

47 CFR PART 15 C - BLUETOOTH

TEST REPORT

of

IP TOUCH 4068EE Handset Bluetooth®

My IC Phone Handset Bluetooth®

Trade Name: Alcatel-Lucent

Brand Name: Alcatel-Lucent

Model Name: IP TOUCH 4068EE Handset Bluetooth®

My IC Phone Handset Bluetooth®

Report No: SH12010005B01

FCC ID: OL3OT8HSBT

IC number: 1737D-OT8HSBT

prepared for

Alcatel-Lucent Enterprise

1 Route du Dr A.Schweitzer 67408 ILLKIRCH (France)

prepared by

Shenzhen Electronic Product Quality Testing Center

Morlab Laboratory

3/F, Electronic Testing Building, Shahe Road, Xili,
Nanshan District, Shenzhen, 518055 P. R. China

Tel: +86 755 86130398

Fax: +86 755 86130218



Bluetooth®

CTIA

Authorized Test Lab

LAB CODE 20081223-00

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Equipment under Test: IP TOUCH 4068EE Handset Bluetooth®
My IC Phone Handset Bluetooth®
Brand Name: Alcatel-Lucent
Model Name: IP TOUCH 4068EE Handset Bluetooth®
My IC Phone Handset Bluetooth®
FCC ID: OL3OT8HSBT
IC number: 1737D-OT8HSBT
Applicant: Alcatel-Lucent Enterprise
1 Route du Dr A.Schweitzer 67408 ILLKIRCH (France)
Manufacturer: Alcatel-Lucent
1 Route du Dr A.Schweitzer 67408 ILLKIRCH (France)
Test Standards: 47 CFR Part 15 Subpart C
FCC Public Notice DA 00-705
ANSI C63.4-2003
IC RSS-210 Issue 7
Test Date(s): 2012.2.17 - 2012.2.28
Test Result: PASS

*** We Hereby Certify That:**

The equipment under test was tested by Shenzhen Electronic Product Quality Testing Center 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 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:

Shi Feng
Shi Feng

Dated:

2012.4.1

Reviewed by:

Zhang Jun
Zhang Jun

Dated:

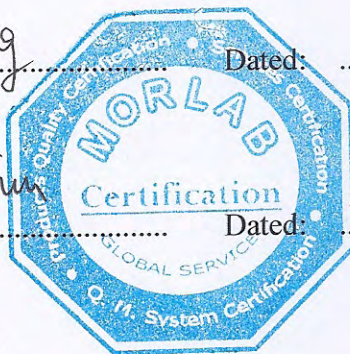
2012.4.1

Approved by:

Wei Bei
Wei Bei

Dated:

2012.4.1



GENERAL INFORMATION

1.1 EUT Description

EUT Type.....: IP TOUCH 4068EE Handset Bluetooth®
My IC Phone Handset Bluetooth®

Model Name: IP TOUCH 4068EE Handset Bluetooth®
My IC Phone Handset Bluetooth®

Serial No.....: n.a

Modulation Type.....: Frequency Hopping Spread Spectrum (FHSS)

Frequency: The frequency range used is 2402MHz - 2480MHz (79 channels, at intervals of 1MHz);
The frequency block is 2400MHz to 2483.5MHz.

Power Supply.....: Battery
Mode Name.: 1VHAA1500
Capacitance: 1500mAh
Rated voltage: 1.2V
Charge limited: 1.4V
Manufacturer: SAFT BATTERIES
12 Rue Sadi Carnot 93170 Bagnolet - France

Antenna Specification: -2.4 dBi gain (Max)

Note 1: The difference between IP TOUCH 4068EE & My IC Phone Handset is as follow:

Model Name	IP TOUCH 4068EE Handset Bluetooth®	My IC Phone Handset Bluetooth®
Hardware Version	3MG22020JAAA	3MG22020JAAA
Description	2pin for charger	4pin for charger

Note 2: The EUT is a Mobile Phone, it contains Bluetooth Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth Module is $F(\text{MHz})=2402+1*n$ ($0 \leq n \leq 78$). 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 3: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer. IP TOUCH 4068EE Handset Bluetooth is a existing family

1.2 Test Standards and Results

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ☐ FCC Part 15 Subpart C §15.247
- ☐ FCC Public Notice DA 00-705
- ☐ ANSI C63.42003
- ☐ IC RSS-210 Issue 7

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

Test items and the results are as bellow:

No	FCC Rules	IC Rules	Test Type	Limits	Result
1	15.247(a)(1)	A8.4(2)	Number of Hopping Frequency	$\geq 75\text{Chs}$	PASS
2	15.247(b)(1)	A8.1(b)	Peak Output Power	$\leq 1\text{W}$	PASS
3	15.247(a)(1)	A8.1(a)	20dB Bandwidth	NA	PASS
4	15.247(a)(1)	A8.1(b)	Carrier Frequency Separation	$\geq 2/3$ of 20dB BW	PASS
5	15.247(a)(1)	A8.1(d)	Time of Occupancy (Dwell time)	$\leq 0.4\text{sec}$ in 31.6sec period	PASS
6	15.247(d)	A8.5	Conducted Spurious Emission	$< 20\text{ dBc}$	PASS
7	15.247(d)	A8.5	Band Edge	$\leq 20\text{dBc}$	PASS
8	15.207	Gen 7.2.2	Conducted Emission	15.207(a)	PASS
9	15.247(d)	A8.5	Radiated Emission	15.209(a) & 15.247(d)	PASS
10	15.203 & 15.247(b)	A8.4	Antenna Requirement	N/A	Pass
11	/	GEN 7.2.3	Receiver Spurious Emissions	GEN 7.2.3.1 & GEN 7.2.3.1	Pass

1.3 Facilities and Accreditations

1.3.1 Facilities

Shenzhen Electronic Product Quality Testing Center 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 L1659.

All measurement facilities used to collect the measurement data are located at Electronic Testing Building, Shahe Road, Xili, Nanshan District, Shenzhen 518055 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):	20 - 25
Relative Humidity (%):	40 - 60
Atmospheric Pressure (kPa):	96

1.4 EUT Setup and Operating Conditions

Pre-scanned tests were conducted to determine the final configuration from all possible combinations. The following tables are showing the test modes as the worst cases and recorded in this report.

BT Data Rate / Modulation	Conducted Mode	Radiated Mode
Bluetooth 1Mbps GFSK	Channel 00_2402 MHz	Channel 00_2402 MHz Channel 39_2441 MHz Channel 78_2480 MHz
	Channel 39_2441 MHz	
	Channel 78_2480 MHz	
Bluetooth EDR 2Mbps $\pi/4$ -DQPSK	Channel 00_2402 MHz	N/A
	Channel 39_2441 MHz	
	Channel 78_2480 MHz	
Bluetooth EDR 3Mbps 8-DPSK	Channel 00_2402 MHz	N/A
	Channel 39_2441 MHz	
	Channel 78_2480 MHz	

The EUT has been tested under Operating and standby condition. CMU200 was used to control the EUT for staying in continuous transmitting mode. Channel 0, 39 and 78 with highest data rate (DH1) (DH3) (DH5) are chosen for tested.

Mode 1: Battery + EUT Mode;

Worst Case:GFSK(1 Mbps) Mode 1 Channel Low (2402MHz)、Mid (2441MHz) and High (2480MHz) were chosen for full testing.

47 CFR PART 15C REQUIREMENTS

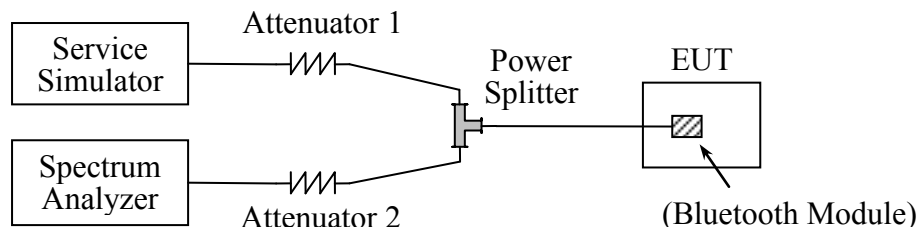
1.5 Number of Hopping Frequency

1.5.1 Requirement

According to FCC section 15.247(a)(1)(ii), frequency hopping systems operating in the 2400MHz to 2483.5MHz bands shall use at least 15 hopping frequencies.

1.5.2 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	Anritsu	MT8852A	6K00002788	2011.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2011.9	1year
Spectrum Analyzer	Agilent	E4440A	MY46187763	2011.9	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Attenuator 1	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)

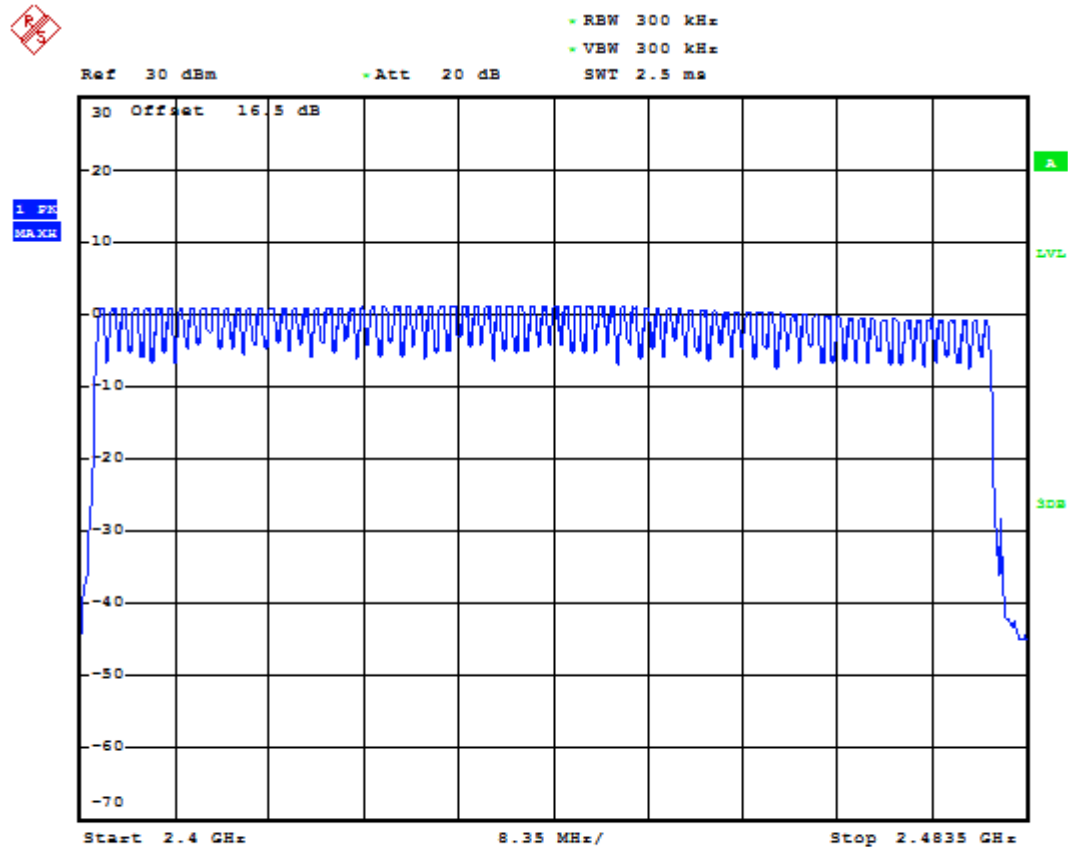
1.5.3 Test Result

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. compliance to Hopping Sequence and Equal Usage of the channels

A. Test Verdict:

Frequency Block (MHz)	Measured Channel Numbers	Min. Limit	Refer to Plot	Verdict
2400 - 2483.5	79	15	Plot A	PASS

B. Test Plot:



Date: 15.FEB.2012 16:00:30

(Plot A: 2402MHz to 2480MHz)

1.6 Peak Output Power

1.6.1 Requirement

According to FCC section 15.247(b)(1), 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.

1.6.2 Test Description

See section 1.5.2 of this report.

1.6.3 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 (1Mbps)

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	-1.97	0.00064	Plot A	30	1	PASS
39	2441	-0.94	0.00081	Plot B			PASS
78	2480	-1.03	0.00079	Plot C			PASS

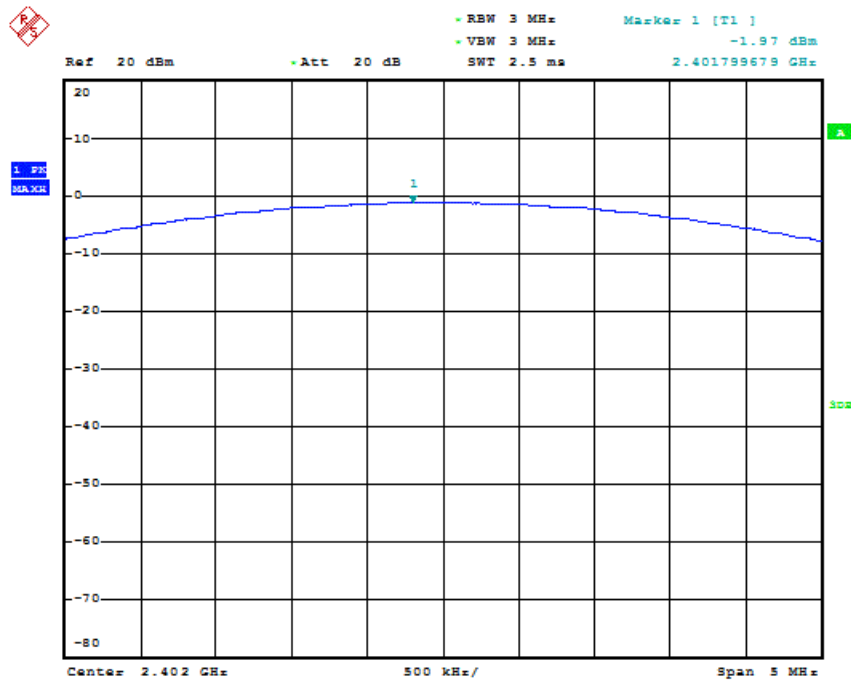
π /4-DQPSK (2Mbps)

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	-1.91	0.00064	Plot D	30	1	PASS
39	2441	-0.98	0.00080	Plot E			PASS
78	2480	-1.04	0.00079	Plot F			PASS

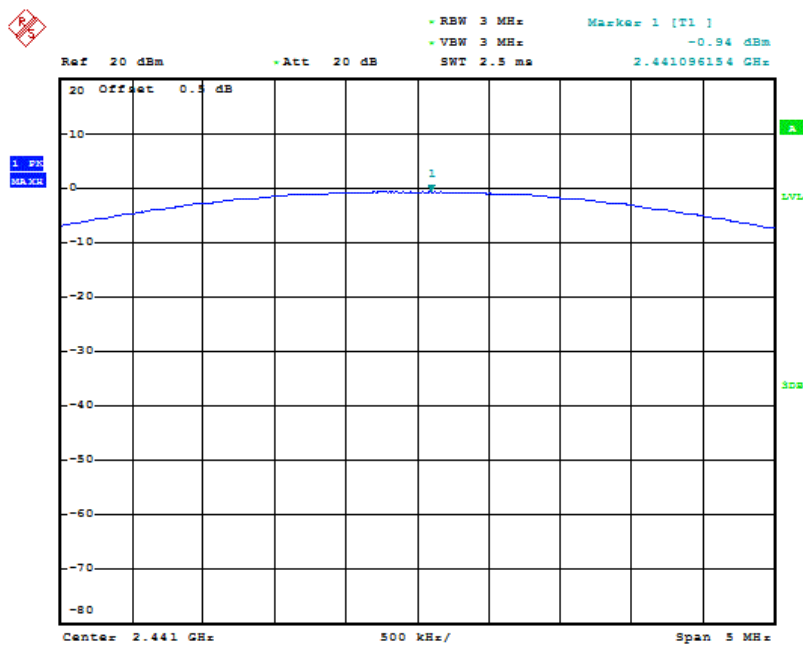
8-DPSK (3Mbps)

Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	-1.98	0.00063	Plot G	30	1	PASS
39	2441	-1.17	0.00076	Plot H			PASS
78	2480	-1.21	0.00076	Plot I			PASS

B. Test Plot:

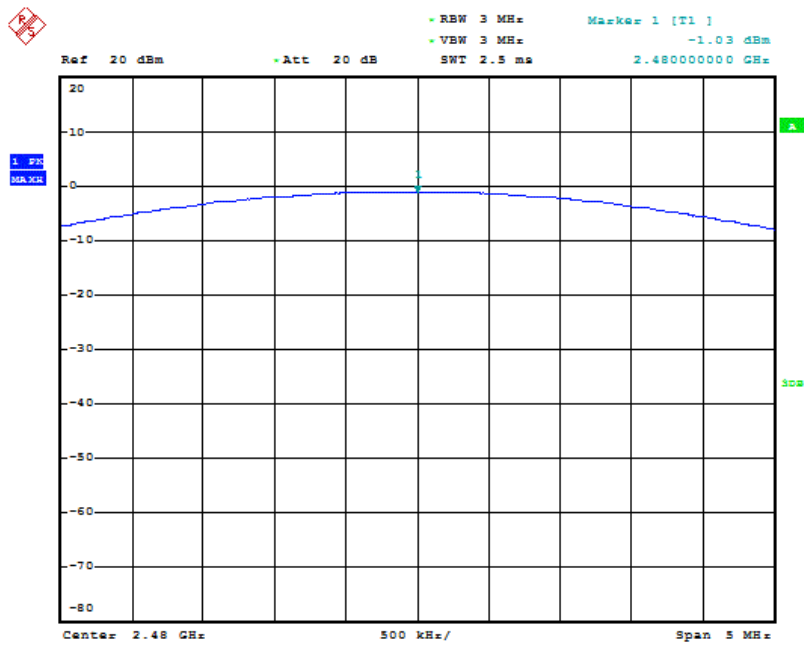


(Plot A: Channel = 2402)



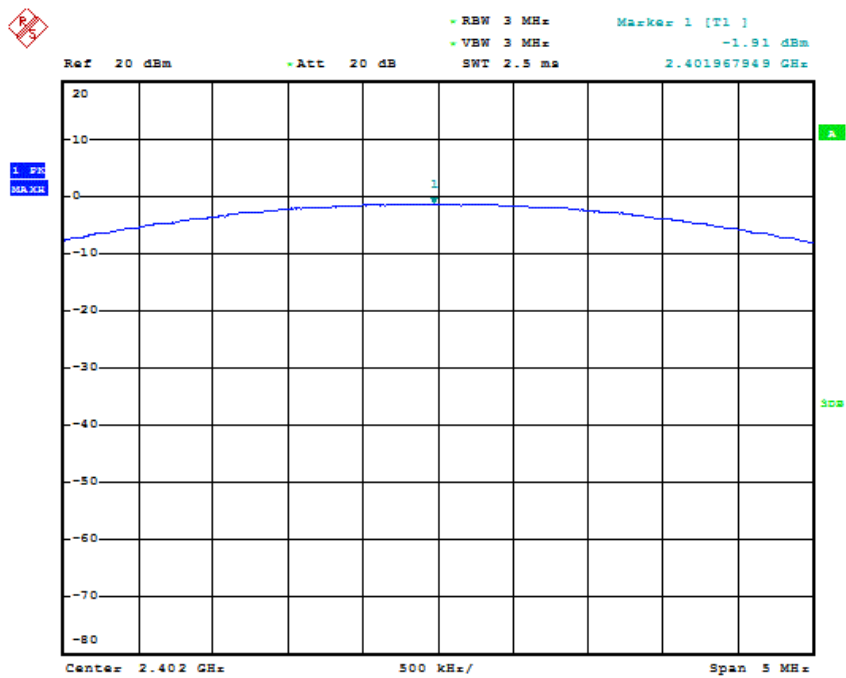
Date: 16.APR.2012 18:57:06

(Plot B: Channel = 2441)

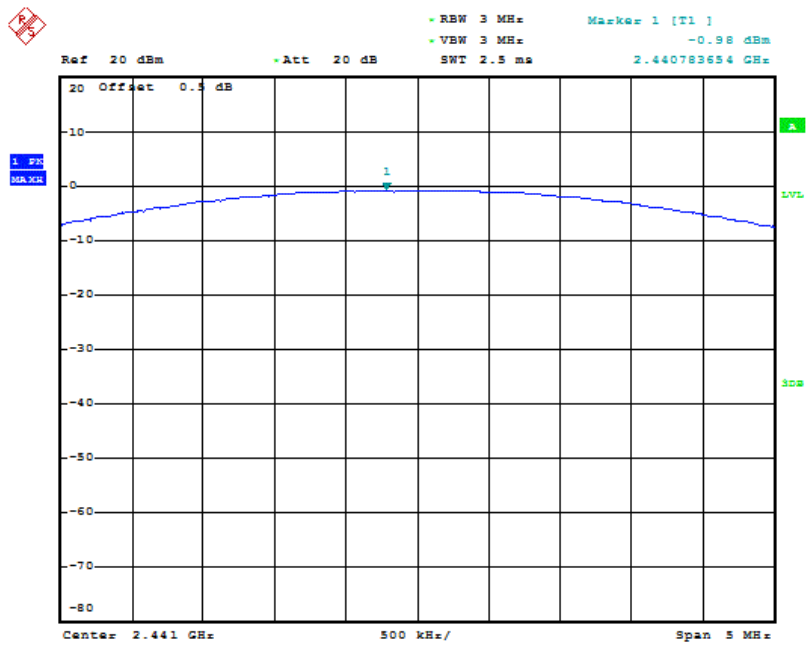


Date: 18.APR.2012 19:01:25

(Plot C: Channel = 2480)

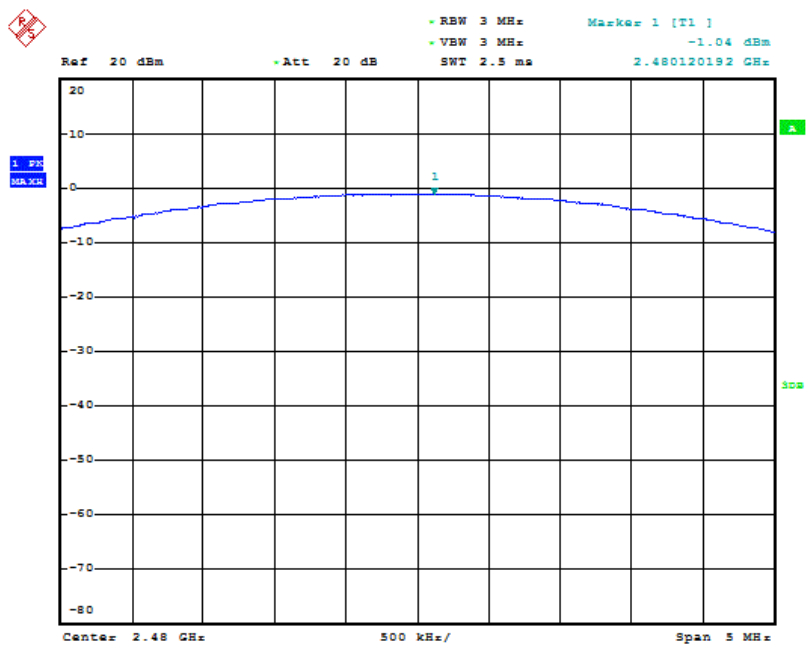


(Plot D: Channel = 2402)



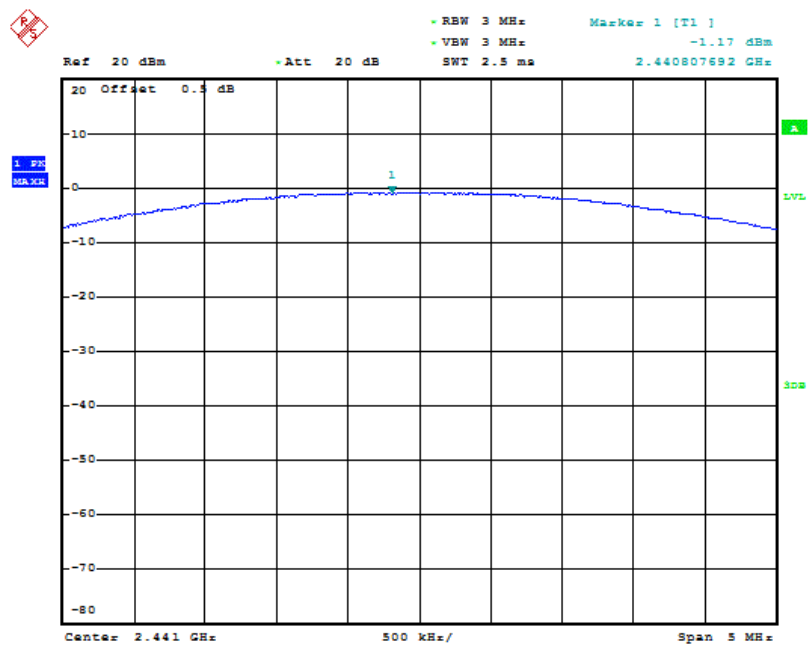
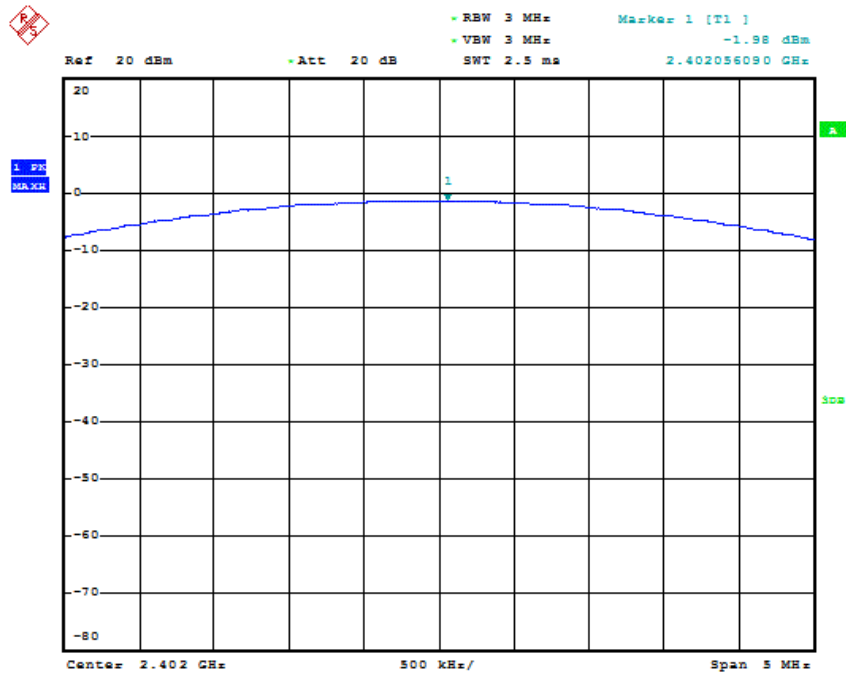
Date: 18.APR.2012 18:57:54

(Plot E: Channel = 2441)

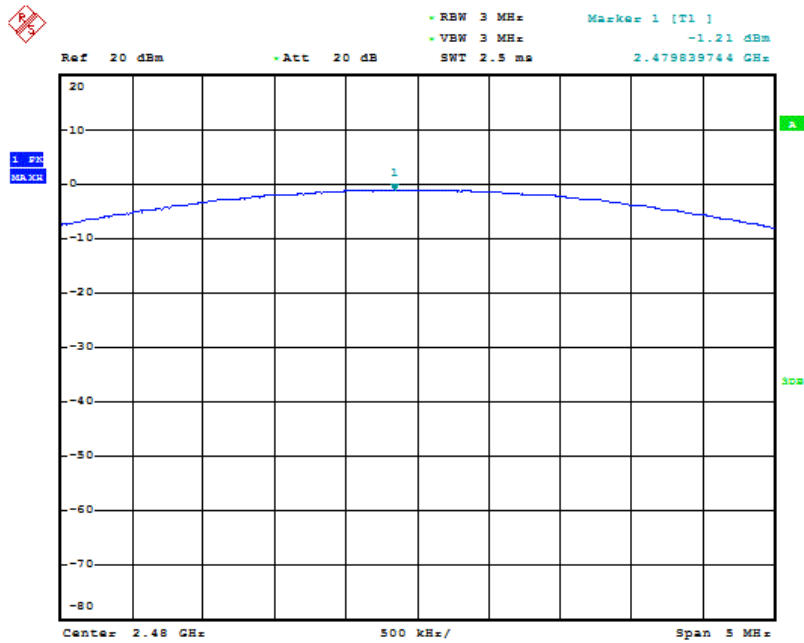


Date: 18.APR.2012 19:01:58

(Plot F: Channel = 2482)



Date: 16.APR.2012 18:58:54



Date: 18.APR.2012 19:02:40

(Plot I: Channel = 2480)

1.7 20dB Bandwidth

1.7.1 Definition

The 20dB bandwidth is known as the 99% emission bandwidth, or 20dB bandwidth ($10 \cdot \log 1\% = 20\text{dB}$) taking the total RF output power.

1.7.2 Test Description

See section 1.5.2 of this report.

1.7.3 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:

The maximum 20dB bandwidth measured is 1.175MHz according to the table below.

