

TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification

Issued Under the Authority of the
Federal Communications Commission

By:

Siemic Inc.
775 Montague Expressway
Milpitas, CA 95035

Date of Grant: 09/01/2015

Application Dated: 09/01/2015

Shenzhen Bilian Electronic Co., Ltd.
Building B1, Zhongxing Industrial Zone, Juling,
Jutang Community, Guanlan street, Bao'an,
Shenzhen, 518110
China

Attention: Tianle Chen , Certification Engineer

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE,
and is VALID ONLY for the equipment identified hereon for use under the
Commission's Rules and Regulations listed below.

FCC IDENTIFIER: S8J-R8723RB1
Name of Grantee: Shenzhen Bilian Electronic
Co., Ltd.
Equipment Class: Part 15 Spread Spectrum Transmitter
Notes: Bluetooth 150Mbps Wireless N USB
Module
Modular Type: Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
CC	15C	2402.0 - 2480.0	0.00277		

Single modular approval for Mobile host platform. Power listed is the maximum conducted output power. Device is SISO. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. OEM integrators must be provided with antenna installation instructions and operation conditions for satisfying RF exposure compliance.

CC: This device is certified pursuant to two different Part 15 rules sections.

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Bluetooth 150Mbps Wireless N USB Module

Model No.: BL-R8723RB1

FCC ID: S8J-R8723RB1

Trademark: LB-LINK

Report No.: KAD150528148E1

Issue Date: September 02, 2015

Prepared for

**Shenzhen Bilian Electronic Co., Ltd.
Building B1, Zhongxing Industrial Zone, Juling Jutang Community,
Guanlan street, Bao'an, Shenzhen China**

Prepared by

DONGGUAN EMTEK CO., LTD.

**No.281, Guantai Road, Nancheng District,
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DONGGUAN EMTEK CO., LTD.**

VERIFICATION OF COMPLIANCE

Applicant:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Manufacturer:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Product Description:	Bluetooth 150Mbps Wireless N USB Module
Trade Mark:	LB-LINK
Model Number:	BL-R8723RB1

We hereby certify that:

The above equipment was tested by DONGGUAN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247(2014).

Date of Test : May 28, 2015 to June 27, 2015

Prepared by : Ivy Huang
Ivy Huang/Editor

Reviewer : Alan He
Alan He/Supervisor

Approved & Authorized
Signer : Sam Lv
Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD150528148E1

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Appendix I (Photos of EUT) (3 pages)

1. GENERAL INFORMATION

1.1 Product Description

Product Name	Bluetooth 150Mbps Wireless N USB Module		
Model number	BL-R8723RB1		
Power Supply	DC From PC		
Technical Description			
Kind of Device	Bluetooth 4.0	Bluetooth 3.0+EDR	WiFi
Operation Frequency	2402-2480MHz		2412-2462MHz for 802.11b/g/n(HT20) ; 2422-2452MHz for 802.11n(HT40)
Modulation	GFSK	GFSK, $\pi/4$ -DQPSK, 8DPSK	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n, DSSS with DBPSK/DQPSK/CCK for 802.11b;
Number of Channel	40	79	11 Channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Channel space	2MHz	1MHz	5MHz
Max RF Output Power	2.02dBm	4.43dBm	14.10dBm
Antenna Type	Internal PCB antenna		External Antenna
Antenna Gain	2 dBi		

1.2 Test Facility

Site Description

EMC Lab. : Registered on FCC, June 18, 2014
The Certificate Number is 247565.

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A

Name of Firm : DONGGUAN EMTEK CO., LTD.

Site Location : No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The Tx frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of EUT was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Limitation

(1) Channel Separation test

FCC Part 15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25kHz or the 20 Bandwidth of the hopping channel, whichever is greater.

Frequency Range (MHz)	Limit(kHz)
902-928	>25kHz
2400-2483.5	>25kHz
5725-5850	>25kHz

(2) 20dB Bandwidth

Frequency Range(MHz)	Quantity of Hopping Channel	Limit(kHz)			
		50	25	15	75
	902-928	<250	>250	NA	NA
	2400-2483.5	NA	NA	>1000	<1000

(3) Quantity of Hopping Channel

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	Limit(Quantity of Hopping Channel)			
	20dB bandwidth <250kHz	20dB bandwidth >250kHz	20dB bandwidth <1MHz	20dB bandwidth >1MHz
902-928	50	25	NA	NA
2400-2483.5	NA	NA	15	15
5725-5850	NA	NA	75	NA

(4) Time of Occupancy(Dwell Time)

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	LIMIT(rms)		
	20dB bandwidth <250kHz(50Channel)	20dB bandwidth >250kHz(25Channel)	20dB bandwidth <1MHz(75Channel)
902-928	400(20S)	400(10S)	NA
2400-2483.5	NA	NA	400(30S)
5725-5850	NA	NA	400(30S)

Note: The “()” is all channel's average time of occupancy.

(5) Maximum Peak Output Power

FCC Part 15, Subpart C Section 15.247

Frequency Range (MHz)	Quantity of Hopping Channel	LIMIT(W)			
		50	25	15	75
902-928		1(30dBm)	0.125(21dBm)	NA	NA
2400-2483.5		NA	NA	0.125(21dBm)	1(30dBm)
5725-5850		NA	NA	NA	1(30dBm)

(6) Band edge

FCC Part15, Subpart C Section 15.247, In any 100kHz bandwidth outside the frequency band in with the spread spectrum 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, attenuation below the general limits specified in section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in section 15.205(a), must also comply with the radiated emission limits specified in section 15.209(a).

Operating Frequency Range(MHz)	Spurious emission frequency	Peak power ration to emission(dBc)	Limit Emission level(dBuV/m)
902-928	<902	>20	NA
	>928	>20	NA
	960-1240	NA	54
2400-2483.5	<2400	>20	NA
	>2483.5-2500	NA	54
5725-5850	<5350-5460	NA	54
	<5725	>20	NA
	>5850	>20	NA

(7) Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

(8) Radiated Emission

FCC Part 15, Subpart C Section 15.209 limit of radiated emission for frequency below 1000MHz. The emissions from an intentional radiator shall not exceed the field strength level specified in the following table:

Frequency (MHz)	Field strength $\mu\text{V/m}$	Distance(m)	Field strength at 3m dB $\mu\text{V/m}$
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	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

Remark 1. Emission level in dB $\mu\text{V/m}$ =20 log ($\mu\text{V/m}$)
: 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

FCC Part 15, Section 15.35(b) limit of radiated emission for frequency above 1000MHz

Frequency(MHz)	Class A(dB $\mu\text{V/m}$)(at 3m)		Class B(dB $\mu\text{V/m}$)(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart C Section 15.249. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Frequency(MHz)	Filed Strength of Fundamental(at 3m)		Filed Strength of Harmonics(at 3m)	
	PEAK	AVERAGE	PEAK	AVERAGE
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

2.5 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

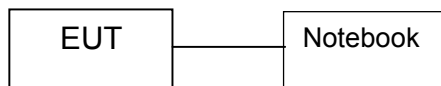


Table 2-1 Equipment Used in Tested System

Item	Equipment	Trade Mark	Model No.	FCC ID	Note
1.	Bluetooth 150Mbps Wireless N USB Module	LB-LINK	BL-R8723RB1	S8J-R8723RB1	EUT
2	Notebook	Dell	14R-N4110	N/A	Support Equipment

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column , device(s) used in tested system is a support equipment.

3. Summary of Test Results

FCC Rules	Description Of Test	Result
§15.207	AC Power Conducted Emission	Compliant
§15.247(d),§15.209	Radiated Emission	Compliant
§15.247(a)(1)	Channel Separation test	Compliant
§15.247(a)(1)	20dB Bandwidth	Compliant
§15.247(a)(1)(iii)	Quantity of Hopping Channel	Compliant
§15.247(a)(1)(iii)	Time of Occupancy(Dwell Time)	Compliant
§15.247(b)	Max Peak output Power test	Compliant
§15.247(d)	Band edge test	Compliant
§15.203	Antenna Requirement	Compliant

4. Description of test modes

The EUT has been tested under TX operating condition.

This EUT is a FHSS system, were conducted to determine the final configuration from all possible combinations. We use software control the EUT, Let EUT hopping on and transmit with highest power, all the modes GFSK, $\pi/4$ -DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

Channel	Frequency(MHz)
1	2402
40	2441
79	2480

5. TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Power Density	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Band Edge Test	$\pm 3\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^{\circ}\text{C}$
Humidity	$\pm 3\%$

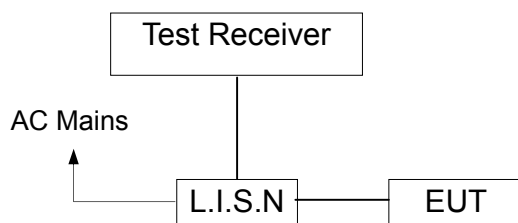
Measurement Uncertainty for a level of Confidence of 95%

6. Conducted Emissions Test

6.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

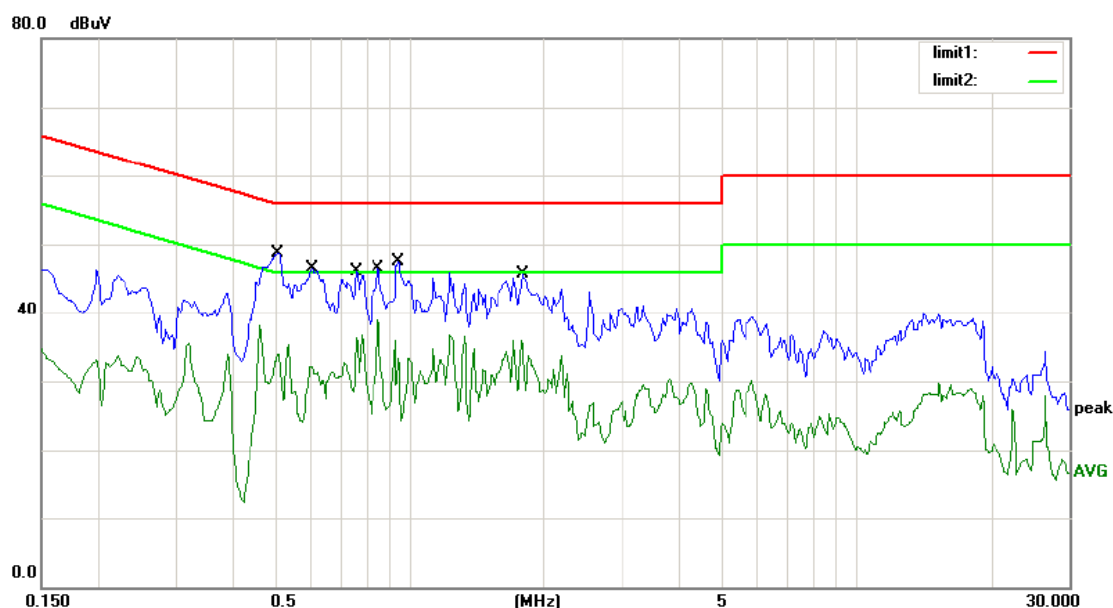
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	03/16/2015	03/15/2016
L.I.S.N	Rohde & Schwarz	ENV216	100017	03/16/2015	03/15/2016
RF Switching Unit	CDS	RSU-M2	38401	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

6.4 Measurement Result:

Pass.

All the modulation modes were tested the data of the worst mode (GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

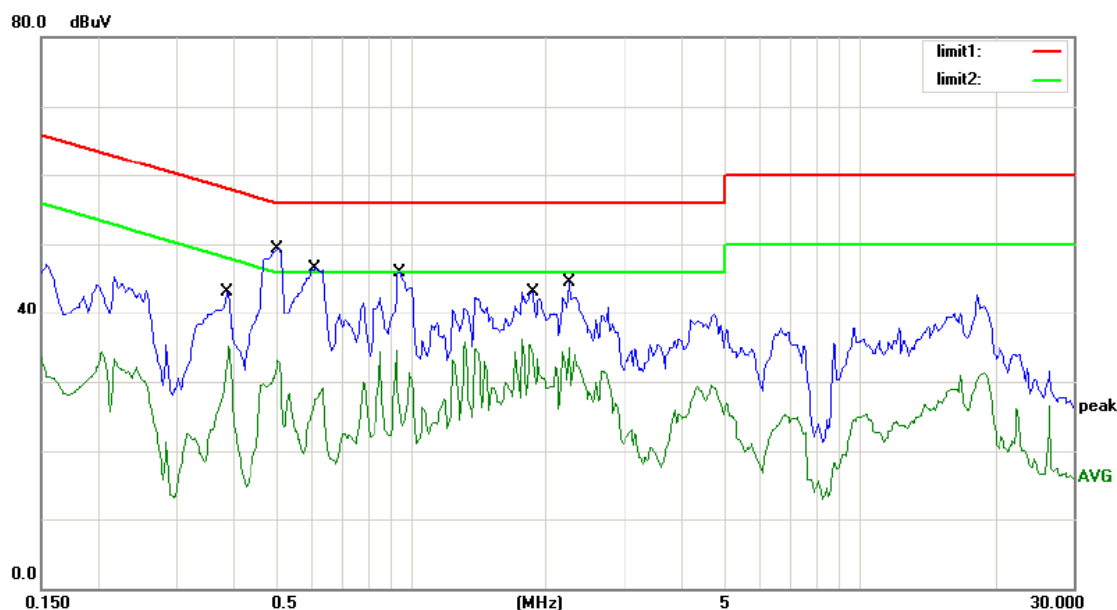
Please refer to the following data.



Site site #1 Phase: **L1** Temperature: 24
 Limit: (CE)FCC PART 15 class B_QP Power: DC 5V Humidity: 55 %
 Mode: TX(2402MHz)
 Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.5100	46.74	0.00	46.74	56.00	-9.26	QP	
2		0.5100	35.29	0.00	35.29	46.00	-10.71	AVG	
3		0.6045	44.25	0.00	44.25	56.00	-11.75	QP	
4		0.6045	32.08	0.00	32.08	46.00	-13.92	AVG	
5		0.7620	44.71	0.00	44.71	56.00	-11.29	QP	
6		0.7620	36.63	0.00	36.63	46.00	-9.37	AVG	
7		0.8520	44.12	0.00	44.12	56.00	-11.88	QP	
8	*	0.8520	38.81	0.00	38.81	46.00	-7.19	AVG	
9		0.9465	45.25	0.00	45.25	56.00	-10.75	QP	
10		0.9465	35.81	0.00	35.81	46.00	-10.19	AVG	
11		1.7925	43.24	0.00	43.24	56.00	-12.76	QP	
12		1.7925	33.68	0.00	33.68	46.00	-12.32	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.



Site site #1
 Limit: (CE)FCC PART 15 class B_QP
 Mode: TX(2402MHz)
 Note:

Phase: **N**
 Power: DC 5V
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.3885	41.14	0.00	41.14	58.10	-16.96	QP	
2		0.3885	35.04	0.00	35.04	48.10	-13.06	AVG	
3	*	0.5054	47.54	0.00	47.54	56.00	-8.46	QP	
4		0.5054	33.04	0.00	33.04	46.00	-12.96	AVG	
5		0.6134	44.25	0.00	44.25	56.00	-11.75	QP	
6		0.6134	22.58	0.00	22.58	46.00	-23.42	AVG	
7		0.9465	43.54	0.00	43.54	56.00	-12.46	QP	
8		0.9465	26.24	0.00	26.24	46.00	-19.76	AVG	
9		1.8690	41.74	0.00	41.74	56.00	-14.26	QP	
10		1.8690	35.36	0.00	35.36	46.00	-10.64	AVG	
11		2.2500	42.63	0.00	42.63	56.00	-13.37	QP	
12		2.2500	34.89	0.00	34.89	46.00	-11.11	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.

6.5 Conducted Measurement Photos:



7. Radiated Emission Test

7.1 Measurement Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.
5. The following table is the setting of spectrum analyzer:

When spectrum scanned from 30MHz to 1GHz setting resolution bandwidth 120KHz and video bandwidth 300KHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	120KHz
VB	300KHz
Detector	QP
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

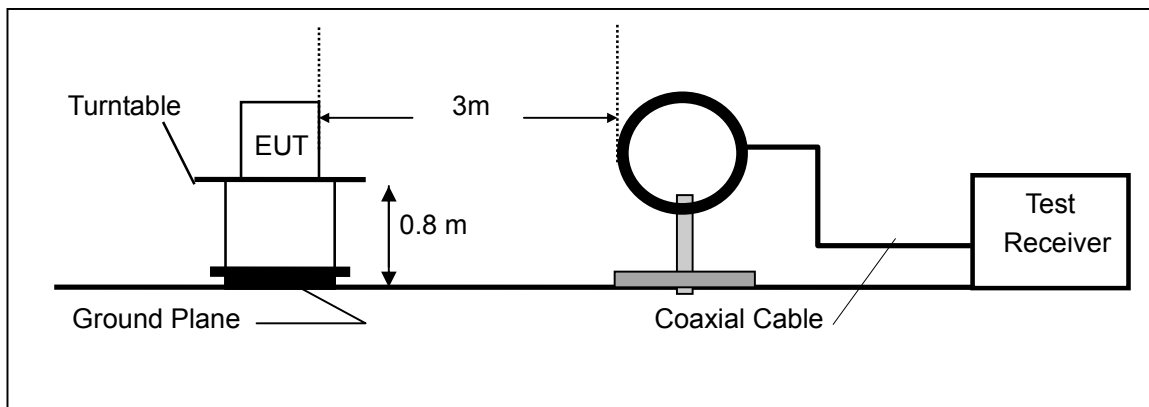
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

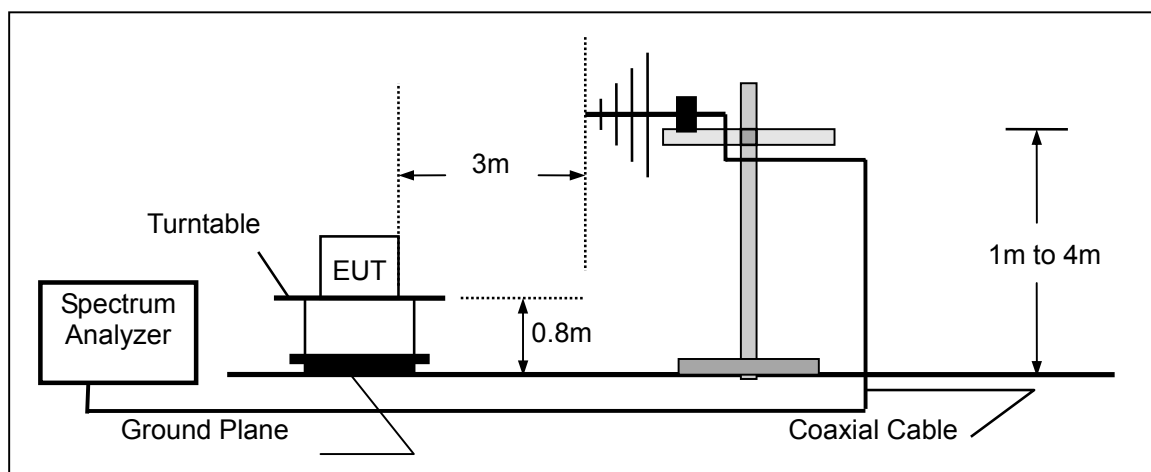
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

7.2 Test SET-UP (Block Diagram of Configuration)

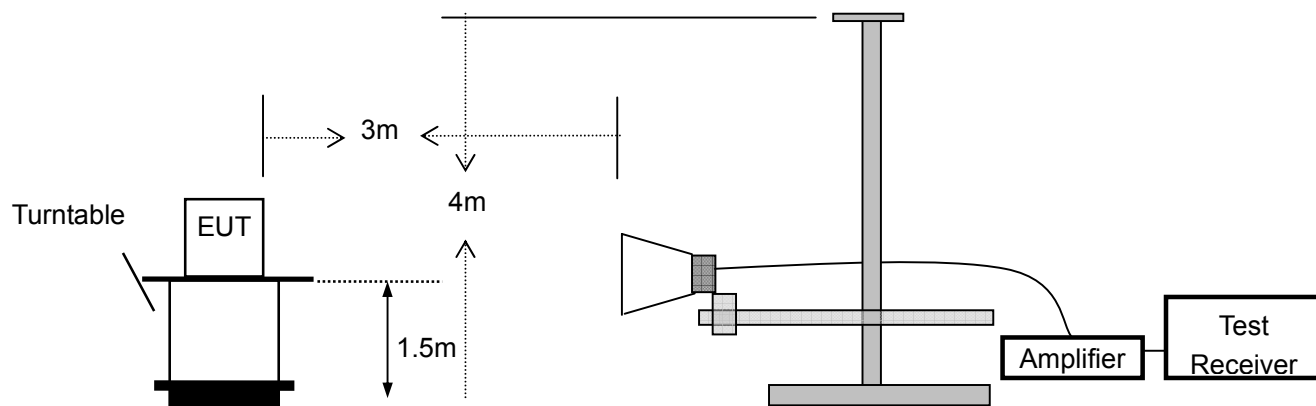
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



7.3 Measurement Equipment Used:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	03/16/2015	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	03/16/2015	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	03/16/2015	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	03/16/2015	1 Year
5.	Color Monitor	SUNSP0	SP-140A	N/A	03/16/2015	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	03/16/2015	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	03/16/2015	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	03/16/2015	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	03/16/2015	1 Year
10.	Cable	Schwarzbeck	PLF-100	549489	03/16/2015	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	03/16/2015	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	03/16/2015	1 Year
13.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	12/29/2014	1 Year
14.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	12/29/2014	1 Year
15.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	12/29/2014	1 Year
16.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
17.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
18.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year

7.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

Remark 1. Emission level in dBuV/m=20 log (uV/m)

: 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

7.5 Measurement Result

Below 30MHz:

Operation Mode:	TX	Test Date :	June 12, 2015
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

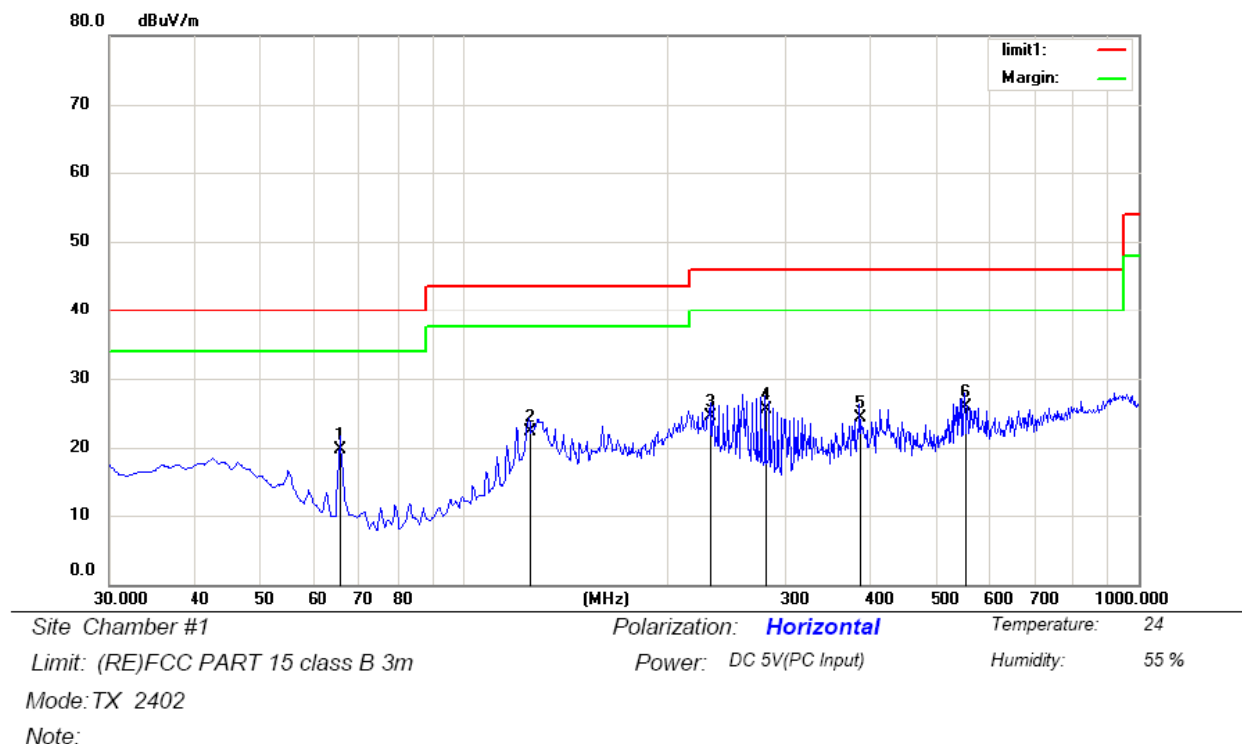
Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Below 1000MHz:

Pass.

All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

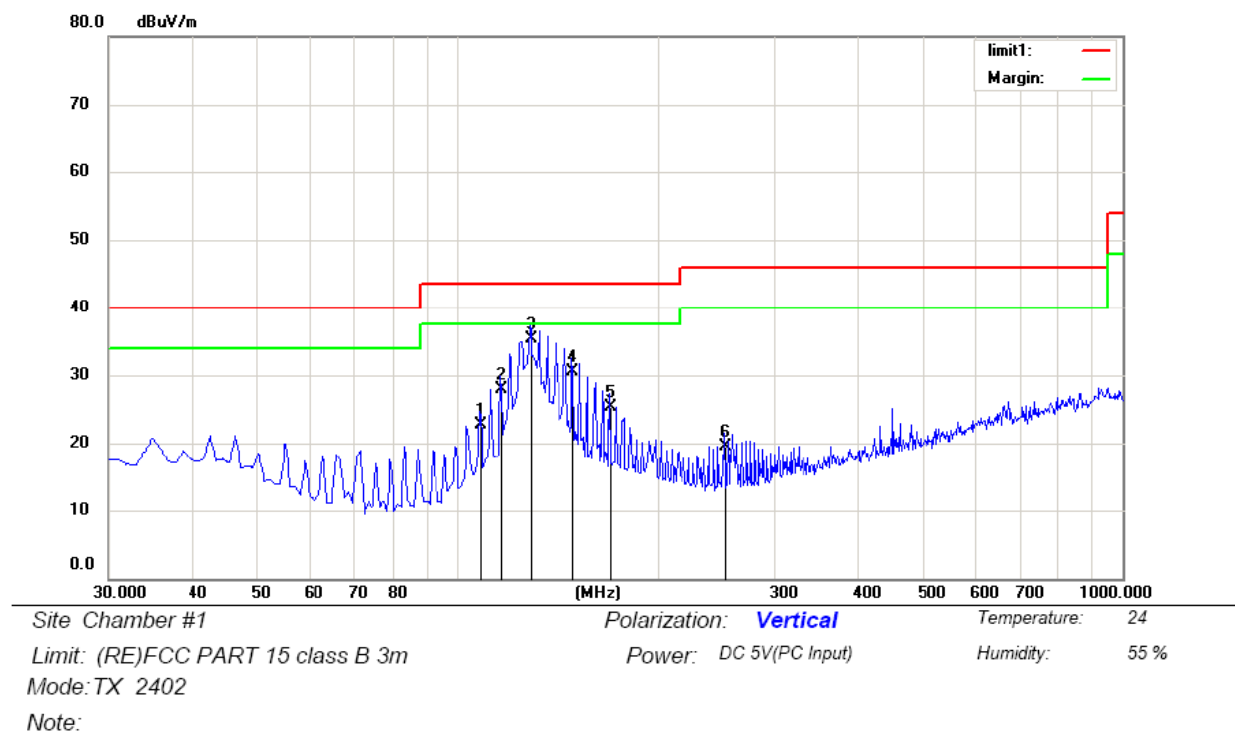
Please refer to the following data.



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		65.8900	40.81	-21.07	19.74	40.00	-20.26	QP		
2		125.0600	38.63	-16.40	22.23	43.50	-21.27	QP		
3		232.7300	40.45	-15.93	24.52	46.00	-21.48	QP		
4		280.2600	40.36	-14.90	25.46	46.00	-20.54	QP		
5		386.9600	36.19	-11.84	24.35	46.00	-21.65	QP		
6	*	554.7700	34.77	-8.93	25.84	46.00	-20.16	QP		

*:Maximum data x:Over limit !:over margin

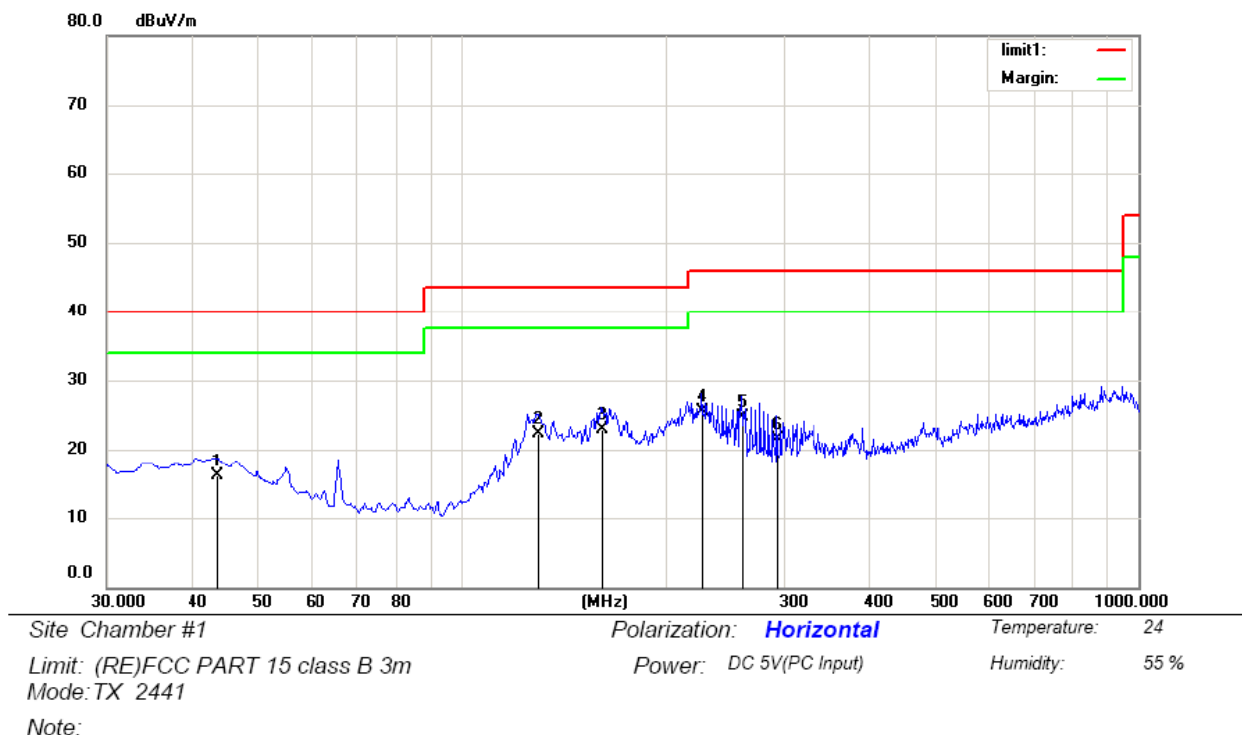
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		108.5700	40.51	-17.75	22.76	43.50	-20.74	QP		
2		116.3300	45.02	-17.21	27.81	43.50	-15.69	QP		
3	*	128.9400	51.62	-16.35	35.27	43.50	-8.23	QP		
4		149.3100	48.17	-17.68	30.49	43.50	-13.01	QP		
5		169.6800	43.63	-18.42	25.21	43.50	-18.29	QP		
6		252.1300	35.07	-15.54	19.53	46.00	-26.47	QP		

*:Maximum data x:Over limit !:over margin

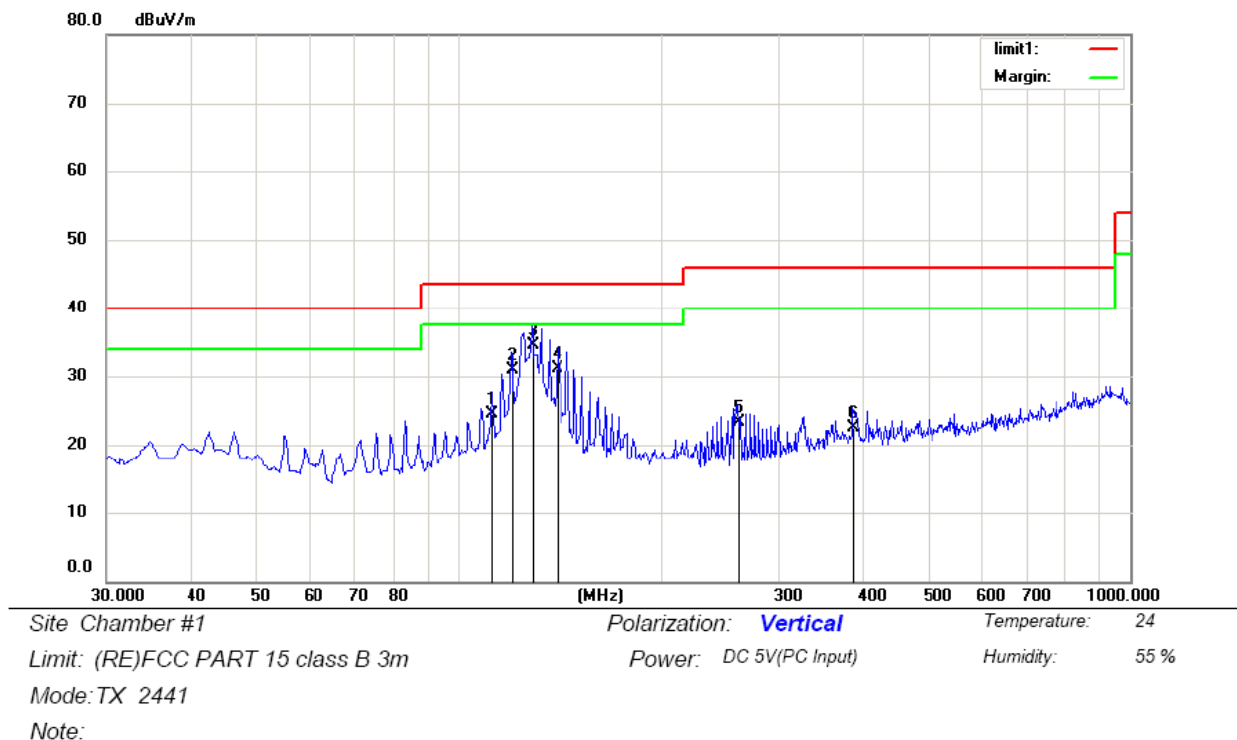
Operator: Snake



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		43.5800	29.57	-13.37	16.20	40.00	-23.80	QP		
2		129.9100	38.46	-16.25	22.21	43.50	-21.29	QP		
3		160.9500	41.30	-18.43	22.87	43.50	-20.63	QP		
4	*	226.9100	41.58	-16.10	25.48	46.00	-20.52	QP		
5		259.8900	40.00	-15.38	24.62	46.00	-21.38	QP		
6		292.8700	36.25	-14.69	21.56	46.00	-24.44	QP		

*:Maximum data x:Over limit !:over margin

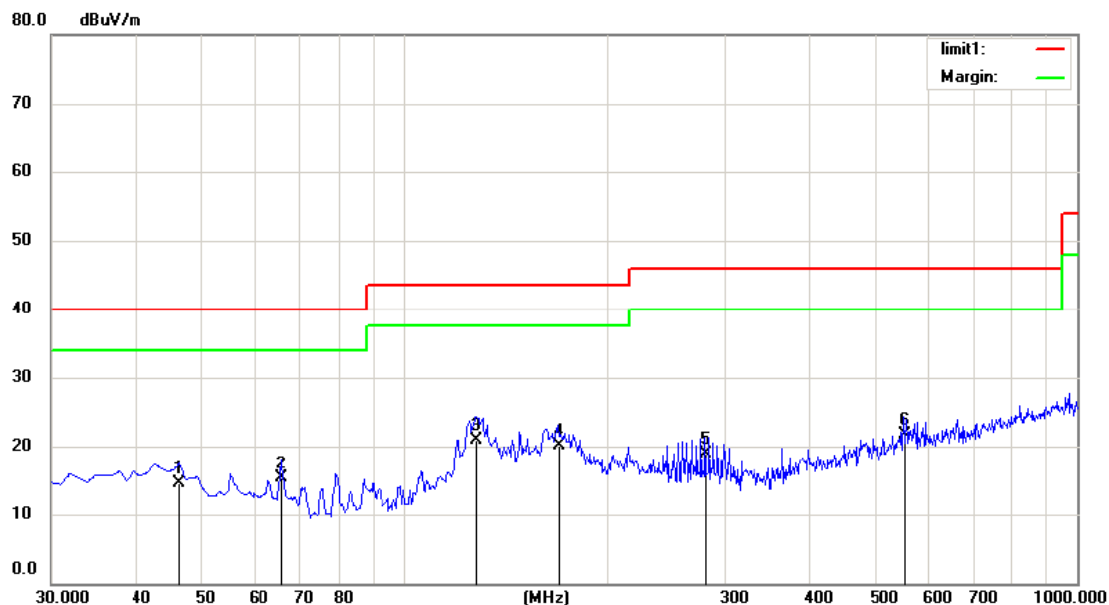
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1		112.4500	42.01	-17.43	24.58	43.50	-18.92	QP		
2		120.2100	47.80	-16.93	30.87	43.50	-12.63	QP		
3	*	128.9400	50.92	-16.35	34.57	43.50	-8.93	QP		
4		140.5800	48.21	-17.09	31.12	43.50	-12.38	QP		
5		261.8300	38.65	-15.36	23.29	46.00	-22.71	QP		
6		387.9300	34.33	-11.79	22.54	46.00	-23.46	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



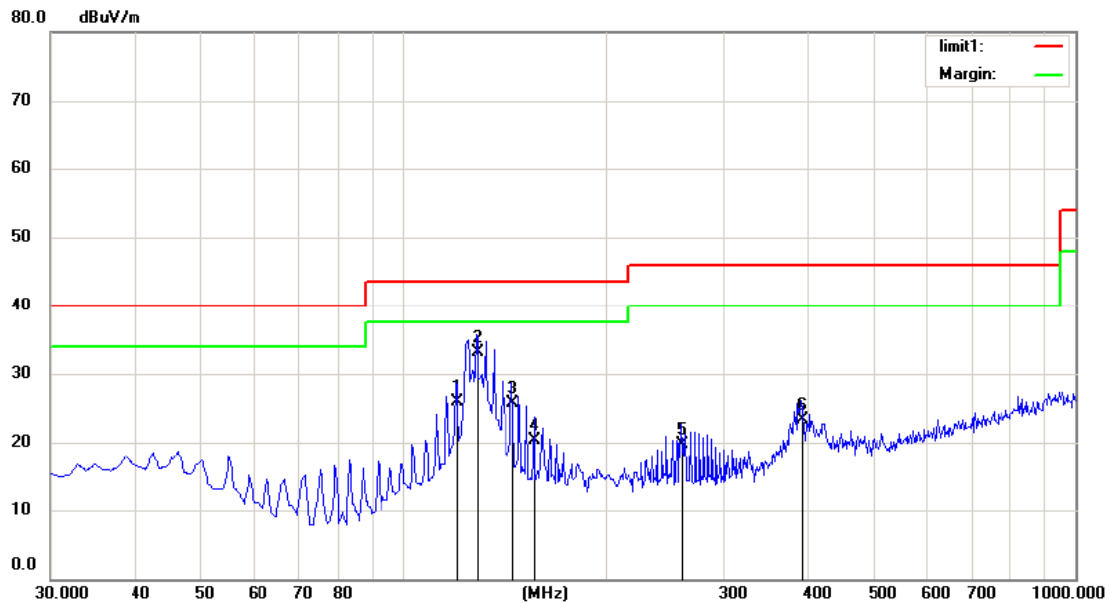
Site: Chamber #1
 Limit: (RE)FCC PART 15 class B 3m
 Mode: TX 2480
 Note:

Polarization: **Horizontal**
 Power: DC 5V(PC Input)
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		46.4900	28.53	-14.06	14.47	40.00	-25.53	QP		
2		65.8900	36.42	-21.07	15.35	40.00	-24.65	QP		
3	*	127.9700	37.21	-16.31	20.90	43.50	-22.60	QP		
4		169.6800	38.55	-18.42	20.13	43.50	-23.37	QP		
5		280.2600	33.74	-14.90	18.84	46.00	-27.16	QP		
6		554.7700	30.59	-8.93	21.66	46.00	-24.34	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



Site: Chamber #1
 Limit: (RE)FCC PART 15 class B 3m
 Mode: TX 2480
 Note:

Polarization: **Vertical**
 Power: DC 5V(PC Input)
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1		120.2100	42.90	-16.93	25.97	43.50	-17.53	QP			
2	*	128.9400	49.36	-16.35	33.01	43.50	-10.49	QP			
3		145.4300	43.12	-17.42	25.70	43.50	-17.80	QP			
4		157.0700	38.65	-18.28	20.37	43.50	-23.13	QP			
5		259.8900	35.12	-15.38	19.74	46.00	-26.26	QP			
6		392.7800	34.86	-11.58	23.28	46.00	-22.72	QP			

*:Maximum data x:Over limit !:over margin

Operator: Snake

Above 1000MHz

Worst Operation Mode: GFSK (CH1: 2402MHz) Test Date : June 12, 2015
 Frequency Range: 1-25GHz Temperature : 25 °C
 Test Result: PASS Humidity : 50 %
 Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4804	V	65.01	45.15	74	54	-8.99	-8.85
7206	V	63.24	44.01	74	54	-10.76	-9.99
9608	V	62.74	43.62	74	54	-11.26	-10.38
12010	V	61.62	42.15	74	54	-12.38	-11.85
14412	V	60.25	41.82	74	54	-13.75	-12.18
16814	V	59.72	40.24	74	54	-14.28	-13.76
4804	H	64.35	46.35	74	54	-9.65	-7.65
7206	H	63.15	45.18	74	54	-10.85	-8.82
9608	H	62.04	44.05	74	54	-11.96	-9.95
12010	H	61.72	43.62	74	54	-12.28	-10.38
14412	H	60.92	42.18	74	54	-13.08	-11.82
16814	H	59.48	40.27	74	54	-14.52	-13.73

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 (3) The average measurement was not performed when the peak measured data under the limit of average detection.
 (4) The results of worst cased (GFSK) was recorded.

Worst Operation Mode: GFSK (CH40: 2441MHz) Test Date : June 12, 2015
 Frequency Range: 1-25GHz Temperature : 25 °C
 Test Result: PASS Humidity : 50 %
 Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4882	V	65.35	45.72	74	54	-8.65	-8.28
7323	V	64.05	44.35	74	54	-9.95	-9.65
9764	V	63.72	43.62	74	54	-10.28	-10.38
12205	V	62.15	42.15	74	54	-11.85	-11.85
14646	V	61.04	41.05	74	54	-12.96	-12.95
17087	V	60.25	40.82	74	54	-13.75	-13.18
4882	H	64.72	46.35	74	54	-9.28	-7.65
7323	H	63.92	45.25	74	54	-10.08	-8.75
9764	H	62.15	44.15	74	54	-11.85	-9.85
12205	H	61.8	43.92	74	54	-12.2	-10.08
14646	H	60.24	42.01	74	54	-13.76	-11.99
17087	H	59.1	41.58	74	54	-14.9	-12.42

Other harmonics emissions are lower than 20dB below the allowable limit.

- Note:**
- (1) All Readings are Peak Value and AV.
 - (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 - (3) The average measurement was not performed when the peak measured data under the limit of average detection.
 - (4) The results of worst cased (GFSK) was recorded.

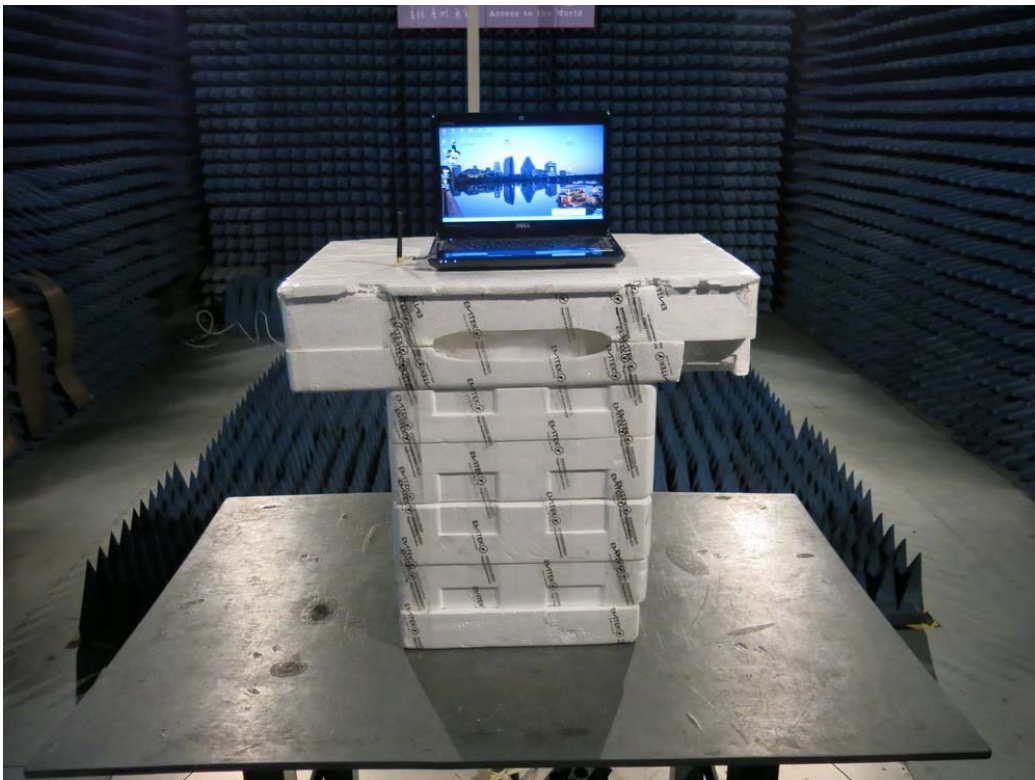
Worst Operation Mode: GFSK (CH79: 2480MHz) Test Date : June 12, 2015
Frequency Range: 1-25GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4960	V	65.32	45.15	74	54	-8.68	-8.85
7440	V	64.15	44.35	74	54	-9.85	-9.65
9920	V	63.72	43.62	74	54	-10.28	-10.38
12400	V	62.05	42.05	74	54	-11.95	-11.95
14880	V	61.82	41.82	74	54	-12.18	-12.18
17360	V	60.72	40.71	74	54	-13.28	-13.29
4960	H	65.72	45.6	74	54	-8.28	-8.4
7440	H	64.2	44.15	74	54	-9.8	-9.85
9920	H	63.62	43.62	74	54	-10.38	-10.38
12400	H	62.15	42.01	74	54	-11.85	-11.99
14880	H	61.87	41.82	74	54	-12.13	-12.18
17360	H	60	40.3	74	54	-14	-13.7

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.
(4) The results of worst cased (GFSK) was recorded.

