



47 CFR PART 15 C - BLUETOOTH

TEST REPORT

of

Odin

Trade Name: UniStrong
Brand Name: UniStrong
Model Name: MG758/MG75X/MG75875075X
/MG752/E750
Report No.: SH10110004B01
FCC ID: YYEMG75875075X

prepared for

Beijing UniStrong Science & Technology Co., Ltd
6F East, A2 Building, #9 Jiuxianqiao East Road, Chaoyang District,
Beijing 100015, China



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Bluetooth®

CTIA

Authorized Test Lab

LAB CODE 20081223-00

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1. TEST CERTIFICATION

Equipment under Test: Odin

Brand Name: UniStrong

Model Name: MG758/MG75X/MG75875075X/MG752/E750

FCC ID: YYEMG75875075X

Applicant: Beijing UniStrong Science & Technology Co., Ltd
6F East, A2 Building, #9 Jiuxianqiao East Road, Chaoyang District,
Beijing 100015, China

Manufacturer: Beijing UniStrong Science & Technology Co., Ltd
6F East, A2 Building, #9 Jiuxianqiao East Road, Chaoyang District,
Beijing 100015, China

Test Standards: 47 CFR Part 15 Subpart C

Test Date(s): Nov. 18, 2010 –Nov. 30, 2010

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 Dated: 2010.12.9
Shi Feng

Reviewed by: Zhang Jun Dated: 2010.12.9
Zhang Jun

Approved by: Wei Bei Dated: 2010.12.9
Wei Bei



2. GENERAL INFORMATION

2.1 EUT Description

EUT Type: Odin
Model Name: MG758/MG75X/MG75875075X/MG752/E750
Serial No.....: (n.a, marked #1 by test site)
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
Brand name: DBK
Mode Name.: MG-4LH
Capacitance: 3000mAh
Rated voltage: 3.7V
Charge limited: 4.2V
Manufacturer: SHENZHEN DBK ELECTRONICS CO., LTD
DBK Ind. Park, the north of longguan Rd.
Hualian community, Longhua Town, Baoan District, Shenzhen
Ancillary Equipments.....: AC Adapter (Charger for Battery)
Brand name: PHIHONG
Mode Name.: PSAI05R-050Q
Rated Input: AC100~240V, 300mA, 50/60Hz
Rated Output: DC5V, 1000 mA
Manufacturer: PHIHONG TECHNOLOGY CO.,LTD
Yinhu Industry park ,Qingxi district,Dongguan City,Guangdong Province
Antenna Specification: 5dBi gain (Max)

Note 1: 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 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 ID Certification:

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-05 Edition)	Radio Frequency Devices

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

No.	Section	Description	Result
1	15.247(a)	Number of Hopping Frequency	PASS
2	15.247(b)	Peak Output Power	PASS
3	15.247(a)	20dB Bandwidth	PASS
4	15.247(a)	Carrier Frequency Separation	PASS
5	15.247(a)	Time of Occupancy (Dwell time)	PASS
6	15.247(c)	Conducted Spurious Emission	PASS
7	15.247(c)	Band Edge	PASS
8	15.207	Conducted Emission	PASS
9	15.209 15.247(c)	Radiated Emission	PASS

2.3 Facilities and Accreditations

2.3.1 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.

2.3.2 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

2.4 EUT Setup and Operating Conditions

The EUT has been tested under Operating and standby condition. MT8852A 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: AC charge+EUT Mode;

Mode 2: Battery+EUT Mode;

After the preliminary scan GFSK, $\pi/4$ -DQPSK, 8-DPSK. we found the modulation at GFSK producing the highest emission level, so evaluated we chosen the above modes (worst case) as a representative.

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

3. 47 CFR PART 15C REQUIREMENTS

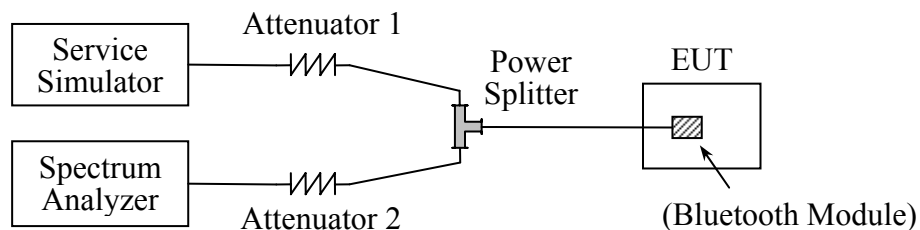
3.1 Number of Hopping Frequency

3.1.1 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 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	Anritsu	MT8852A	6K00002788	2010.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2010.9	1year
Spectrum Analyzer	Agilent	E4440A	MY46187763	2010.9	1year
Spectrum Analyzer	R&S	FSU26	200880	2010.10	1year
Power Splitter	Weinschel	1506A	NW521	(n.a.)	(n.a.)
Power Splitter	Mini-Circuits	ZFRSC-183-S+	765001016	(n.a.)	(n.a.)
Attenuator 1	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 2	Resnet	10dB	(n.a.)	(n.a.)	(n.a.)
Attenuator 3	Resnet	3dB	(n.a.)	(n.a.)	(n.a.)

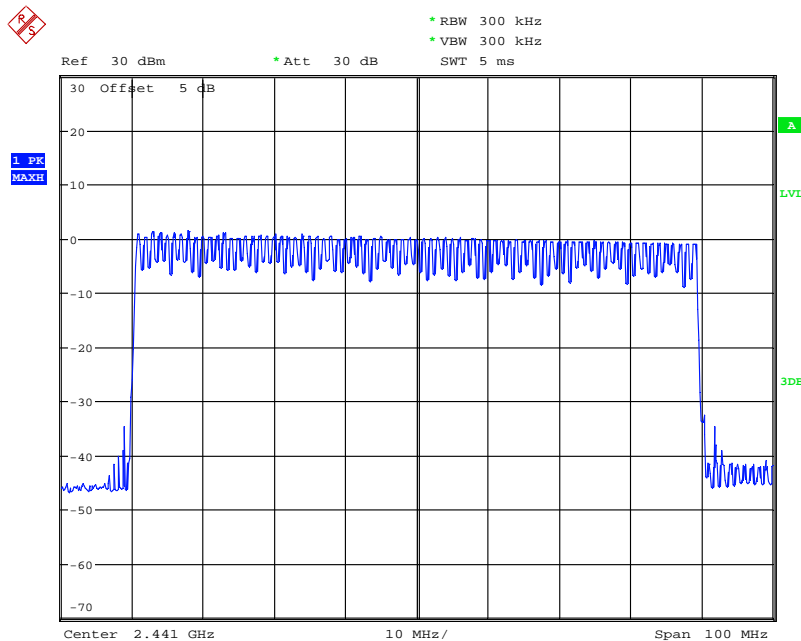
3.1.3 Test Result

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. 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	75	Plot A	PASS

B. Test Plot:



Date: 19.NOV.2010 09:56:11

(Plot A: 2402MHz to 2480MHz)

3.2 Peak Output Power

3.2.1 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.

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.

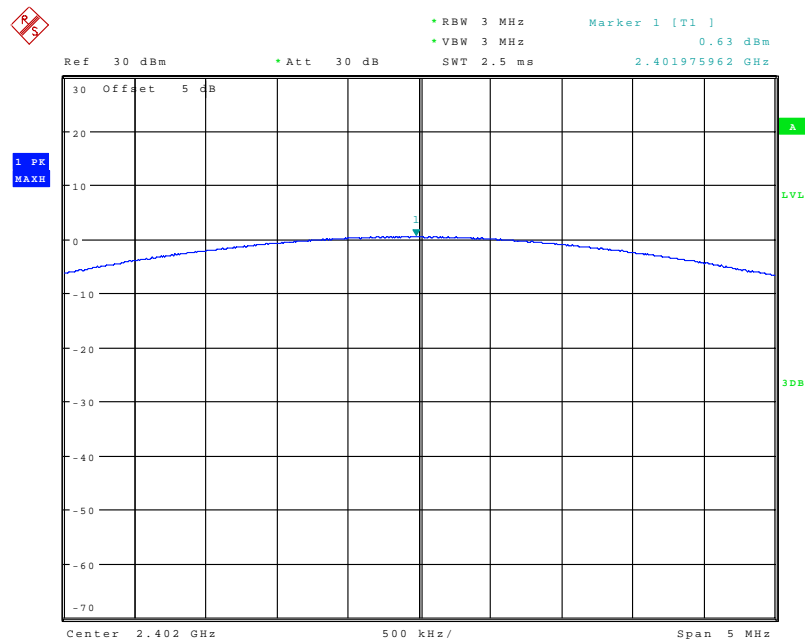
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power			Limit	Verdict
		Data Rate/Modulation				
		GFSK	π /4-DQPSK	8-DPSK	dBm	
		1Mbps	2Mbps	3Mbps		
0	2402	0.63 dBm	0.42 dBm	0.58 dBm	30	PASS
39	2441	-0.07 dBm	-0.20 dBm	-0.14 dBm		PASS
78	2480	-0.89 dBm	-1.10 dBm	-1.01 dBm		PASS

GFSK (1Mbps)

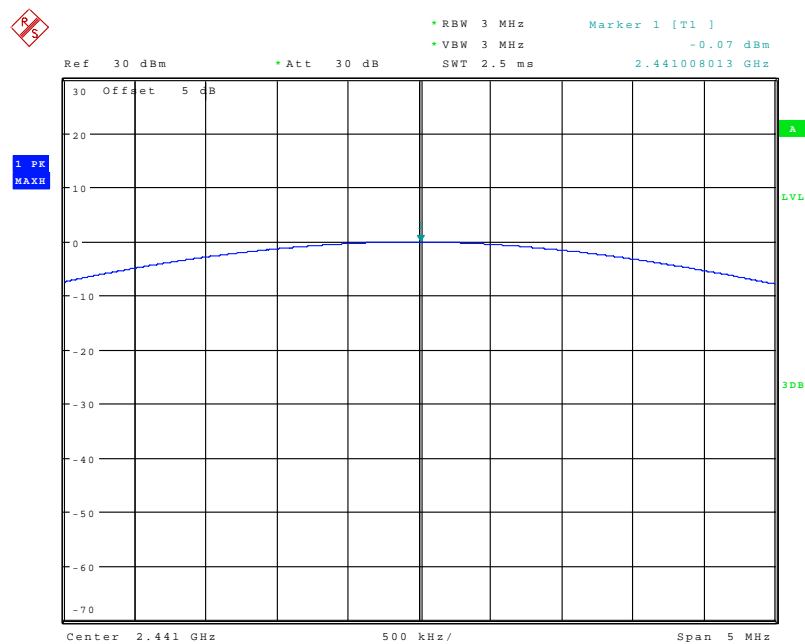
Channel	Frequency (MHz)	Measured Output Peak Power			Limit		Verdict
		dBm	W	Refer to Plot	dBm	W	
0	2402	0.63	0.00116	Plot A	30	1	PASS
39	2441	-0.07	0.00098	Plot B			PASS
78	2480	-0.89	0.00081	Plot C			PASS

