FCC/IC RADIO TEST REPORT

TESTING
CNAS L3572

Issued to

National Electronics & Watch Co. Ltd

For

BLE 4.0 Temperature Sensor

Model Name:	M12-082
Trade Name:	N/A
Brand Name:	N/A
FCC ID:	UH5M12-082BTM
IC Number:	4127A-12082BTS
Standard:	47 CFR Part 15 Subpart C
	RSS-GEN
	RSS-210
Test date:	2013-5-21 to 2013-8-2
Issue date:	2013-8-2

By

Shenzhen MORLAB Communication Technology Co., Ltd.

Tested by Nie Quan	*Approved by* Zeng Dexin	*Review by* Peng Huarui
Nie Quan	*Zeng Dexin*	*Peng Huarui*
(Test Engineer)	*(Department Manager)*	*(Project Manager)*
Date 2013. 8. 2	*Date* 2013. 8. 2	*Date* 2013. 8. 2

CTIA Authorized Test Lab LAB CODE 20081223-00 IEEE 1725 OTA | OFTA 電訊管理局 | ilac-MRA | TAF Testing Laboratory | GCF Official Observer of Global Certification Forum | Bluetooth BQTF | FCC Reg. No. 695796

DIRECTORY

Change History		
Issue	Date	Reason for change
1.0	August 2, 2013	First edition

1. General Information

1.1. EUT Description

EUT Type	:	BLE 4.0 Temperature Sensor
Serial No.	:	(n.a, marked #1 by test site)
Hardware Version	:	M12-082R7
Software Version	:	0112
Applicant	:	National Electronics & Watch Co. Ltd 15/F., Shing Dao Ind. Bldg., 232 Aberdeen Main Road, Aberdeen, HK
Manufacturer	:	EASTERN MOUNT ELECTRONICS & WATCH CO.,LTD The second industrial Estate, Hong Hua Shan, Gong Ming Zhen,Bao'an District, Shenzhne, P.R.C.
Frequency Range	:	The frequency range used is 2402MHz - 2480MHz (40 channels, at intervals of 2MHz);
Modulation Type	:	GFSK
Antenna Type	:	Integral antenna
Antenna Gain	:	0.04dBi

Note 1: The EUT is BLE 4.0 Temperature Sensor, it contain Bluetooth 4.0 LE Module operating at 2.4GHz ISM band; the frequencies allocated for the Bluetooth 4.0 LE is F(MHz)=2402+2*n (0<=n<=39). The lowest, middle, highest channel numbers of the Bluetooth Module used and tested in this report are separately 0 (2402MHz), 19 (2440MHz) and 39 (2480MHz).

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

1.2. Test Standards and Results

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

No.	Identity	Document Title
1	47 CFR Part 15 (10-1-09 Edition)	Radio Frequency Devices
2	RSS-GEN: Issue 3, December 2010	General Requirements and Information for the Certification of Radio Apparatus
3	RSS-210: Issue 8, December 2010	Low-power Licence-exempt Radiocommunication Devices (All Frequency Bands): Category I Equipment

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

No.	Section in CFR 47	Section in RSS-GEN, RSS-210	Description	Result
1	15.203	7.1.4	Antenna Requirement	PASS
2	15.247(b)	A8.4 (2)	Peak Output Power	PASS
3	15.247(b)	A8.4 (2)	Average power	PASS
4	15.247(a)	A8.2 (a)	6dB Bandwidth	PASS
5	15.247(a)	A8.2 (a)	99% Bandwidth	PASS
8	15.247(d)	A8.5	Conducted Spurious Emission and Band Edge	PASS
9	15.247(d)	A8.5	Restricted Frequency Bands	PASS
10	15.207	7.2.4	Conducted Emission	N/A
11	15.209 15.247(d)	A8.5	Radiated Emission	PASS
12	15.247(e)	A8.2(b)	Power spectral density (PSD)	PASS
10	15.247(i). § 1.1307&2.1093	RSS-102	RF exposure evaluation	PASS

The tests of Conducted Emission and Radiated Emission were performed according to the method of measurements prescribed in ANSI C63.4-2009.

These RF tests were performed according to the method of measurements prescribed in KDB558074 D01 V02 10/04/2012.

1.3. Facilities and Accreditations

1.3.1. Facilities

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

All measurement facilities used to collect the measurement data are located at FL.1, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10 2009, ANSI C63.4 2009 and CISPR Publication 22: 2010; the FCC registration number is 695796.

The IC registration number is 7183A-2.

1.3.2. Test Environment Conditions

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

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

2. 47 CFR Part 15C and RSS-210 Requirements

2.1. Antenna requirement

2.1.1. Applicable Standard

According to FCC 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section.

2.1.2. **Result:** Compliant

The EUT has a permanently and irreplaceable attached antenna. Please refer to the EUT internal photos.

2.2. Peak Output Power

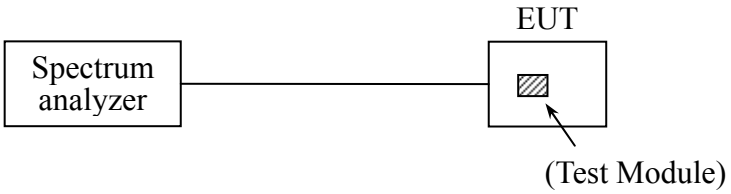
2.2.1. Requirement

According to FCC section 15.247(b)(3) and RSS-210 A8.4 (2), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: The maximum peak conducted output power of the intentional radiator shall not exceed 1 Watt.

2.2.2. Test Description

The measured output power was calculated by the reading of the spectrum analyzer and calibration.

A. Test Setup:



The EUT (Equipment under the test) which is powered by the Battery is coupled to the Spectrum analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading, all test result in Spectrum analyzer.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum analyzer	Agilent	E4407B	MY45101810	2013.05.12	2014.05.11

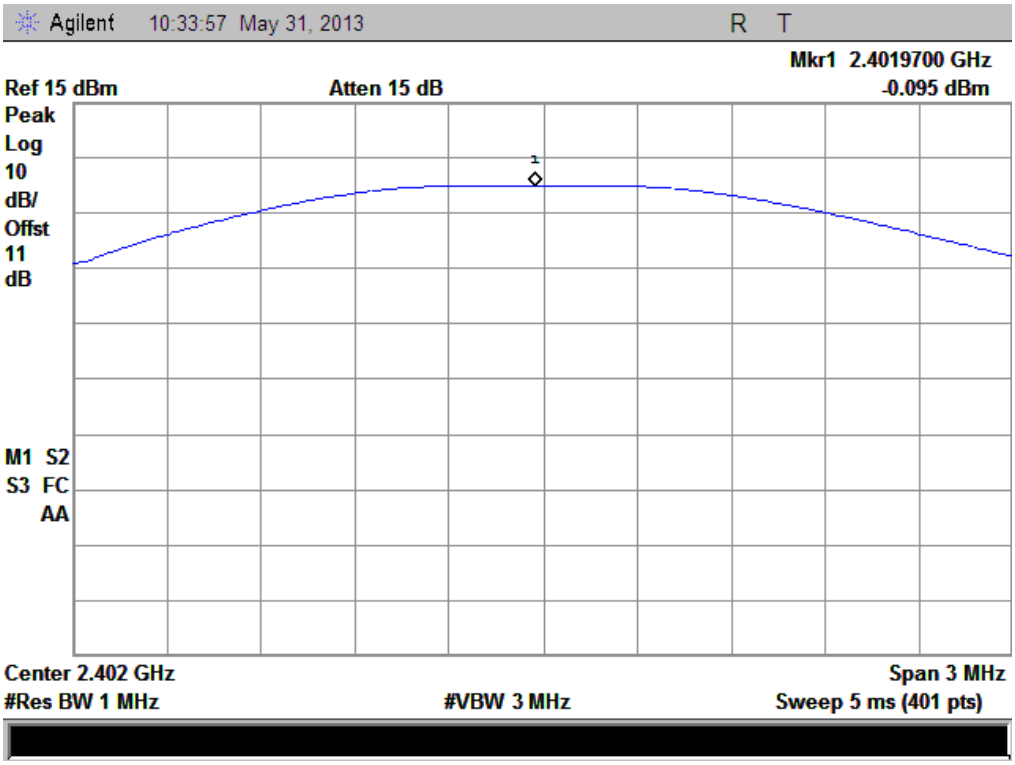
2.2.3. Test Result

The lowest, middle and highest channels are selected to perform testing to verify the conducted RF output peak power of the Module.

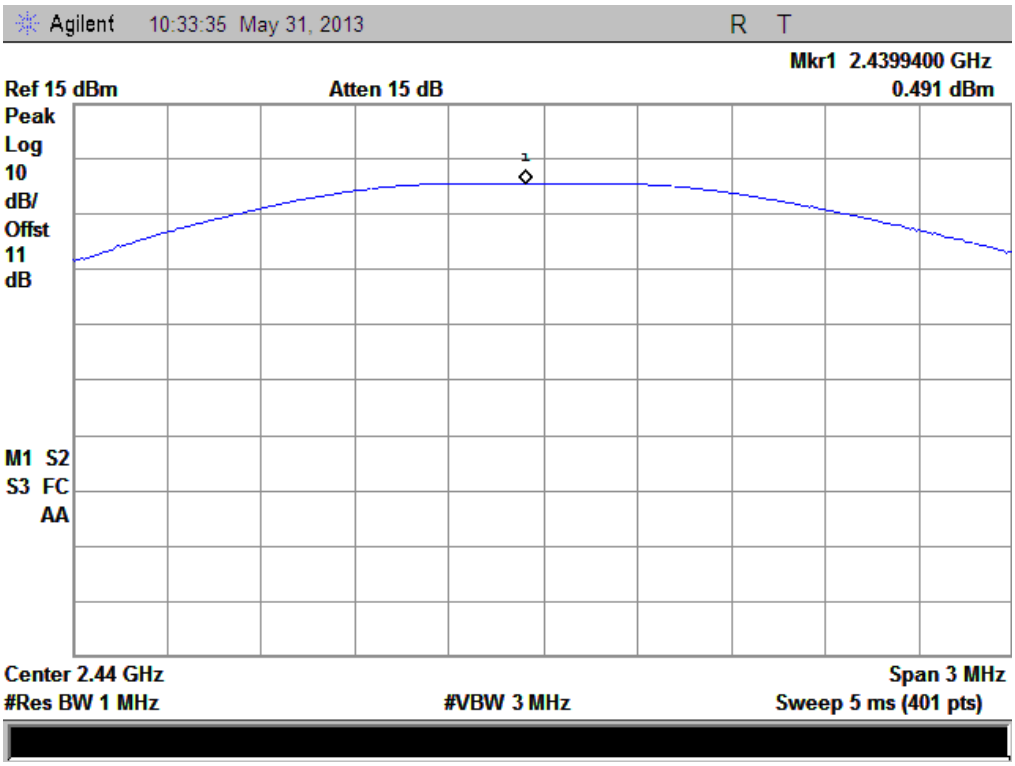
A. Test Verdict:

Channel	Frequency (MHz)	Measured Output Peak Power		Refer to Plot	Limit		Verdict
		dBm	W		dBm	W	
0	2402	-0.095	0.000978	Plot A	30	1	PASS
19	2440	0.491	0.001120	Plot B			PASS
39	2480	0.979	0.001253	Plot C			PASS