7.5 Radiated Measurement Photos:

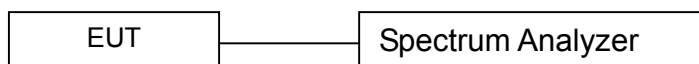


8. Channel Separation test

8.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

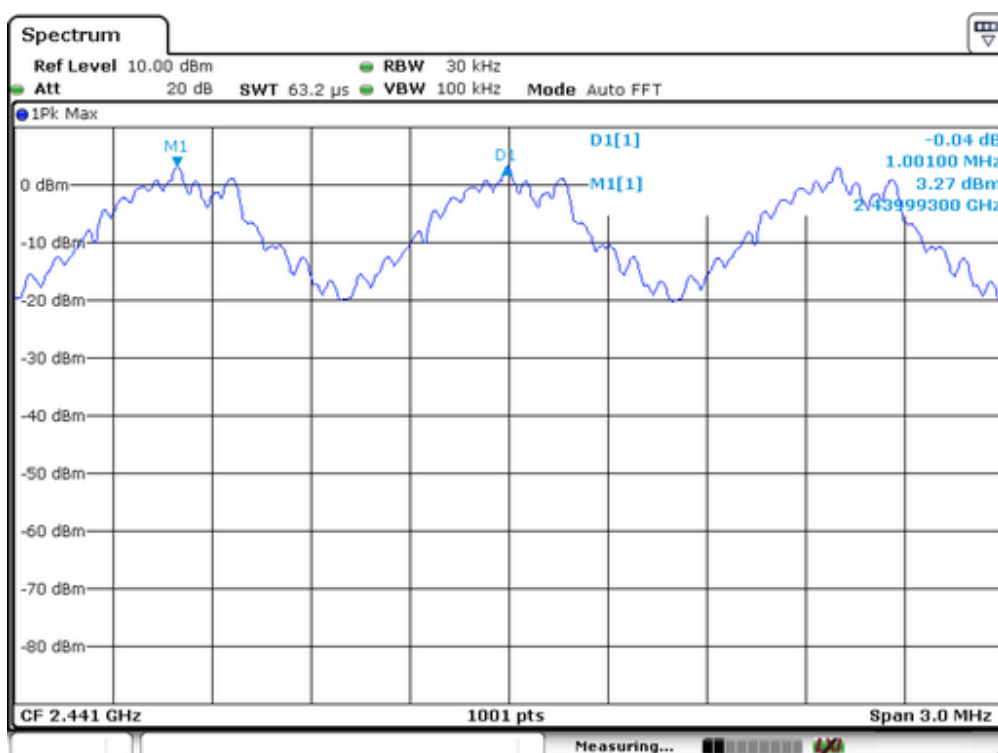
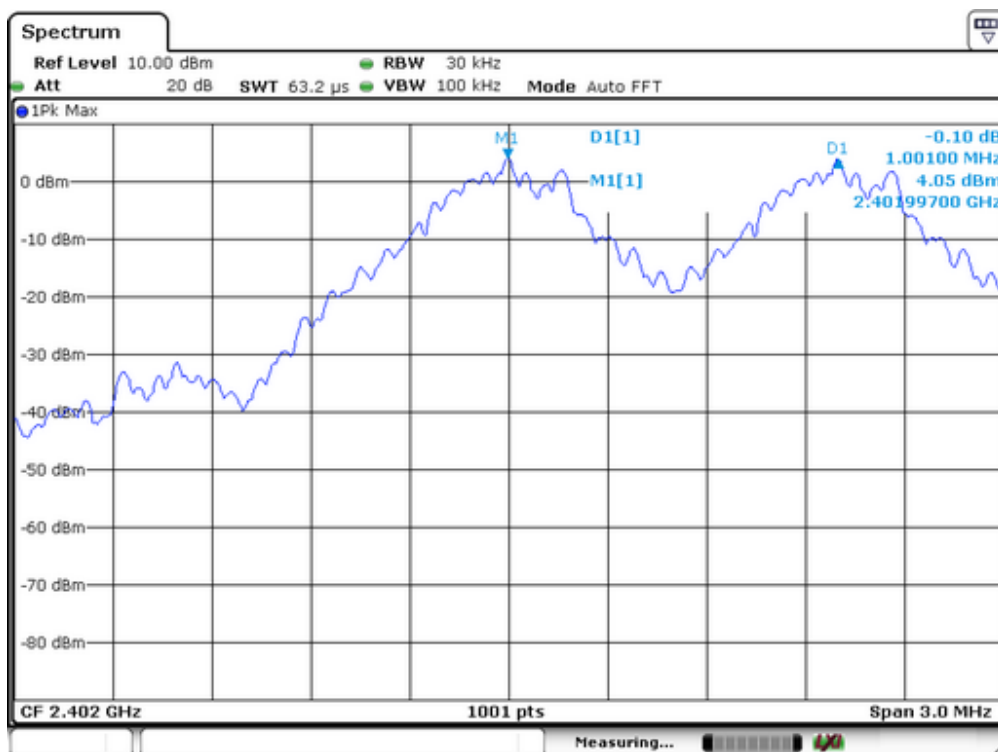
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

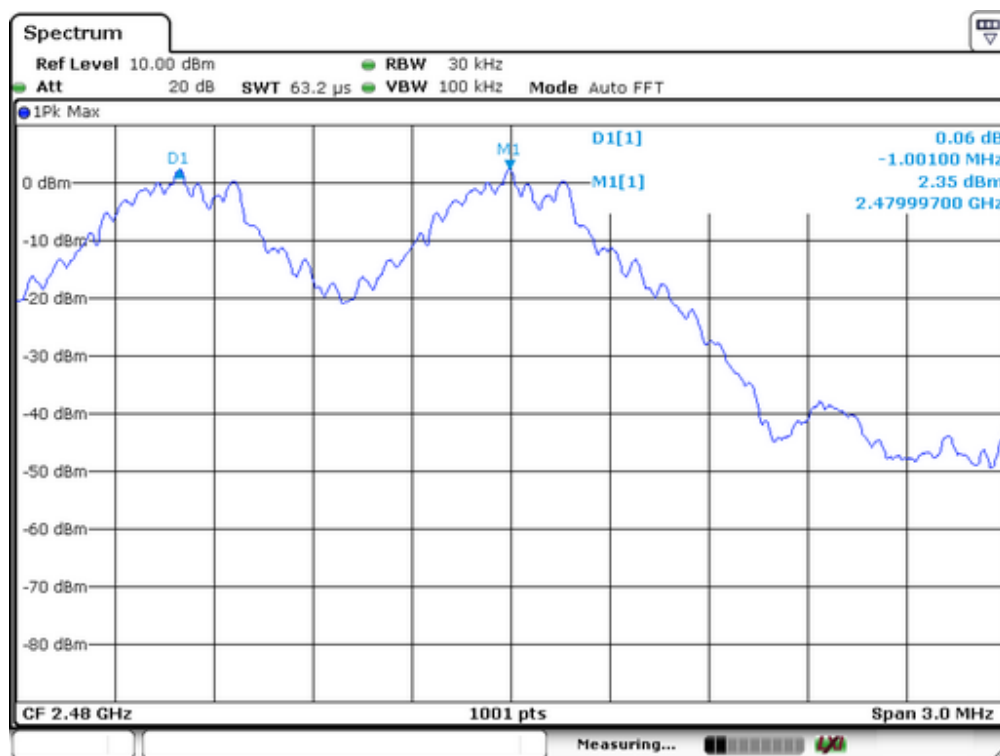
8.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %
Modulation:	GFSK		

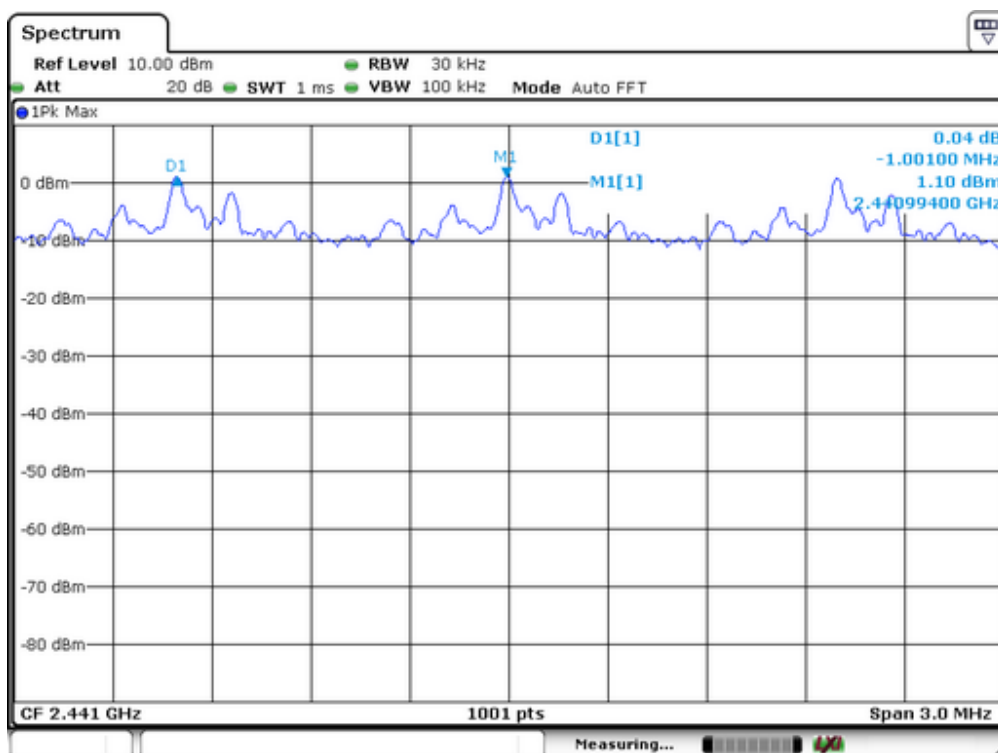
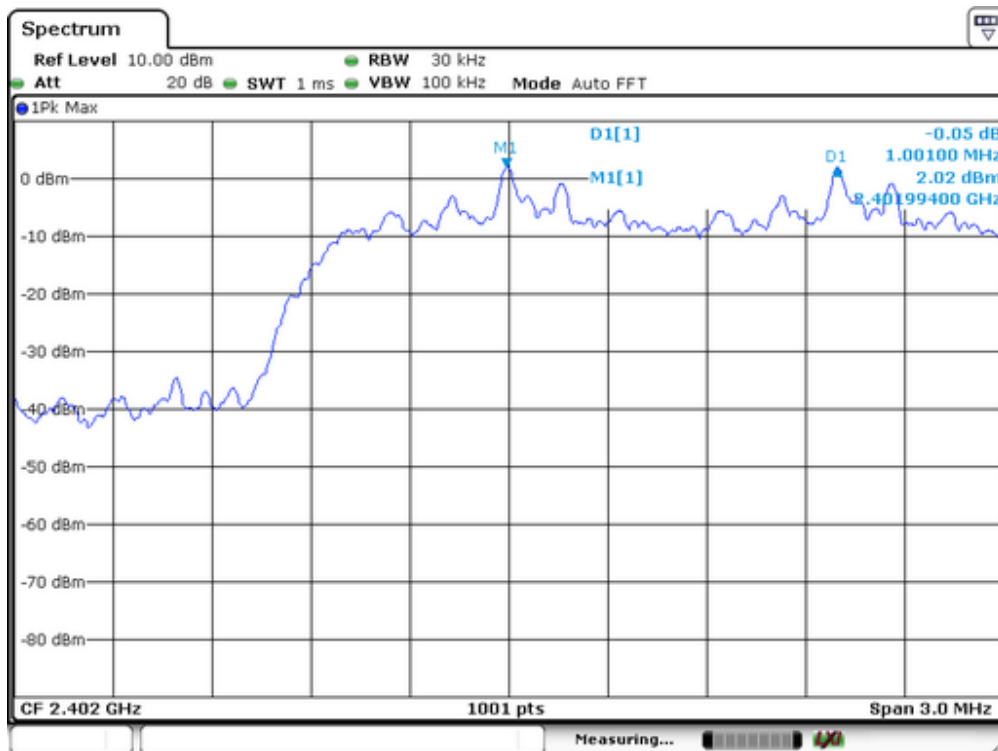
Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
1	2402	1001	>815
40	2441	1001	>818
79	2480	1001	>818

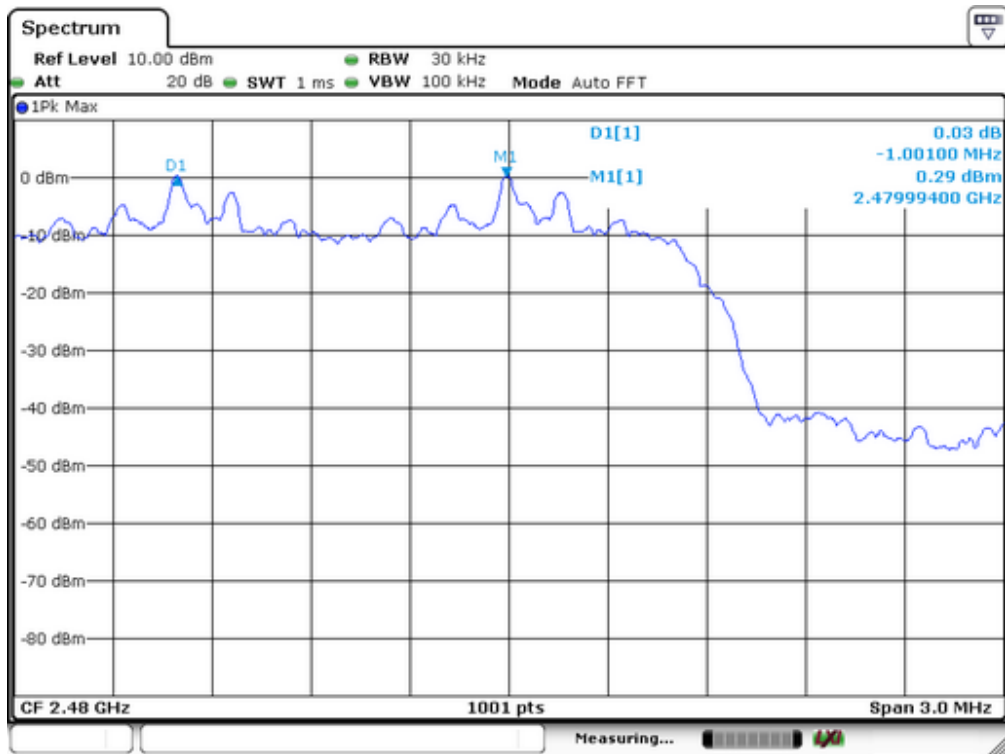




Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	Π/4-DQPSK		

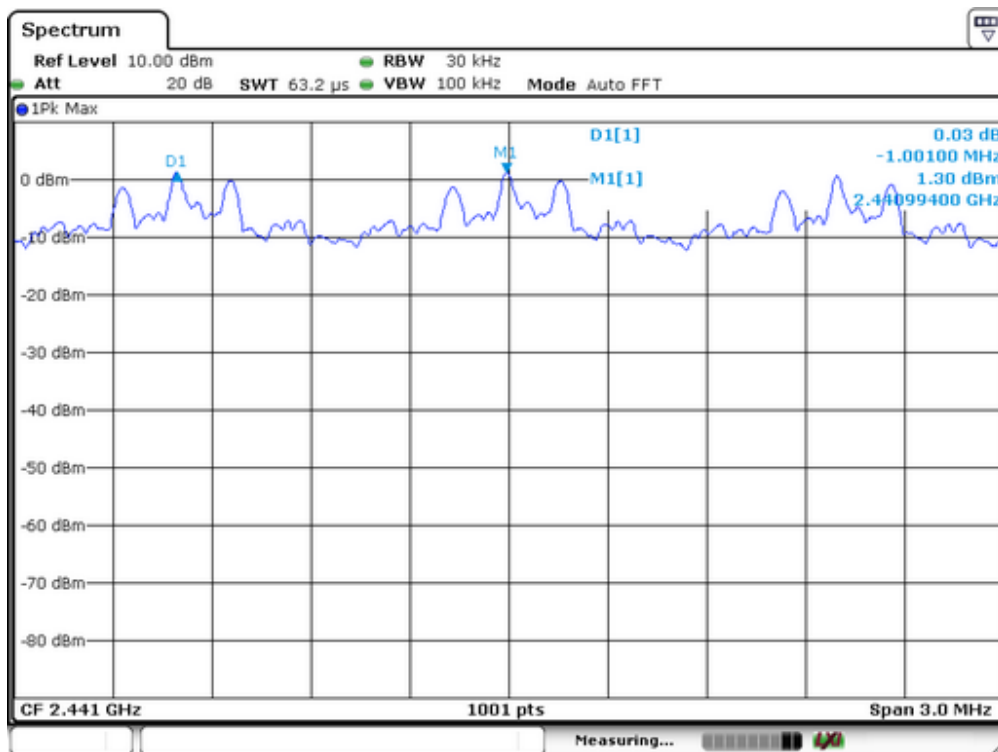
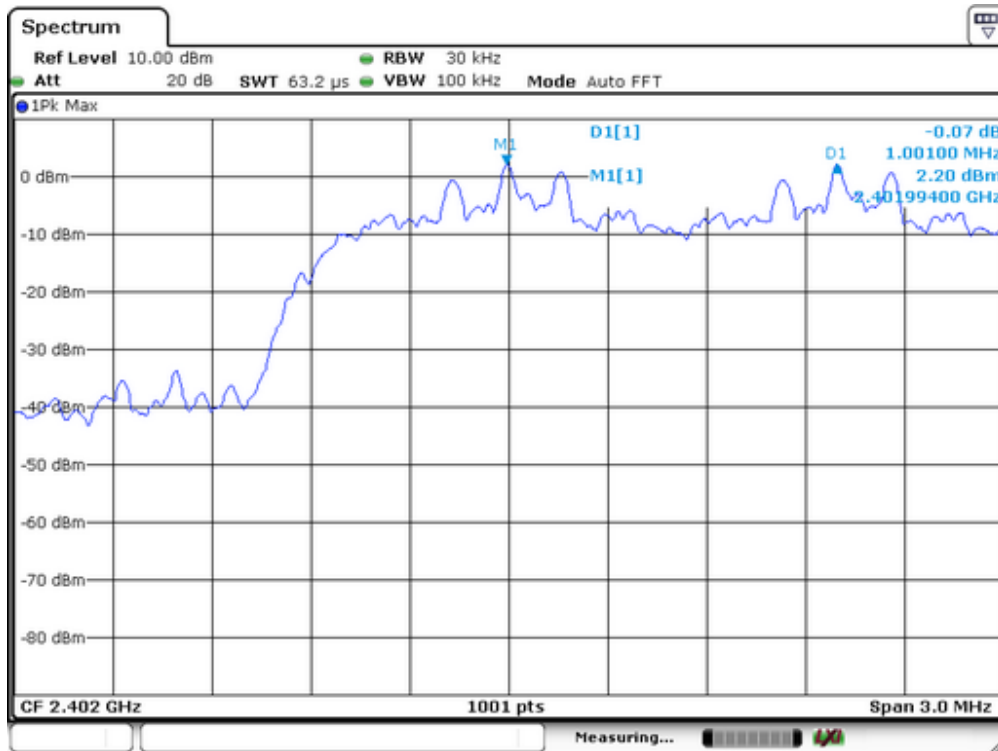
Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1001	>824
40	2441	1001	>824
79	2480	1001	>828

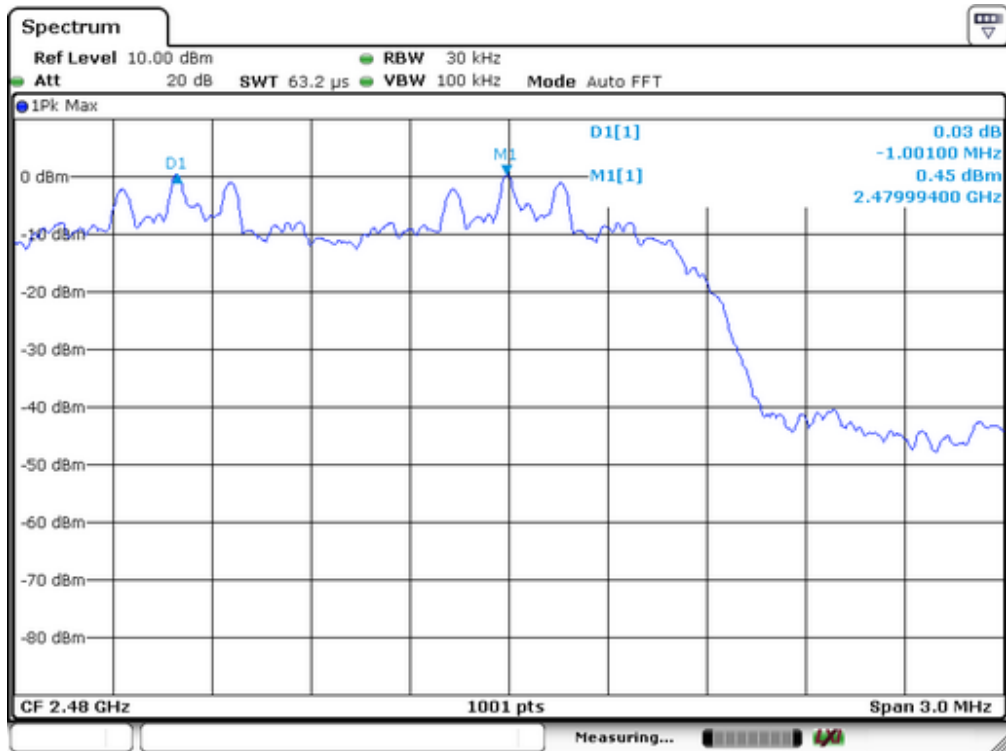




Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1001	>806
40	2441	1001	>806
79	2480	1001	>808



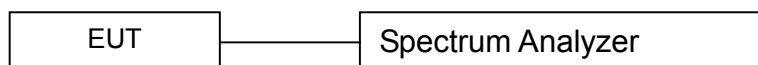


9. 20dB Bandwidth test

9.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

9.2 Test SET-UP (Block Diagram of Configuration)



9.3 Measurement Equipment Used:

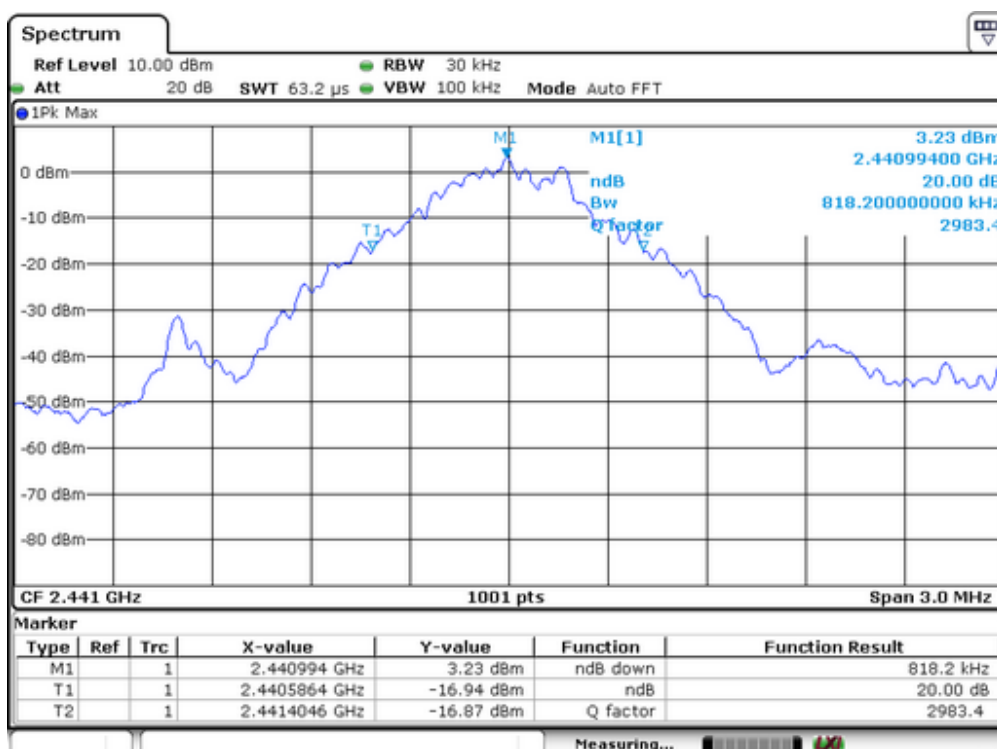
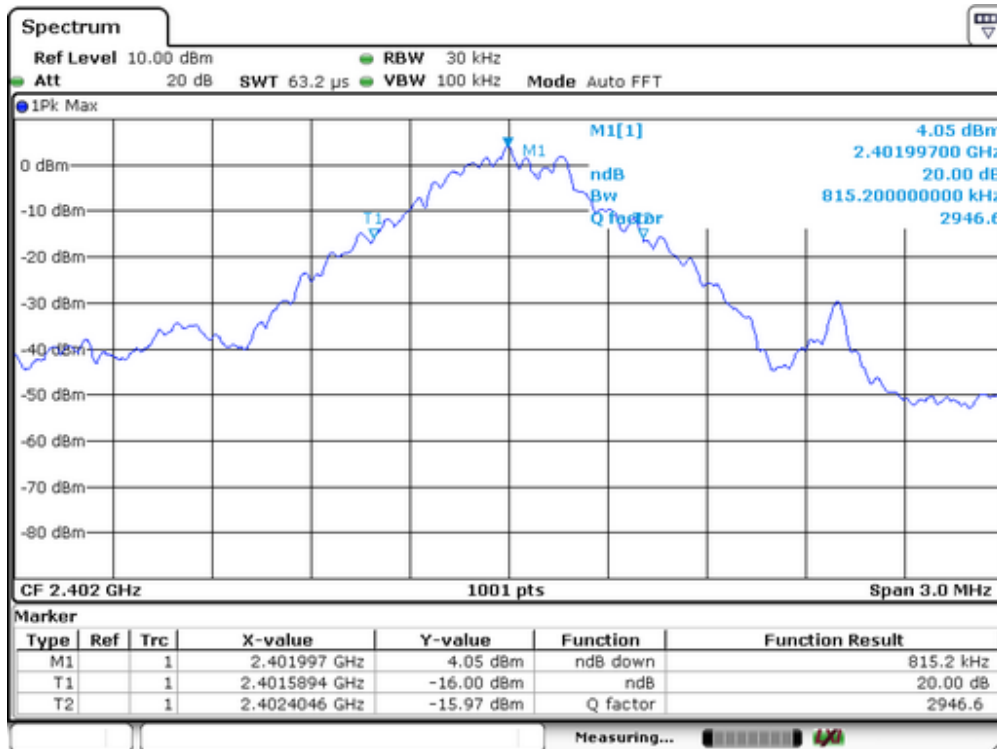
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

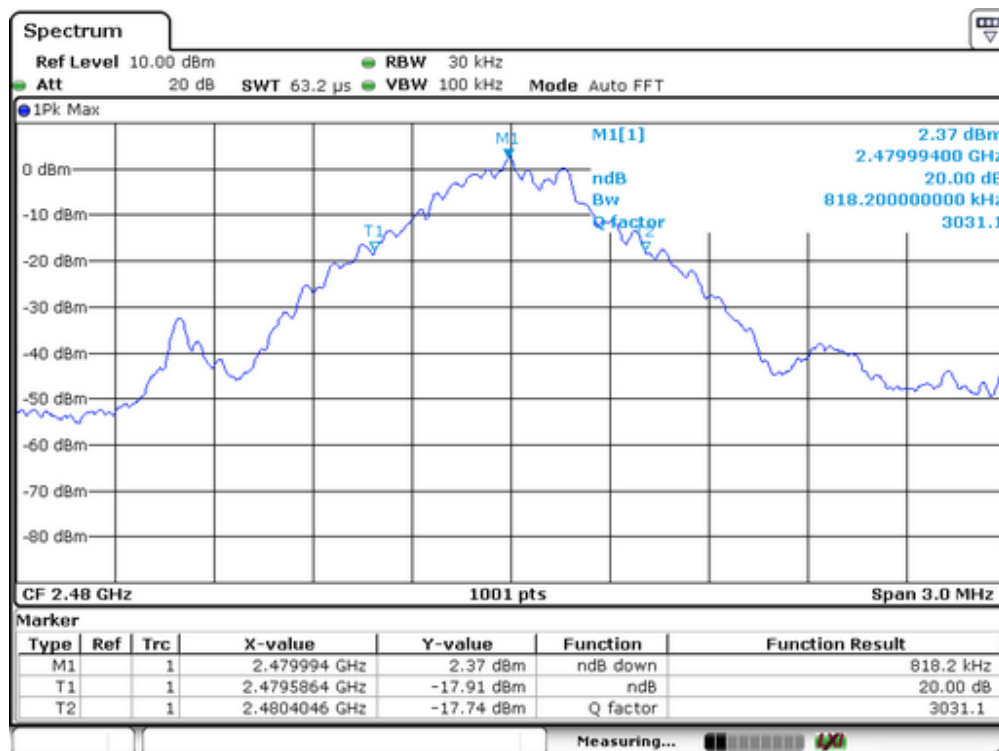
9.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	GFSK		

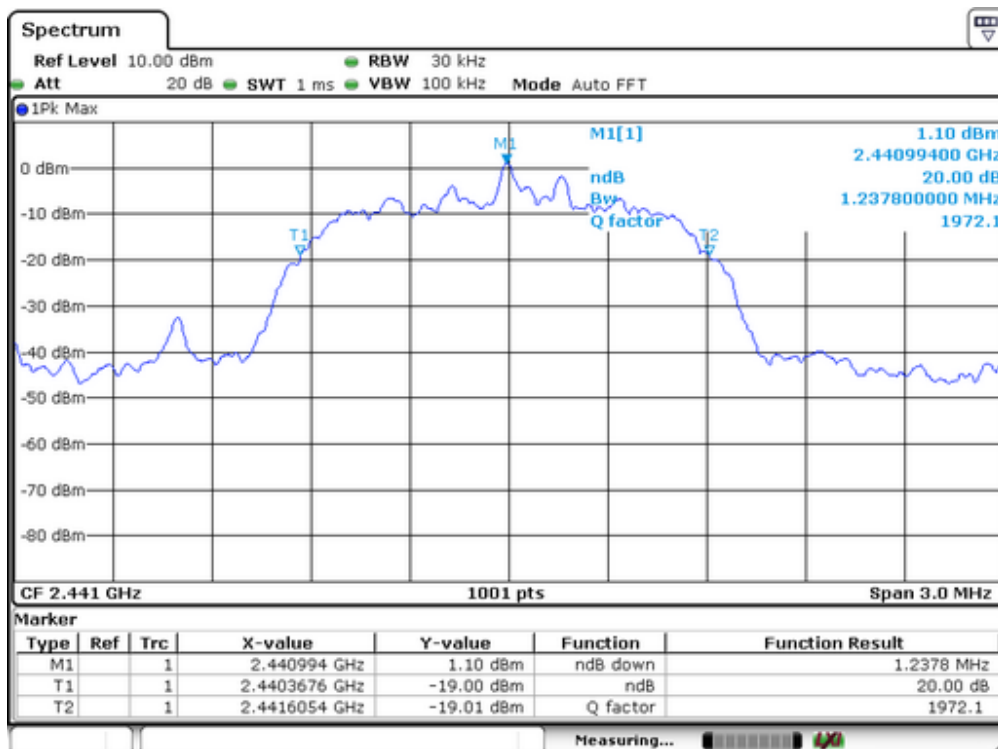
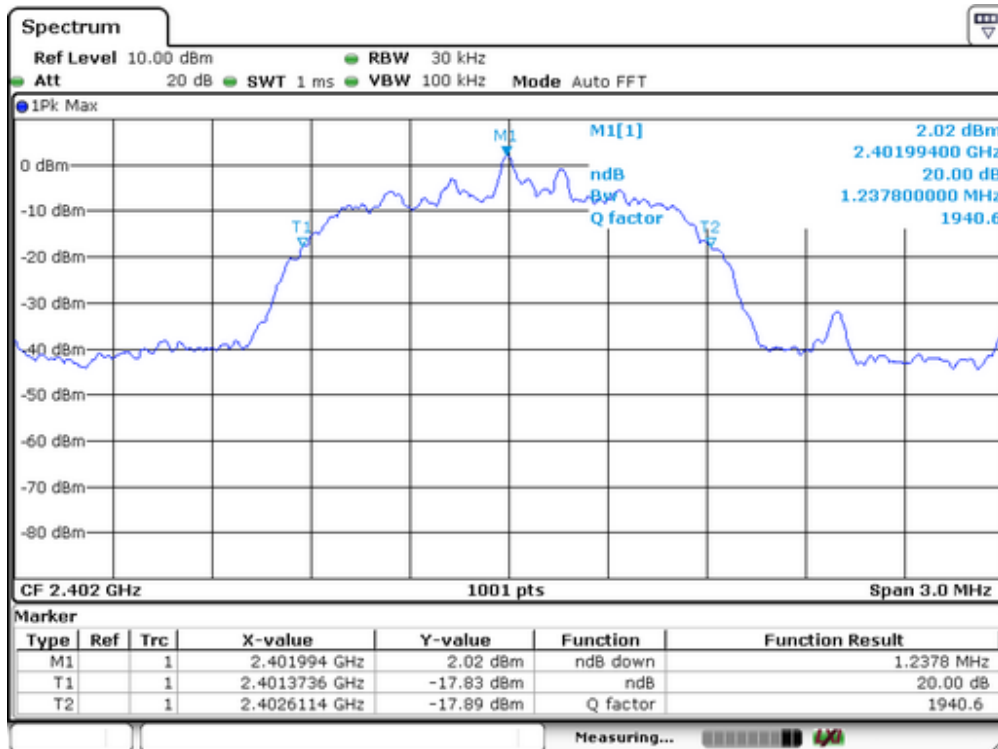
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	815
40	2441	818
79	2480	818

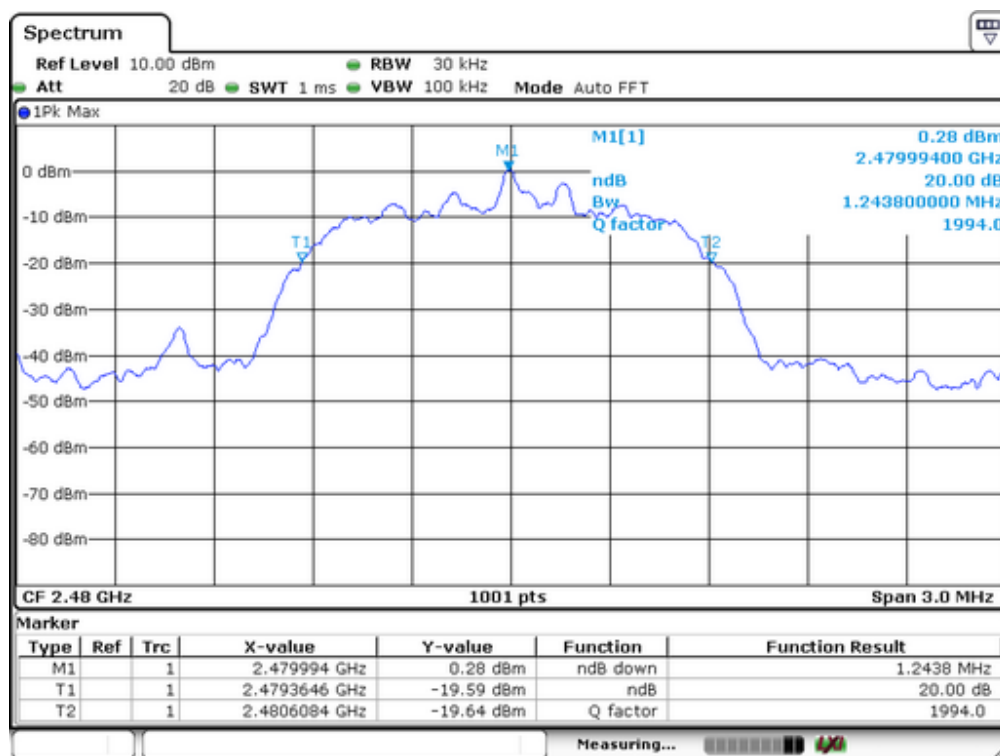




Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	Π/4-DQPSK		

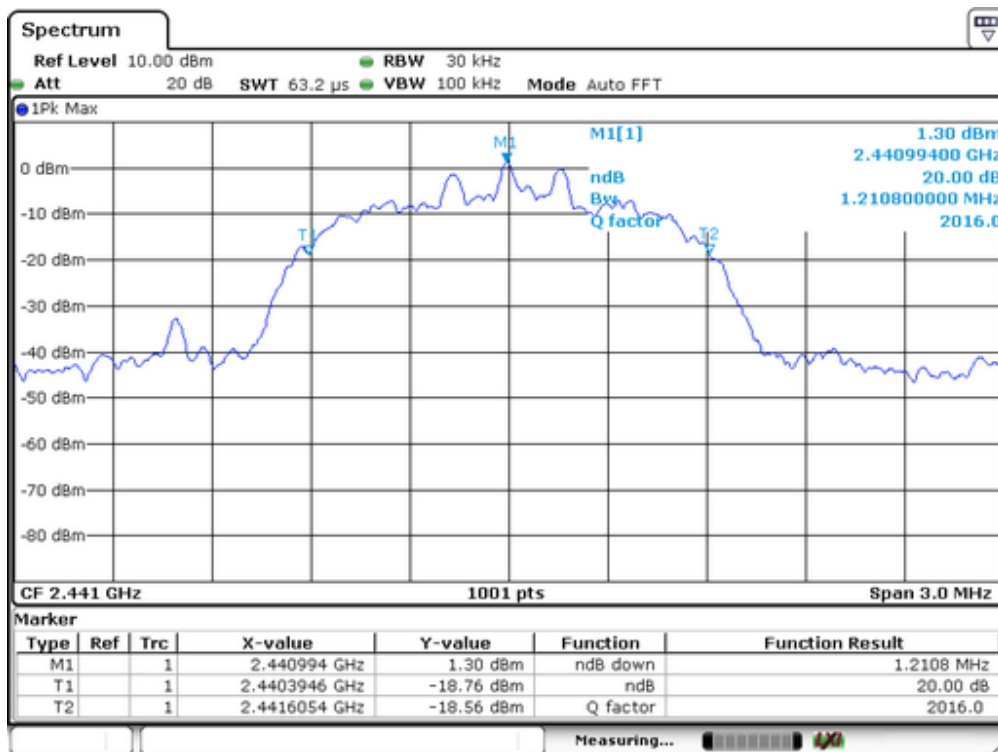
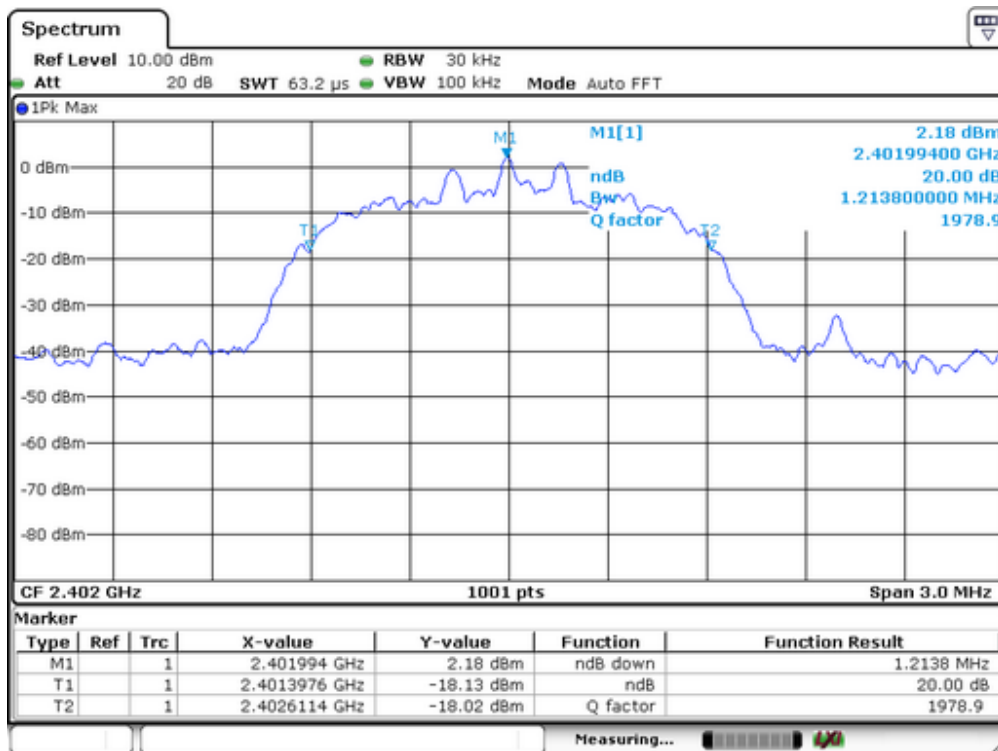
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1237
40	2441	1237
79	2480	1243

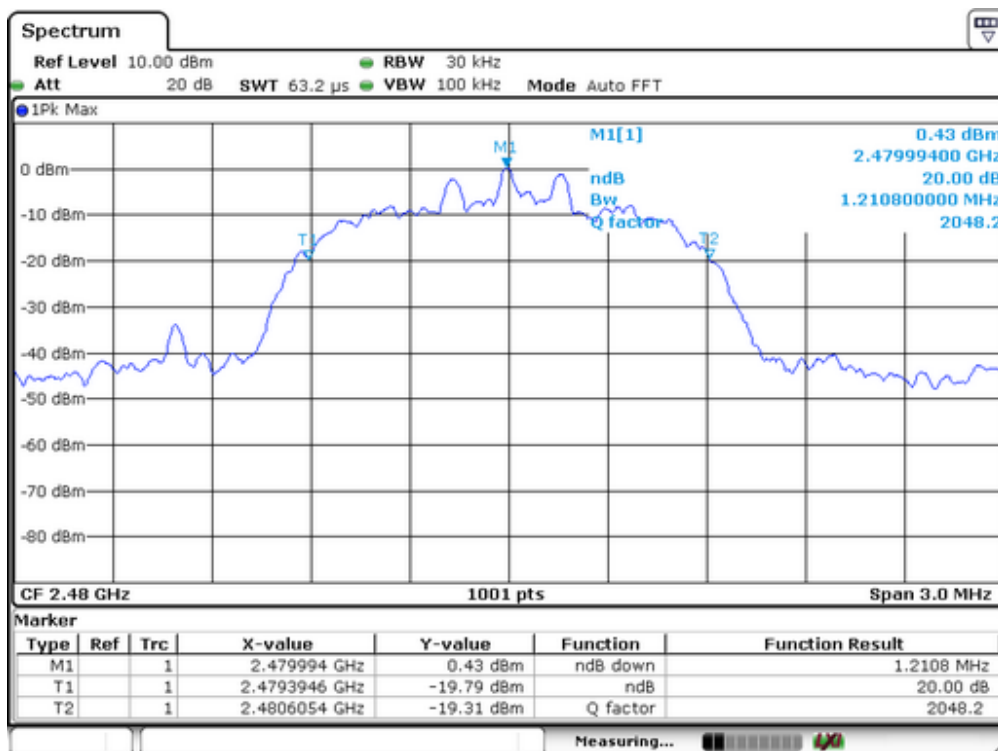




Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1213
40	2441	1210
79	2480	1210



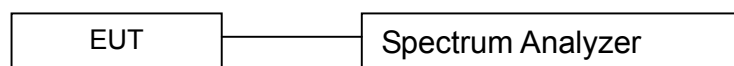


10. Quantity of Hopping Channel Test

10.1 Measurement Procedure

The EUT was operating in hopping mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

10.2 Test SET-UP (Block Diagram of Configuration)



10.3 Measurement Equipment Used:

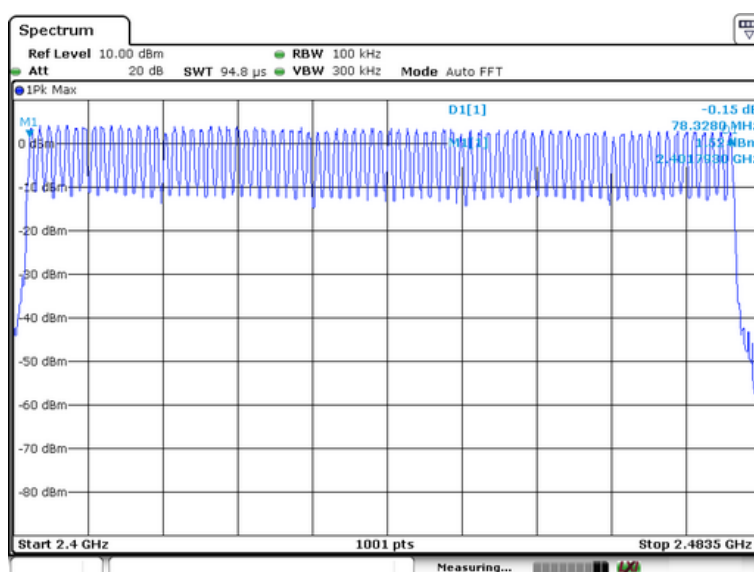
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

10.4 Measurement Results:

Refer to attached data chart.

Worst Test Mode	GFSK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Hopping Channel Frequency Range	Quantity of Hopping Channel	Quantity of Hopping Channel
2402-2480	79	> 15



11. Time of Occupancy (Dwell Time) test

11.1 Test Description

The Equipment Under Test (EUT) was set up to perform the dwell time measurements. The EUT was connected to the spectrum analyzer via a short coax cable. The dwell time is calculated by:

$$\text{Dwell time} = \text{time slot length} * \text{hop rate} / \text{number of hopping channels} * 31.6\text{s}$$

with:

- hop rate = $1600 * 1/\text{s}$ for DH1 packets = 1600 s^{-1}
- hop rate = $1600/3 * 1/\text{s}$ for DH3 packets = 533.33 s^{-1}
- number of hopping channels = 79
- $31.6 \text{ s} = 0.4 \text{ seconds}$ multiplied by the number of hopping channels = $0.4 \text{ s} * 79$

The highest value of the dwell time is reported.

11.2 Test Requirements / Limits

FCC Part 15, Subpart C, §15.247 (a) (1) (iii)

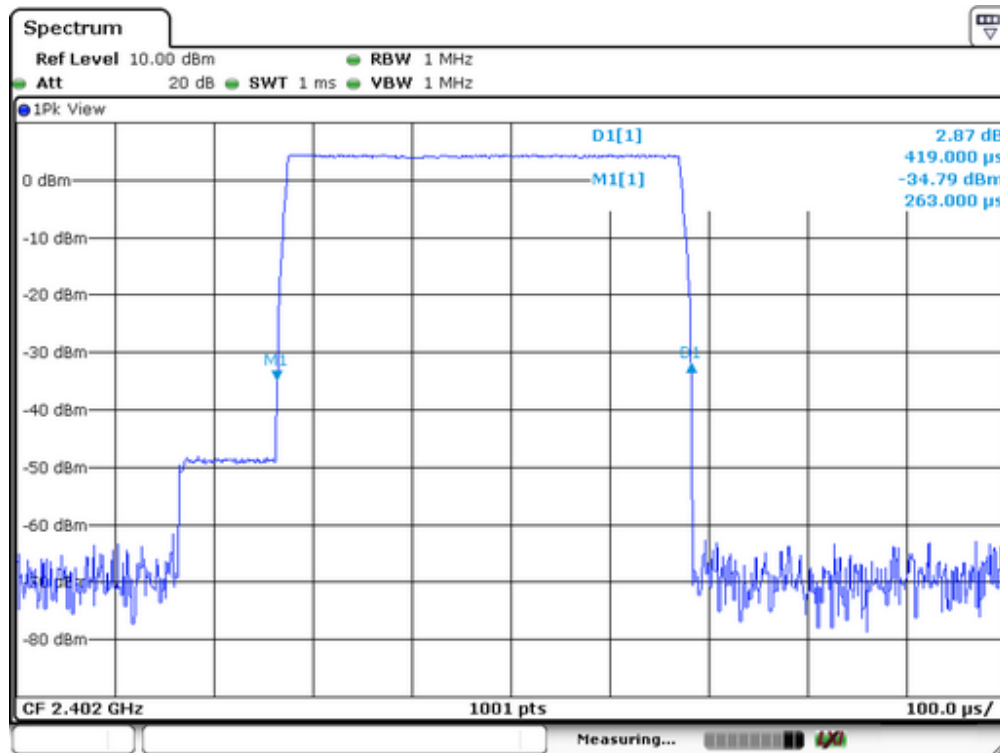
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Since the Bluetooth technology uses 79 channels this period is calculated to be 31.6seconds. Refer to attached data chart.

11.3 Test result

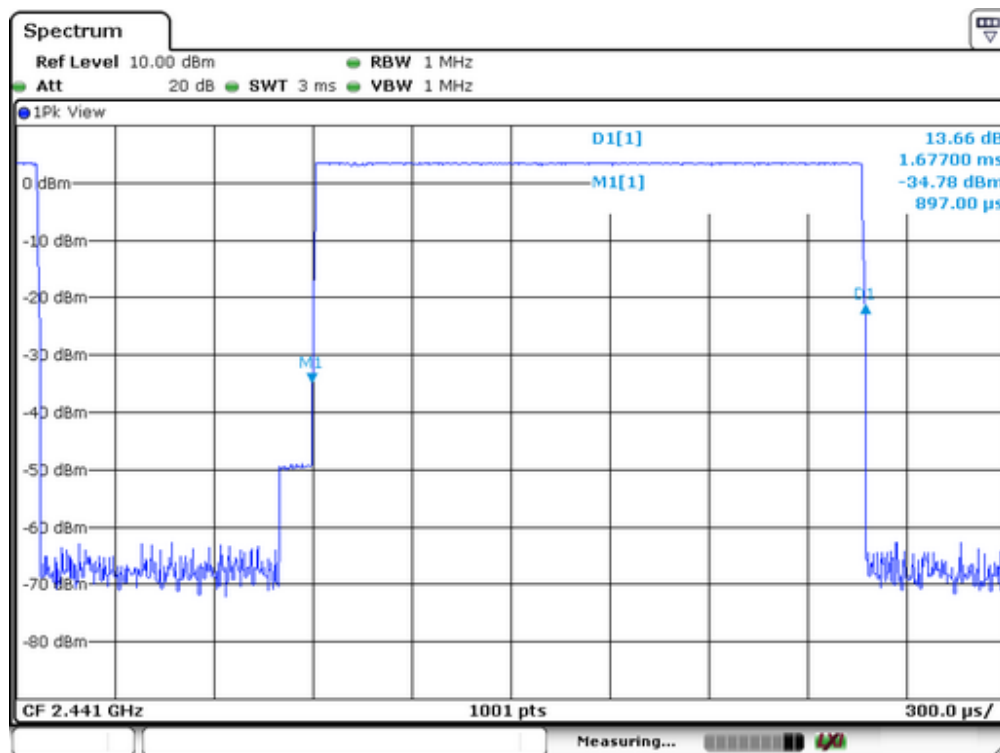
Mode	Number of transmission in a 31.6(79 Hopping*0.4)	Length of transmissions time(msec)	Result (msec)	Limit (msec)
DH1	$1600/(2*79) \times 31.6 = 320$	0.419	134.08	400
DH3	$1600/(4*79) \times 31.6 = 160$	1.677	268.32	400
DH5	$1600/(6*79) \times 31.6 = 106.67$	2.925	312.00	400

Remark: The results of worst case was recorded.

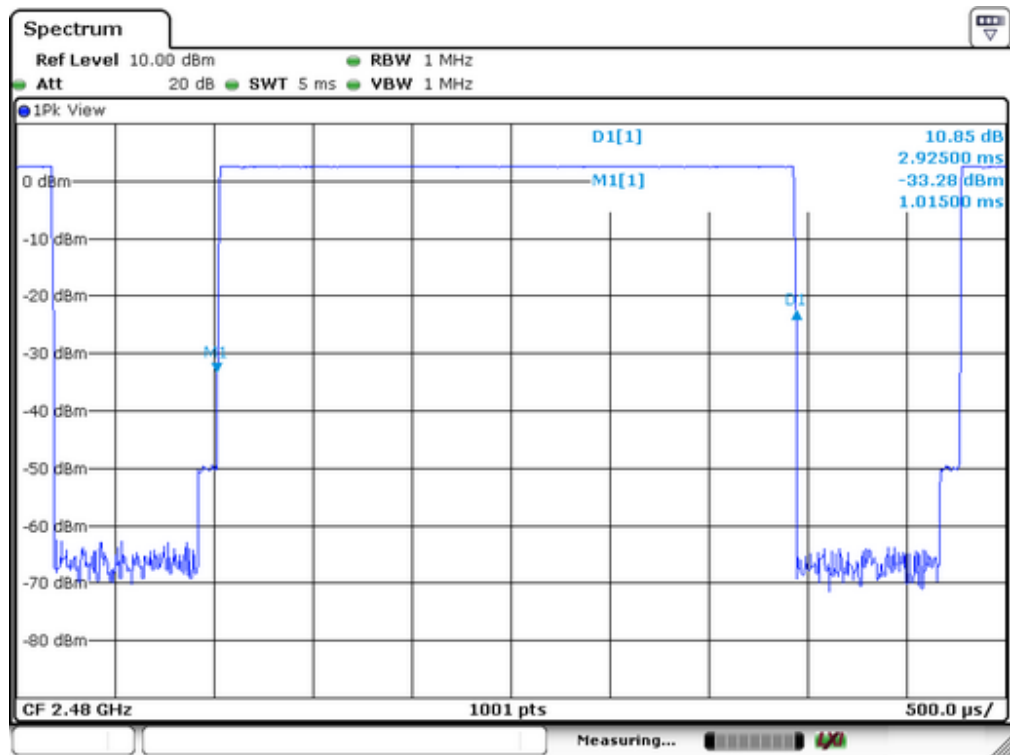
DH1:



DH3:



DH5:

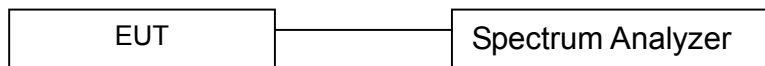


12. MAXIMUM PEAK OUTPUT POWER TEST

12.1 Measurement Procedure

- Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.
- Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
- The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.
- Measure the captured power within the band and recording the plot.
- Repeat above procedures until all frequencies required were complete.