GFSK(1Mbps)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.796	Plot A
39	2441	0.796	Plot B
78	2480	0.788	Plot C

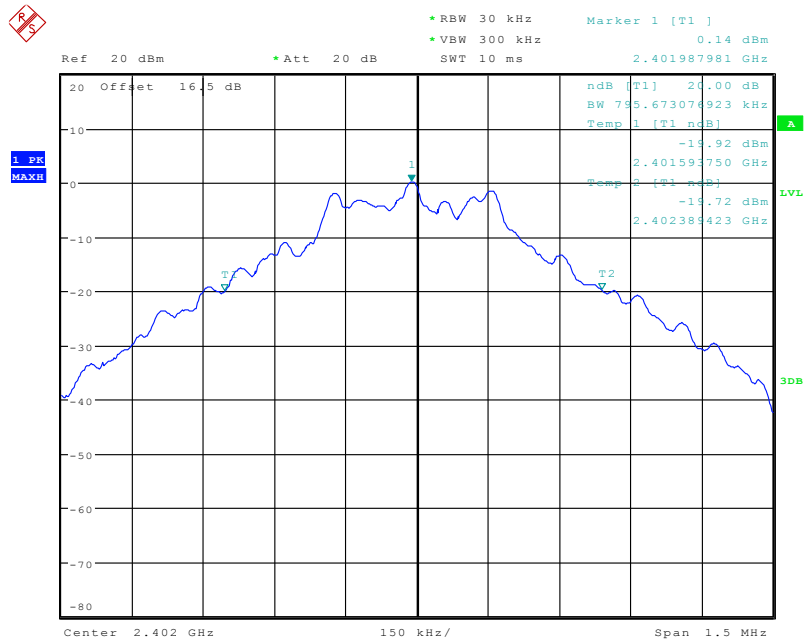
$\pi/4$ -DQPSK(2Mbps)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.130	Plot D
39	2441	1.113	Plot E
78	2480	1.118	Plot F

8-DPSK(3Mbps)

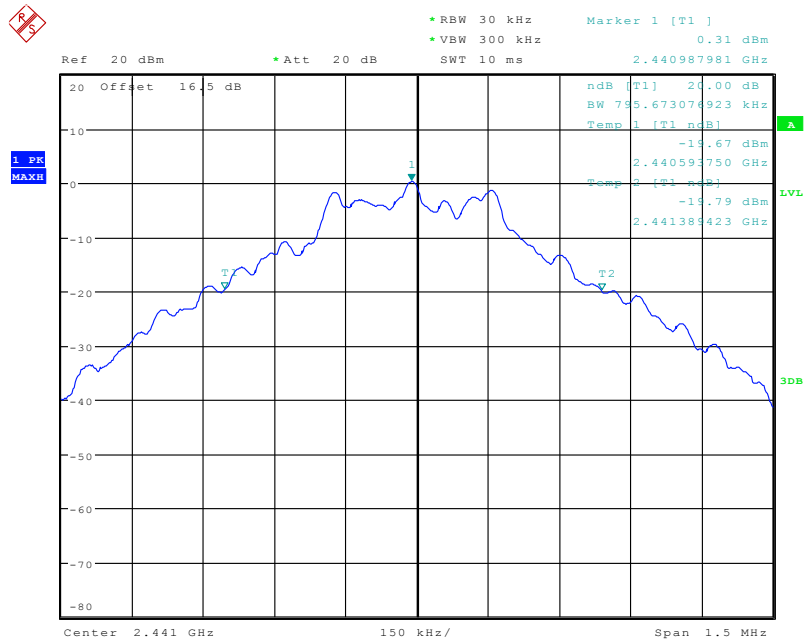
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.142	Plot G
39	2441	1.175	Plot H
78	2480	1.147	Plot I

B. Test Plot:



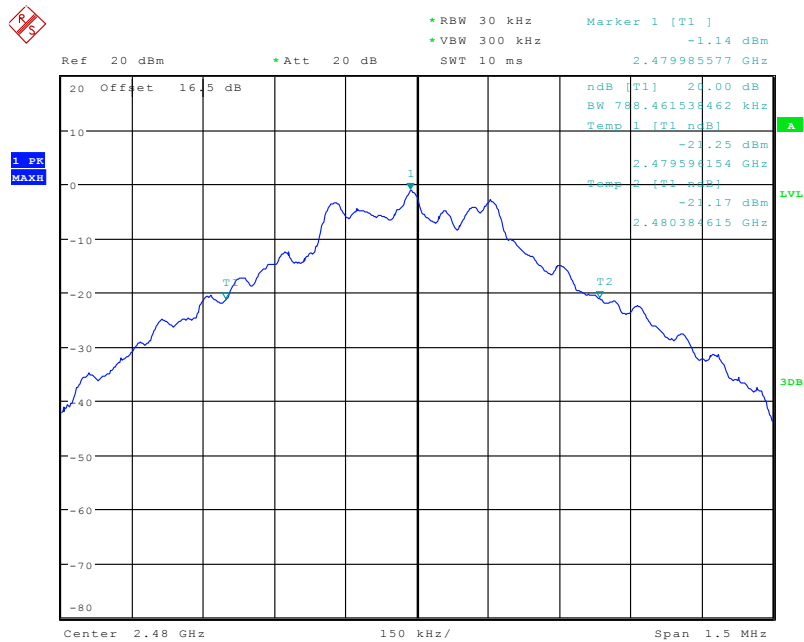
Date: 20.FEB.2012 16:18:10

(Plot A: Channel = 2402)



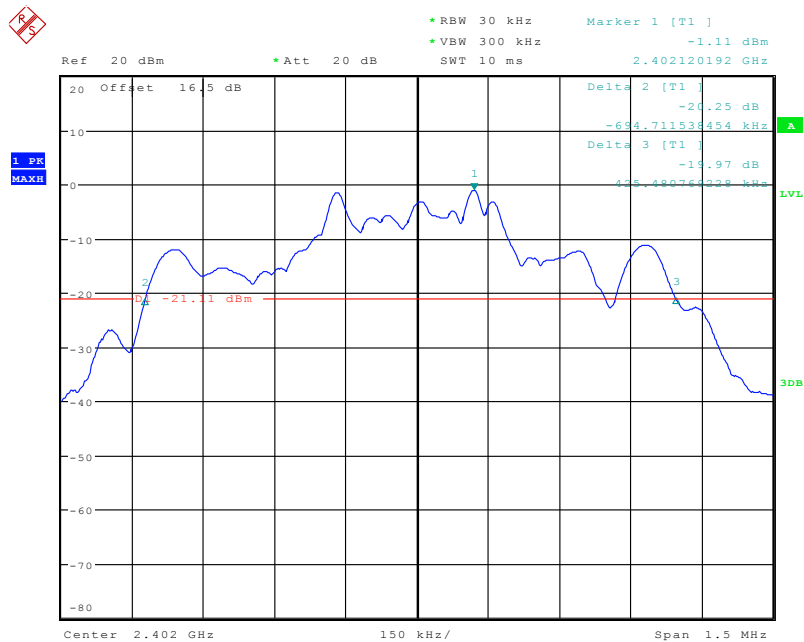
Date: 20.FEB.2012 16:17:21

(Plot B: Channel = 2441)



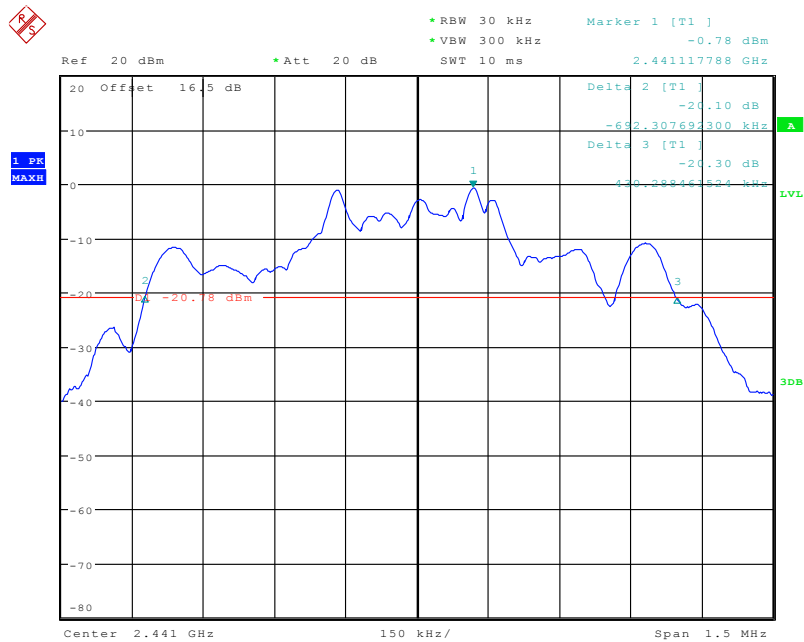
Date: 20.FEB.2012 16:15:43

(Plot C: Channel = 2480)



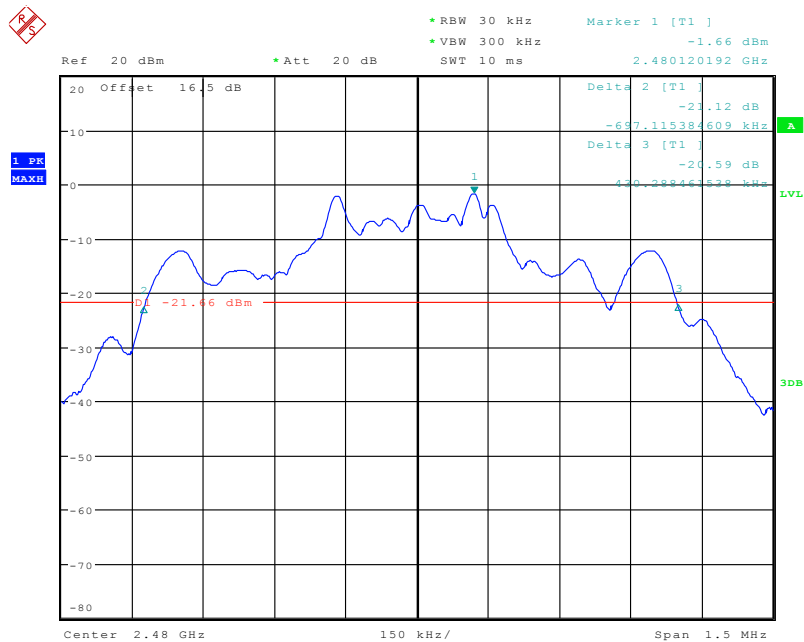
Date: 20.FEB.2012 18:15:51

(Plot D: Channel = 2402)



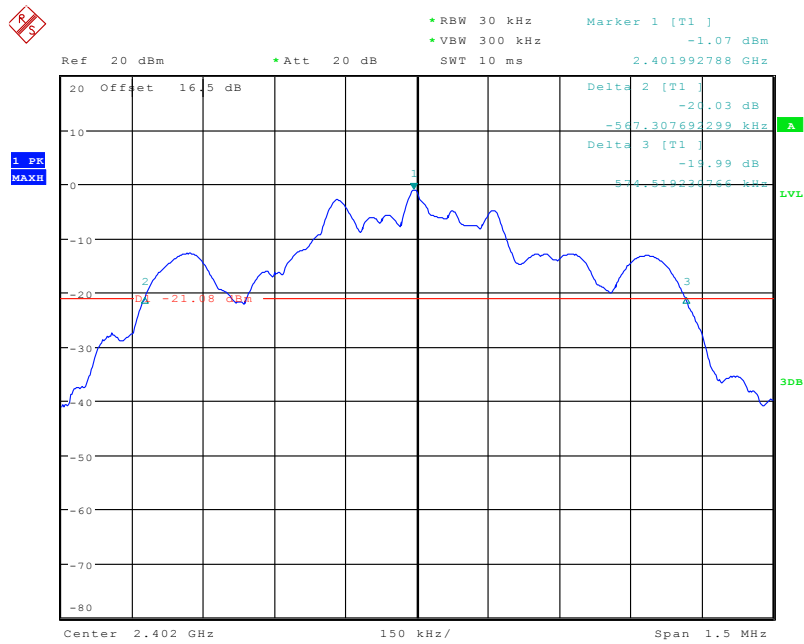
Date: 20.FEB.2012 18:20:15

(Plot E: Channel = 2441)



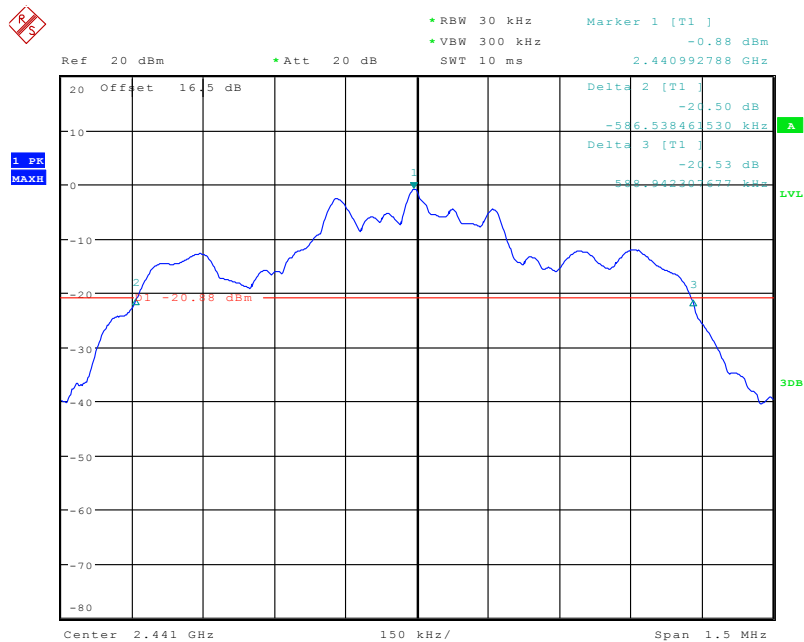
Date: 20.FEB.2012 18:21:27

(Plot F: Channel = 2480)



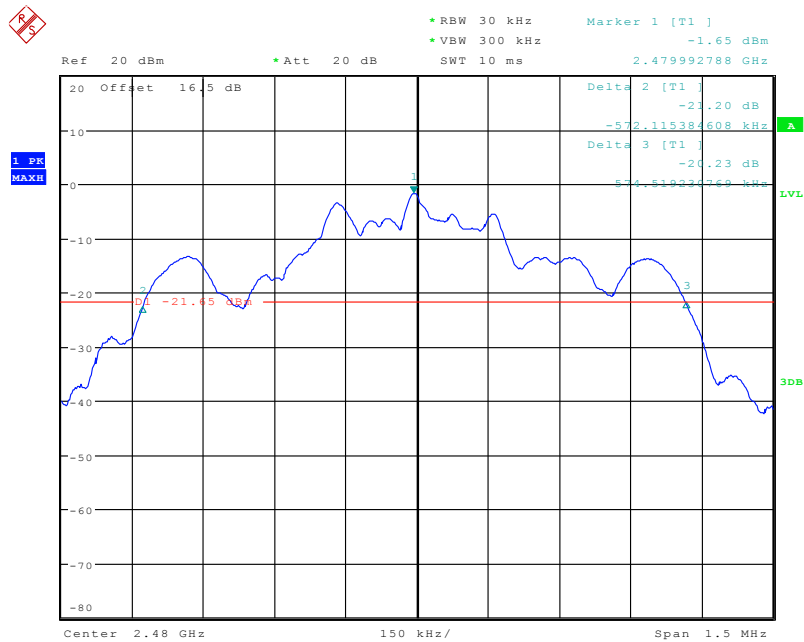
Date: 20.FEB.2012 18:16:43

(Plot G: Channel = 2402)



Date: 20.FEB.2012 18:19:16

(Plot H: Channel = 2441)



Date: 20.FEB.2012 18:22:53

(Plot I: Channel = 2480)

1.8 Carried Frequency Separation

1.8.1 Definition

According to FCC section 15.247(a)(1), 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.

1.8.2 Test Description

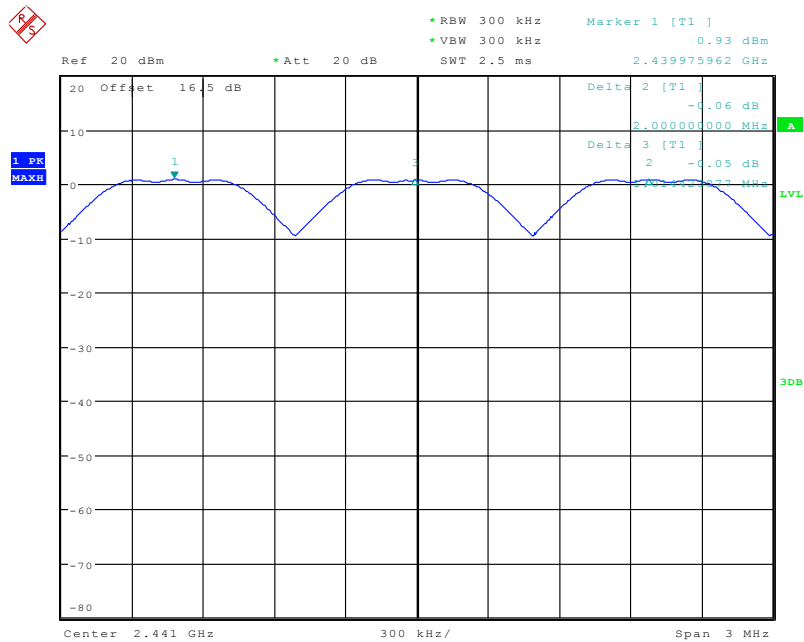
See section 1.5.2 of this report.

