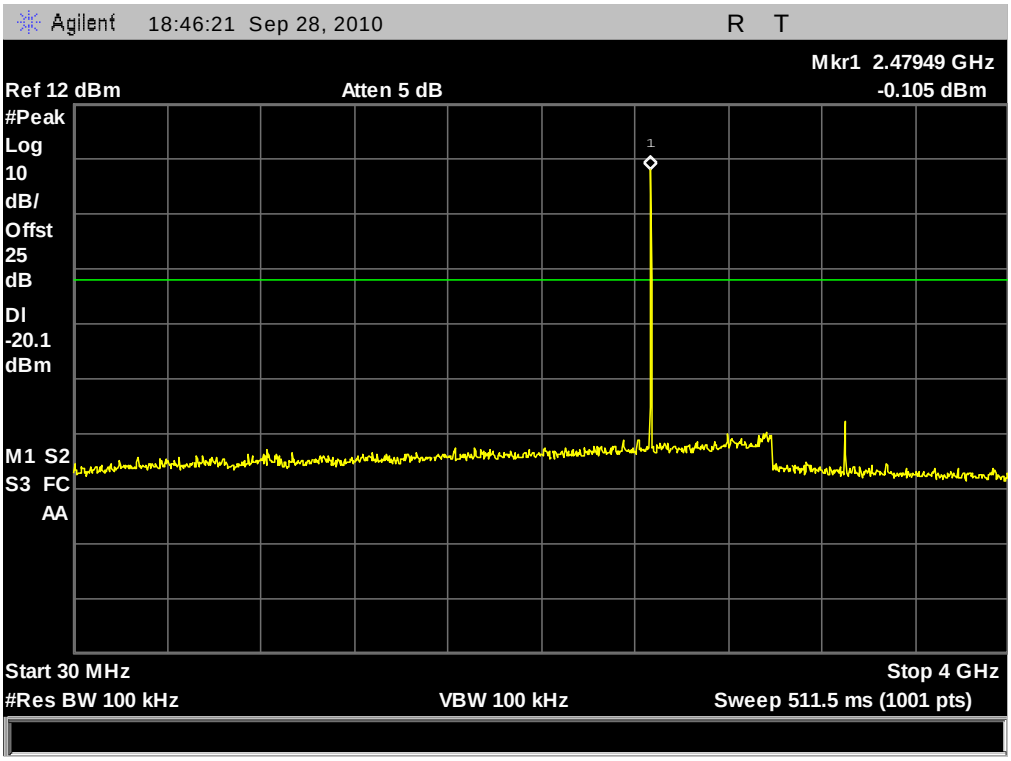
(Plot D.2: Channel = 0, 4GHz to 25GHz)



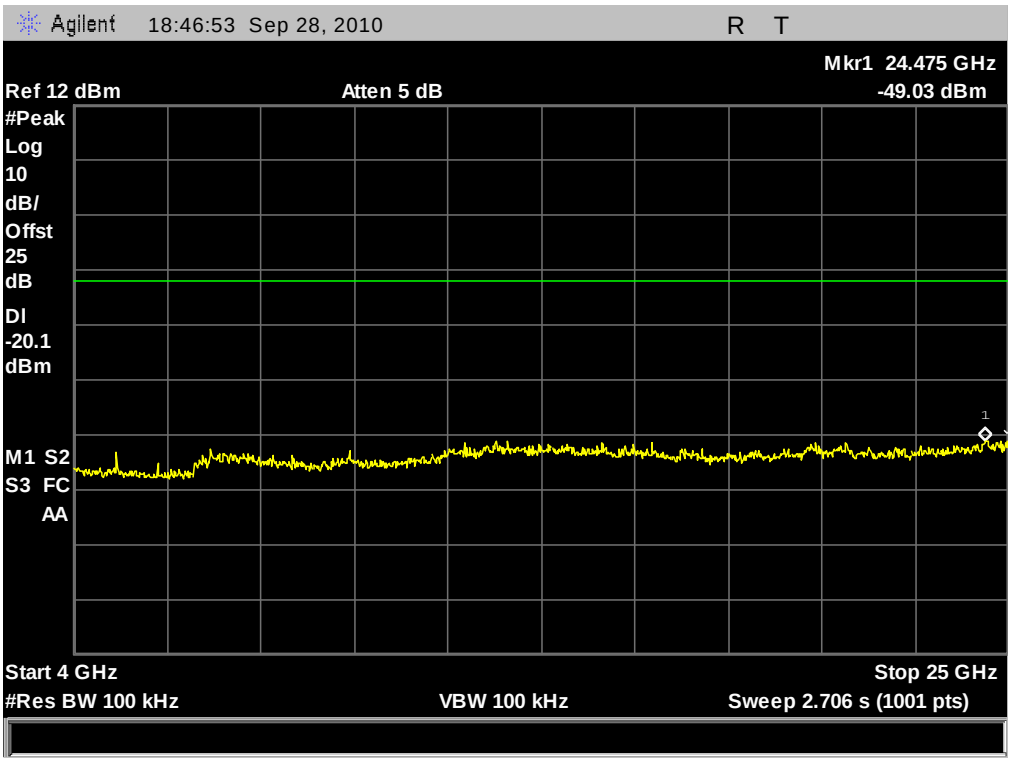
(Plot E.1: Channel = 39, 30MHz to 4GHz)



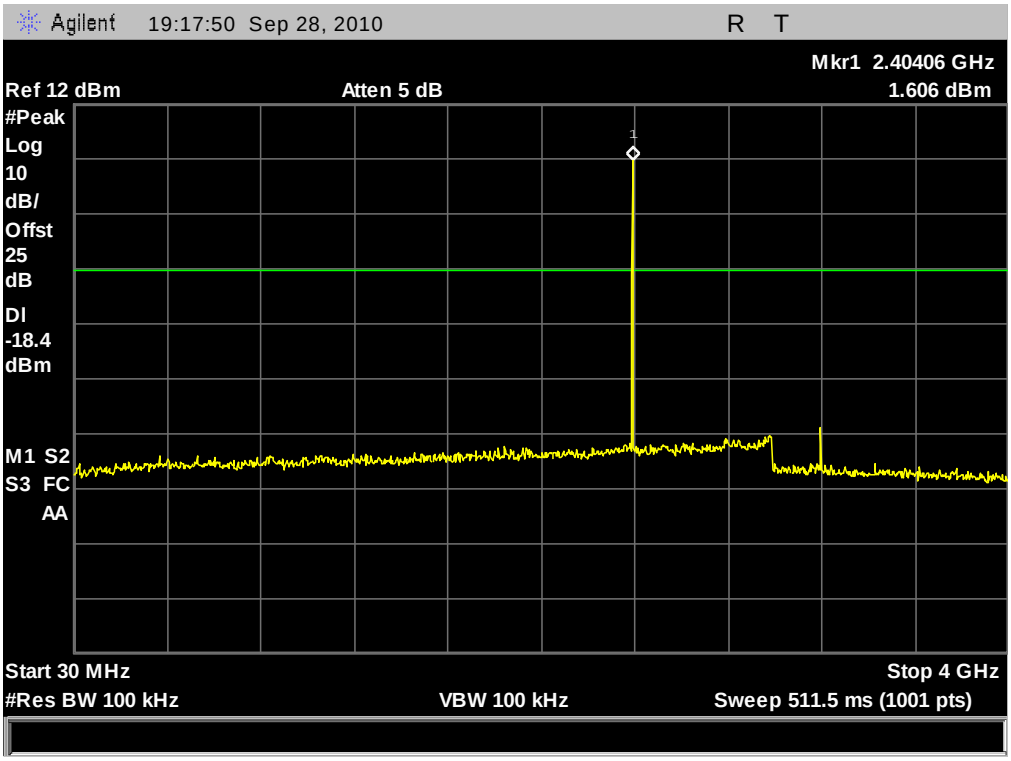
(Plot E.2: Channel = 39, 4GHz to 25GHz)



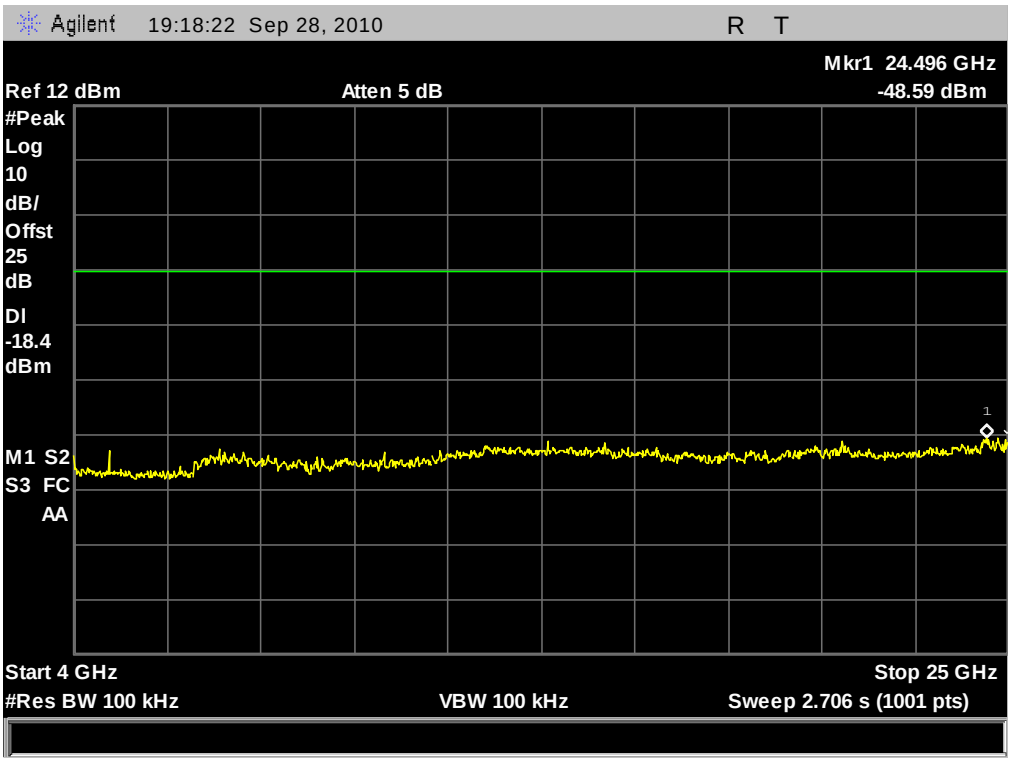
(Plot F.1: Channel = 78, 30MHz to 4GHz)



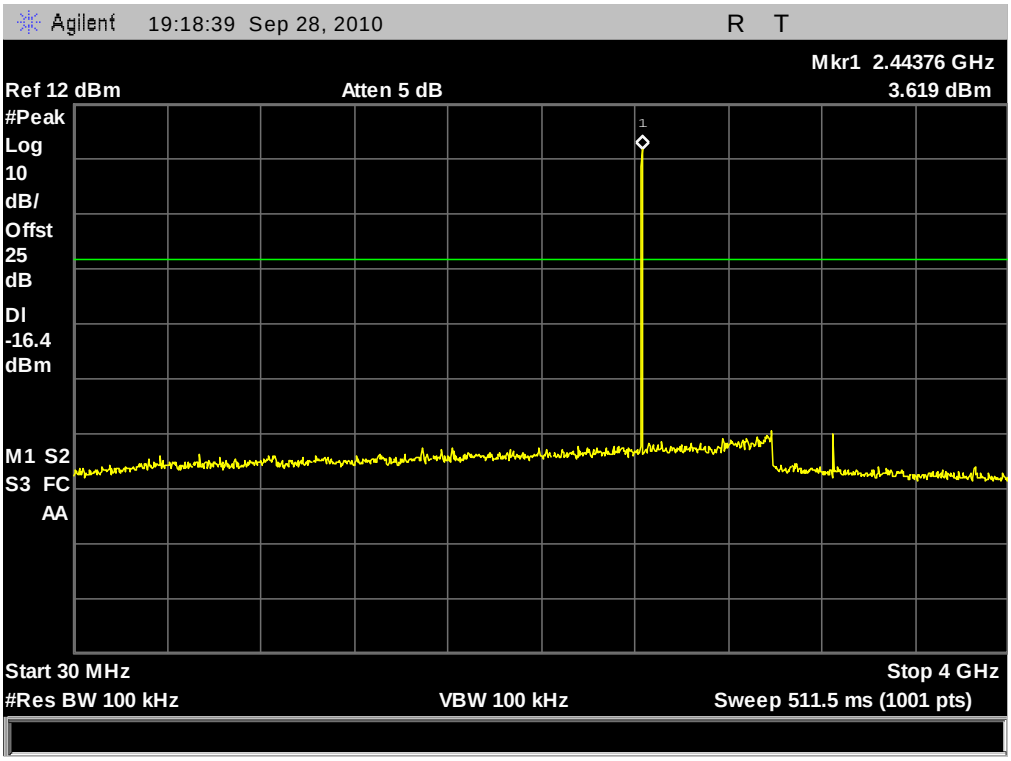
(Plot F.2: Channel = 78, 4GHz to 25GHz)



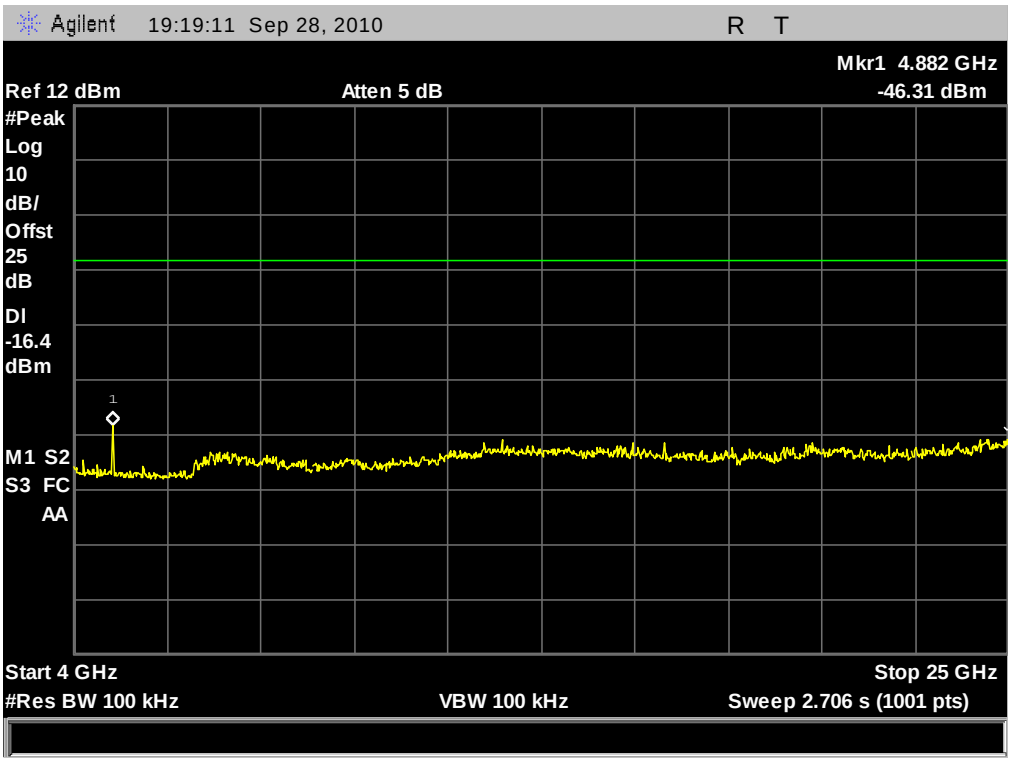
(Plot G.1: Channel = 0, 30MHz to 4GHz)



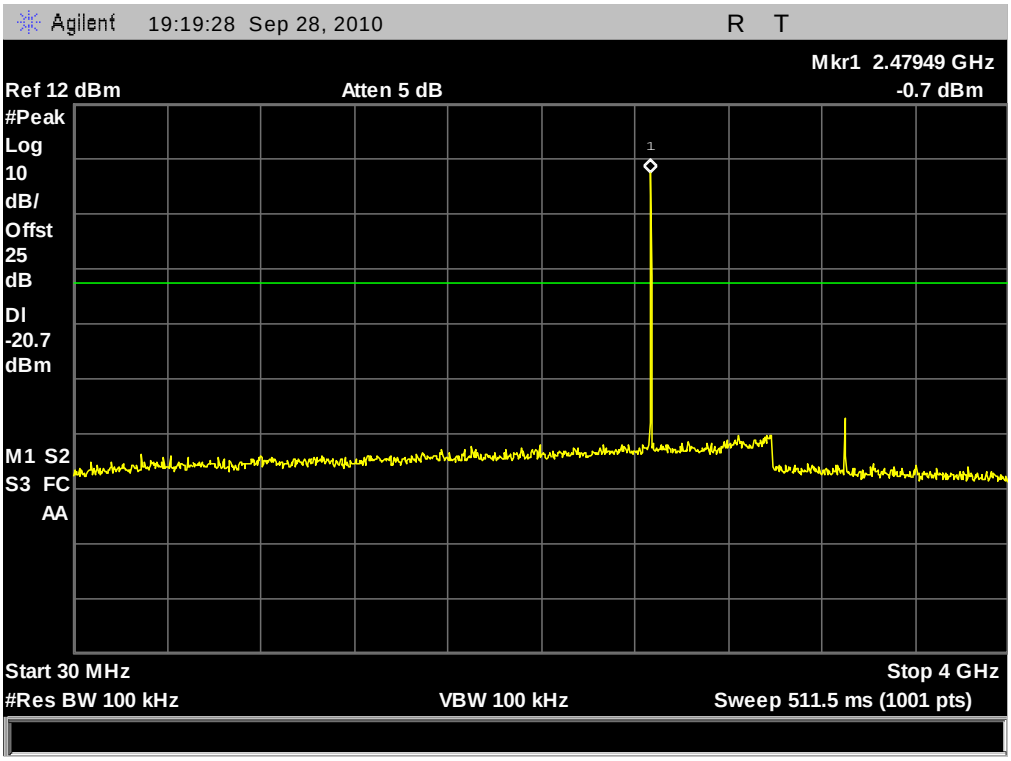
(Plot G.2: Channel = 0, 4GHz to 25GHz)