12.2 Test SET-UP (Block Diagram of Configuration)



12.3 Measurement Equipment Used:

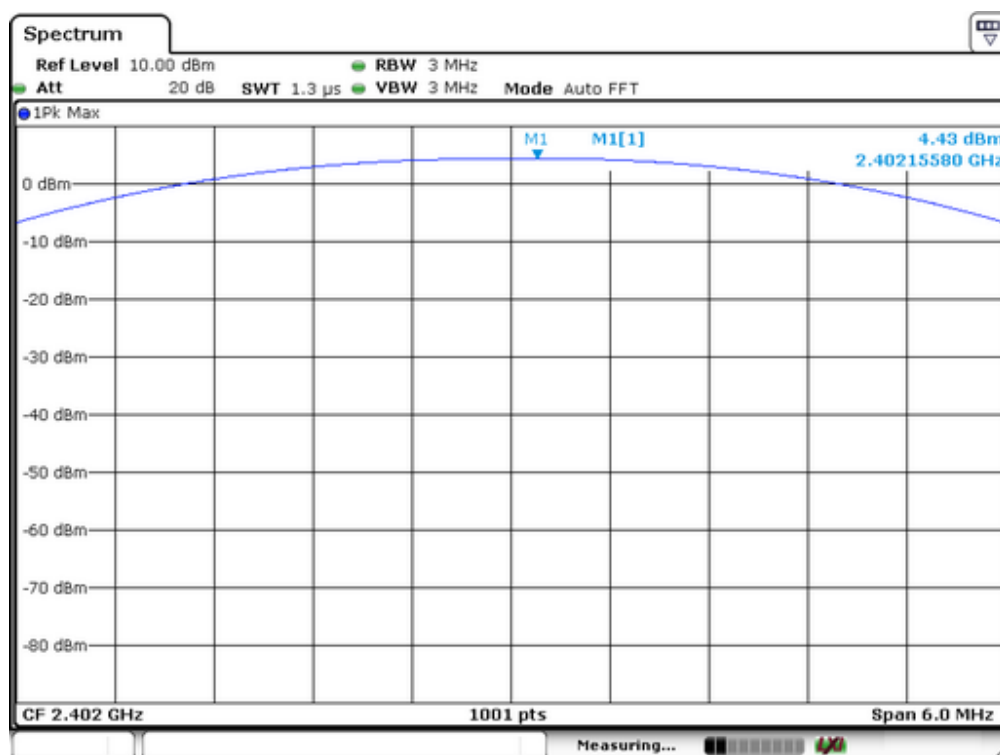
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

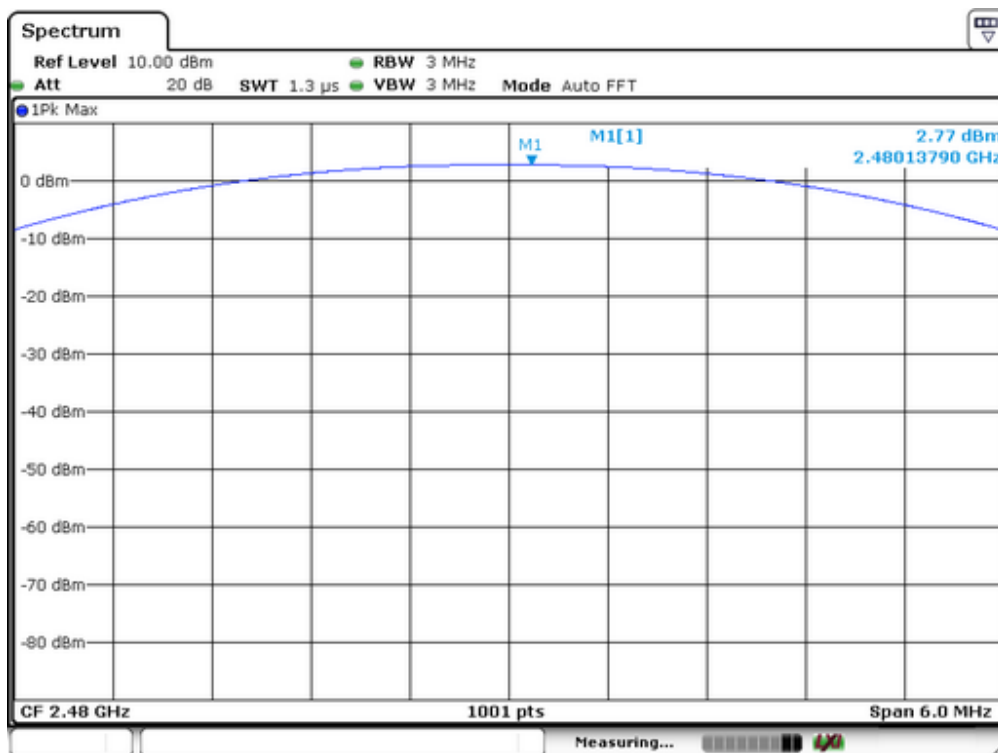
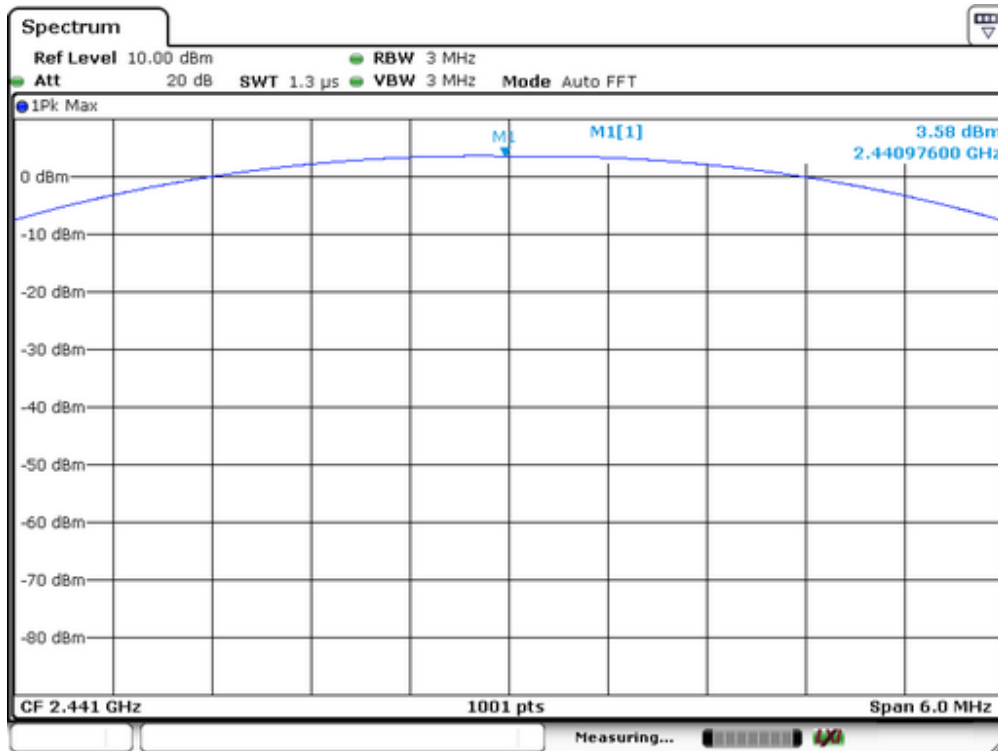
12.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %
Modulation:	GFSK		

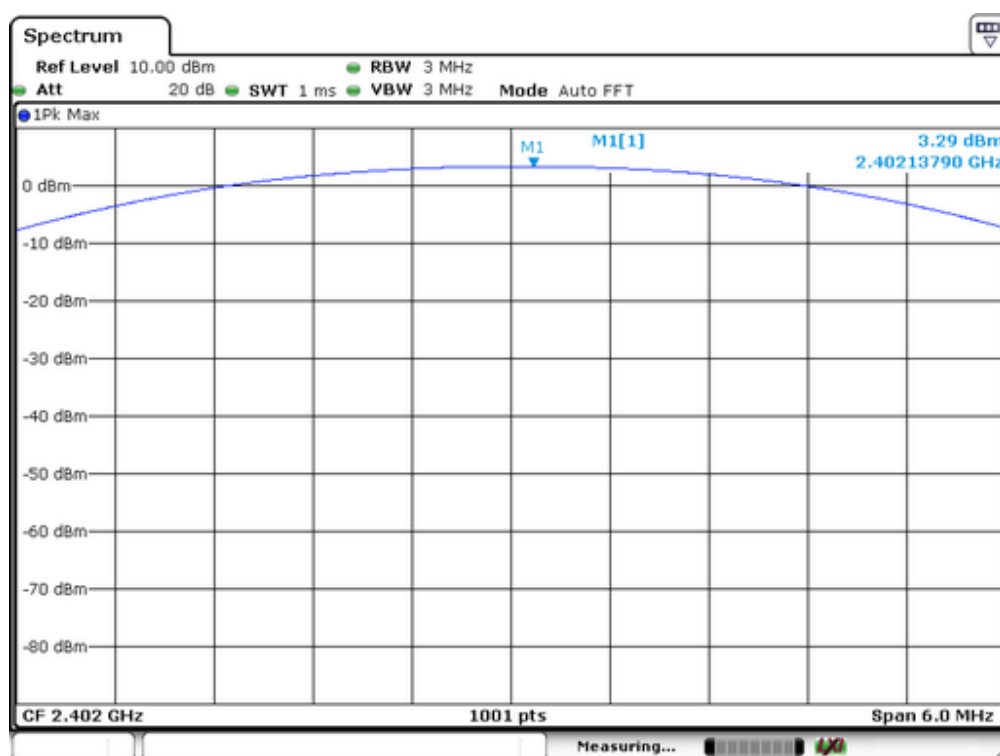
Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
01	2402	4.43	2.773	1000	PASS
40	2441	3.58	2.280	1000	PASS
79	2480	2.77	1.892	1000	PASS

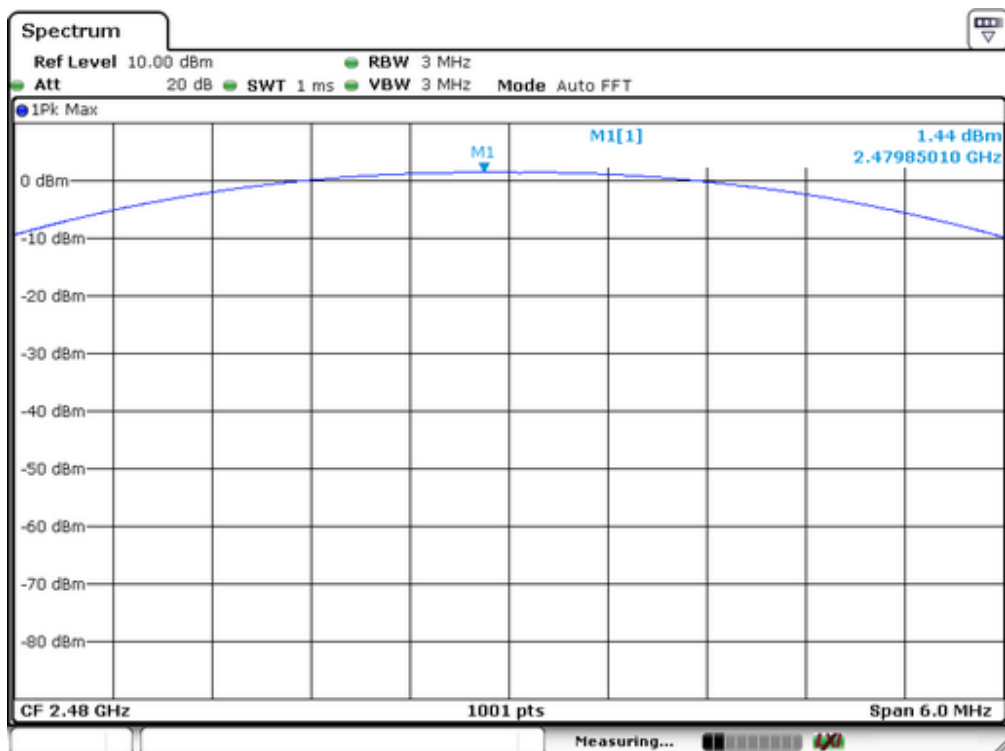
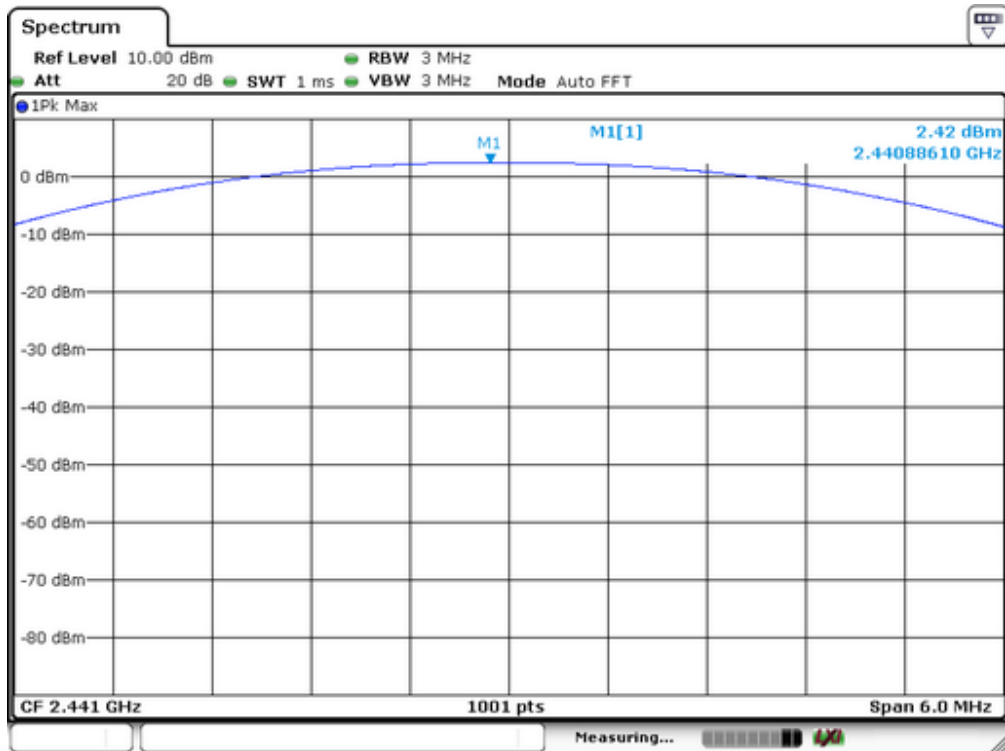




Spectrum Detector: PK Test Date : June 12, 2015
 Test By: Andy Temperature : 25 °C
 Test Result: PASS Humidity : 50 %
 Modulation: $\Pi/4$ -DQPSK

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
01	2402	3.29	2.133	125	PASS
40	2441	2.42	1.746	125	PASS
79	2480	1.44	1.393	125	PASS

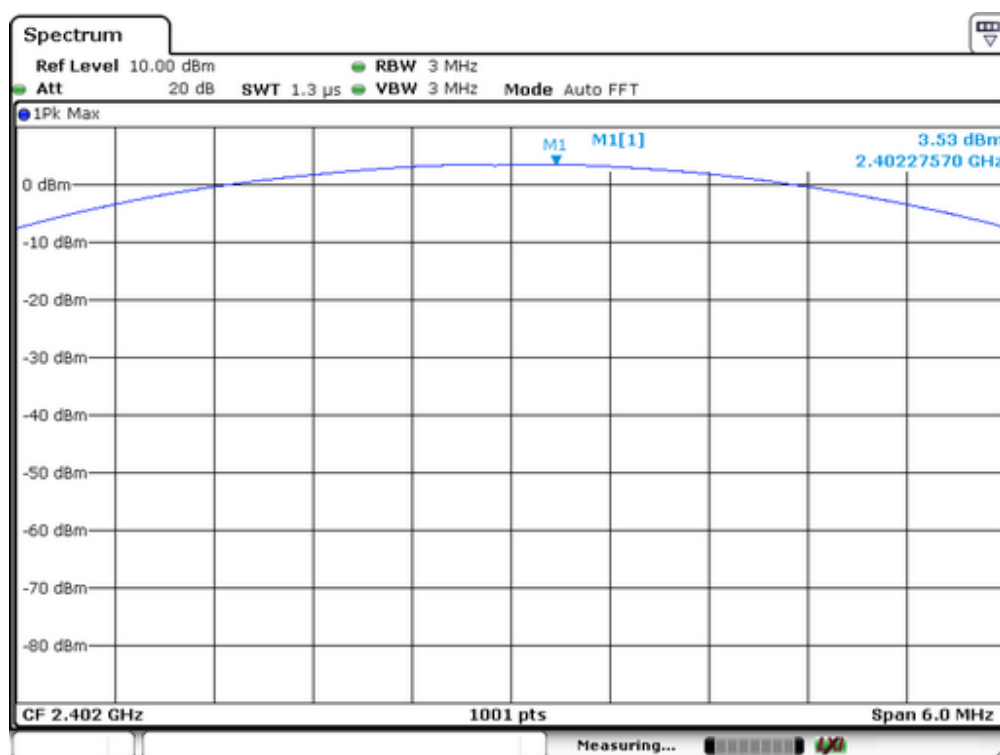


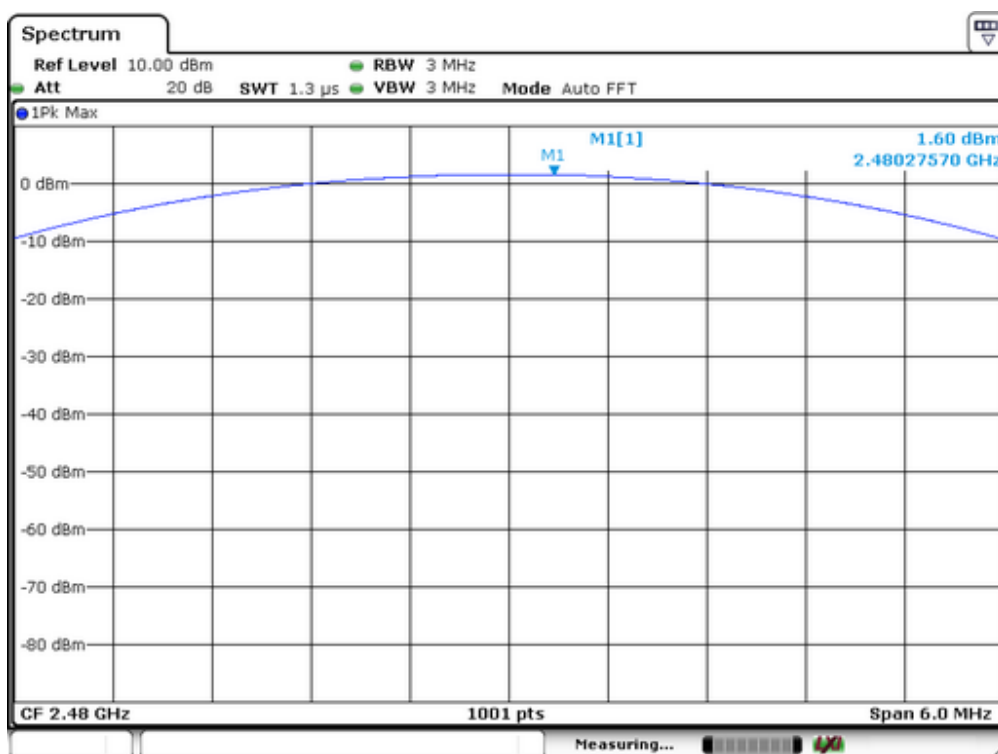
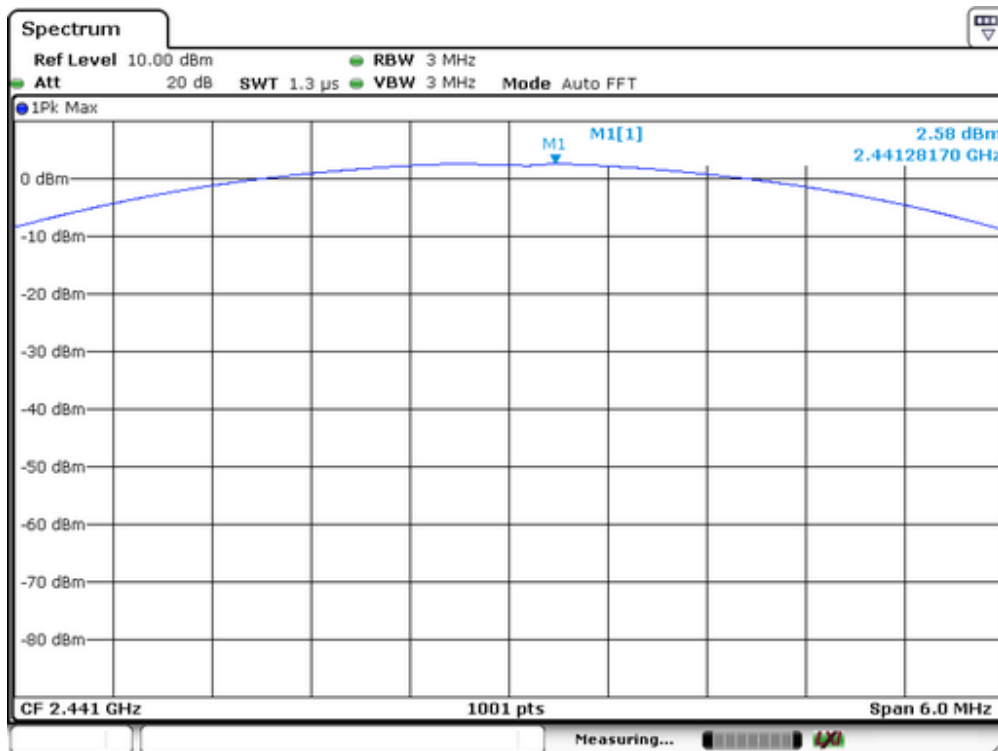


Spectrum Detector: PK
 Test By: Andy
 Test Result: PASS
 Modulation: 8DPSK

Test Date : June 12, 2015
 Temperature : 25 °C
 Humidity : 50 %

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
01	2402	3.53	2.254	125	PASS
40	2441	2.58	1.811	125	PASS
79	2480	1.60	1.445	125	PASS





13. Band EDGE test

13.1 Measurement Procedure

1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a styrofoam table which is 1.5m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.
6. Use the following spectrum analyzer settings:

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

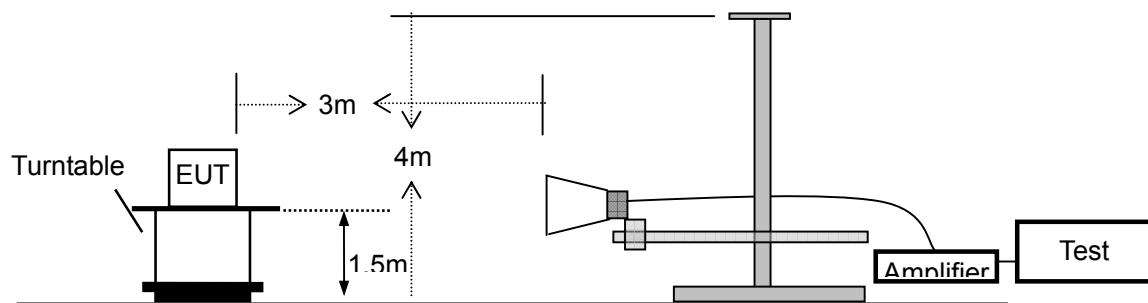
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

13.2 Test SET-UP (Block Diagram of Configuration)

For Conducted Test



For Radiated emission Test



13.3 Measurement Equipment Used:

For Conducted Test

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

For Radiated emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Analyzer	Rohde & Schwarz	FSV30	103040	12/29/2014	1 Year
2	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	12/29/2014	1 Year
3	Power Amplifier	LUNAR EM	LNA1G18-40	J101000000 81	12/29/2014	1 Year
4	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
5	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
6	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year

13.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

1. Conducted Test

For Non-Hopping Mode:

Frequency (MHz)	Modulation	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
2399.99	GFSK	4.28	-41.62	45.9	>20dBc
2399.2	pi/4-DQPSK	2.51	-43.62	46.13	>20dBc
2399.99	8DPSK	2.57	-43.91	46.48	>20dBc
2484.69	GFSK	2.58	-60.42	63	>20dBc
2483.51	pi/4-DQPSK	0.75	-57.02	57.77	>20dBc
2483.5	8DPSK	0.84	-58.3	59.14	>20dBc

For Hopping Mode:

Frequency (MHz)	Modulation	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
2399.99	GFSK	4.24	-42.22	46.46	>20dBc
2399.99	pi/4-DQPSK	2.25	-43.83	46.08	>20dBc
2399.98	8DPSK	2.57	-43.76	46.33	>20dBc
2383.98	GFSK	2.56	-60.67	63.23	>20dBc
2483.51	pi/4-DQPSK	0.76	-58.4	59.16	>20dBc
2483.52	8DPSK	0.8	-59.69	60.49	>20dBc

2. Radiated emission Test

Worst test modulation GFSK

For Non-Hopping Mode:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
2399.98	H	64.01	43.62	74	54	-9.99	-10.38
2398.95	V	60.24	40.15	74	54	-13.76	-13.85
2484.16	H	65.72	44.17	74	54	-8.28	-9.83
2483.69	V	59.72	38.72	74	54	-14.28	-15.28

For Hopping Mode:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
2399.59	H	64.15	45.72	74	54	-9.85	-8.28
2398.82	V	60.38	39.15	74	54	-13.62	-14.85
2483.95	H	65.27	44.2	74	54	-8.73	-9.8
2484.12	V	59.35	40.72	74	54	-14.65	-13.28

14. Antenna Application

14.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

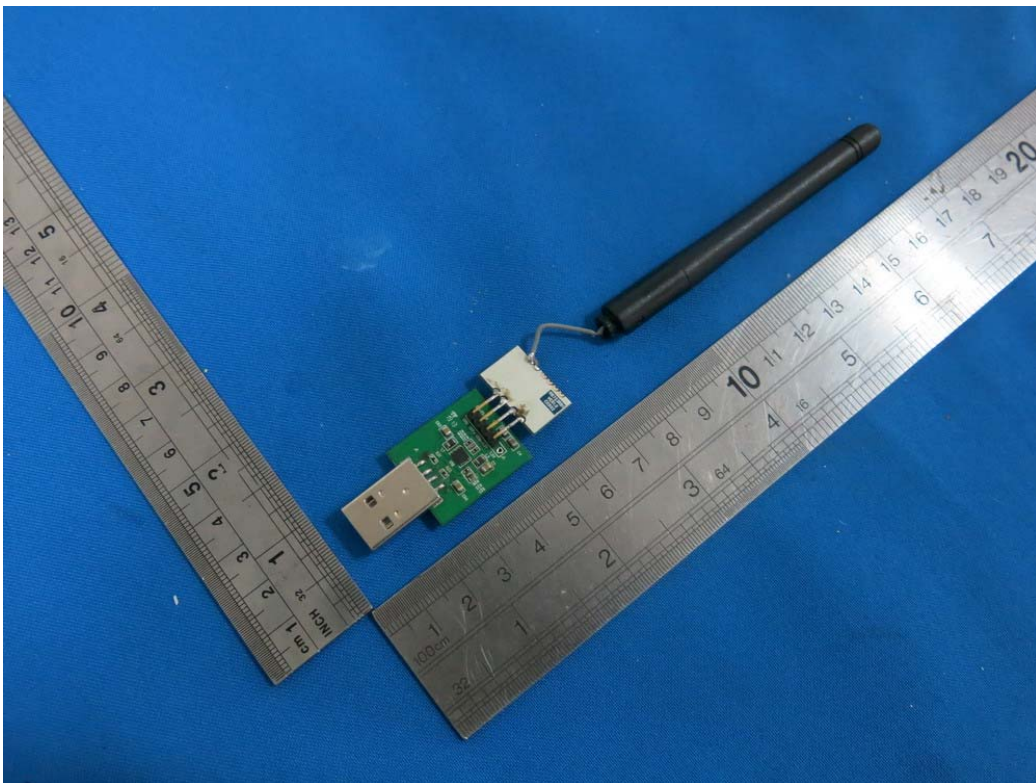
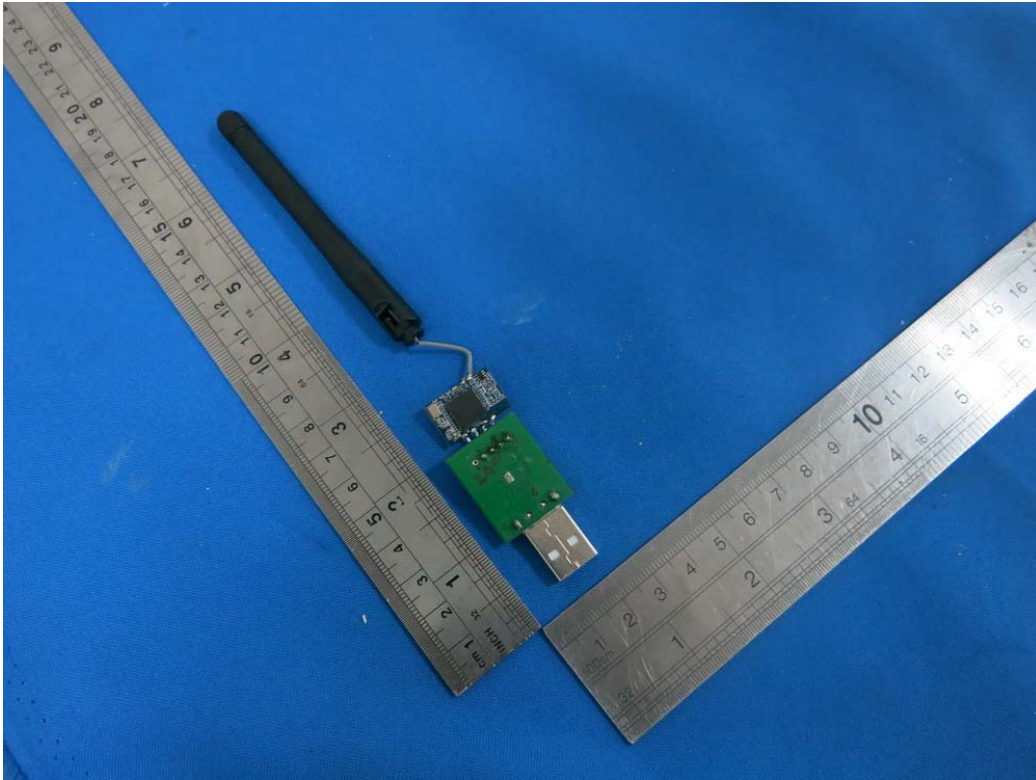
FCC part 15C section 15.247 requirements:

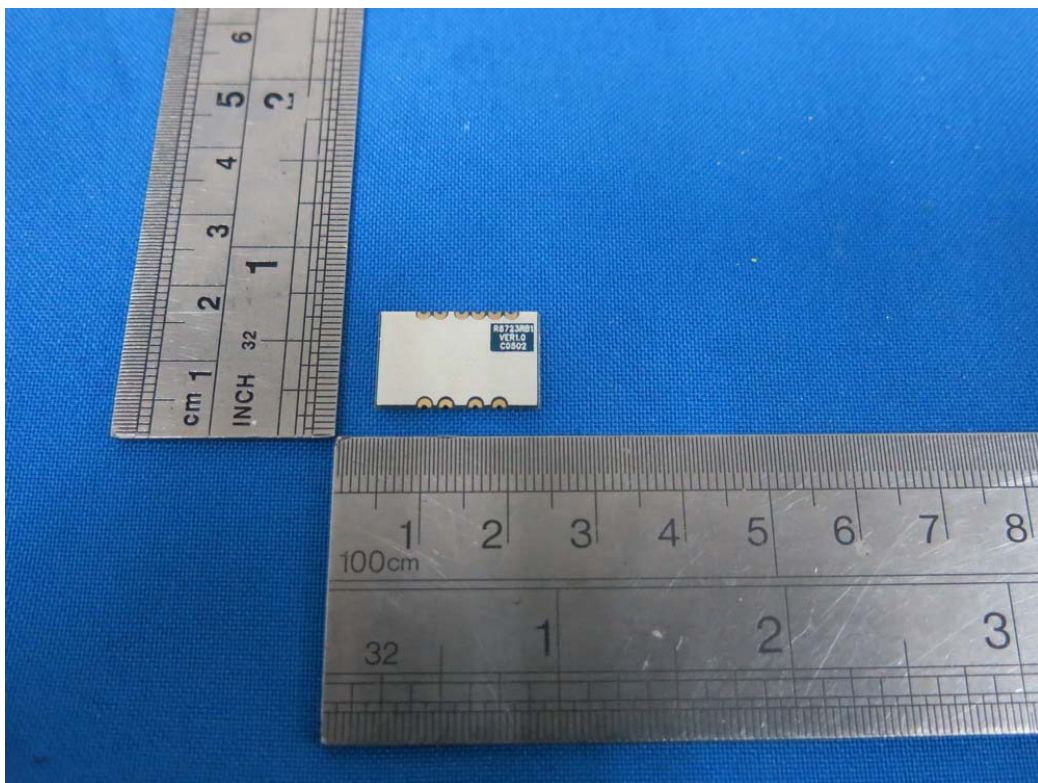
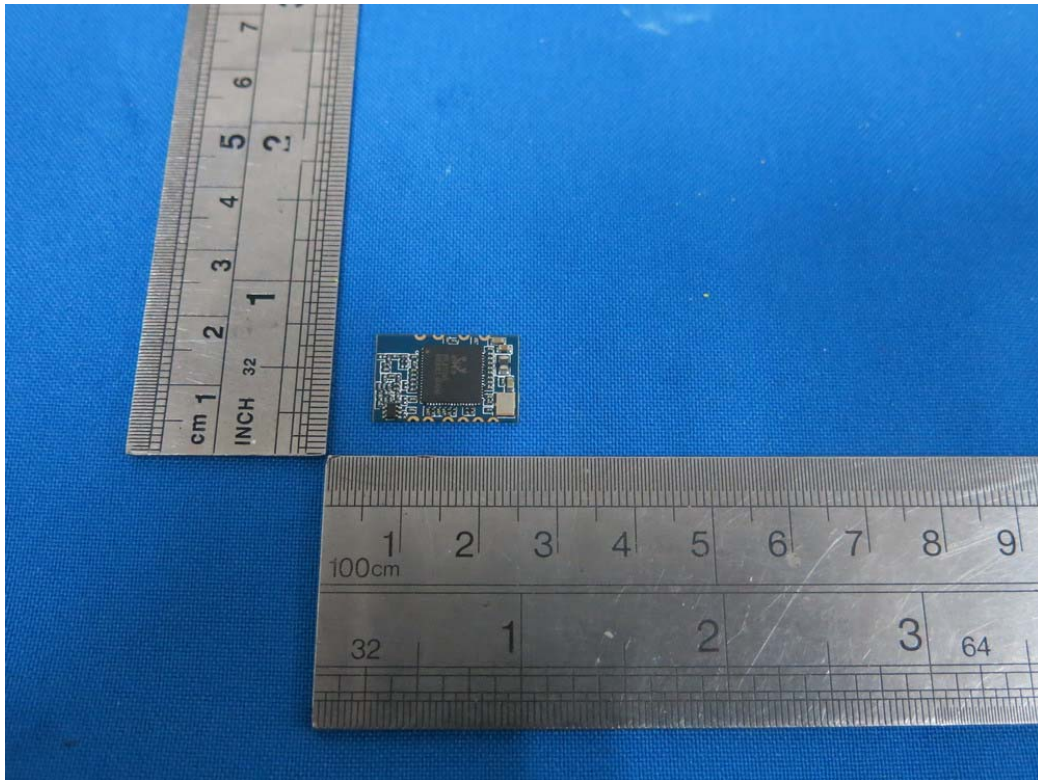
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

14.2 Result

The EUT's antenna, permanent attached antenna, used a PCB antenna and integrated on PCB, The antenna's gain is 2 dBi and meets the requirement.

APPENDIX I (Photos of EUT)





TCB

GRANT OF EQUIPMENT AUTHORIZATION

TCB

Certification

Issued Under the Authority of the
Federal Communications Commission

By:

Siemic Inc.
775 Montague Expressway
Milpitas, CA 95035

Date of Grant: 09/01/2015

Application Dated: 09/01/2015

Shenzhen Bilian Electronic Co., Ltd.
Building B1, Zhongxing Industrial Zone, Juling,
Jutang Community, Guanlan street, Bao'an,
Shenzhen, 518110
China

Attention: Tianle Chen , Certification Engineer

NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE,
and is VALID ONLY for the equipment identified hereon for use under the
Commission's Rules and Regulations listed below.

FCC IDENTIFIER: S8J-R8723RB1
Name of Grantee: Shenzhen Bilian Electronic
Co., Ltd.
Equipment Class: Digital Transmission System
Notes: Bluetooth 150Mbps Wireless N USB
Module
Modular Type: Single Modular

<u>Grant Notes</u>	<u>FCC Rule Parts</u>	<u>Frequency Range (MHZ)</u>	<u>Output Watts</u>	<u>Frequency Tolerance</u>	<u>Emission Designator</u>
CC	15C	2402.0 - 2480.0	0.00159		
CC	15C	2412.0 - 2462.0	0.025704		

Device contains both 20 MHz and 40 MHz signal bandwidth. Single modular approval for Mobile host platform. Power listed is the maximum conducted output power. Device is SISO. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. OEM integrators must be provided with antenna installation instructions and operation conditions for satisfying RF exposure compliance.

CC: This device is certified pursuant to two different Part 15 rules sections.

**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Bluetooth 150Mbps Wireless N USB Module

Model No.: BL-R8723RB1

FCC ID: S8J-R8723RB1

Trademark: LB-LINK

Report No.: KAD150528148E2

Issue Date: September 02, 2015

Prepared for

**Shenzhen Bilian Electronic Co., Ltd.
Building B1, Zhongxing Industrial Zone, Juling Jutang Community,
Guanlan street, Bao'an, Shenzhen China**

Prepared by

DONGGUAN EMTEK CO., LTD.

**No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China
TEL: 86-769-22807078
FAX: 86-769-22807079**

**This report shall not be reproduced, except in full, without the written approval of
DONGGUAN EMTEK CO., LTD.**

VERIFICATION OF COMPLIANCE

Applicant:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Manufacturer:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Product Description:	Bluetooth 150Mbps Wireless N USB Module
Trade Mark:	LB-LINK
Model Number:	BL-R8723RB1


We hereby certify that:


The above equipment was tested by DONGGUAN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10 (2013) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247(2014).

Date of Test : May 28, 2015 to June 27, 2015

Prepared by : 
Ivy Huang/Editor

Reviewer : 
Alan He/Supervisor

Approved & Authorized
Signer : 
Sam Lv/Manager



Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD150528148E2

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1. GENERAL INFORMATION

1.1 Product Description

Product Name	Bluetooth 150Mbps Wireless N USB Module		
Model number	BL-R8723RB1		
Power Supply	DC From PC		
Technical Description			
Kind of Device	Bluetooth 4.0	Bluetooth 3.0+EDR	WiFi
Operation Frequency	2402-2480MHz		2412-2462MHz for 802.11b/g/n(HT20) ; 2422-2452MHz for 802.11n(HT40)
Modulation	GFSK	GFSK, $\pi/4$ -DQPSK, 8DPSK	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n, DSSS with DBPSK/DQPSK/CCK for 802.11b;
Number of Channel	40	79	11 Channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Channel space	2MHz	1MHz	5MHz
Max RF Output Power	2.02dBm	4.43dBm	14.10dBm
Antenna Type	Internal PCB antenna		External Antenna
Antenna Gain	2 dBi		

2. Test Facility

Site Description

EMC Lab. : Registered on FCC, June 18, 2014
The Certificate Number is 247565

Registered on Industry Canada, February 19, 2014
The Certificate Number is 9444A.

Name of Firm : DONGGUAN EMTEK CO., LTD

Site Location : No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China

3. Description of test modes

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The details of test channels and bandwidth were for RF conductive measurement.

Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

Note:

1. Test of channel was included the lowest 2402MHz, middle 2442MHz and highest frequency 2480MHz in highest data rate and to perform the test, then record on this report.

4. TEST SYSTEM UNCERTAINTY

The following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Parameter	Uncertainty
Radio Frequency	$\pm 1 \times 10^{-5}$
Maximum Peak Output Power Test	$\pm 1.0\text{dB}$
Conducted Emissions Test	$\pm 2.0\text{dB}$
Radiated Emission Test	$\pm 2.0\text{dB}$
Power Density	$\pm 2.0\text{dB}$
Occupied Bandwidth Test	$\pm 1.0\text{dB}$
Band Edge Test	$\pm 3\text{dB}$
All emission, radiated	$\pm 3\text{dB}$
Antenna Port Emission	$\pm 3\text{dB}$
Temperature	$\pm 0.5^{\circ}\text{C}$
Humidity	$\pm 3\%$

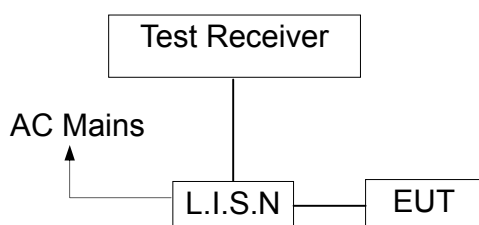
Measurement Uncertainty for a level of Confidence of 95%

5. Conducted Emissions Test

5.1 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	03/16/2015	03/15/2016
L.I.S.N	Rohde & Schwarz	ENV216	100017	03/16/2015	03/15/2016
RF Switching Unit	CDS	RSU-M2	38401	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

5.4 Conducted Emission Limit

(7) Conducted Emission Frequency(MHz)

0.15-0.5

0.5-5.0

5.0-30.0

Quasi-peak

66-56

56

60

Average

56-46

46

50

Note:

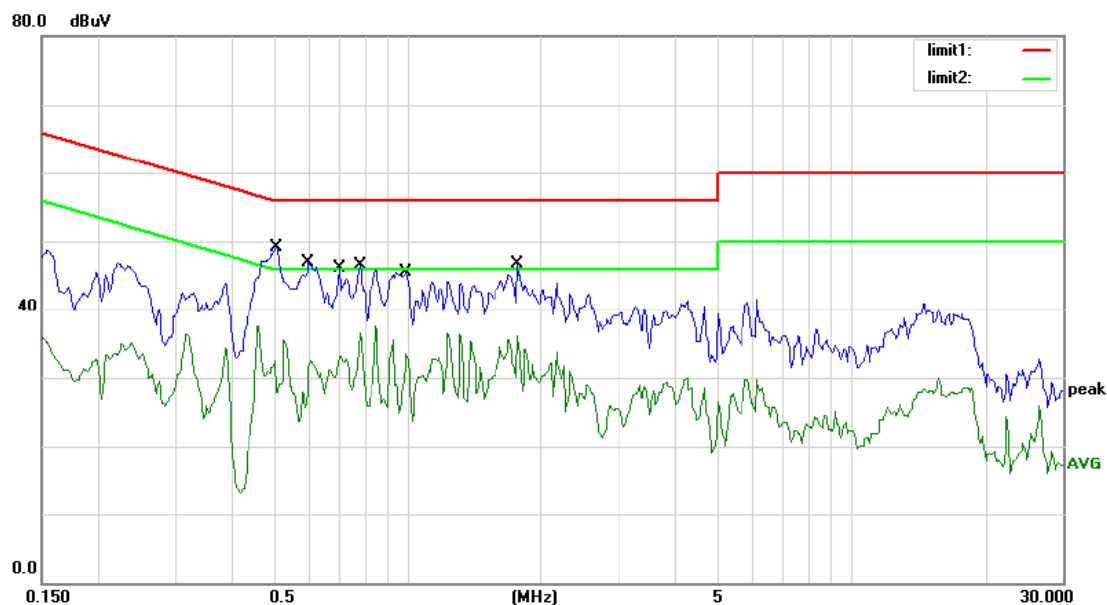
1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.5 Measurement Result:

Pass.

All the modulation modes were tested the data of the worst mode (GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

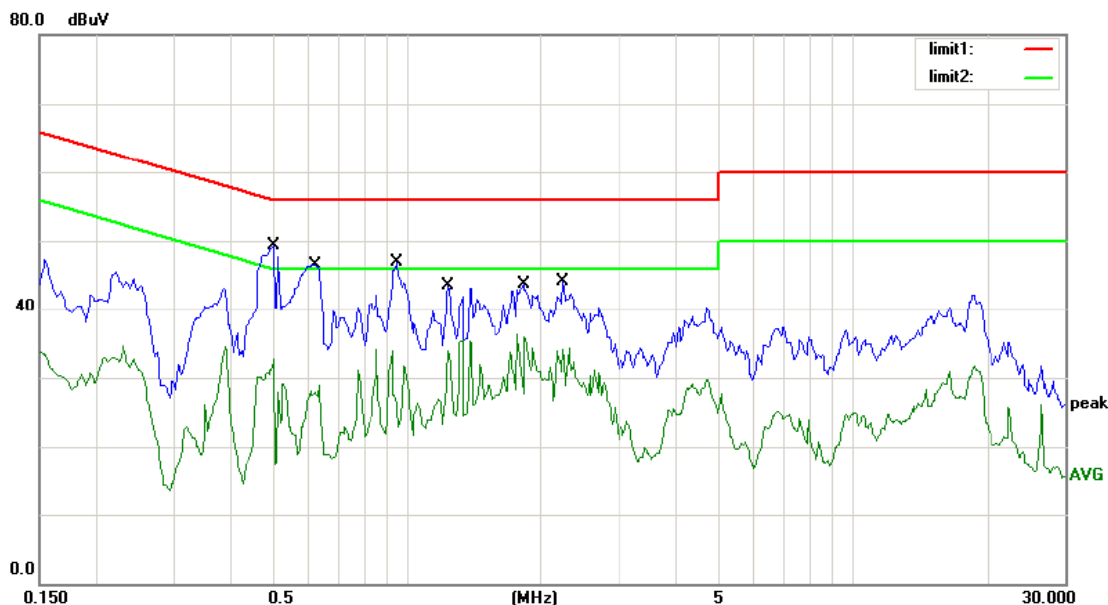
Please refer to the following data.



Site site #1 Phase: **L1** Temperature: 24
 Limit: (CE)FCC PART 15 class B_QP Power: DC 5V Humidity: 55 %
 Mode: TX(2402MHz)
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.5100	46.74	0.00	46.74	56.00	-9.26	QP	
2		0.5100	35.49	0.00	35.49	46.00	-10.51	AVG	
3		0.6000	44.25	0.00	44.25	56.00	-11.75	QP	
4		0.6000	32.48	0.00	32.48	46.00	-13.52	AVG	
5		0.7035	44.31	0.00	44.31	56.00	-11.69	QP	
6		0.7035	33.12	0.00	33.12	46.00	-12.88	AVG	
7		0.7800	44.25	0.00	44.25	56.00	-11.75	QP	
8		0.7800	36.57	0.00	36.57	46.00	-9.43	AVG	
9		0.9960	43.14	0.00	43.14	56.00	-12.86	QP	
10		0.9960	35.45	0.00	35.45	46.00	-10.55	AVG	
11		1.7790	44.25	0.00	44.25	56.00	-11.75	QP	
12		1.7790	36.14	0.00	36.14	46.00	-9.86	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.



Site site #1
 Limit: (CE)FCC PART 15 class B_QP
 Mode: TX(2402MHz)
 Note:

Phase: **N**
 Power: DC 5V
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over		
		MHz	Level	Factor	ment			Detector	Comment
			dBuV	dB	dBuV	dBuV	dB		
1	*	0.5055	47.41	0.00	47.41	56.00	-8.59	QP	
2		0.5055	32.67	0.00	32.67	46.00	-13.33	AVG	
3		0.6225	44.24	0.00	44.24	56.00	-11.76	QP	
4		0.6225	28.85	0.00	28.85	46.00	-17.15	AVG	
5		0.9555	44.54	0.00	44.54	56.00	-11.46	QP	
6		0.9555	33.97	0.00	33.97	46.00	-12.03	AVG	
7		1.2390	41.23	0.00	41.23	56.00	-14.77	QP	
8		1.2390	33.81	0.00	33.81	46.00	-12.19	AVG	
9		1.8330	41.74	0.00	41.74	56.00	-14.26	QP	
10		1.8330	36.34	0.00	36.34	46.00	-9.66	AVG	
11		2.2400	42.31	0.00	42.31	56.00	-13.69	QP	
12		2.2400	34.38	0.00	34.38	46.00	-11.62	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.

4.6 Conducted Measurement Photos:



6. Radiated Emission Test

5.1 Measurement Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

When spectrum scanned from 30MHz to 1GHz setting resolution bandwidth 120KHz and video bandwidth 300KHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	120KHz
VB	300KHz
Detector	QP
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

For Average Measurement:

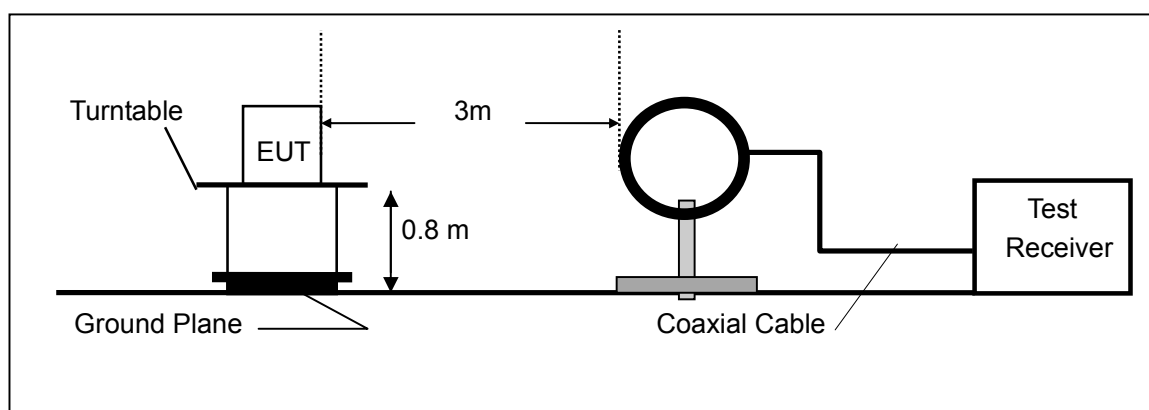
VBW=10Hz, when duty cycle is no less than 98 percent.

VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

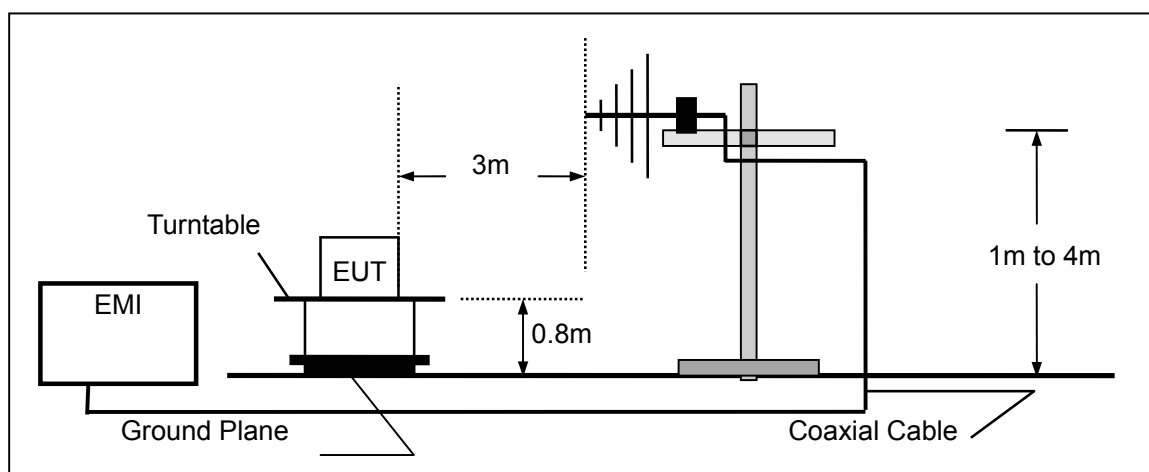
Band	Duty Cycle(%)	T(μ s)	1/T(KHz)	Average Correction Factor	VBW Setting
2402-2480	100	-	-	0	10Hz

5.2 Test SET-UP (Block Diagram of Configuration)

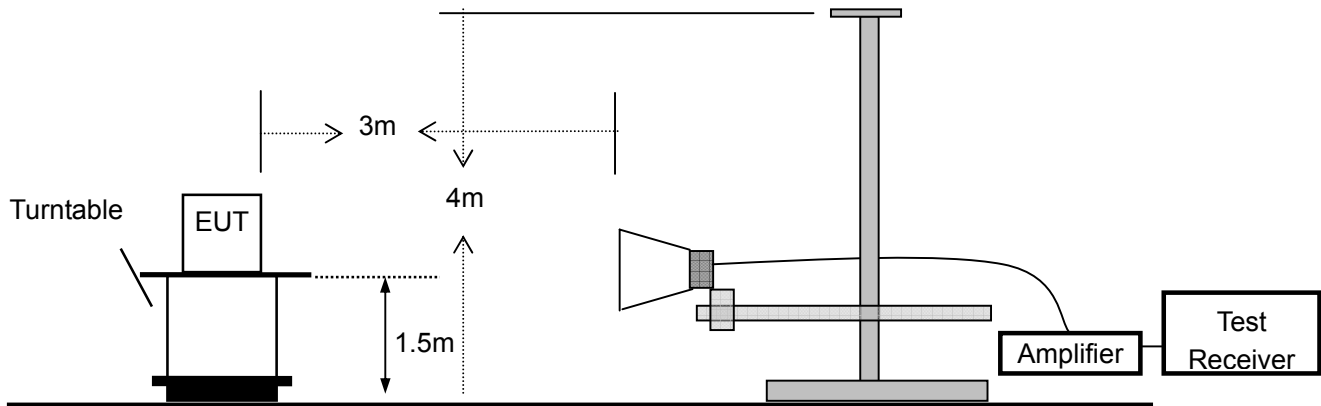
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



5.3 Measurement Equipment Used:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	03/16/2015	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	03/16/2015	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	03/16/2015	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	03/16/2015	1 Year
5.	Color Monitor	SUNSPO	SP-140A	N/A	03/16/2015	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	03/16/2015	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	03/16/2015	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	03/16/2015	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	03/16/2015	1 Year
10.	Cable	Schwarzbeck	PLF-100	549489	03/16/2015	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	03/16/2015	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	03/16/2015	1 Year
13.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	12/29/2014	1 Year
14.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	12/29/2014	1 Year
15.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	12/29/2014	1 Year
16.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
17.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
18.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year

5.4 Radiated emission limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

Remark 1. Emission level in dBuV/m=20 log (uV/m)

: 2. Measurement was performed at an antenna to the closed point of EUT distance of meters.

3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

5.5 Measurement Result

Below 30MHz:

Operation Mode:	TX	Test Date :	June 12, 2015
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	65 %
Measured Distance:	3m	Test By:	Andy

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

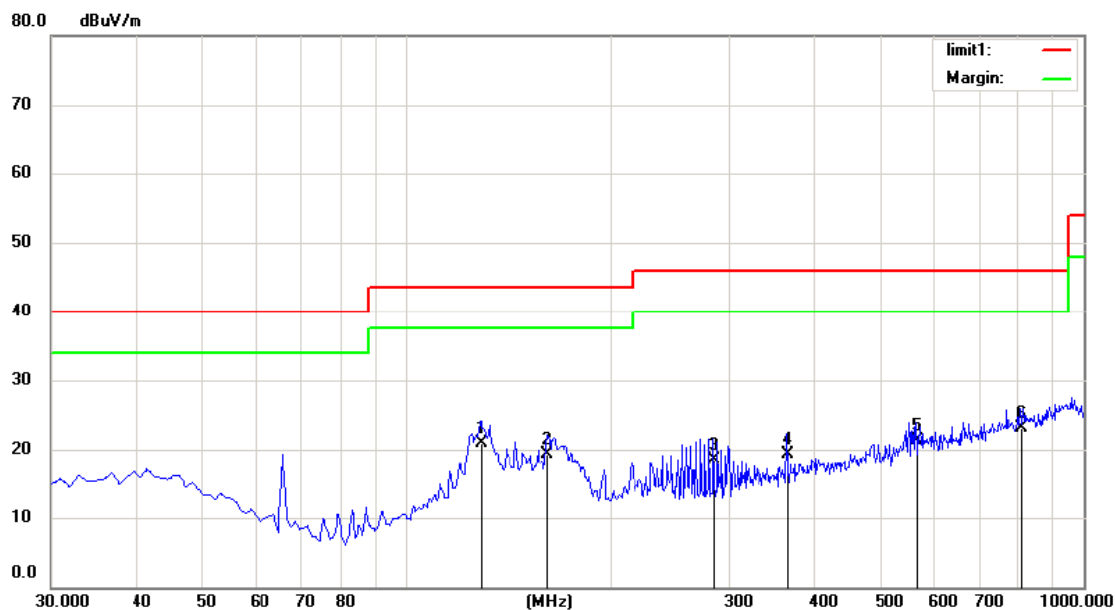
Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Below 1000MHz:

Pass.

All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

Please refer to the following data.



Site Chamber #1

Polarization: **Horizontal**

Temperature: 24

Limit: (RE)FCC PART 15 class B 3m

Power: DC 5V(PC Input)

Humidity: 55 %

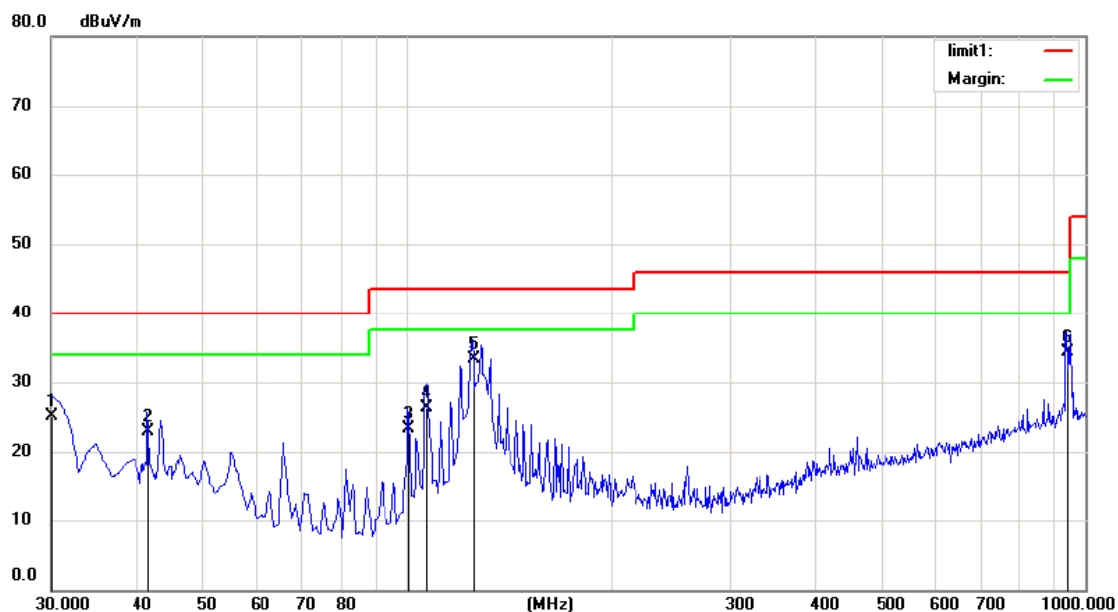
Mode: TX 2402

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree
1	*	128.9400	37.25	-16.27	20.98	43.50	-22.52	QP		
2		161.9200	37.68	-18.41	19.27	43.50	-24.23	QP		
3		284.1400	33.41	-14.86	18.55	46.00	-27.45	QP		
4		365.6200	31.90	-12.54	19.36	46.00	-26.64	QP		
5		567.3800	30.01	-8.80	21.21	46.00	-24.79	QP		
6		807.9400	27.95	-4.85	23.10	46.00	-22.90	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



Site Chamber #1

Polarization: **Vertical**

Temperature: 24

Limit: (RE)FCC PART 15 class B 3m

Power: DC 5V(PC Input)

Humidity: 55 %

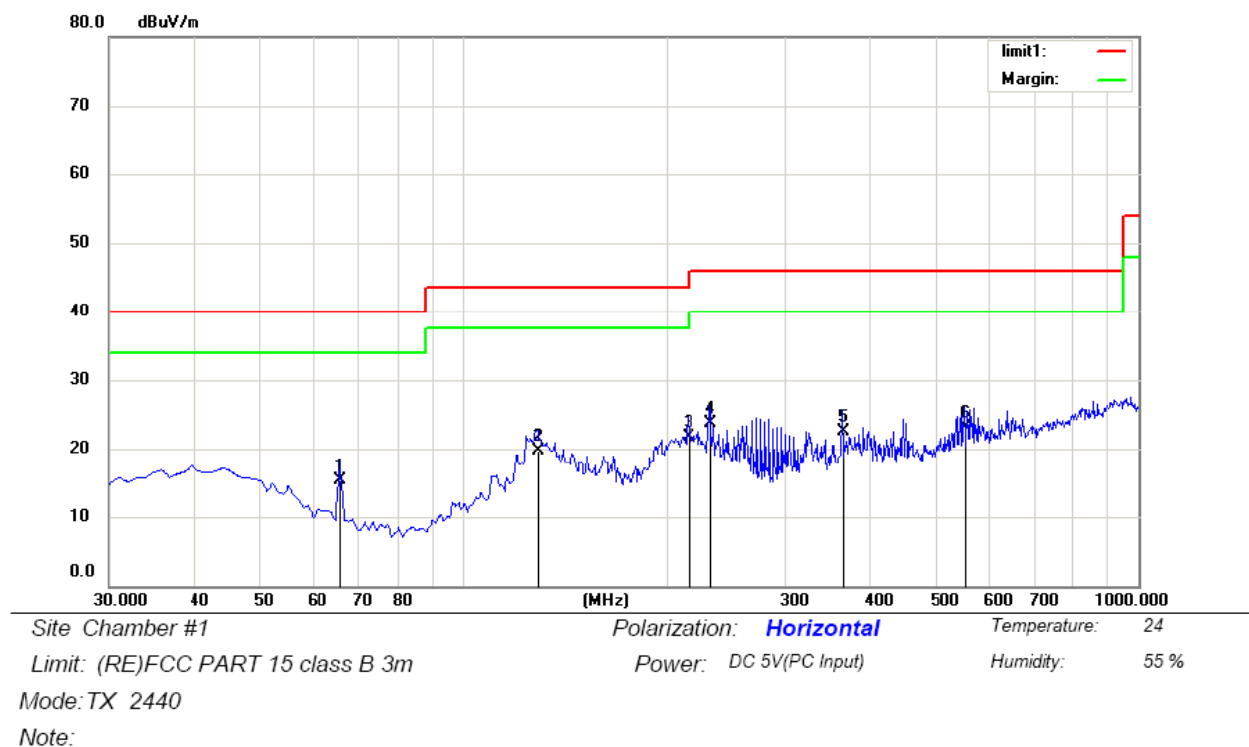
Mode: TX 2402

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table	
		MHz	Level	Factor	ment			Height	Degree	
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		30.0000	40.21	-15.15	25.06	40.00	-14.94	QP		
2		41.6400	36.58	-13.58	23.00	40.00	-17.00	QP		
3		100.8100	42.16	-18.92	23.24	43.50	-20.26	QP		
4		107.1337	44.31	-17.92	26.39	43.50	-17.11	QP		
5	*	125.0600	49.75	-16.40	33.35	43.50	-10.15	QP		
6		939.8600	36.80	-2.47	34.33	46.00	-11.67	QP		

*:Maximum data x:Over limit !:over margin

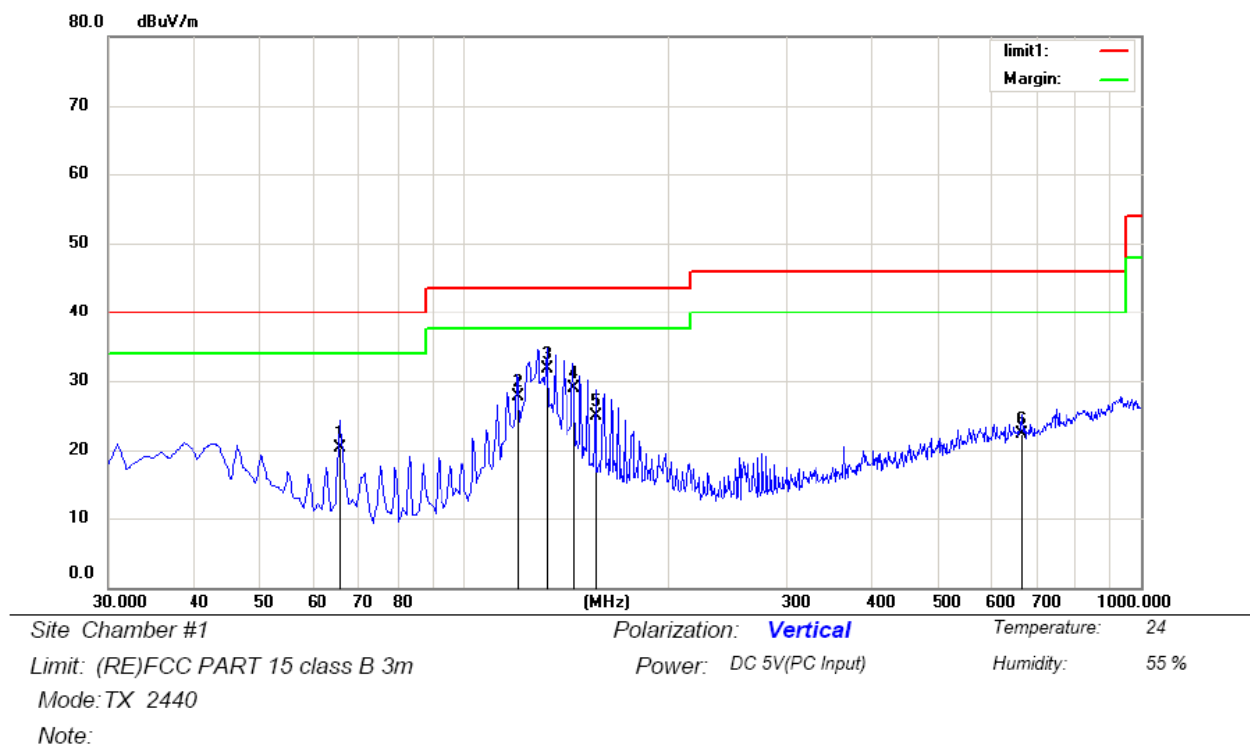
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		65.8900	36.32	-21.07	15.25	40.00	-24.75	QP		
2		128.9400	36.05	-16.27	19.78	43.50	-23.72	QP		
3	*	215.2700	38.12	-16.46	21.66	43.50	-21.84	QP		
4		231.7600	39.68	-15.93	23.75	46.00	-22.25	QP		
5		365.6200	35.11	-12.54	22.57	46.00	-23.43	QP		
6		554.7700	31.96	-8.93	23.03	46.00	-22.97	QP		

*:Maximum data x:Over limit !:over margin

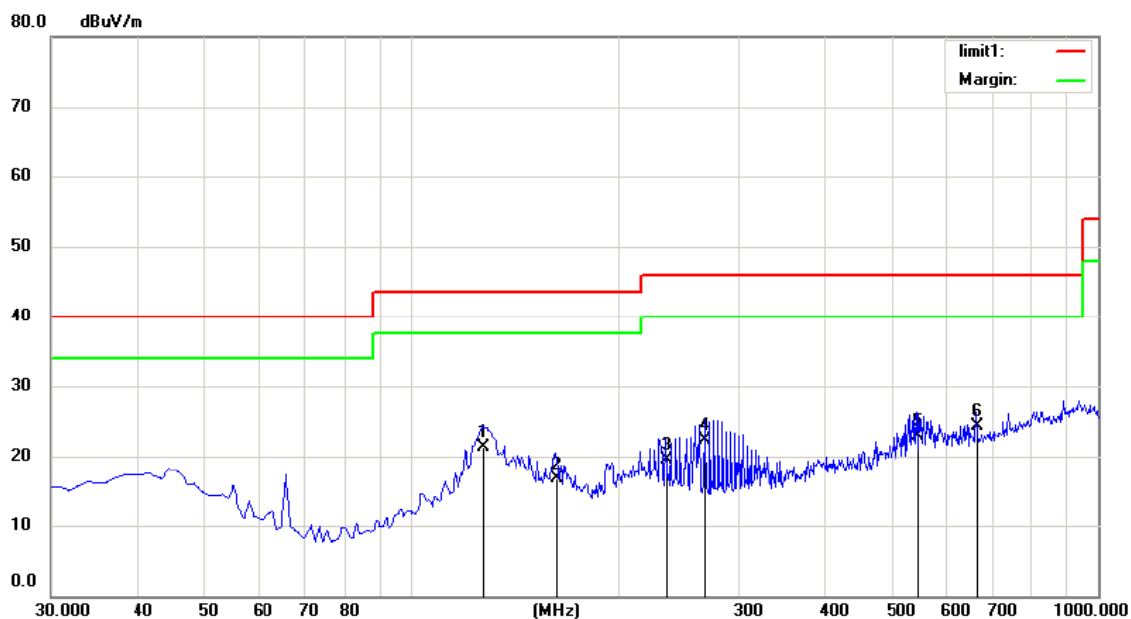
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree Comment
1		65.8900	41.36	-21.07	20.29	40.00	-19.71	QP		
2		120.2100	44.69	-16.93	27.76	43.50	-15.74	QP		
3	*	132.8200	48.22	-16.43	31.79	43.50	-11.71	QP		
4		145.4300	46.35	-17.42	28.93	43.50	-14.57	QP		
5		157.0700	43.11	-18.28	24.83	43.50	-18.67	QP		
6		666.3200	30.07	-7.78	22.29	46.00	-23.71	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



Site Chamber #1

Polarization: **Horizontal**

Temperature: 24

Limit: (RE)FCC PART 15 class B 3m

Power: DC 5V(PC Input)

Humidity: 55 %

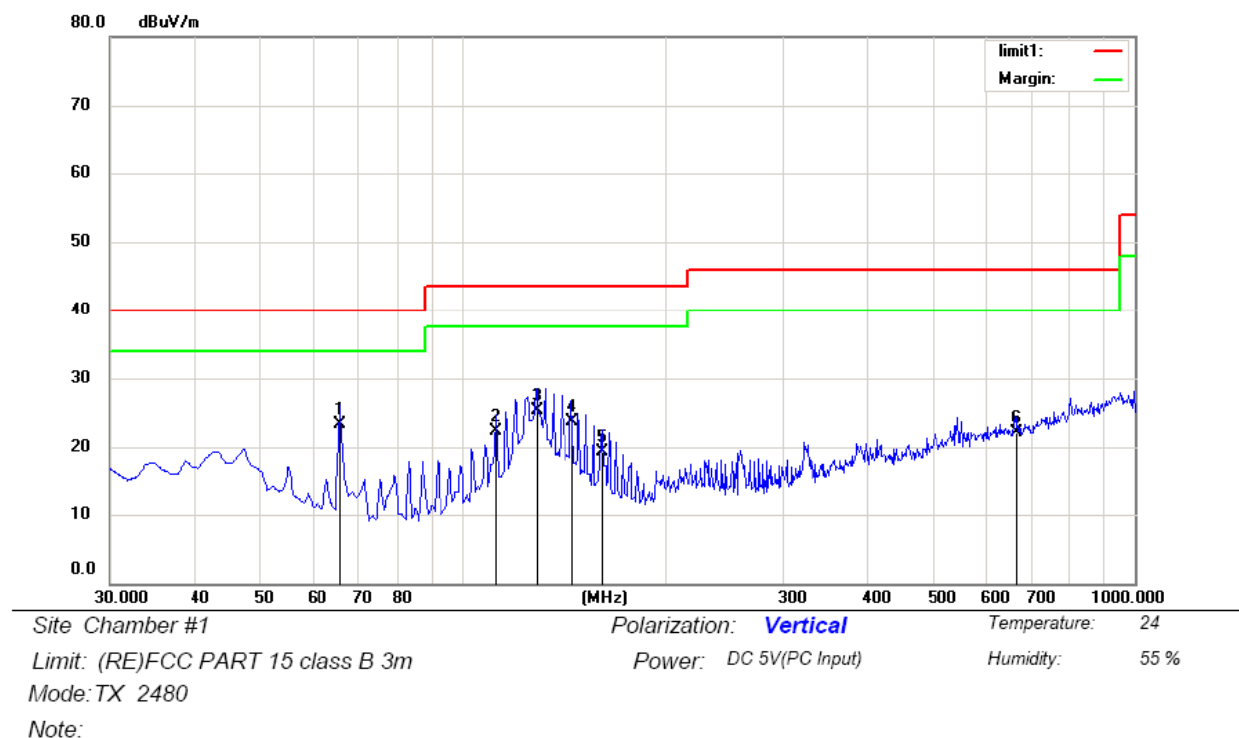
Mode: TX 2480

Note:

No.	Mk.	Freq.	Reading	Correct	Measure-	Limit	Over	Antenna	Table
		MHz	Level	Factor	ment			Height	Degree
			dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree
1		127.0000	37.64	-16.34	21.30	43.50	-22.20	QP	
2		162.8900	35.21	-18.41	16.80	43.50	-26.70	QP	
3		235.6400	35.46	-15.87	19.59	46.00	-26.41	QP	
4		267.6500	37.52	-15.26	22.26	46.00	-23.74	QP	
5		547.0100	32.01	-9.08	22.93	46.00	-23.07	QP	
6	*	664.3800	31.96	-7.75	24.21	46.00	-21.79	QP	

*:Maximum data x:Over limit !:over margin

Operator: Snake



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree degree	Comment
1	*	65.8900	44.43	-21.07	23.36	40.00	-16.64	QP			
2		112.4500	39.65	-17.43	22.22	43.50	-21.28	QP			
3		128.9400	41.72	-16.35	25.37	43.50	-18.13	QP			
4		145.4300	41.11	-17.42	23.69	43.50	-19.81	QP			
5		161.9200	37.68	-18.41	19.27	43.50	-24.23	QP			
6		665.3500	29.84	-7.80	22.04	46.00	-23.96	QP			

*:Maximum data x:Over limit !:over margin

Operator: Snake

Above 1000MHz

Operation Mode: TX Mode (CH00: 2402MHz) Test Date : June 12, 2015
 Frequency Range: 1-25GHz Temperature : 25 °C
 Test Result: PASS Humidity : 50 %
 Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4804	V	63.15	45.15	74	54	-10.85	-8.85
7206	V	62.48	44.35	74	54	-11.52	-9.65
9608	V	61.05	43.68	74	54	-12.95	-10.32
12010	V	60.72	42.4	74	54	-13.28	-11.6
14412	V	59.24	41.92	74	54	-14.76	-12.08
16814	V	58.17	40.27	74	54	-15.83	-13.73
4804	H	65.36	45.62	74	54	-8.64	-8.38
7206	H	64.24	44.18	74	54	-9.76	-9.82
9608	H	63.82	43.5	74	54	-10.18	-10.5
12010	H	62.15	42.17	74	54	-11.85	-11.83
14412	H	61.7	41.92	74	54	-12.3	-12.08
16814	H	60	40.27	74	54	-14	-13.73

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
 (2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
 (3) The average measurement was not performed when the peak measured data under the limit of average detection.

Operation Mode: TX Mode (CH20: 2442MHz) Test Date : June 12, 2015
Frequency Range: 1-25GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4884	V	64.05	45.15	74	54	-9.95	-8.85
7326	V	63.15	44.53	74	54	-10.85	-9.47
9768	V	62.72	43.62	74	54	-11.28	-10.38
12210	V	61.08	42.04	74	54	-12.92	-11.96
14652	V	60.72	41.7	74	54	-13.28	-12.3
17094	V	59.72	40.26	74	54	-14.28	-13.74
4884	H	65.35	46.35	74	54	-8.65	-7.65
7326	H	64.18	45.25	74	54	-9.82	-8.75
9768	H	63.24	44.15	74	54	-10.76	-9.85
12210	H	62	43.62	74	54	-12	-10.38
14652	H	61.7	42.08	74	54	-12.3	-11.92
17094	H	60.58	41.9	74	54	-13.42	-12.1

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

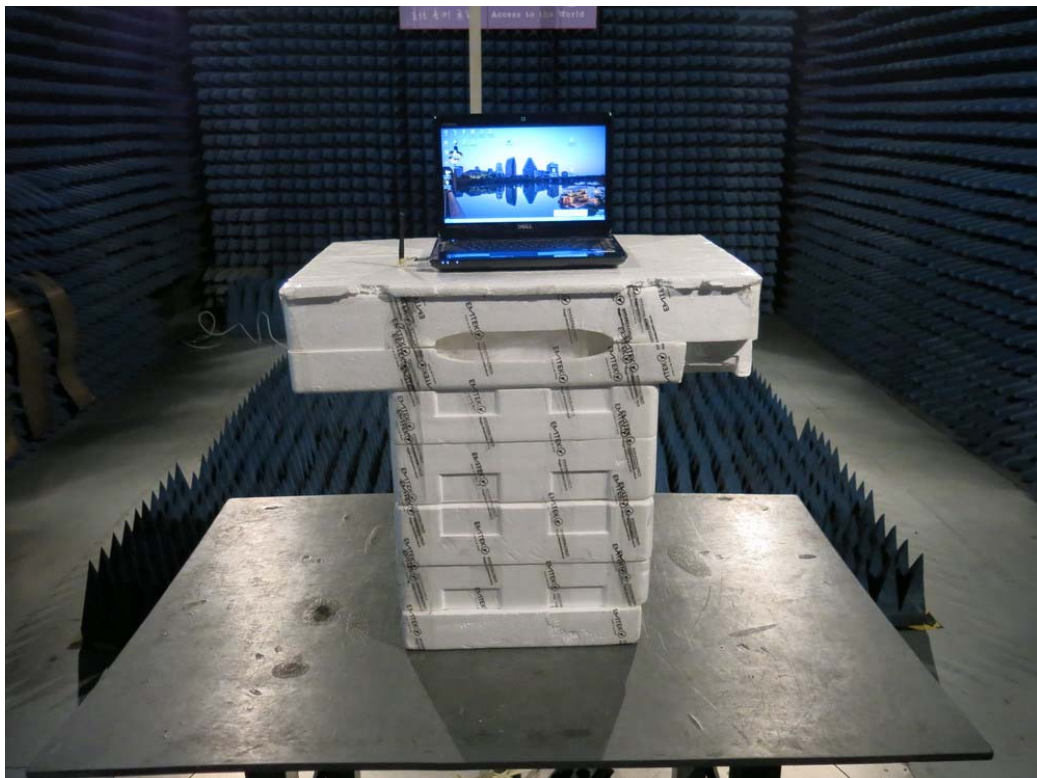
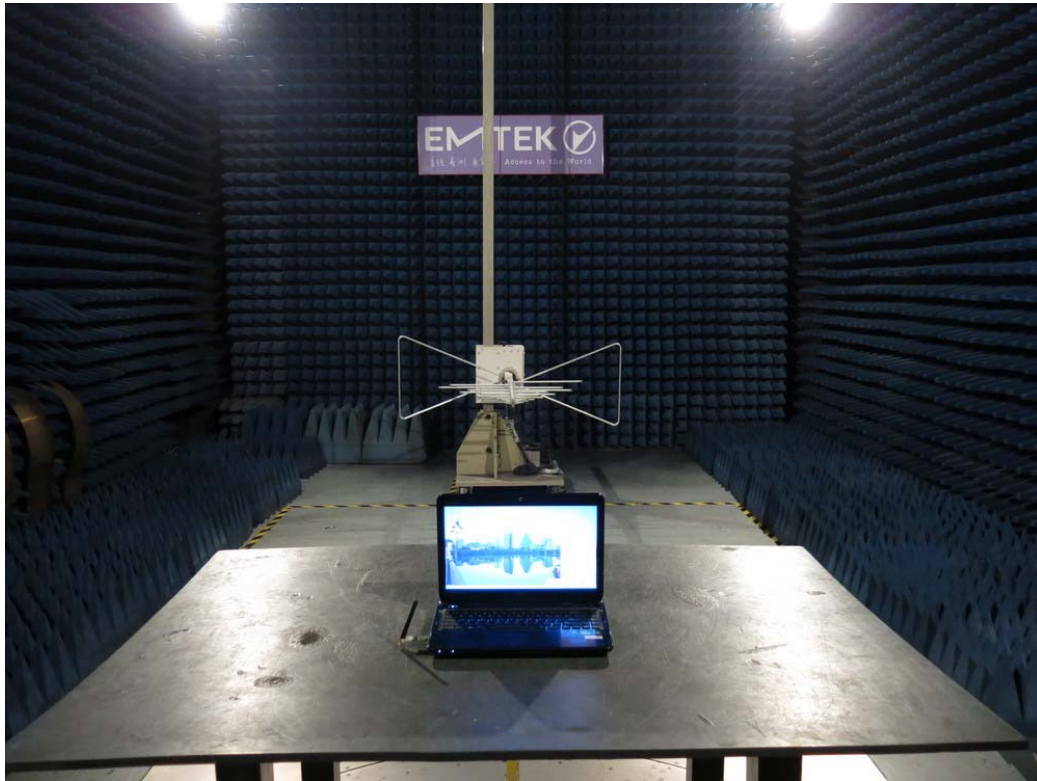
Operation Mode: TX Mode (CH39: 2480MHz) Test Date : June 12, 2015
Frequency Range: 1-25GHz Temperature : 25 °C
Test Result: PASS Humidity : 50 %
Measured Distance: 3m Test By: Andy

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4960	V	64.25	45.15	74	54	-9.75	-8.85
7440	V	63.15	44.2	74	54	-10.85	-9.8
9920	V	62.82	43.92	74	54	-11.18	-10.08
12400	V	61.72	42.01	74	54	-12.28	-11.99
14880	V	60.89	41.05	74	54	-13.11	-12.95
17360	V	59.72	40.28	74	54	-14.28	-13.72
4960	H	65.35	45.62	74	54	-8.65	-8.38
7440	H	64.15	44.18	74	54	-9.85	-9.82
9920	H	63.62	43.62	74	54	-10.38	-10.38
12400	H	62.05	42.1	74	54	-11.95	-11.9
14880	H	61.72	41.92	74	54	-12.28	-12.08
17360	H	60.35	40.8	74	54	-13.65	-13.2

Other harmonics emissions are lower than 20dB below the allowable limit.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+ Probe Factor +Cable Loss.
(3) The average measurement was not performed when the peak measured data under the limit of average detection.

5.6 Radiated Measurement Photos:

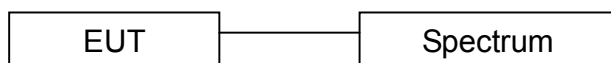


7. 6dB Bandwidth Measurement

6.1 Measurement Procedure

The EUT was operating in Bluetooth mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

6.2 Test SET-UP (Block Diagram of Configuration)



6.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

6.4 Limit

The minimum 6dB bandwidth shall be at least 500kHz.

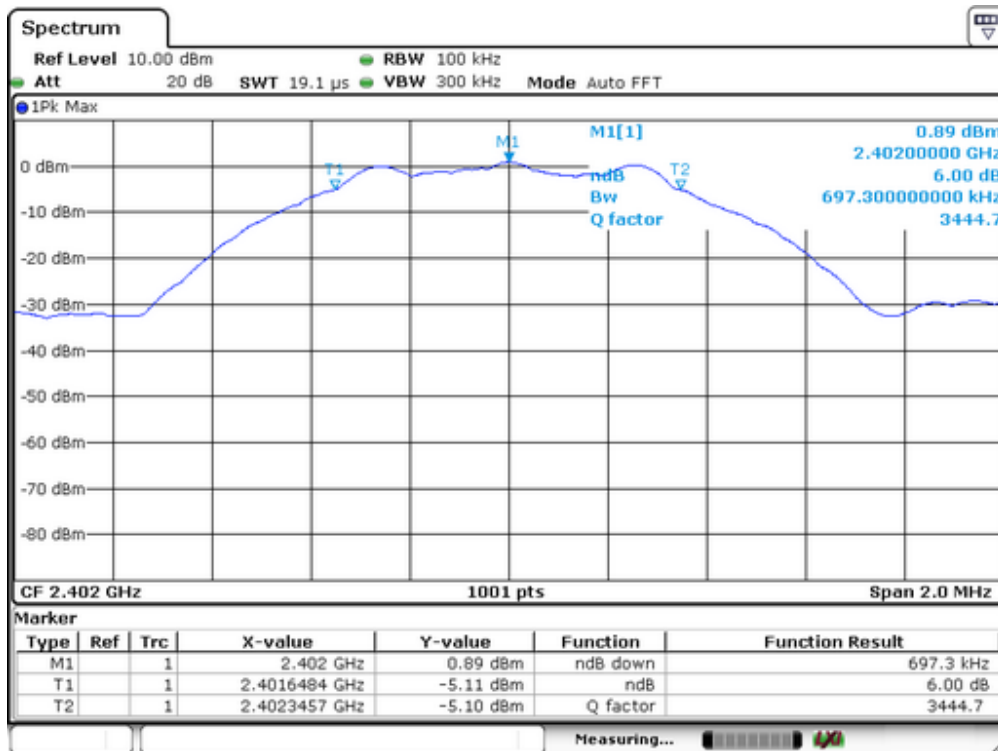
6.5 Measurement Results:

Refer to attached data chart.

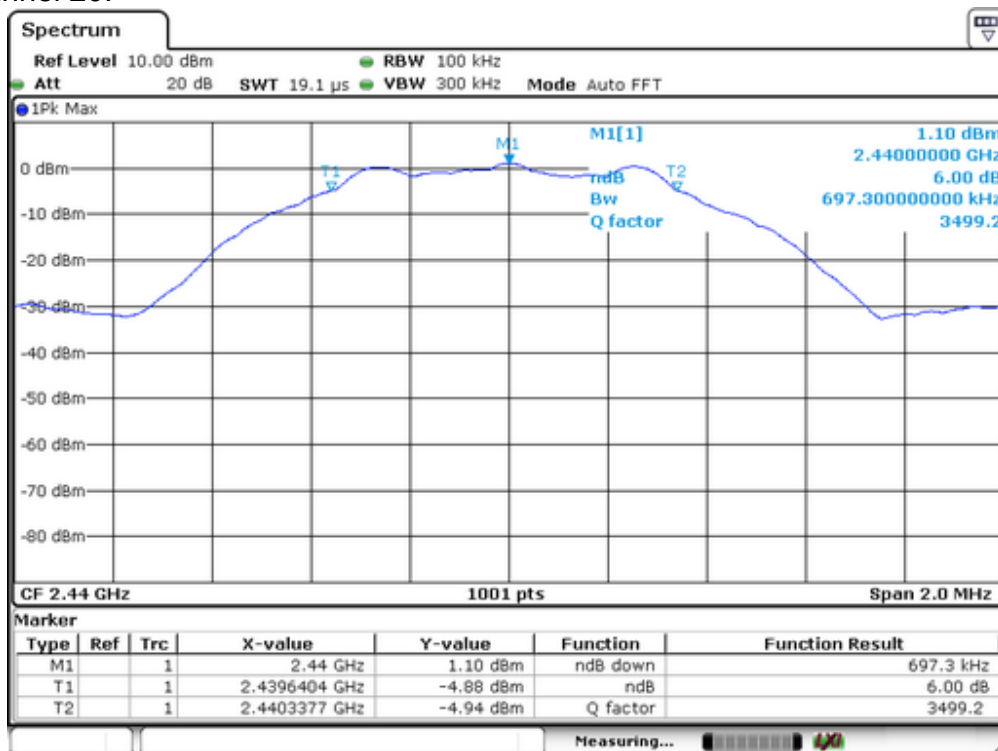
Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Channel number	Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)
00	2402	697	>500
20	2442	697	>500
39	2480	701	>500

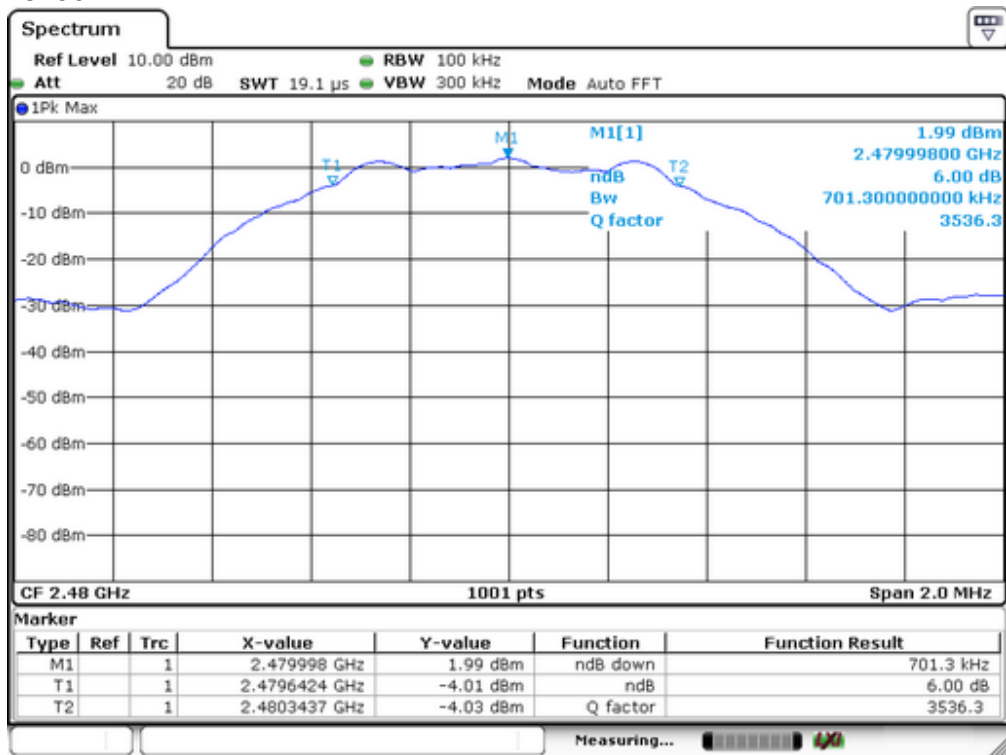
Channel 00:



Channel 20:



Channel 39:

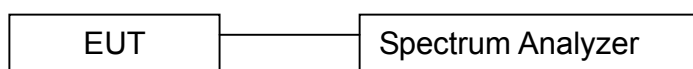


7. MAXIMUM PEAK OUTPUT POWER TEST

7.1 Measurement Procedure

- The Transmitter output (antenna port) was connected to the spectrum Analyzer.
- Turn on the EUT and then record the peak power value.
- Repeat above procedures on all channels needed to be tested.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

7.4 Peak Power output limit

The maximum peak power shall be less 1Watt.

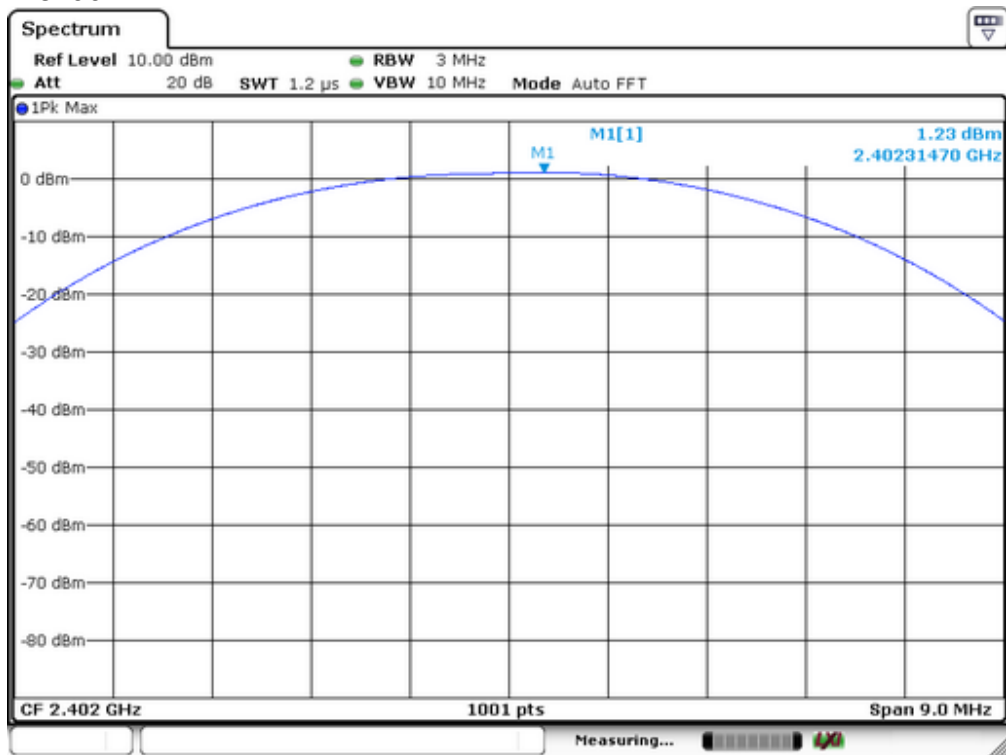
7.5 Measurement Results:

Refer to attached data chart.

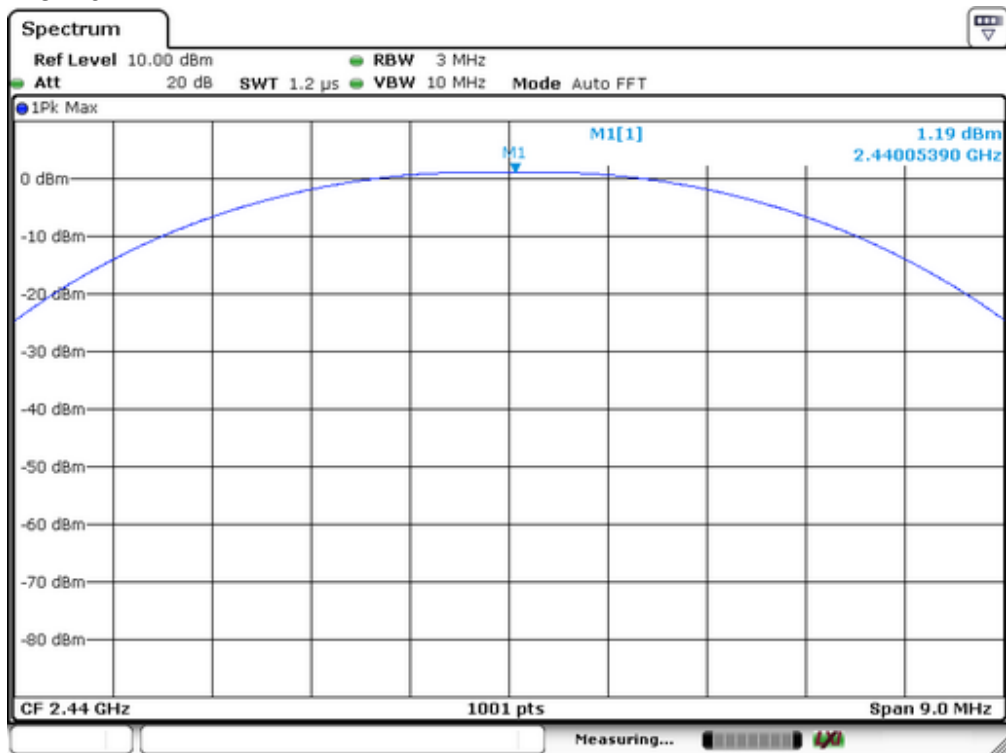
Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(W)	Pass/Fail
0	2402	1.23	1.327	1W(30dBm)	PASS
20	2442	1.19	1.315	1W(30dBm)	PASS
39	2480	2.02	1.592	1W(30dBm)	PASS

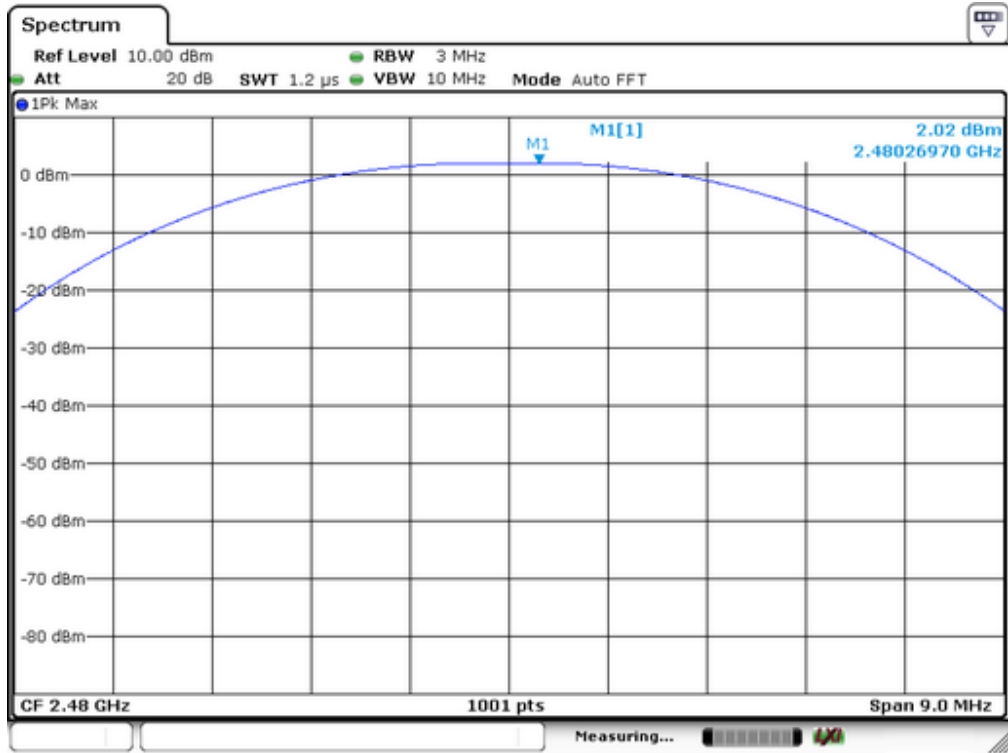
Channel 00:



Channel 20:



Channel 39:

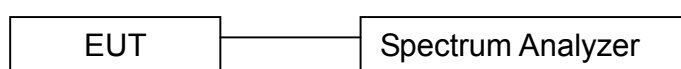


8. Power Spectral Density Measurement

8.1 Measurement Procedure

The EUT was operating in Bluetooth mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

8.4 Measurement Procedure

8.4.1 The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

8.4.2. Set to the maximum power setting and enable the EUT transmit continuously.

8.4.3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 3 kHz. Video bandwidth VBW = 10 kHz In order to make an accurate measurement, set the span to 1.5 times DTS Channel Bandwidth. (6dB BW)

8.4.4. Detector = peak, Sweep time = auto couple, Trace mode = max hold, Allow trace to fully stabilize. Use the peak marker function to determine the maximum power level.

8.4.5. Measure and record the results in the test report.

8.4.6. The Measured power density (dBm)/ 100KHz is a reference level and used as 20dBc down limit line for Conducted Band Edges and Conducted Spurious Emission.

8.5 Measurement Results:

The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS bandwidth.
RB	3KHz
VB	10KHz
Detector	Peak
Trace	Max hold
Sweep Time	Automatic

Refer to attached data chart.

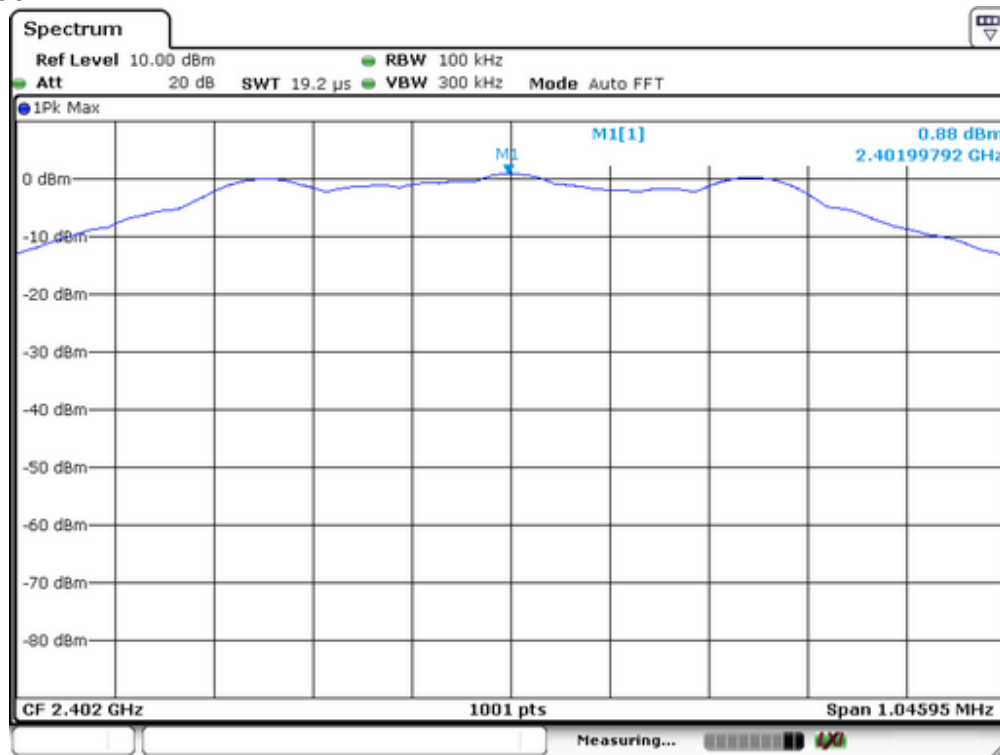
Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

Channel number	Channel frequency (MHz)	Measurement level (dBm)		Required Limit (dBm/3kHz)	Pass/Fail
		PSD/100kHz	PSD/3kHz		
00	2402	0.88	-14.70	8	PASS
20	2442	1.10	-14.20	8	PASS
39	2480	1.97	-13.12	8	PASS

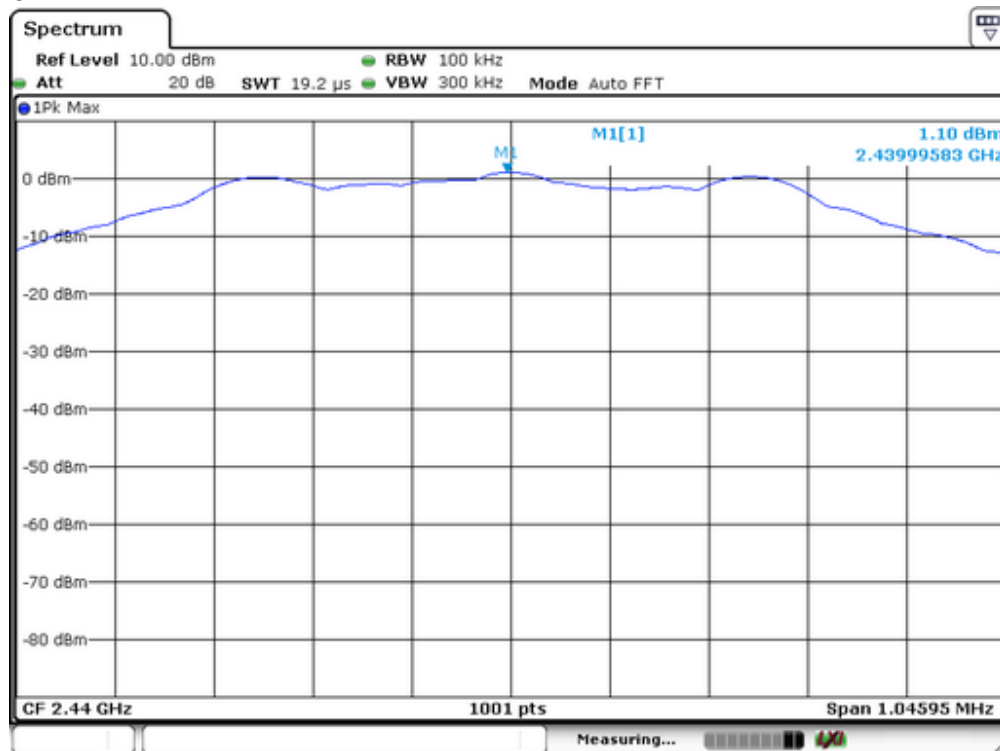
Note:

1. Measured power density(dBm) has offset with cable loss.
2. The measured power density(dBm)/100KHz is reference level and used as 20dBc down for Conducted Band Edges and Conducted Spurious Emission limit line.