1.8.3 Test Result

The Bluetooth Module operates at hopping-on test mode.

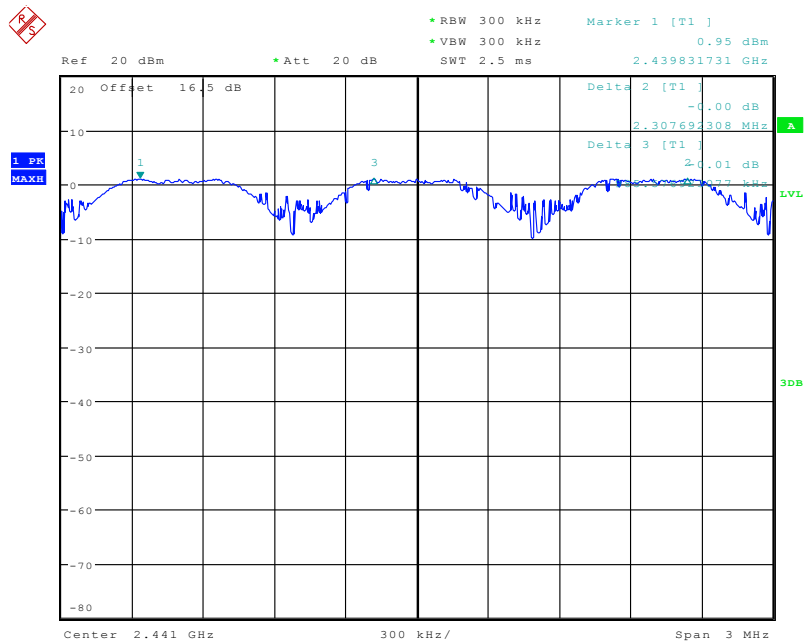
For any adjacent channels (e.g. the channel 39 and 40 as showed in the Plot A), the Module does have hopping channel carrier frequencies separated by a minimum of 25kHz or two-thirds of the 20dB bandwidth of the hopping channel (refer to section 1.7.3), whichever is greater. So, the verdict is PASS.

Test Mode	Channel Separation (MHz)	Limit (MHz)	Test Plot	Result
GFSK	1.00	1.00	Plot A	Pass
π /4-DQPSK	1.00	1.00	Plot B	Pass
8-DPSK	1.00	1.00	Plot C	Pass



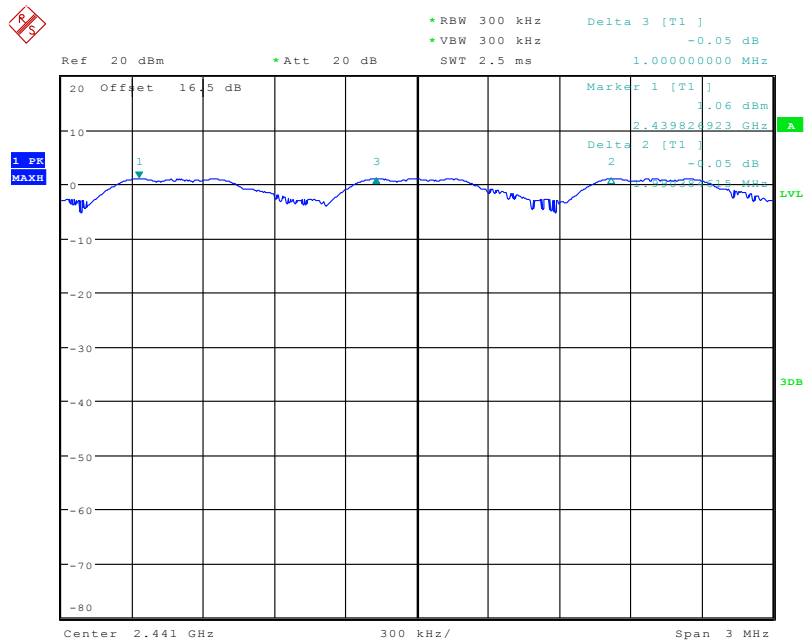
Date: 20.FEB.2012 16:23:04

(Plot A: Carried Frequency Separation)



Date: 20.FEB.2012 18:27:02

(Plot B: Carried Frequency Separation)



Date: 20.FEB.2012 18:39:10

(Plot C: Carried Frequency Separation)

1.9 Time of Occupancy (Dwell time)

1.9.1 Requirement

According to FCC section 15.247(a)(1)(iii), 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.

1.9.2 Test Description

See section 1.5.2 of this report.

1.9.3 Test Result

The average time of occupancy on any channel within the Period can be calculated with formulas:

$$\begin{aligned}\{\text{Total of Dwell}\} &= \{\text{Pulse Time}\} * (1600 / 6) / \{\text{Number of Hopping Frequency}\} * \{\text{Period}\} \\ \{\text{Period}\} &= 0.4s * \{\text{Number of Hopping Frequency}\}\end{aligned}$$

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 DH5

Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.949	Plot A	314.56	400	PASS
39	2441	2.965	Plot B	316.27		PASS
78	2480	2.965	Plot C	316.27		PASS

$\pi/4$ -DQPSK DH5

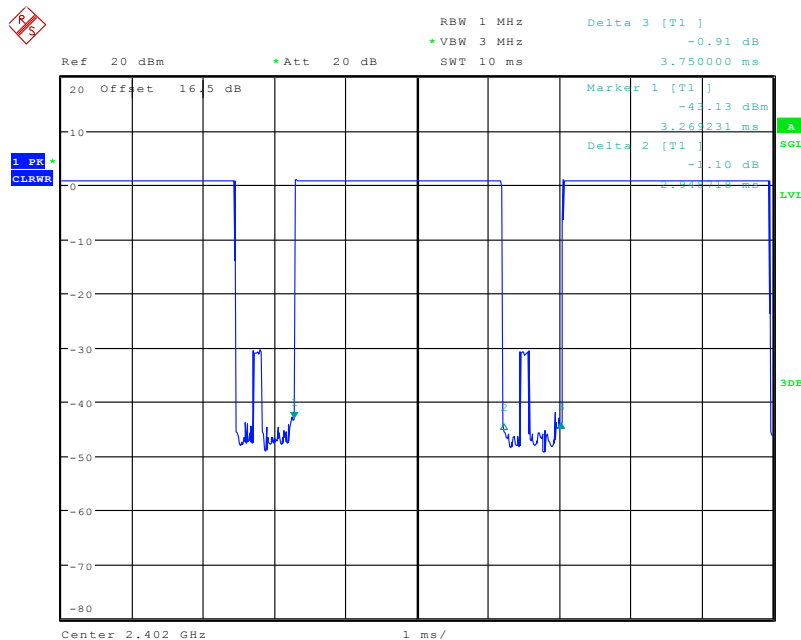
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.965	Plot D	316.27	400	PASS
39	2441	2.965	Plot E	316.27		PASS
78	2480	2.949	Plot F	314.56		PASS

8-DPSK DH5

Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.965	Plot G	316.27	400	PASS
39	2441	2.965	Plot H	316.27		PASS
78	2480	2.949	Plot I	314.56		PASS

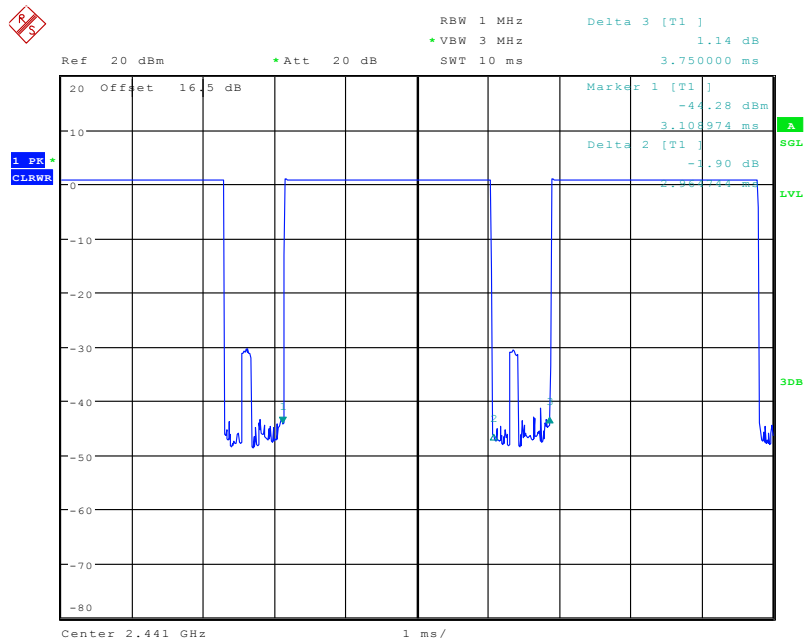
B. Test Plot:

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



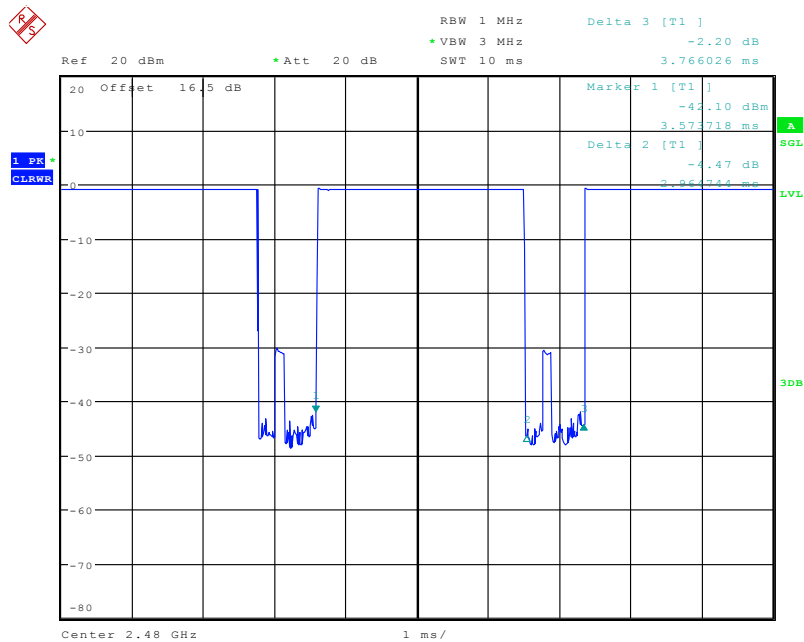
Date: 20.FEB.2012 17:01:30

(Plot A: Channel = 2402)



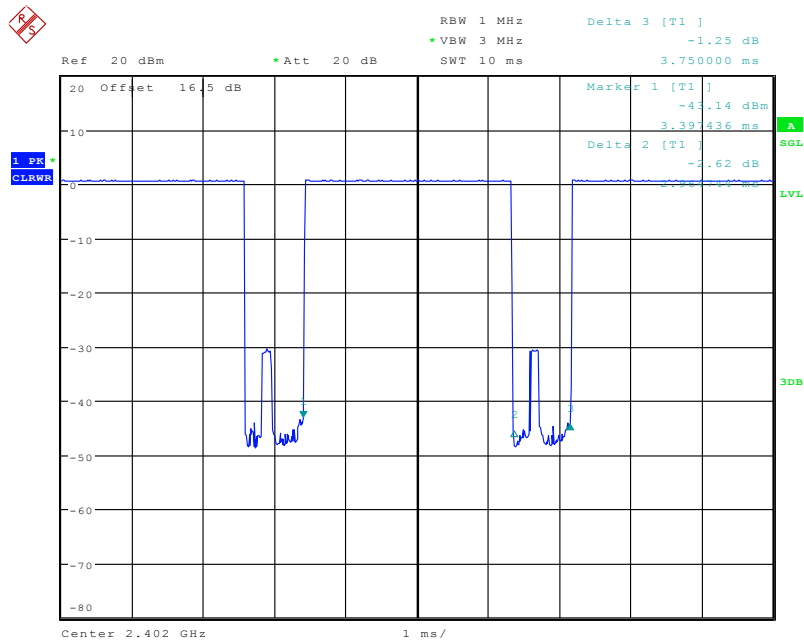
Date: 20.FEB.2012 17:00:20

(Plot B: Channel = 2441)



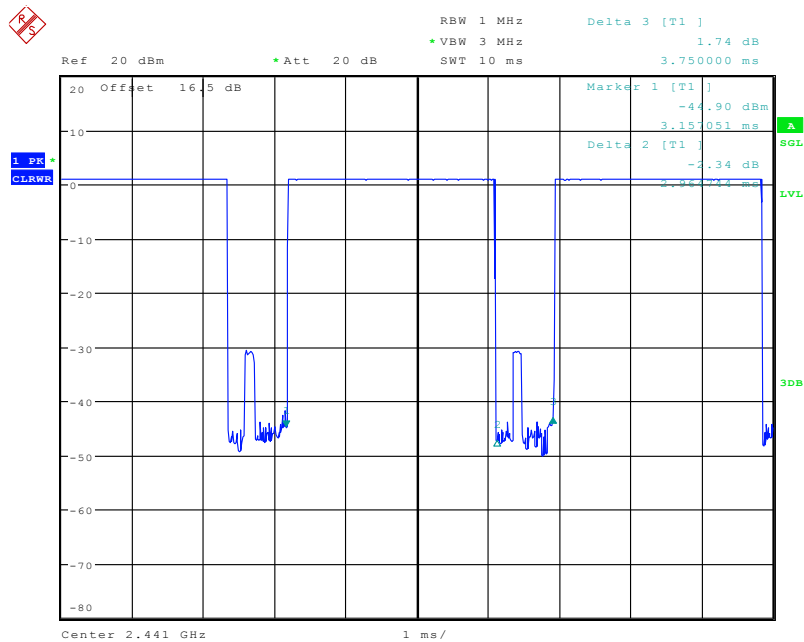
Date: 20.FEB.2012 17:02:13

(Plot C: Channel = 2480)



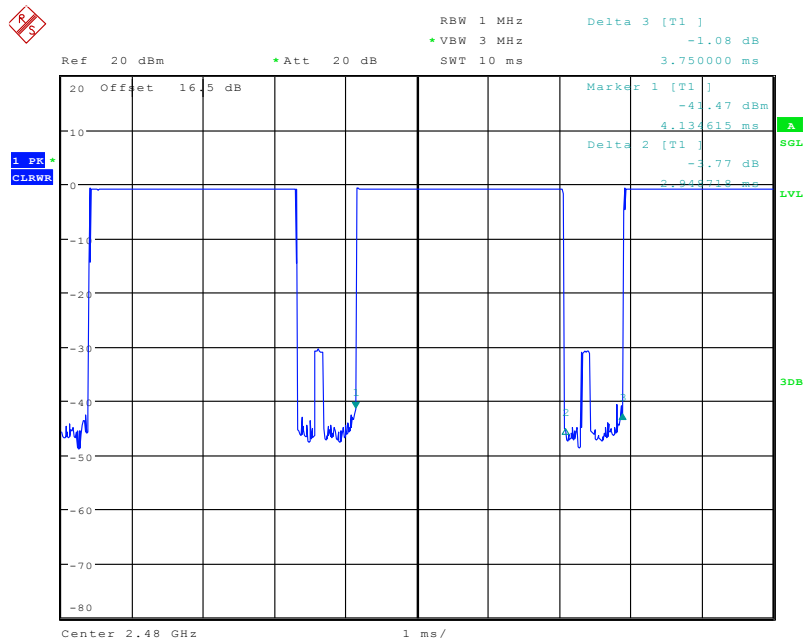
Date: 20.FEB.2012 17:04:19

(Plot D: Channel = 2402)