B. Test Plot:



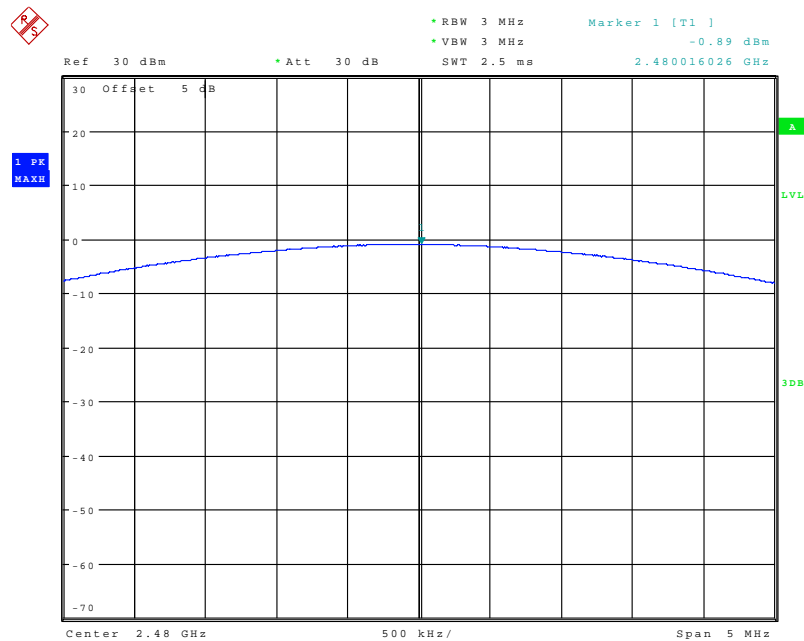
Date: 25.NOV.2010 12:36:41

(Plot A:Channel = 2402)



Date: 25.NOV.2010 12:38:49

(Plot B:Channel = 2441)



Date: 25.NOV.2010 12:50:00

(Plot C:Channel = 2480)

3.3 20dB Bandwidth

3.3.1 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.

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. Test Verdict:

The maximum 20dB bandwidth measured is 1.369MHz according to the table below.

GFSK(1Mbps):

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	0.668	Plot A
39	2441	0.665	Plot B
78	2480	0.663	Plot C

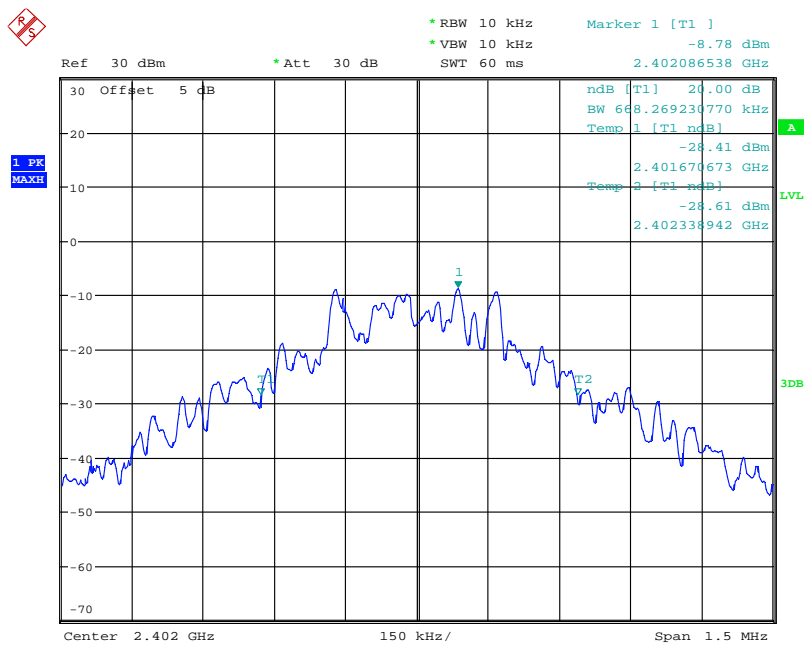
$\pi/4$ -DQPSK(2Mbps)

Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.346	Plot D
39	2441	1.343	Plot E
78	2480	1.346	Plot F

8-DPSK(3Mbps)

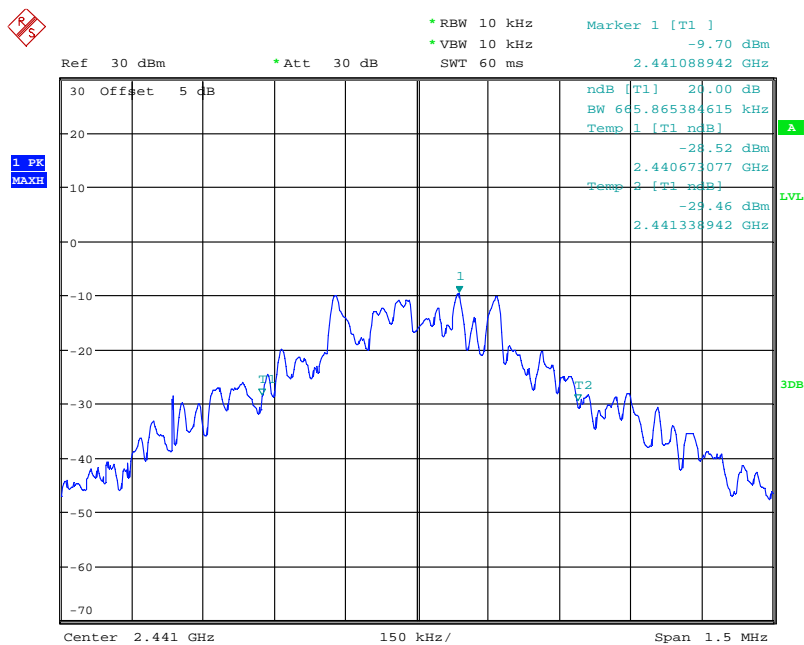
Channel	Frequency (MHz)	20dB Bandwidth (MHz)	Refer to Plot
0	2402	1.362	Plot G
39	2441	1.369	Plot H
78	2480	1.362	Plot I

B. Test Plot:



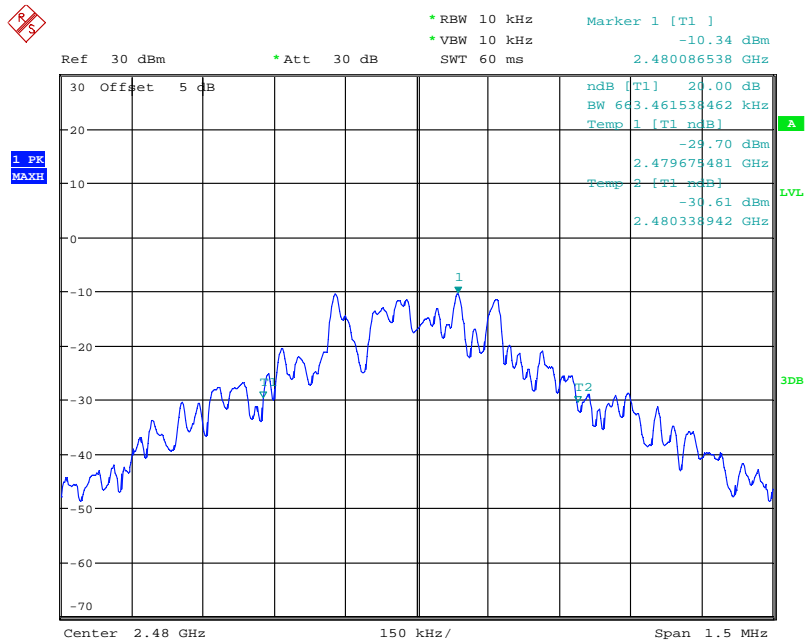
Date: 19.NOV.2010 10:22:46

(Plot A: Channel = 2402)



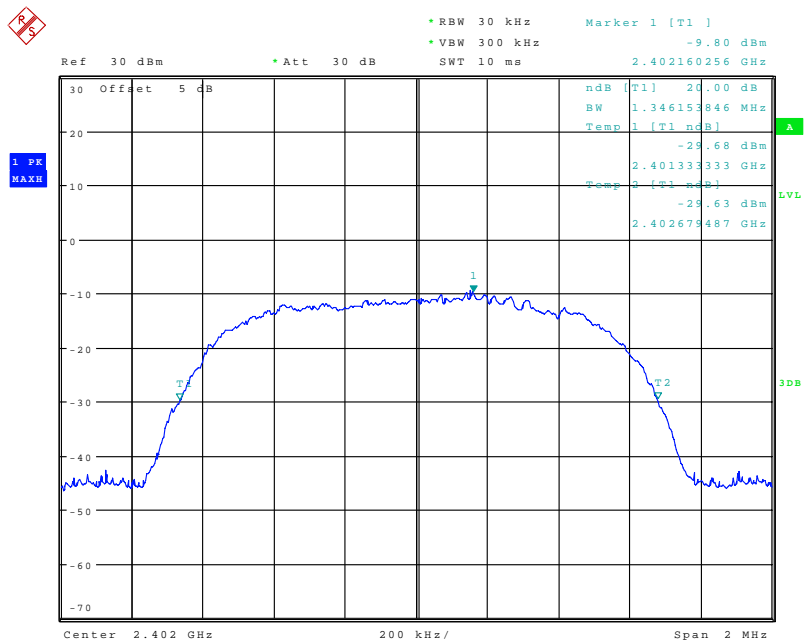
Date: 19.NOV.2010 10:25:28

(Plot B: Channel = 2441)