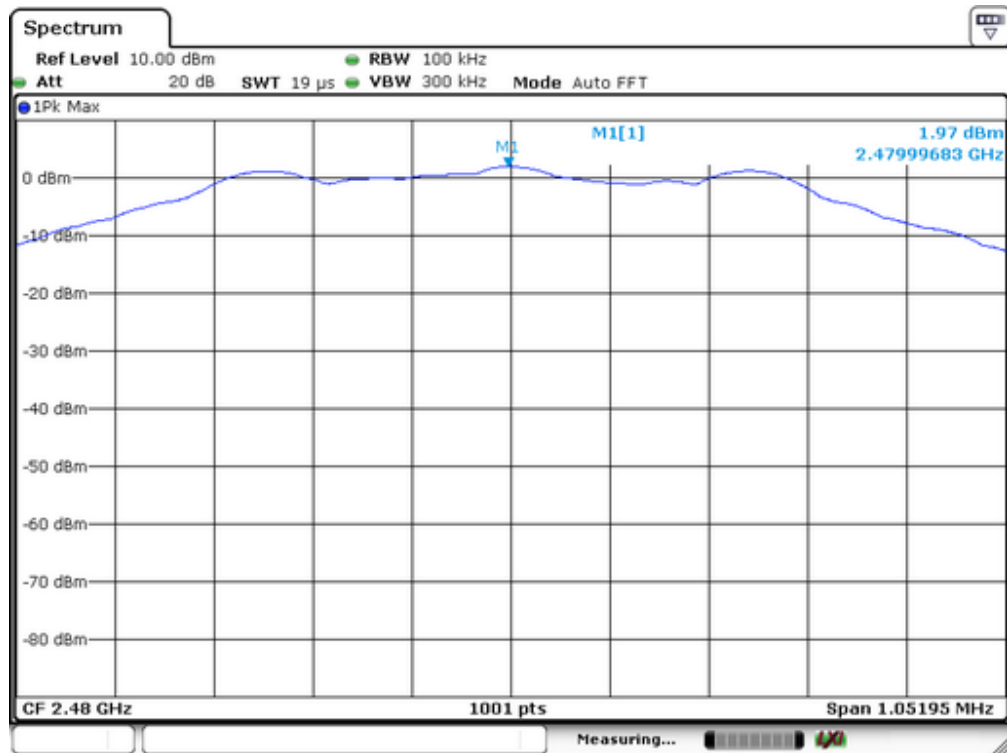
PSD 100kHz Plot:
Channel 00



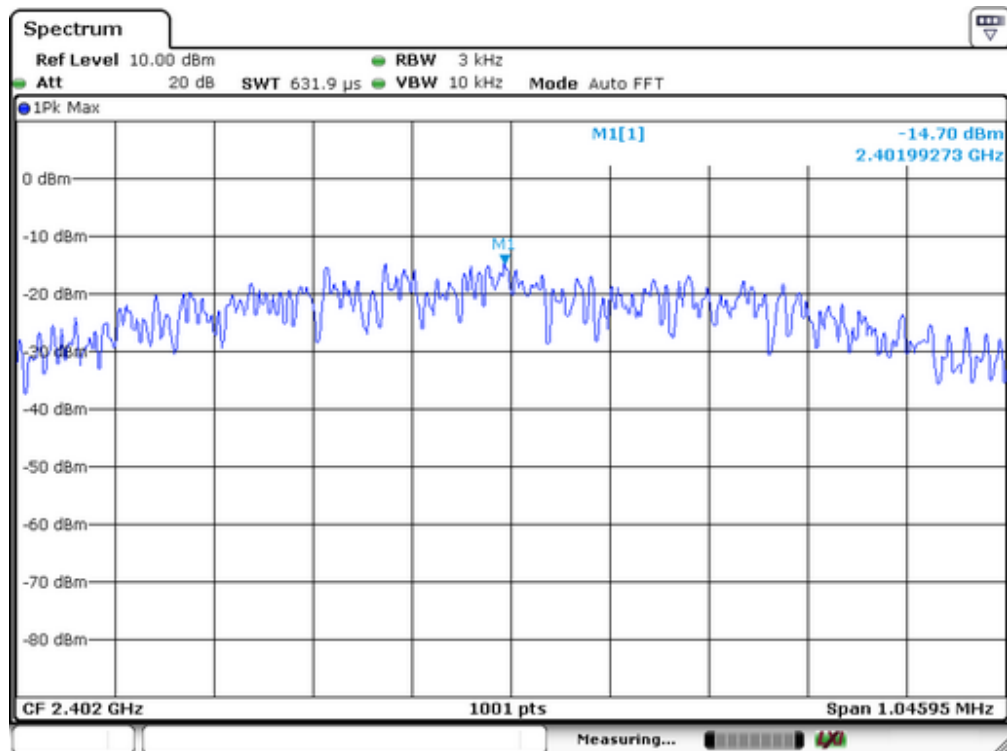
Channel 20



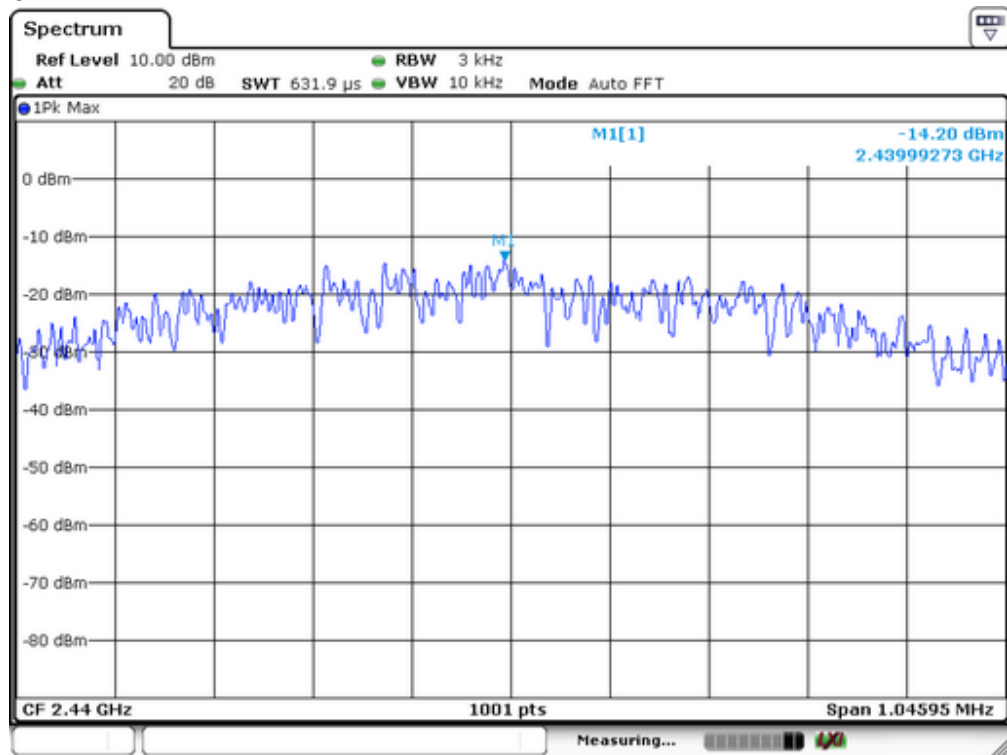
Channel 39



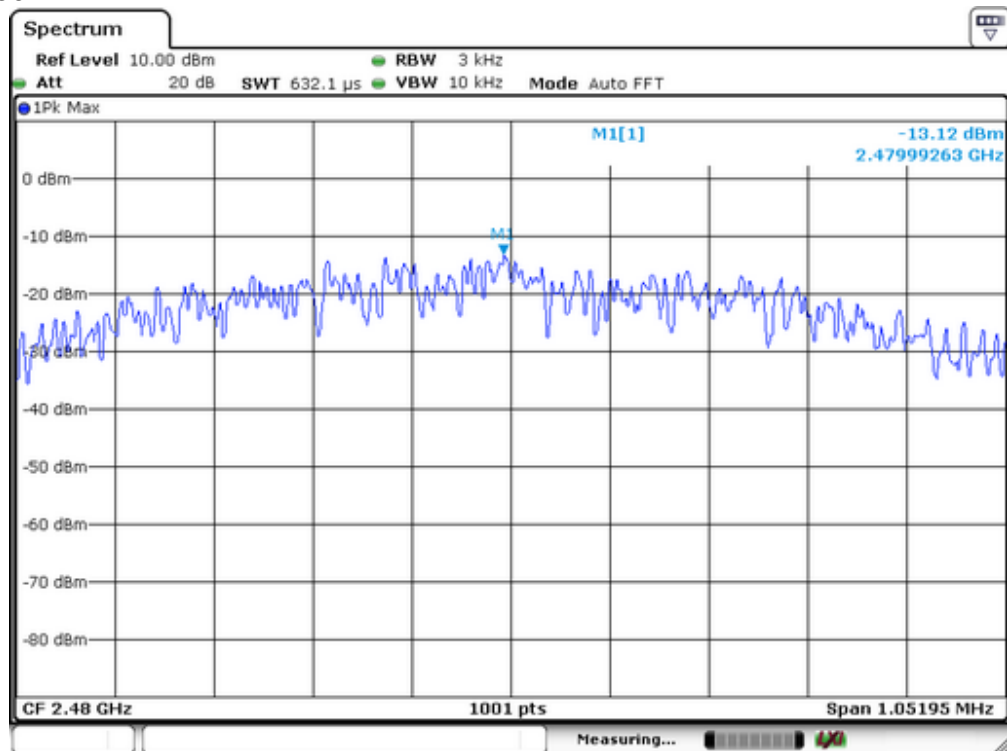
PSD 3KHz Plot: Channel 00



Channel 20



Channel 39



9. Band EDGE test

9.1 Measurement Procedure

For Conducted Test

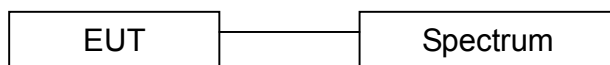
1. The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 300KHz.
2. The spectrum from 30MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.
3. Preliminary tests on individual chains, and on all chains with a combiner, were performed. The worst-case configuration was with a combiner, therefore final test were preformed with all chains feeding a combiner.

For Radiated emission Test

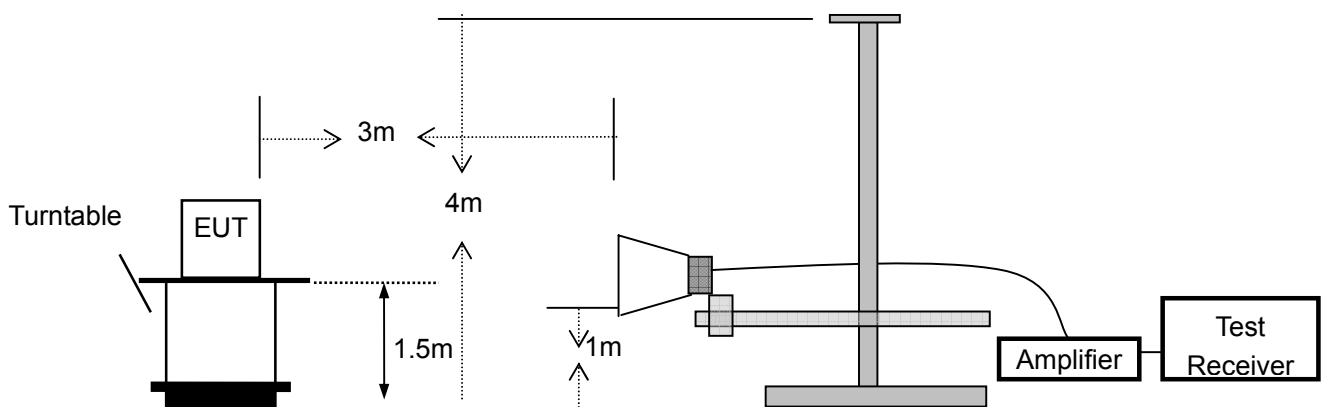
1. The EUT was Operating in hopping mode or could be controlled its channel. Printed out test result from the spectrum by hard copy function.
2. The EUT was placed on a turn table which is 0.8m above ground plane.
3. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
4. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
5. Repeat above procedures until all frequency measured were complete.

9.2 Test SET-UP (Block Diagram of Configuration)

For Conducted Test



For Radiated emission Test



9.3 Measurement Equipment Used:

For Conducted Test

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

For Radiated emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Analyzer	Rohde & Schwarz	FSV30	103040	12/29/2014	1 Year
2	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	12/29/2014	1 Year
3	Power Amplifier	LUNAR EM	LNA1G18-40	J101000000 81	12/29/2014	1 Year
4	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
5	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
6	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year

9.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %

1. Conducted Test

Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
2399.99	1.23	-46.03	47.26	>20dBc
2484	2.02	-54.37	56.39	>20dBc

2. Radiated emission Test

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
		PK	AV	PK	AV	PK	AV
2399.95	H	64.35	45.27	74	54	-9.65	-8.73
2398.05	V	60.25	40.15	74	54	-13.75	-13.85
2483.65	H	65.32	44.35	74	54	-8.68	-9.65
2481.06	V	59.18	39.75	74	54	-14.82	-14.25

10 Antenna Application

10.1 Antenna requirement

The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

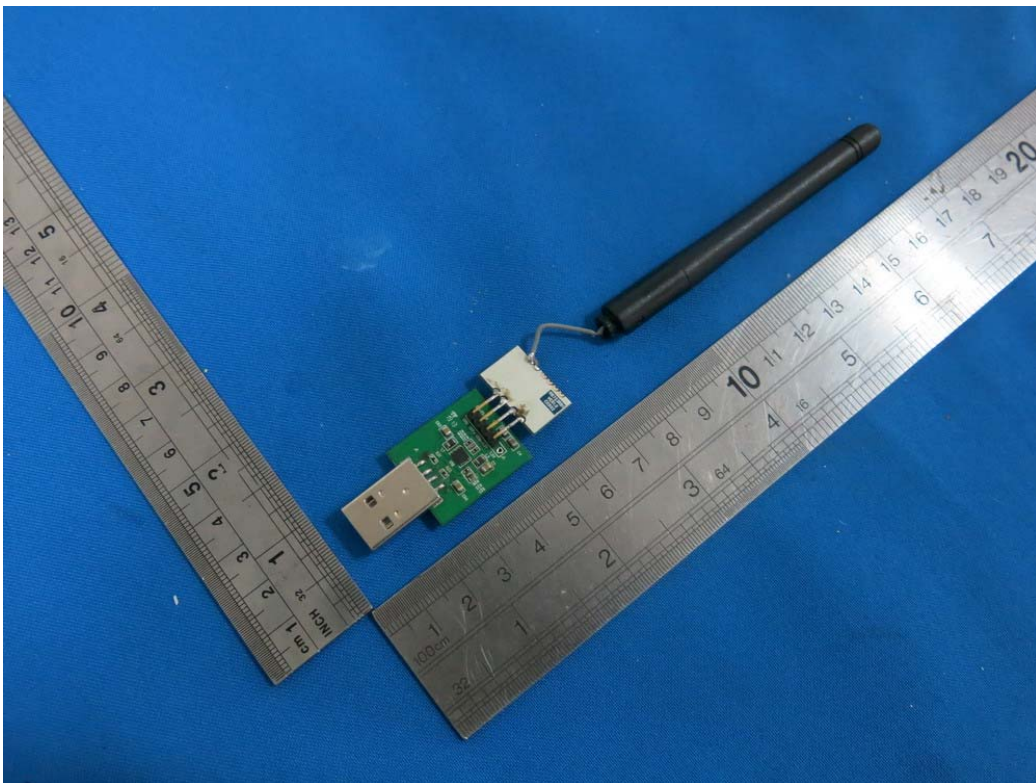
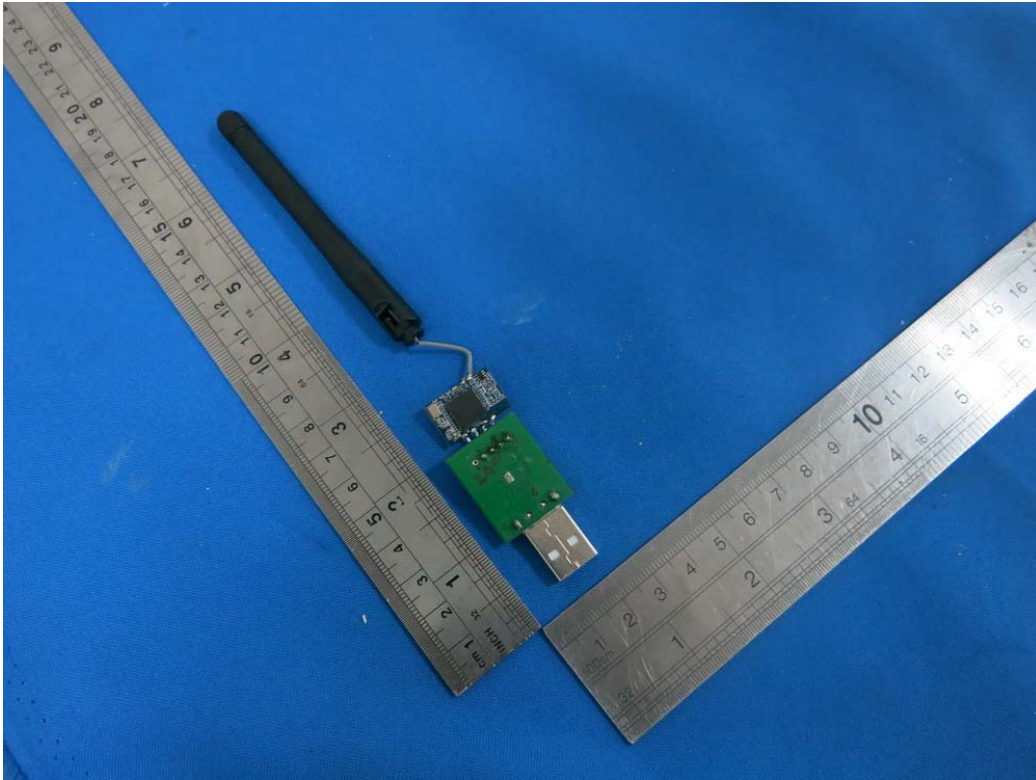
FCC part 15C section 15.247 requirements:

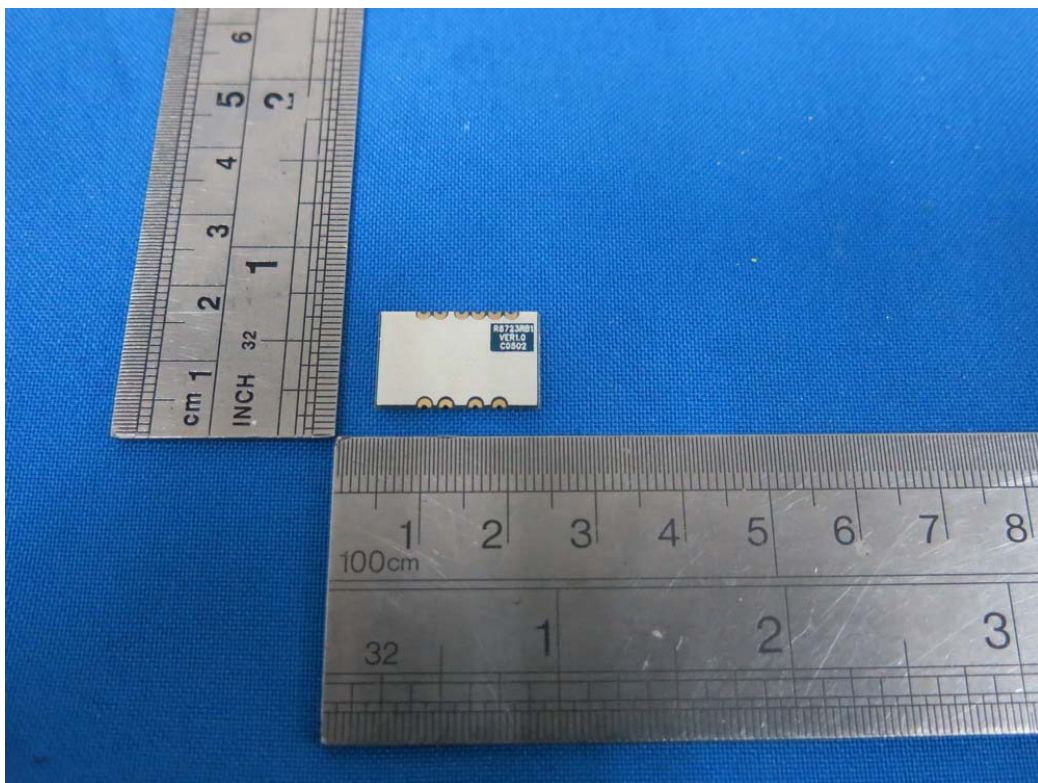
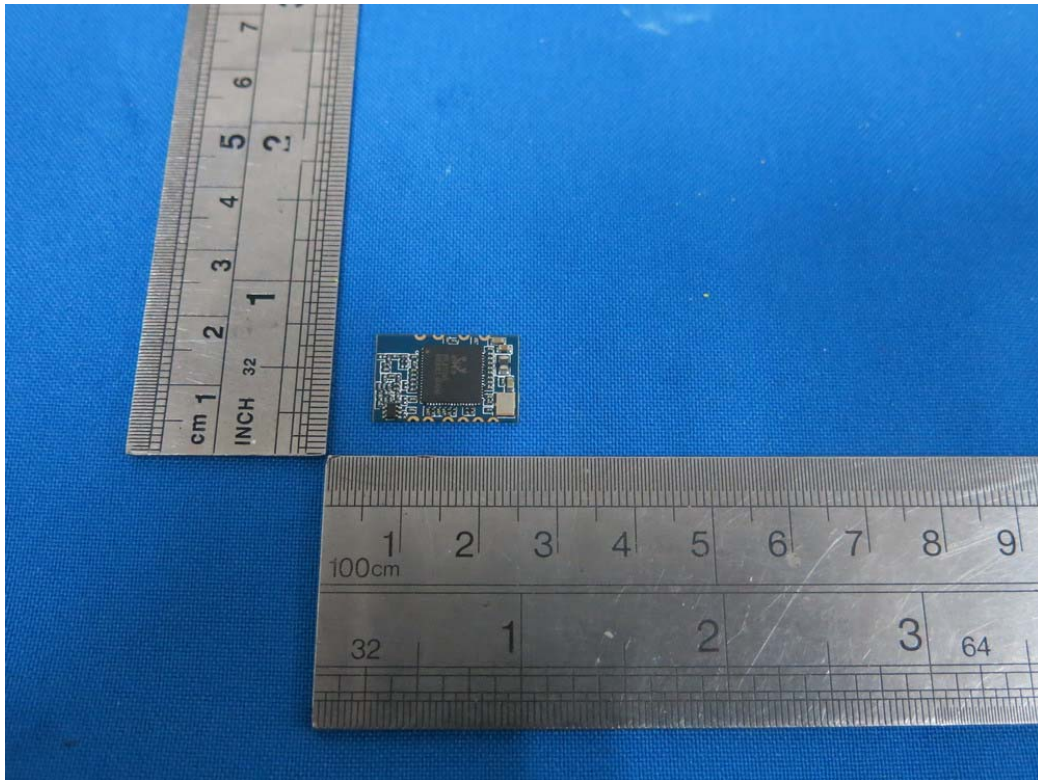
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

10.2 Result

The EUT's antenna, permanent attached antenna, used a PCB antenna and integrated on PCB, The antenna's gain is 2 dBi and meets the requirement.

APPENDIX I (PHOTOS OF EUT)





**ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT
INTENTIONAL RADIATOR CERTIFICATION TO
FCC PART 15 SUBPART C REQUIREMENT**

OF

Bluetooth 150Mbps Wireless N USB Module

Model No.: BL-R8723RB1

FCC ID: S8J-R8723RB1

Trademark: LB-LINK

Report No.: KAD150528148E3

Issue Date: September 02, 2015

Prepared for

**Shenzhen Bilian Electronic Co., Ltd.
Building B1, Zhongxing Industrial Zone, Juling Jutang Community,
Guanlan street, Bao'an, Shenzhen China**

Prepared by

**DONGGUAN EMTEK CO., LTD.
No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China
TEL: 86-769-22807078
FAX: 86-769-22807079**

**This report shall not be reproduced, except in full, without the written approval of
DONGGUAN EMTEK CO., LTD.**

VERIFICATION OF COMPLIANCE

Applicant:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Manufacturer:	Shenzhen Bilian Electronic Co., Ltd. Building B1, Zhongxing Industrial Zone, Juling Jutang Community, Guanlan street, Bao'an, Shenzhen China
Product Description:	Bluetooth 150Mbps Wireless N USB Module
Trade Mark:	LB-LINK
Model Number:	BL-R8723RB1

We hereby certify that:

The above equipment was tested by DONGGUAN EMTEK CO., LTD. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.10-2013 and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.247(2014).

Date of Test : May 28, 2015 to June 27, 2015

Prepared by :

Ivy Huang

Ivy Huang/Editor

Reviewer :

Alan He

Alan He/Supervisor

Approved & Authorized
Signer :

Sam Lv
Sam Lv/Manager



Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD150525148E3

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APPENDIX I (PHOTOS OF EUT)(3PAGES)

1. General Information

1.1 Product Description

Product Name	Bluetooth 150Mbps Wireless N USB Module		
Model number	BL-R8723RB1		
Power Supply	DC From PC		
Technical Description			
Kind of Device	Bluetooth 4.0	Bluetooth 3.0+EDR	WiFi
Operation Frequency	2402-2480MHz		2412-2462MHz for 802.11b/g/n(HT20) ; 2422-2452MHz for 802.11n(HT40)
Modulation	GFSK	GFSK, $\pi/4$ -DQPSK, 8DPSK	OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n, DSSS with DBPSK/DQPSK/CCK for 802.11b;
Number of Channel	40	79	11 Channels for 802.11b/g/n(HT20) 7 Channels for 802.11n(HT40)
Channel space	2MHz	1MHz	5MHz
Max RF Output Power	2.02dBm	4.43dBm	14.10dBm
Antenna Type	Internal PCB antenna		External Antenna
Antenna Gain	2 dBi		

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		

Note:

1. This device is included 802.11b, 802.11g and 802.11n(HT20), 802.11n(HT40) 2.4GHz transceiver function.
2. Channel 1-11 for 802.11b, 802.11g, 802.11n(HT20); Channel 3-9 for 802.11n(HT40)
3. Test of channel was included the lowest middle and highest frequency in lowest data rate and to perform the test, then record on this report.

1.2 Related Submittal(s) / Grant(s)

This submittal(s) (test report) is intended for filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules. The composite system is compliance with Subpart B is authorized under a DOC procedure.

1.3 Test Methodology

All the test program has follow FCC new test procedure KDB558074 D01 v03r02, Both conducted and radiated testing was performed according to the procedures in ANSI C63.10-2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

1.4 Special Accessories

Not available for this EUT intended for grant.

1.5 Equipment Modifications

Not available for this EUT intended for grant.

1.6 Test Facility

Site Description

EMC Lab :

Accredited by FCC, June 18, 2014
The Certificate Number is 247565

Accredited by Industry Canada, February 19, 2014
The Certificate Number is 9444A

Name of Firm : DONGGUAN EMTEK CO., LTD.
Site Location : No.281, Guantai Road, Nancheng District,
Dongguan, Guangdong, China

2. System Test Configuration

2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

2.3 Test Procedure

2.3.1 Conducted Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. According to the requirements in Section 13.1.4.1 of ANSI C63.10-2013 Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and average detector mode.

2.3.2 Radiated Emissions

The EUT is placed on a turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. Emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes according to the requirements in Section 13.1.4.1 of ANSI C63.10-2013.

2.4 Configuration of Tested System

Fig. 2-1 Configuration of Tested System

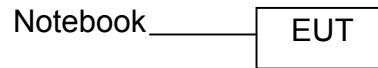


Table 2-1 Equipment Used in Tested System

Item	Equipment	Trade Mark	Model No.	FCC ID	Note
1.	Bluetooth 150Mbps Wireless N USB Module	LB-LINK	BL-R8723RB1	S8J-R8723RB1	EUT
2	Notebook	Dell	14R-N4110	N/A	Support Equipment

Note:

- (1) Unless otherwise denoted as EUT in 『Remark』 column, device(s) used in tested system is a support equipment.

3. Description of Test Modes

These is Digital Transmission system (DTS) and have modulation OFDM, DSSS, DBPSK, DQPSK, CCK, 16QAM, 64QAM. According exploratory test, EUT will have maximum output power in those data rate (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n : MCS0), so those data rate were used for all test.

For 802.11b/g/n(HT20) :

1. For lowest channel : 2412MHz (Channel 1)
2. For middle channel : 2437MHz (Channel 6)
3. For highest channel: 2462MHz (Channel 11)

For 802.11n(HT40):

1. For lowest channel : 2422MHz (Channel 3)
2. For middle channel : 2437MHz (Channel 6)
3. For highest channel: 2452MHz (Channel 9)

4. Summary of Test Results

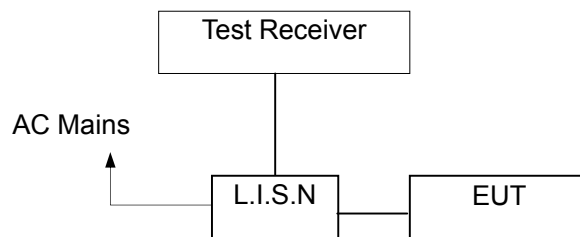
FCC Rules	Description Of Test	Result
§15.247(a)(2)	6dB bandwidth	Pass
§15.247(b)(3)	Max Peak output Power test	Pass
§15.247(e)	Power density	Pass
§15.247(d)	Band edge test	Pass
§15.207	AC Power Conducted Emission	Pass
§15.247(d), §15.209	Radiated Emission	Pass
§15.247(d)	Antenna Port Emission	Pass
§15.247(b)&§15.203	Antenna Application	Pass

5. Conducted Emissions Test

5.1 Measurement Procedure

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.2 Test SET-UP (Block Diagram of Configuration)



5.3 Measurement Equipment Used

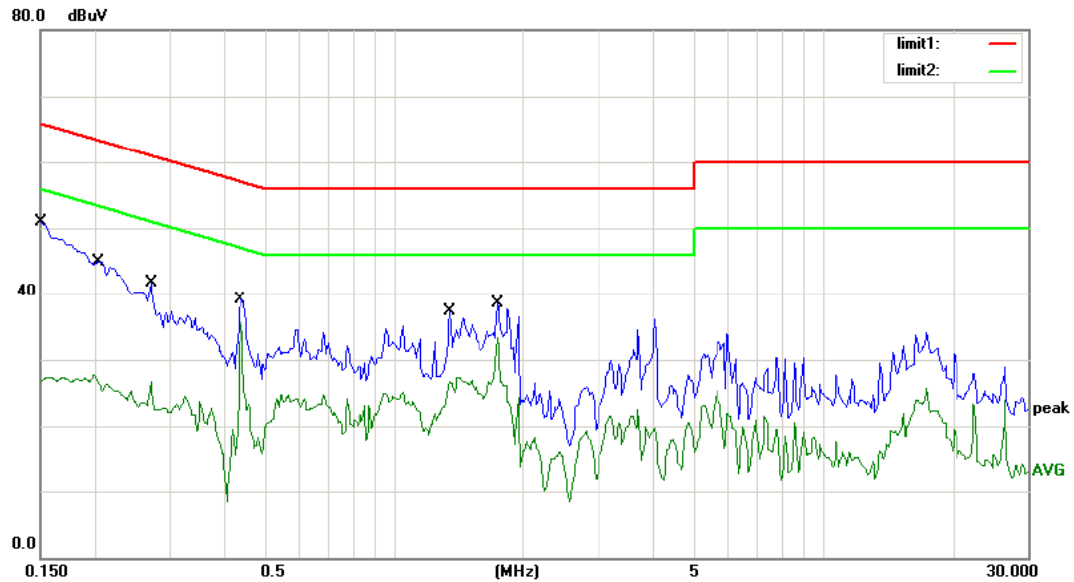
Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	03/16/2015	03/15/2016
L.I.S.N	Rohde & Schwarz	ENV216	100017	03/16/2015	03/15/2016
RF Switching Unit	CDS	RSU-M2	38401	03/16/2015	03/15/2016
Coaxial Cable	CDS	79254	46107086	03/16/2015	03/15/2016

5.4 Conducted Emission Limit

Conducted Emission Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

- Note:** 1. The lower limit shall apply at the transition frequencies
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

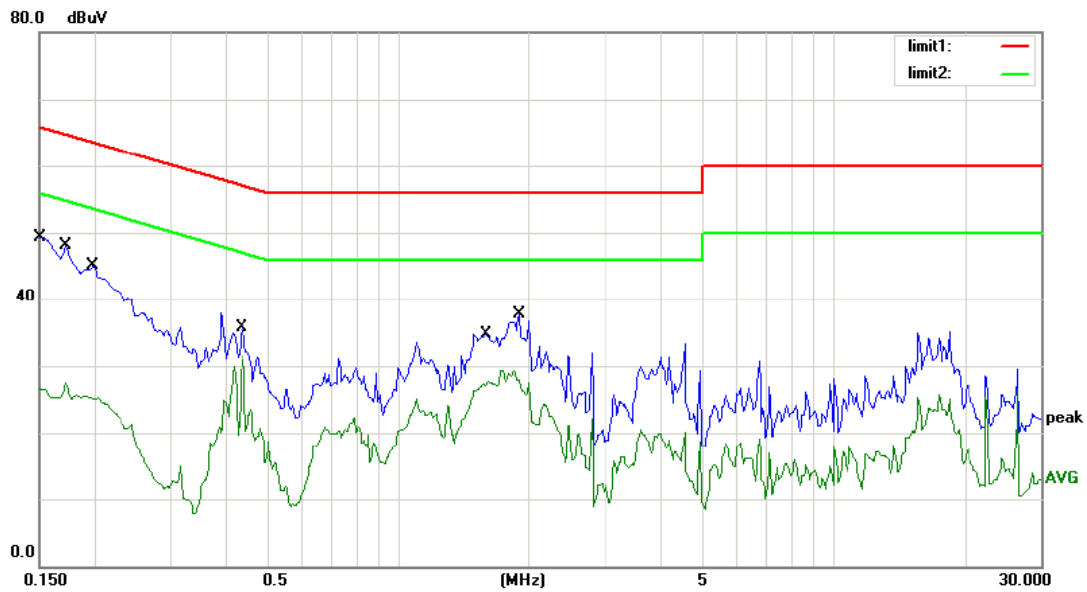
5.5 Measurement Result



Site site #1 Phase: **L1** Temperature: 24
Limit: (CE)FCC PART 15 class B_QP Power: DC 5V Humidity: 55 %
Mode: TX(2412)
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	48.54	0.00	48.54	66.00	-17.46	QP	
2		0.1500	27.35	0.00	27.35	56.00	-28.65	AVG	
3		0.2040	41.24	0.00	41.24	63.45	-22.21	QP	
4		0.2040	27.72	0.00	27.72	53.45	-25.73	AVG	
5		0.2742	36.54	0.00	36.54	60.99	-24.45	QP	
6		0.2742	26.63	0.00	26.63	50.99	-24.36	AVG	
7		0.4380	36.45	0.00	36.45	57.10	-20.65	QP	
8	*	0.4380	35.74	0.00	35.74	47.10	-11.36	AVG	
9		1.3470	35.24	0.00	35.24	56.00	-20.76	QP	
10		1.3470	27.32	0.00	27.32	46.00	-18.68	AVG	
11		1.7475	36.74	0.00	36.74	56.00	-19.26	QP	
12		1.7475	33.31	0.00	33.31	46.00	-12.69	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.



Site site #1 Phase: **N** Temperature: 24
 Limit: (CE)FCC PART 15 class B_QP Power: DC 5V Humidity: 55 %
 Mode: TX(2412)
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1500	47.51	0.00	47.51	66.00	-18.49	QP	
2		0.1500	26.61	0.00	26.61	56.00	-29.39	AVG	
3		0.1725	46.25	0.00	46.25	64.84	-18.59	QP	
4		0.1725	27.47	0.00	27.47	54.84	-27.37	AVG	
5		0.1995	43.21	0.00	43.21	63.63	-20.42	QP	
6		0.1995	25.23	0.00	25.23	53.63	-28.40	AVG	
7		0.4380	32.14	0.00	32.14	57.10	-24.96	QP	
8	*	0.4380	31.43	0.00	31.43	47.10	-15.67	AVG	
9		1.5945	32.74	0.00	32.74	56.00	-23.26	QP	
10		1.5945	27.71	0.00	27.71	46.00	-18.29	AVG	
11		1.9005	35.14	0.00	35.14	56.00	-20.86	QP	
12		1.9005	27.87	0.00	27.87	46.00	-18.13	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver.

6. Radiated Emission Test

6.1 Measurement Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane, And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured was complete.

When spectrum scanned from 30MHz to 1GHz setting resolution bandwidth 120KHz and video bandwidth 300KHz:

EMI Test Receiver	Setting
Attenuation	Auto
RB	120KHz
VB	300KHz
Detector	QP
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz:

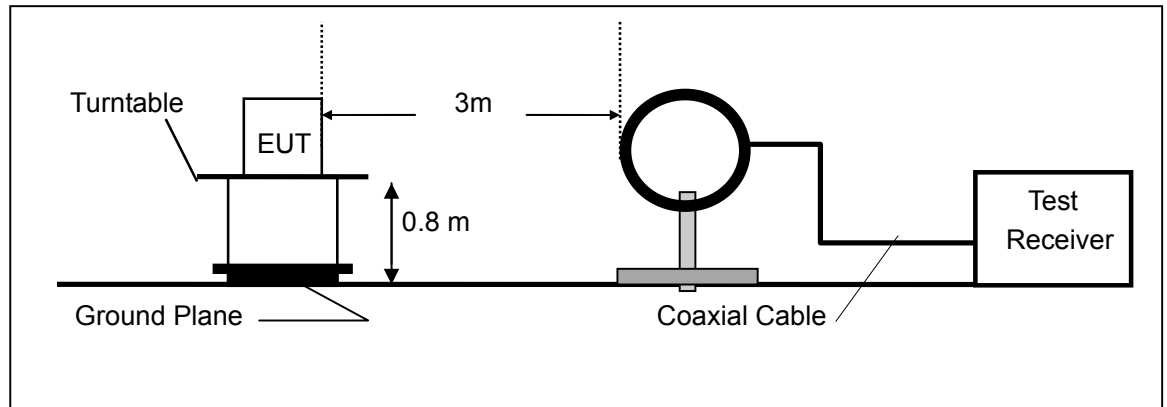
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz:

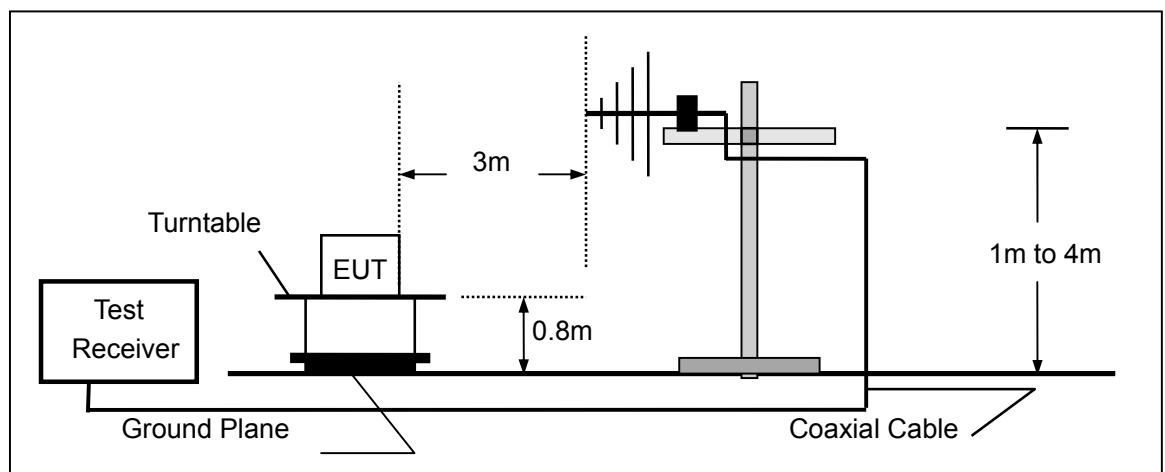
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

6.2 Test SET-UP (Block Diagram of Configuration)

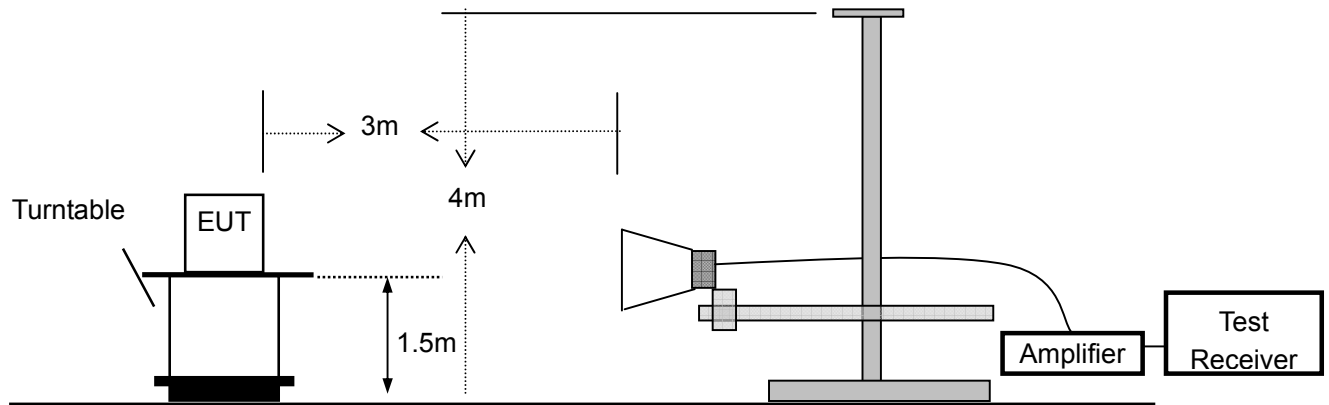
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(C) Radiated Emission Test Set-Up, Frequency above 1000MHz



6.3 Measurement Equipment Used

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	03/16/2015	1 Year
2.	Bilog Antenna	Schwarzbeck	VULB9163	000141	03/16/2015	1 Year
3.	Power Amplifier	CDS	RSU-M352	818	03/16/2015	1 Year
4.	Power Amplifier	HP	8447F	OPT H64	03/16/2015	1 Year
5.	Color Monitor	SUNSPO	SP-140A	N/A	03/16/2015	1 Year
6.	Single Line Filter	JIANLI	XL-3	N/A	03/16/2015	1 Year
7.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	03/16/2015	1 Year
8.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	03/16/2015	1 Year
9.	DC Power Filter	JIANLI	DL-2X50B	N/A	03/16/2015	1 Year
10.	Cable	Schwarzbeck	PLF-100	549489	03/16/2015	1 Year
11.	Cable	Rosenberger	CIL02	A0783566	03/16/2015	1 Year
12.	Cable	Rosenberger	RG 233/U	525178	03/16/2015	1 Year
13.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	12/29/2014	1 Year
14.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	12/29/2014	1 Year
15.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	12/29/2014	1 Year
16.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
17.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year
18.	Cable	H+S	CBL-26	N/A	12/29/2014	1 Year

6.4 Radiated Emission Limit

The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table 15.209(a):

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
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

Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

Remark 1. Emission level in dBuV/m=20 log (uV/m)

- :
2. Measurement was performed at an antenna to the closed point of EUT distance of meters.
 3. Only spurious frequency is permitted to locate within the Restricted Bands specified in provision of § 15.205, and the emissions located in restricted bands also comply with 15.209 limit.

6.5 Measurement Result

Below 30MHz:

All the modulation modes were tested the data of the test mode are recorded in the following pages.

Operation Mode:	TX Mode	Test Date :	June 12, 2015
Frequency Range:	9KHz~30MHz	Temperature :	28℃
Test Result:	PASS	Humidity :	60 %
Measured Distance:	3m	Test By:	WOLF

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

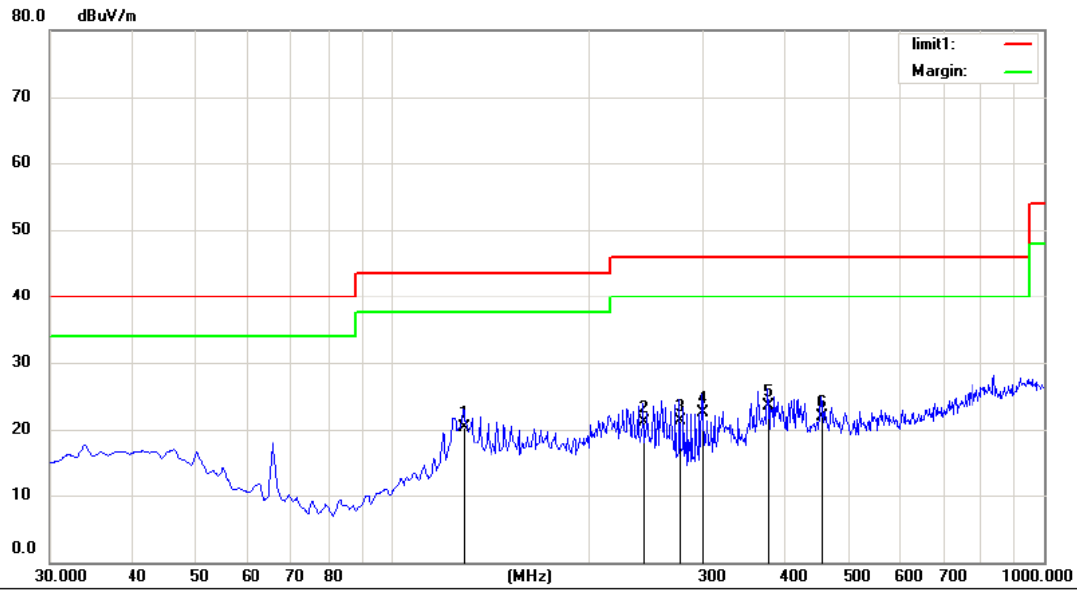
Distance extrapolation factor = $40\log(\text{Specific distance}/\text{test distance})$ (dB);

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

Below 1000MHz:

All the modulation modes were tested the data of the worst mode (TX 802.11g) are recorded in the following pages and the others modulation methods do not exceed the limits.