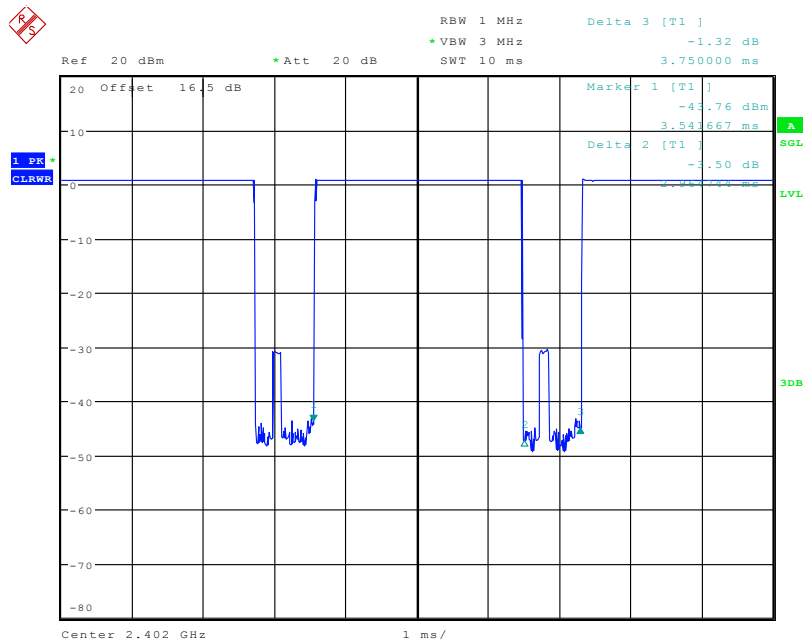
Date: 20.FEB.2012 17:03:38

(Plot E: Channel = 2441)



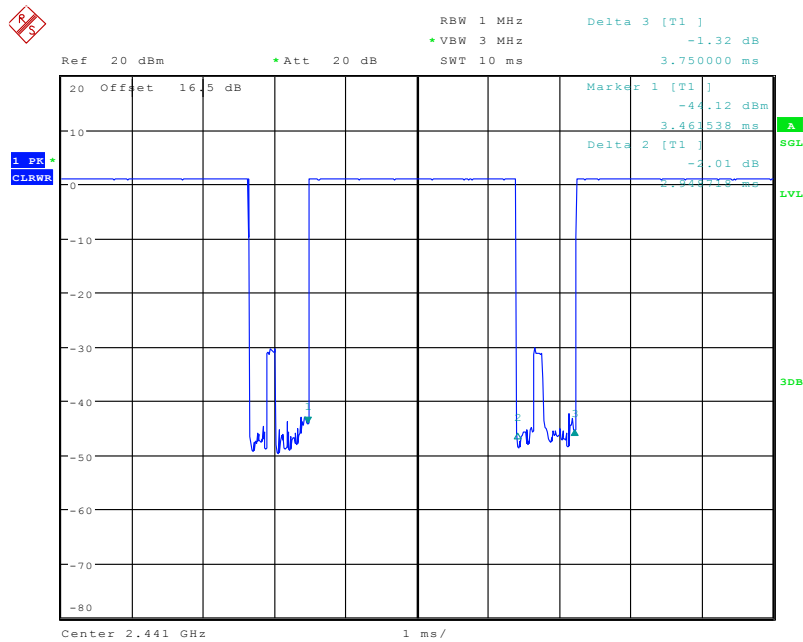
Date: 20.FEB.2012 17:02:50

(Plot F: Channel = 2480)



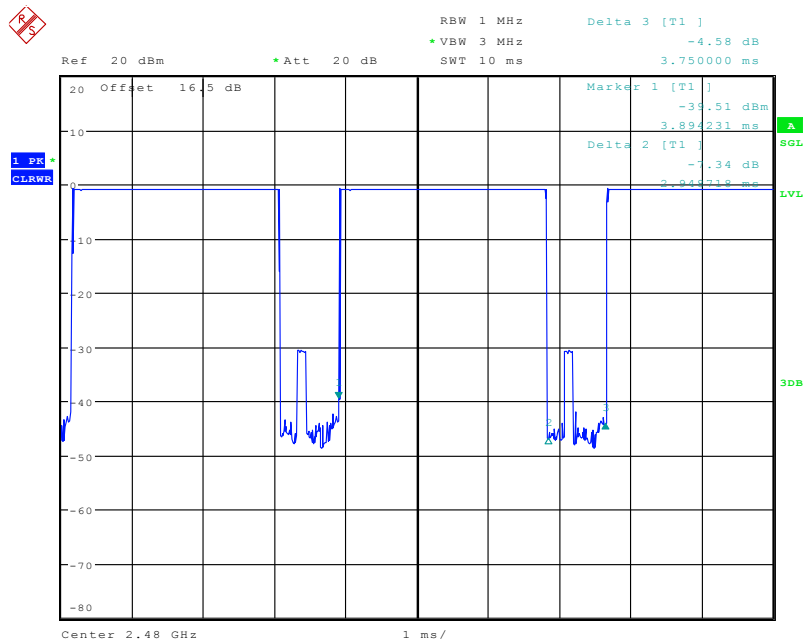
Date: 20.FEB.2012 17:04:50

(Plot G: Channel = 2402)



Date: 20.FEB.2012 17:05:33

(Plot H: Channel = 2441)



Date: 20.FEB.2012 17:06:12

(Plot I: Channel = 2480)

1.10 Conducted Spurious Emissions

1.10.1 Requirement

According to FCC section 15.247(c), 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.

1.10.2 Test Description

See section 1.5.2 of this report.

1.10.3 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

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-44.47	Plot A	0.20	-19.80	PASS
39	2441	-43.40	Plot B	-0.11	-20.11	PASS
78	2480	-45.75	Plot C	-1.32	-21.32	PASS

$\pi/4$ -DQPSK

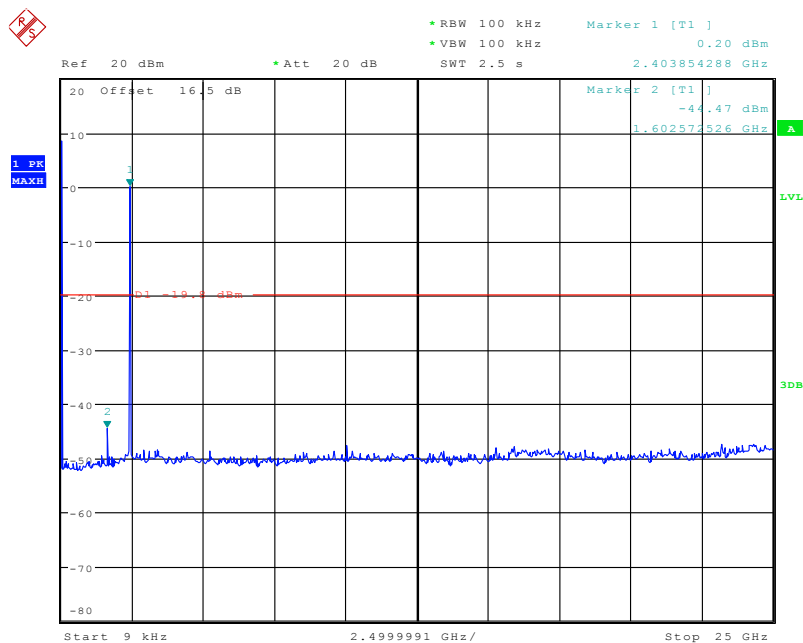
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-46.26	Plot D	0.65	-19.35	PASS
39	2441	-46.16	Plot E	-0.80	-20.80	PASS
78	2480	-46.62	Plot F	-3.00	-23.00	PASS

8-DPSK

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-47.09	Plot G	-0.89	-20.89	PASS
39	2441	-46.59	Plot H	0.10	-19.90	PASS
78	2480	-47.38	Plot I	-1.38	-21.38	PASS

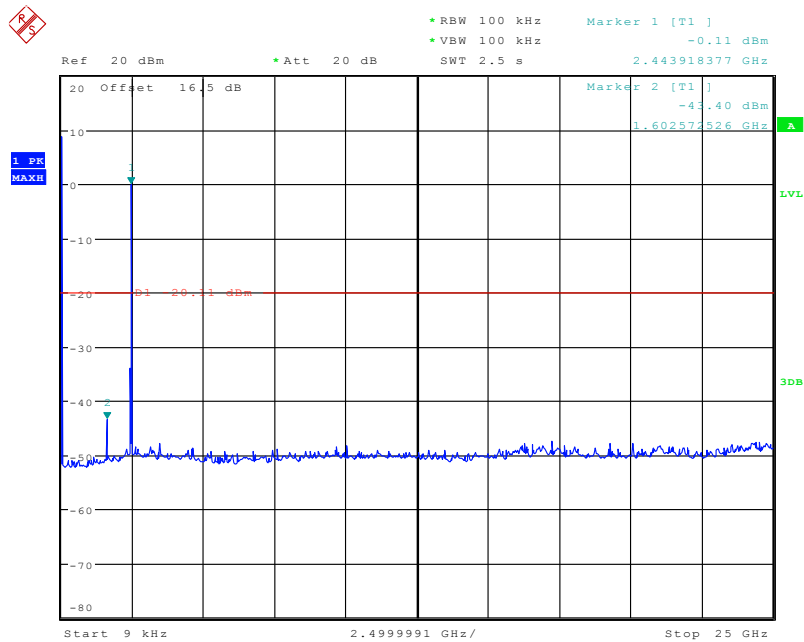
B. Test Plot:

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



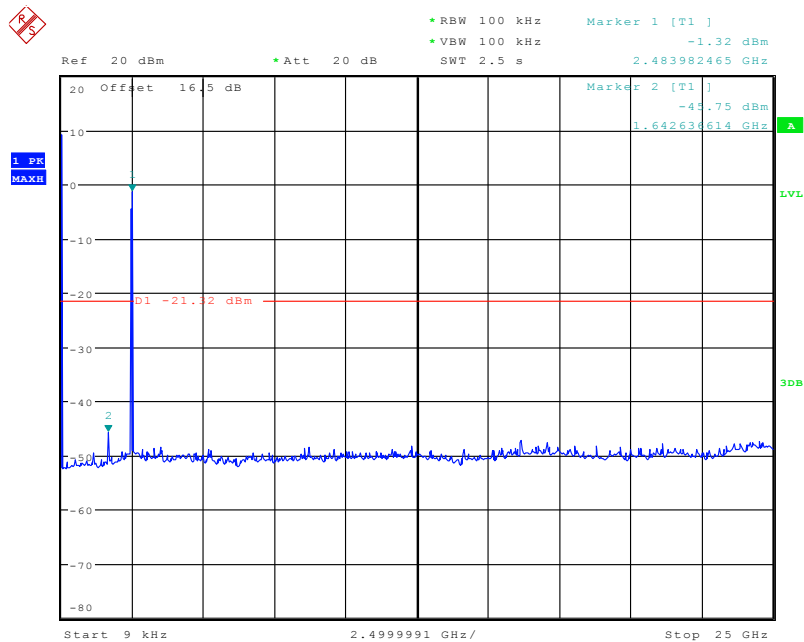
Date: 20.FEB.2012 17:11:14

(Plot A: Channel = 0, 9KHz to 25GHz)



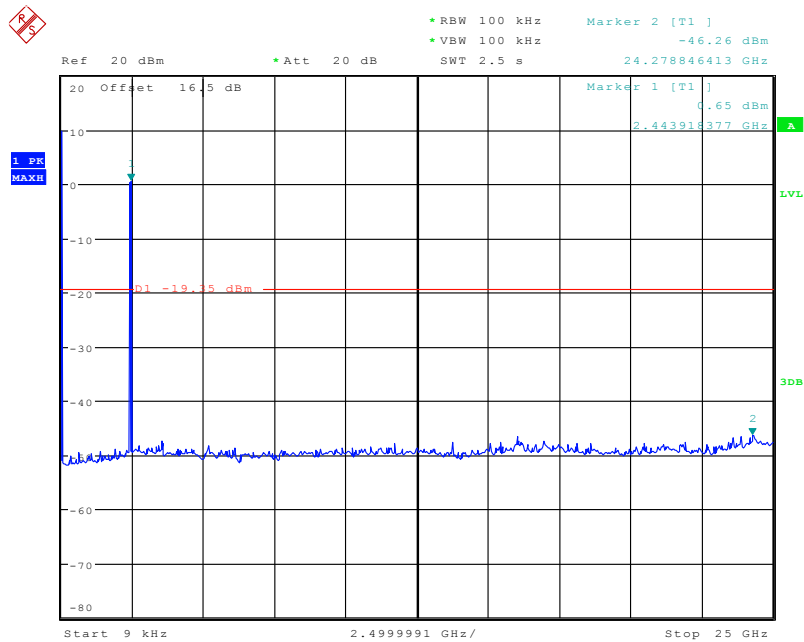
Date: 20.FEB.2012 17:13:26

(Plot B: Channel = 39, 9KHz to 25GHz)



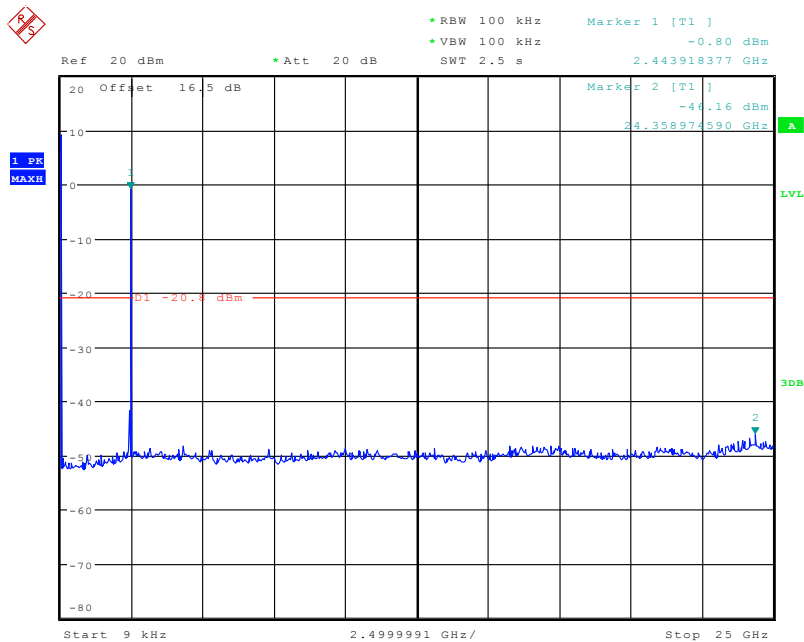
Date: 20.FEB.2012 17:17:08

(Plot C: Channel = 78, 9KHz to 25GHz)



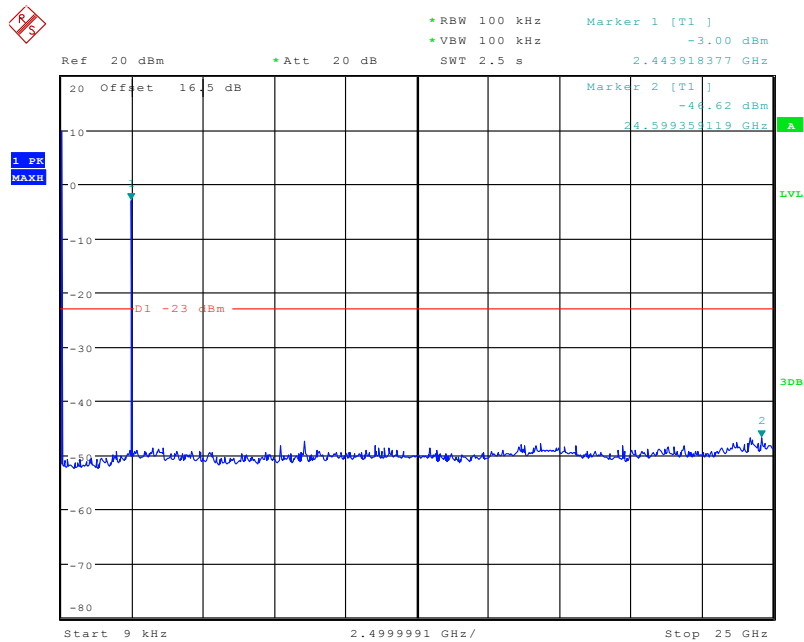
Date: 20.FEB.2012 18:48:59

(Plot D: Channel = 0, 9KHz to 25GHz)