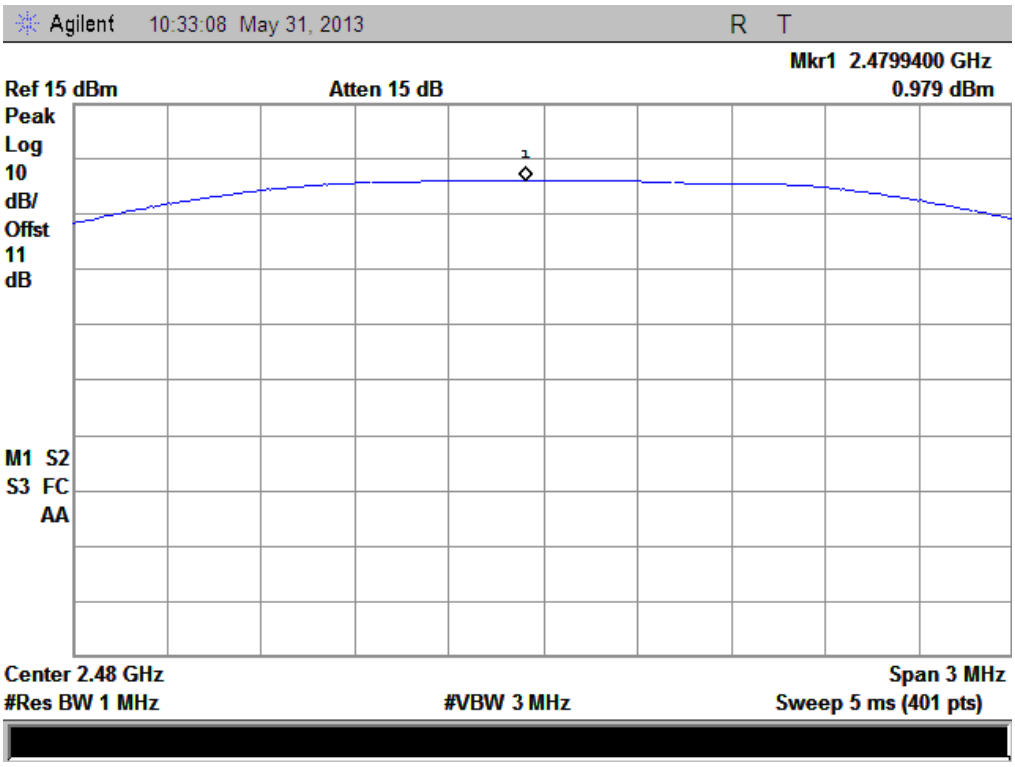
B. Test Plots:



(Plot A: Channel 0: 2402MHz)



(Plot B: Channel 19: 2440MHz)



(Plot C: Channel 39: 2480MHz)

2.3. Average power

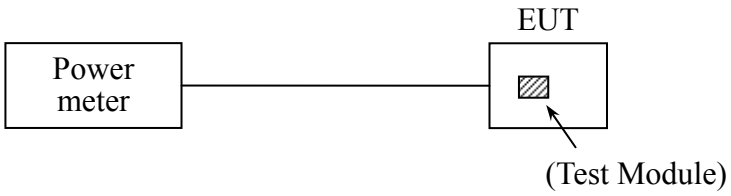
2.3.1. Requirement

None; for reporting purposes only.

2.3.2. Test Description

The transmitter output is connected to a power meter.

A. Test Setup:



B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
EPM Series Power Meter	Agilent	E4418B	GB43318055	2013.05.12	2014.05.11

2.3.3. Results

The cable assembly insertion loss of 1.5dB was entered as an offset in the power meter to allow for direct reading of power.

Channel	Frequency (MHz)	Average Power	
		dBm	W
0	2402	-6.87	0.000206
19	2440	-6.18	0.000241
39	2480	-5.62	0.000274

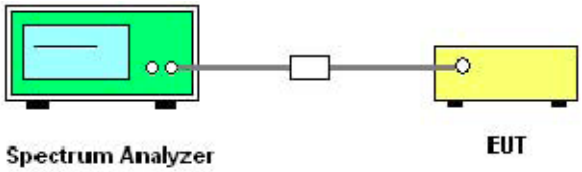
2.4. 6dB & 99% Bandwidth

2.4.1. Requirement

According to FCC section 15.247(a) (2) and RSS-210 A8.1(a), Systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

2.4.2. Test Description

A. Test Set:



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum analyzer	Agilent	E4407B	MY45101810	2013.05.12	2014.05.11

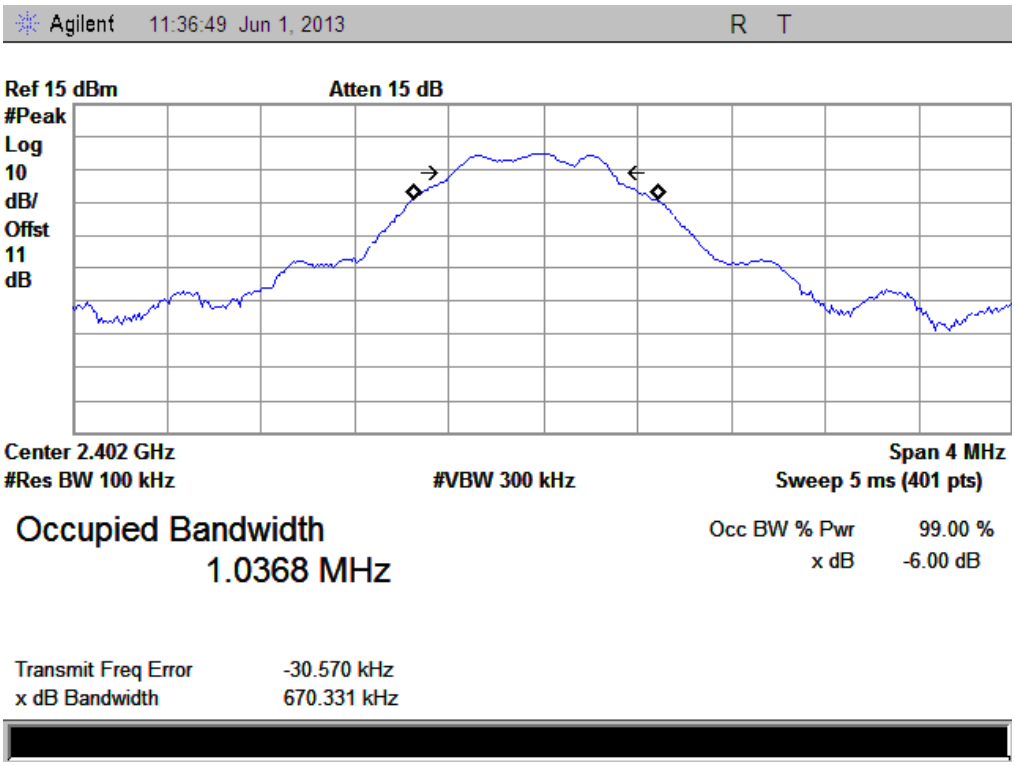
2.4.3. Test Result

The lowest, middle and highest channels are selected to perform testing to record the 6 dB bandwidth of the Module.

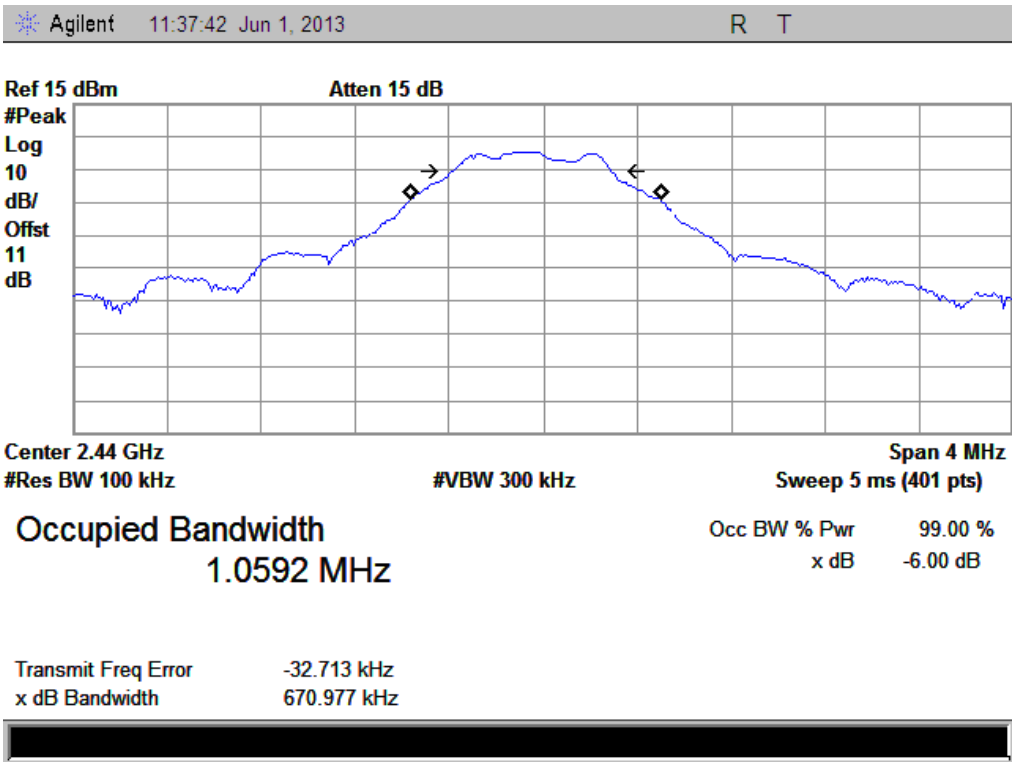
A. Test Verdict:

Channel	Frequency (MHz)	6 dB Bandwidth (MHz)	99% Bandwidth (MHz)	Refer to Plot	Limits(kHz)	Result
0	2402	0.670	1.037	Plot A	≥500	PASS
19	2440	0.671	1.592	Plot B	≥500	PASS
39	2480	0.693	1.946	Plot C	≥500	PASS

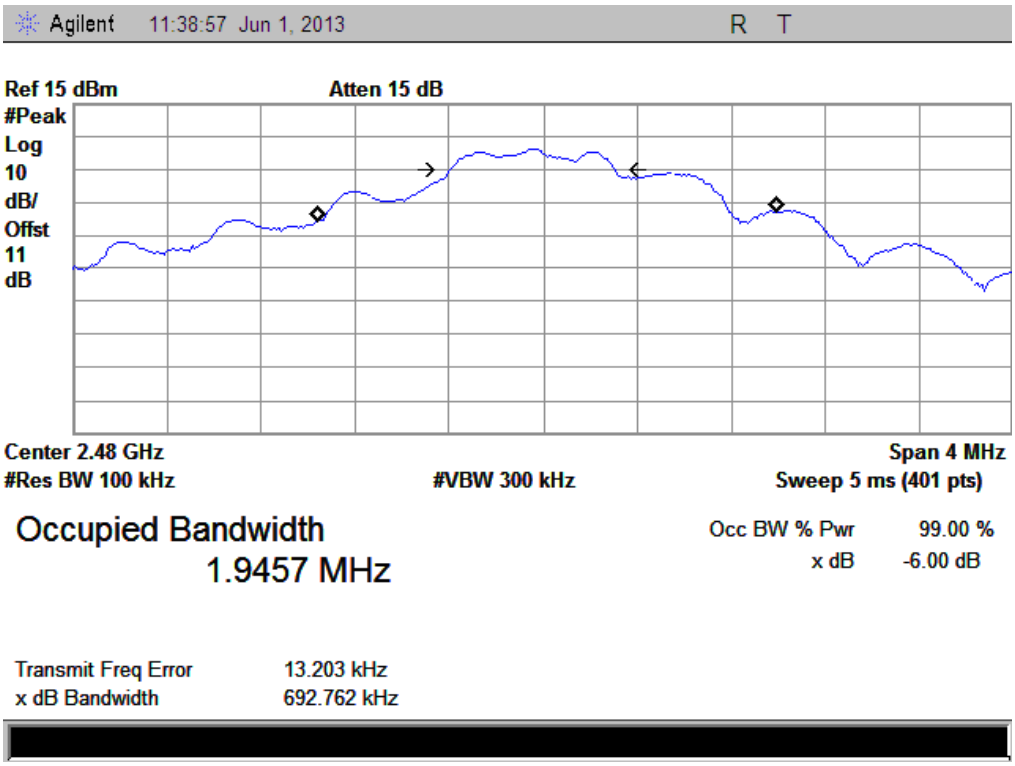
B. Test Plots:



(Plot A: Channel 0: 2402MHz)



(Plot B: Channel 19: 2440 MHz)



(Plot C: Channel 39: 2480MHz)

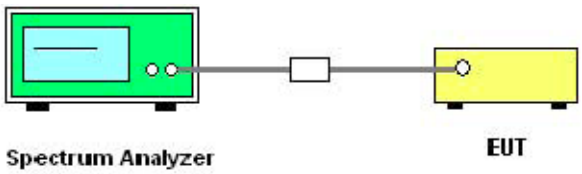
2.5. Conducted Spurious Emissions and Band Edge

2.5.1. Requirement

According to FCC section 15.247(d) and RSS-210 A8.5, in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement.

