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

OF

Tablet

Model No.: MINION TAB

Trade Mark: Minion Tab

FCC ID: 2ADP4-MINIONTAB

Report No.: KAD141128097E2

Issue Date: December 10, 2014

Prepared for

Inco Electronics Co, S.A. de C.V.
Av. Nuevo Leon 54, of. 302, Col. Condesa Cuauhtemoc Mexico

Prepared by

DONGGUAN EMTEK CO., LTD.

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

VERIFICATION OF COMPLIANCE

Applicant:	Inco Electronics Co, S.A. de C.V. Av. Nuevo Leon 54, of. 302, Col. Condesa Cuauhtemoc Mexico
Manufacturer:	DAZA INTERNATIONAL (HK) CO., LIMITED Building G, Xinmusheng Low Carbon Industrial Park, #6 Xinmu Road, Pinghu Town, Longgang District, Shenzhen, China.
Product Description:	Tablet
Trade Mark:	Minion Tab
Model Number:	MINION TAB
File Number:	KAD141128097E2
Date of Test:	November 28, 2014 to December 10, 2014

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 C63.4 (2009) 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).

The test results of this report relate only to the tested sample identified in this report.

Approved By

Sam Lv / Q.A. Manager
DONGGUAN EMTEK CO., LTD.

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD141128097E2

Table of Contents

1. GENERAL INFORMATION

1.1 Product Description

The Inco Electronics Co, S.A. de C.V., Model: MINION TAB (referred to as the EUT in this report) The EUT is an short range, lower power transmitter. It is designed by way of utilizing the following modulation achieves the system operating.

A major technical descriptions of EUT is described as following:

Technical Specifications	Bluetooth 4.0	Bluetooth 2.1+EDR	WIFI
Operation Frequency	2402-2480MHz	2402-2480MHz	2412-2462MHz
Modulation	GFSK	GFSK, π/4-DQPSK, 8DPSK	OFDM, DSSS
Channel Number	40	79	11
Channel space	2 MHz	1 MHz	5MHz
Rated RF Output Power	7.17dBm	-3.02dBm	16.73dBm
Antenna Type	Internal PCB antenna		
Antenna GAIN	0dBi		
Remark: 1. This report only considers Bluetooth 2.1+EDR 2. The basic data rate of 1Mbps uses GFSK modulation and the enhanced data rate uses PSK modulation. For the enhanced data rate of 3Mbps 8DPSK modulation and of 2Mbps π/4-DQPSK modulation is used.			

1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: 2ADP4-MINIONTAB filing to comply with Section 15.247 of the FCC Part 15, Subpart C Rules and FCC Public Notice DA 00-705.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2009). 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 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 C63.4-2009. 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 C63.4-2009.

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	Limit	
		Peak power ration to emission(dBc)	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 μV/m	Distance(m)	Field strength at 3m dBμV/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 dBuV/m=20 log (uV/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(dBμV/m)(at 3m)		Class B(dBμV/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

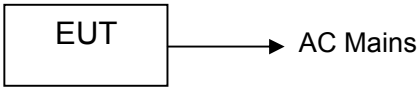


Table 2-1 Equipment Used in Tested System

Item	Equipment	Trade Mark	Model No.	FCC ID	Note
1.	Tablet	N/A	MINION TAB	2ADP4-MINIONTAB	***EUT***
2	Adapter	N/A	YSV6-0501000	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
§15.247(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
§15.207	AC Power Conducted Emission	Compliant
§15.247(d),§15.209	Radiated Emission	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, Π/4-DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

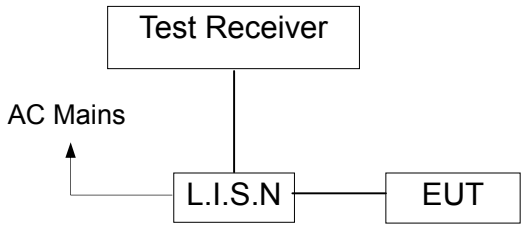
Channel	Frequency(MHz)
1	2402
40	2441
79	2480