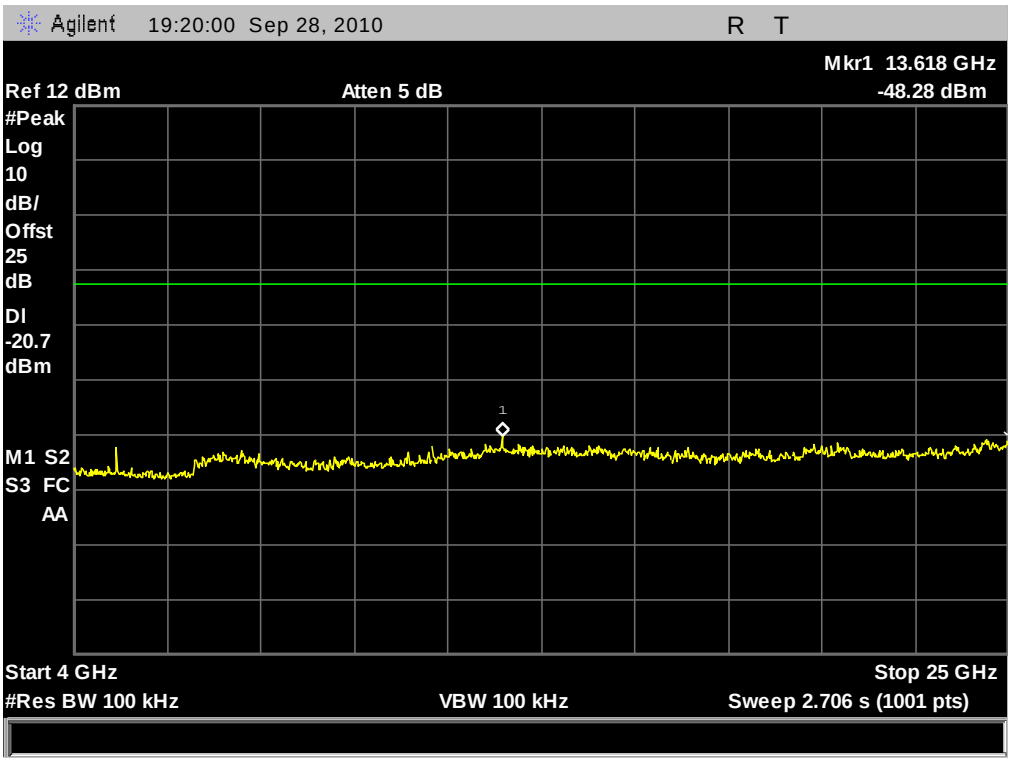
(Plot H.1: Channel = 39, 30MHz to 4GHz)



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



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



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

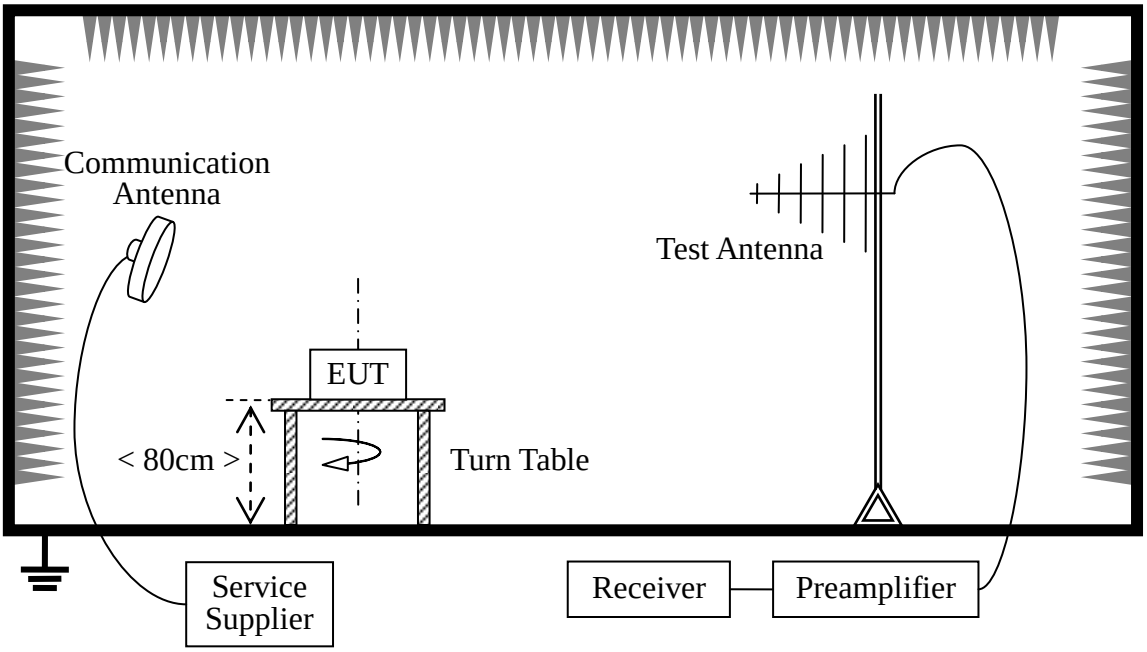
3.7 Band Edge

3.7.1 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.

3.7.2 Test Description

A. Test Setup:



The Bluetooth Module of the EUT is powered by the Battery charged with the AC Adapter which is powered by 120V, 60Hz AC mains supply. 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	Cal. Due
System Simulator	R&S	CMU200	100448	2009.9	2year
Receiver	Agilent	E7405A	US44210471	2009.9	2year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.9	2year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2009.9	2year

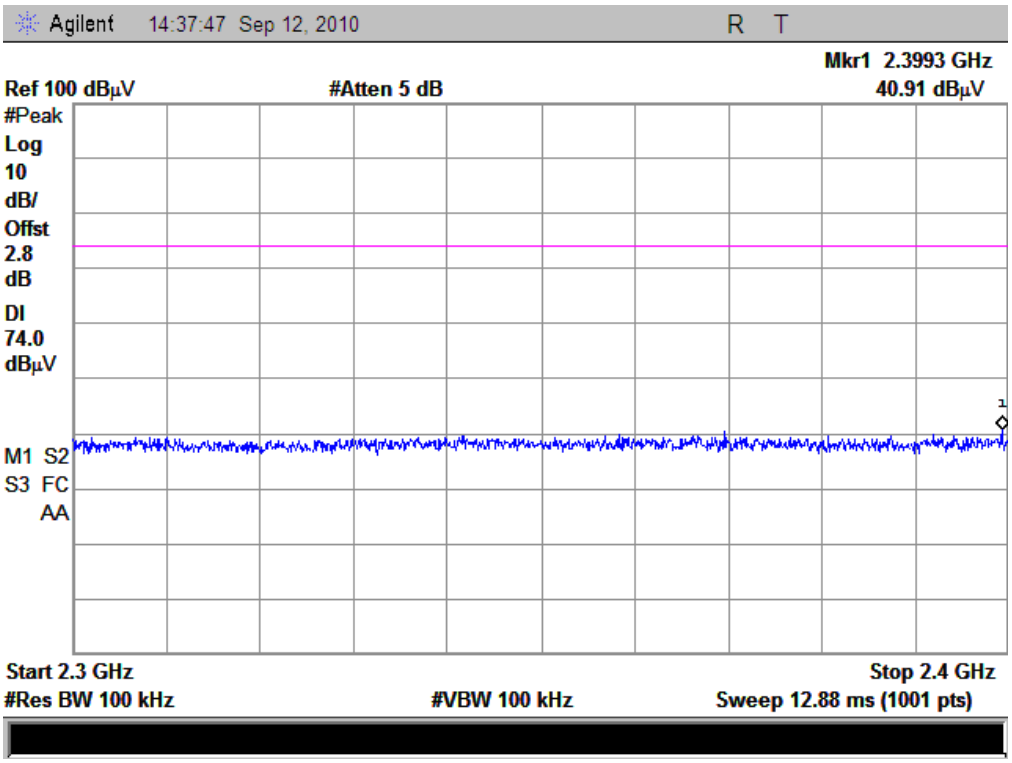
3.7.3 Test Result

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

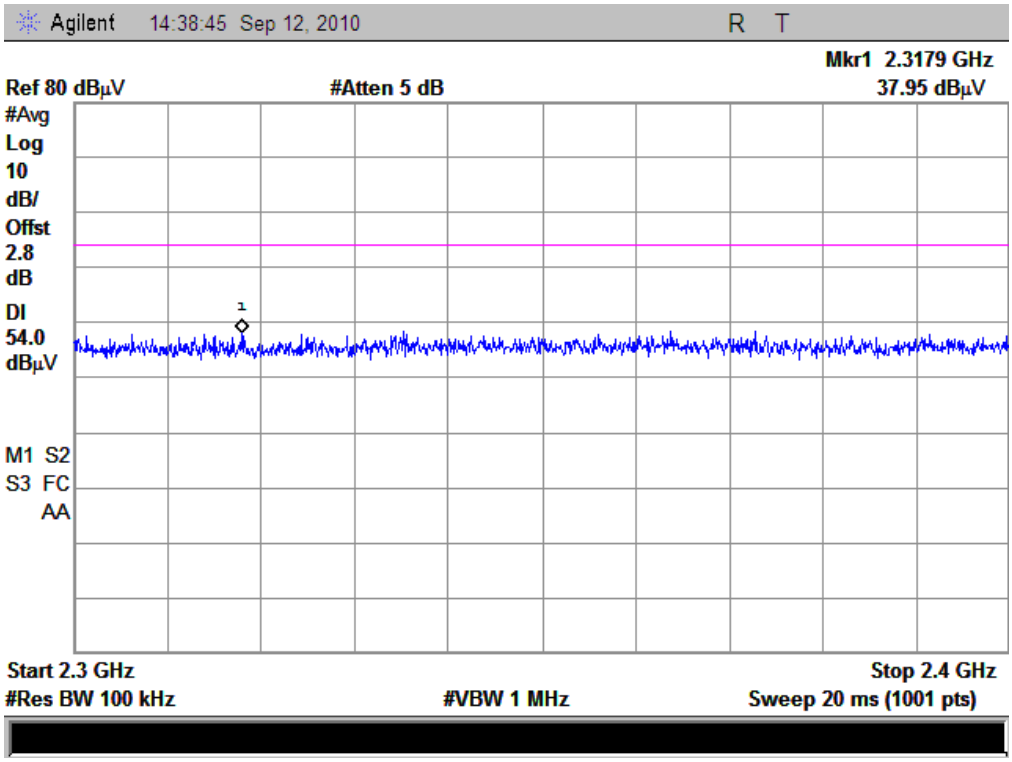
A. Test Verdict:.

Test Mode	Frequency (MHz)	Max. Emission in the Restricted Bands (dBμV/m)		Limit (dBμV/m)		Refer to Plot	Verdict
		PK	AV	PK	AV		
GFSK	2402	40.91	37.95	74	54	Plot A.1/A.2	PASS
	2480	40.18	38.88	74	54	Plot B.1/B.2	PASS
π/4-DQPSK	2402	39.85	37.88	74	54	Plot C.1/C.2	PASS
	2480	38.17	37.88	74	54	Plot D.1/D.2	PASS
8-DPSK	2402	57.47	38.28	74	54	Plot E.1/E.2	PASS
	2480	48.79	38.41	74	54	Plot F.1/F.2	PASS

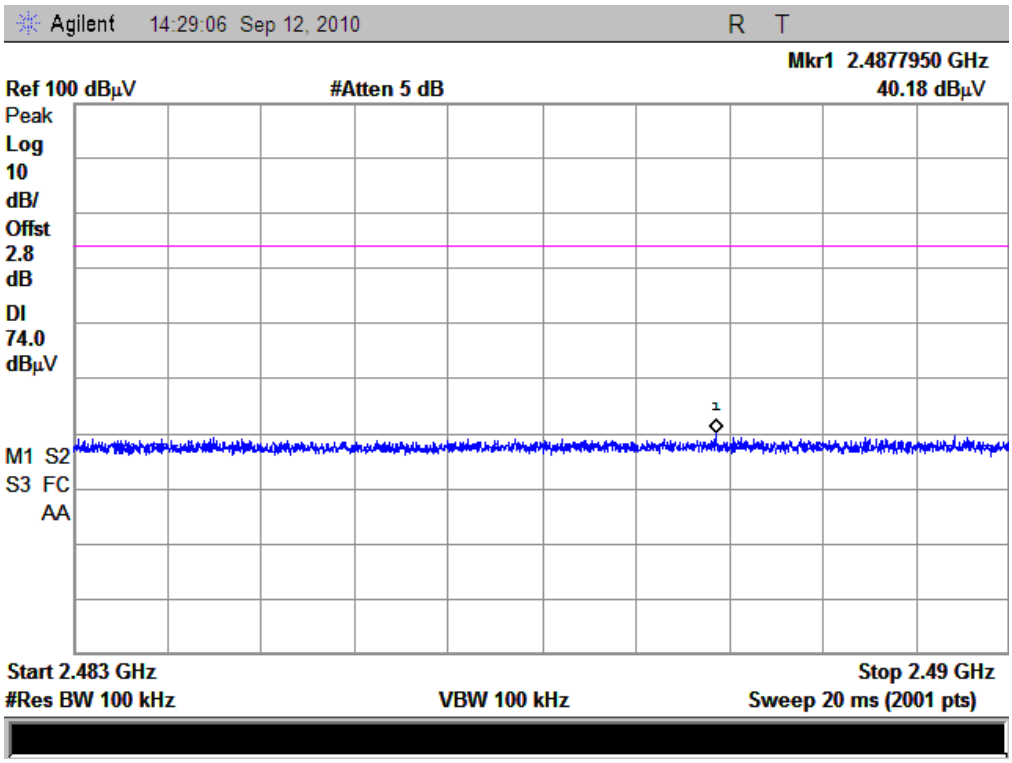
B. Test Plot:



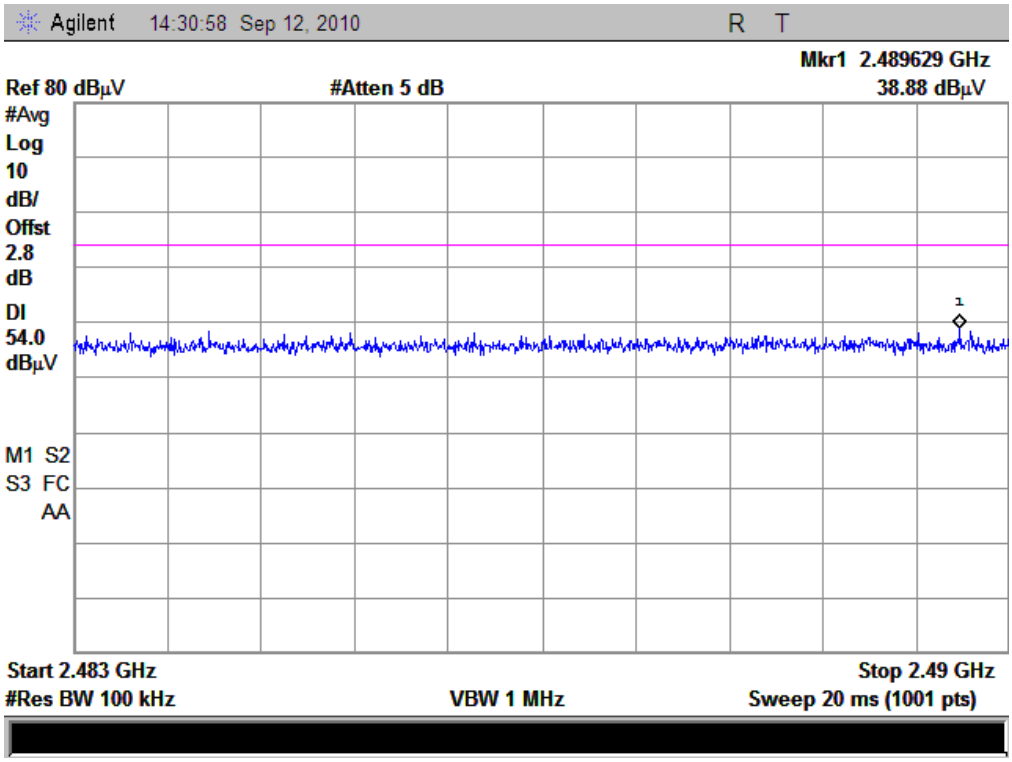
(Plot A1: Channel = 0 PEAK)