Please refer to the following test plots:



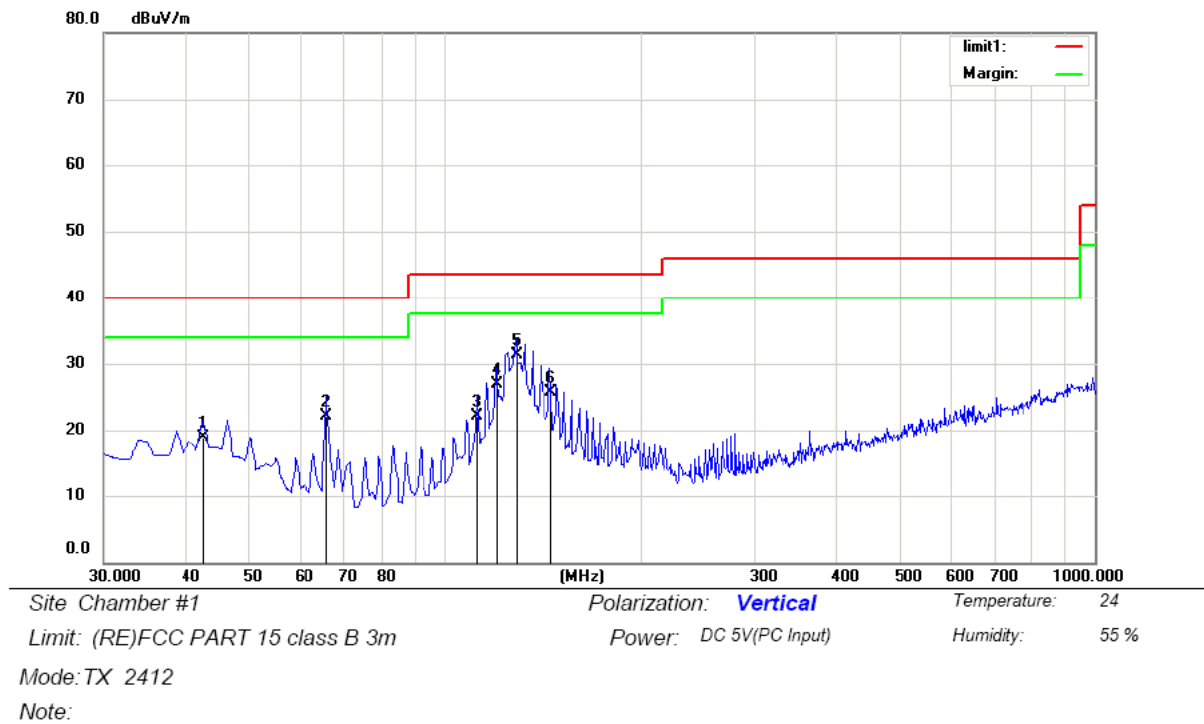
Site: Chamber #1
 Limit: (RE)FCC PART 15 class B 3m
 Mode: TX 2412
 Note:

Polarization: **Horizontal**
 Power: DC 5V(PC Input)
 Temperature: 24
 Humidity: 55 %

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		128.9400	36.54	-16.27	20.27	43.50	-23.23	QP		
2		243.4000	36.82	-15.63	21.19	46.00	-24.81	QP		
3		276.3800	36.40	-15.00	21.40	46.00	-24.60	QP		
4		298.6900	36.95	-14.42	22.53	46.00	-23.47	QP		
5	*	377.2600	35.67	-12.21	23.46	46.00	-22.54	QP		
6		455.8300	32.90	-11.08	21.82	46.00	-24.18	QP		

*:Maximum data x:Over limit !:over margin

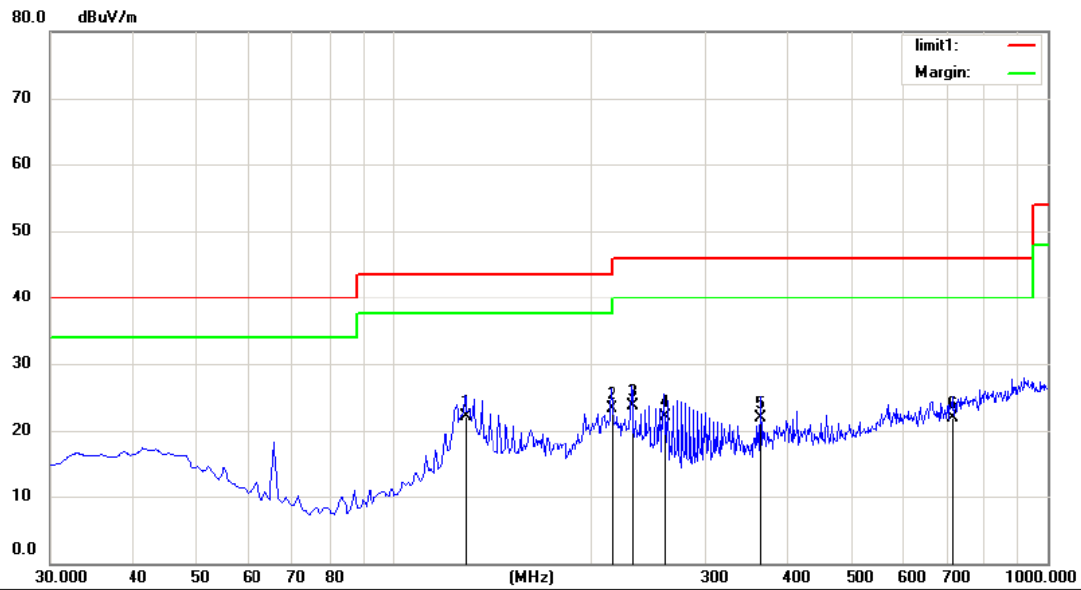
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		42.6100	32.44	-13.49	18.95	40.00	-21.05	QP		
2		65.8900	43.23	-21.07	22.16	40.00	-17.84	QP		
3		112.4500	39.61	-17.43	22.18	43.50	-21.32	QP		
4		120.2100	43.87	-16.93	26.94	43.50	-16.56	QP		
5	*	128.9400	47.65	-16.35	31.30	43.50	-12.20	QP		
6		145.4300	43.21	-17.42	25.79	43.50	-17.71	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



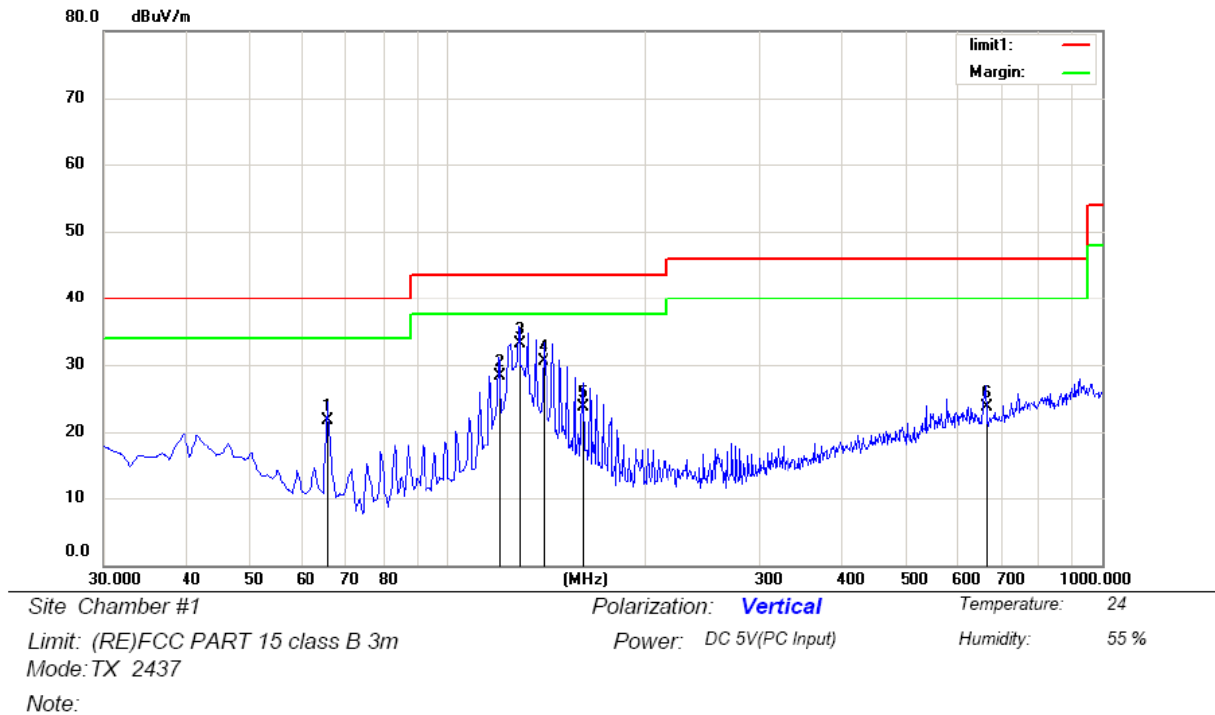
Site: Chamber #1
Limit: (RE)FCC PART 15 class B 3m
Mode: TX 2437
Note:

Polarization: **Horizontal**
Power: DC 5V(PC Input)
Temperature: 24
Humidity: 55 %

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		128.9400	38.41	-16.27	22.14	43.50	-21.36	QP		
2	*	215.2700	39.86	-16.46	23.40	43.50	-20.10	QP		
3		231.7600	39.61	-15.93	23.68	46.00	-22.32	QP		
4		259.8900	37.47	-15.38	22.09	46.00	-23.91	QP		
5		364.6500	34.52	-12.58	21.94	46.00	-24.06	QP		
6		714.8200	28.63	-6.80	21.83	46.00	-24.17	QP		

*:Maximum data x:Over limit !:over margin

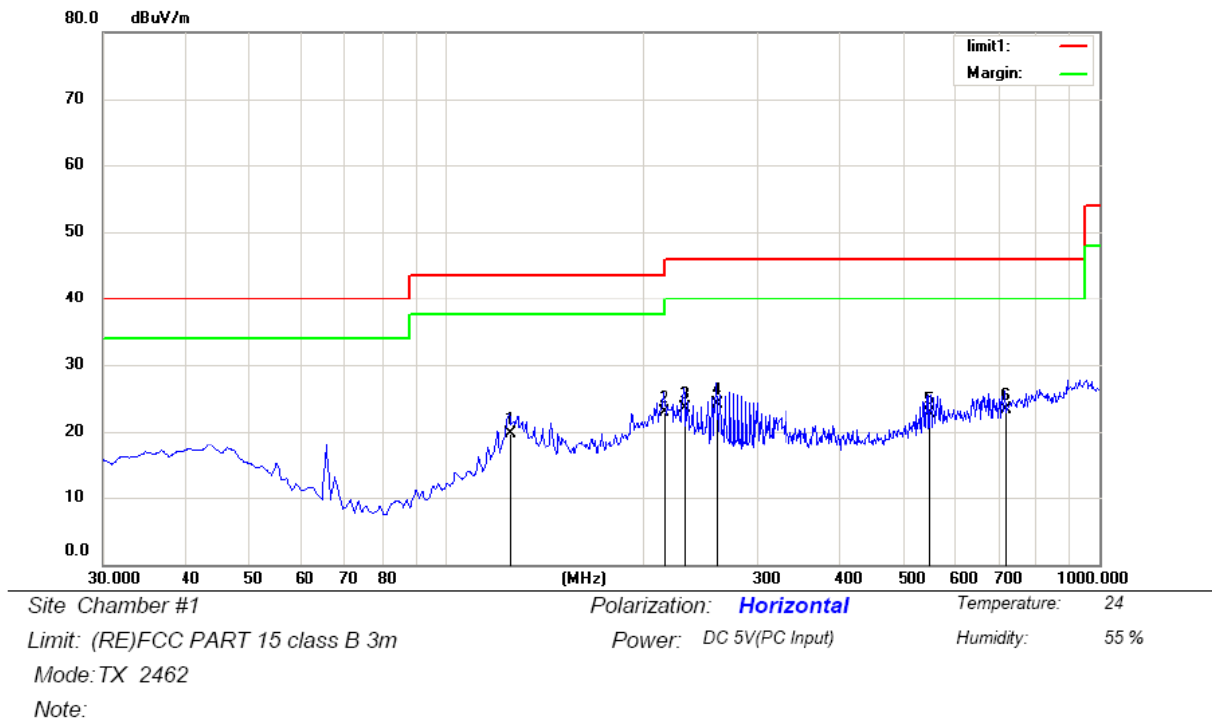
Operator: Snake



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Comment
1		65.8900	42.81	-21.07	21.74	40.00	-18.26	QP		
2		120.2100	45.22	-16.93	28.29	43.50	-15.21	QP		
3	*	128.9400	49.37	-16.27	33.10	43.50	-10.40	QP		
4		140.5800	47.66	-17.09	30.57	43.50	-12.93	QP		
5		161.9200	42.18	-18.41	23.77	43.50	-19.73	QP		
6		665.3500	31.52	-7.75	23.77	46.00	-22.23	QP		

*:Maximum data x:Over limit !:over margin

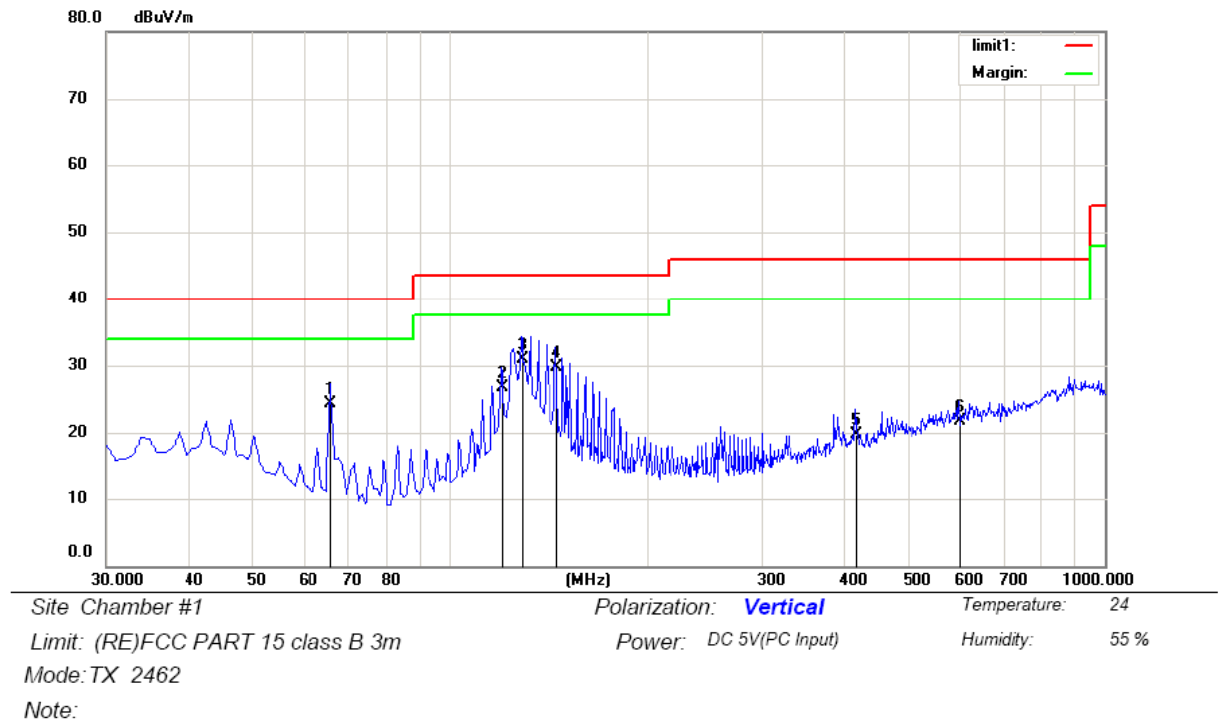
Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		125.0600	36.02	-16.40	19.62	43.50	-23.88	QP		
2	*	215.2700	39.28	-16.46	22.82	43.50	-20.68	QP		
3		231.7600	39.50	-15.93	23.57	46.00	-22.43	QP		
4		259.8900	39.42	-15.38	24.04	46.00	-21.96	QP		
5		550.8900	31.75	-8.97	22.78	46.00	-23.22	QP		
6		718.7000	30.03	-6.67	23.36	46.00	-22.64	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake



No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		65.8900	45.32	-21.07	24.25	40.00	-15.75	QP		
2		120.2100	43.59	-16.93	26.66	43.50	-16.84	QP		
3	*	128.9400	47.31	-16.35	30.96	43.50	-12.54	QP		
4		145.4300	47.15	-17.42	29.73	43.50	-13.77	QP		
5		417.0300	31.02	-11.38	19.64	46.00	-26.36	QP		
6		600.3600	30.12	-8.40	21.72	46.00	-24.28	QP		

*:Maximum data x:Over limit !:over margin

Operator: Snake

Above 1000MHz:

Operation Mode: 802.11g Lowest

Test Date : June 12, 2015

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4824	V	64.15	46.35	74	54	-9.85	-7.65
7236	V	63.05	45.15	74	54	-10.95	-8.85
9648	V	62.82	44.15	74	54	-11.18	-9.85
12060	V	61.71	43.25	74	54	-12.29	-10.75
14472	V	60.25	41.82	74	54	-13.75	-12.18
16884	V	59.35	40.35	74	54	-14.65	-13.65
4824	H	65.34	45.82	74	54	-8.66	-8.18
7236	H	64.05	44.15	74	54	-9.95	-9.85
9648	H	63.15	43.62	74	54	-10.85	-10.38
12060	H	62.05	42.15	74	54	-11.95	-11.85
14472	H	61.72	41.05	74	54	-12.28	-12.95
16884	H	60.35	40.38	74	54	-13.65	-13.62

Operation Mode: 802.11g Middle

Test Date : June 12, 2015

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4874	V	65.3	45.38	74	54	-8.7	-8.62
7311	V	64.15	44.15	74	54	-9.85	-9.85
9688	V	63.2	43.62	74	54	-10.8	-10.38
12185	V	62.48	42.72	74	54	-11.52	-11.28
14622	V	61.92	41.05	74	54	-12.08	-12.95
17059	V	60.35	39.25	74	54	-13.65	-14.75
4874	H	64.82	45.3	74	54	-9.18	-8.7
7311	H	63.72	44.15	74	54	-10.28	-9.85
9688	H	62.15	43.62	74	54	-11.85	-10.38
12185	H	61.82	42.08	74	54	-12.18	-11.92
14622	H	60.38	41	74	54	-13.62	-13
17059	H	59.72	40.85	74	54	-14.28	-13.15

Operation Mode: 802.11g Highest

Test Date : June 12, 2015

Freq. (MHz)	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4924	V	65.72	44.15	74	54	-8.28	-9.85
7386	V	64.35	43.62	74	54	-9.65	-10.38
9848	V	63.15	42.05	74	54	-10.85	-11.95
12310	V	62	41.82	74	54	-12	-12.18
14772	V	61.82	40.74	74	54	-12.18	-13.26
17234	V	60.48	39.55	74	54	-13.52	-14.45
4924	H	64.82	45.15	74	54	-9.18	-8.85
7386	H	63.62	44.36	74	54	-10.38	-9.64
9848	H	62.18	43.62	74	54	-11.82	-10.38
12310	H	61.74	41.82	74	54	-12.26	-12.18
14772	H	60.25	40.72	74	54	-13.75	-13.28
17234	H	59.82	39.25	74	54	-14.18	-14.75

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Note: (1) All Readings are Peak Value and AV.
(2) Emission Level= Reading Level+Probe Factor +Cable Loss.
(3) Data of measurement within this frequency range shown “ – ” in the table above means the reading of emissions are attenuated more than 20Db below the permissible limits or the field strength is too small to be measured.

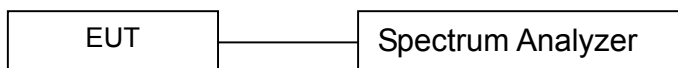
7. 6dB Bandwidth Test

7.1 Measurement Procedure

The EUT was operating in IEEE 802.11b, 802.11g, 802.11n(HT20), 802.11n(HT40) mode or could be controlled its channel. Printed out the test result from the spectrum by hard copy function.

1. Set resolution bandwidth (RBW) = 100 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequency) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used

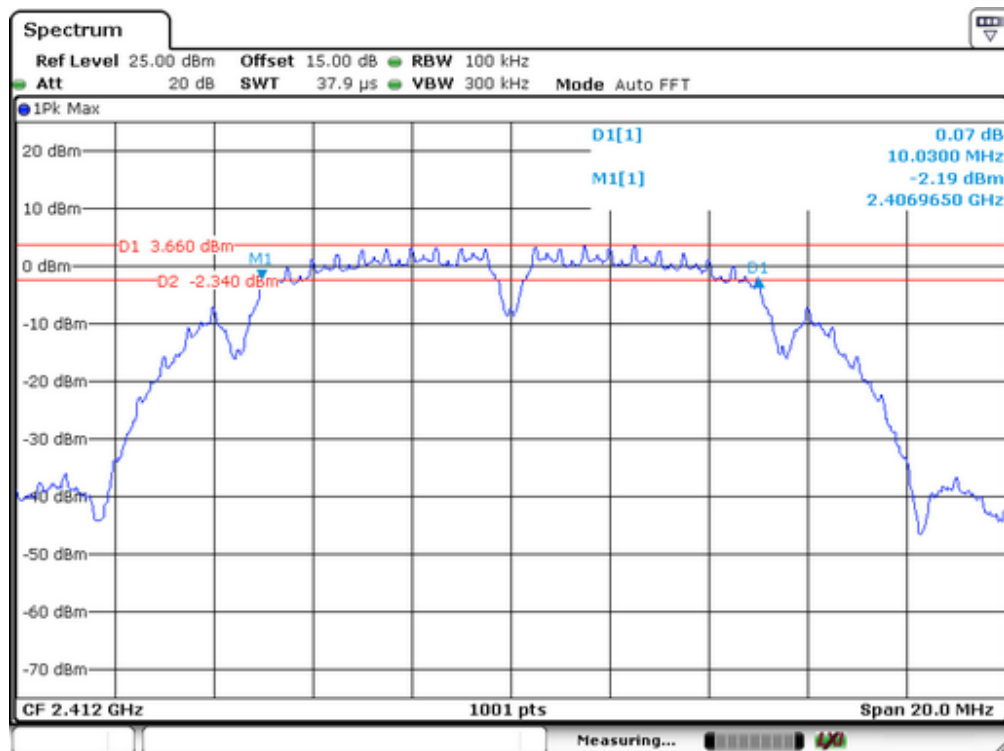
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	FSV30	1321.3008K	03/16/2015	03/15/2016

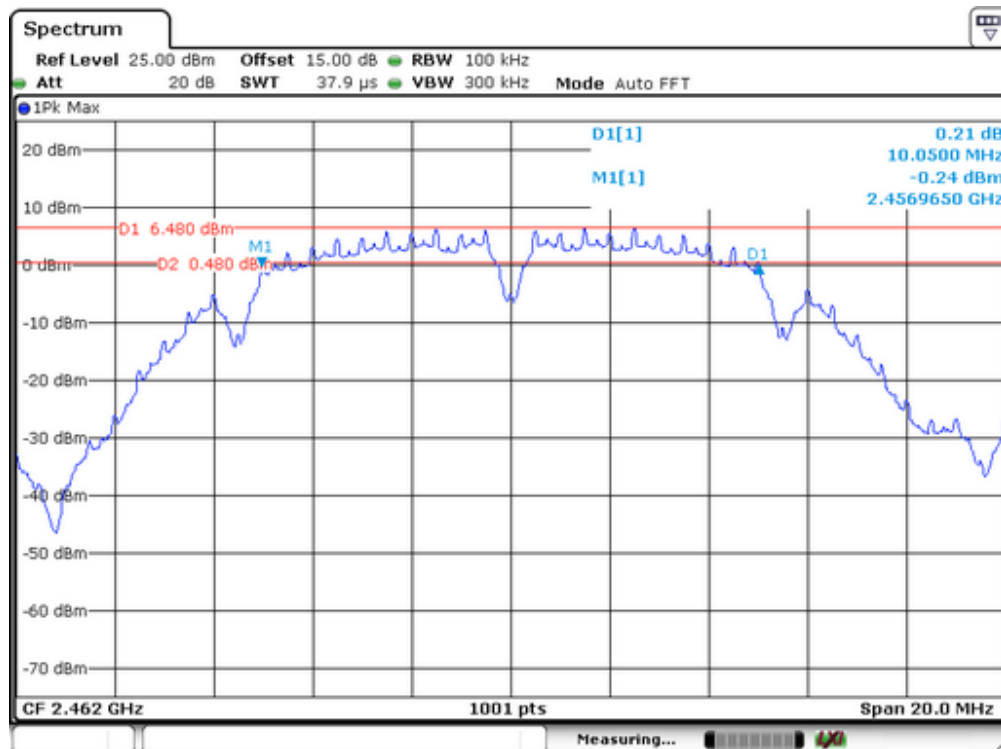
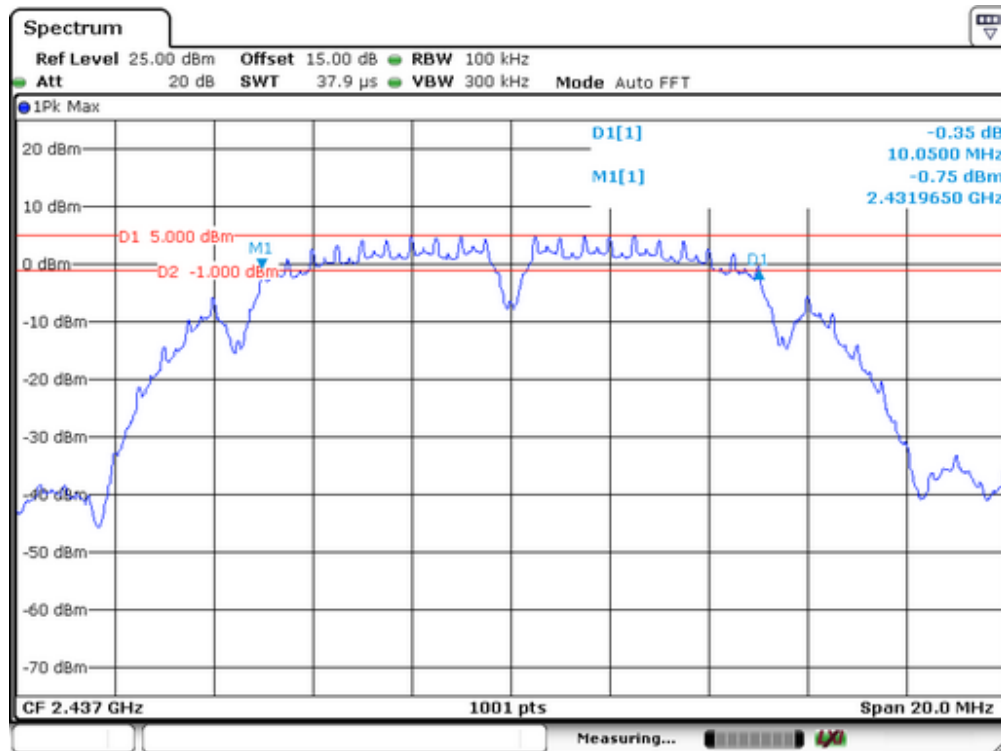
7.4 Measurement Results

6 Bandwidth Test Data Chart:

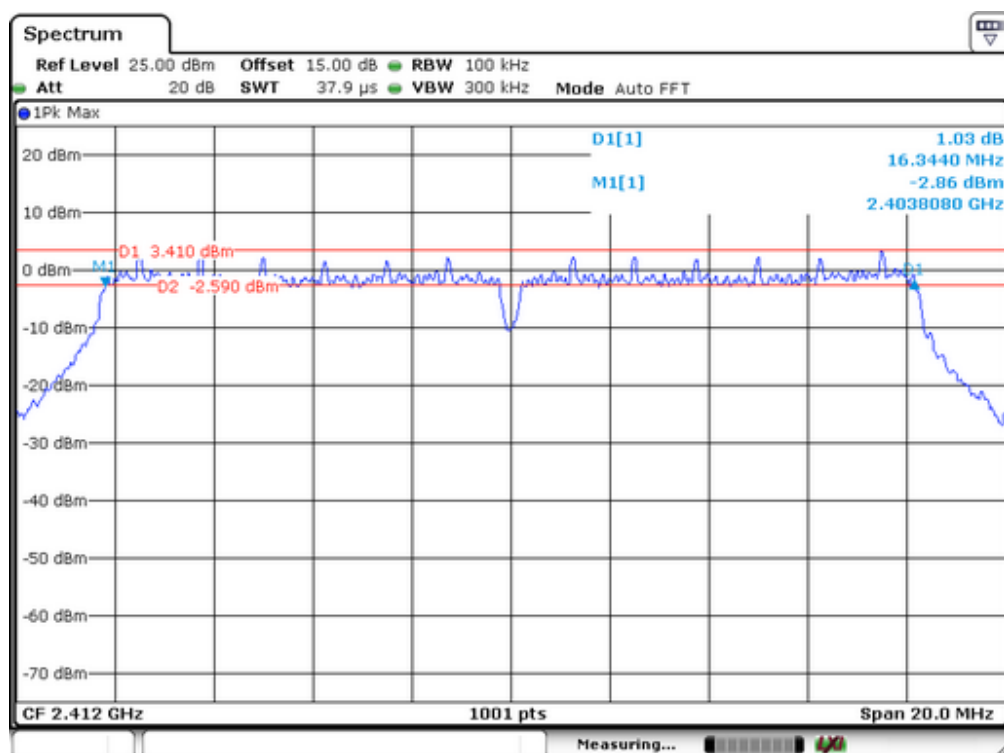
Refer to attached data chart.

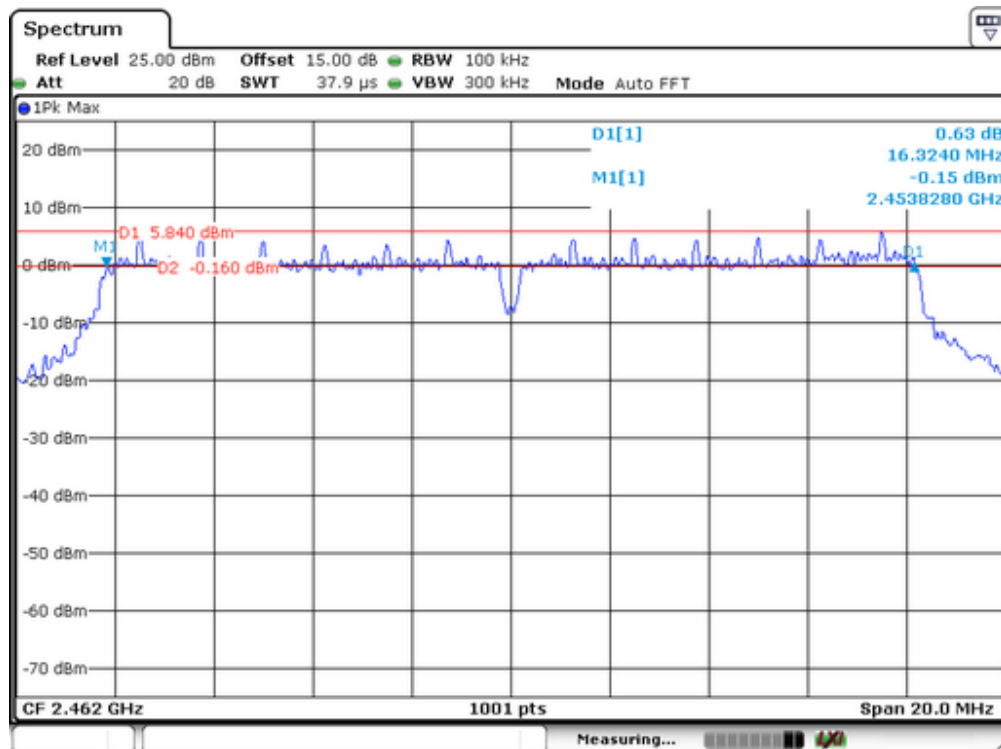
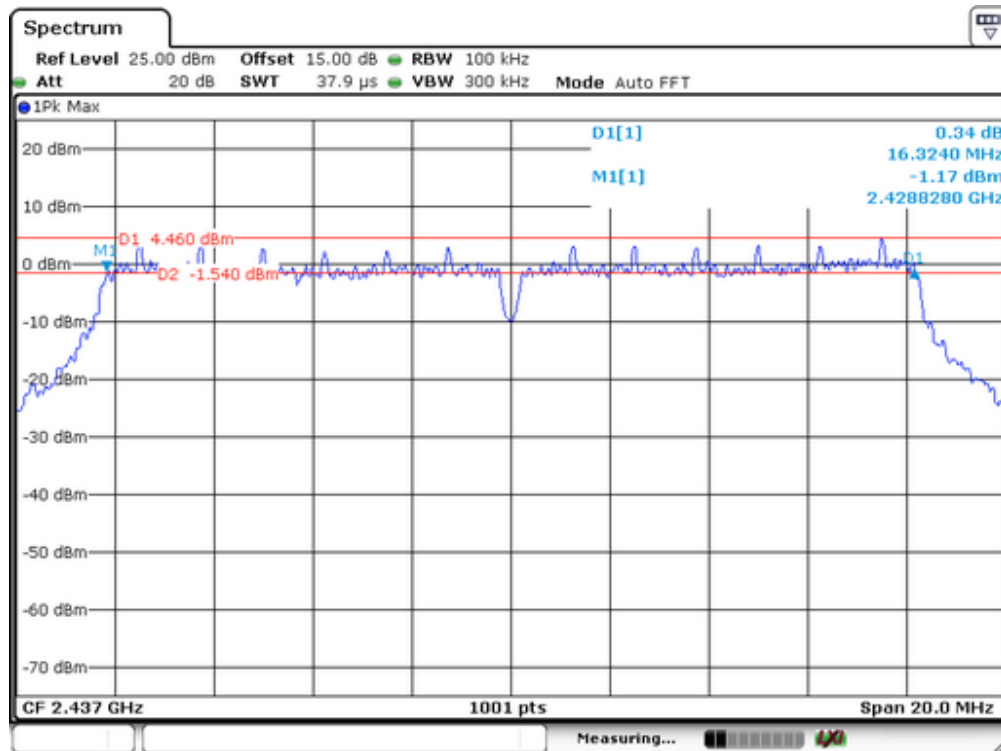
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	10030	>500	Pass
2437	10050	>500	
2462	10050	>500	



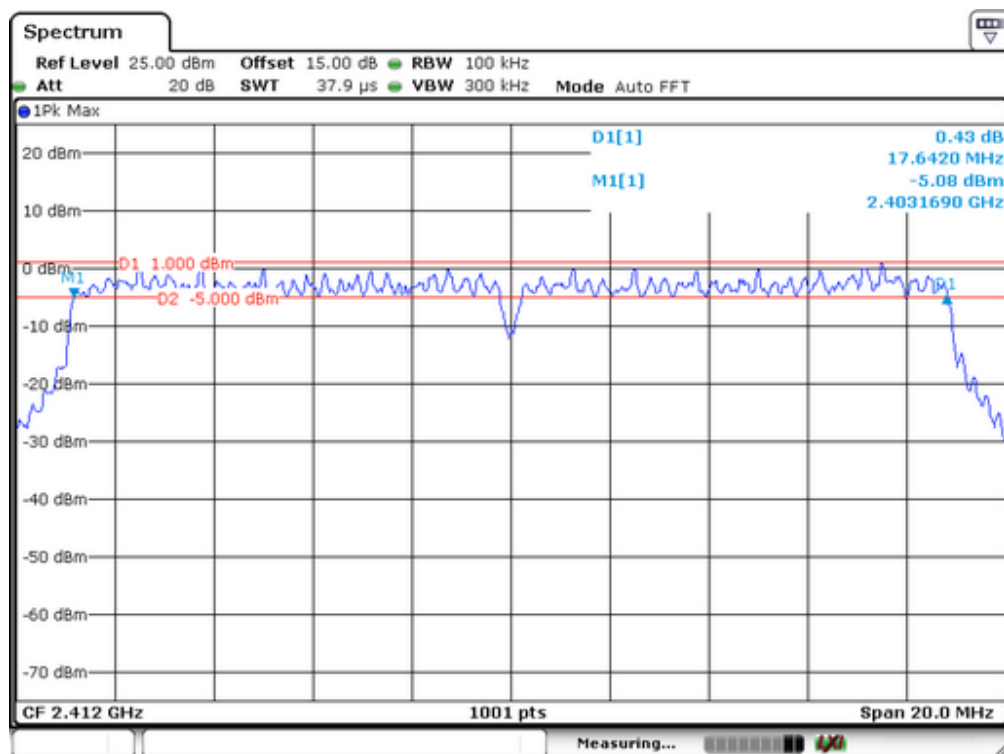


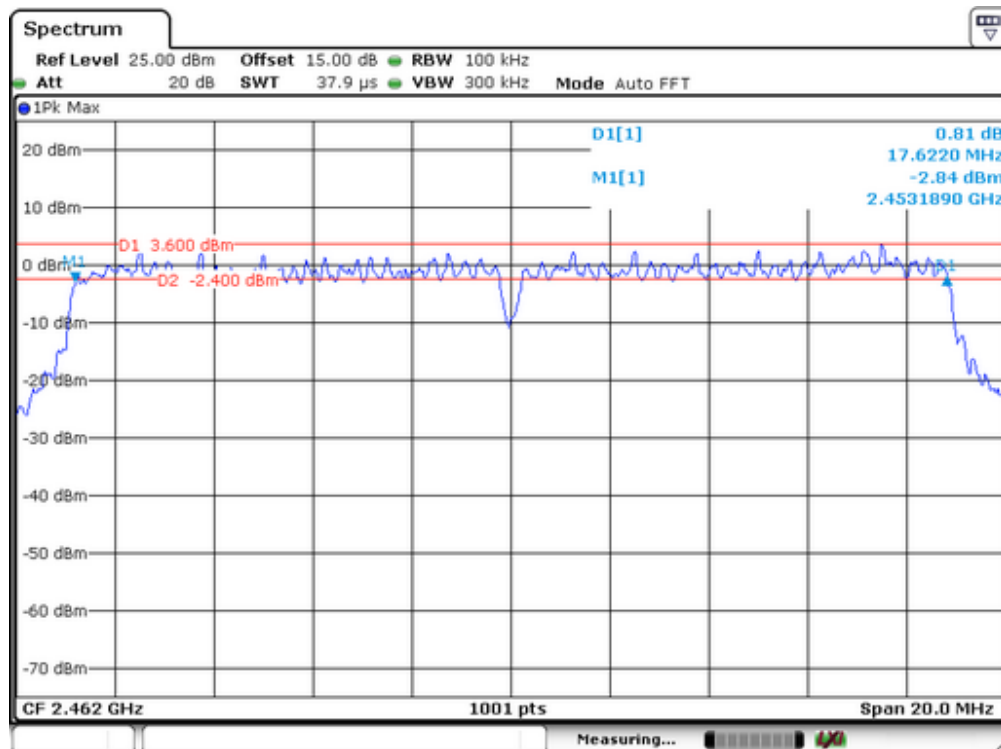
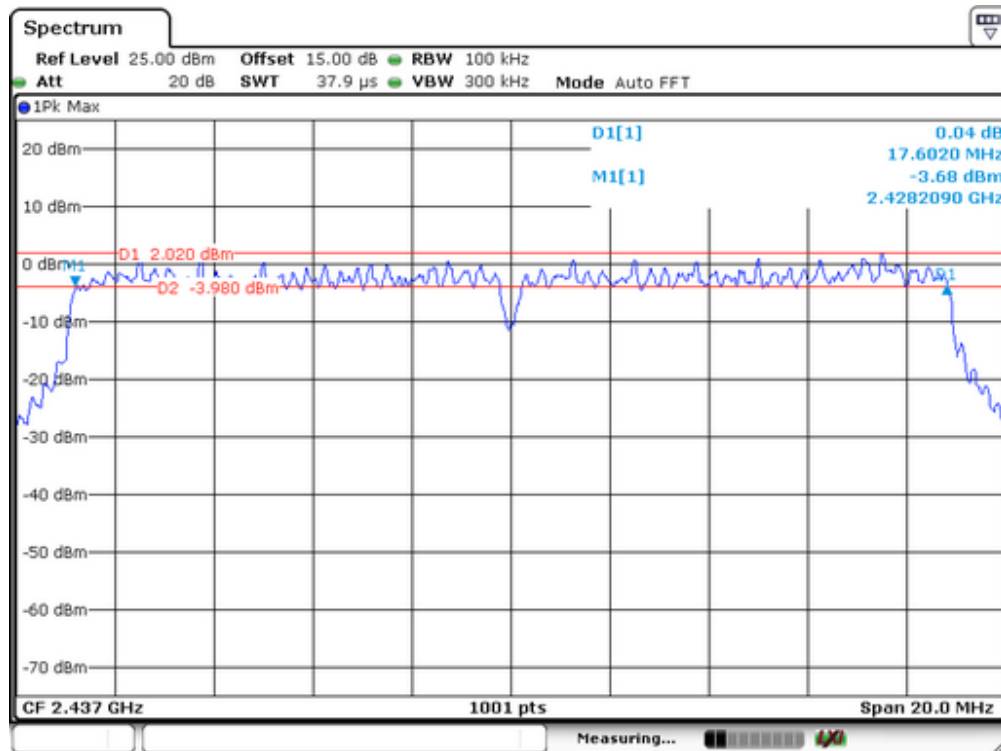
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	16344	>500	Pass
2437	16324	>500	
2462	16324	>500	



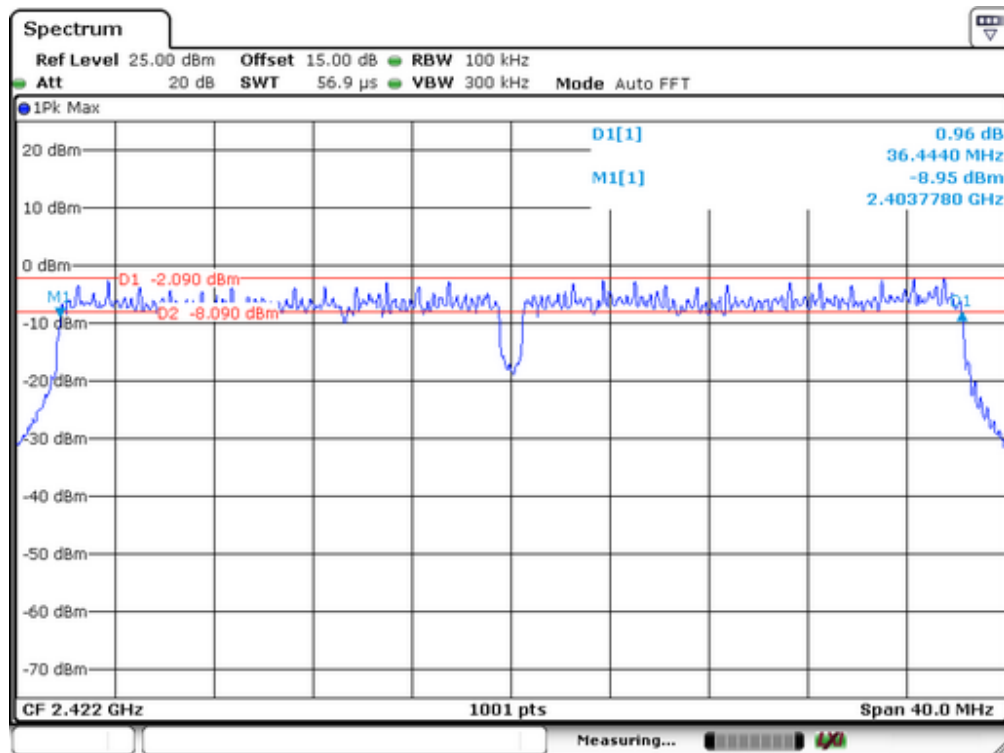


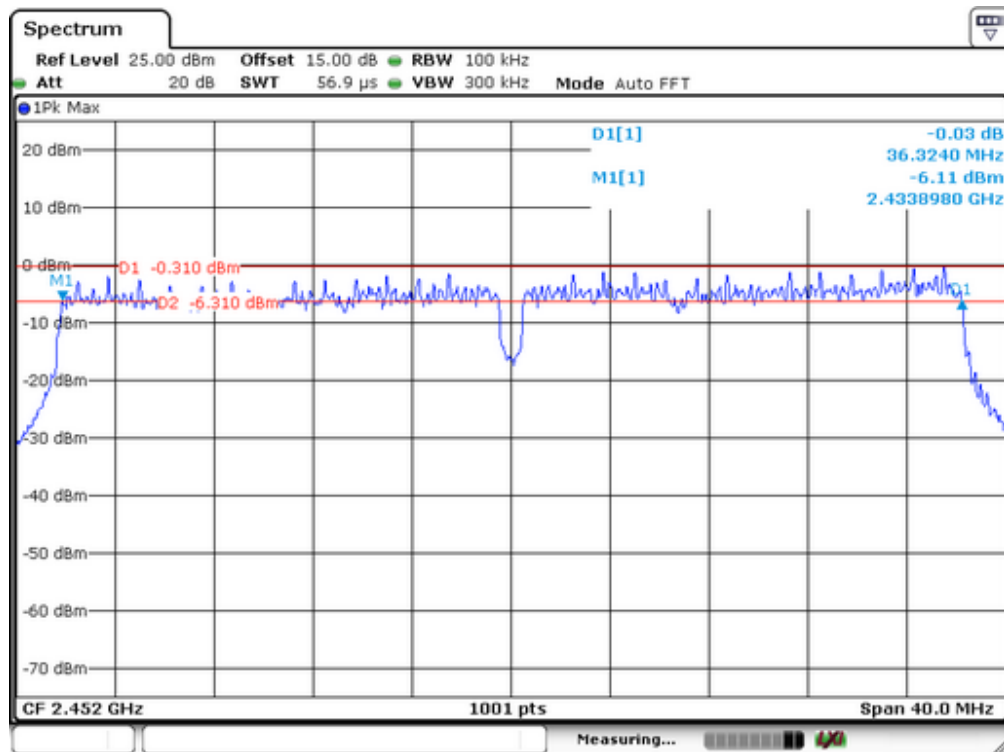
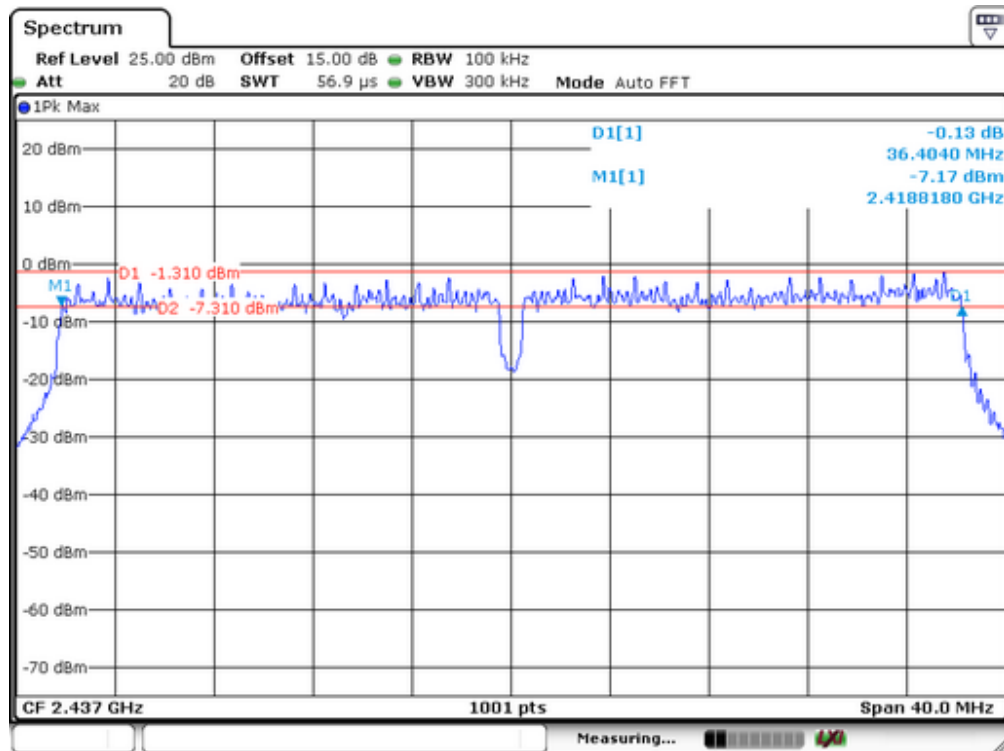
IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2412	17642	>500	Pass
2437	17602	>500	
2462	17622	>500	





IEEE 802.11n(HT40)			
Channel frequency (MHz)	Measurement level (KHz)	Required Limit (KHz)	Result
2422	36444	>500	Pass
2437	36404	>500	
2452	36424	>500	





8. Maximum Peak Output Power Test

8.1 Measurement Procedure

The maximum peak conducted output power can be measured using a broadband peak RF power meter. The power meter must have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast, average-responding diode type sensor.

- The Transmitter output (antenna port) was connected to the power meter.
- Turn on the EUT and power meter and then record the peak power value.
- Repeat above procedures on all channels needed to be tested.

8.2 Test SET-UP (Block Diagram of Configuration)



8.3 Measurement Equipment Used

EQUIPMENT TYPE	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Power meter	ML2495A	0824006	03/16/2015	03/15/2016
Power sensor	MA2411B	0738172	03/16/2015	03/15/2016

8.4 Peak Power output limit

The maximum peak power shall be less 1Watt.

8.5 Measurement Results

Spectrum Detector:	PK	Test Date :	June 12, 2015
Test By:	Jack	Temperature :	28°C
Test Result:	PASS	Humidity :	60%

Test Channel	Max Output Power (dBm)				Limit(dBm)	Result
	802.11b	802.11g	802.11n(HT20)	802.11n(HT40)		
Lowest	14.10	11.81	10.73	10.25	30	Pass
Middle	13.90	11.90	10.19	9.92		
Highest	13.25	11.38	9.90	9.59		

9. Band Edge Test

9.1 Measurement Procedure

For Conducted Test

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. Set to the maximum power setting and enable the EUT transmit continuously.
4. Set RBW = 100 kHz, VBW=300 kHz, Peak Detector. Unwanted Emissions measured in any 100 kHz bandwidth outside of the authorized frequency band shall be attenuated by at least 20 dB relative to the maximum in-band peak PSD level in 100 kHz when maximum peak conducted output power procedure is used. Measure and record the results in the test report.
5. The RF fundamental frequency should be excluded against the limit line in the operating frequency band.

For Radiated emission Test

1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.
6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
7. Repeat above procedures until all frequency measured were complete.

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 3MHz.

EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

When spectrum scanned above 1GHz setting resolution bandwidth 1MHz, video bandwidth 10Hz.

EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

9.2 Test SET-UP (Block Diagram of Configuration)

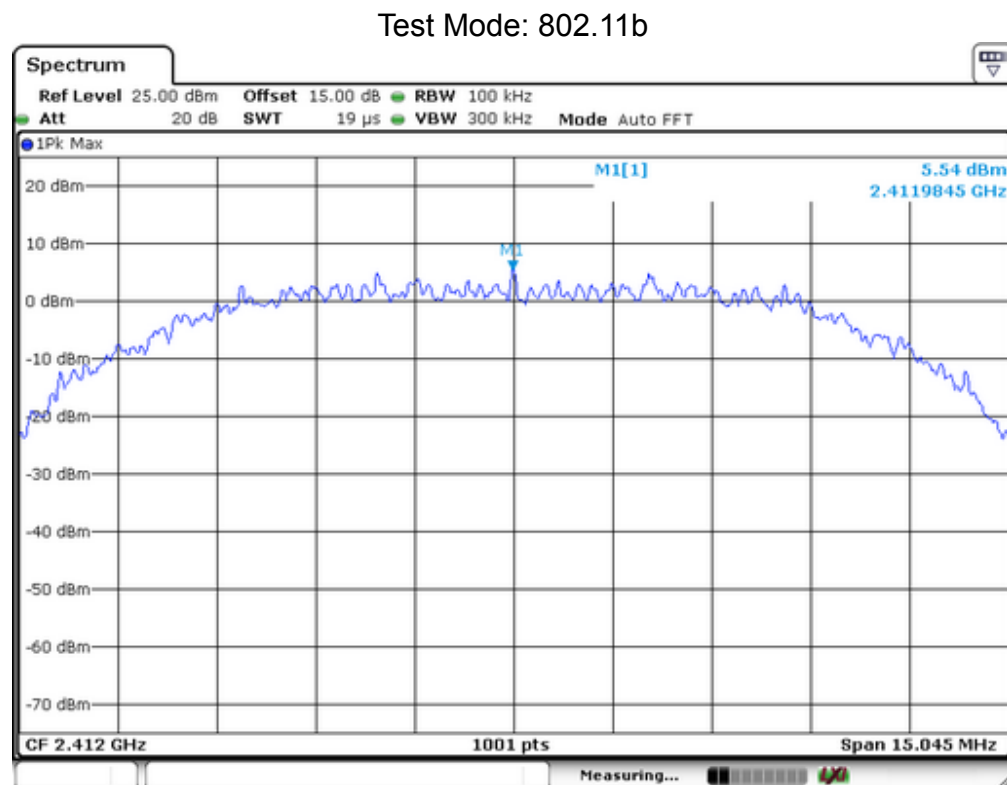
As 6.2 Test set up (B) and (C)

9.3 Measurement Equipment Used

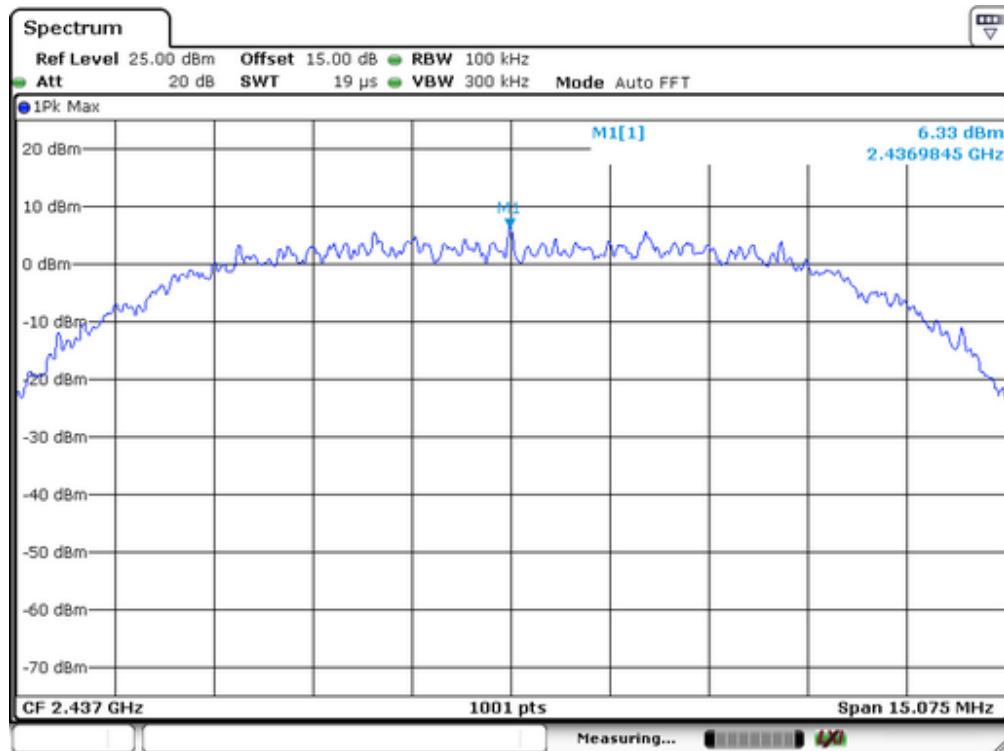
Same as 6.3 Radiated Emission Measurement.