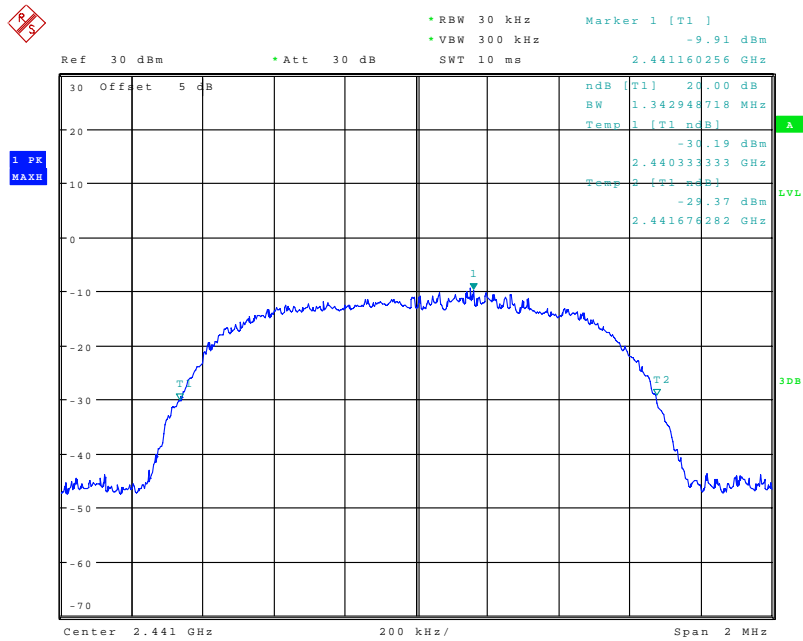
Date: 19.NOV.2010 10:28:05

(Plot C: Channel = 2480)



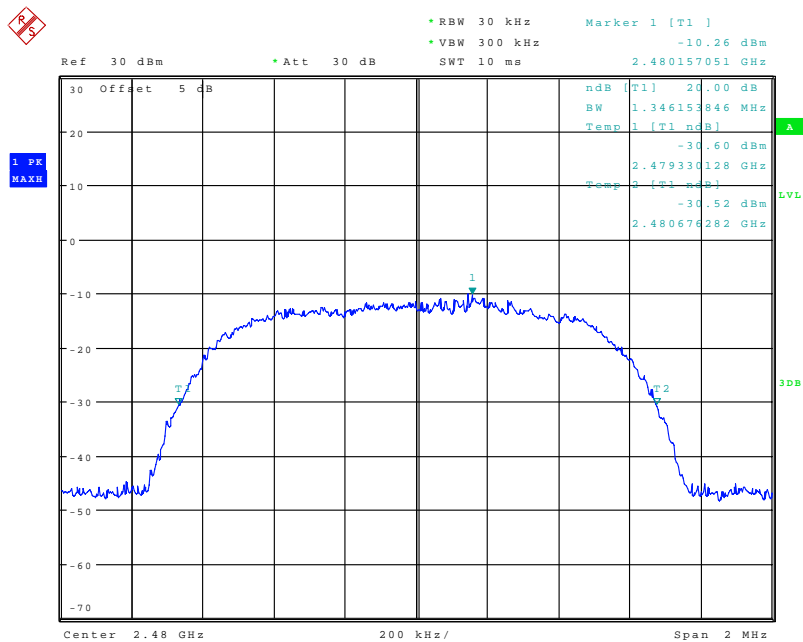
Date: 25.NOV.2010 14:14:23

(Plot D: Channel = 2402)



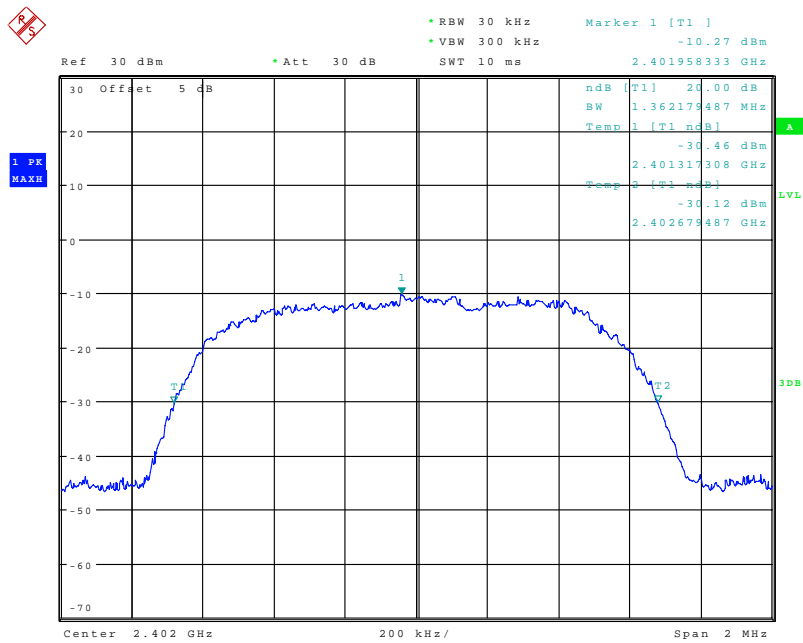
Date: 25.NOV.2010 14:16:12

(Plot E: Channel = 2441)



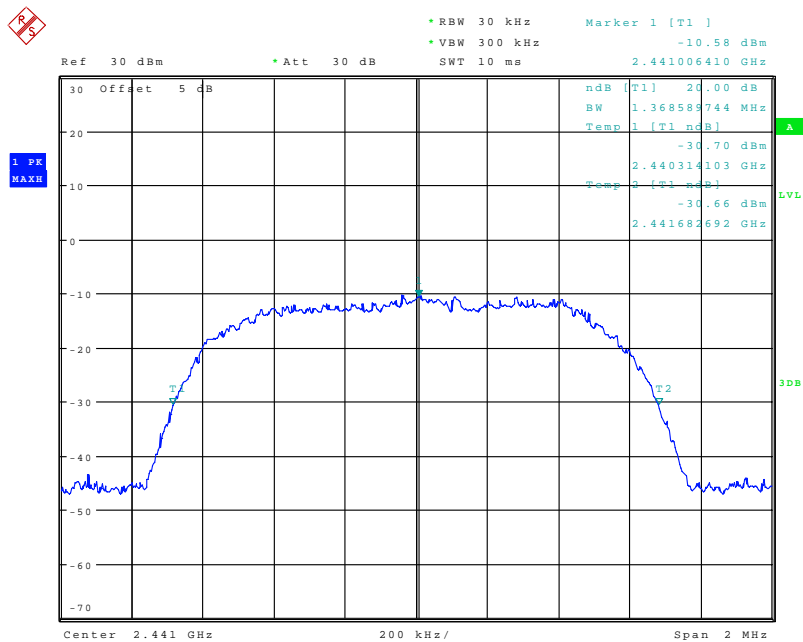
Date: 25.NOV.2010 14:19:02

(Plot F: Channel = 2480)



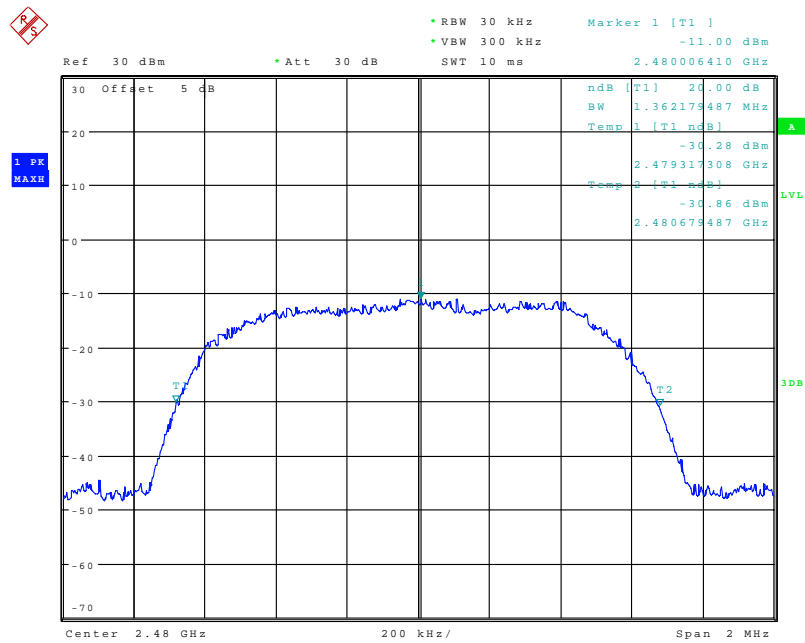
Date: 25.NOV.2010 14:10:42

(Plot G: Channel = 2402)



Date: 25.NOV.2010 14:16:52

(Plot H: Channel = 2441)



Date: 25.NOV.2010 14:20:22

(Plot I: Channel = 2480)

3.4 Carried Frequency Separation

3.4.1 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.

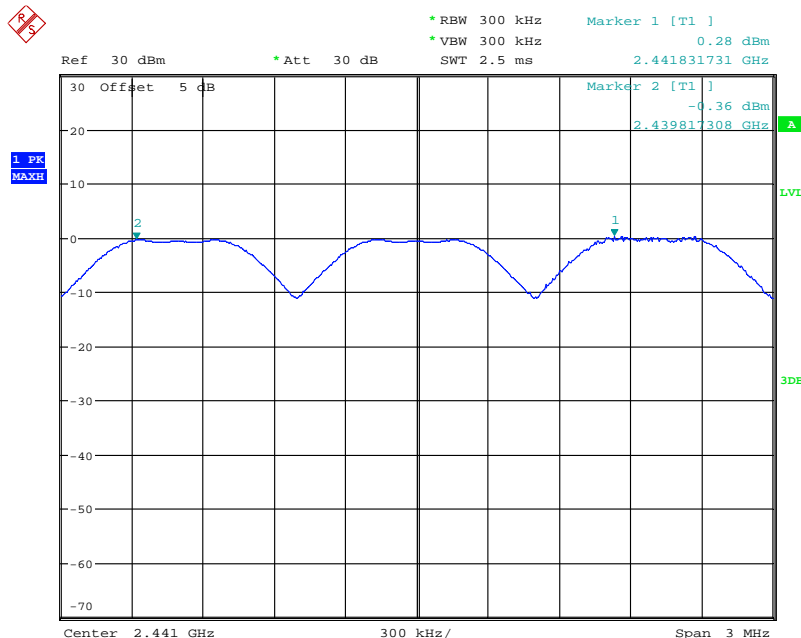
3.4.2 Test Description

See section 3.1.2 of this report.

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



Date: 19.NOV.2010 10:31:12

(Plot A: Carried Frequency Separation)

3.5 Time of Occupancy (Dwell time)

3.5.1 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.