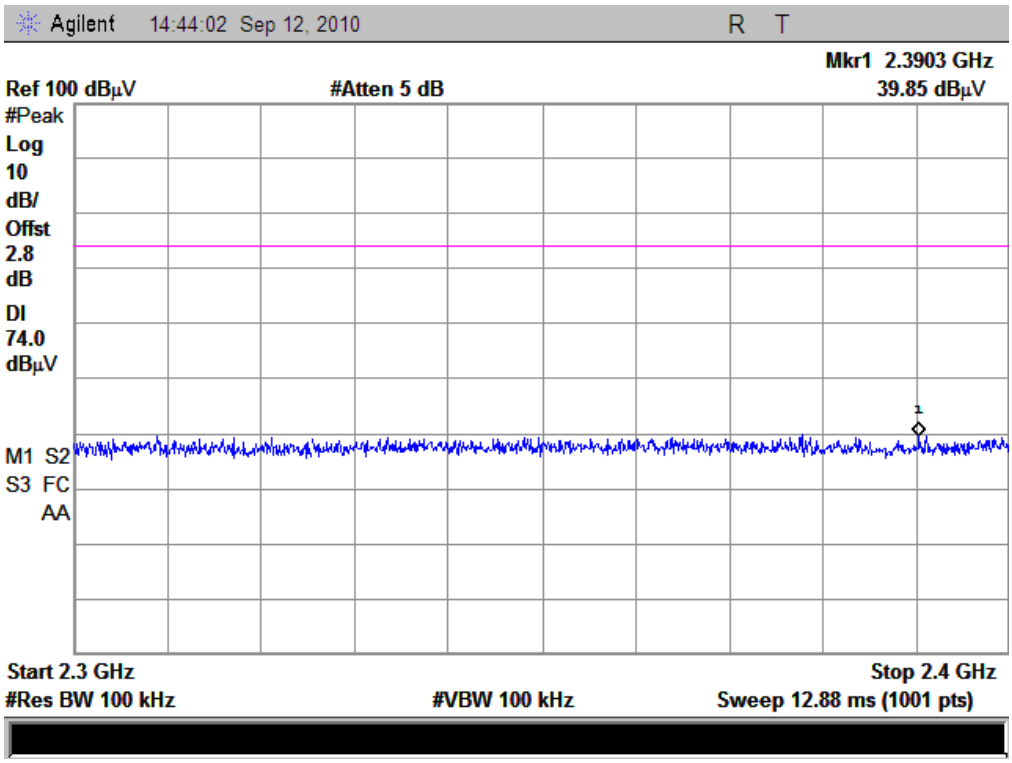
(Plot A2: Channel = 0 AVERAGE)



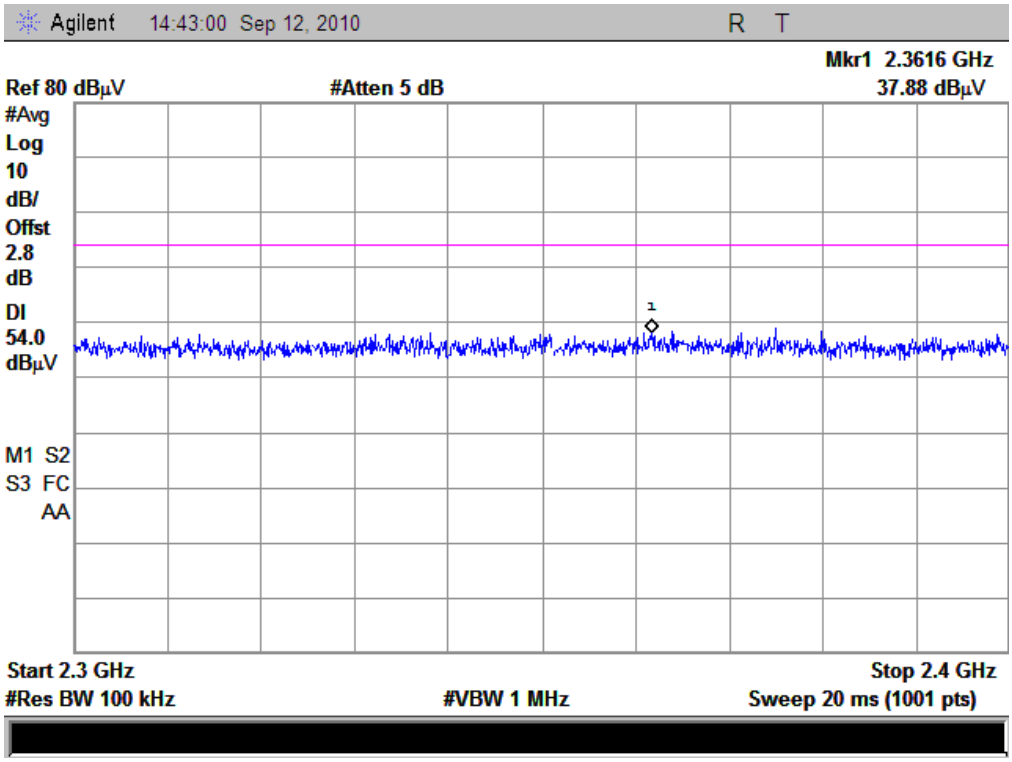
(Plot B1: Channel = 78 PEAK)



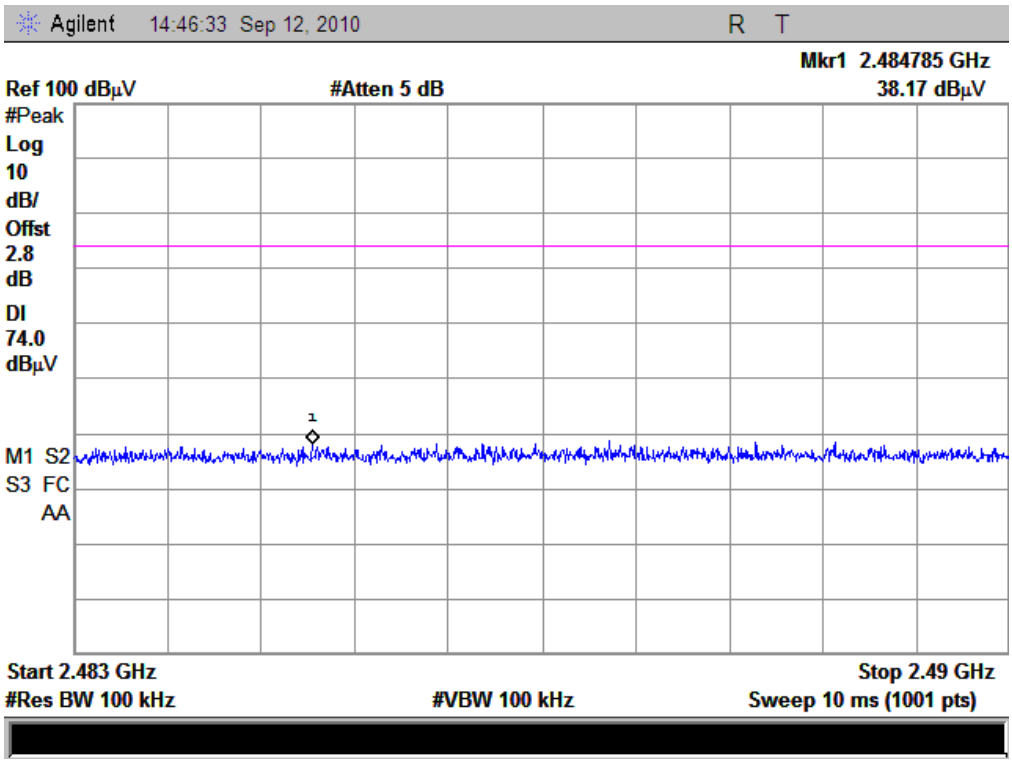
(Plot B2: Channel = 78 AVERAGE)



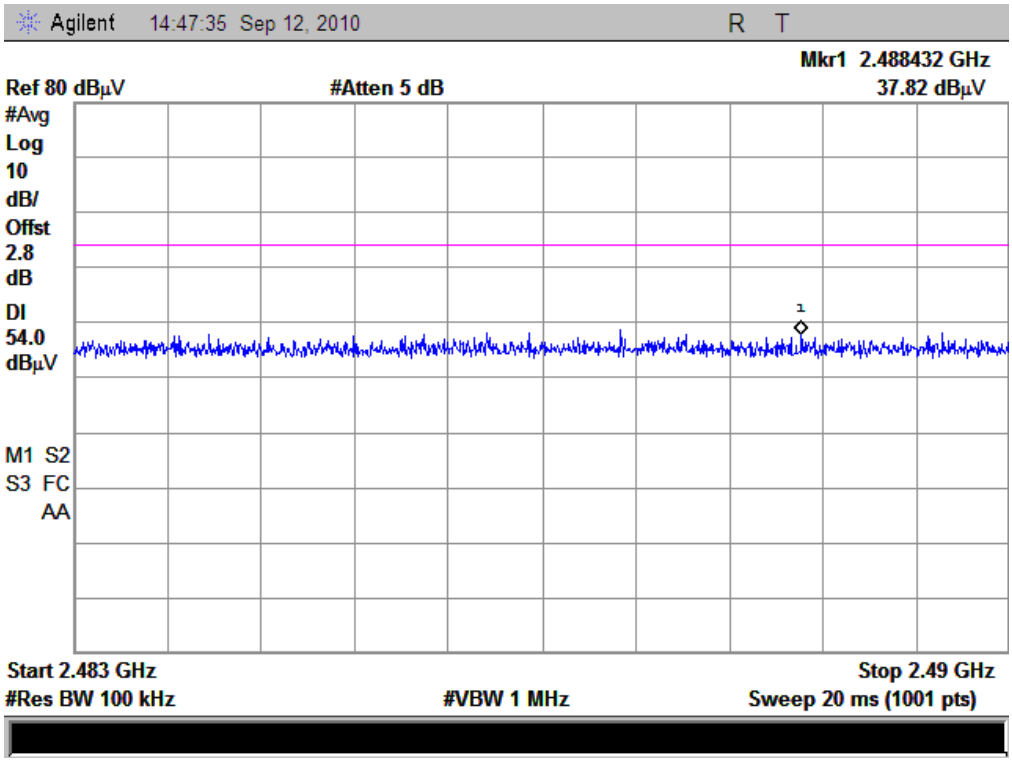
(Plot C1: Channel = 0 PEAK)



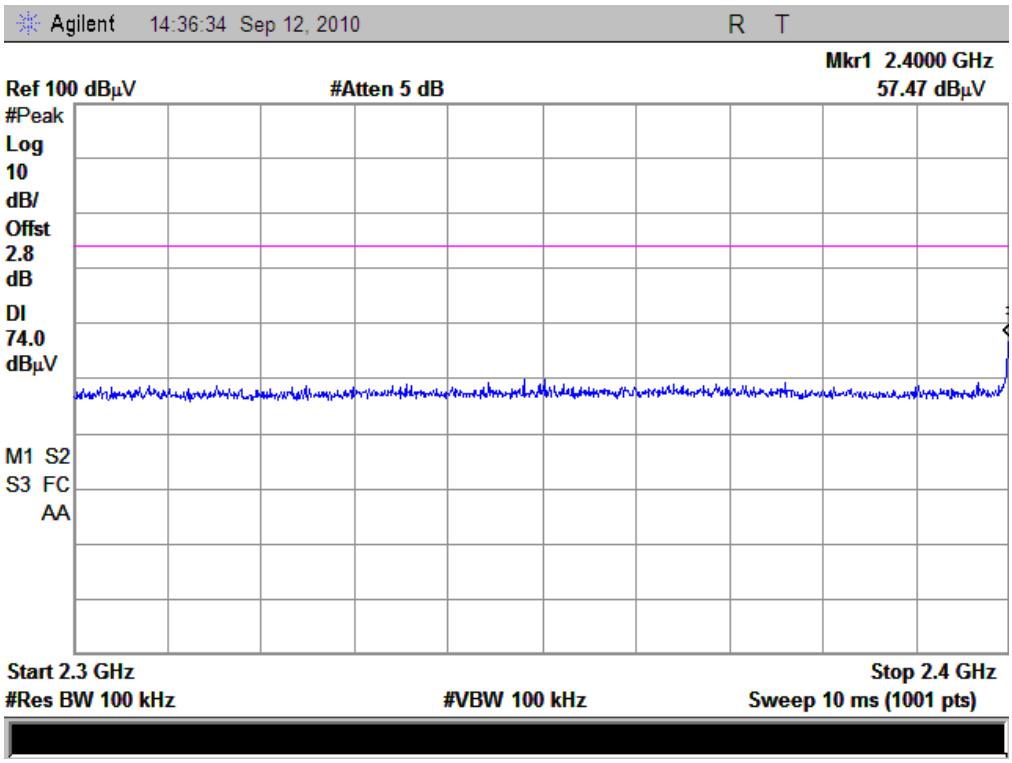
(Plot C2: Channel = 0 AVERAGE)



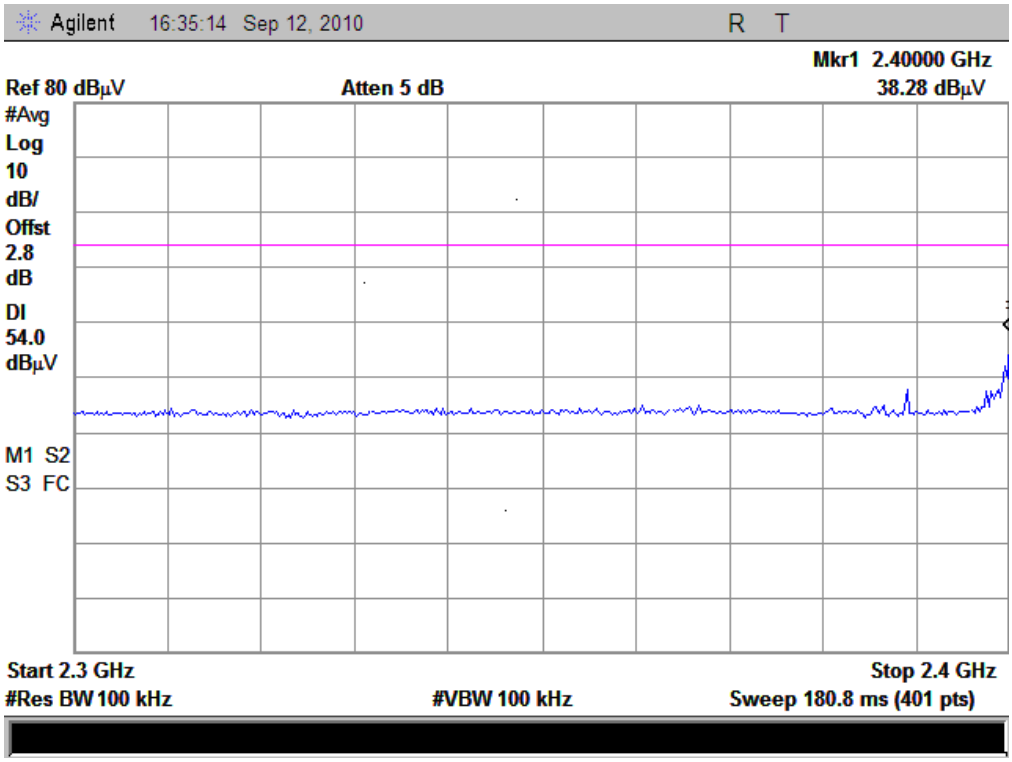
(Plot D1: Channel = 78 PEAK)



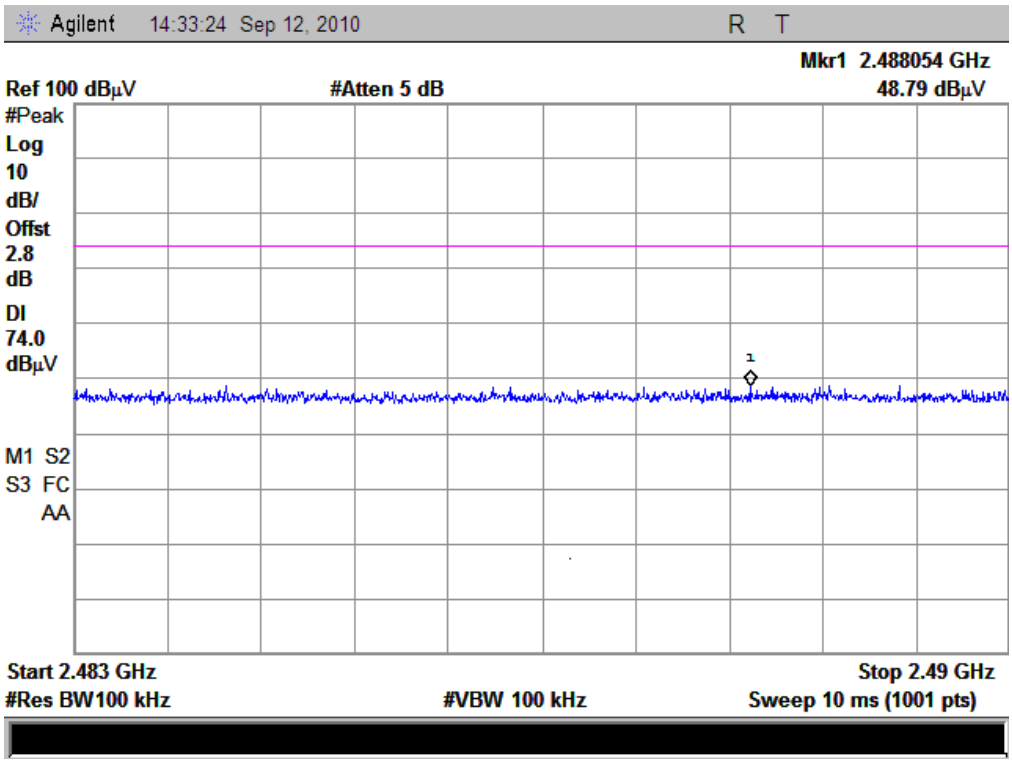
(Plot D2: Channel = 78 AVERAGE)



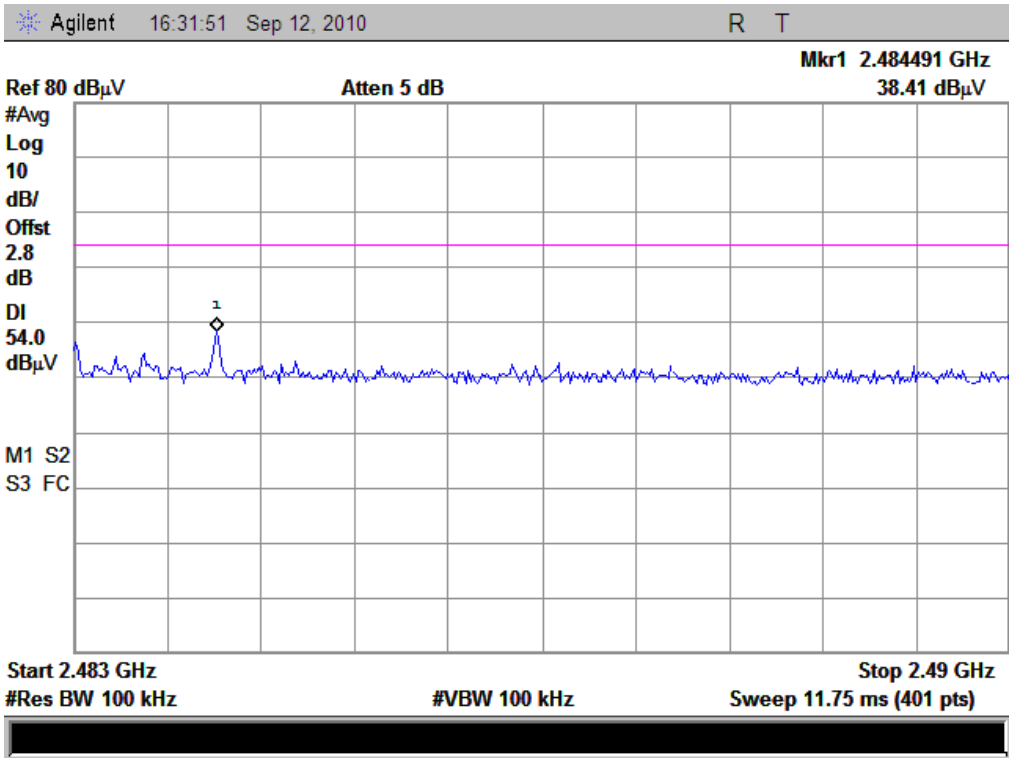
(Plot E1: Channel = 0 PEAK)



(Plot E2: Channel = 0 AVERAGE)



(Plot F1: Channel = 78 PEAK)



(Plot F2: Channel = 78 AVERAGE)

3.8 Conducted Emission

The test is not applicable, because the EUT is supplied by DC power.