5. 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)



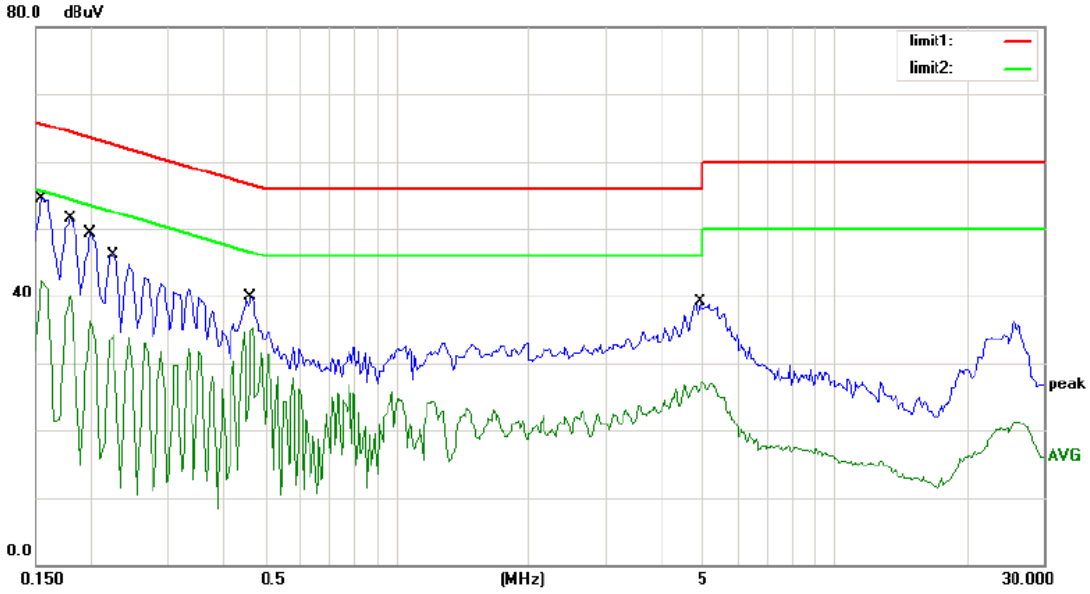
5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Test Receiver	Rohde & Schwarz	ESCS30	100018	05/16/2014	05/15/2015
L.I.S.N	Rohde & Schwarz	ENV216	100017	05/16/2014	05/15/2015
RF Switching Unit	CDS	RSU-M2	38401	05/16/2014	05/15/2015

5.4 Measurement Result:

Pass.

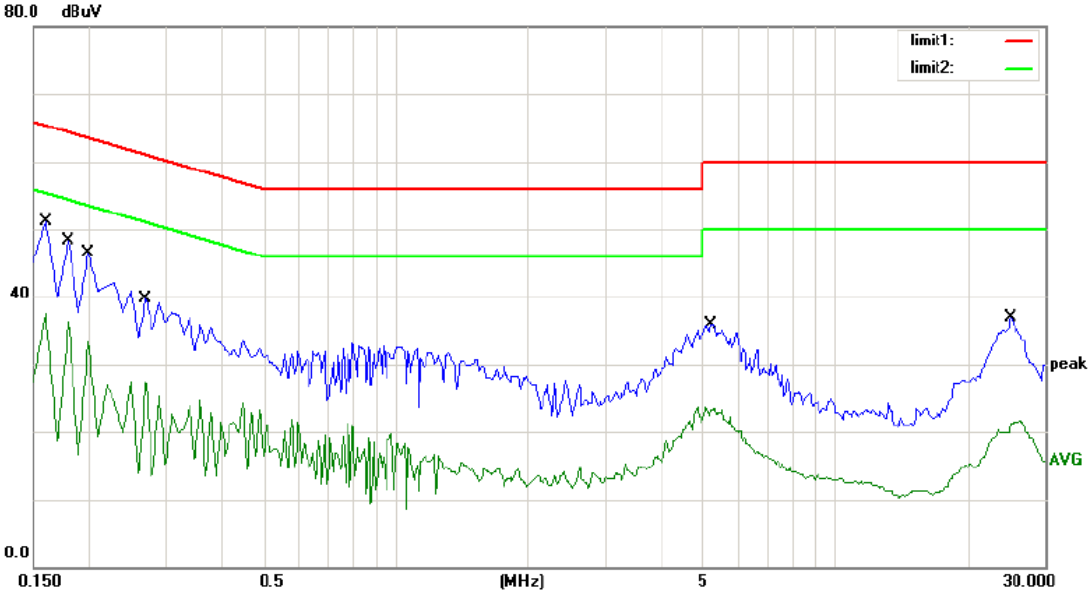
Please refer to the following data.