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 DH1 and DH5 package type):

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

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:

DH1

Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	0.37	Plot A	39.47	400	PASS
39	2441	0.37	Plot B	39.47		PASS
78	2480	0.37	Plot C	39.47		PASS

DH3

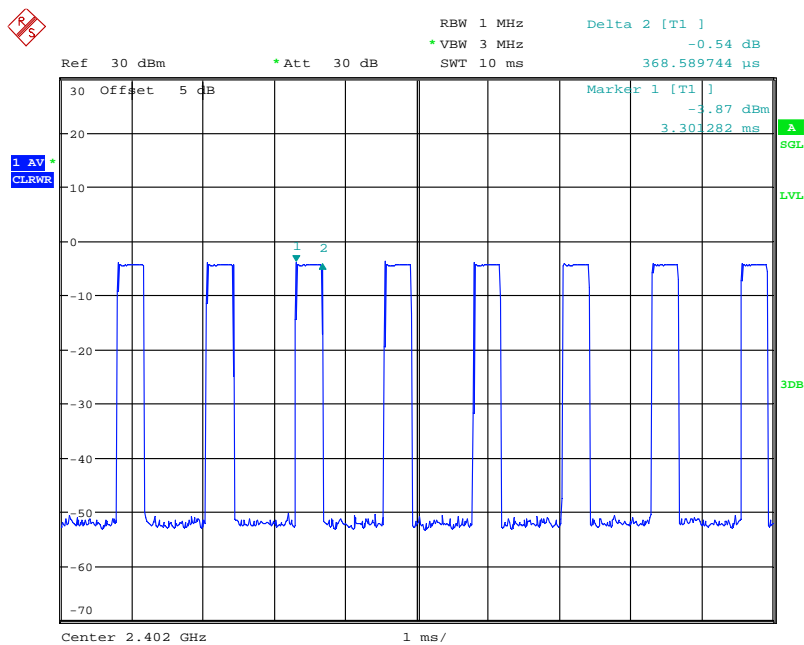
Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	1.63	Plot D	173.87	400	PASS
39	2441	1.62	Plot E	172.80		PASS
78	2480	1.62	Plot F	172.80		PASS

DH5

Channel	Frequency (MHz)	Pulse Time		Total of Dwell (ms)	Limit (ms)	Verdict
		ms	Refer to Plot			
0	2402	2.87	Plot G	306.13	400	PASS
39	2441	2.87	Plot H	306.13		PASS
78	2480	2.85	Plot I	304.00		PASS

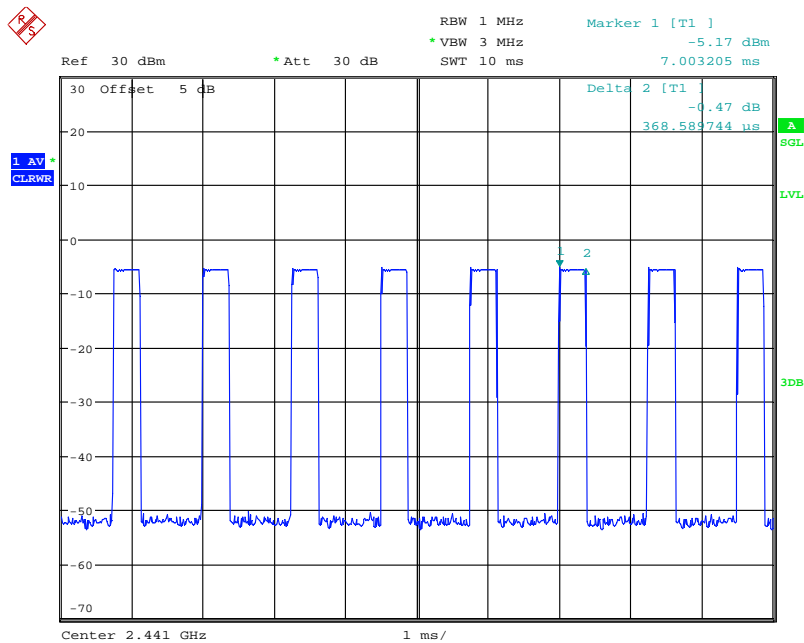
B. Test Plot:

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



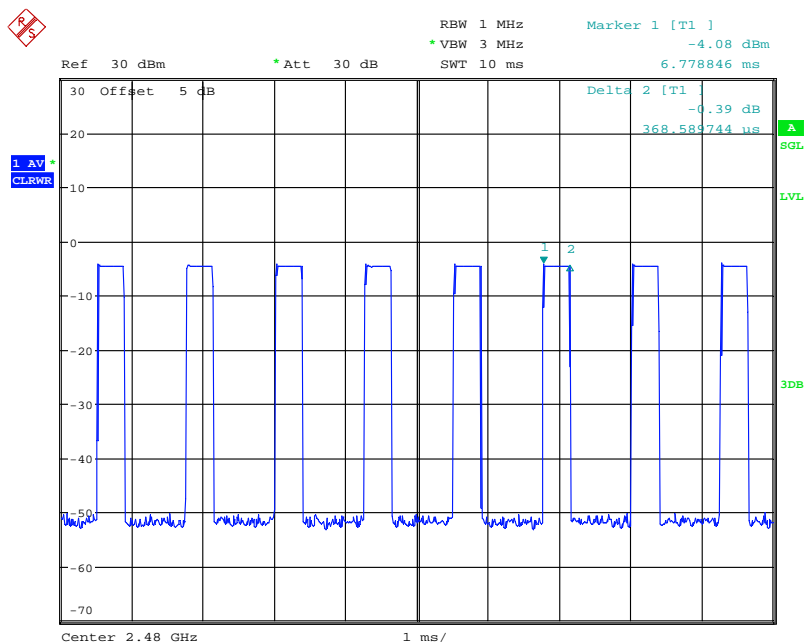
Date: 19.NOV.2010 11:31:48

(Plot A: Channel = 2402)



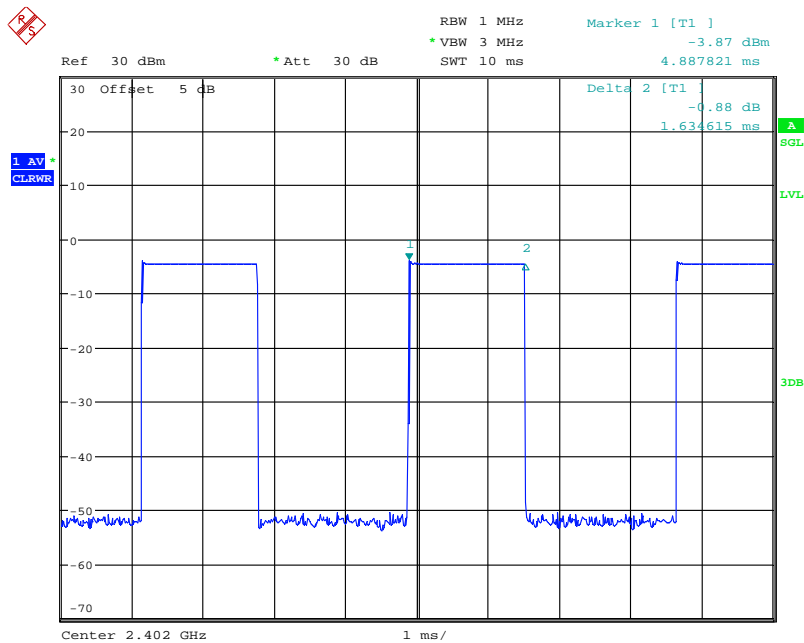
Date: 19.NOV.2010 11:34:46

(Plot B: Channel = 2441)



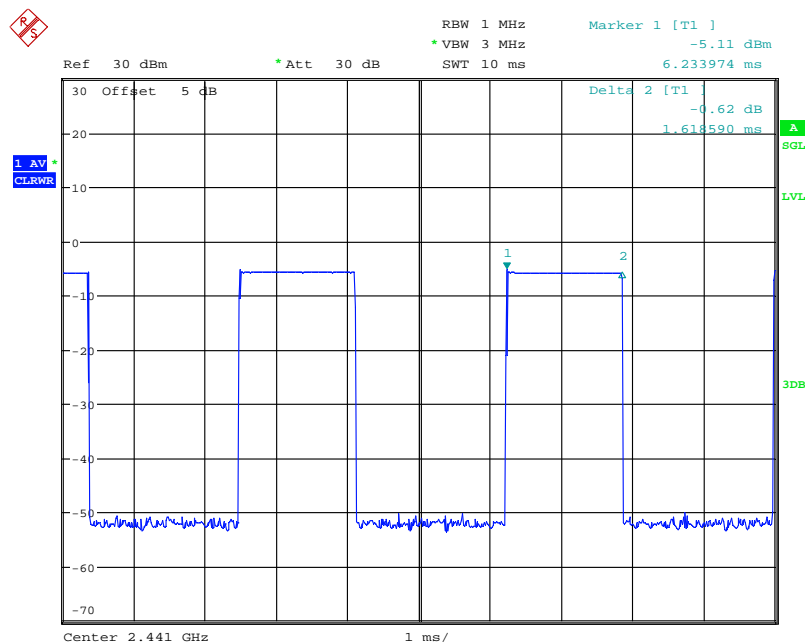
Date: 19.NOV.2010 11:37:33

(Plot C: Channel = 2480)



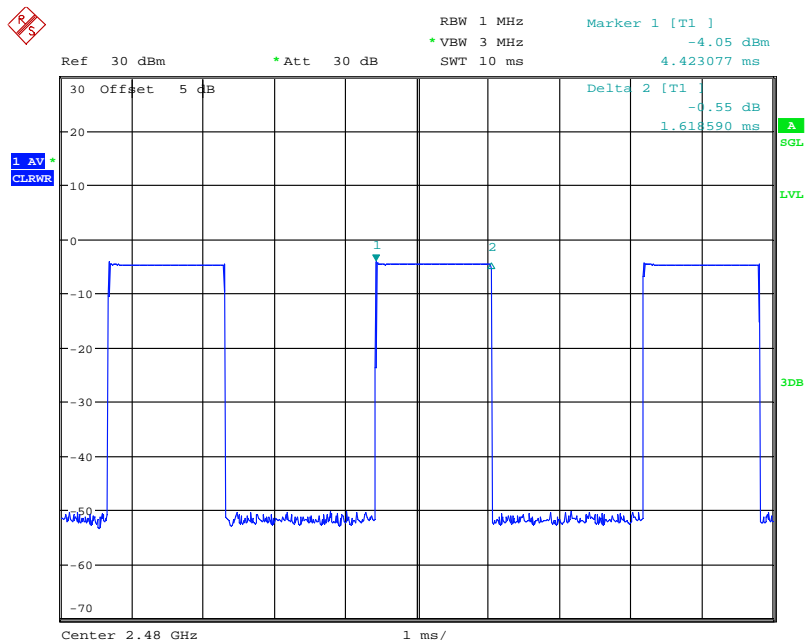
Date: 19.NOV.2010 11:32:58

(Plot D: Channel = 2402)