3.9 Radiated Emission

3.9.1 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).

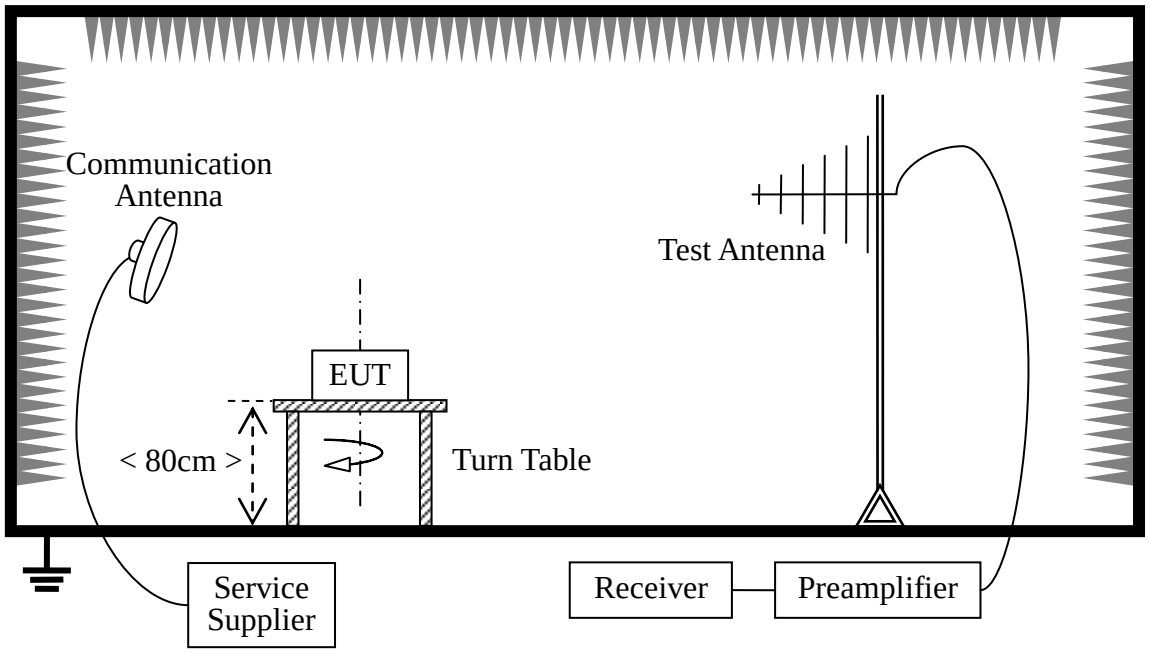
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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)

3.9.2 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 charged with the AC Adapter which is powered by 120V, 60Hz AC mains supply. 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	Cal. Due
System Simulator	R&S	CMU200	100448	2009.9	2year
Receiver	Agilent	E7405A	US44210471	2009.9	2year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.9	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2009.9	2year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2009.9	2year
Test Antenna - circular	R&S	AC004R1	0749.3000.03	2009.6	2year

3.9.3 Test Result

1. 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)	Fundamental Emission (dBμV/m)		Antenna Polarization	Refer to Plot
		PK	AV		
0	2402	86.20	82.08	Horizontal	Plot A.1
		87.18	83.35	Vertical	Plot A.2
39	2441	89.45	84.91	Horizontal	Plot B.1
		87.81	83.75	Vertical	Plot B.2

Channel	Frequency (MHz)	Fundamental Emission (dBμV/m)		Antenna Polarization	Refer to Plot
		PK	AV		
78	2480	85.78	80.96	Horizontal	Plot C.1
		87.63	83.72	Vertical	Plot C.2

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
160.9 M	28.07	43.5	-15.43	100	242	Horizontel
336.5 M	25.62	46	-20.38	100	359	Horizontel
384.1 M	26.11	46	-19.89	100	236	Horizontel
673.1 M	28.66	46	-17.34	100	83	Horizontel
1.176 G	35.43	54	-18.57	100	299	Horizontel
1.601 G	37.25	54	-16.75	100	83	Horizontel
3.940 G	59.79	54	5.79	100	360	Horizontel
240.5 M	22.15	46	-23.85	100	347	Vertical
336.5 M	25.17	46	-20.83	100	227	Vertical
495.6 M	26.64	46	-19.36	100	60	Vertical
672.1 M	28.52	46	-17.48	100	124	Vertical
960.2 M	32.59	54	-21.41	100	301	Vertical
1.176 G	35.33	54	-18.67	100	165	Vertical
1.601 G	50.4	54	-3.6	100	190	Vertical
3.715 G	47.68	54	-6.32	100	211	Vertical

Test result of channel: 39 (2442MHz)

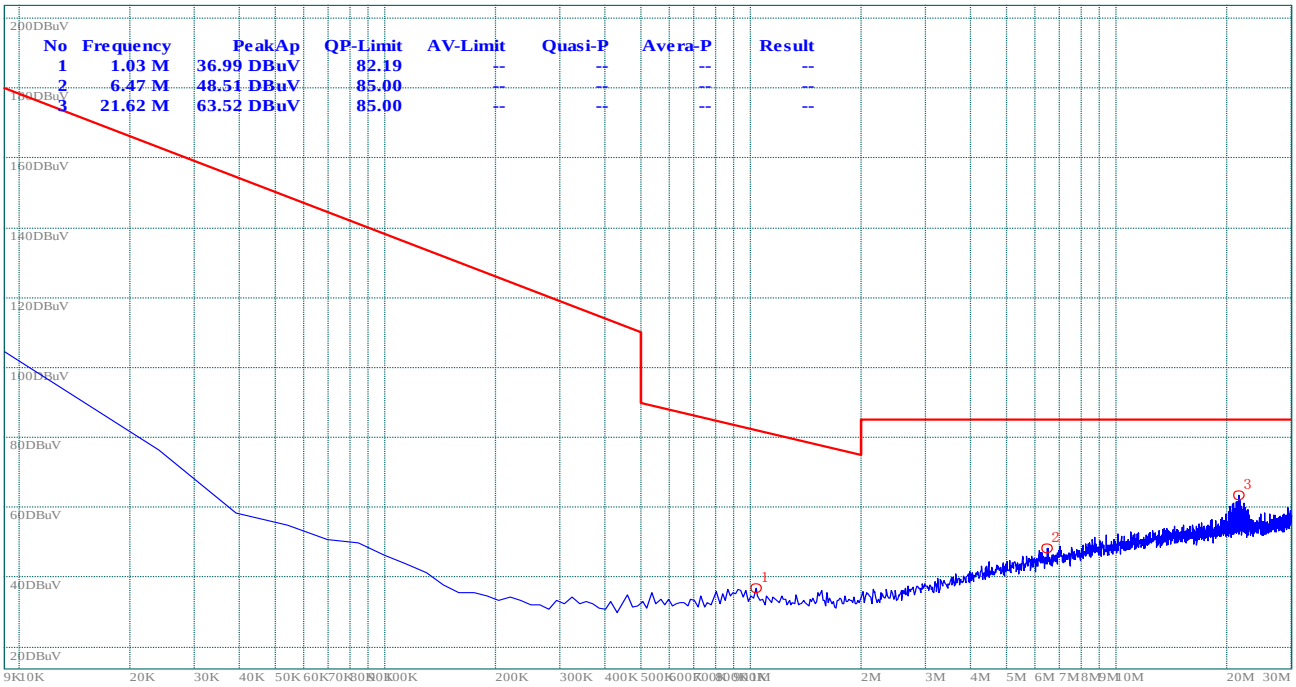
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
193.0 M	25.46	43.5	-18.04	100	179	Horizontel
271.5 M	24.5	46	-21.5	100	258	Horizontel
336.5 M	25.33	46	-20.67	100	339	Horizontel
385.0 M	26.31	46	-19.69	100	53	Horizontel
495.6 M	26.91	46	-19.09	100	295	Horizontel
1.176 G	35.67	54	-18.33	100	72	Horizontel
1.629 G	40.02	54	-13.98	100	123	Horizontel
3.940 G	53.06	54	-0.94	100	268	Horizontel
4.885 G	48.29	54	-5.71	100	173	Horizontel
240.5 M	22.12	46	-23.88	100	260	Vertical
336.5 M	25.01	46	-20.99	100	72	Vertical
495.6 M	26.27	46	-19.73	100	305	Vertical
672.1 M	28.4	46	-17.6	100	337	Vertical
1.176 G	37.57	54	-16.43	100	200	Vertical
1.629 G	48.08	54	-5.92	100	174	Vertical
3.940 G	50.36	54	-3.64	100	301	Vertical
4.885 G	48.84	54	-5.16	100	254	Vertical

Test result of channel: 78 (2480MHz)

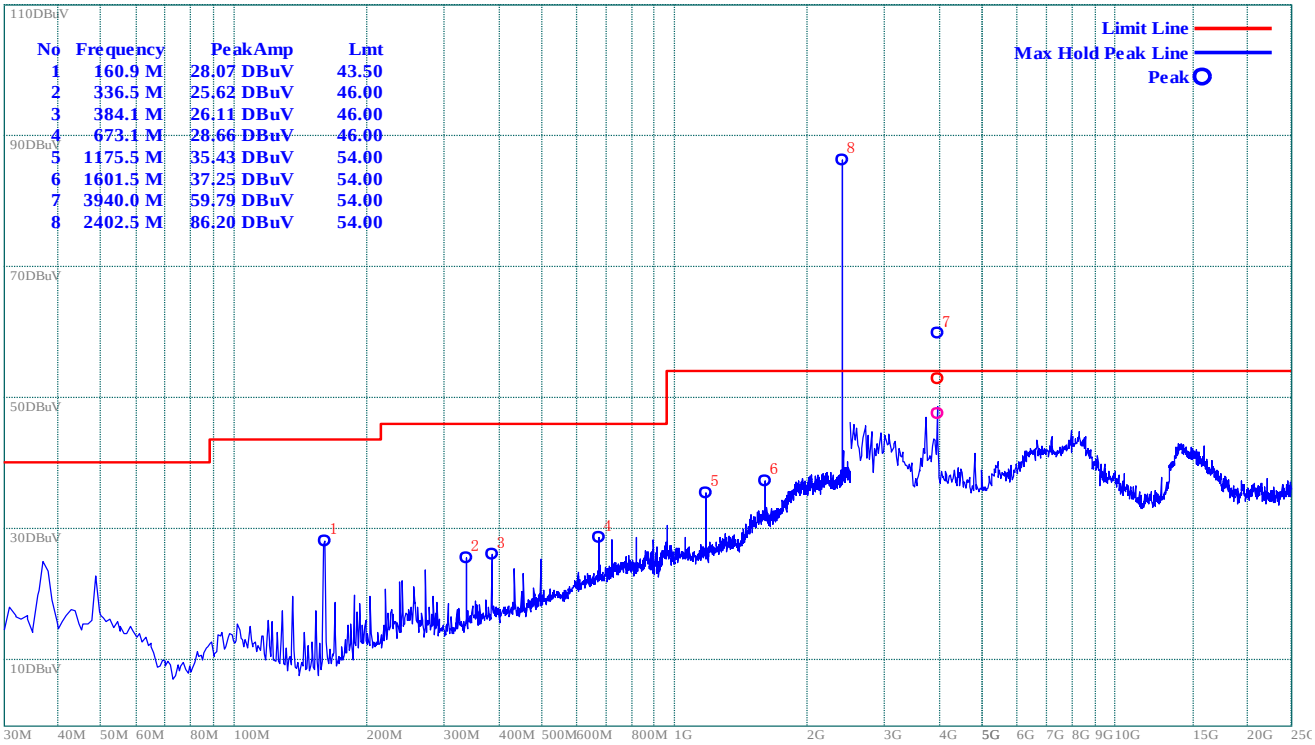
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
624.6 M	33.21	46	-12.79	100	353	Horizontel
240.5 M	25.84	46	-20.16	100	124	Horizontel
120.2 M	28.16	43.5	-15.34	100	66	Horizontel
624.6 M	33.39	46	-12.61	100	207	Vertical
120.2 M	30.13	43.5	-13.37	100	37	Vertical
147.4 M	23.4	43.5	-20.1	100	293	Horizontel
188.1 M	23.56	43.5	-19.94	100	204	Horizontel
271.5 M	24.31	46	-21.69	100	262	Horizontel
384.1 M	26.71	46	-19.29	100	228	Horizontel
495.6 M	27.02	46	-18.98	100	188	Horizontel
1.654 G	42.04	54	-11.96	100	116	Horizontel
3.940 G	49.37	54	-4.63	100	76	Horizontel
240.5 M	22.49	46	-23.51	100	350	Vertical
336.5 M	25.02	46	-20.98	100	355	Vertical
673.1 M	28.24	46	-17.76	100	249	Vertical
1.428 G	34.98	54	-19.02	100	349	Vertical
1.654 G	50.71	54	-3.29	100	161	Vertical
3.940 G	50.12	54	-3.88	100	268	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