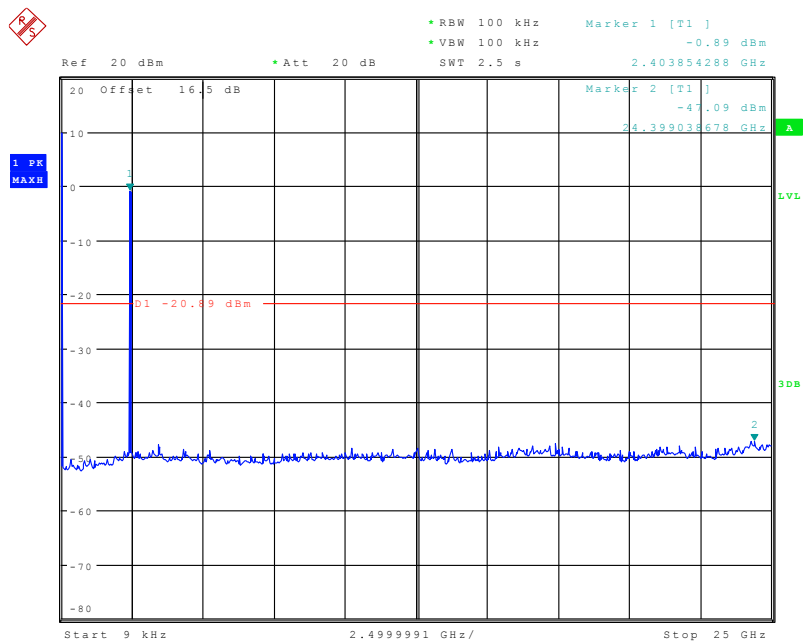
Date: 20.FEB.2012 18:43:20

(Plot E: Channel = 39, 9KHz to 25GHz)



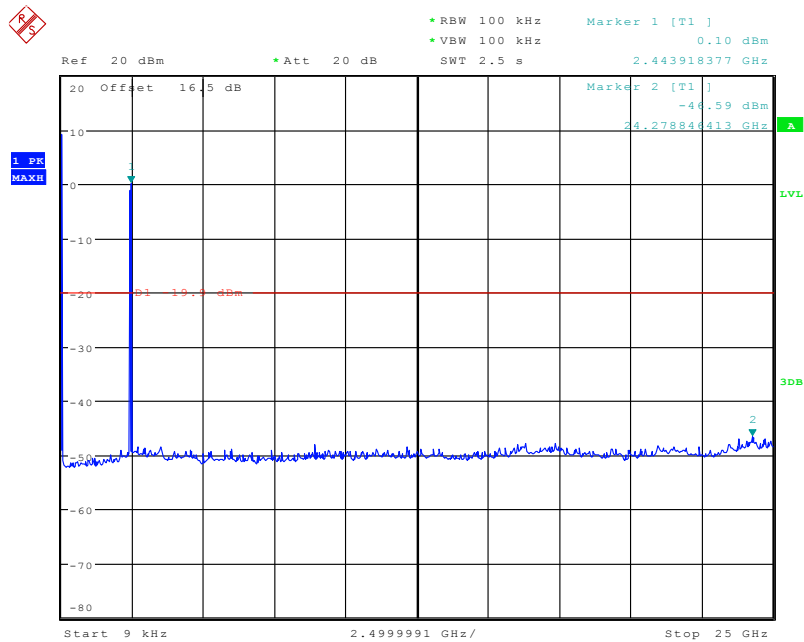
Date: 20.FEB.2012 18:52:29

(Plot F: Channel = 78, 9KHz to 25GHz)



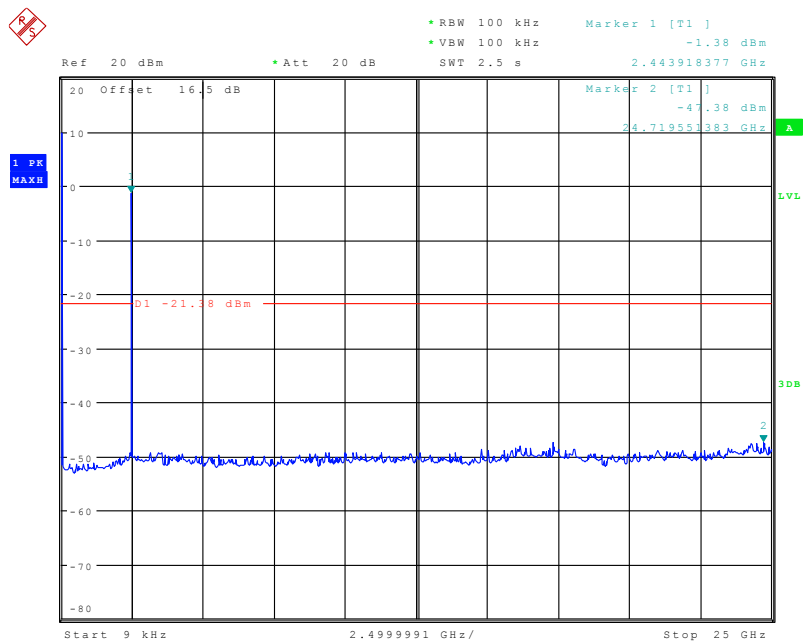
Date: 20.FEB.2012 18:50:49

(Plot G: Channel = 0, 9KHz to 25GHz)



Date: 20.FEB.2012 18:42:01

(Plot H: Channel = 39, 9KHz to 25GHz)



Date: 20.FEB.2012 18:51:27

(Plot I: Channel = 78, 9KHz to 25GHz)

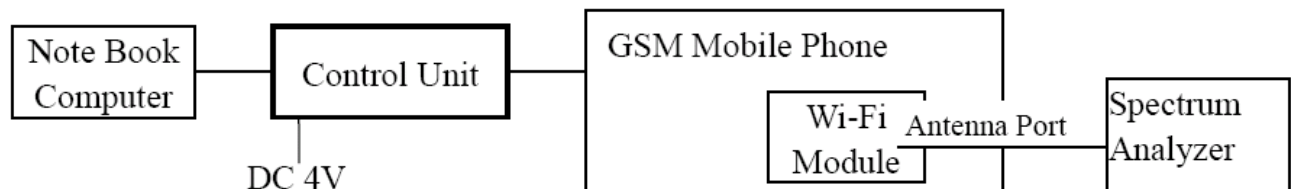
1.11 Band Edge

1.11.1 Requirement

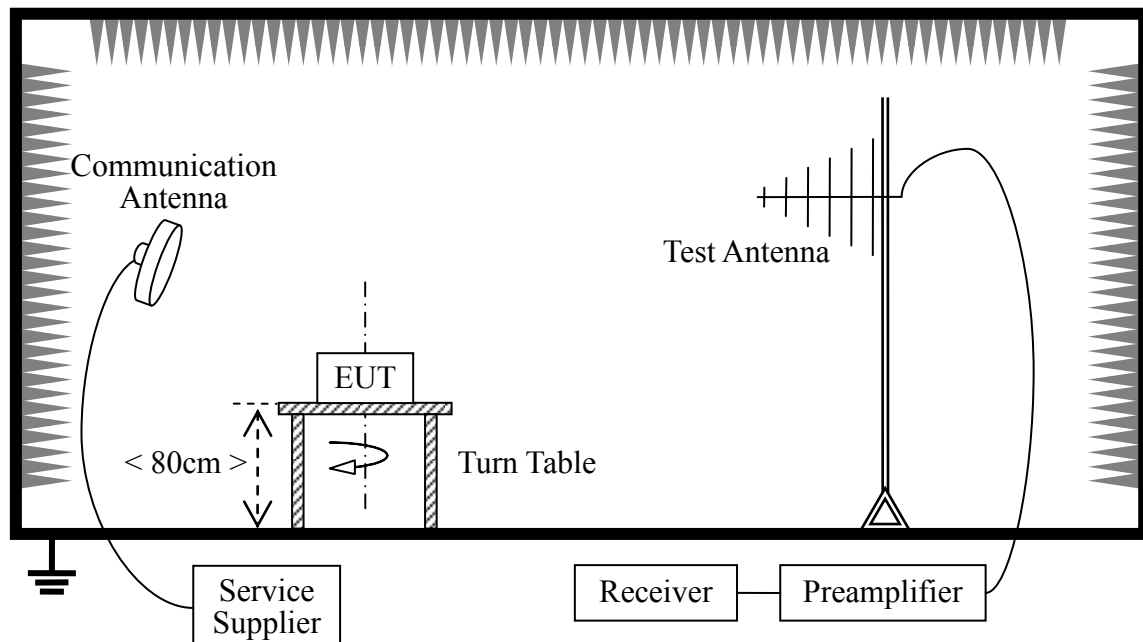
According to FCC section 15.247(c), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

1.11.2 Test Description

Conducted Band Edge



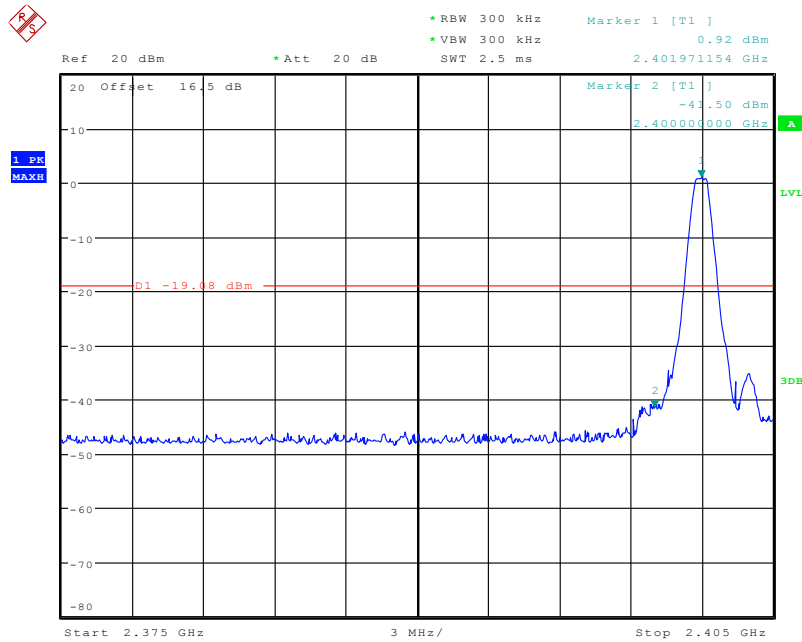
Radiated Band Edge



1.11.3 Test Result

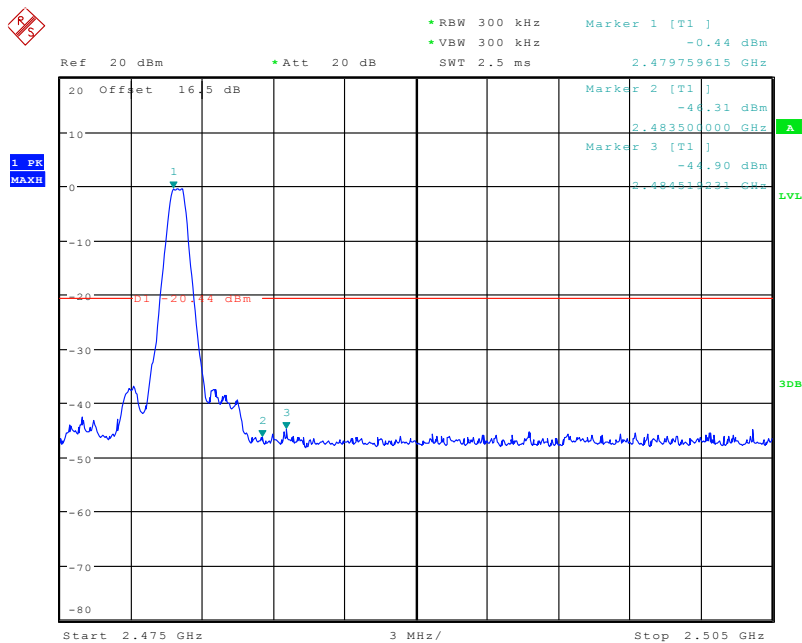
The Bluetooth Module operates at hopping-off test mode. The lowest and highest channels are tested to verify the band edge emissions.

Conducted Band Edge:



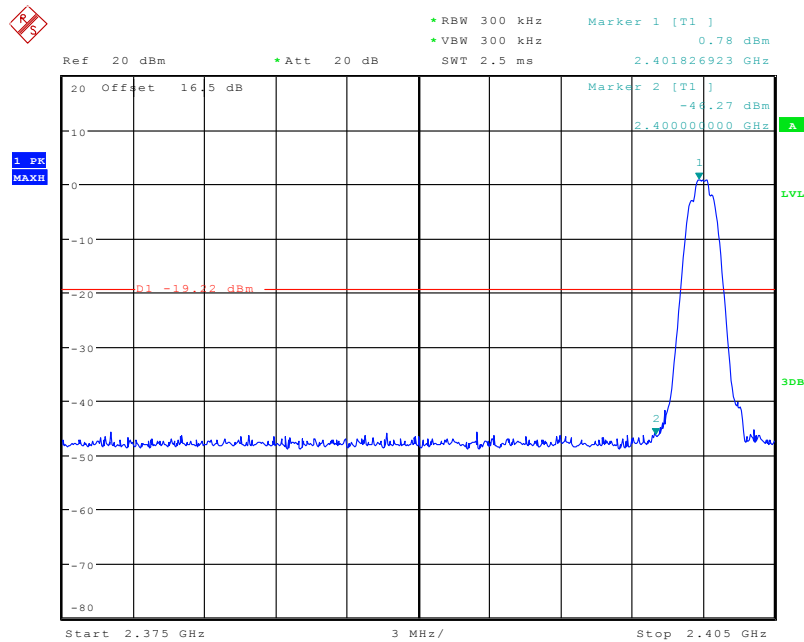
Date: 20.FEB.2012 17:22:53

(Plot A: GFSK Channel = 0)

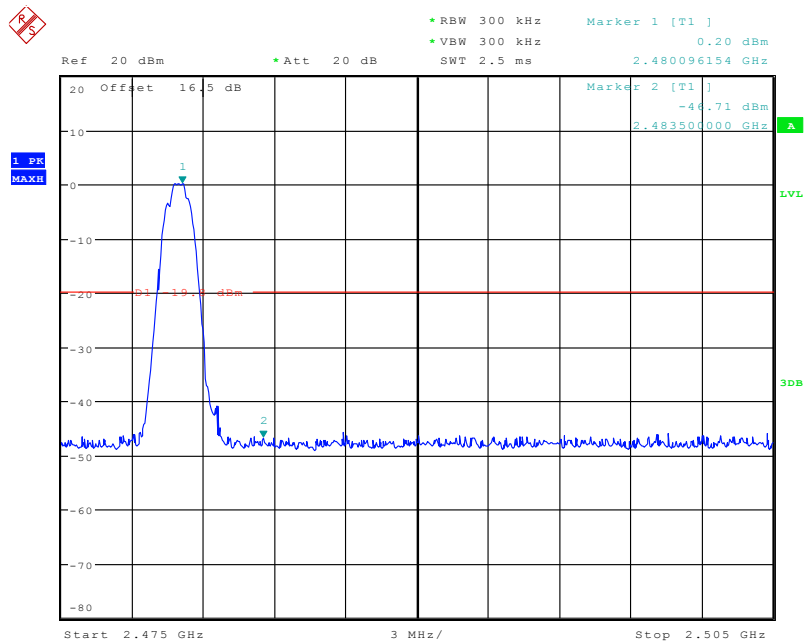


Date: 20.FEB.2012 17:25:09

(Plot B: GFSK Channel = 78)