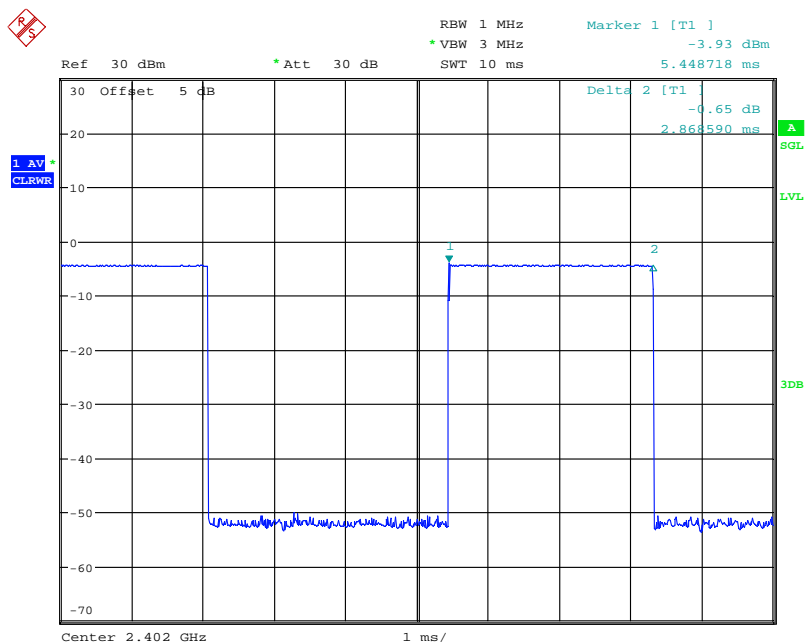
Date: 19.NOV.2010 11:35:51

(Plot E: Channel = 2441)



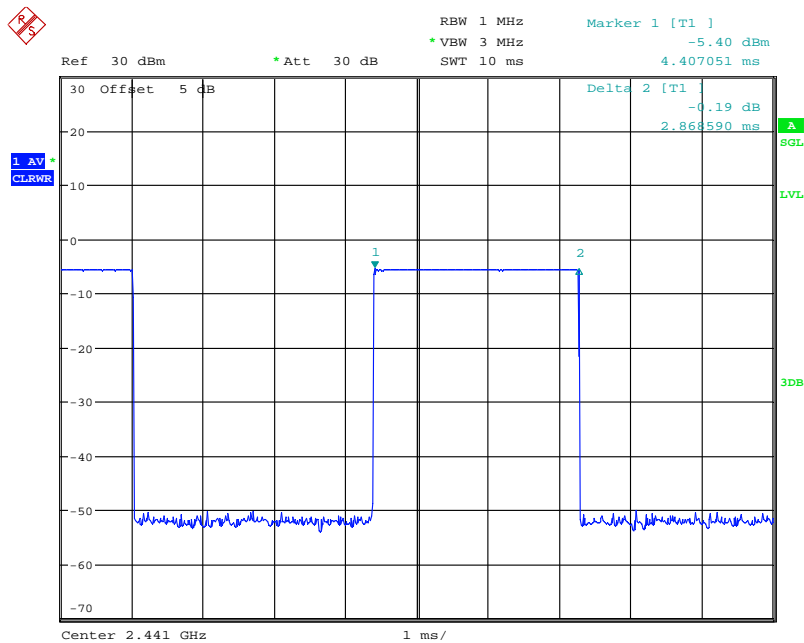
Date: 19.NOV.2010 11:38:15

(Plot F: Channel = 2480)



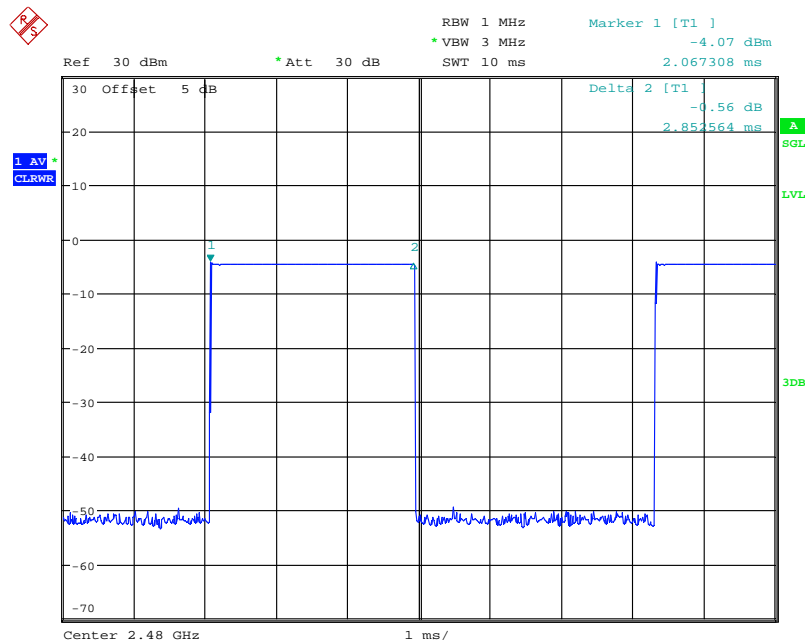
Date: 19.NOV.2010 11:33:30

(Plot G: Channel = 2402)



Date: 19.NOV.2010 11:36:19

(Plot H: Channel = 2441)



Date: 19.NOV.2010 11:38:38

(Plot I: Channel = 2480)

3.6 Conducted Spurious Emissions

3.6.1 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.

3.6.2 Test Description

See section 3.1.2 of this report.

3.6.3 Test Result

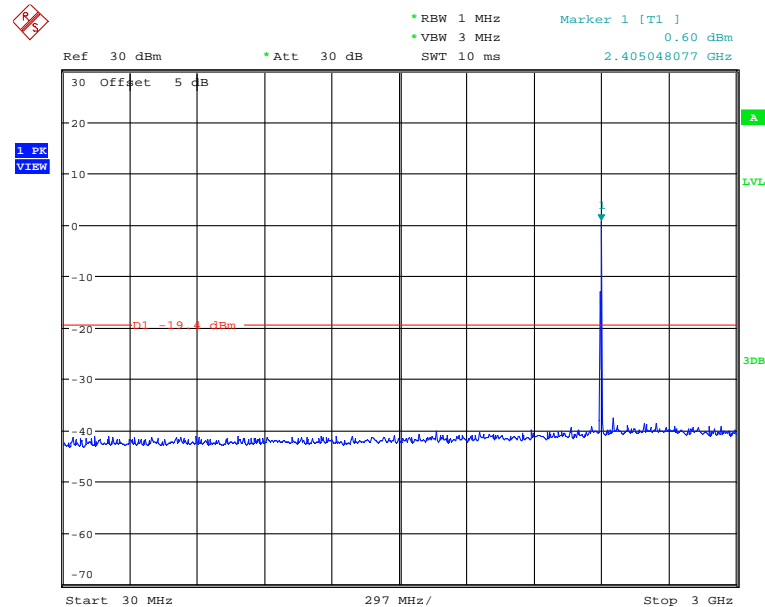
The Bluetooth Module operates at hopping-off test mode. The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

A. Test Verdict:

Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-37.58	Plot A.1/A.2	0.60	-19.60	PASS
39	2441	-37.21	Plot B.1/B.2	-0.25	-20.25	PASS
78	2480	-37.17	Plot C.1/C.2	-0.91	-20.91	PASS

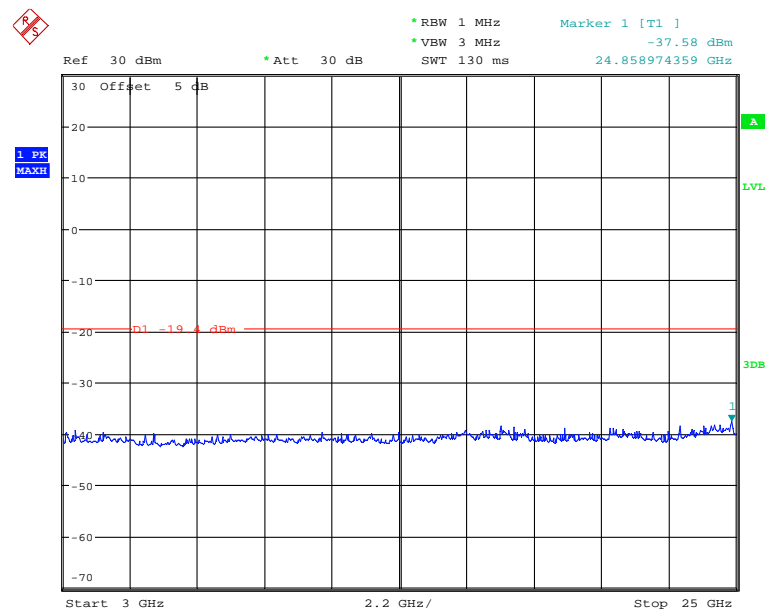
B. Test Plot:

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



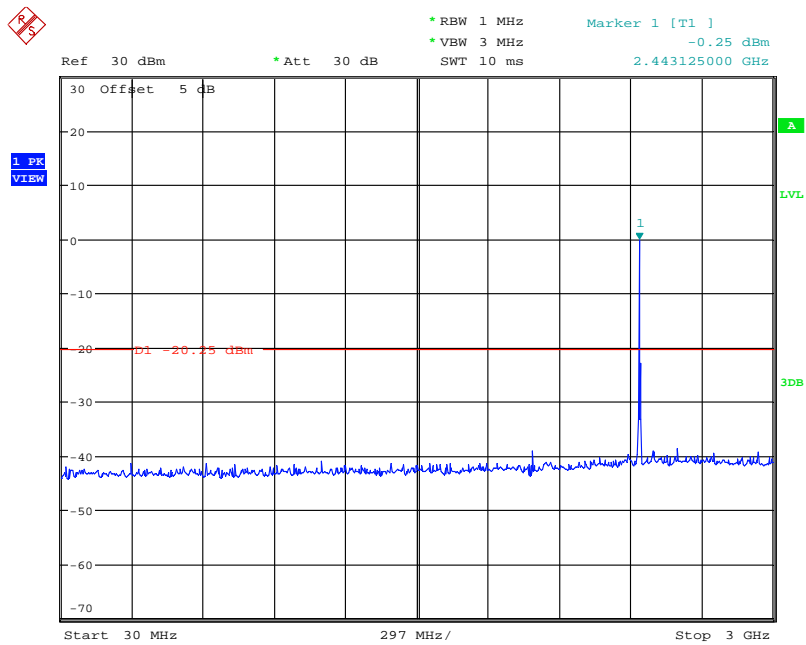
Date: 19.NOV.2010 10:38:41

(Plot A.1: Channel = 0, 30MHz to 3GHz)