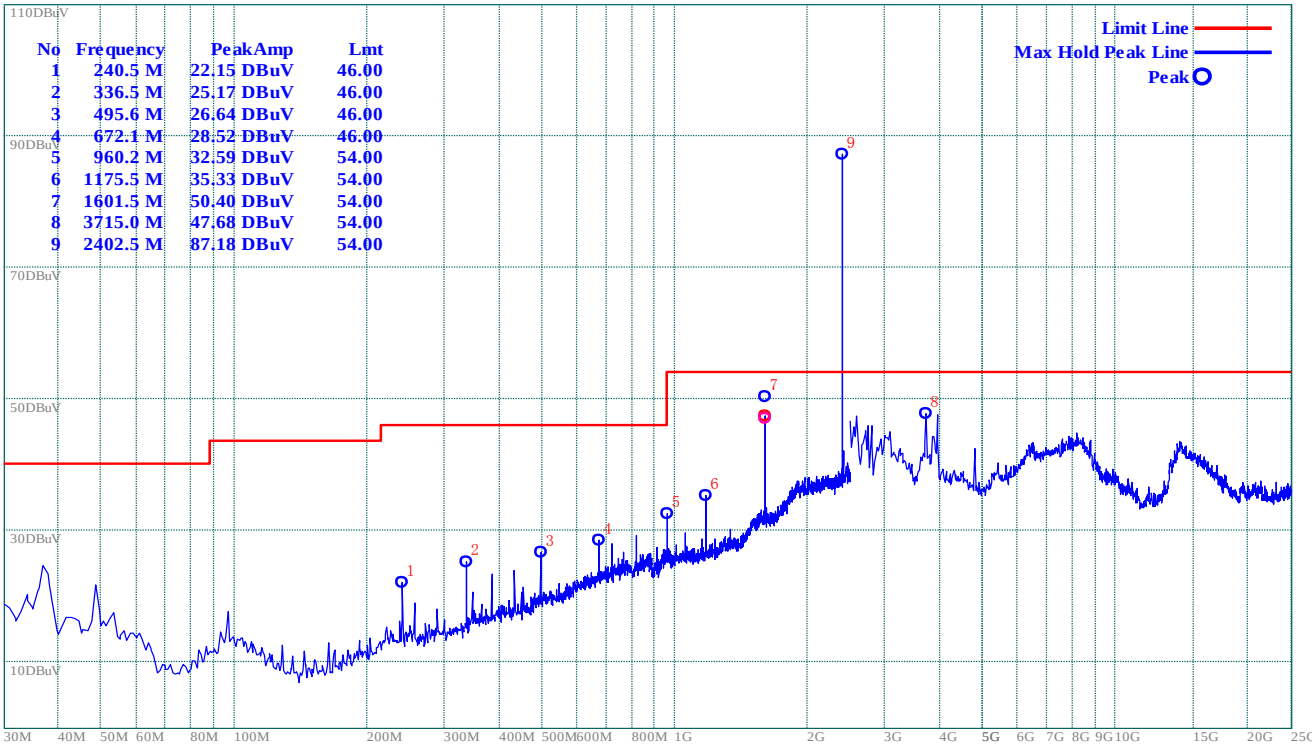
Plots for Channel = 0



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

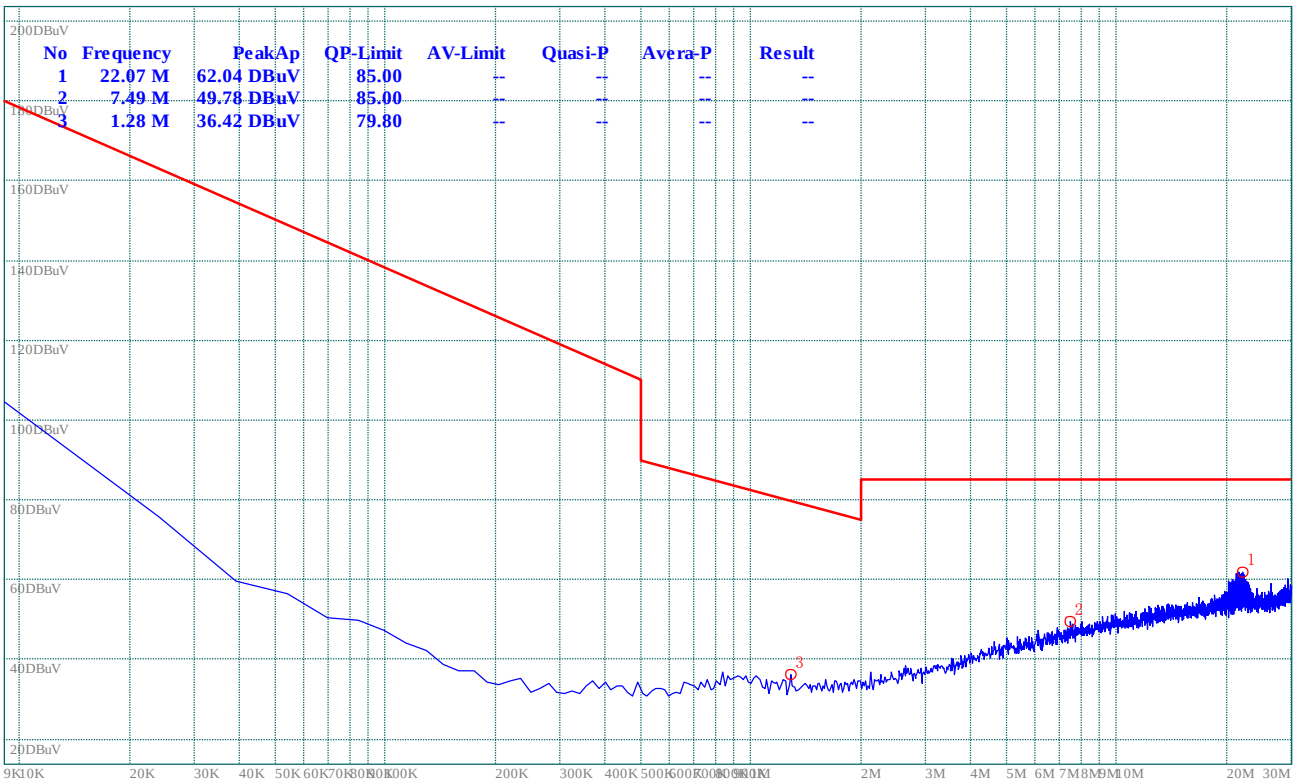


(Plot A.1: Antenna Horizonta)

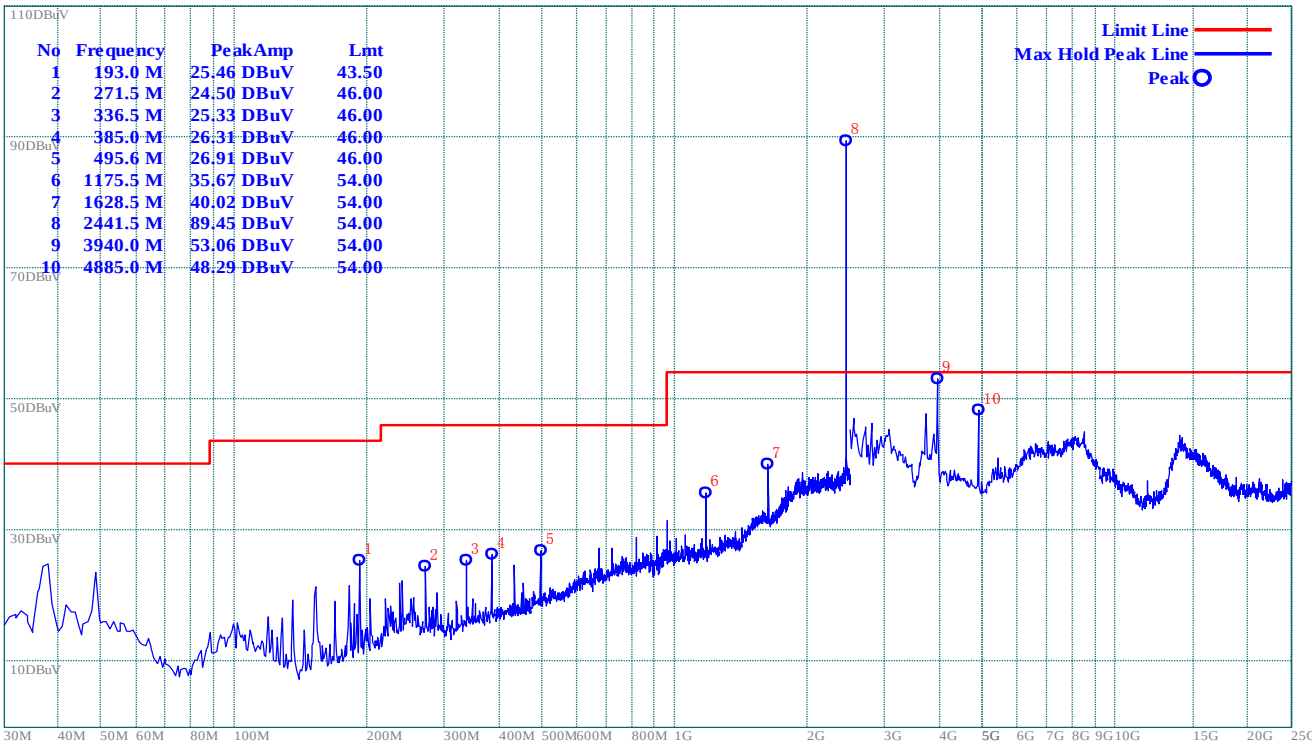


(Plot A.2: Antenna Vertical)

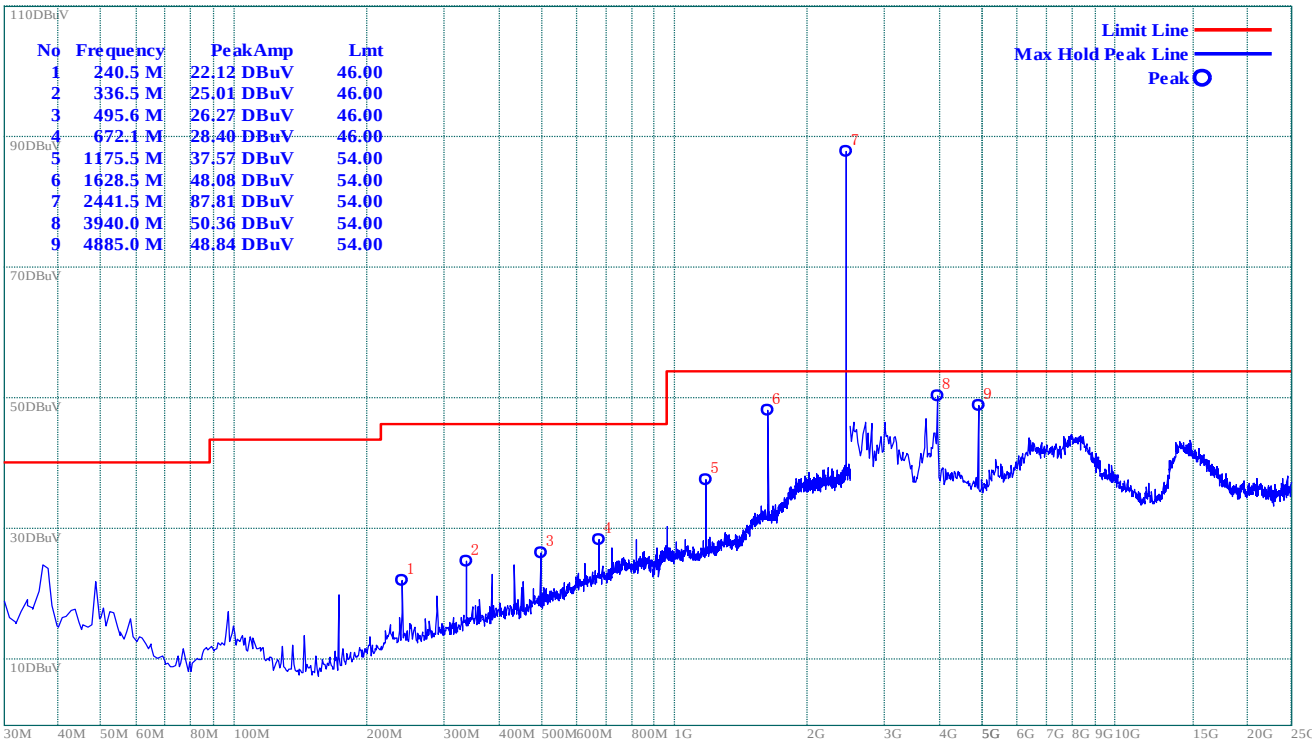
Plot for Channel = 39



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

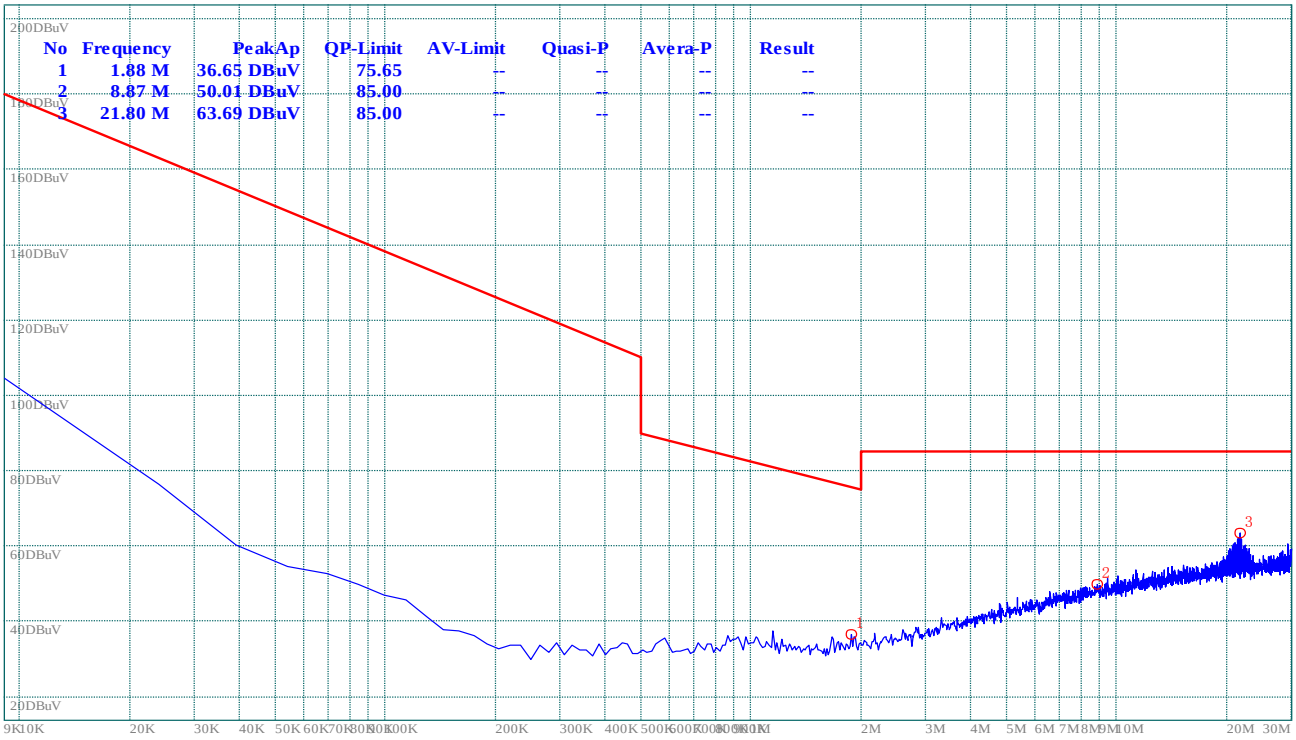


(Plot B.1: Antenna Horizontal)

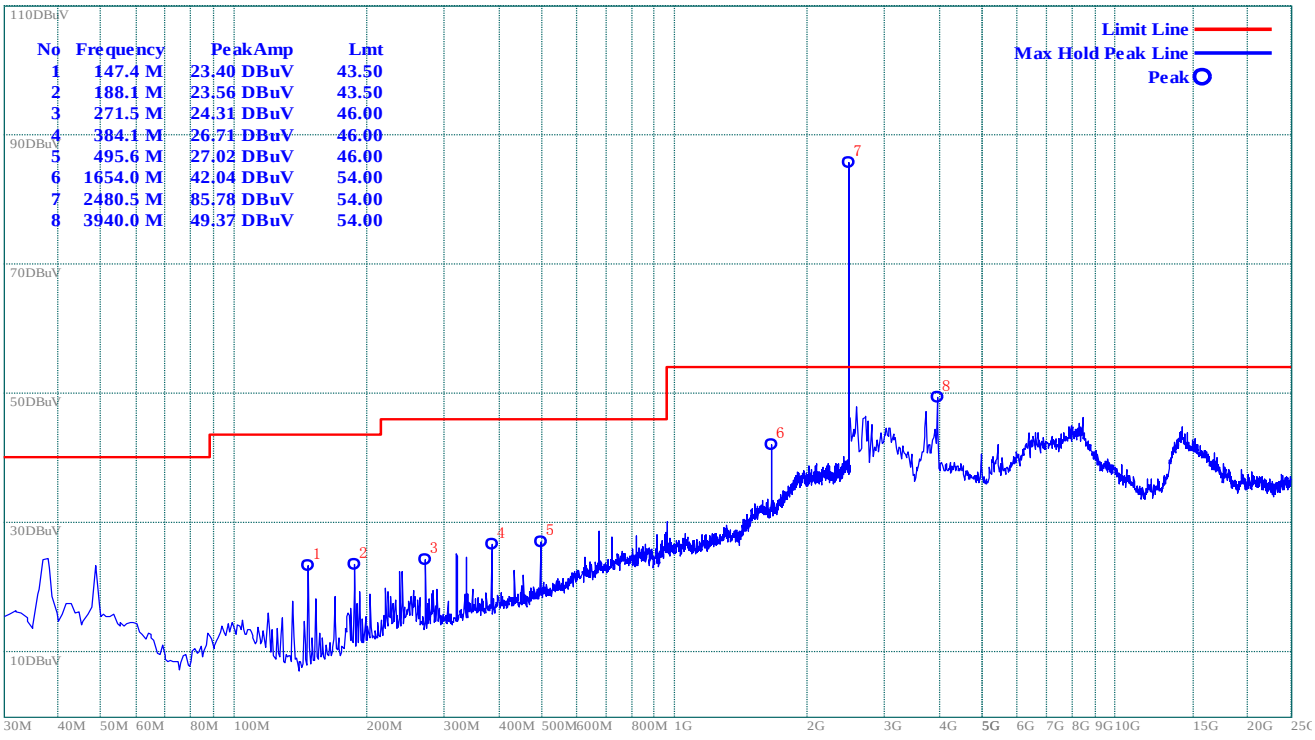


(Plot B.2: Antenna Vertical)