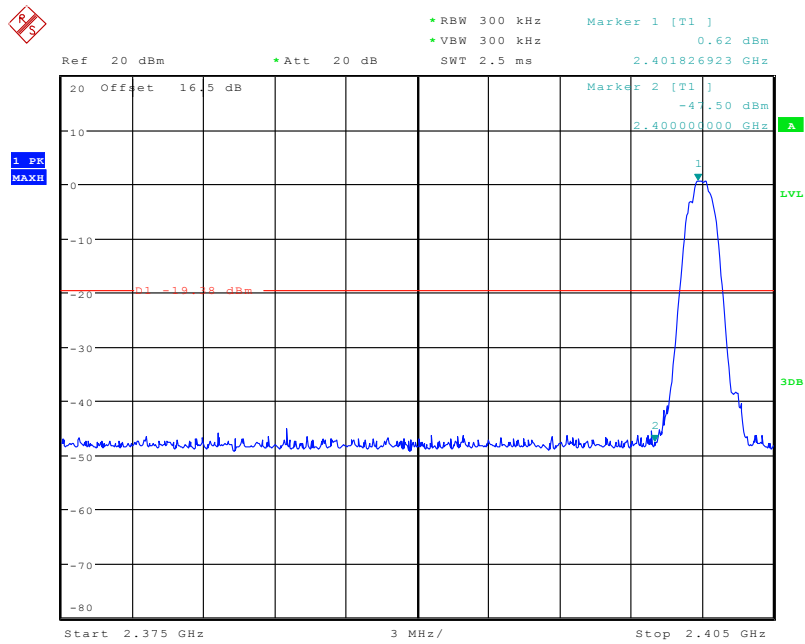


Date: 20.FEB.2012 18:54:45

(Plot C: $\pi/4$ -DQPSK Channel = 0)


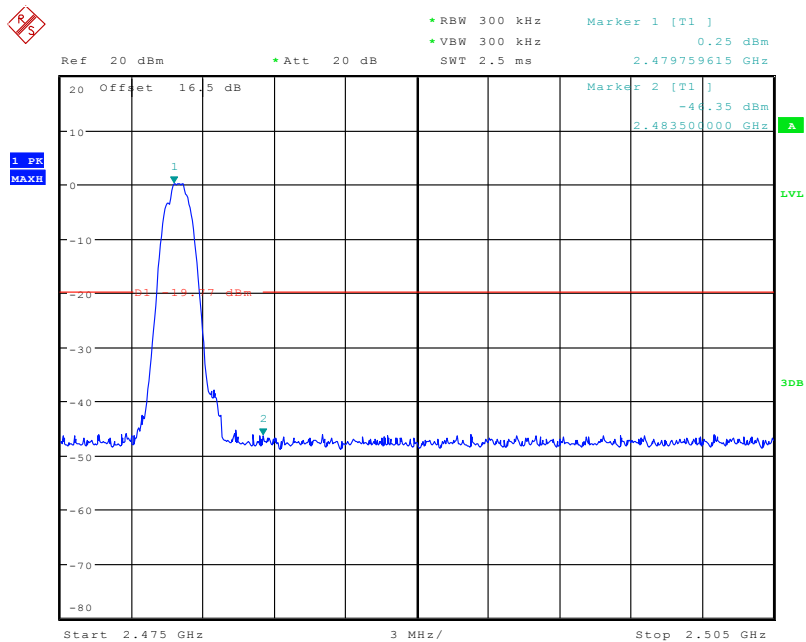
Date: 20.FEB.2012 18:58:08

(Plot D: $\pi/4$ -DQPSK Channel = 78)



Date: 20.FEB.2012 18:55:38

(Plot E: 8-DPSK Channel = 0)



Date: 20.FEB.2012 18:56:46

(Plot F: 8-DPSK Channel = 78)

Radiated Band Edge:
GFSK

Frequency (MHz)	Measure Level (dBuV/m)	Correct Factor (dB)	Reading Level (dBuV)	Limit (dBuV/m)	Detector Type	Antenna Polarity
2400	45.48	0.35	45.13	74	Peak	H
2400	32.37	0.35	32.02	54	Average	
2400	45.22	0.35	44.87	74	Peak	V
2400	32.05	0.35	31.70	54	Average	
2483.5	44.68	0.64	44.04	74	Peak	H
2483.5	32.11	0.64	31.47	54	Average	
2483.5	44.29	0.64	43.65	74	Peak	V
2483.5	31.85	0.64	31.21	54	Average	

 π /4-DQPSK

Frequency (MHz)	Measure Level (dBuV/m)	Correct Factor (dB)	Reading Level (dBuV)	Limit (dBuV/m)	Detector Type	Antenna Polarity
2400	45.37	0.35	45.02	74	Peak	H
2400	32.05	0.35	31.70	54	Average	
2400	44.95	0.35	44.60	74	Peak	V
2400	31.68	0.35	31.33	54	Average	
2483.5	44.11	0.64	43.47	74	Peak	H
2483.5	31.36	0.64	30.72	54	Average	
2483.5	43.92	0.64	43.28	74	Peak	V
2483.5	31.47	0.64	30.83	54	Average	

8-DPSK

Frequency (MHz)	Measure Level (dBuV/m)	Correct Factor (dB)	Reading Level (dBuV)	Limit (dBuV/m)	Detector Type	Antenna Polarity
2400	45.26	0.35	44.91	74	Peak	H
2400	32.02	0.35	31.67	54	Average	
2400	44.81	0.35	44.46	74	Peak	V
2400	31.57	0.35	31.22	54	Average	
2483.5	44.08	0.64	43.44	74	Peak	H
2483.5	31.40	0.64	30.76	54	Average	
2483.5	43.75	0.64	43.11	74	Peak	V
2483.5	31.34	0.64	30.7	54	Average	

NOTE:

Measurement Level = Reading Level + Correct Factor

1.12 Conducted Emission

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

1.13 Radiated Emission

1.13.1 Requirement

According to FCC section 15.247(c), 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).

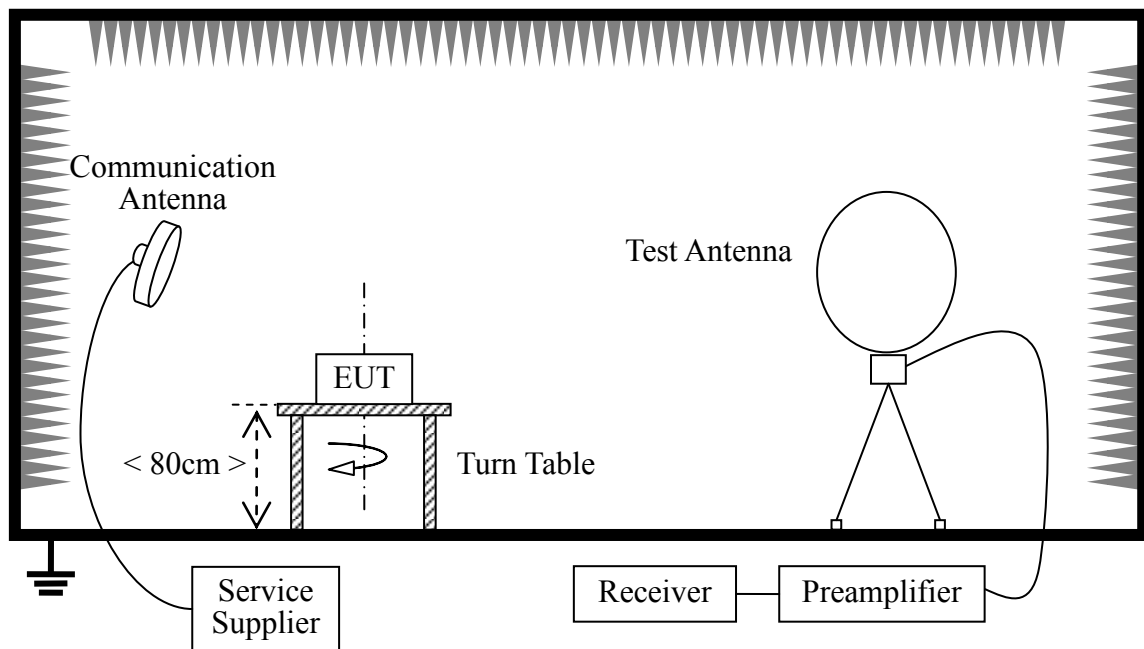
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
960 - 1000	500	3
Above 1000	500	3

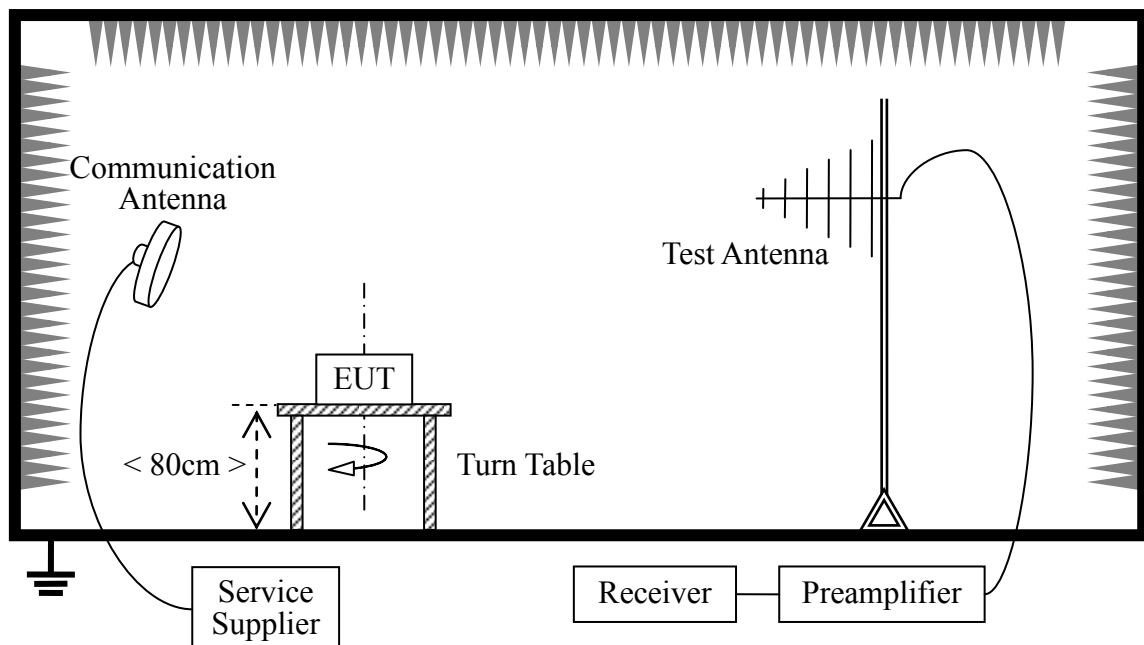
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

1.13.2 Test Description

A. Test Setup:



radiated emissions below 30MHz



radiated emissions above 30MH

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° to 360°, 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	Anritsu	MT8852A	6K00002788	2011.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2011.9	1year
Receiver	Agilent	E7405A	US44210471	2011.9	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2011.9	2year
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2011.9	1year
Test Antenna - Horn	Schwarzbeck	BBHA 9120C	9120C-384	2011.9	1year
Test Antenna - Loop	R&S	HFH2-Z2	860004/001	2011.9	1year

1.13.3 Test Result

A. Test Mode:

1. Channel 0: Frequency 2402MHz
2. Channel 39: Frequency 2441MHz
3. Channel 78: Frequency 2480Mhz

NOTE:

All test modes are performed, only the worst cases are recorded in this report.

B. Test Result for 9 kHz ~ 30 MHz:

Frequency (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
--	--	--	--	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = 40 log (specific distance / test distance) (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

C. Test Result for 30 MHz ~ 10th Harmonic:

Channel 0 (2402MHz)

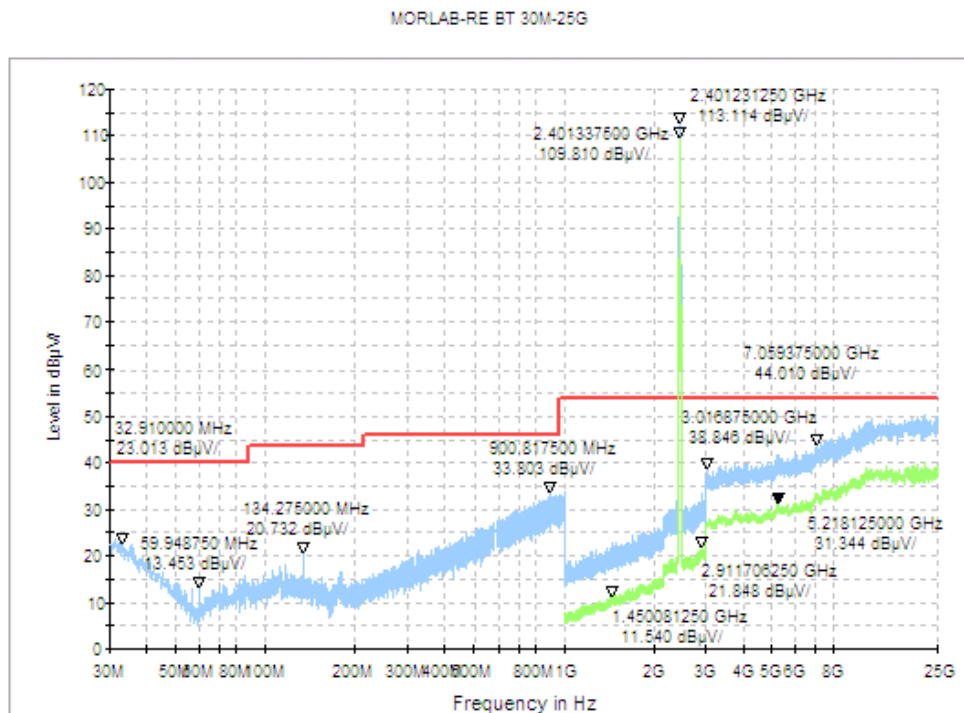
Frequency (MHz)	Level (dBUV)	Limit Line (dBUV)	Margin (dB)	Antenna Polarization	Result
32.910	23.013	40	16.987	Horizontal	PASS
59.949	13.453	40	26.547	Horizontal	PASS
134.275	20.732	43.5	22.768	Horizontal	PASS
900.818	33.803	46	12.197	Horizontal	PASS
3016.875	38.846	54	15.154	Horizontal	PASS
7059.375	44.010	54	9.990	Horizontal	PASS
32.910	24.674	40	15.326	Vertical	PASS
51.946	18.452	40	21.548	Vertical	PASS
134.275	22.567	43.5	20.933	Vertical	PASS
357.981	22.952	46	23.048	Vertical	PASS
898.514	33.398	46	12.602	Vertical	PASS
4959.375	42.259	54	11.741	Vertical	PASS

Channel 39 (2441MHz)