9.4 Measurement Results

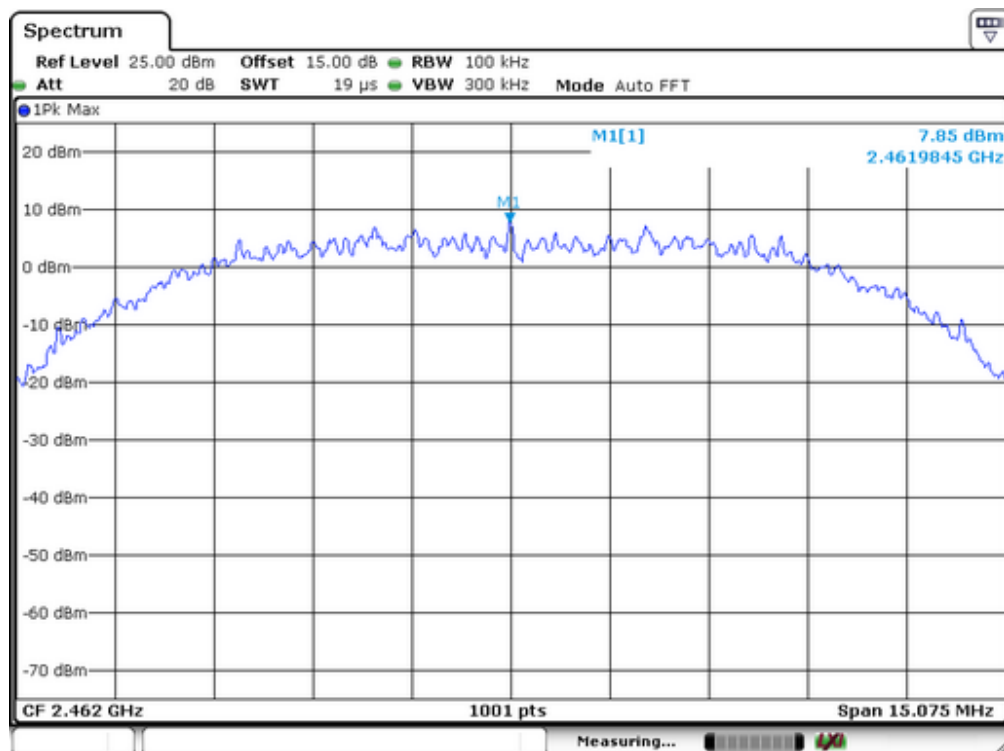
1. Conducted Test



Lowest Channel

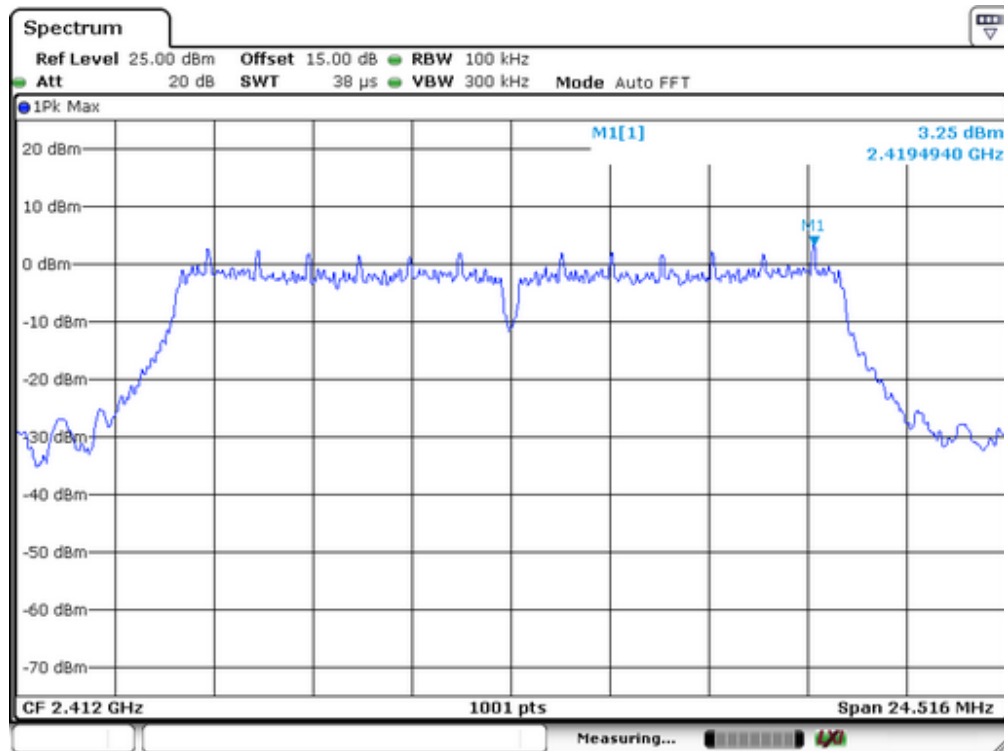


Middel Channel

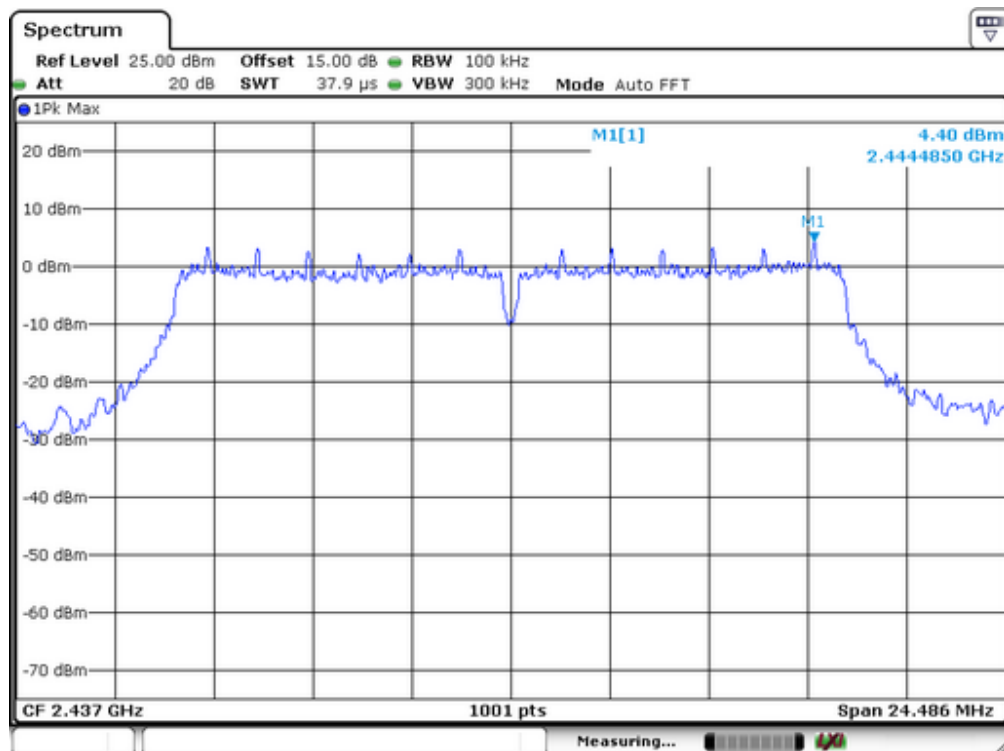


Highest Channel

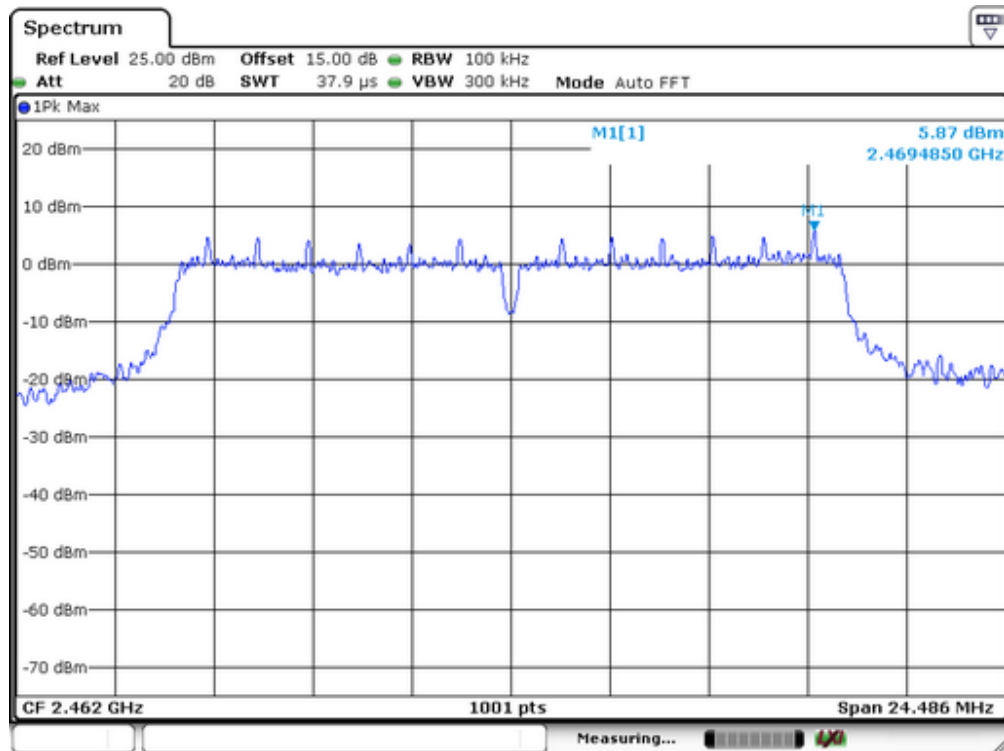
Test Mode: 802.11g



Lowest Channel

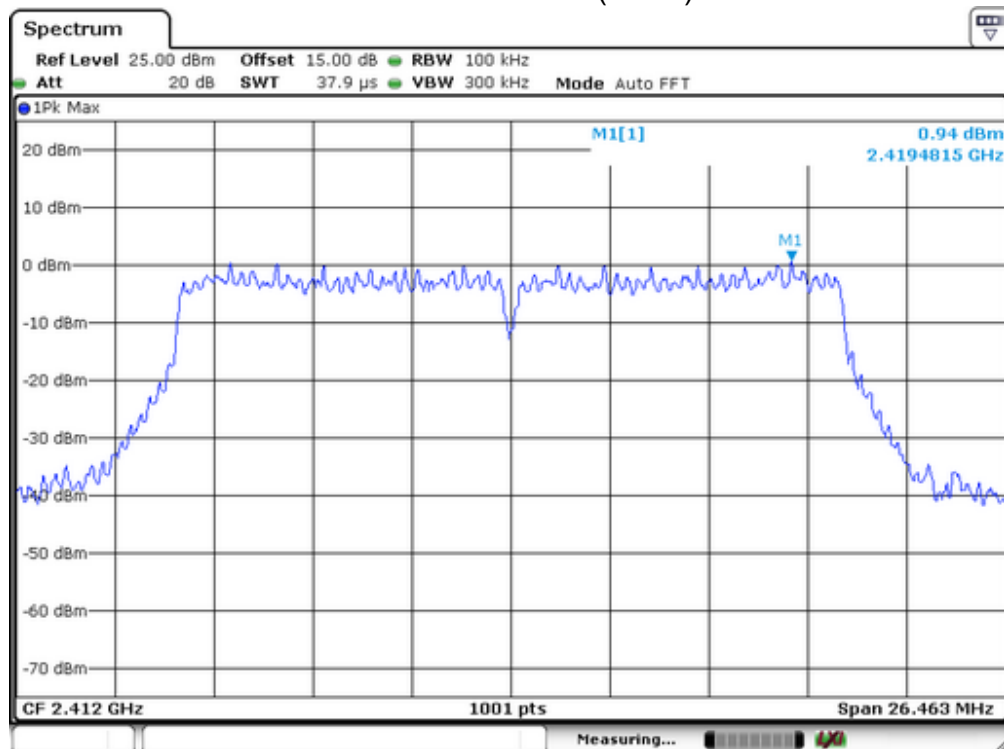


Middle Channel

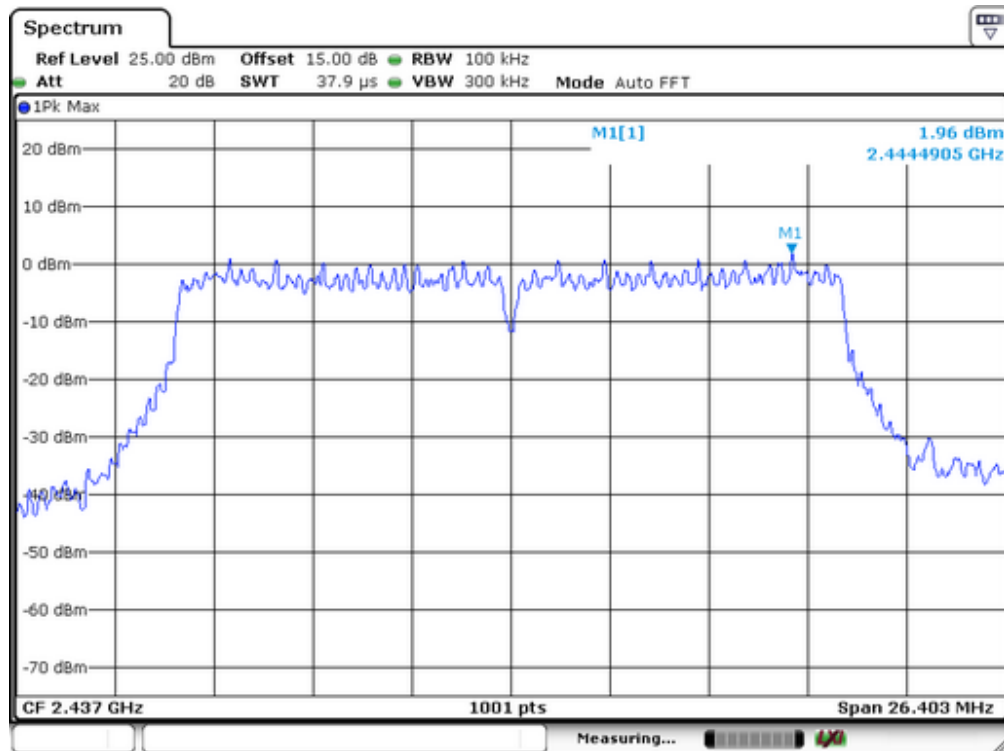


Highest Channel

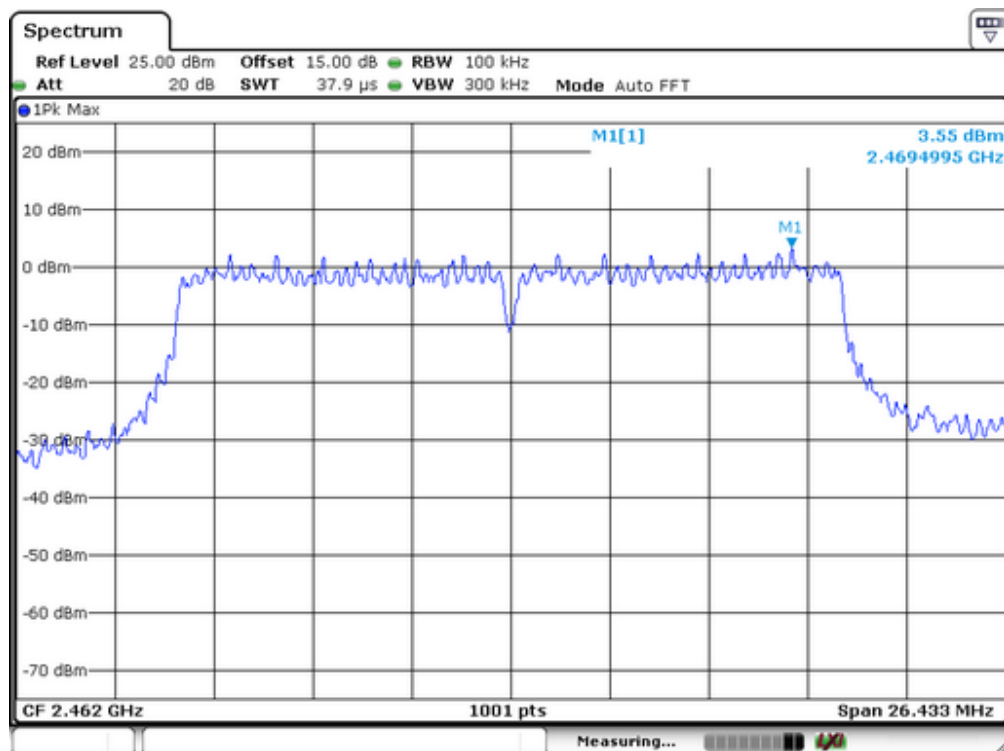
Test Mode: 802.11n(HT20)



Lowest Channel

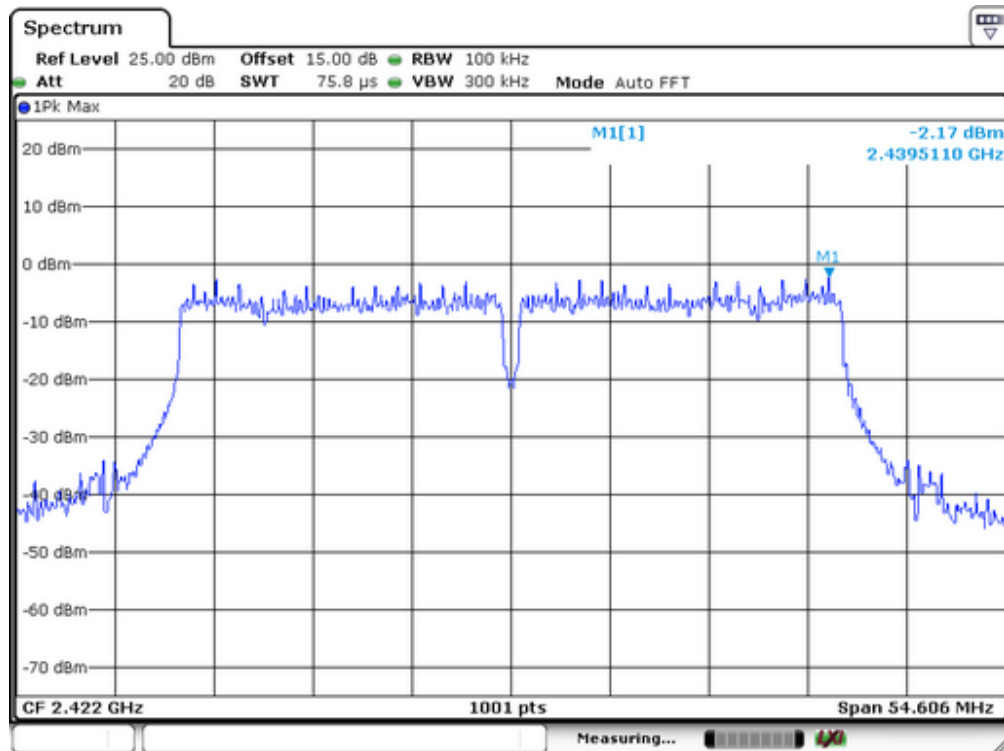


Middle Channel

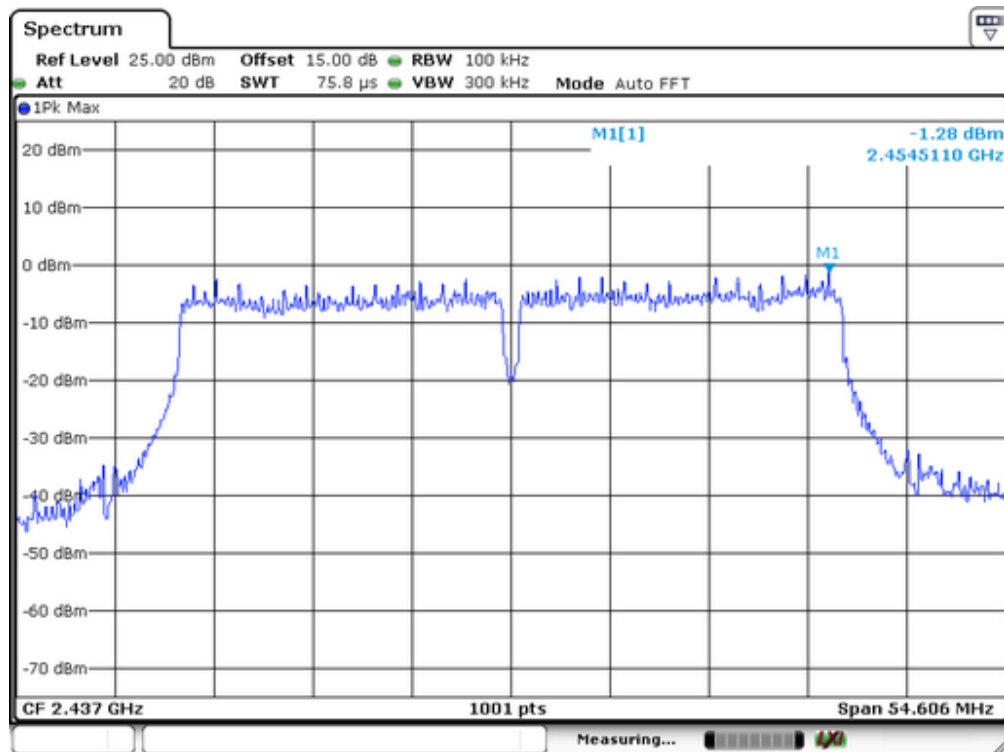


Highest Channel

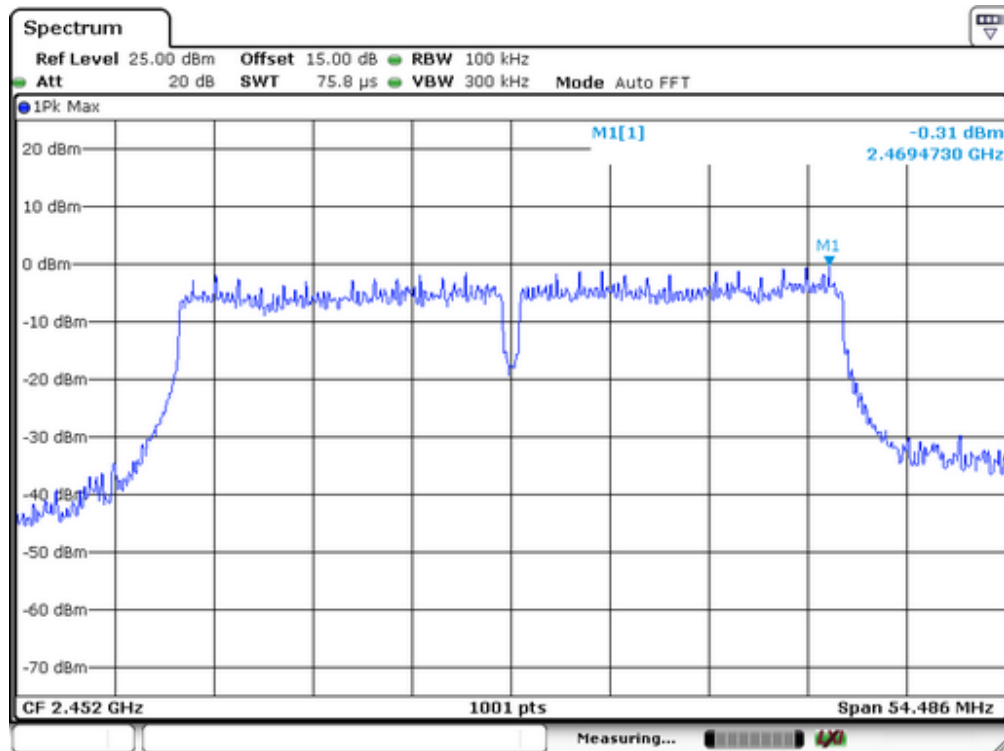
Test Mode: 802.11n(HT40)



Lowest Channel

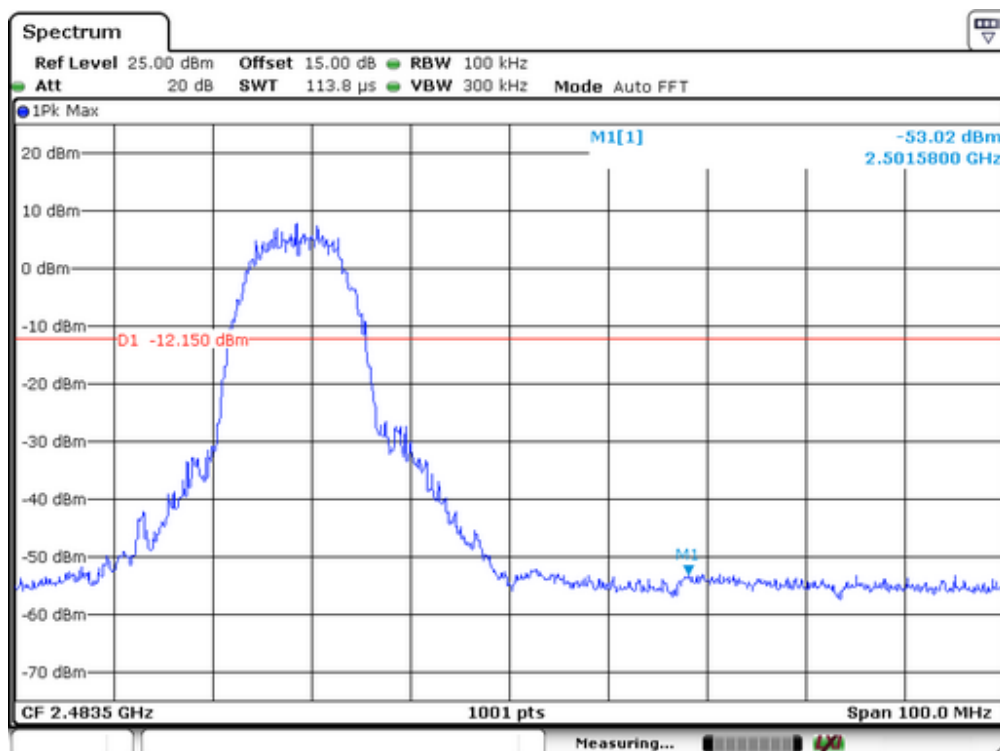
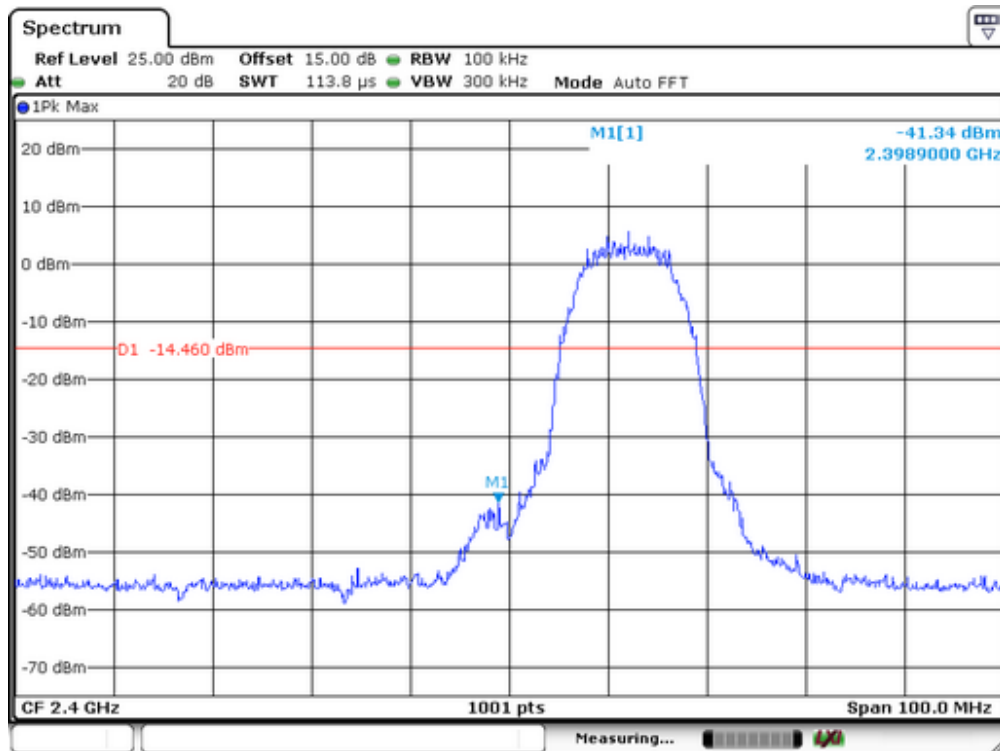


Middle Channel

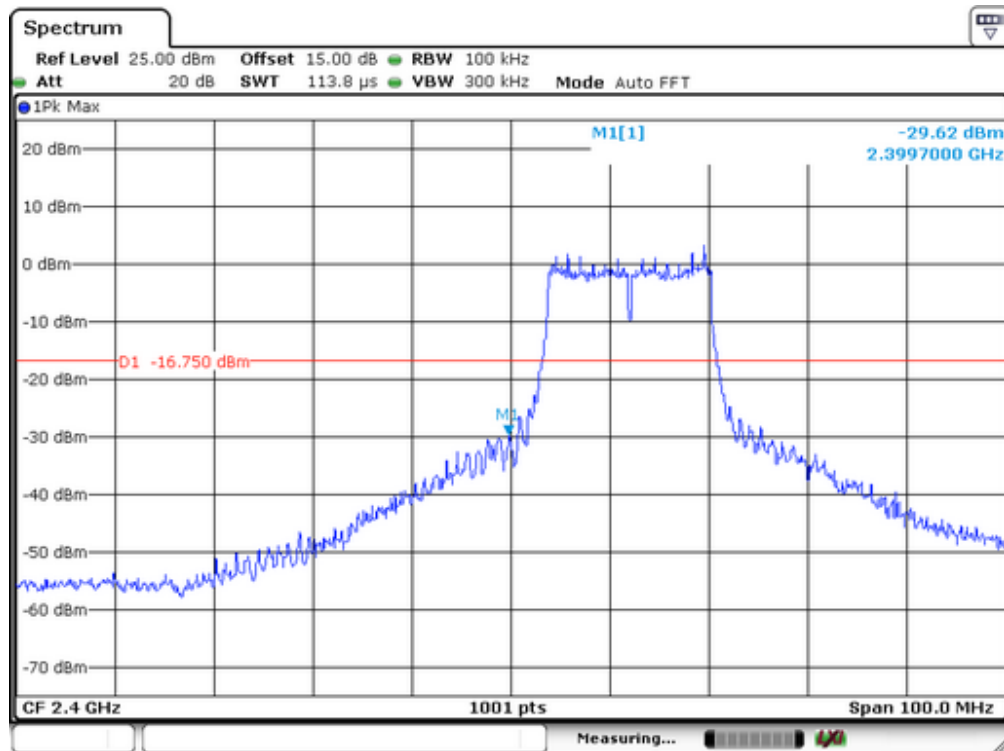


Highest Channel

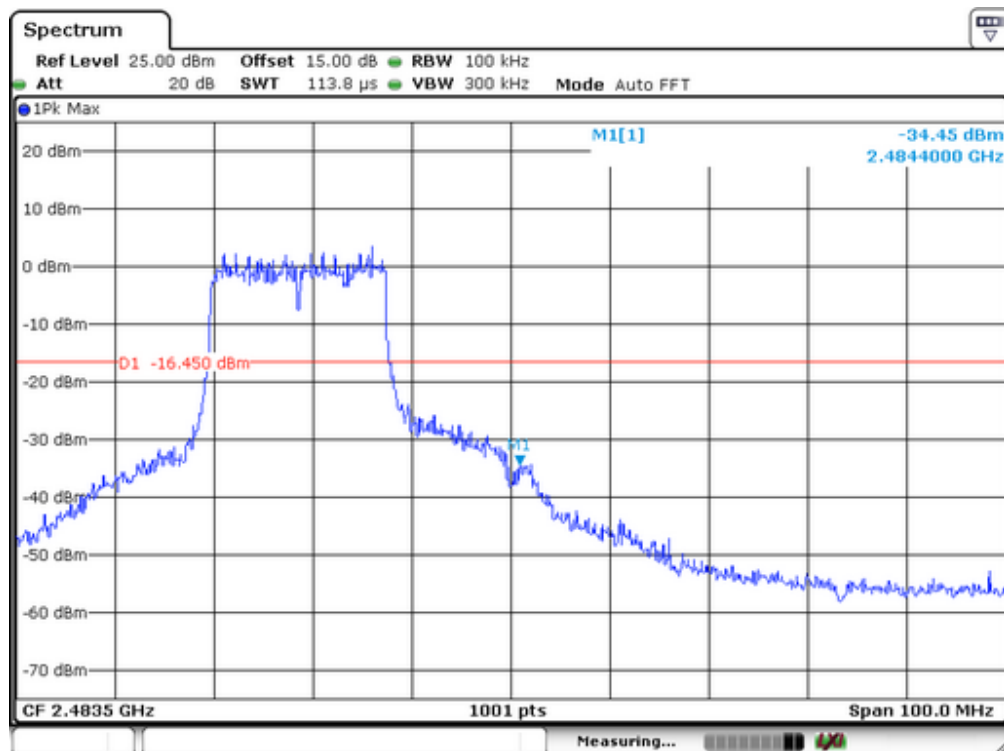
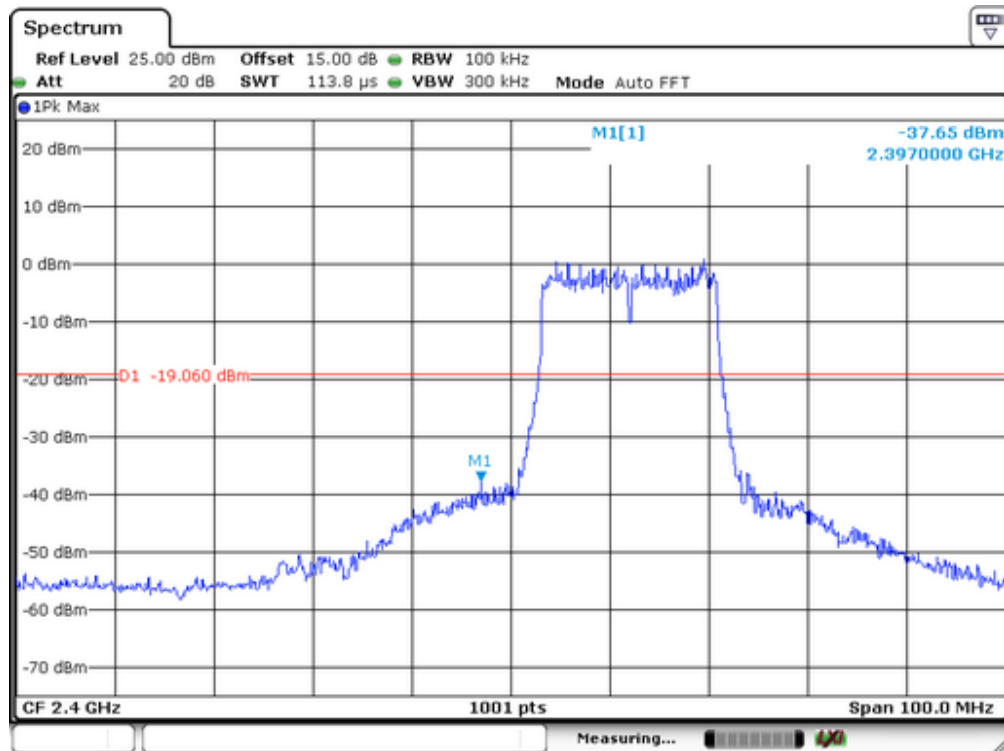
Test mode: 802.11b



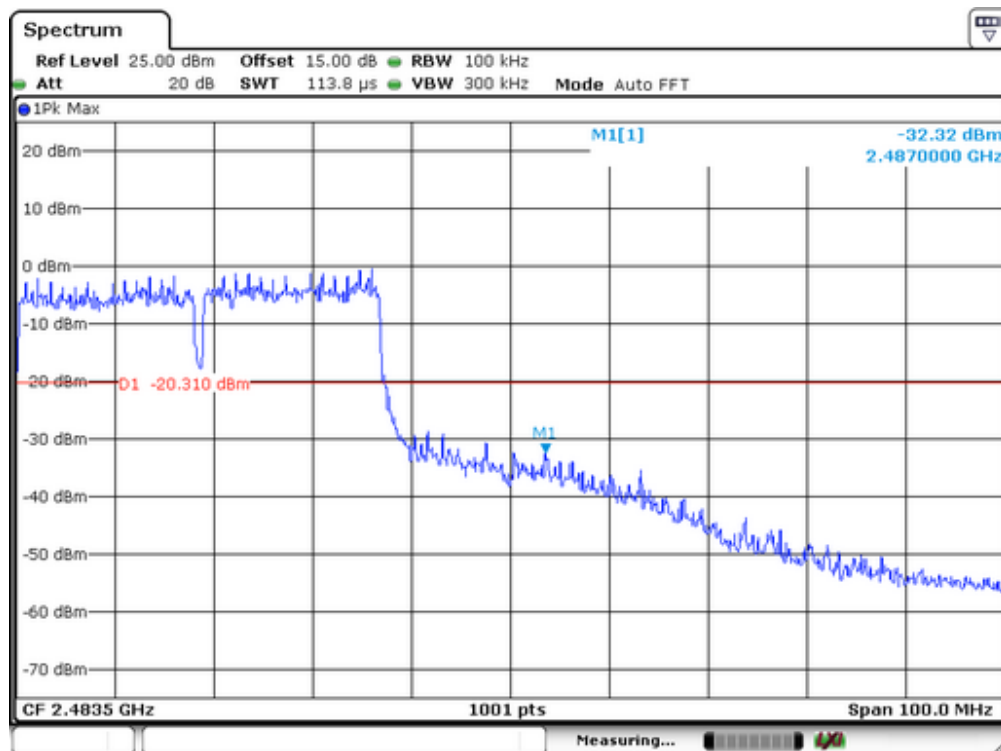
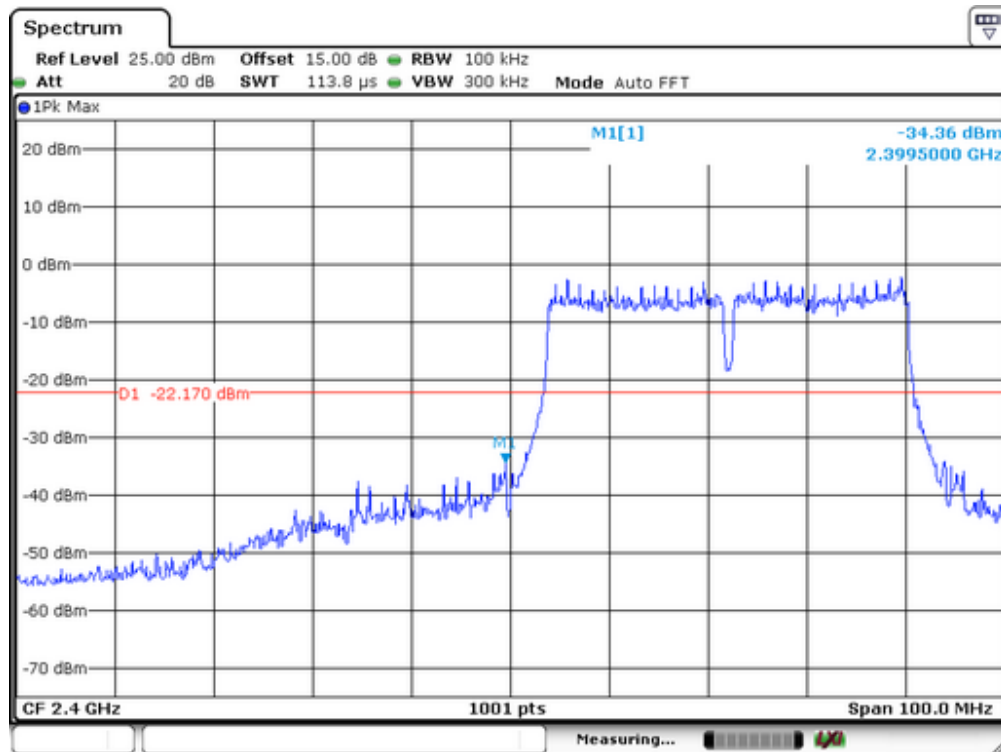
Test mode: 802.11g



Test mode: 802.11n(HT20)



Test mode: 802.11n(HT40)



2. Radiated emission Test

Spectrum Detector: PK/AV Test Date : June 12, 2015
Test By: Andy Temperature : 28 °C
Humidity : 65 %

IEEE 802.11b							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
<2400	H	64.13	44.15	74	54	-9.87	-9.85
<2400	V	60.2	40.24	74	54	-13.8	-13.76
>2483.5	H	65.35	45.38	74	54	-8.65	-8.62
>2483.5	V	59.48	39.15	74	54	-14.52	-14.85

IEEE 802.11g							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
<2400	H	65.72	44.05	74	54	-8.28	-9.95
<2400	V	60.15	40.15	74	54	-13.85	-13.85
>2483.5	H	64.35	45.35	74	54	-9.65	-8.65
>2483.5	V	59.37	39.5	74	54	-14.63	-14.5

IEEE 802.11n(HT20)							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
<2400	H	65.15	45.15	74	54	-8.85	-8.85
<2400	V	60.34	40.72	74	54	-13.66	-13.28
>2483.5	H	64.2	46.3	74	54	-9.8	-7.7
>2483.5	V	59.35	41.27	74	54	-14.65	-12.73

IEEE 802.11n(HT40)							
Frequency (MHz)	Antenna polarization	Emission (dBuV/m)		Band edge Limit (dBuV/m)		Margin (dB)	
	(H/V)	PK	AV	PK	AV	PK	AV
<2400	H	64.15	44.18	74	54	-9.85	-9.82
<2400	V	60.24	39.72	74	54	-13.76	-14.28
>2483.5	H	65.35	45.35	74	54	-8.65	-8.65
>2483.5	V	59.71	40.17	74	54	-14.29	-13.83

10. Power Density

10.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	FSV30	1321.3008K	03/16/2015	03/15/2016

10.2 Measuring Instruments and Setting

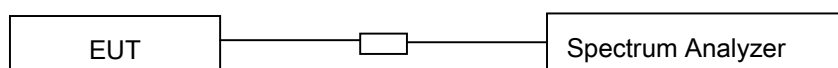
The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
Span Frequency	Set the span to 1.5 times the DTS bandwidth.
RB	100KHz
VB	300KHz
Detector	Peak
Trace	Max hold
Sweep Time	Automatic

10.3 Test Procedures

- The transmitter output (antenna port) was connected to the spectrum analyzer.
- Set analyzer center frequency to DTS channel center frequency.
- Set the analyzer span to a minimum of 1.5 times the DTS bandwidth.
- Set the RBW=100KHz. Set the VBW=300KHz
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level.

10.4 Block Diagram of Test Setup



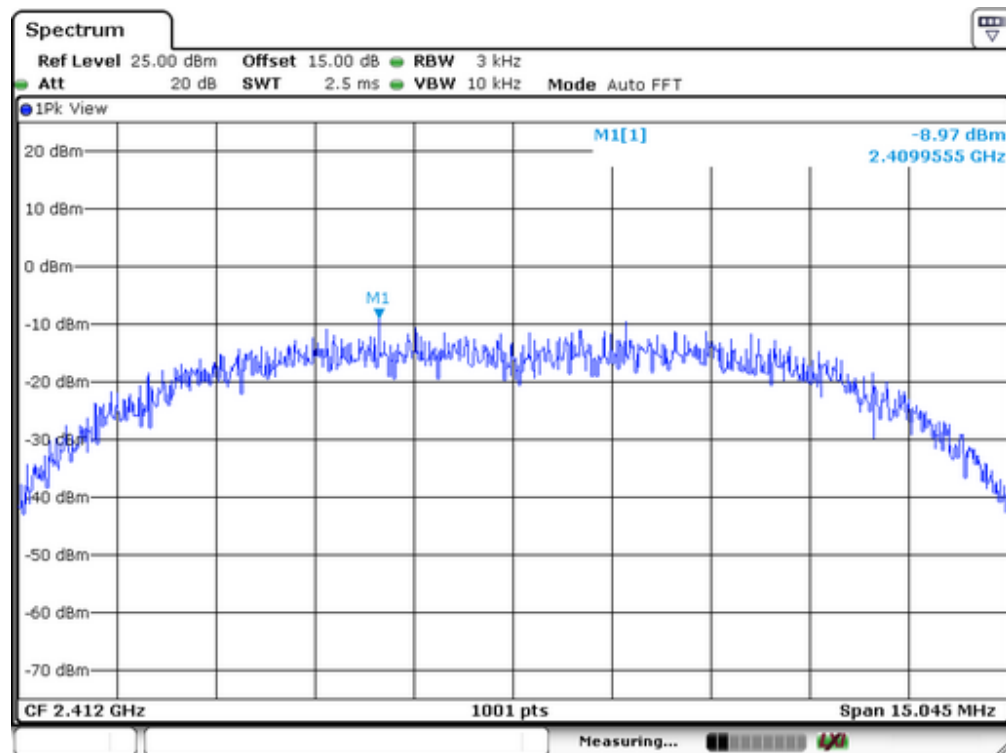
10.5 Limit

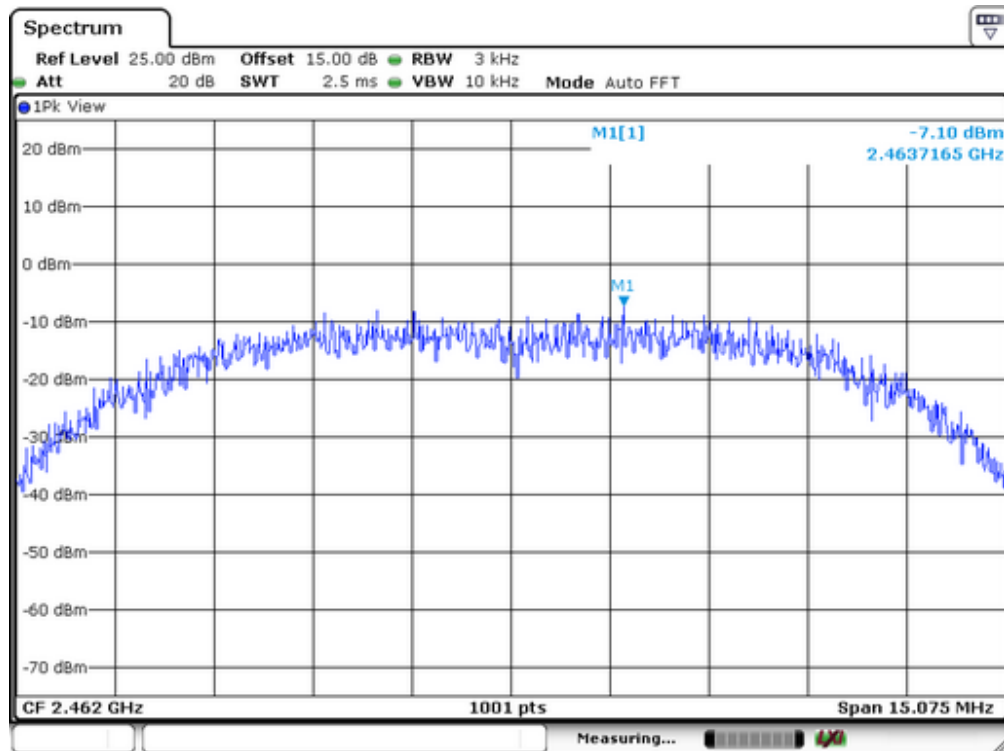
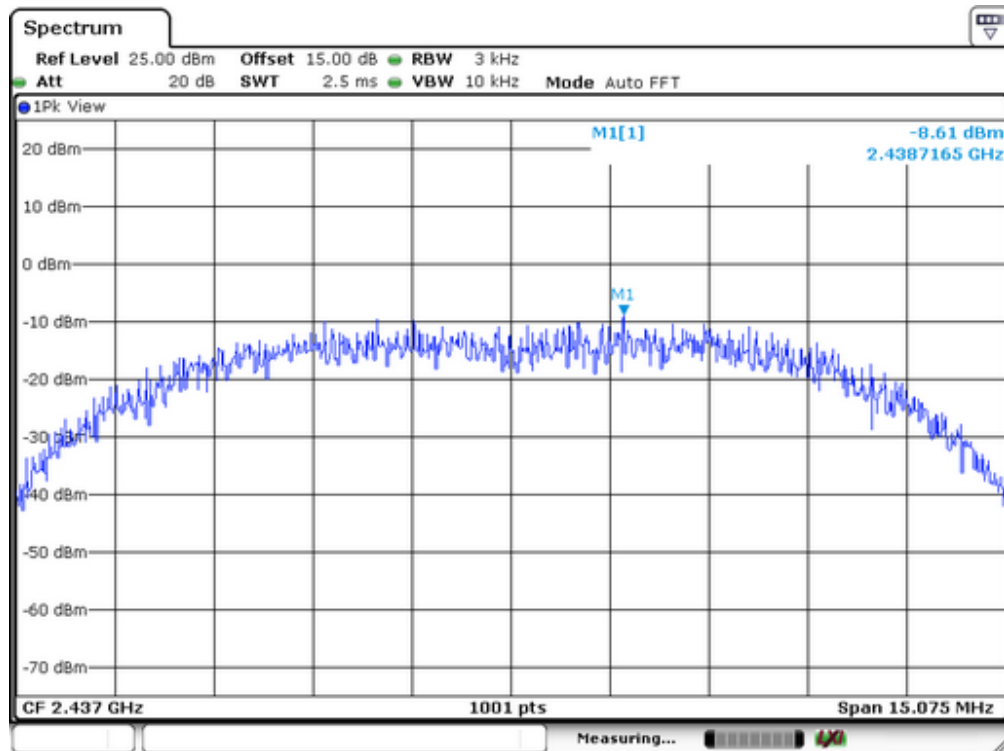
The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3 kHz bandwidth.