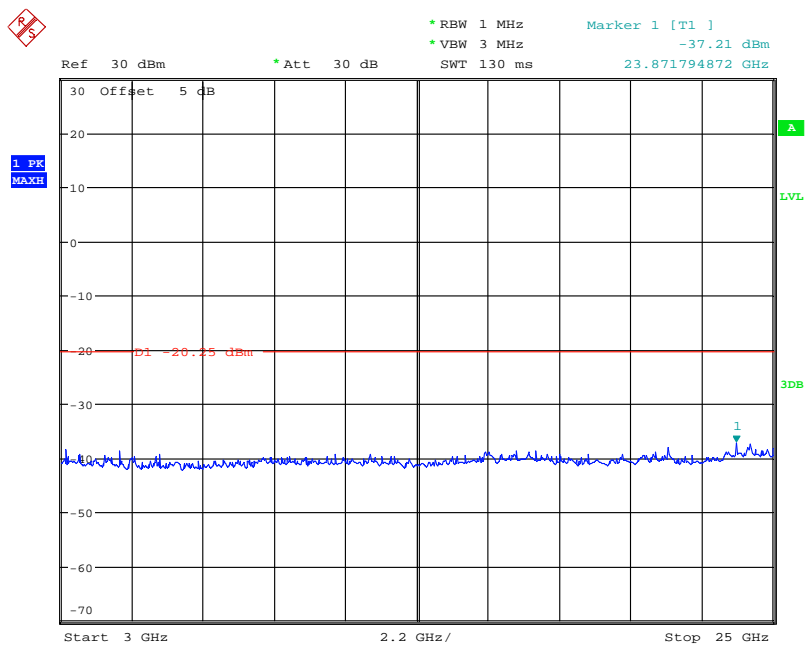
Date: 19.NOV.2010 10:39:43

(Plot A.2: Channel = 0, 3GHz to 25GHz)



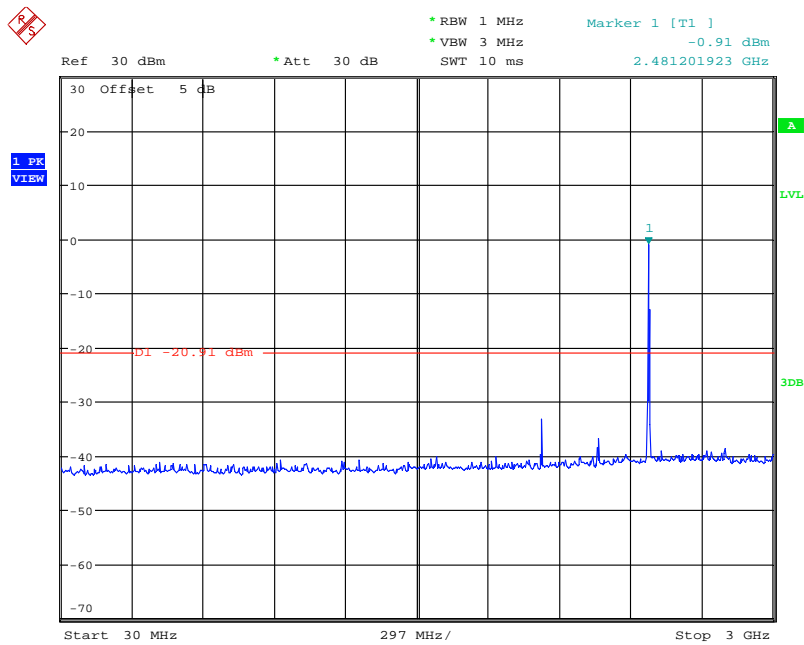
Date: 19.NOV.2010 10:40:53

(Plot B.1: Channel = 39, 30MHz to 3GHz)



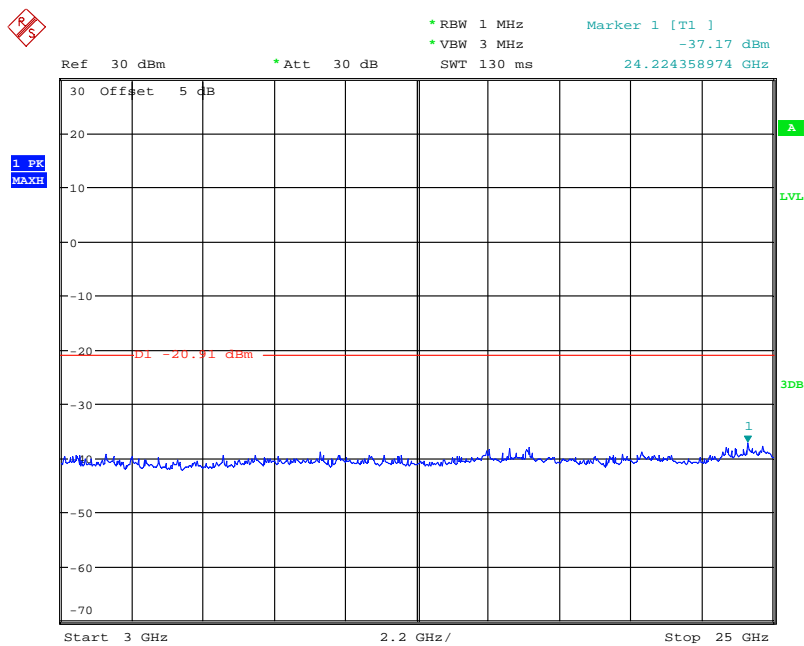
Date: 19.NOV.2010 10:41:58

(Plot B.2: Channel = 39, 3GHz to 25GHz)



Date: 19.NOV.2010 10:44:00

(Plot C.1: Channel = 78, 30MHz to 3GHz)



Date: 19.NOV.2010 10:45:53

(Plot C.2: Channel = 78, 3GHz to 25GHz)

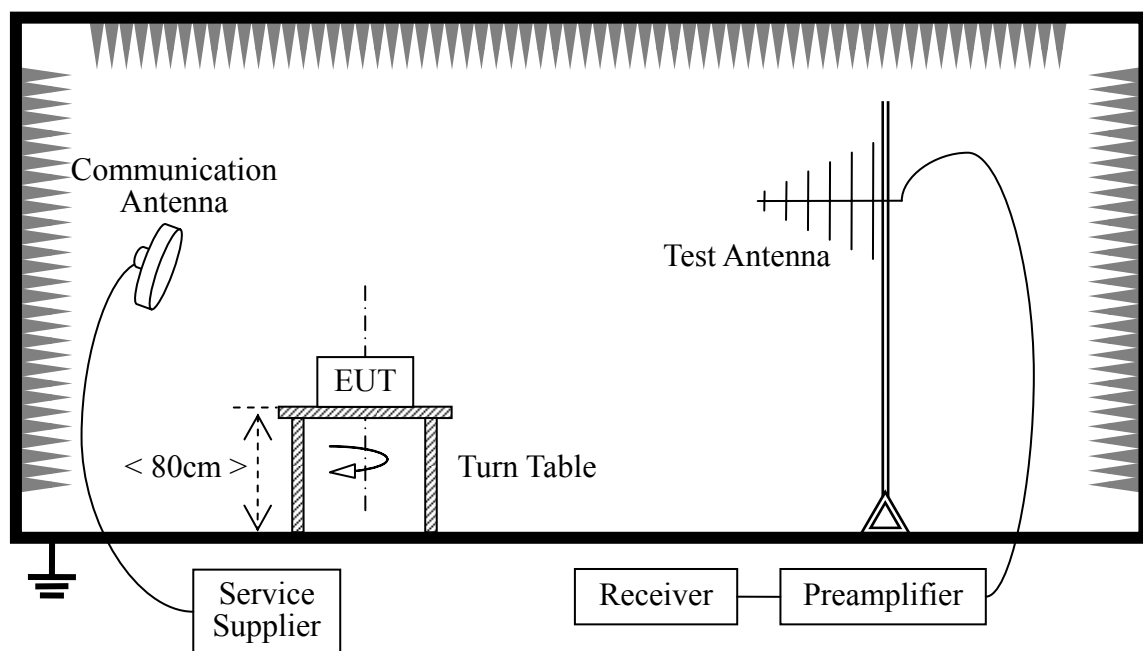
3.7 Band Edge

3.7.1 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.

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	Anritsu	MT8852A	6K00002788	2010.9	1year
Receiver	Agilent	E4440A	MY46187763	2010.9	1year
Spectrum Analyzer	R&S	FSP30	101020	2010.9	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2009.10	2year
Antenna	Schwarzbeck	BBHA 9120C	9120C-384	2010.9	1year
Antenna	R&S	HL562	100385	2010.9	1year
Antenna	R&S	HF906	100565	2010.9	1year

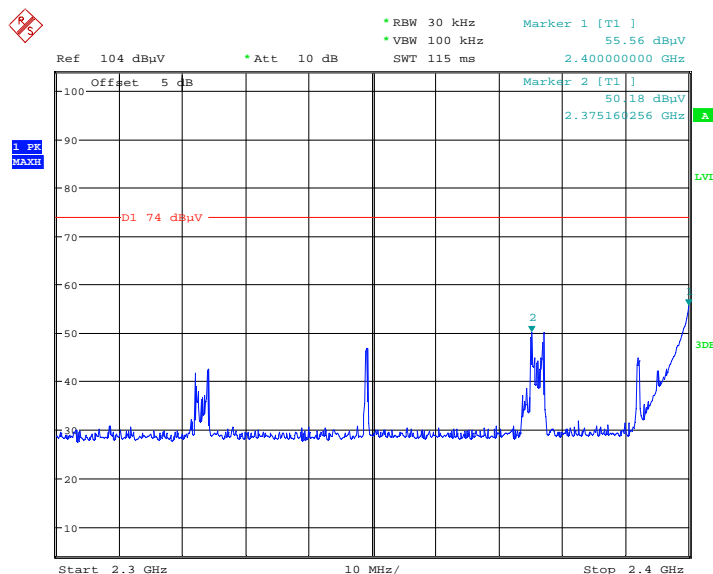
3.7.3 Test Result

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:.