2.5.2. Test Description

A. Test Set:



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum analyzer	Agilent	E4407B	MY45101810	2013.05.12	2014.05.11

2.5.3. Test Result

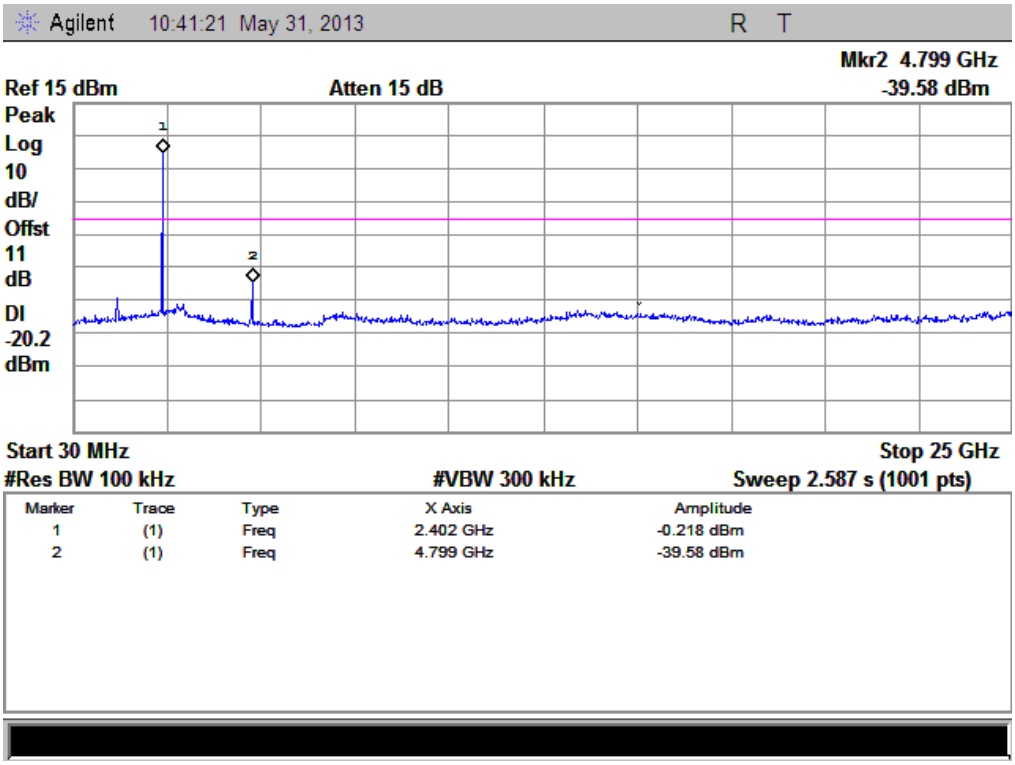
The measurement frequency range is from 30MHz to the 10th harmonic of the fundamental frequency. The lowest, middle and highest channels are tested to verify the spurious emissions.

A. Test Verdict:

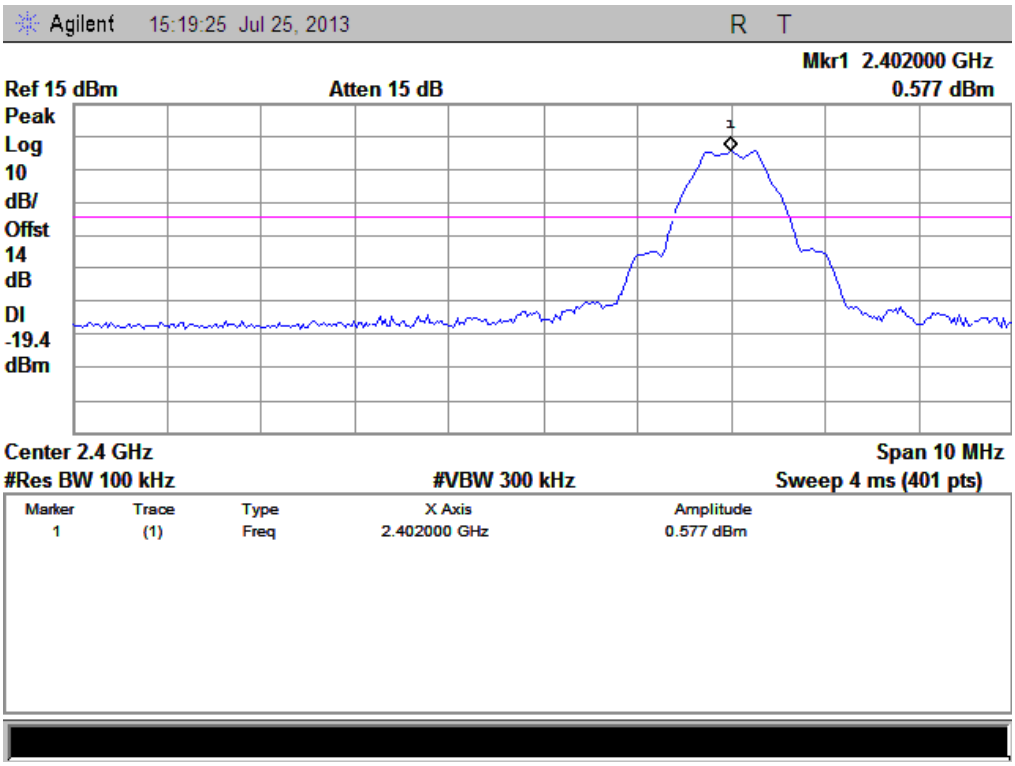
Channel	Frequency (MHz)	Measured Max. Out of Band Emission (dBm)	Refer to Plot	Limit (dBm)		Verdict
				Carrier Level	Calculated -20dBc Limit	
0	2402	-39.58	Plot A.1/A.2	-0.218	-20.2	PASS
19	2440	-42.20	Plot B.1/B.2	0.591	-19.4	PASS
39	2480	-43.40	Plot C.1/C.2	0.998	-19.0	PASS

B. Test Plots:

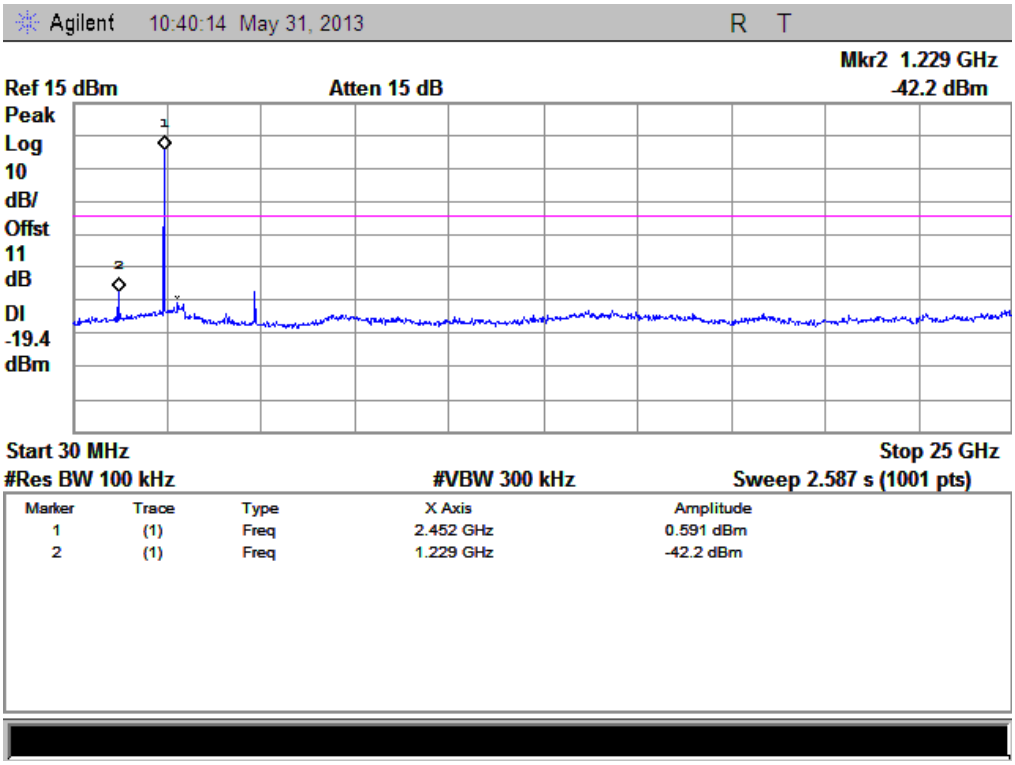
Note: the power of the Module transmitting frequency should be ignored.



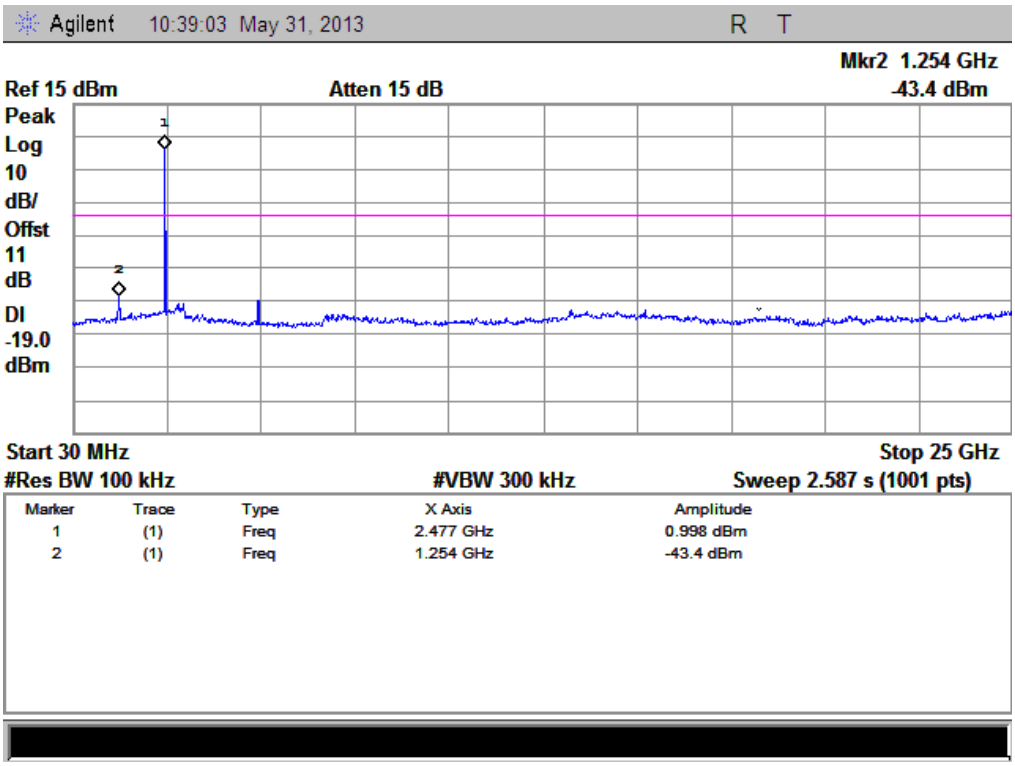
(Plot A.1: Channel = 0, 30MHz to 25GHz)