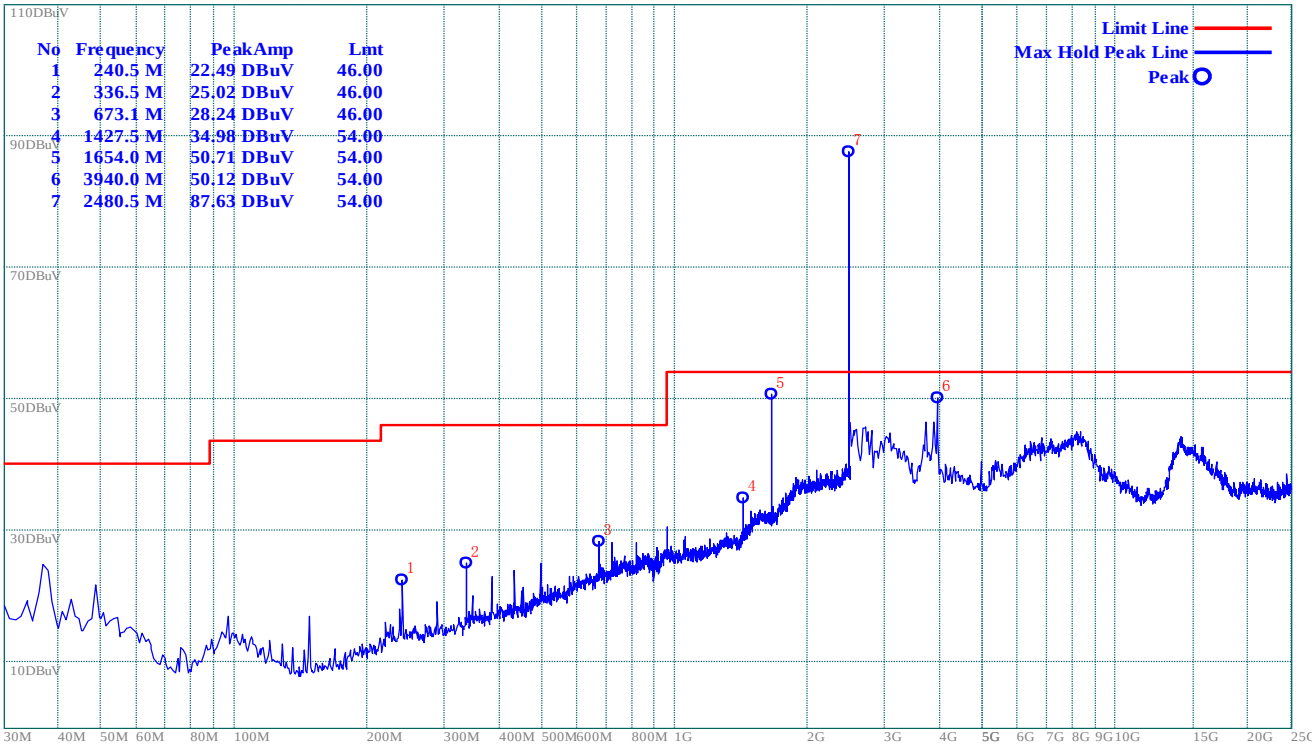
Plot for Channel = 78



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



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

2. 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)	Fundamental Emission (dBμV/m)		Antenna Polarization	Refer to Plot
		PK	AV		
0	2402	82.21	78.56	Horizontal	Plot A.1
		83.14	79.34	Vertical	Plot A.2
39	2441	88.52	84.97	Horizontal	Plot B.1
		86.35	82.36	Vertical	Plot B.2
78	2480	82.24	79.03	Horizontal	Plot C.1
		83.01	79.95	Vertical	Plot C.2

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
36.8 M	24.61	40	-15.39	100	73	Horizontel
176.5 M	28.28	43.5	-15.22	100	78	Horizontel
225.0 M	27.55	46	-18.45	100	55	Horizontel
1.603 G	35.76	54	-18.24	100	3	Horizontel
2.793 G	48.56	54	-5.44	100	19	Horizontel
4.795 G	42.54	54	-11.46	100	67	Horizontel
36.8 M	25.32	40	-14.68	100	99	Vertical
122.1 M	23.76	43.5	-19.74	100	9	Vertical
432.6 M	26.14	46	-19.86	100	6	Vertical
1.603 G	50.68	54	-3.32	100	0	Vertical
2.793 G	50.44	54	-3.56	100	91	Vertical
7.945 G	44.78	54	-9.22	100	19	Vertical

Test result of channel: 39 (2442MHz)

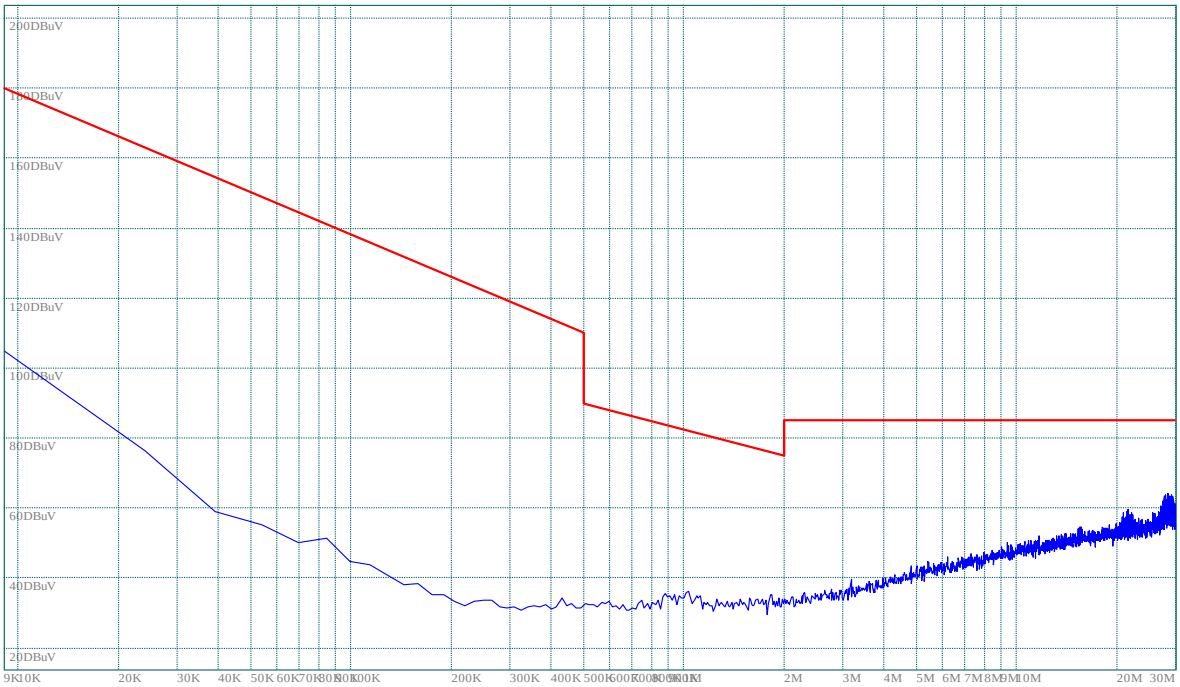
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
160.9 M	29.48	43.5	-14.02	100	37	Horizontel
384.1 M	26.84	46	-19.16	100	18	Horizontel
1.627 G	35.21	54	-18.79	100	7	Horizontel
2.793 G	50.24	54	-3.76	100	0	Horizontel
4.885 G	48.31	54	-5.69	100	0	Horizontel
7.968 G	44.36	54	-9.64	100	0	Horizontel
122.1 M	24.67	43.5	-18.83	100	352	Vertical
1.428 G	37.29	54	-16.71	100	153	Vertical
1.627 G	51.34	54	-2.66	100	354	Vertical
2.793 G	49.22	54	-4.78	100	92	Vertical
4.885 G	46.09	54	-7.91	100	140	Vertical
7.923 G	44.73	54	-9.27	100	44	Vertical

Test result of channel: 78 (2480MHz)

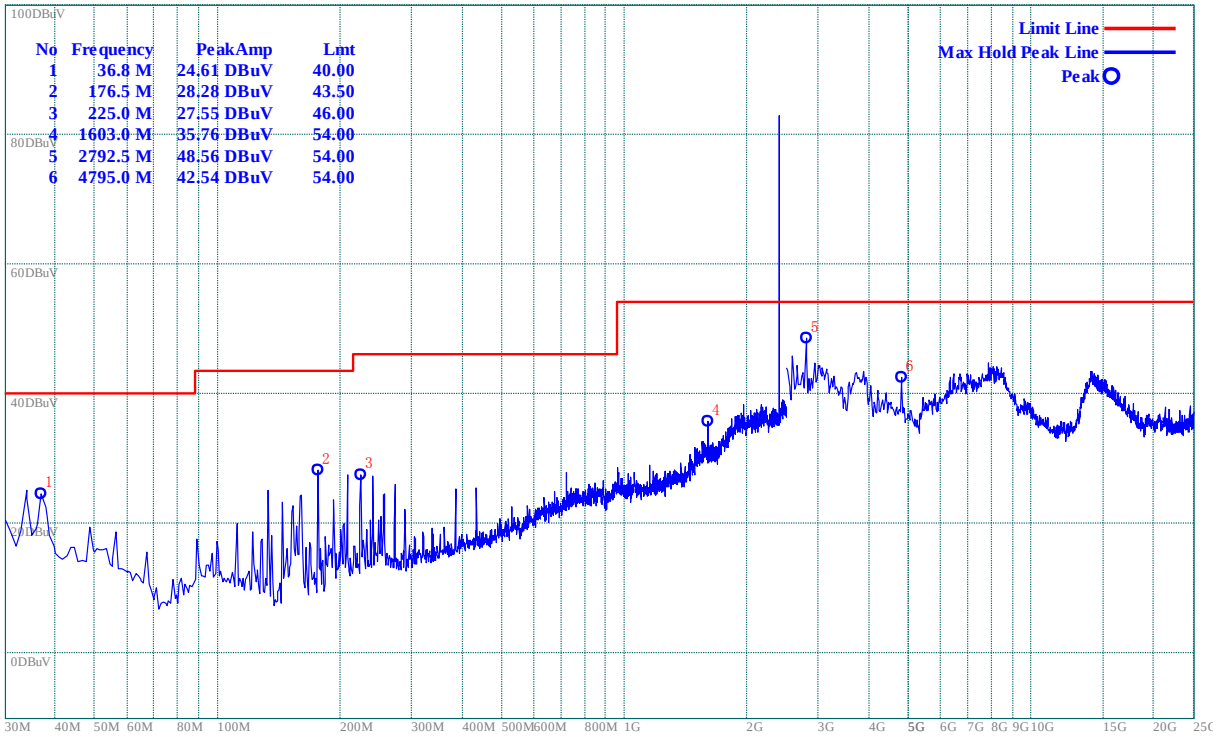
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
33.9 M	24.47	40	-15.53	100	32	Horizontel
160.0 M	26.59	43.5	-16.91	100	6	Horizontel
192.0 M	26.23	43.5	-17.27	100	38	Horizontel
1.654 G	36.83	54	-17.17	100	106	Horizontel
2.590 G	47.39	54	-6.61	100	67	Horizontel
2.793 G	47.63	54	-6.37	100	92	Horizontel
4.952 G	44.07	54	-9.93	100	67	Horizontel
122.1 M	23.99	43.5	-19.51	100	40	Vertical
1.654 G	48.03	54	-5.97	100	0	Vertical
2.793 G	50.05	54	-3.95	100	19	Vertical
7.923 G	44.31	54	-9.69	100	67	Vertical
14.290 G	43.83	54	-10.17	100	139	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

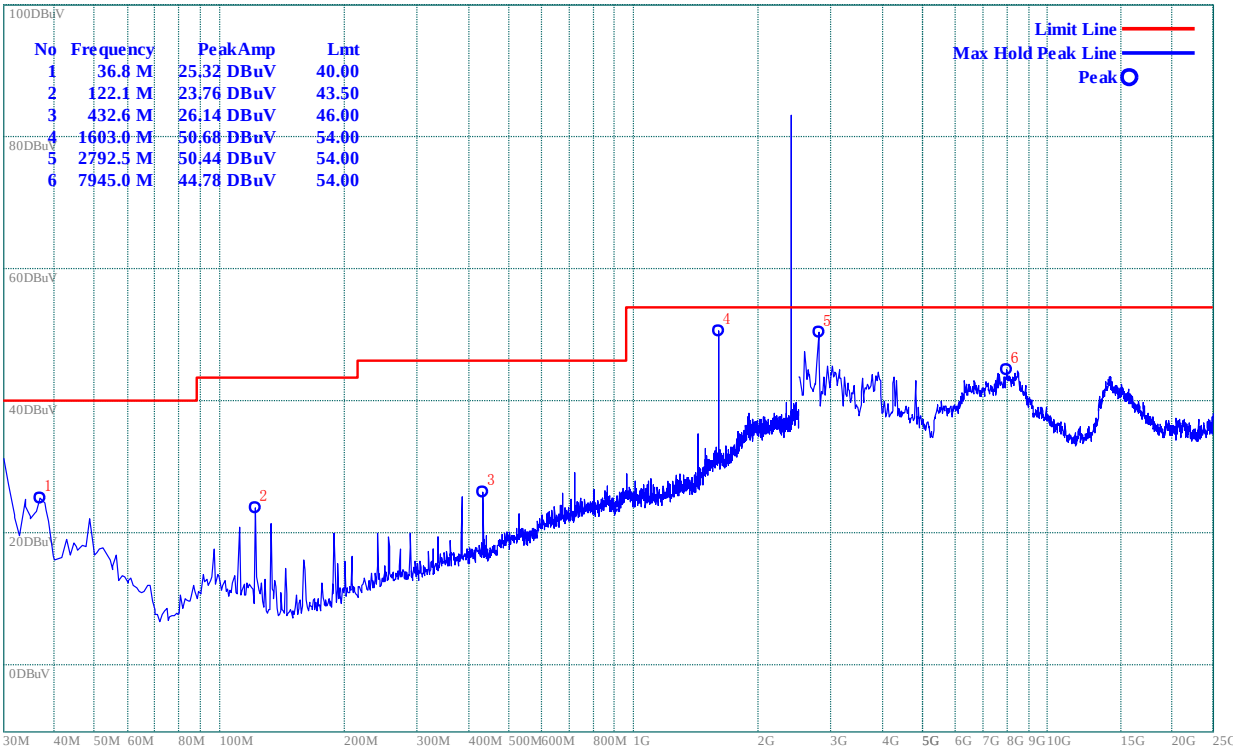
Plots for Channel = 0



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

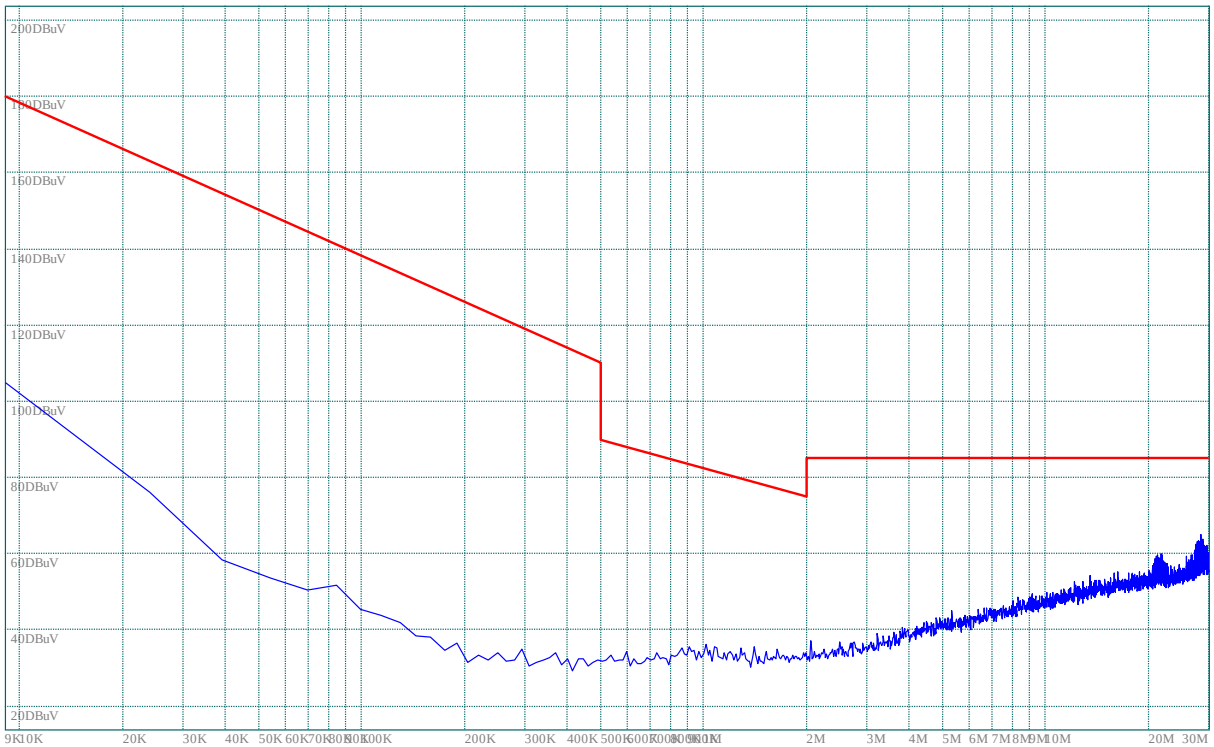


(Plot A.1: Antenna Horizontal)