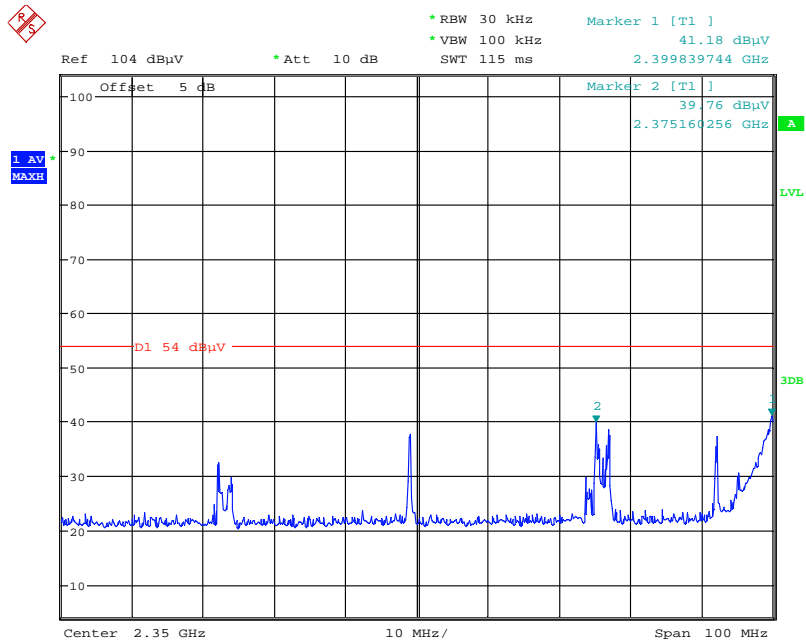
Channel	Frequency (MHz)	Max. Emission in the Restricted Bands (dBμV/m)		Refer to Plot	Limit (dBμV/m)		Verdict
		PK	AV		PK	AV	
0	2402	55.56	41.18	Plot G.1/G.2	74	54	PASS
78	2480	53.23	48.22	Plot H.1/H.2	74	54	PASS

B. Test Plot:



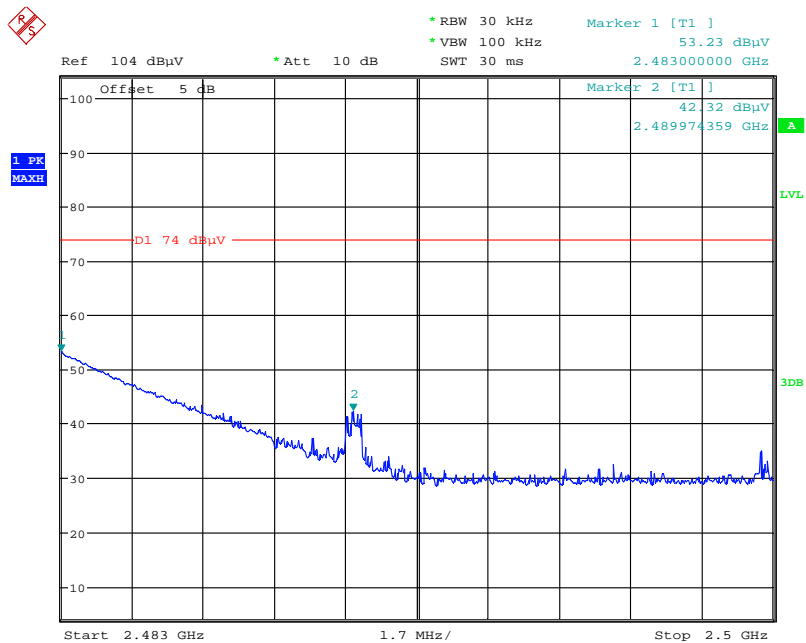
Date: 19.NOV.2010 10:13:08

(Plot G1: Channel = 0 PEAK)



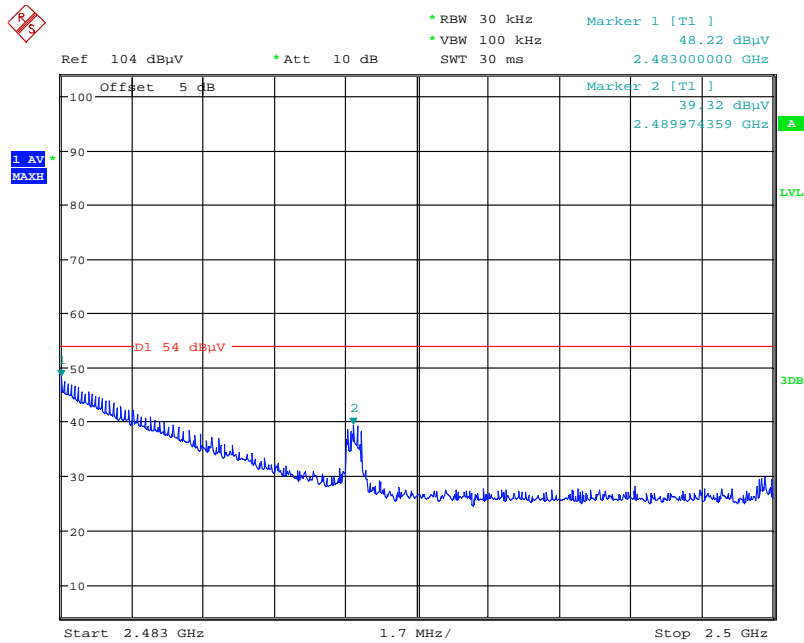
Date: 19.NOV.2010 10:15:02

(Plot G2: Channel = 0 AVERAGE)



Date: 19.NOV.2010 10:18:19

(Plot H1: Channel = 78 PEAK)



Date: 19.NOV.2010 10:17:11

(Plot H2: Channel = 78 AVERAGE)

3.8 Conducted Emission

3.8.1 Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 Ω line impedance stabilization network (LISN).

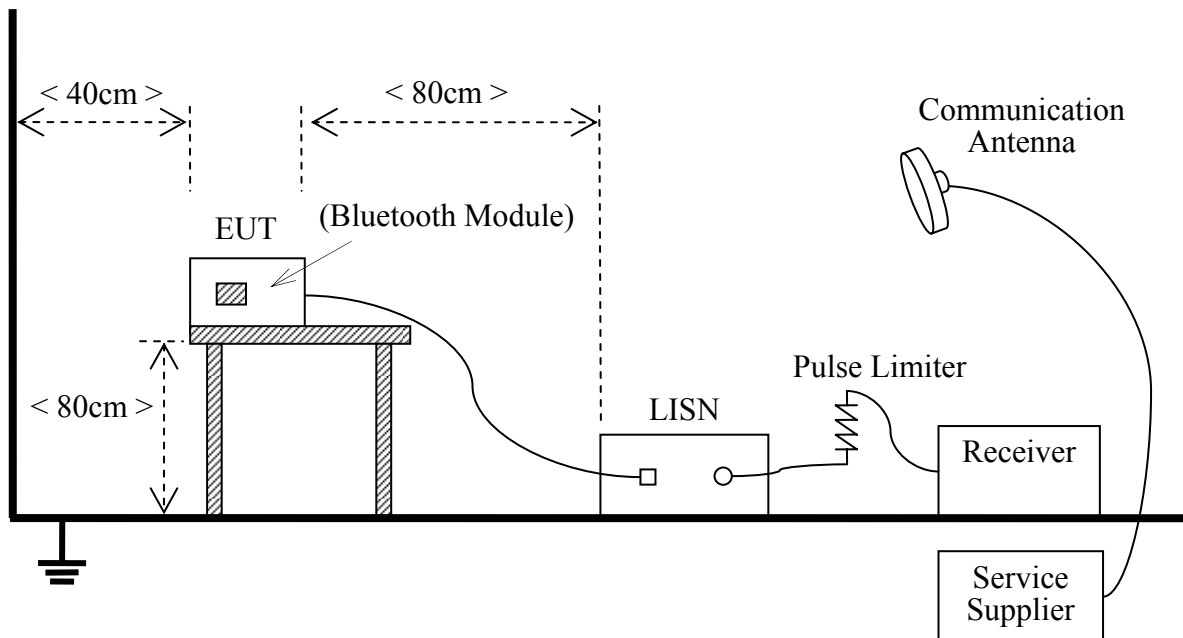
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
0.50 - 30	60	50

NOTE:

- The lower limit shall apply at the band edges.
- The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

3.8.2 Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.4:2003

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 factors of the site are calibrated 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.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Rohde&Schwarz	ESCI3	100666	2010.09	1year
System Simulator	Rohde&Schwarz	CMU200	105571	2010.09	1year
LISN	Rohde&Schwarz	ENV216	812744	2010.09	1year
Personal Computer	Lenovo	(n.a.)	(n.a.)	(n.a.)	(n.a.)

3.8.3 Test Result

The maximum conducted interference is searched using Peak (PK), Quasi-peak (QP) and Average (AV) detectors; the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

The EUT configuration of the emission tests is MS+Battery+Charger.

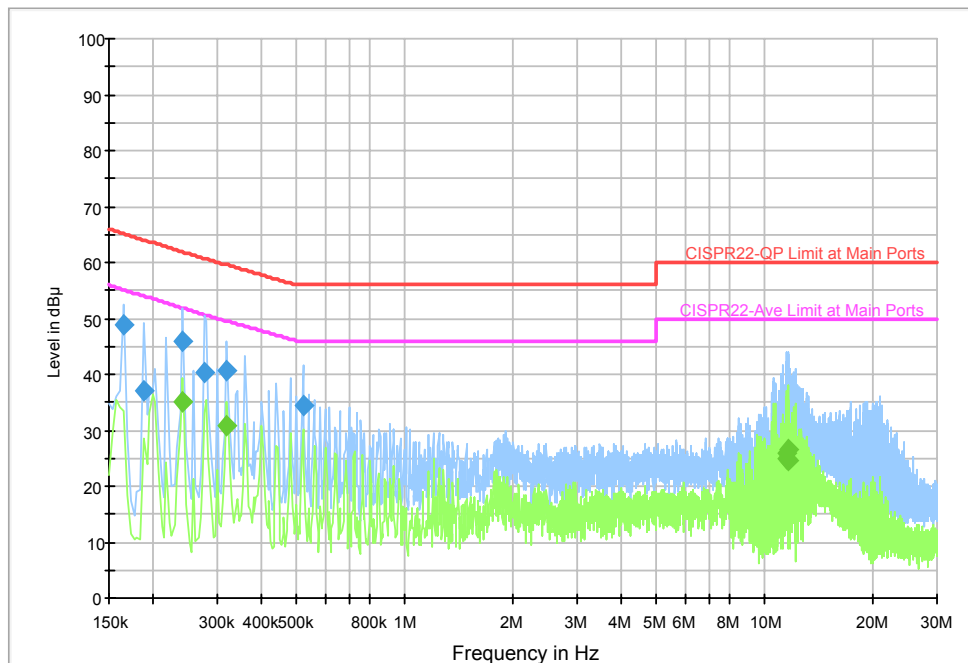
A. Test Verdict Recorded for Suspicious Points:

Frequency (MHz)	QuasiPeak (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.164925	49.0	150.000	9.000	L	9.5	16.2	65.2	PASS
0.187312	37.0	150.000	9.000	L	9.6	27.0	64.0	PASS
0.239550	45.9	150.000	9.000	L	9.7	16.0	61.9	PASS
0.276862	40.4	150.000	9.000	L	9.7	20.3	60.7	PASS
0.317906	40.8	150.000	9.000	L	9.7	18.8	59.6	PASS
0.519394	34.5	150.000	9.000	L	9.7	21.5	56.0	PASS
0.250744	29.5	150.000	9.000	N	9.6	32.0	61.5	PASS
0.291788	27.6	150.000	9.000	N	9.6	32.7	60.3	PASS
0.332831	26.3	150.000	9.000	N	9.7	32.9	59.2	PASS
0.452231	22.2	150.000	9.000	N	9.7	34.6	56.8	PASS
0.530588	20.0	150.000	9.000	N	9.7	36.0	56.0	PASS
0.612675	16.9	150.000	9.000	N	9.7	39.1	56.0	PASS