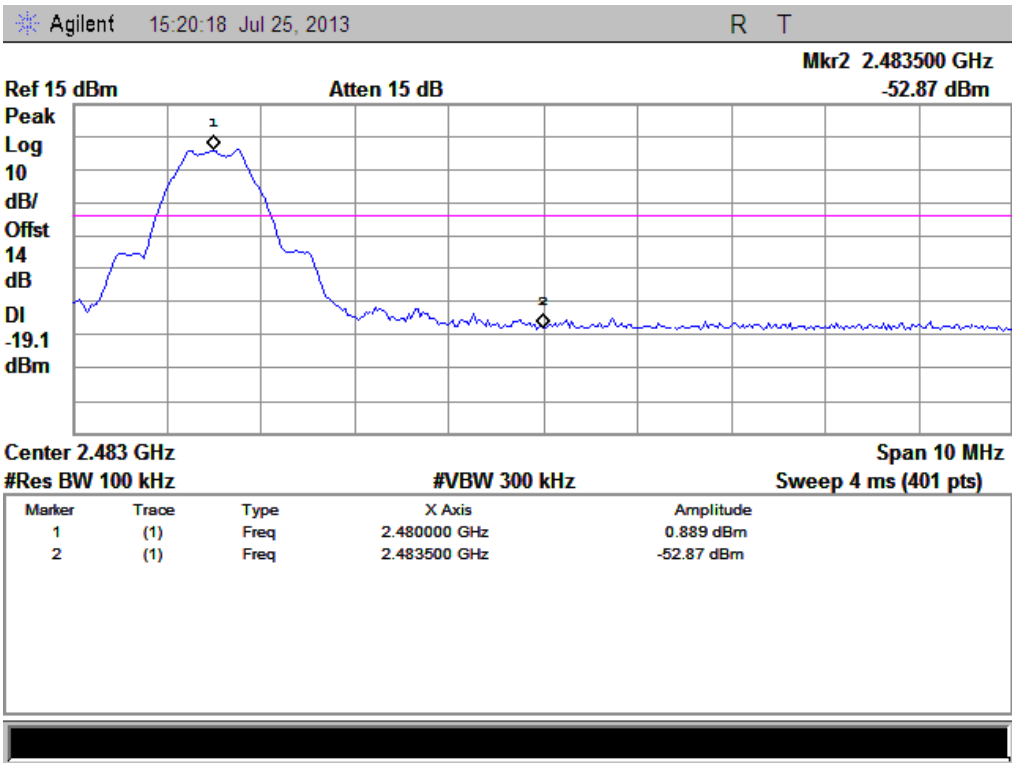
(Band Edge @ Channel = 0)



(Plot B.1: Channel = 19, 30MHz to 25GHz)



(Plot C.1: Channel = 39, 30MHz to 25GHz)



(Band Edge @ Channel = 39)

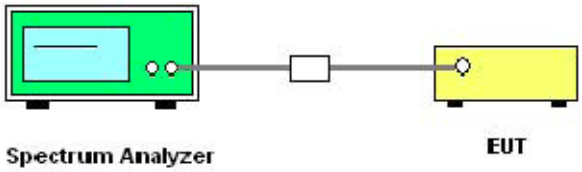
2.6. Power spectral density (PSD)

2.6.1. Requirement

According to FCC section 15.247(e) and RSS-210 A8.5, the same method of determining the conducted output power shall be used to determine the power spectral density. If a peak output power is measured, then a peak power spectral density measurement is required. If an average output power is measured, then an average power spectral density measurement should be used.

2.6.2. Test Description

A. Test Set:



The EUT which is powered by the Battery, is coupled to the Spectrum Analyzer; the RF load attached to the EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.

Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. In order to make an accurate measurement, set the span greater than RBW.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Spectrum analyzer	Agilent	E4407B	MY45101810	2013.05.12	2014.05.11

2.6.3. Test Result

The lowest, middle and highest channels are tested.

A. Test Verdict:

Spectral power density (dBm/3kHz)					
Channel	Frequency (MHz)	Measured PSD (dBm/3kHz)	Refer to Plot	Limit (dBm/3kHz)	Verdict
0	2402	-15.19	Plot A	8	PASS
19	2440	-16.08	Plot B	8	PASS
39	2480	-14.32	Plot C	8	PASS
Measurement uncertainty: ±1.3dB					

B. Test Plots:

(Plot A: Channel = 0)

(Plot B: Channel = 19)

(Plot C: Channel = 39)

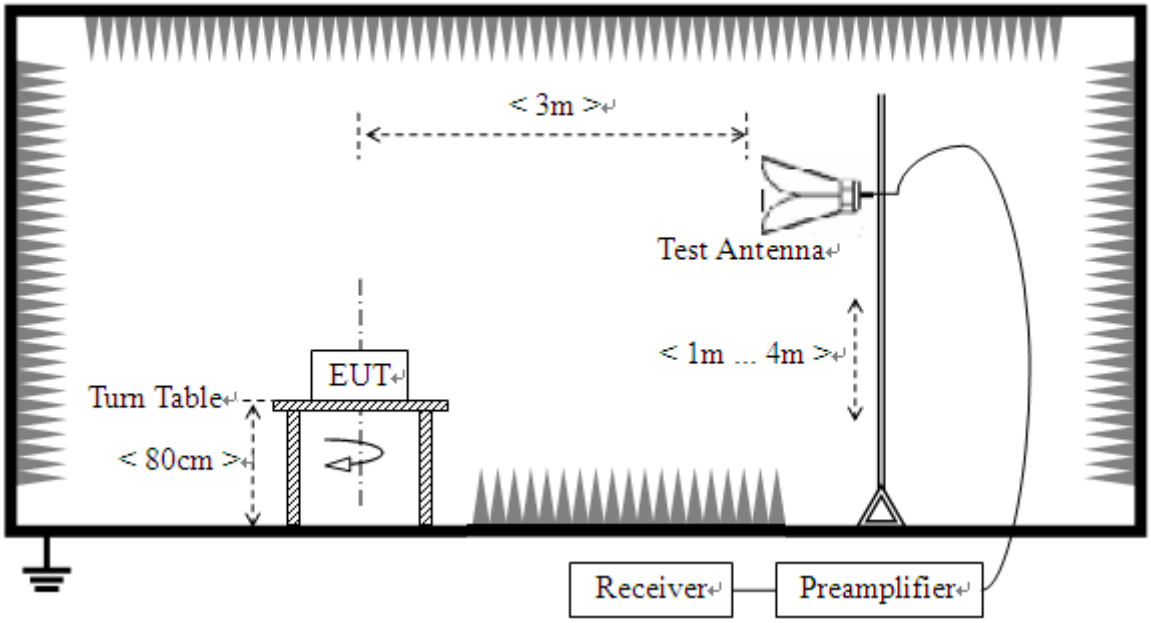
2.7. Restricted Frequency Bands

2.7.1. Requirement

According to FCC section 15.247(d) and RSS-210 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, , In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.7.2. Test Description

A. Test Setup



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.

For the Test Antenna:

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
Receiver	Agilent	E7405A	US44210471	2013.05.12	2014.05.11
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05.12	2014.05.11
Test Antenna	Schwarzbeck	BBHA 9120D	9120D-963	2013.05.12	2014.05.11

2.7.3. Test Result

The lowest and highest channels are tested to verify the Restricted Frequency Bands.

The measurement results are obtained as below:

$E\ [dB\ \mu\ V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

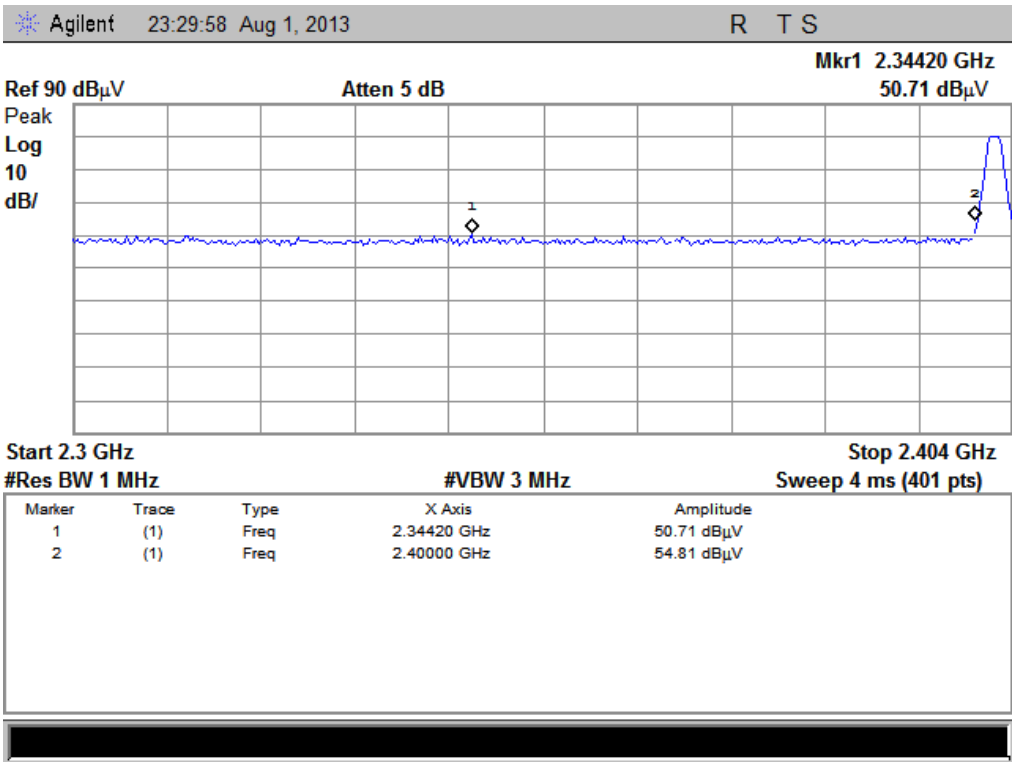
A_{Factor}: Antenna Factor at 3m

Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

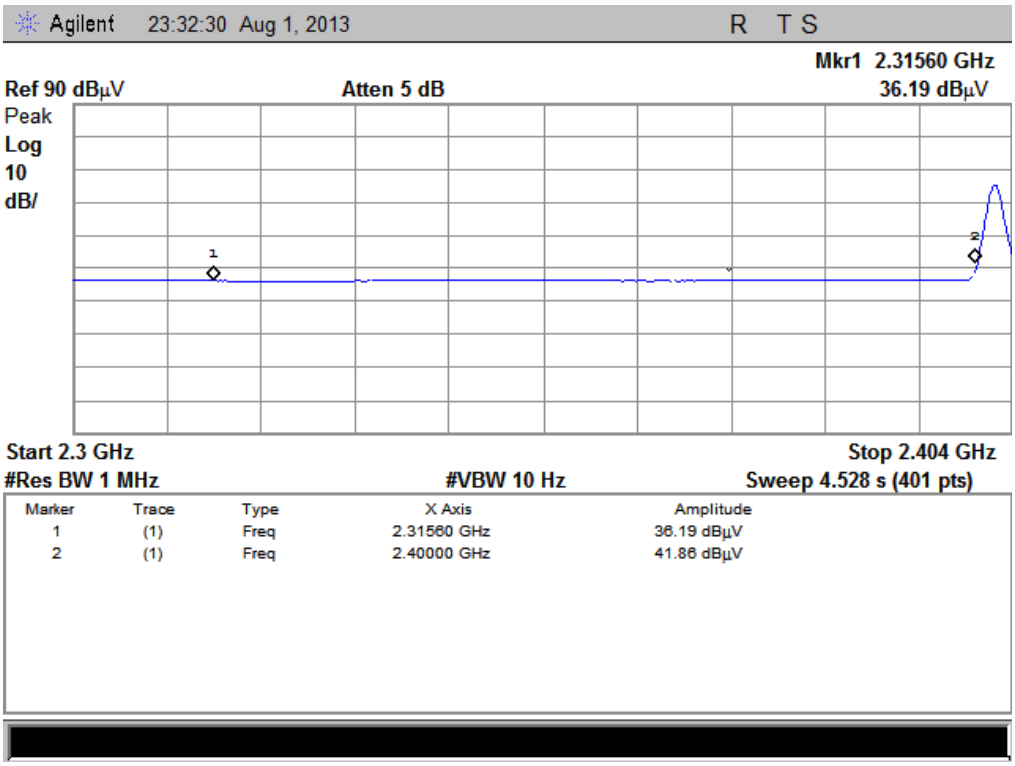
A. Test Verdict:

Channel	Frequency (MHz)	Detector PK/ AV	Receiver Reading UR (dBuV)	AT (dB)	AFactor (dB@3m)	Max. Emission E (dBµV/m)	Limit (dBµV/m)	Verdict
0	2344.20	PK	50.71	-30.93	32.56	51.80	74	Pass
0	2315.60	AV	36.19	-30.93	32.56	37.82	54	Pass
39	2489.17	PK	52.28	-29.05	32.50	55.73	74	Pass
39	2489.72	AV	39.26	-29.05	32.50	42.71	54	Pass

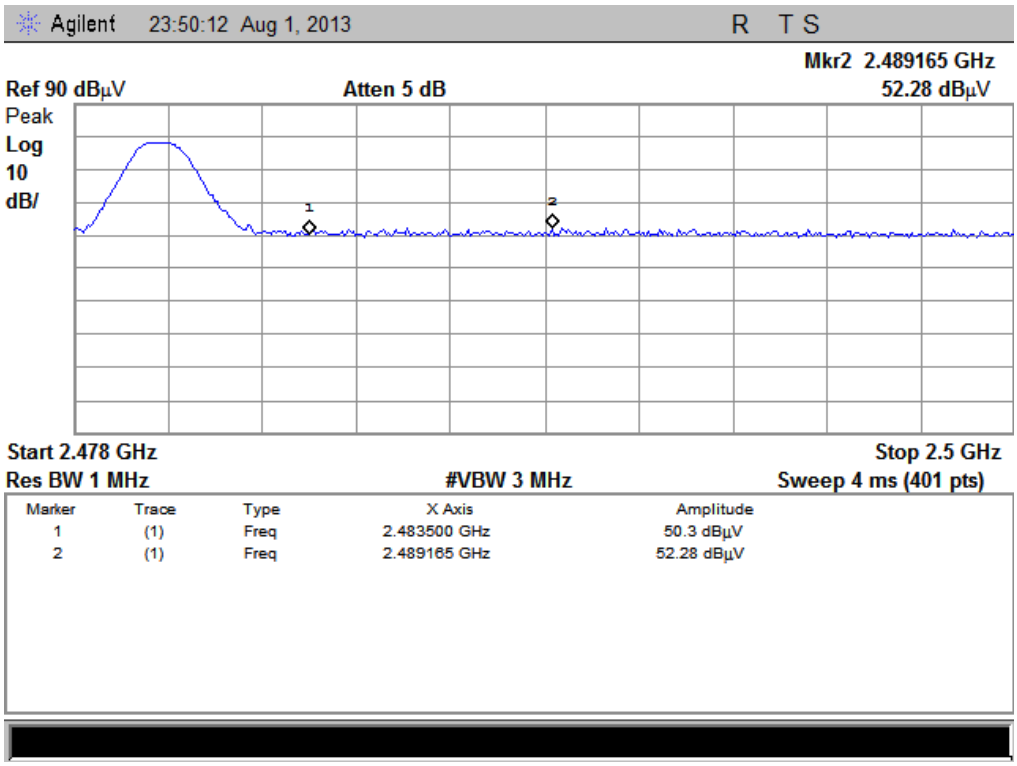
B. Test Plots:



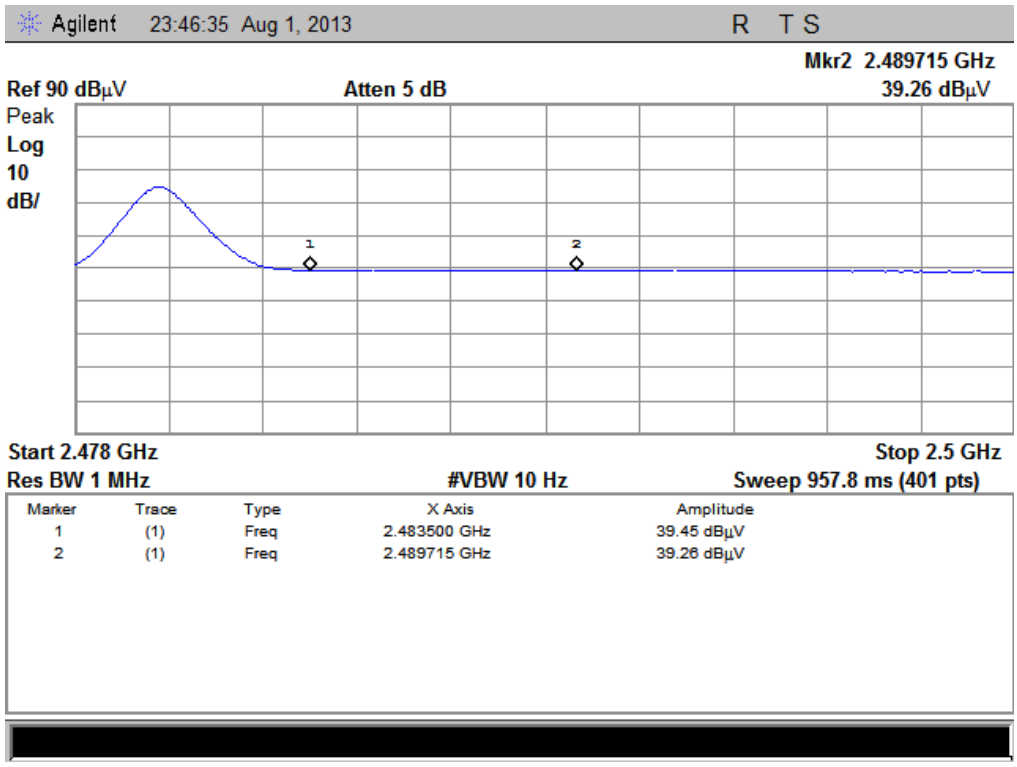
(Plot A1: Channel = 0 PEAK)



(Plot A2: Channel = 0 AVG)



(Plot B1: Channel = 39 PEAK)



(Plot B2: Channel = 39 AVG)

2.8. Conducted Emission

2.8.1. Requirement

According to FCC section 15.207 and RSS-GEN 7.2.4, 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 50μH/50Ω line impedance stabilization network (LISN).

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

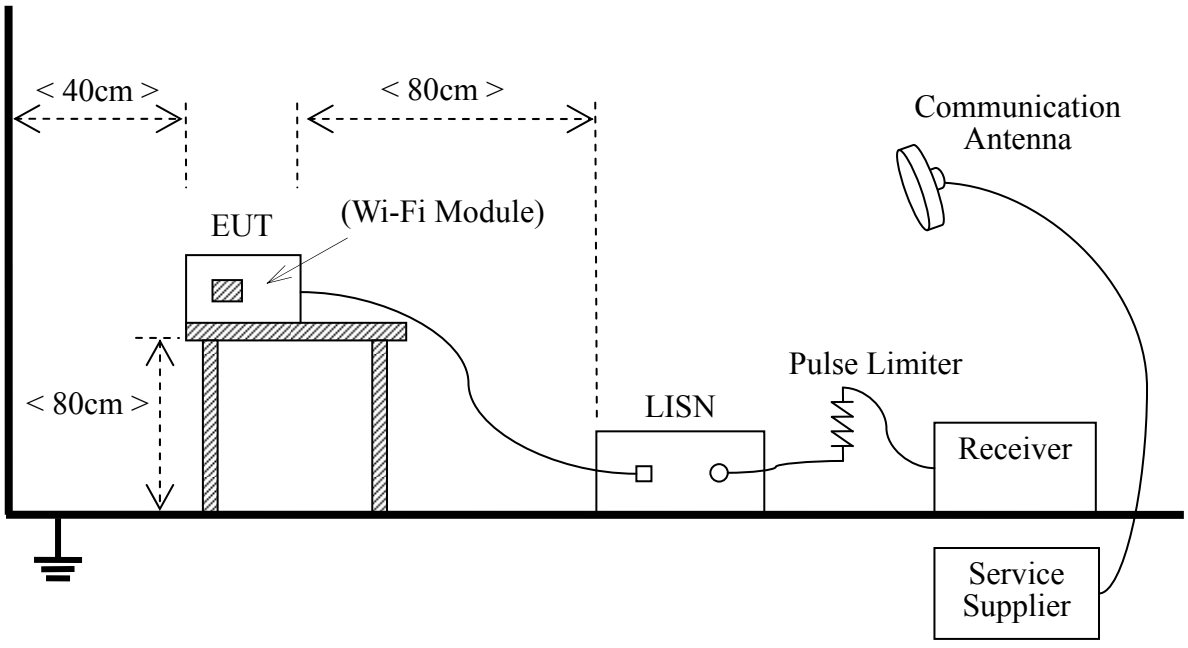
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.8.2. 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 C63.4:2009

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
Receiver	Agilent	E7405A	US44210471	2013.05.12	2014.05.11
LISN	Schwarzbeck	NSLK 8127	812744	2013.05.12	2014.05.11
Service Supplier	R&S	CMU200	100448	2013.05.12	2014.05.11
Pulse Limiter (20dB)	Schwarzbeck	VTSD 9561-D	9391	(n.a.)	(n.a.)

2.8.3. Test Result

This Bluetooth module designed can not to be connected to the public utility (AC) power line, so conducted emission is unnecessary.