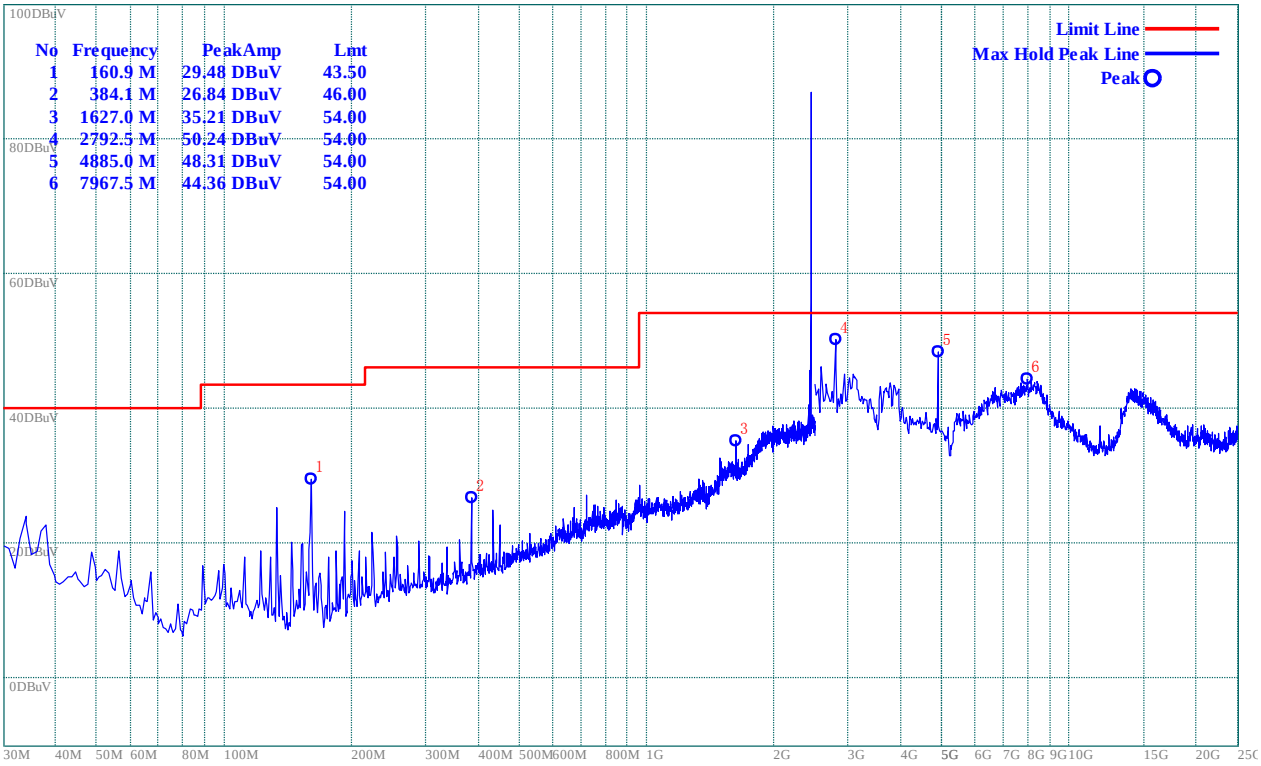


(Plot A.2: Antenna Vertical)

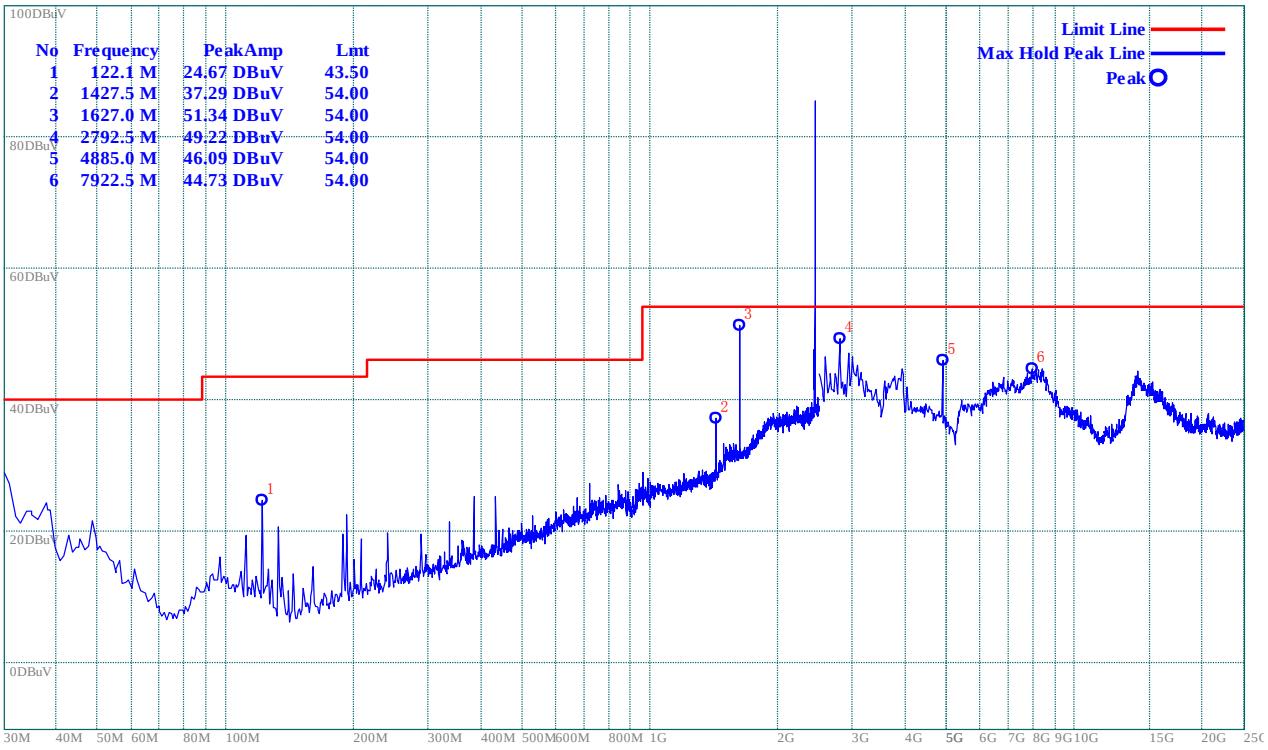
Plot for Channel = 39



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

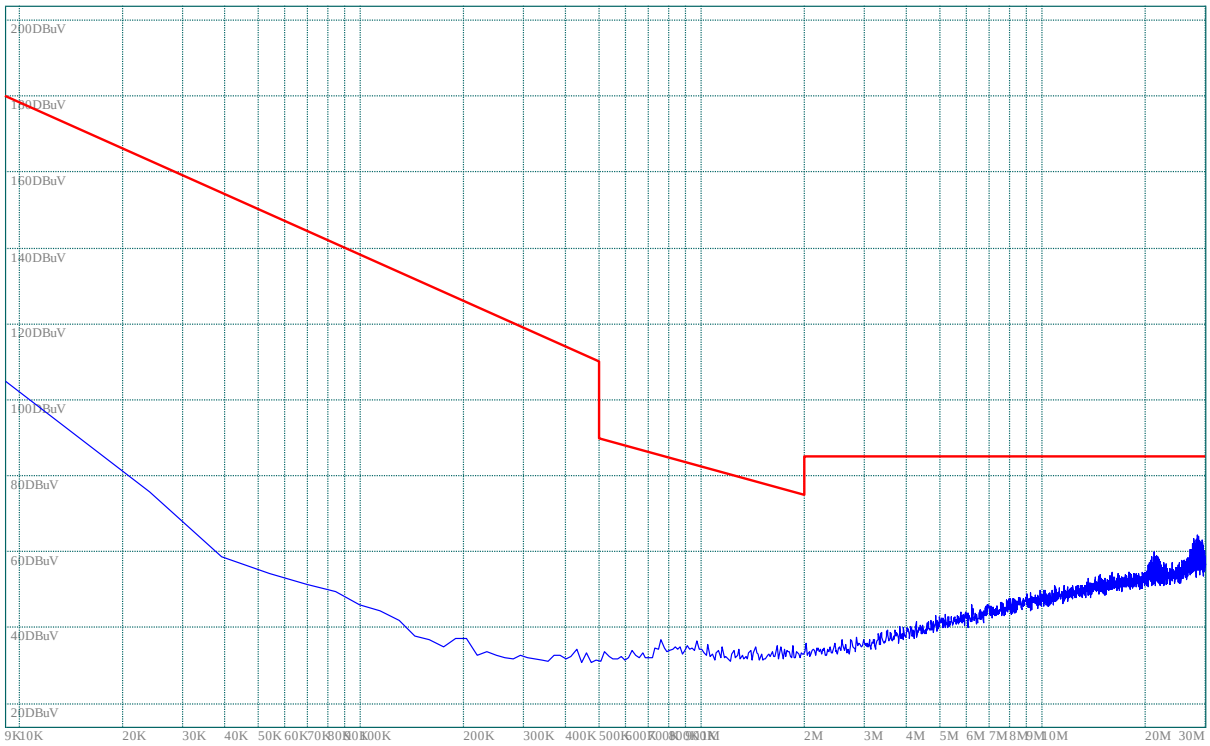


(Plot B.1: Antenna Horizontal)

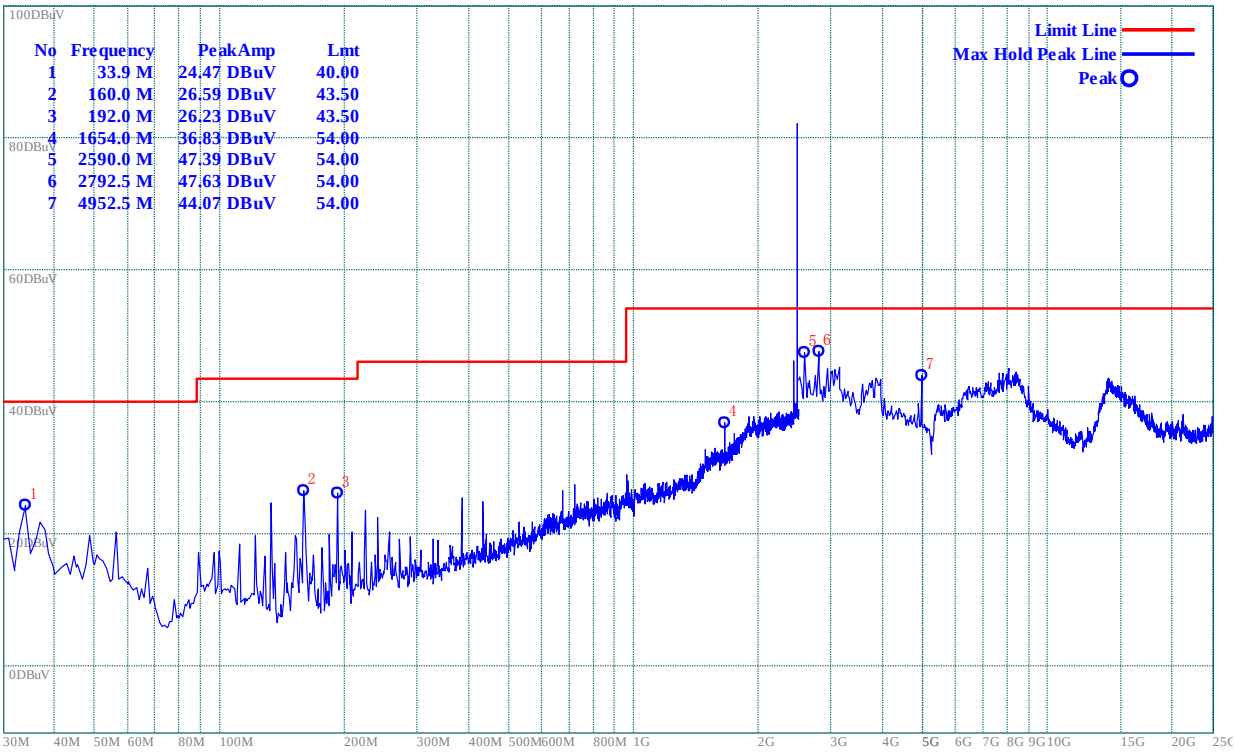


(Plot B.2: Antenna Vertical)

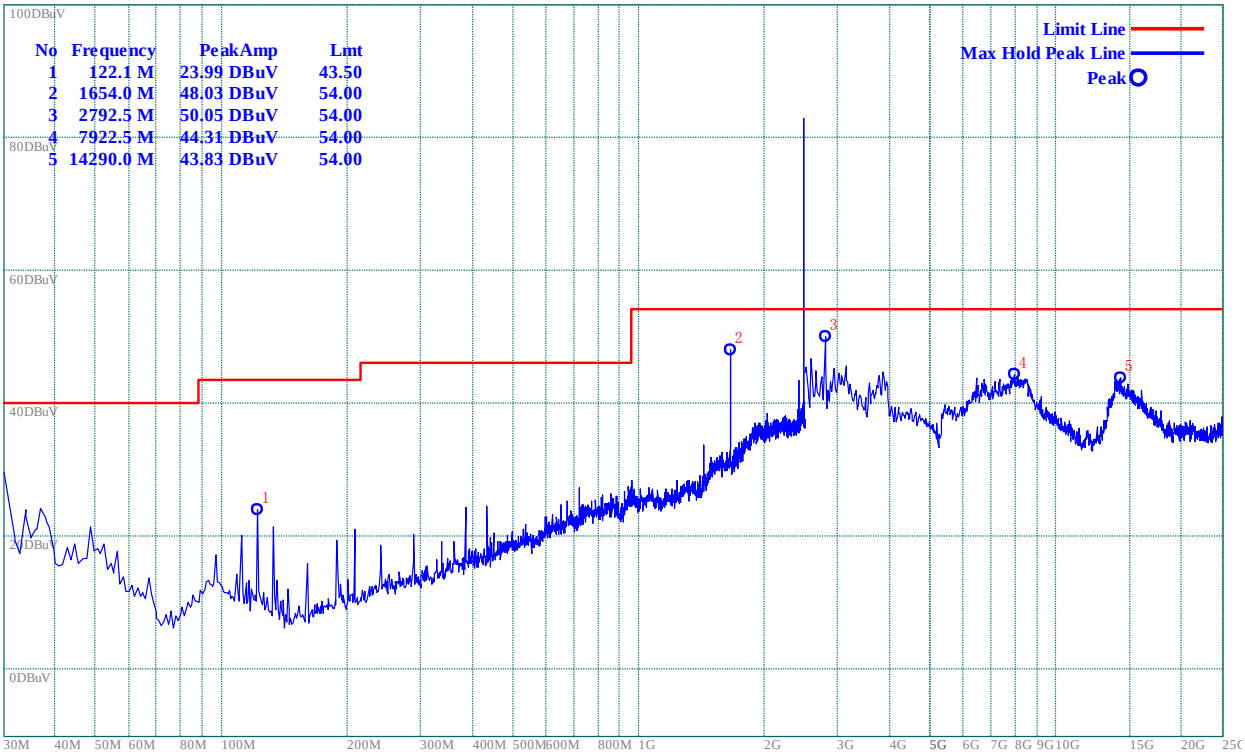
Plot for Channel = 78



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



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

3. 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)	Fundamental Emission (dBμV/m)		Antenna Polarization	Refer to Plot
		PK	AV		
0	2402	82.01	78.21	Horizontal	Plot A.1
		82.97	77.98	Vertical	Plot A.2
39	2441	88.12	84.24	Horizontal	Plot B.1
		88.01	84.07	Vertical	Plot B.2
78	2480	82.14	78.24	Horizontal	Plot C.1
		83.67	78.38	Vertical	Plot C.2

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
160.0 M	29.59	43.5	-13.91	100	77	Horizontel
1.603 G	39.68	54	-14.32	100	295	Horizontel
2.793 G	50.28	54	-3.72	100	292	Horizontel
3.850 G	45.14	54	-8.86	100	340	Horizontel
8.373 G	44.64	54	-9.36	100	359	Horizontel
33.9 M	25.63	40	-14.37	100	9	Vertical
385.0 M	25.08	46	-20.92	100	9	Vertical
1.603 G	50.9	54	-3.1	100	0	Vertical
2.793 G	49.5	54	-4.5	100	19	Vertical
3.850 G	44.58	54	-9.42	100	67	Vertical
7.832 G	45.45	54	-8.55	100	44	Vertical
14.200 G	43.3	54	-10.7	100	44	Vertical

Test result of channel: 39 (2442MHz)

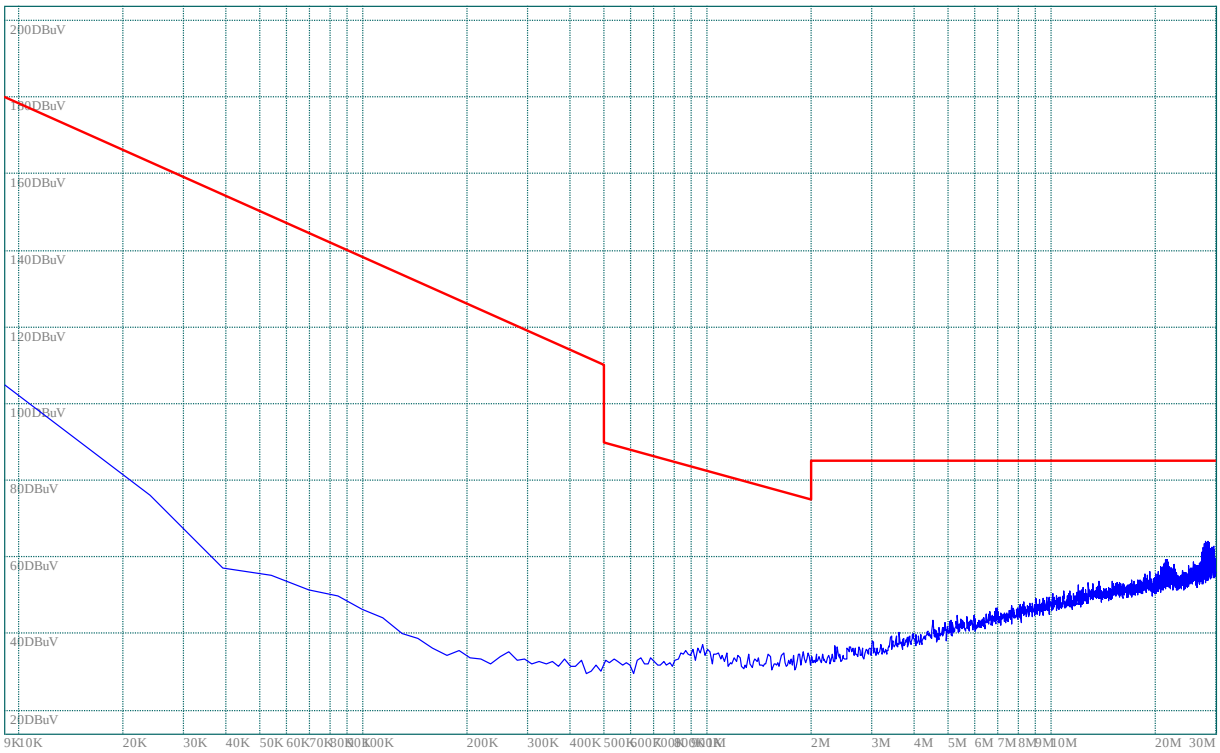
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
160.9 M	29.85	43.5	-13.65	100	7	Horizontel
384.1 M	26.75	46	-19.25	100	29	Horizontel
1.627 G	37.72	54	-16.28	100	0	Horizontel
2.793 G	50.01	54	-3.99	100	20	Horizontel
8.148 G	44.35	54	-9.65	100	20	Horizontel
36.8 M	22.98	40	-17.02	100	1	Vertical
122.1 M	24.26	43.5	-19.24	100	13	Vertical
1.428 G	37.5	54	-16.5	100	149	Vertical
1.627 G	50.17	54	-3.83	100	0	Vertical
2.793 G	47.98	54	-6.02	100	340	Vertical
3.558 G	46.1	54	-7.9	100	316	Vertical