10.6 Test Result

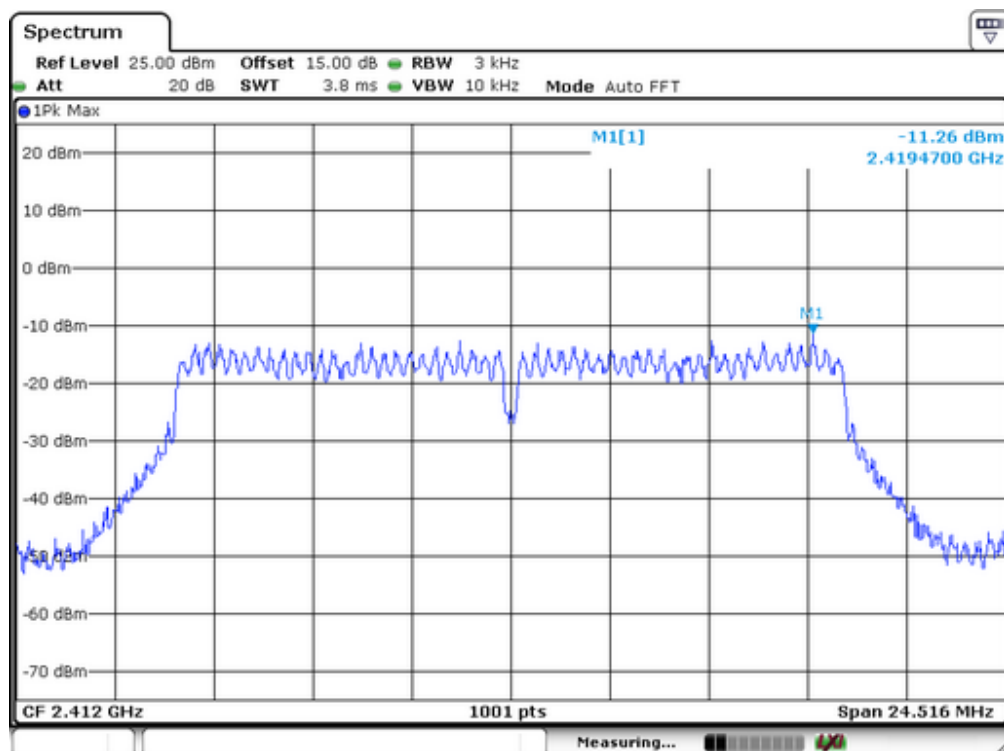
Spectrum Detector: PK Test Date : June 12, 2015
Test By: Andy Temperature : 28°C
Humidity : 60%

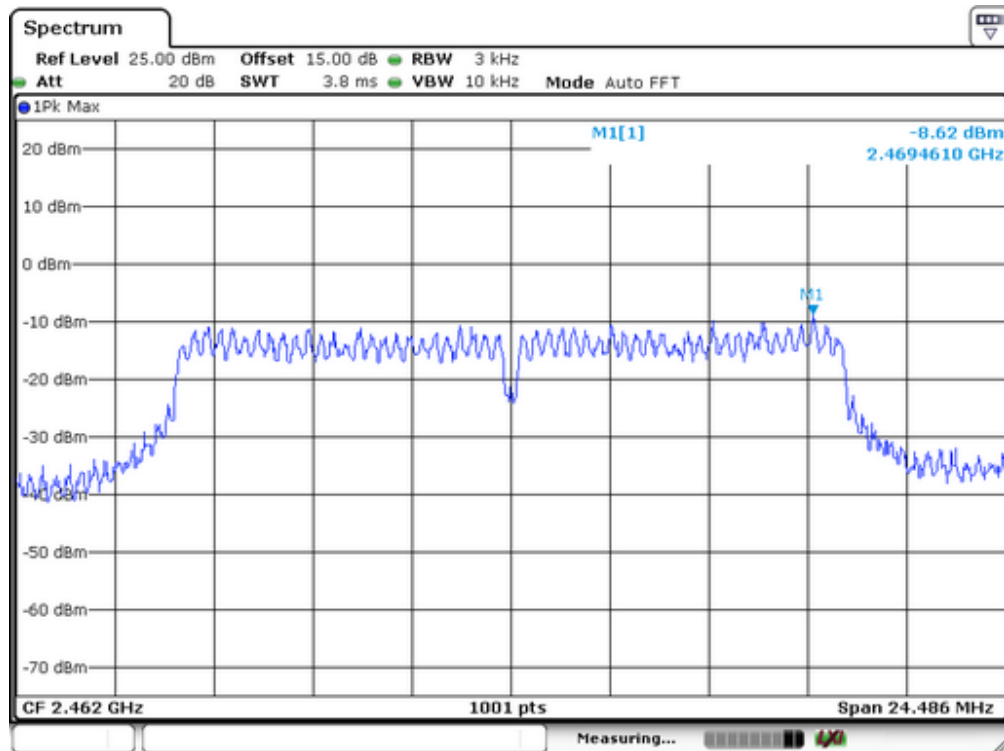
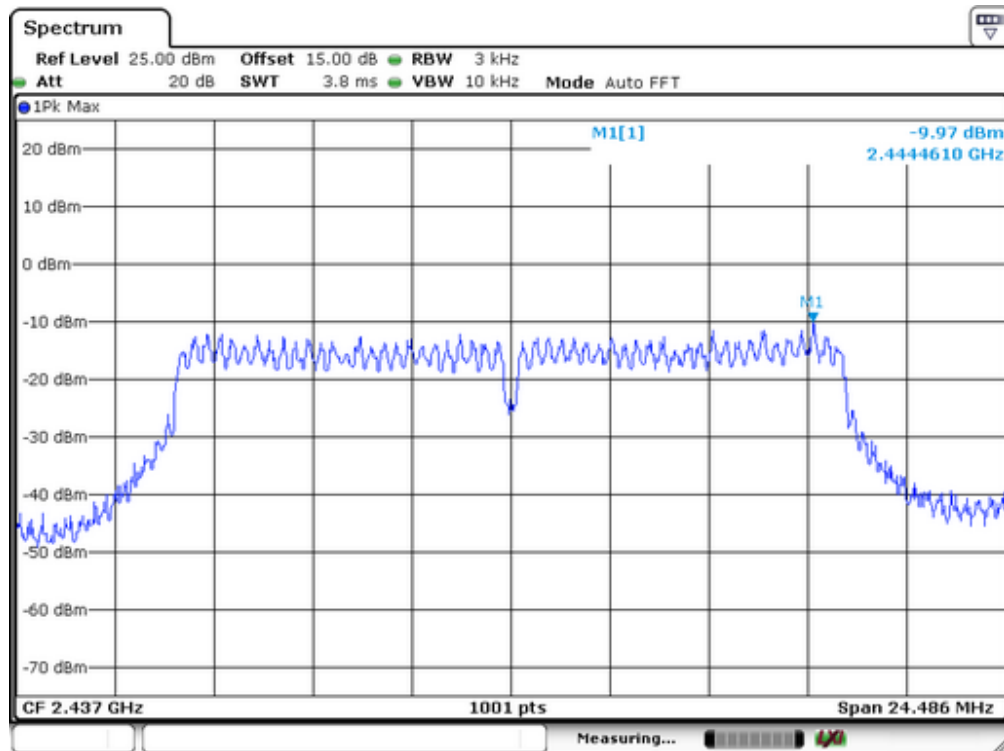
IEEE 802.11b			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-8.97	8	Pass
2437	-8.61		
2462	-7.10		



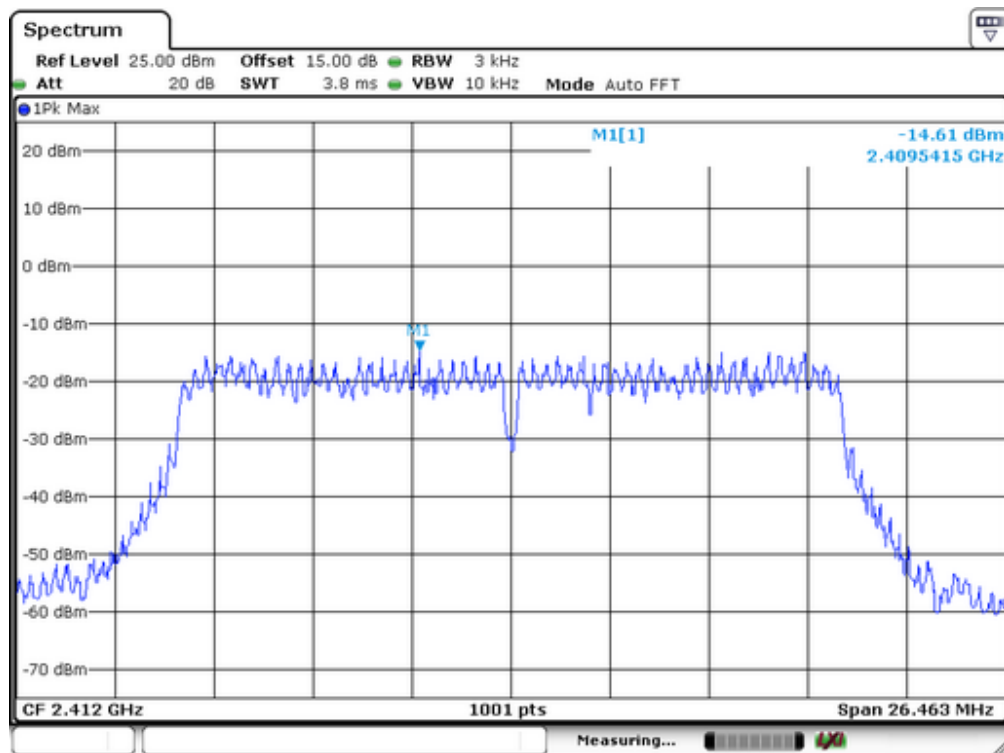


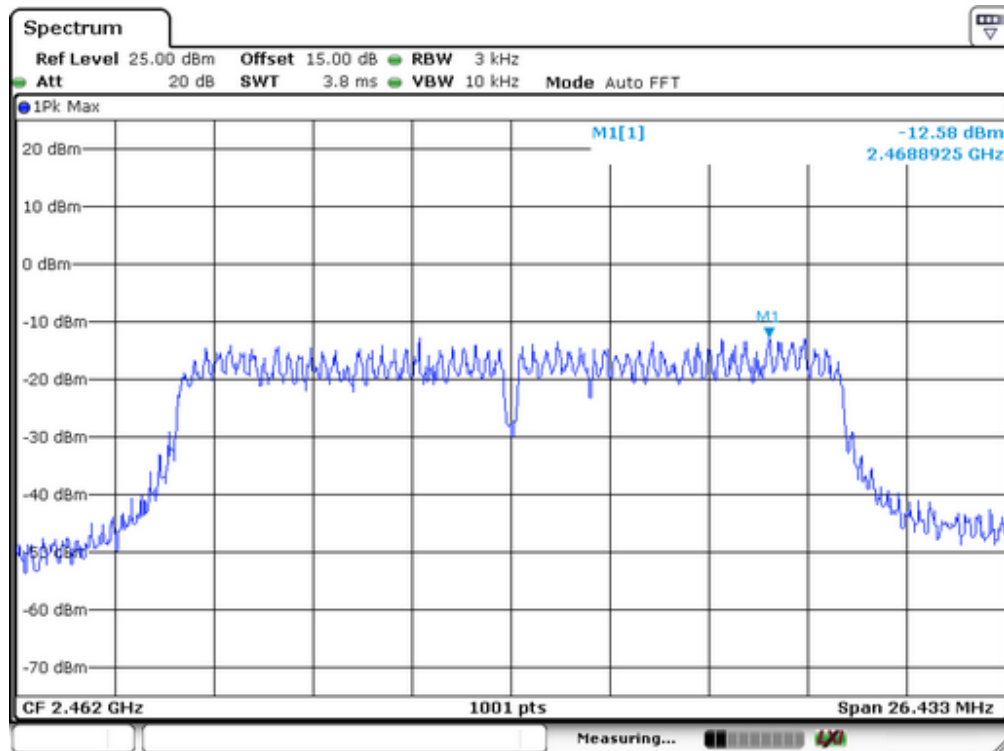
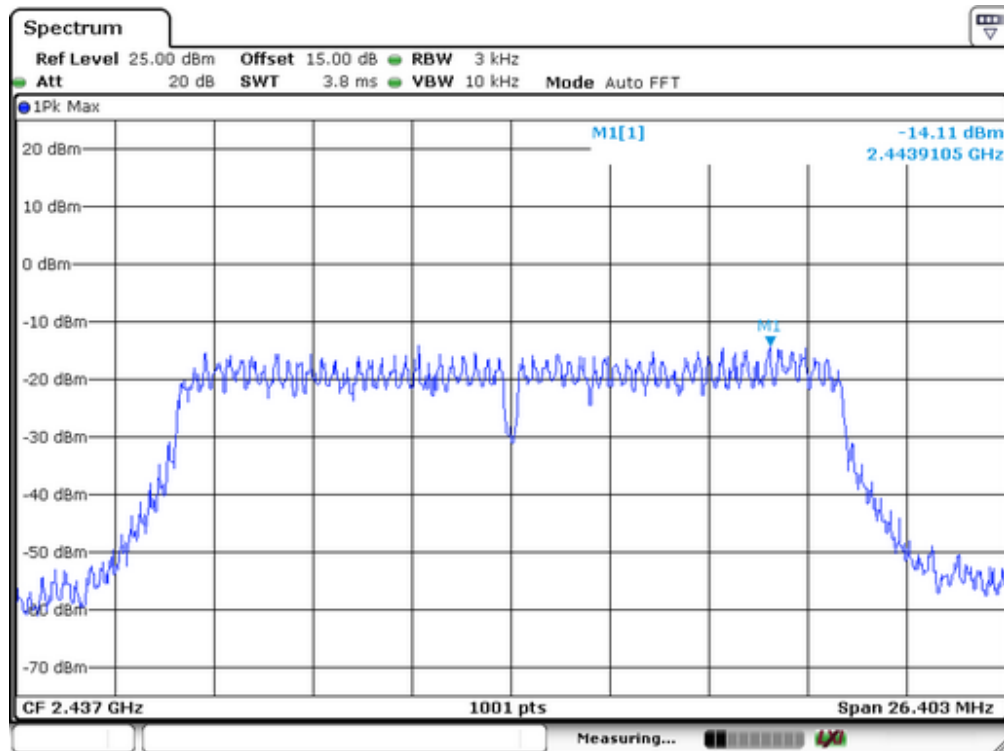
IEEE 802.11g			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-11.26	8	Pass
2437	-9.97		
2462	-8.62		



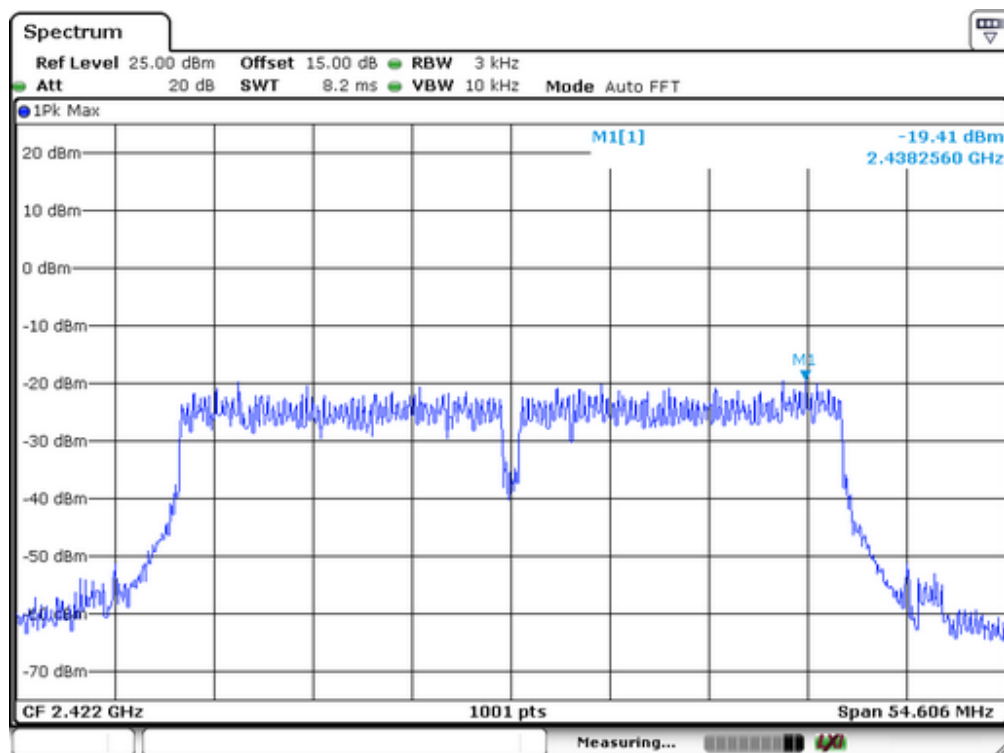


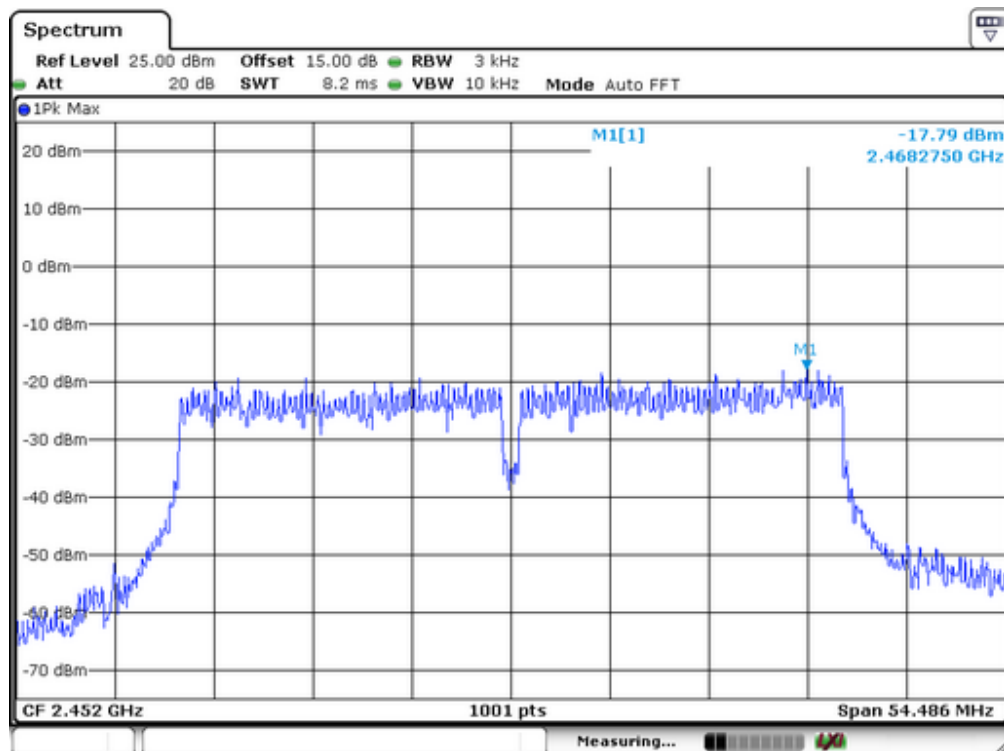
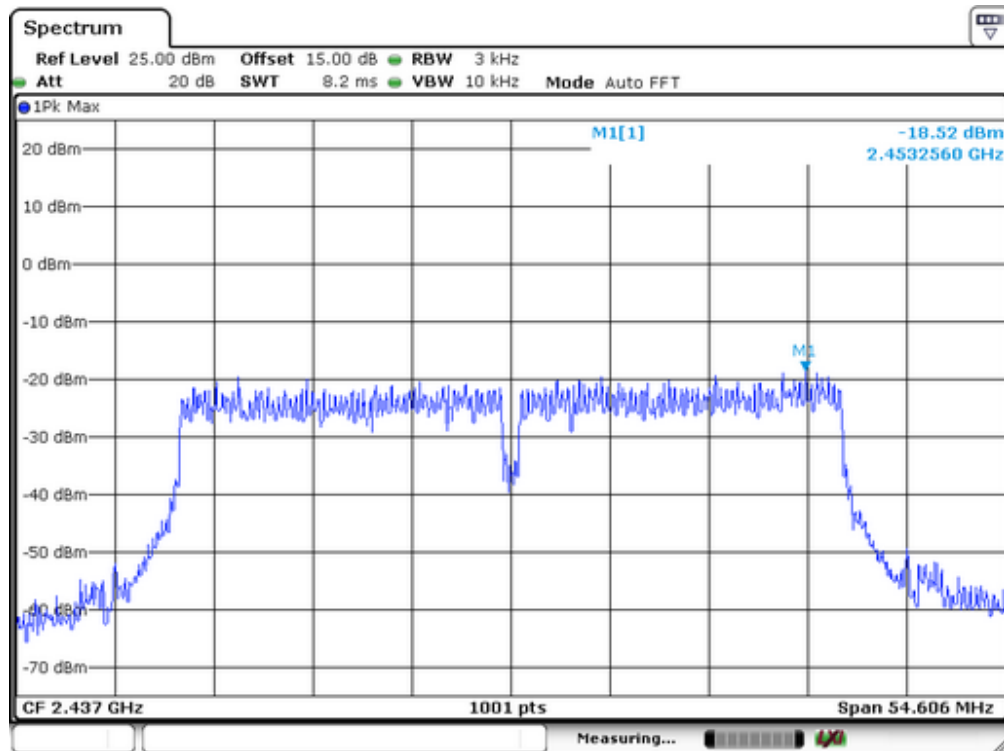
IEEE 802.11n(HT20)			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2412	-14.61	8	Pass
2437	-14.11		
2462	-12.58		





IEEE 802.11n(HT40)			
Channel frequency (MHz)	Measurement level (dBm)	Limit(dBm)	Result
2422	-19.41	8	Pass
2437	-18.52		
2452	-17.78		





11. Antenna Port Emission

11.1 Test Equipment

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Agilent	FSV30	1321.3008K	03/16/2015	03/15/2016

11.2 Measuring Instruments and Setting

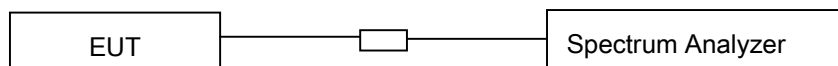
The following table is the setting of spectrum analyzer.

Spectrum analyzer	Setting
Attenuation	Auto
RB	100kHz
VB	300kHz
Detector	Peak
Trace	Max hold

11.3 Test Procedures

The conducted spurious emissions were measured conducted using a spectrum analyzer at low, Middle, and high channels, the limit was determined by attenuation 20dB of the RF peak power output.

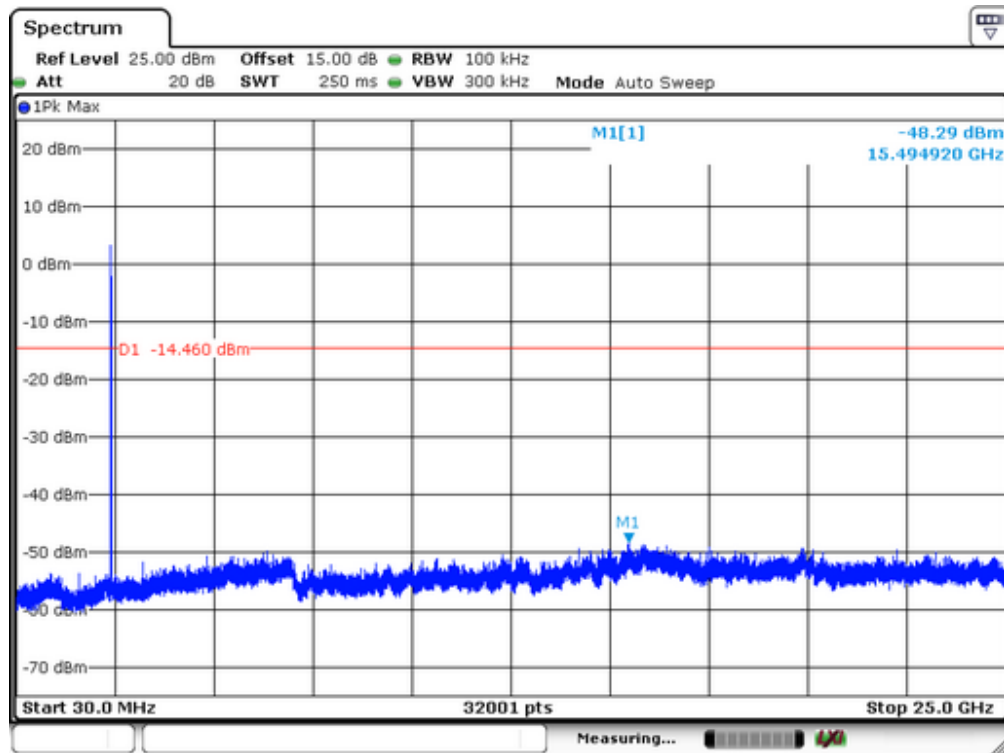
11.4 Block Diagram of Test setup



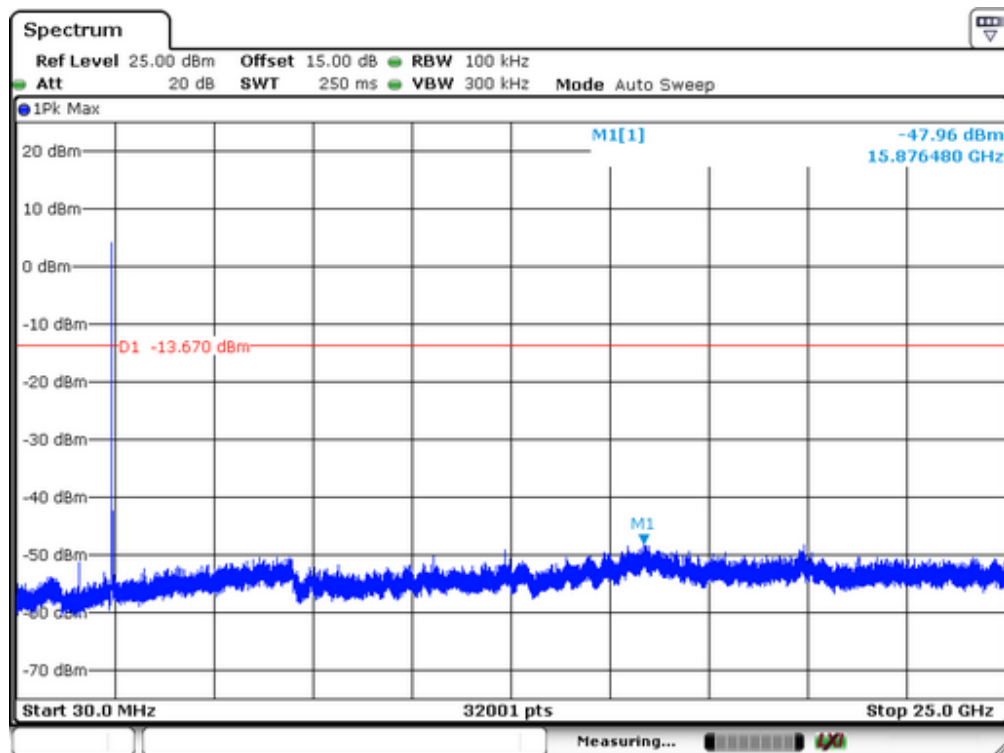
11.5 Test Result

PASS.

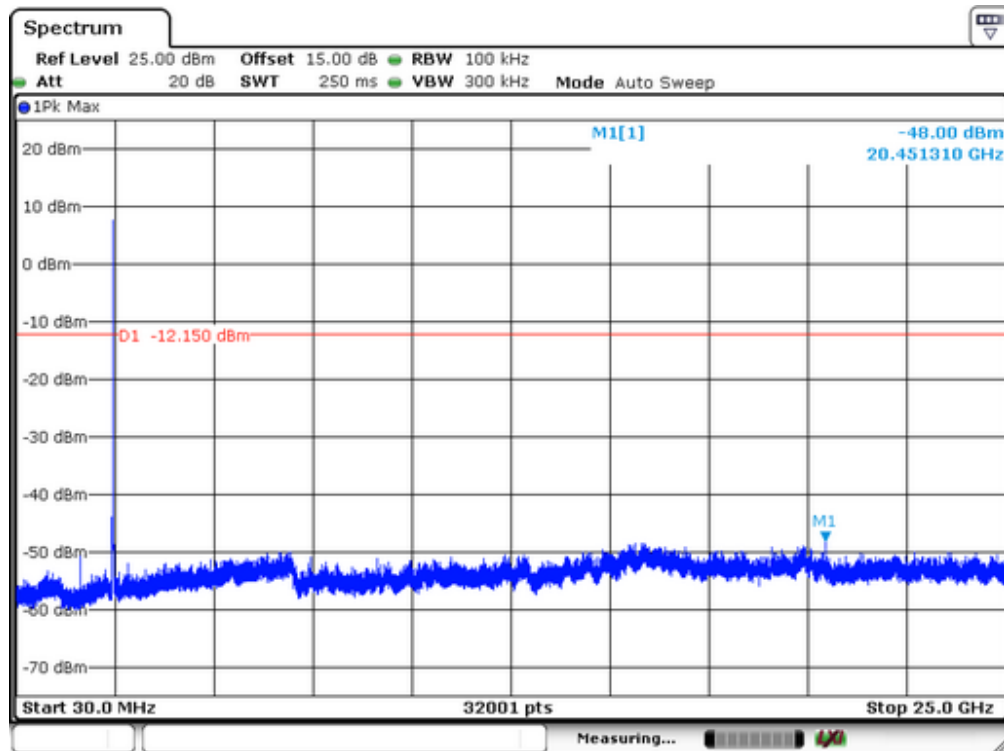
Test Mode: 802.11b



Lowest Channel

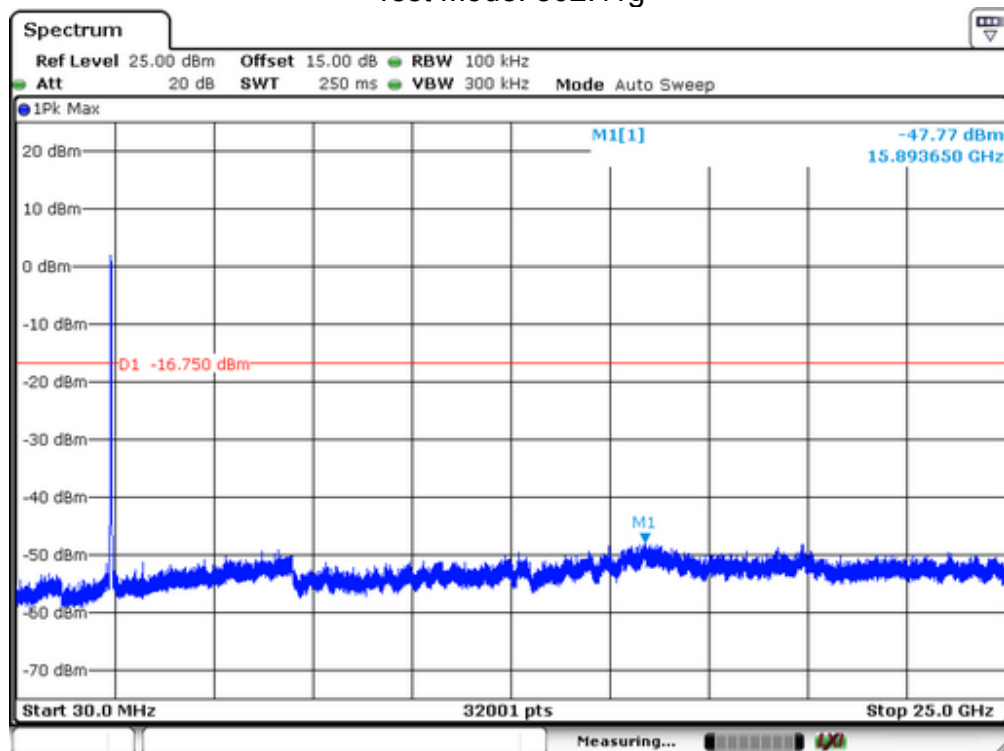


Middle Channel

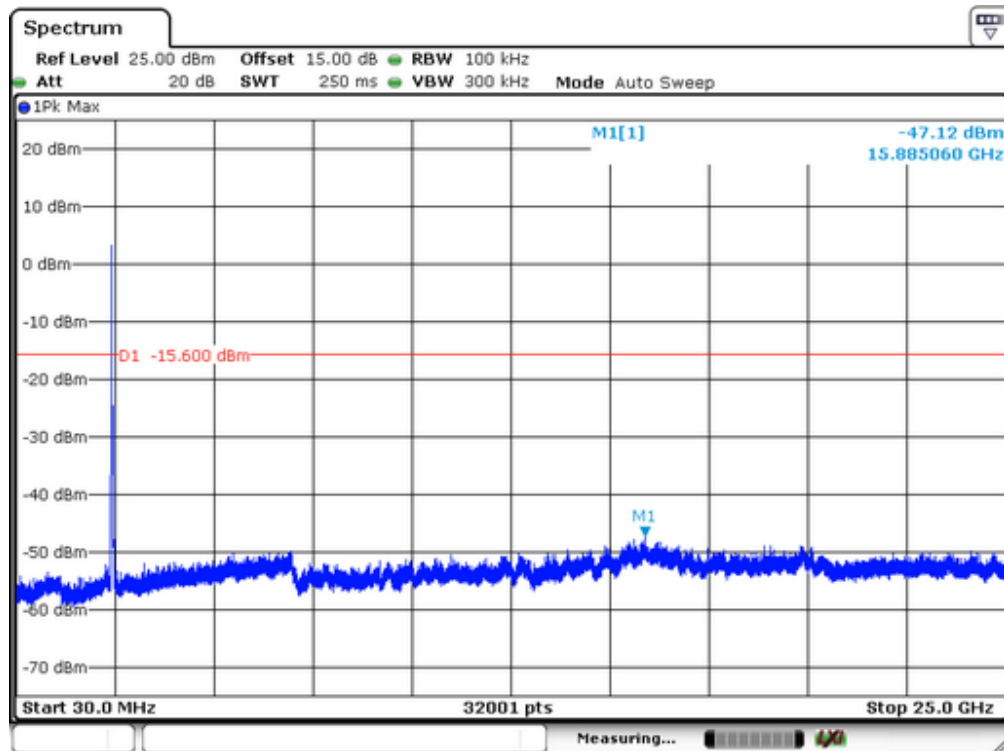


Highest Channel

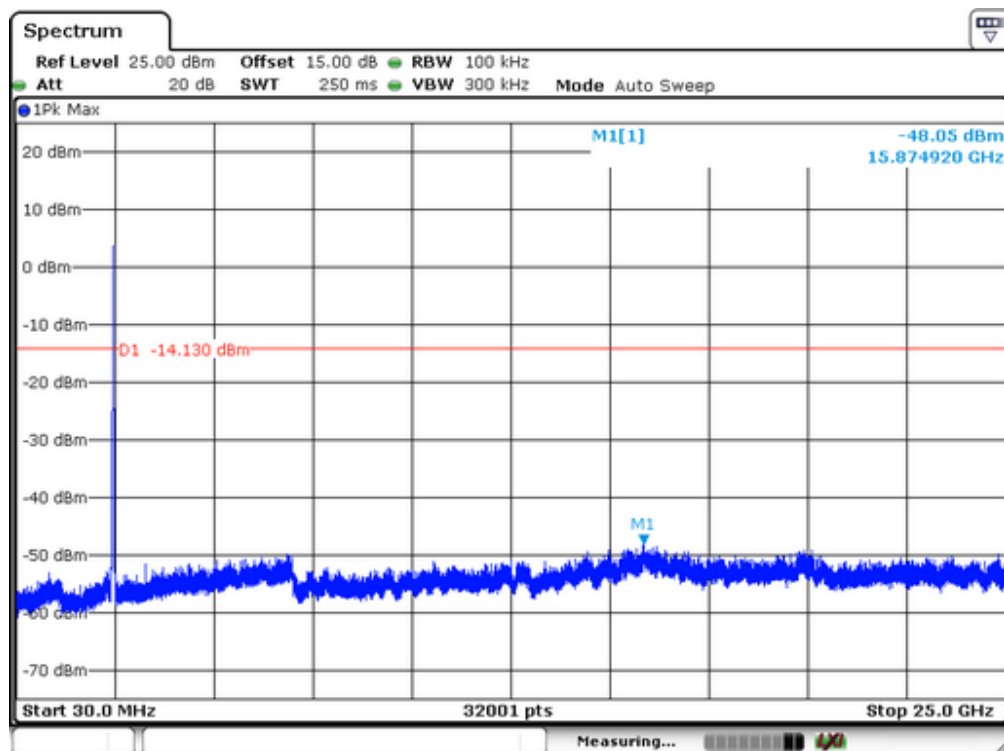
Test Mode: 802.11g



Lowest Channel

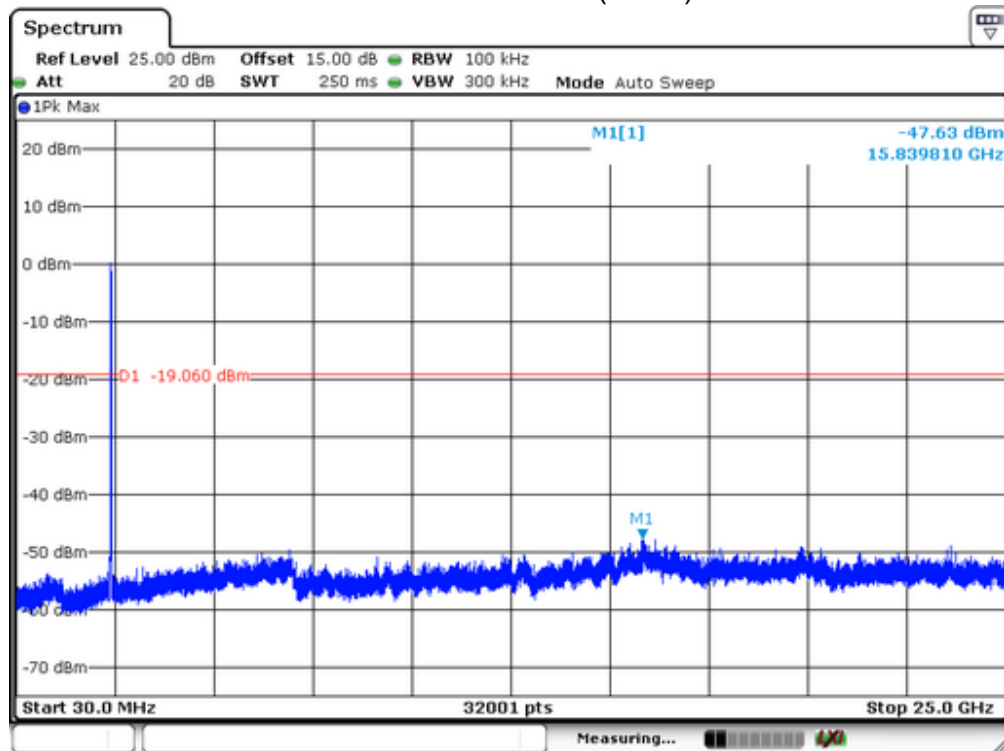


Middle Channel

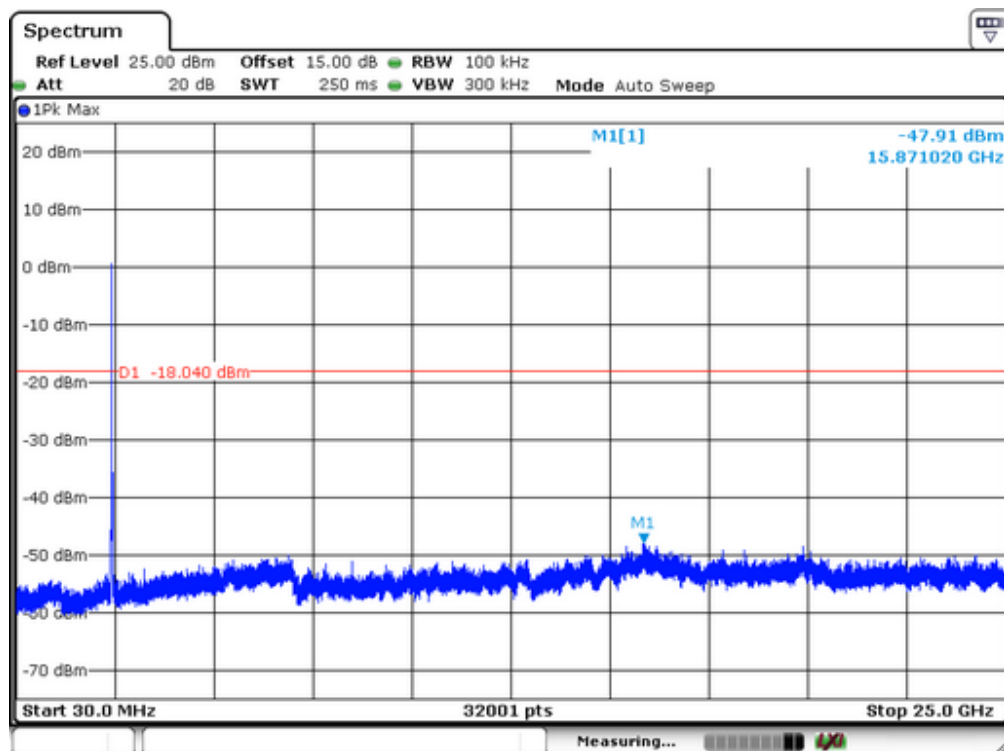


Highest Channel

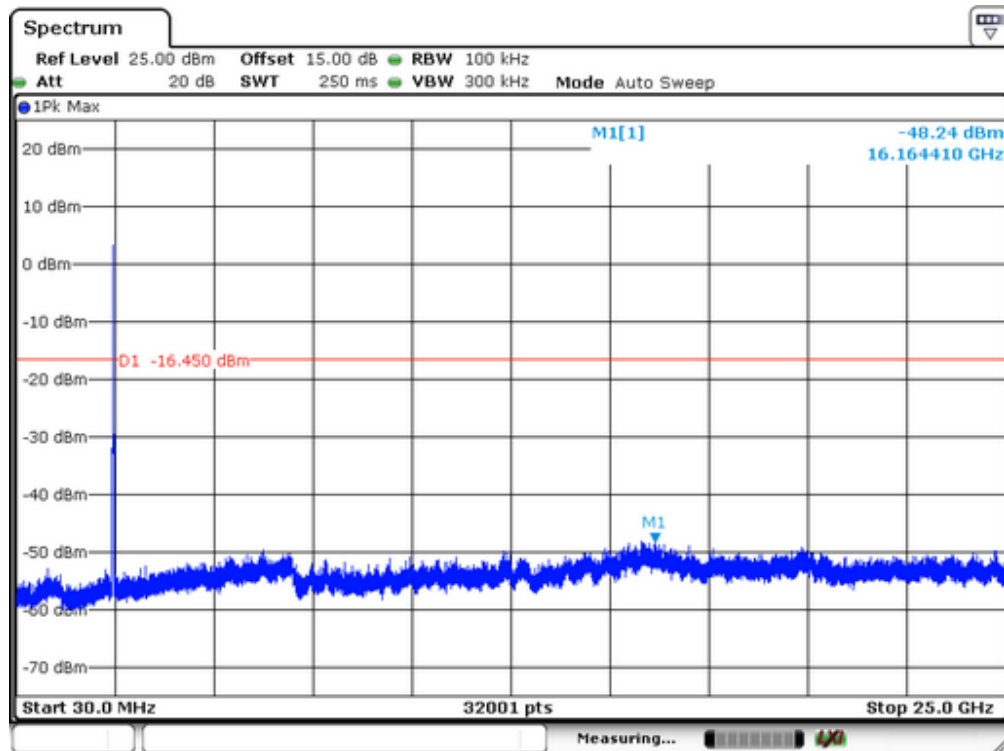
Test Mode: 802.11n(HT20)



Lowest Channel

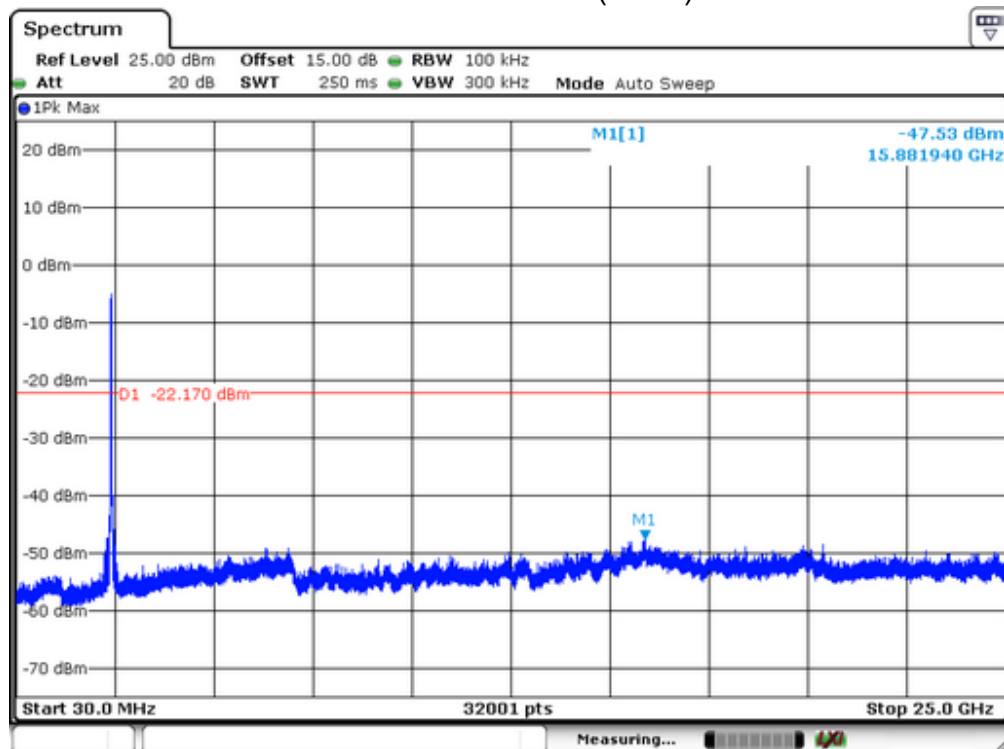


Middle Channel

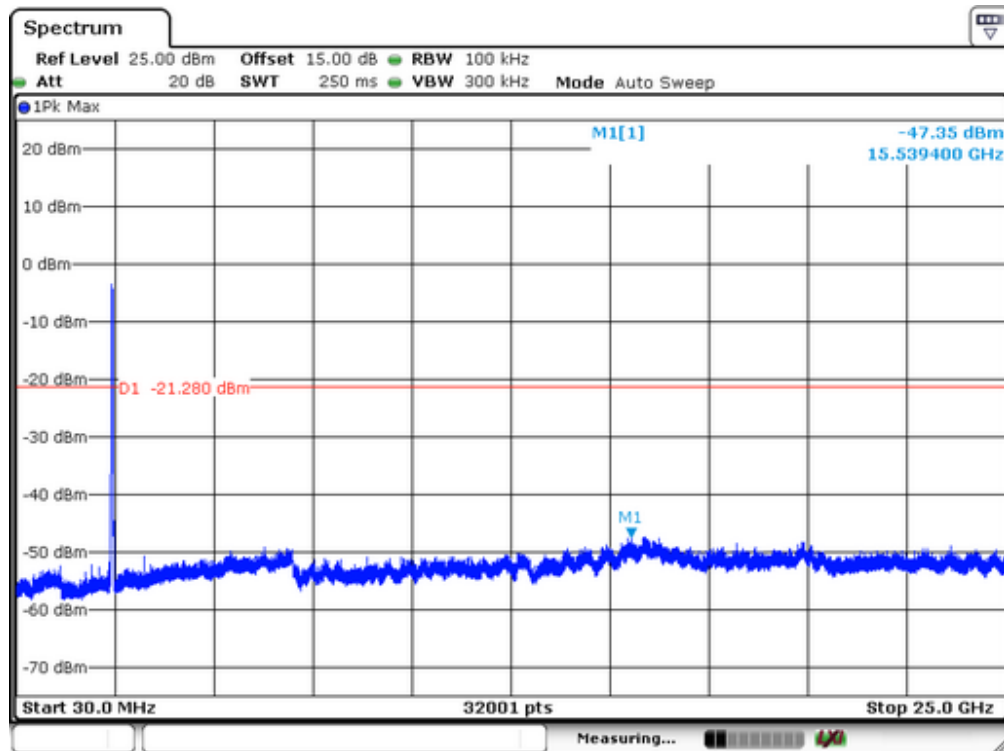


Highest Channel

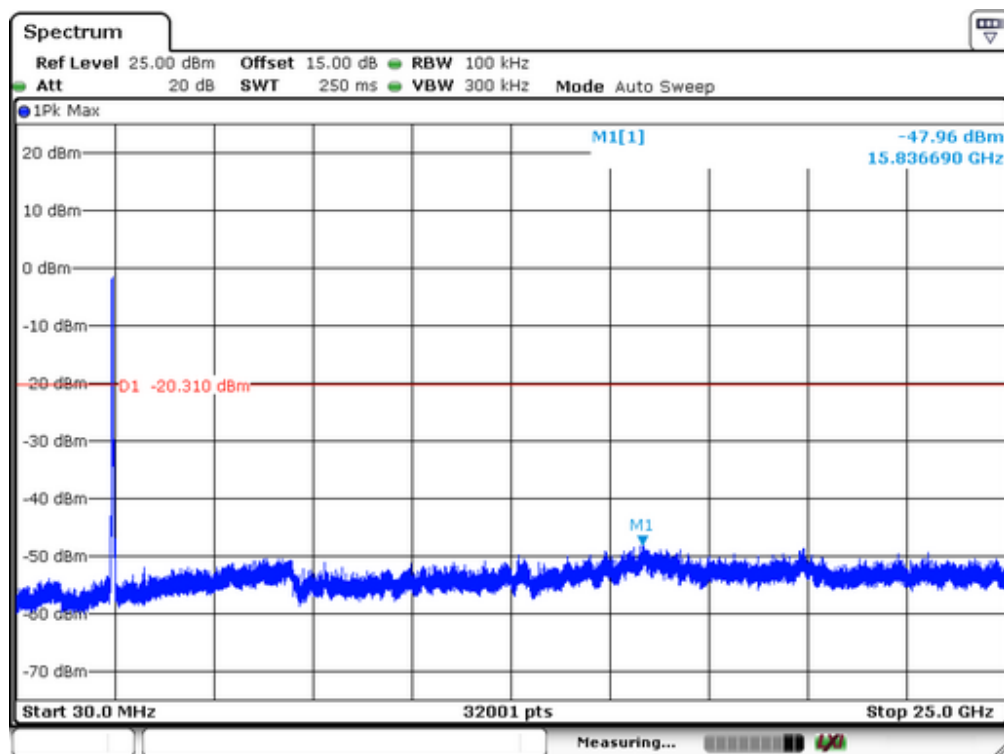
Test Mode: 802.11n(HT40)



Lowest Channel



Middle Channel



Highest Channel

12. Antenna Application

12.1 Antenna Requirement

For intentional device, according to FCC 47 CFR Section 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

12.2 Result

The EUT'S antenna, permanent attached antenna, is an external antenna. The antenna's gain is 2dBi and meets the requirement.

APPENDIX I (PHOTOS OF EUT)