2.9. Radiated Emission

2.9.1. Requirement

According to FCC section 15.247(d) and RSS-210 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)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

Note:

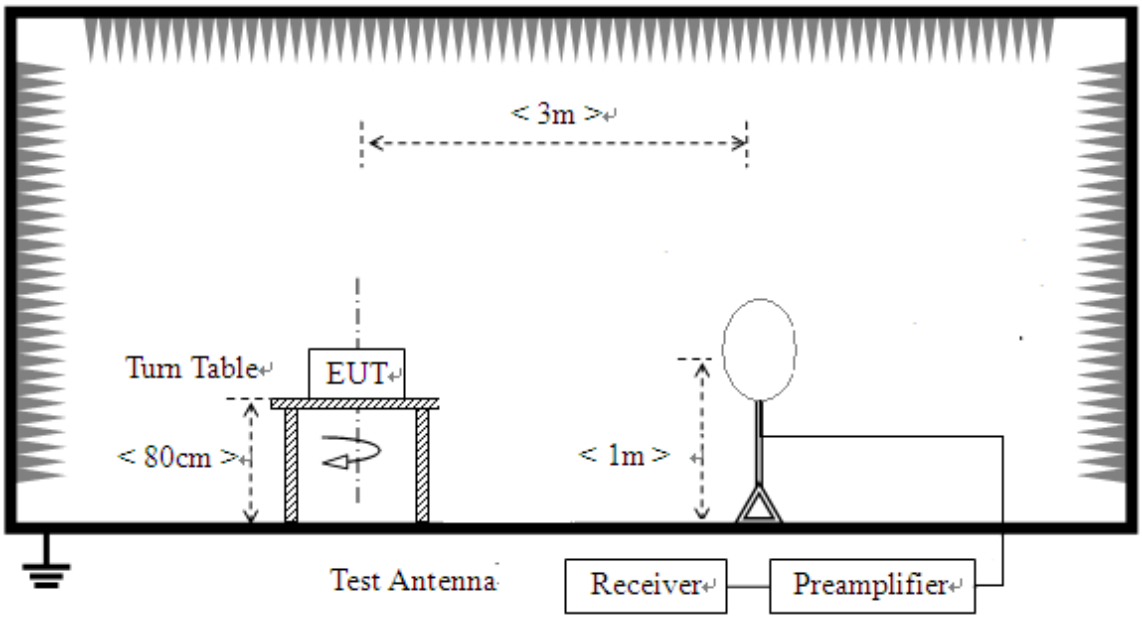
1. For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
2. For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

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

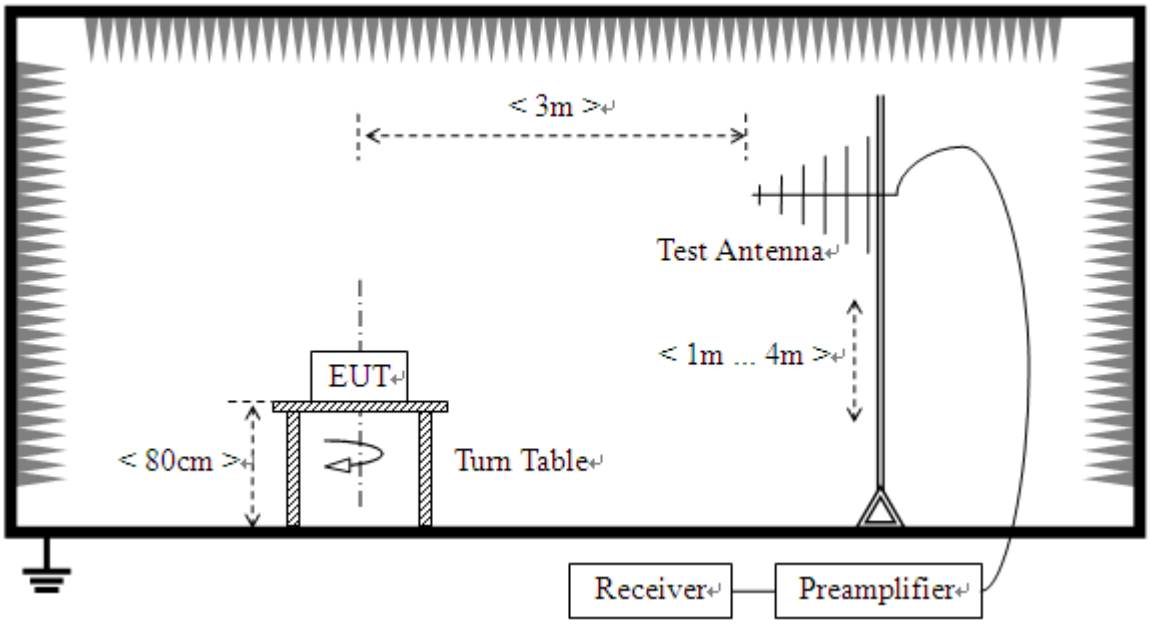
2.9.2. Test Description

A. Test Setup:

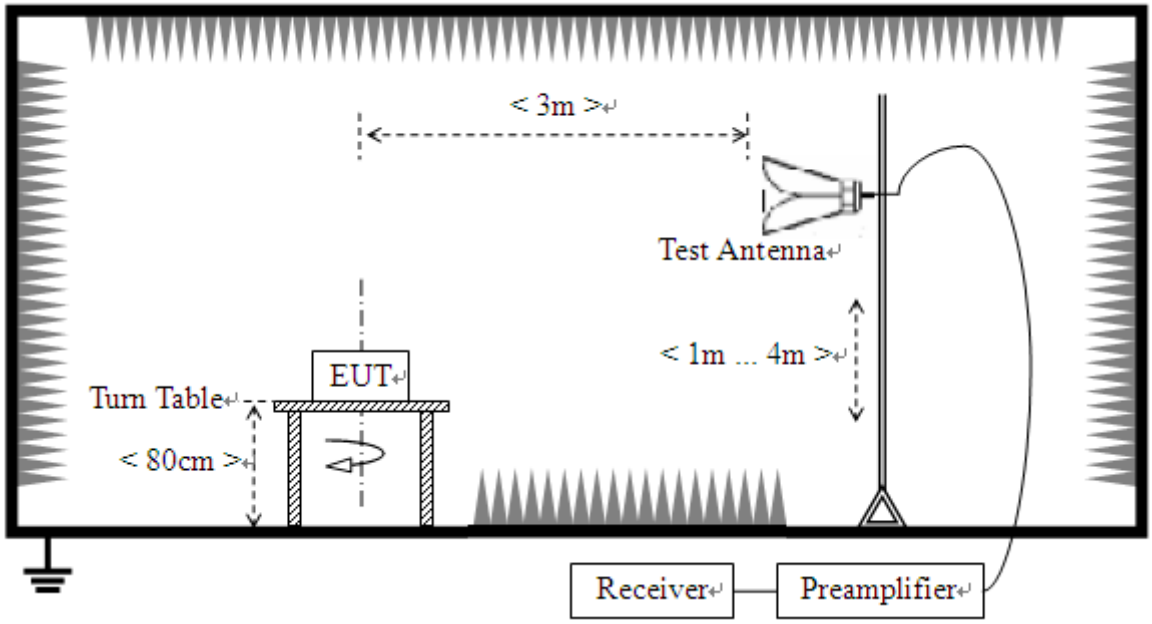
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.4 (2009). The EUT was set-up on insulator 80cm above the Ground Plane. The set-up and test methods were according to ANSI C63.4.

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 2GHz) and Horn Test Antenna (above 2GHz) 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 emission levels at both horizontal and vertical polarizations should be tested.

B. Equipments List:

Description	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due
System Simulator	R&S	CMU200	100448	2013.05.12	2014.05.11
Receiver	Agilent	E7405A	US44210471	2013.05.12	2014.05.11
Full-Anechoic Chamber	Albatross	9m*6m*6m	(n.a.)	2013.05.12	2014.05.11
Test Antenna - Bi-Log	Schwarzbeck	VULB 9163	9163-274	2013.05.12	2014.05.11
Test Antenna - Horn	Schwarzbeck	BBHA 9120D	9120D-963	2013.05.12	2014.05.11
Test Antenna - Horn	R&S	HL050S7	71688	2013.05.12	2014.05.11
Test Antenna -Loop	Schwarzbeck	FMZB 1519	1519-022	2013.05.12	2014.05.11

2.9.3. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\ \mu\ V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

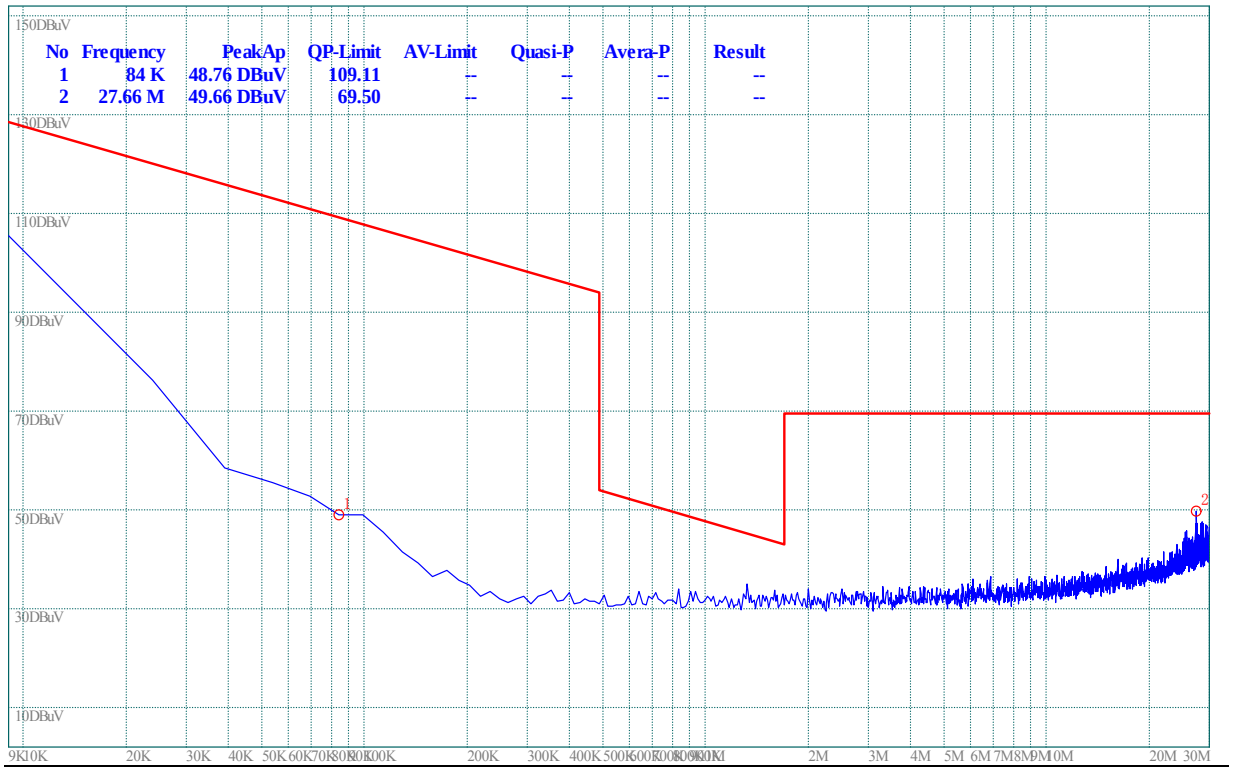
A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor AT and A_{Factor} were built in test software.