Test result of channel: 78 (2480MHz)

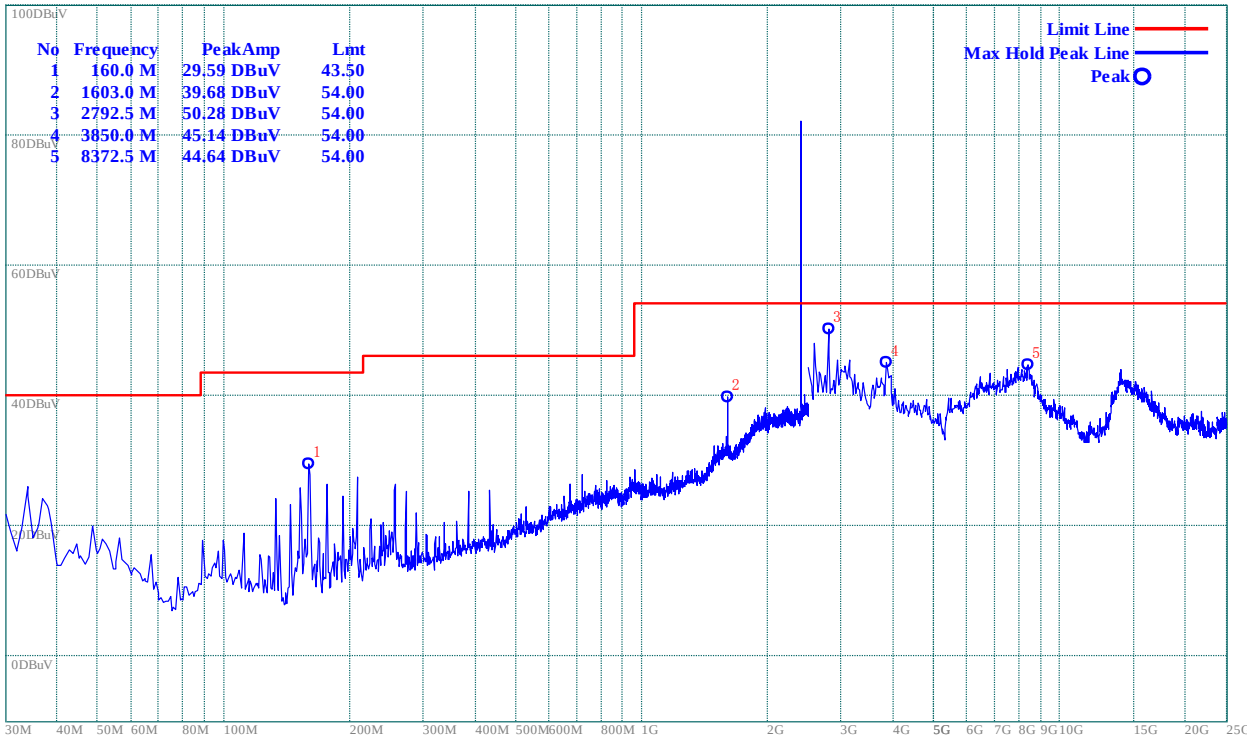
Frequency (MHz)	PK Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Height (cm)	Azimuth (deg)	Antenna Polarization
160.9 M	30.75	43.5	-12.75	100	79	Horizontel
240.5 M	28.59	46	-17.41	100	99	Horizontel
2.793 G	49.61	54	-4.39	100	292	Horizontel
4.952 G	44.58	54	-9.42	100	292	Horizontel
8.193 G	46.31	54	-7.69	100	244	Horizontel
37.8 M	23.72	40	-16.28	100	4	Vertical
122.1 M	23.45	43.5	-20.05	100	17	Vertical
1.654 G	48.2	54	-5.8	100	0	Vertical
2.793 G	49.34	54	-4.66	100	91	Vertical
4.952 G	43.6	54	-10.4	100	43	Vertical
8.530 G	45.05	54	-8.95	100	67	Vertical

B. Test Plots for the Whole Measurement Frequency Range:

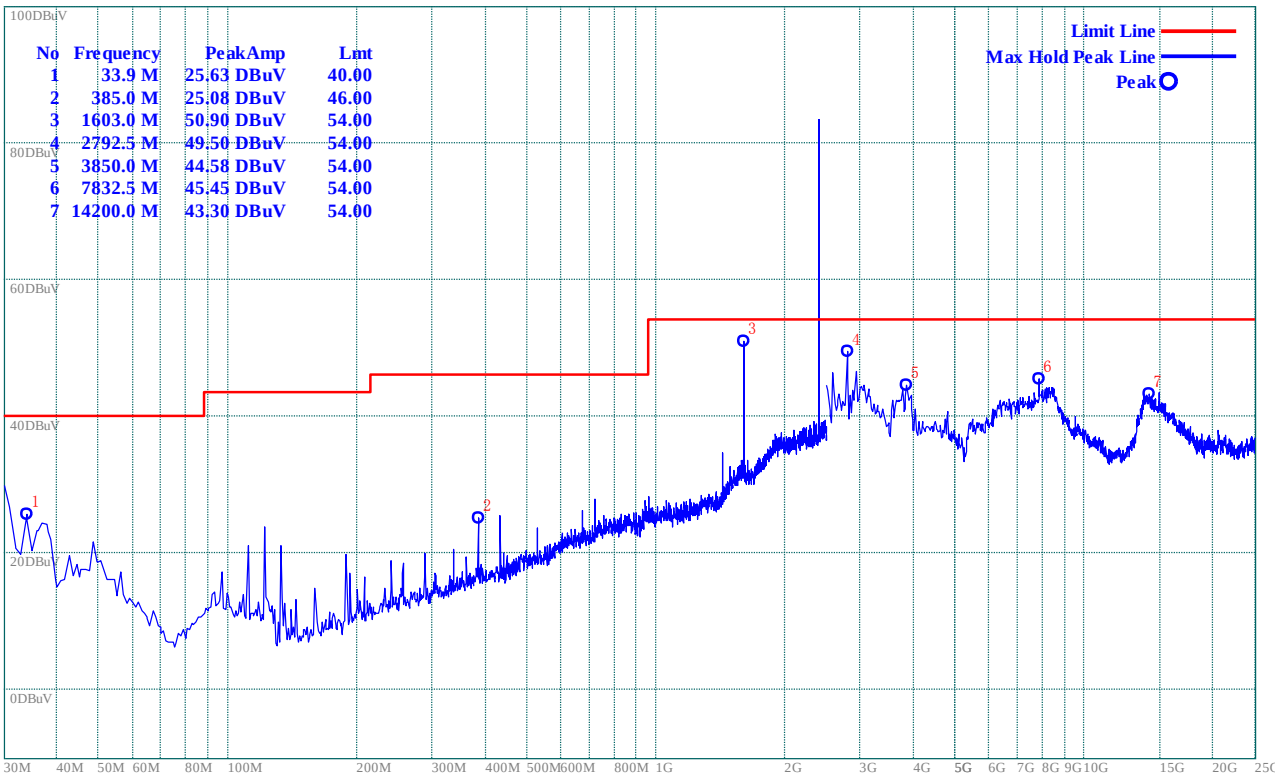
Plots for Channel = 0



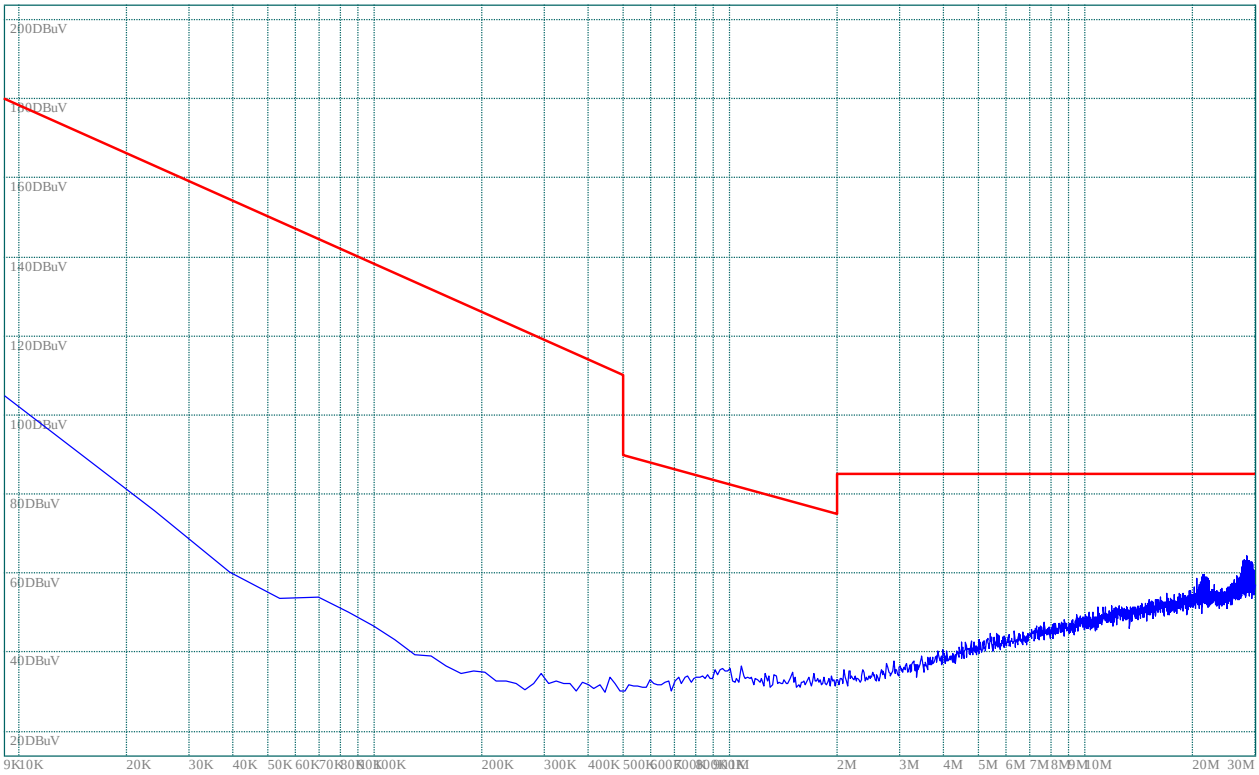
(Plot A.0: 9kHz to 30MHz)



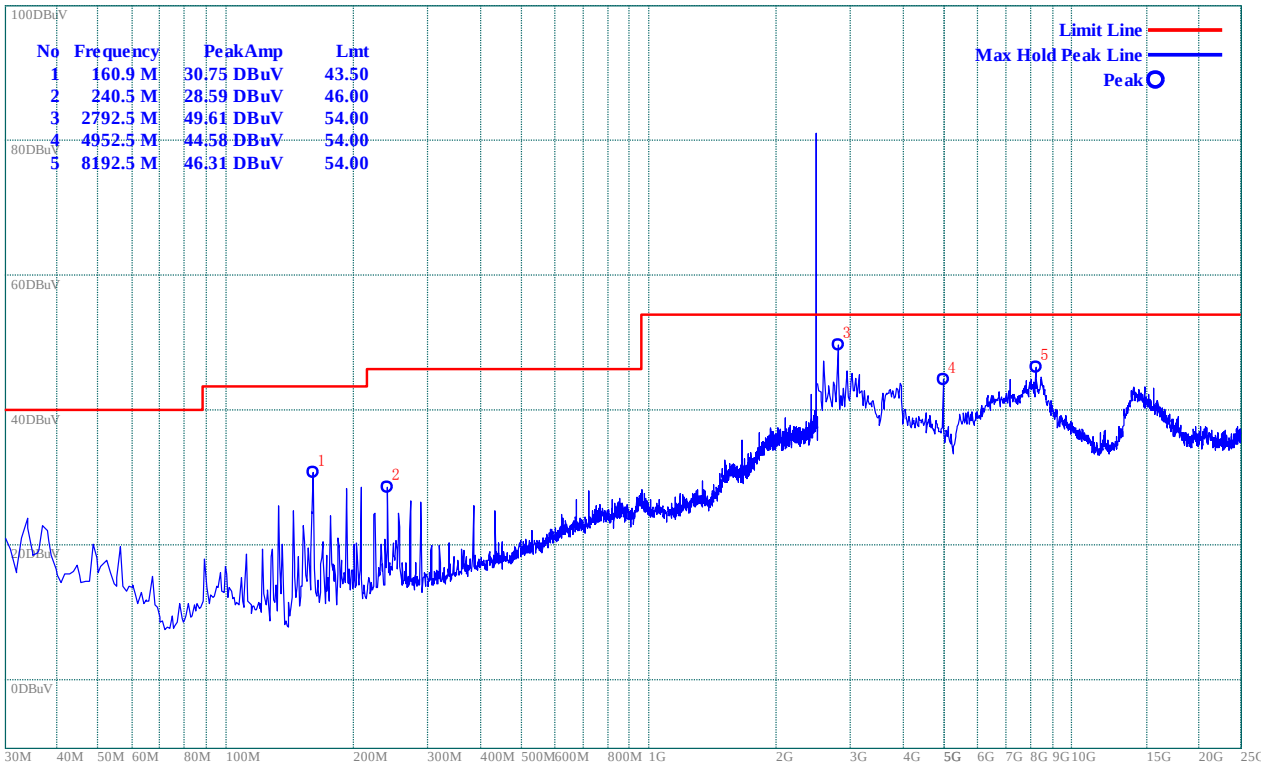
(Plot A.1: Antenna Horizontal)



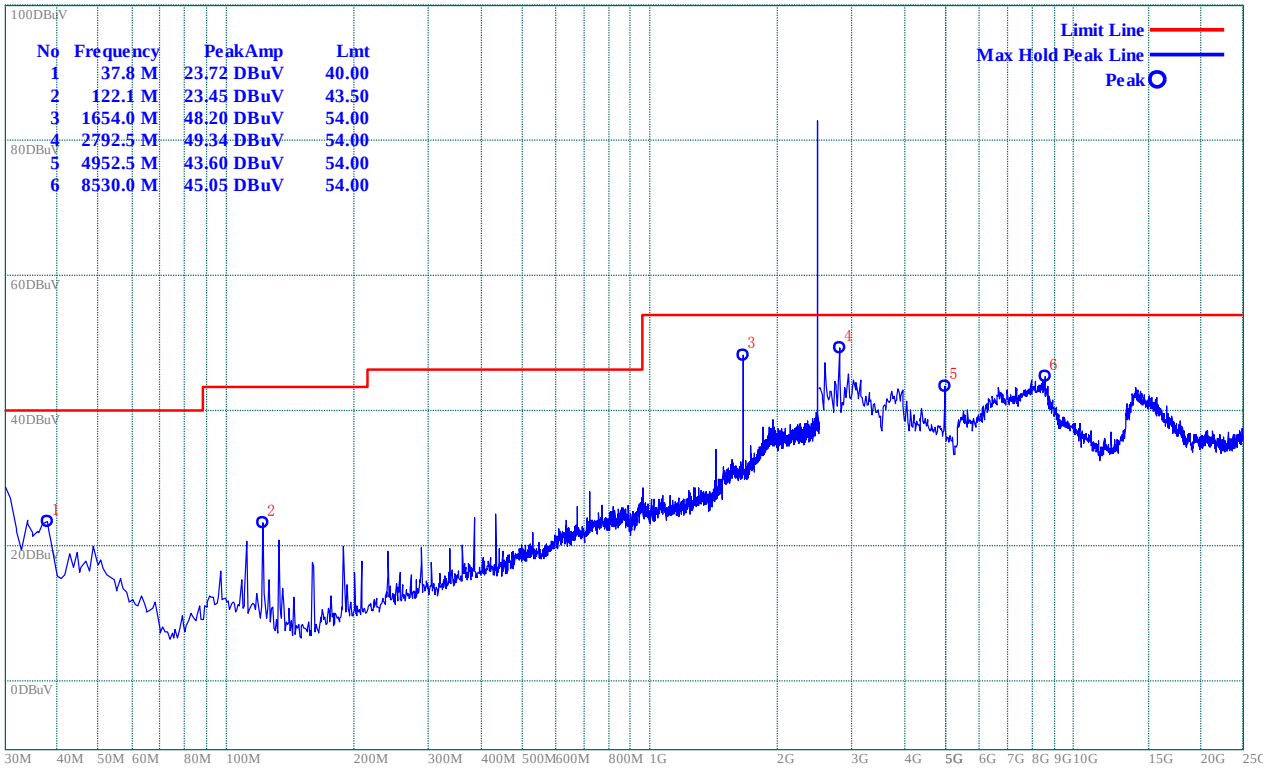
(Plot A.2: Antenna Vertical)



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



(Plot C.1: Antenna Horizontal)



(Plot C.2: Antenna Vertical)

** END OF REPORT **