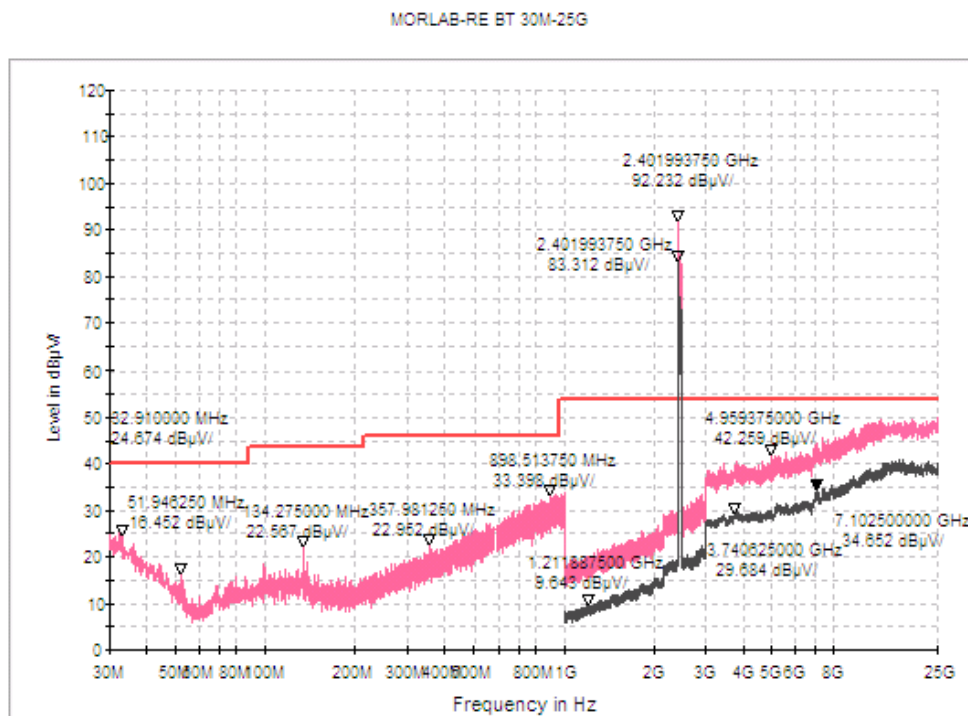
Frequency (MHz)	Level (dBUV)	Limit Line (dBUV)	Margin (dB)	Antenna Polarization	Result
31.698	23.781	40	16.219	Horizontal	PASS
46.733	17.265	40	12.735	Horizontal	PASS
134.275	21.051	43.5	22.449	Horizontal	PASS
723.275	31.287	46	14.713	Horizontal	PASS
1818.944	24.150	54	29.850	Horizontal	PASS
5221.875	42.732	54	11.268	Horizontal	PASS
34.365	23.202	40	16.798	Vertical	PASS
52.431	16.584	40	23.416	Vertical	PASS
134.275	24.993	43.5	18.507	Vertical	PASS
565.440	27.861	46	18.139	Vertical	PASS
1645.869	23.319	54	30.681	Vertical	PASS
5216.250	42.110	54	11.890	Vertical	PASS

Channel 78 (2480MHz)

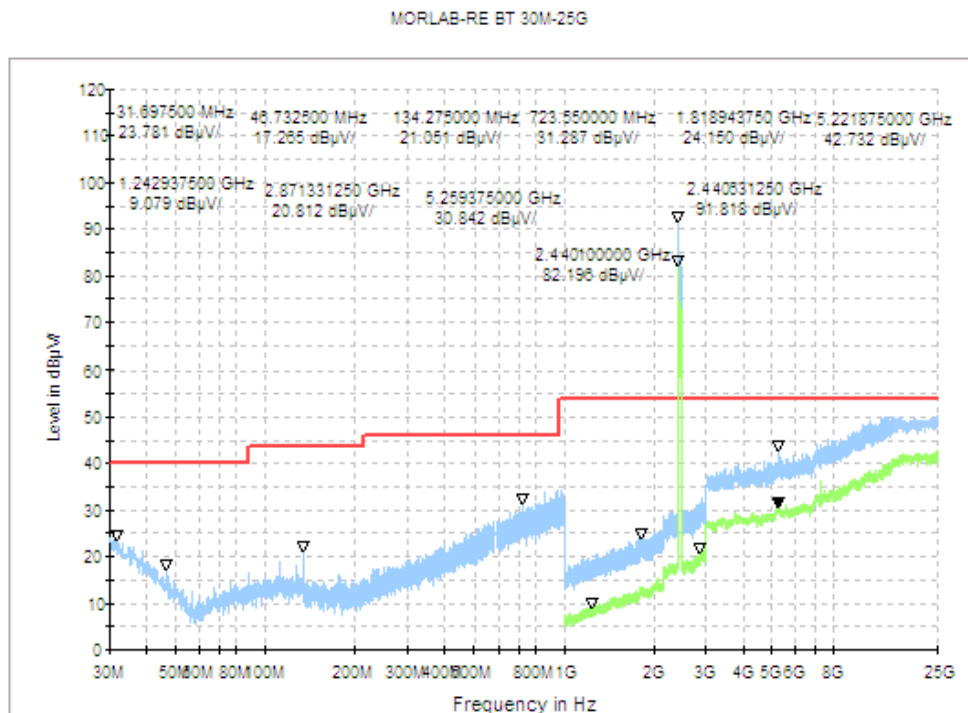
Frequency (MHz)	Level (dBuV)	Limit Line (dBuV)	Margin (dB)	Antenna Polarization	Result
30.970	26.439	40	23.561	Horizontal	PASS
111.723	18.930	43.5	24.570	Horizontal	PASS
265.225	19.766	46	26.234	Horizontal	PASS
650.558	29.490	46	16.510	Horizontal	PASS
1285.775	21.838	54	32.162	Horizontal	PASS
5396.250	41.357	54	12.643	Horizontal	PASS
32.061	24.388	40	25.612	Vertical	PASS
52.068	16.969	40	23.031	Vertical	PASS
134.275	23.340	43.5	20.160	Vertical	PASS
614.061	29.237	46	16.763	Vertical	PASS
1797.094	24.723	54	29.277	Vertical	PASS
5220.000	41.101	54	12.899	Vertical	PASS



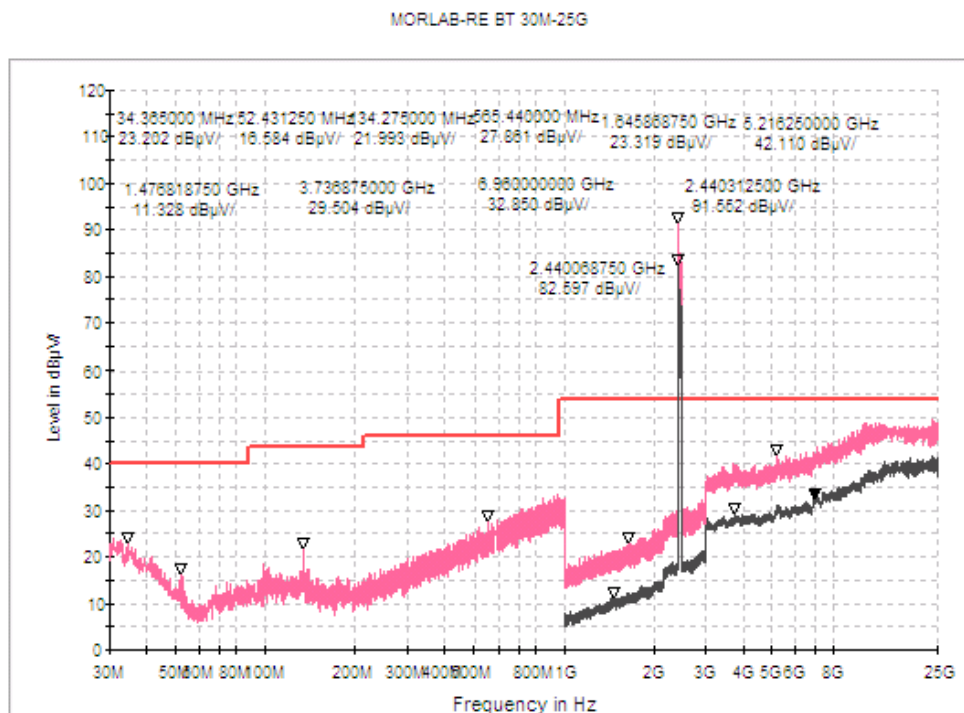
(Plot A : GFSK Channel = 0 Antenna Horizontal)



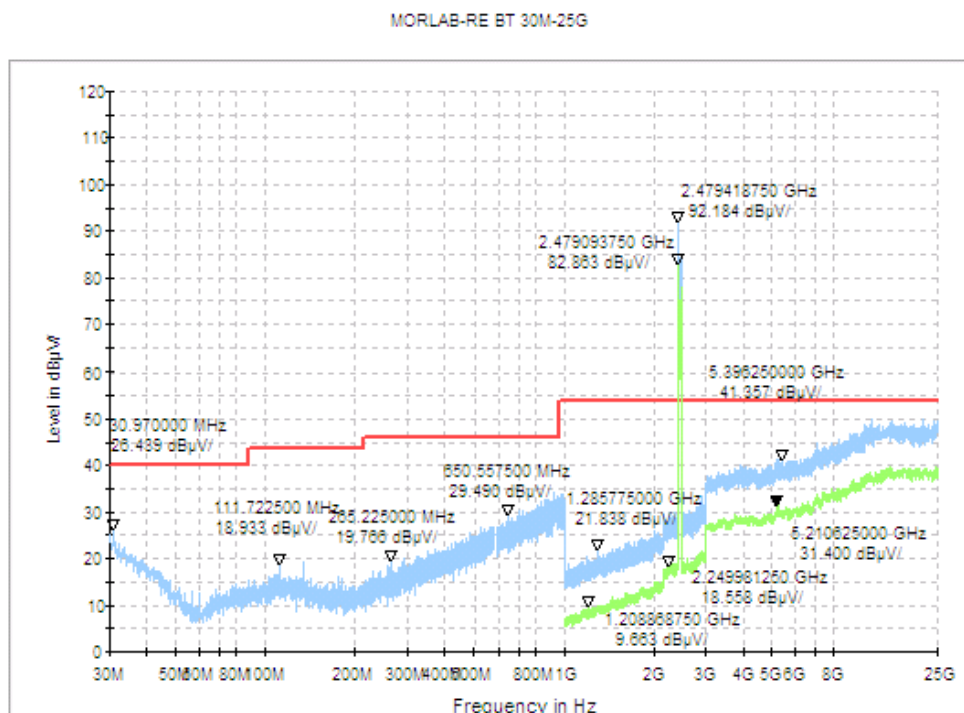
(Plot B: Channel = 0 Antenna Vertical)



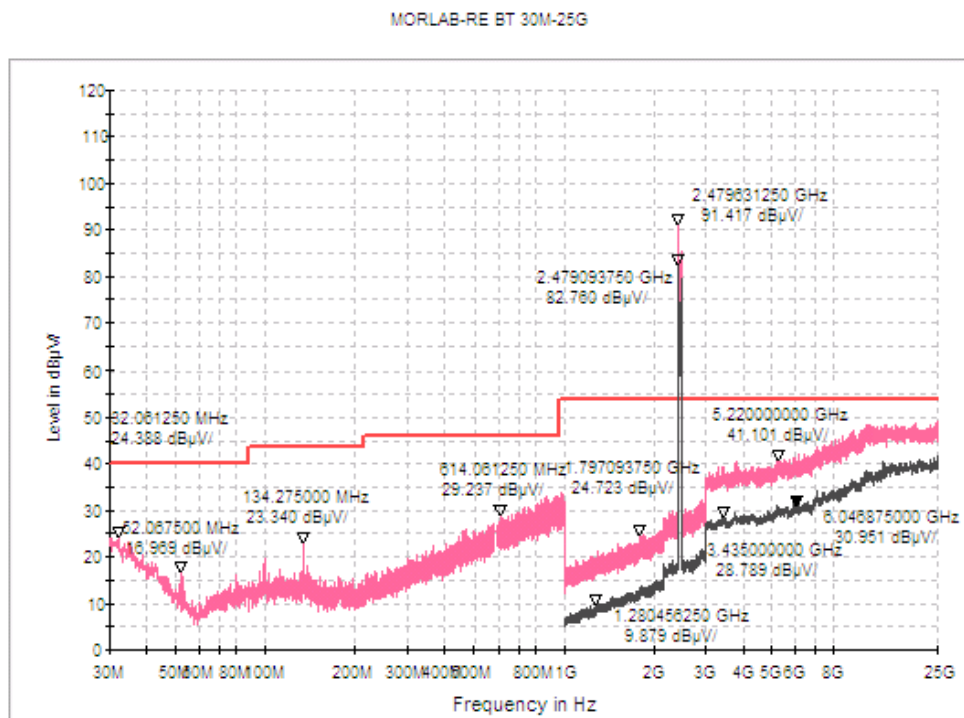
(Plot C : Channel = 39 Antenna Horizontal)



(Plot D: Channel = 39 Antenna Vertical)



(Plot E : Channel = 78 Antenna Horizontal)



(Plot F: Channel = 78 Antenna Vertical)

1.14 Antenna Requirements

1.14.1 Requirement of the standard

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

1.14.2 Antenna Connected Construction

The antennas type used in this product is Chip Antenna without connector and it is considered to meet antenna requirement.

1.14.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

1.15 Receiver Spurious Emissions

1.15.1 Requirement of the standard

According to RSS-GEN 4.10, the receiver shall be operated in the normal receive mode near the mid-point of the band over which the receiver is designed to operate. The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is the higher, to at least 3 times the highest tuneable or local oscillator frequency, whichever is the higher, without exceeding 40 GHz. According to RSS-GEN 7.2.3.1, If the device has a detachable antenna of known antenna impedance, then the antenna conducted method is permitted in lieu of a radiated measurement.

Receiver spurious emissions at any discrete frequency shall not exceed 2 nanowatts in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Limits for Conducted Receiver Spurious Emissions	
Frequency(MHz)	Limit
30 – 1000	2nW
Above 1000	5nW

According to RSS-GEN 7.2.3.2, for Radiated Measurement, all spurious emissions shall comply with the limits of Table below:

Limits for Radiated Receiver Spurious Emissions	
Frequency(MHz)	Field Strength(microvolts/meter)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

1.15.2 Test Procedure

Please refer to RSS-GEN section 4.10 for the measurement methods.

1.15.3 Test Setup

See section 3.9.2 of this report.

1.15.4 Test Results

Conducted Receiver Spurious Emissions

Frequency(MHz)	Measure Result(nW)	Limit (nW)
30 – 1000	--	2
Above 1000	--	5

Radiated Receiver Spurious Emissions

No.	Frequency (MHz)	Antenna Polarization	Detector mode	Level ERP(dBμV)	Limit (dBμV)	Margin (dB)
1	30 - 88	Vertical	Peak	--	40	>10
2	88 – 216	Vertical	Peak	--	43.5	>10
3	216 – 960	Vertical	Peak	--	46	>10
4	960 - 1000	Vertical	Peak	--	54	>10
5	1000 – 10000	Vertical	Average	--	54	>10
6	30 - 88	Horizontal	Peak	--	40	>10
7	88 – 216	Horizontal	Peak	--	43.5	>10
8	216 – 960	Horizontal	Peak	--	46	>10
9	960 - 1000	Horizontal	Peak	--	54	>10
10	1000 - 10000	Horizontal	Average	--	54	>10

Notes:

- 1) Both radiated measurement method and conducted measurement method were used. For the radiated method, the antenna polarization was set to vertical and horizontal respectively.
- 2) The measurement was performed at the mid operating frequencies.
- 3) "--" in the table above means that the emissions are too small to be measured and are at least 10 dB below the limit.

** END OF REPORT **