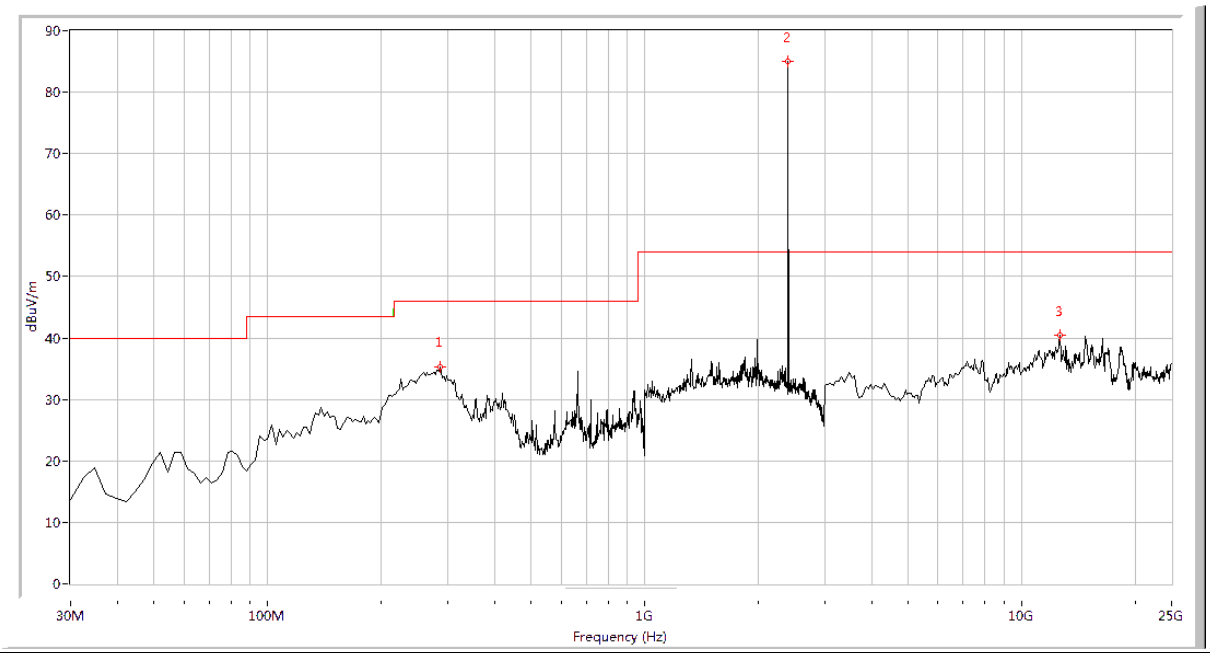
Note: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

A. Test Plots for the Whole Measurement Frequency Range:

Plots for Channel = 0

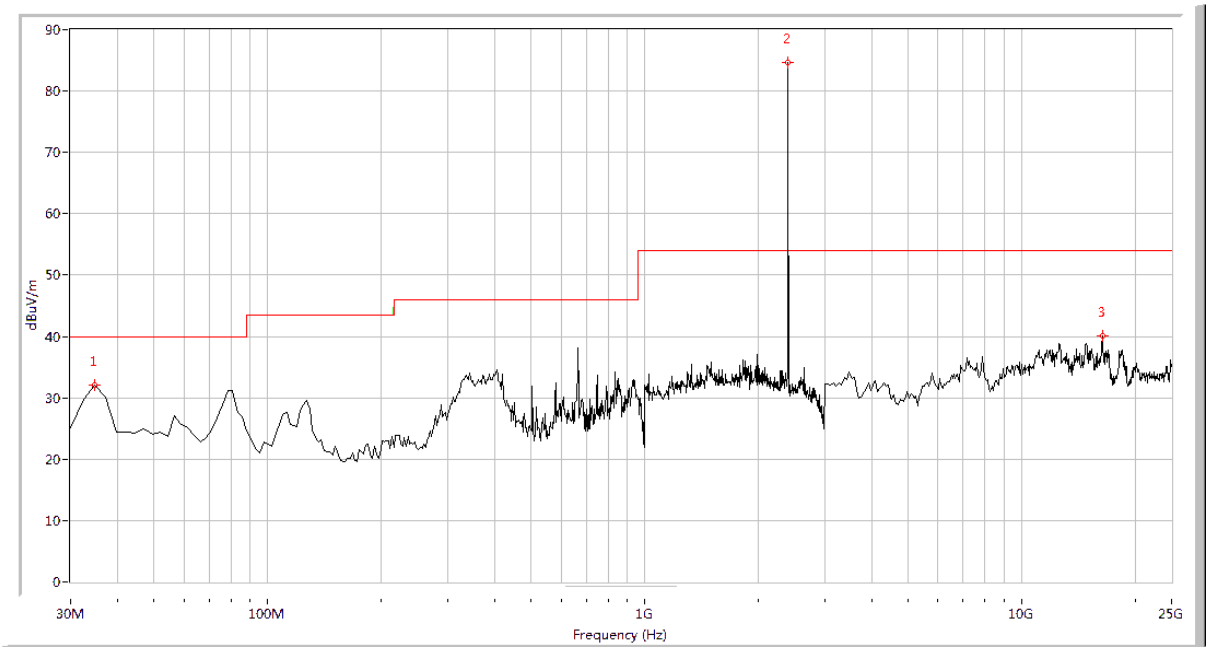


(Plot A.1: 9kHz to 30MHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
286.409	35.35	N.A	N.A	N.A	46.0	N.A	339.1	Horizontal	PASS
2402.000	84.99	N.A	N.A	N.A	N.A	N.A	100.5	Horizontal	N.A
12655.860	40.44	N.A	N.A	74.0	N.A	54.0	174.6	Horizontal	PASS

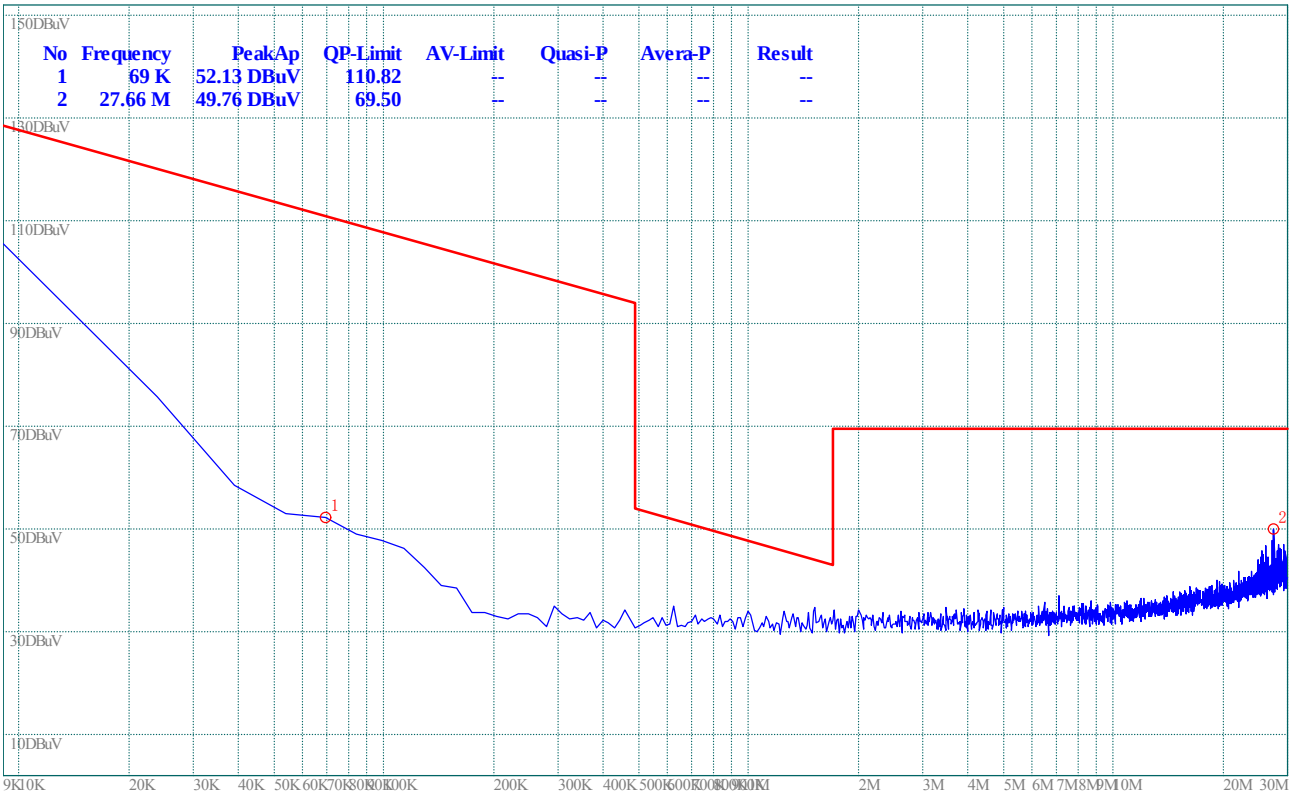
(Plot A.2: Antenna Horizontal, 30MHz to 25GHz)



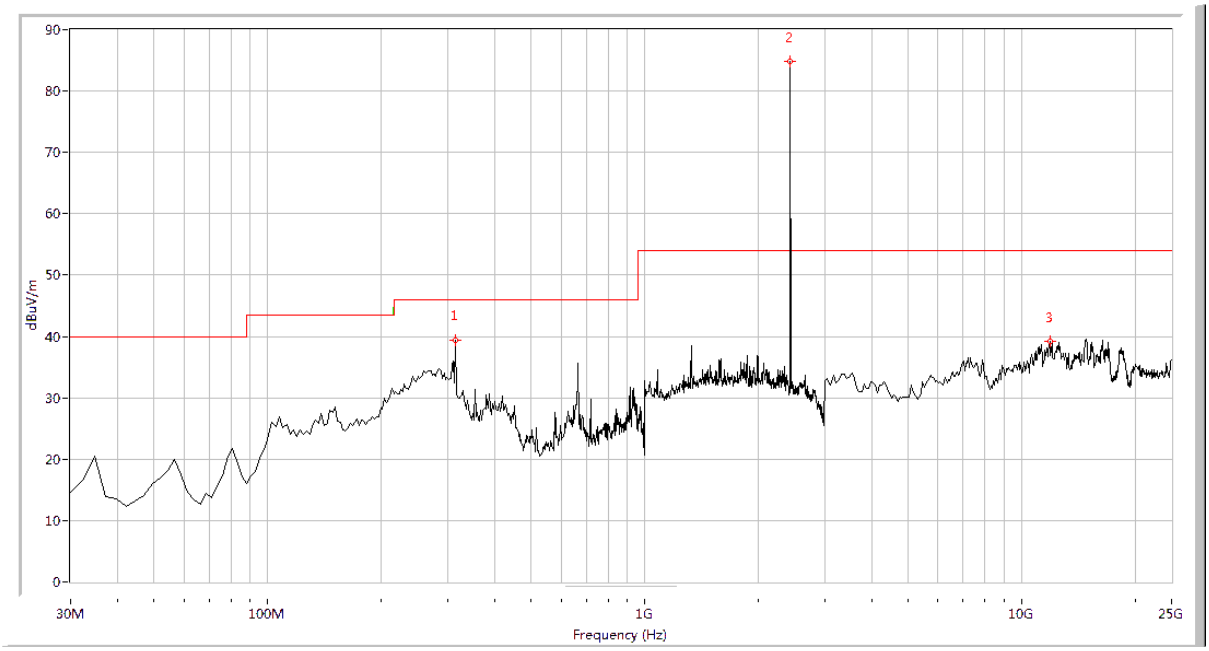
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Degree	Antenna	Verdict
34.838	32.15	N.A	N.A	N.A	40.0	N.A	57.7	Vertical	PASS
2402.000	84.74	N.A	N.A	N.A	N.A	N.A	90.1	Vertical	N.A
16386.534	40.06	N.A	N.A	74.0	N.A	54.0	290.7	Vertical	PASS