Site site #1 Phase: *L1* Temperature: 24
Limit: (CE)FCC PART 15 class C_QP Power: AC 120V/60Hz Humidity: 55 %
Mode: BT Link
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1550	54.53	0.00	54.53	65.73	-11.20	QP	
2		0.1550	42.20	0.00	42.20	55.73	-13.53	AVG	
3		0.1800	51.44	0.00	51.44	64.49	-13.05	QP	
4		0.1800	40.03	0.00	40.03	54.49	-14.46	AVG	
5		0.2000	49.29	0.00	49.29	63.61	-14.32	QP	
6		0.2000	36.35	0.00	36.35	53.61	-17.26	AVG	
7		0.2250	46.17	0.00	46.17	62.63	-16.46	QP	
8		0.2250	34.24	0.00	34.24	52.63	-18.39	AVG	
9		0.4650	39.89	0.00	39.89	56.60	-16.71	QP	
10		0.4650	35.33	0.00	35.33	46.60	-11.27	AVG	
11		4.9500	39.18	0.00	39.18	56.00	-16.82	QP	
12		4.9500	27.09	0.00	27.09	46.00	-18.91	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 C_QP Power: AC 120V/60Hz Humidity: 55 %
Mode: BT Link
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1	*	0.1600	51.09	0.00	51.09	65.46	-14.37	QP	
2		0.1600	37.41	0.00	37.41	55.46	-18.05	AVG	
3		0.1800	48.22	0.00	48.22	64.49	-16.27	QP	
4		0.1800	36.34	0.00	36.34	54.49	-18.15	AVG	
5		0.2000	46.44	0.00	46.44	63.61	-17.17	QP	
6		0.2000	33.21	0.00	33.21	53.61	-20.40	AVG	
7		0.2700	39.62	0.00	39.62	61.12	-21.50	QP	
8		0.2700	27.29	0.00	27.29	51.12	-23.83	AVG	
9		5.2400	35.99	0.00	35.99	60.00	-24.01	QP	
10		5.2400	23.68	0.00	23.68	50.00	-26.32	AVG	
11		25.1500	36.83	0.00	36.83	60.00	-23.17	QP	
12		25.1500	21.62	0.00	21.62	50.00	-28.38	AVG	

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

5.5 Conducted Measurement Photos:

6. Radiated Emission Test

6.1 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8m 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:

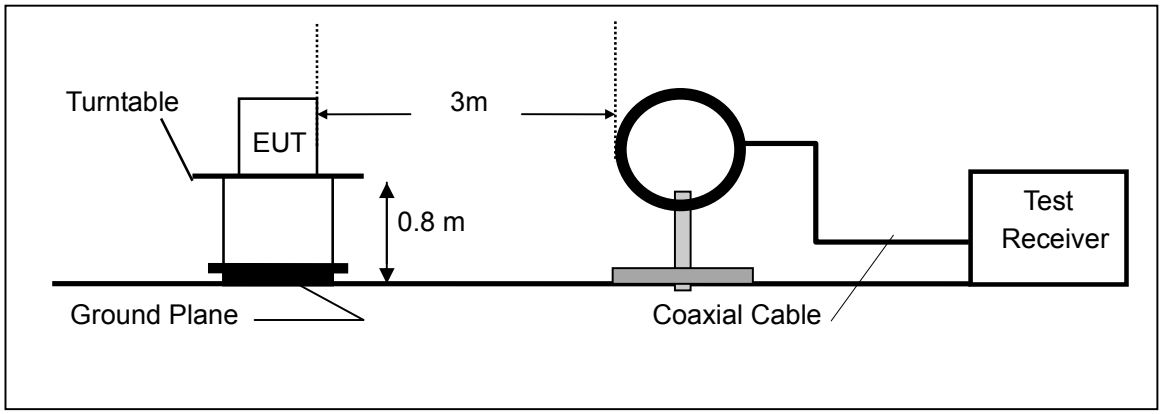
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