Frequency (MHz)	Average (dB μ V)	Meas. Time (ms)	Bandwidth (kHz)	Line	Corr. (dB)	Margin (dB)	Limit (dB μ V)	Comment
0.239550	35.2	150.000	9.000	L	9.7	16.7	51.9	PASS
0.317906	30.7	150.000	9.000	L	9.7	18.8	49.5	PASS
11.422106	25.9	150.000	9.000	L	10.1	24.1	50.0	PASS
11.500462	24.9	150.000	9.000	L	10.1	25.1	50.0	PASS
11.541506	26.6	150.000	9.000	L	10.1	23.4	50.0	PASS
11.578819	24.5	150.000	9.000	L	10.1	25.5	50.0	PASS
0.198506	34.7	150.000	9.000	N	9.6	18.8	53.5	PASS
10.429594	33.0	150.000	9.000	N	10.1	17.0	50.0	PASS
11.310169	29.1	150.000	9.000	N	10.1	20.9	50.0	PASS
11.474344	34.3	150.000	9.000	N	10.1	15.7	50.0	PASS
11.515388	34.5	150.000	9.000	N	10.1	15.5	50.0	PASS
11.552700	32.9	150.000	9.000	N	10.1	17.1	50.0	PASS

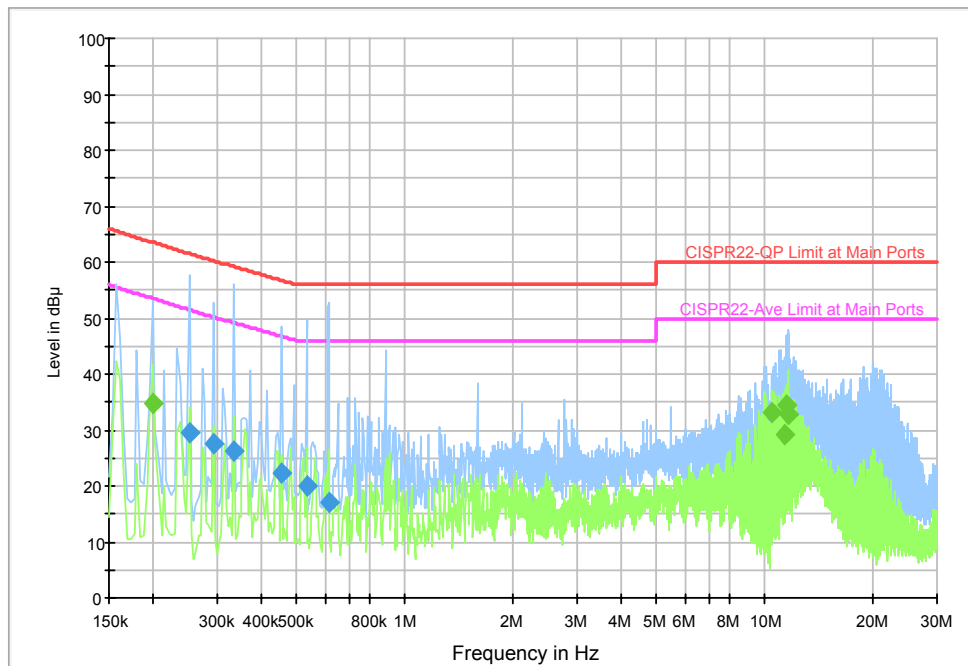
B. Test Plot:

EMI_ENV216 Auto Test-L CISPR22



(Plot A: L Phase)

EMI_ENV216 Auto Test-N CISPR22



(Plot B: N Phase)

3.9 Radiated Emission

3.9.1 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).

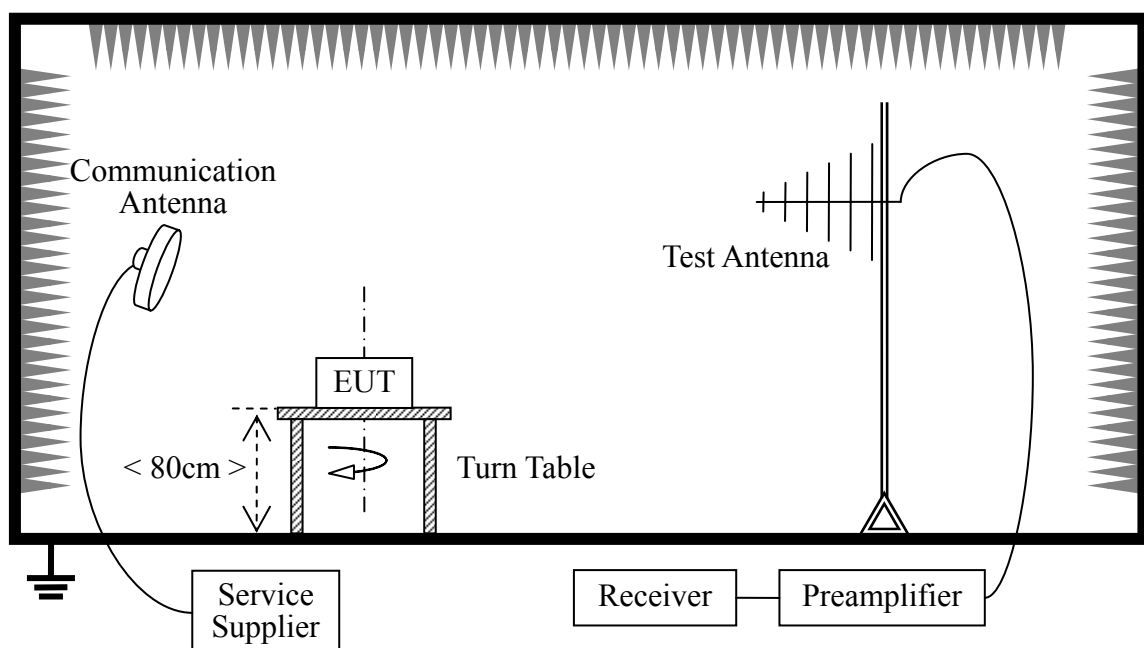
According to FCC section 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength ($\mu\text{V/m}$)	Measurement Distance (m)	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° 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	Rohde&Schwarz	CMU200	105571	2010.09	1year
Receiver	Rohde&Schwarz	ESCI3	100666	2010.09	1year
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2010.09	1year
Test Antenna - Bi-Log	Rohde&Schwarz	HL562	100385	2010.09	1year
System Simulator	Rohde&Schwarz	906	105565	2010.09	1year
Personal Computer	Lenovo	(n.a.)	(n.a.)	(n.a.)	(n.a.)

3.9.3 Test Result

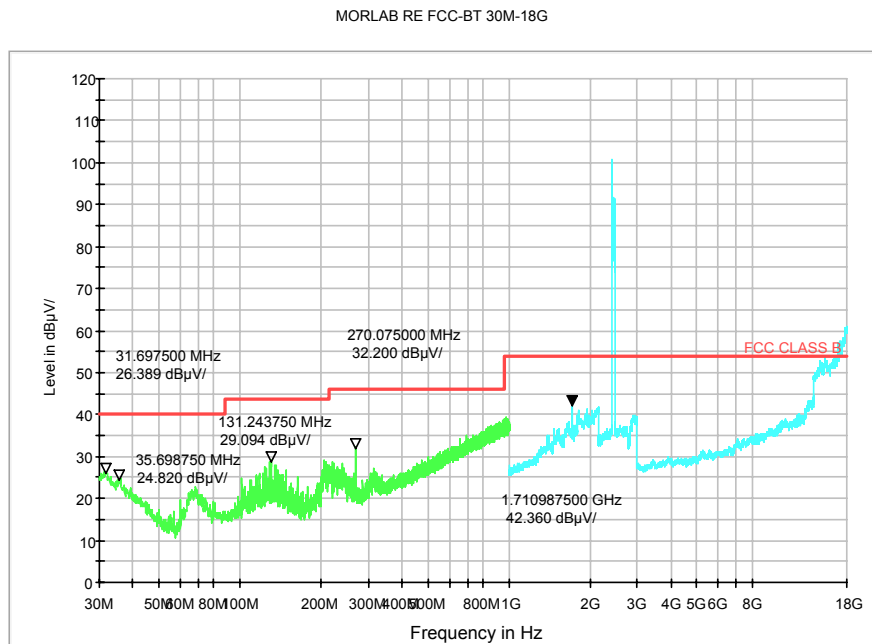
C. Test Mode:

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

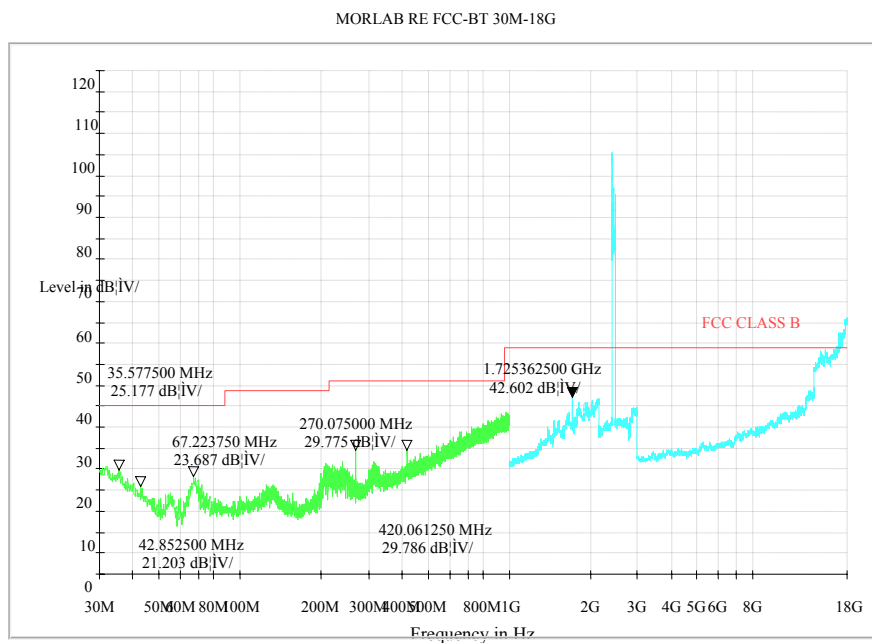
NOTE:

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

D. Test Plots for the Whole Measurement Frequency Range:



(Plot A.1: Antenna Horizontal)



(Plot A.2: Antenna Vertical)

**** END OF REPORT ****