(Plot A.3: Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 19

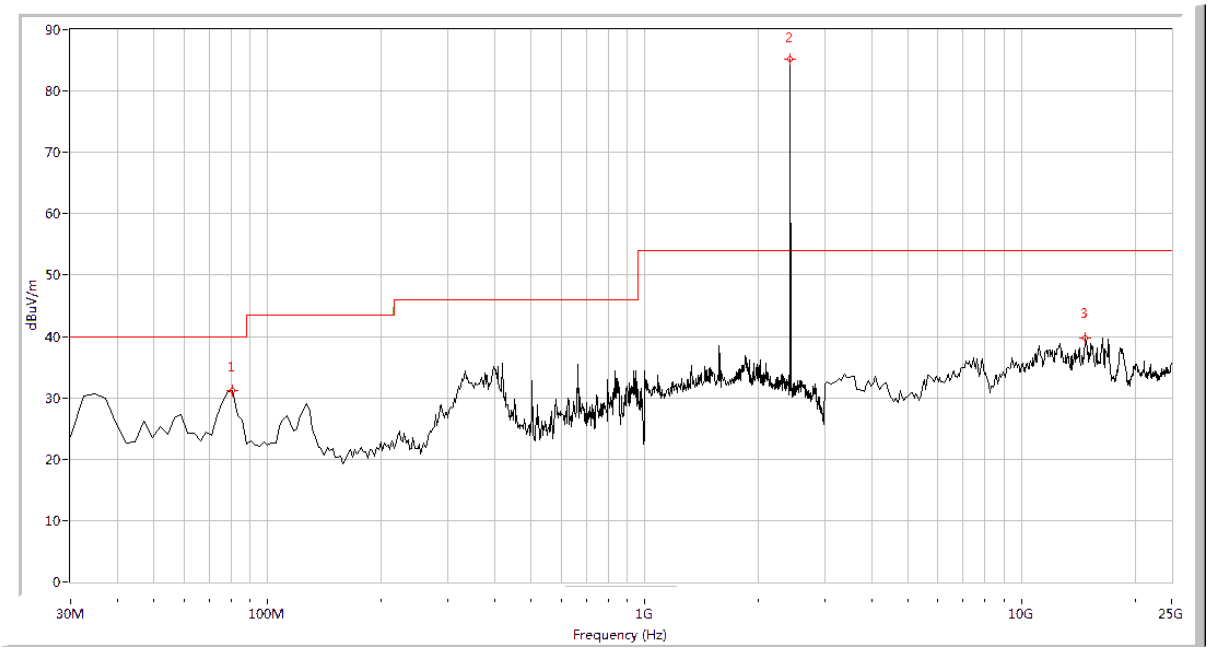


(Plot B.1: 9kHz to 30MHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
315.436	39.41	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2440.000	84.75	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
11887.781	39.26	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

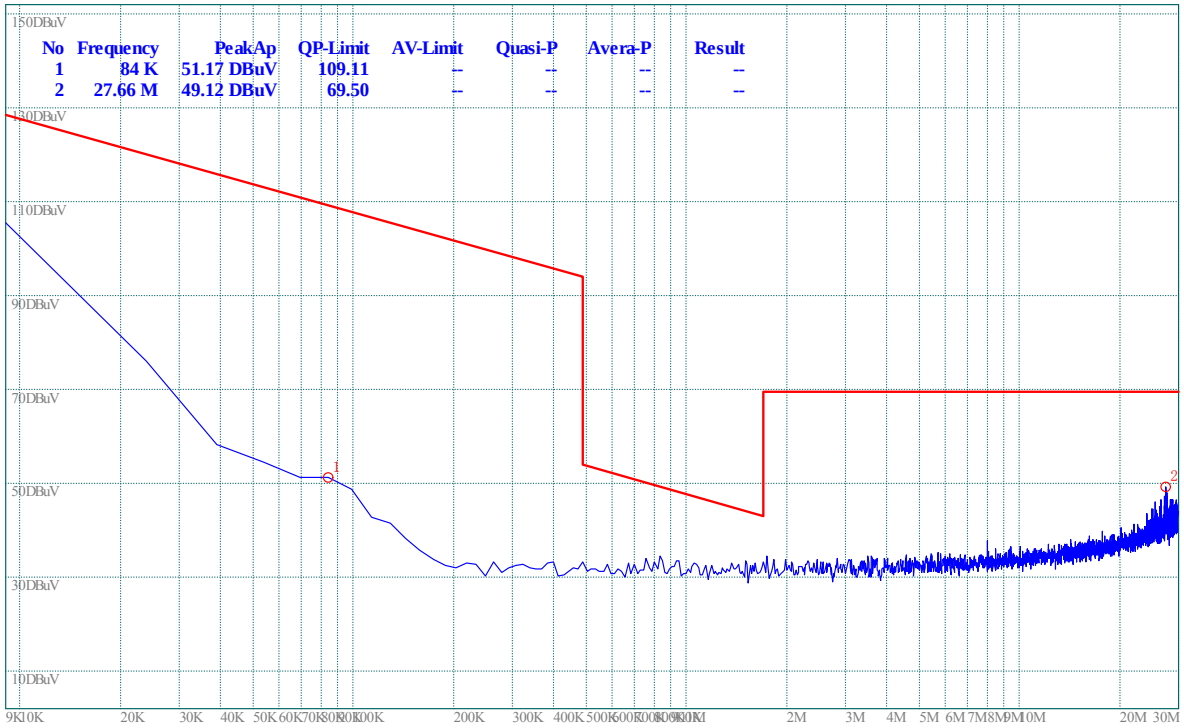
(Plot B.2: Antenna Horizontal, 30MHz to 25GHz)



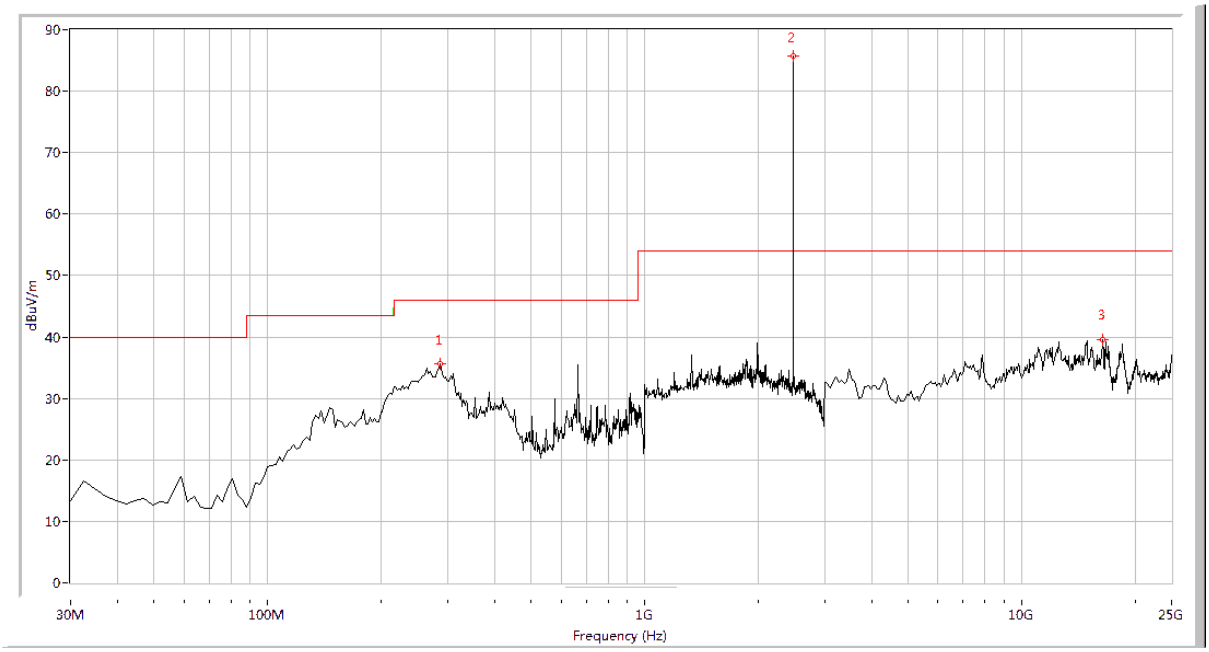
Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
80.798	31.25	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
2440.000	85.27	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
14740.648	39.67	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Plot B.3: Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 39

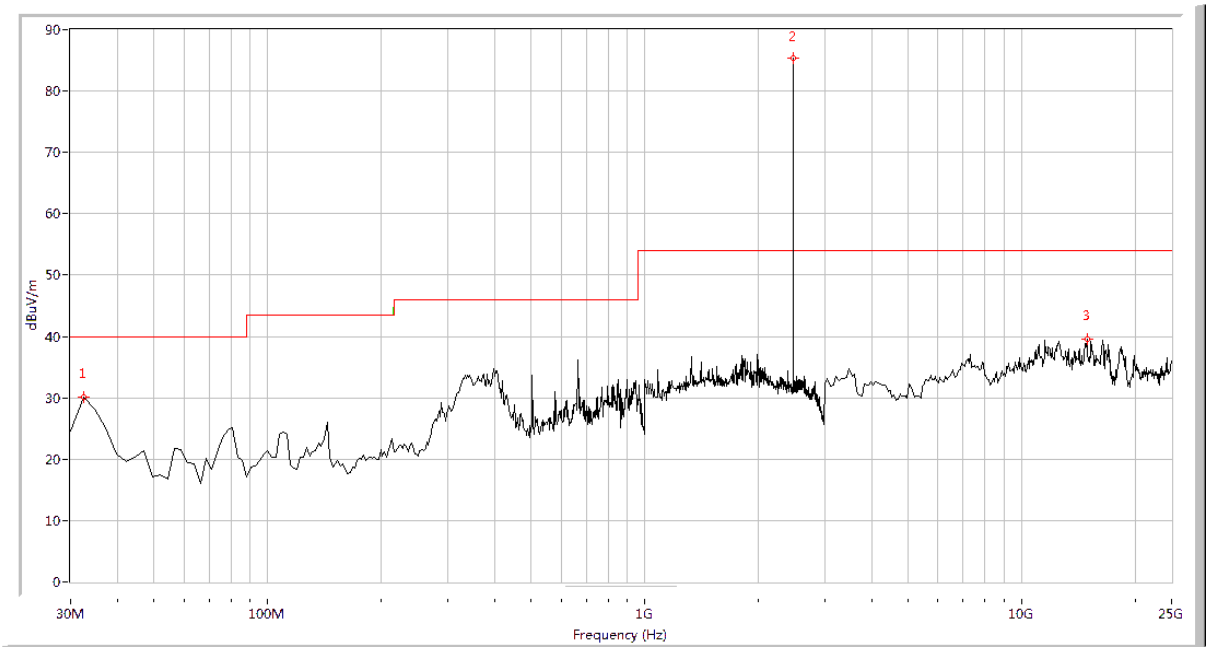


(Plot C.1: 9kHz to 30MHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
286.409	35.65	N.A	N.A	N.A	46.0	N.A	Horizontal	PASS
2480.000	85.78	N.A	N.A	N.A	N.A	N.A	Horizontal	N.A
16441.397	39.51	N.A	N.A	74.0	N.A	54.0	Horizontal	PASS

(Plot C.2: Antenna Horizontal, 30MHz to 25GHz)



Fre. (MHz)	Pk	QP	AV	Limit-PK	Limit-QP	Limit-AV	Antenna	Verdict
32.419	30.09	N.A	N.A	N.A	40.0	N.A	Vertical	PASS
2480.000	85.43	N.A	N.A	N.A	N.A	N.A	Vertical	N.A
14905.237	39.62	N.A	N.A	74.0	N.A	54.0	Vertical	PASS

(Plot C.3: Antenna Vertical, 30MHz to 25GHz)

2.10. RF exposure evaluation

According to § 1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy lever in excess of Commission's guideline.

According to 447498 D01 General RF Exposure Guidance v05, exclusion threshold values at selected frequencies and distances table as following.

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	

MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	
3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Routine SAR evaluation refers to the specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evolution is not required, the portable transmitters with output power greater than the applicable low threshold SAR evolution to qualify for TCB approval.

Result:

This is portable device and the Max conducted peak output power is 0.979dBm, the maximum gain of antenna is 0.04dBi, the maximum output power is 1.019dBm (1.264mW). which is lower than the exclusion threshold 10mW, at frequency 2450MHz, and distance is 5mm.

The SAR measurement is not required.

** END OF REPORT **