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

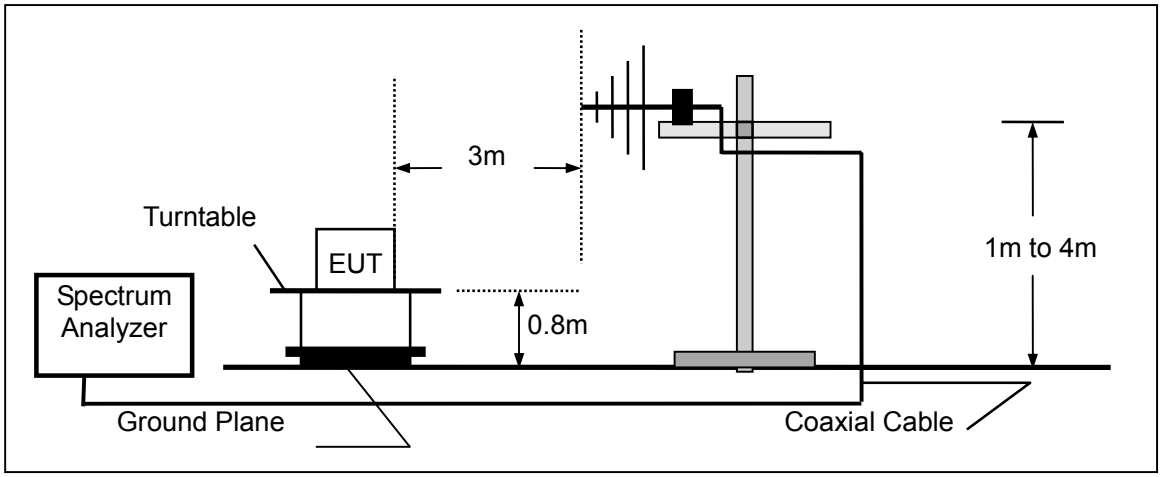
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

6.2 Test SET-UP (Block Diagram of Configuration)

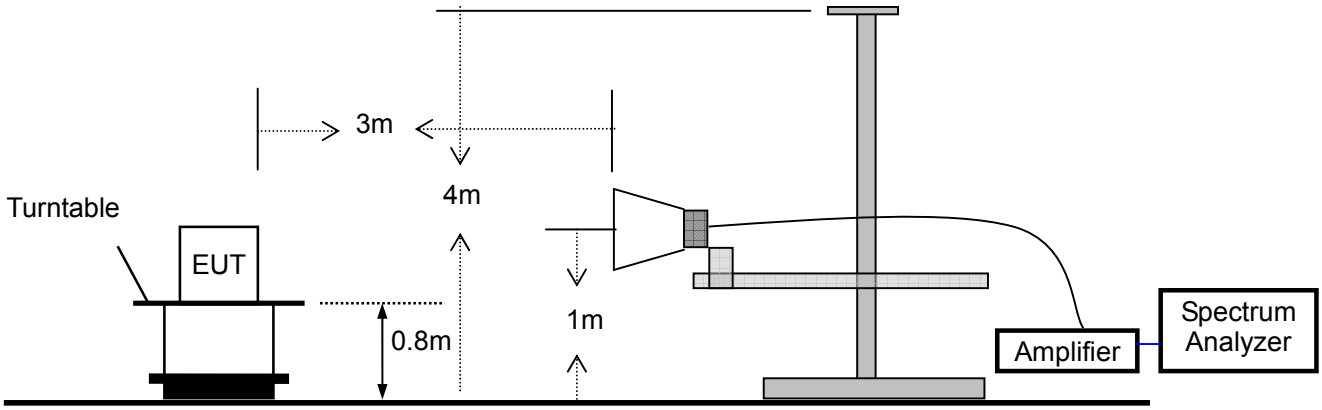
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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



6.3 Measurement Equipment Used:

EQUIPMENT TYPE	**MFR**	**MODEL NUMBER**	**SERIAL NUMBER**	**LAST CAL.**	**CAL DUE.**
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	05/16/2014	05/15/2015
Spectrum Analyzer	HP	E4407B	839840481	05/16/2014	05/15/2015
EMI Test Receiver	Rohde & Schwarz	ESU	1302.6005.26	05/16/2014	05/15/2015
Pre-Amplifier	HP	8447D	2944A07999	05/16/2014	05/15/2015
Bilog Antenna	Schwarzbeck	VULB9163	142	05/19/2014	05/18/2015
Loop Antenna	Schwarzbeck	FMZB 1519	012	05/19/2014	05/18/2015
Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	05/19/2014	05/18/2015
Horn Antenna	Schwarzbeck	BBHA 9120	D143	05/19/2014	05/18/2015
Spectrum Analyzer	Agilent	E4446A	US44300399	05/16/2014	05/15/2015

6.4 Measurement Result

Below 30MHz:

Operation Mode:	TX	Test Date :	December 05, 2014
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)
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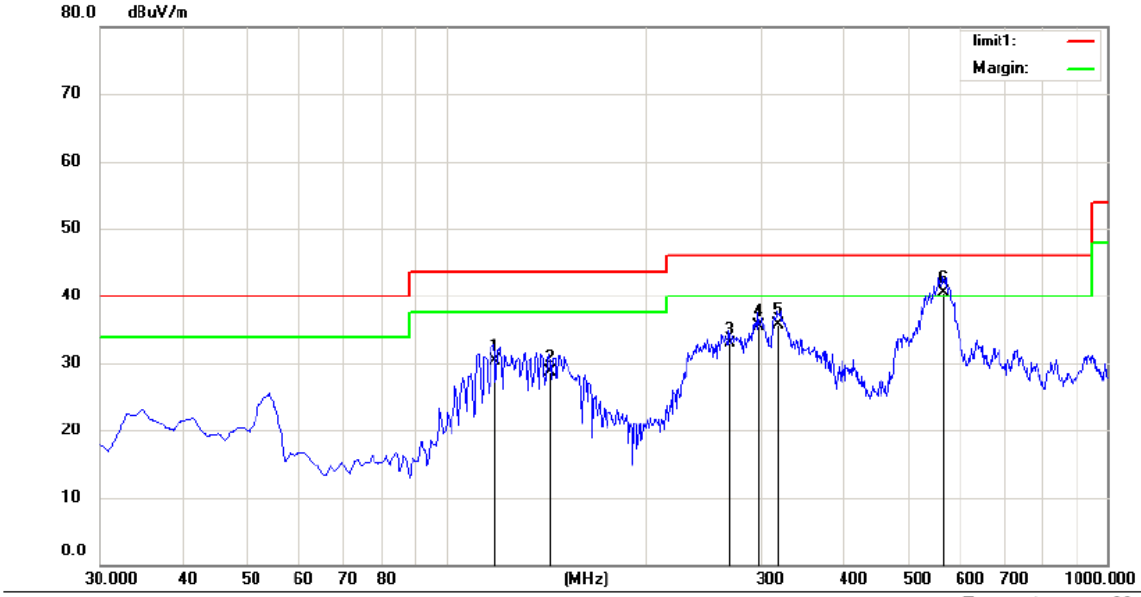
Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

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.



Site Chamber #1 Polarization: **Horizontal** Temperature: 26

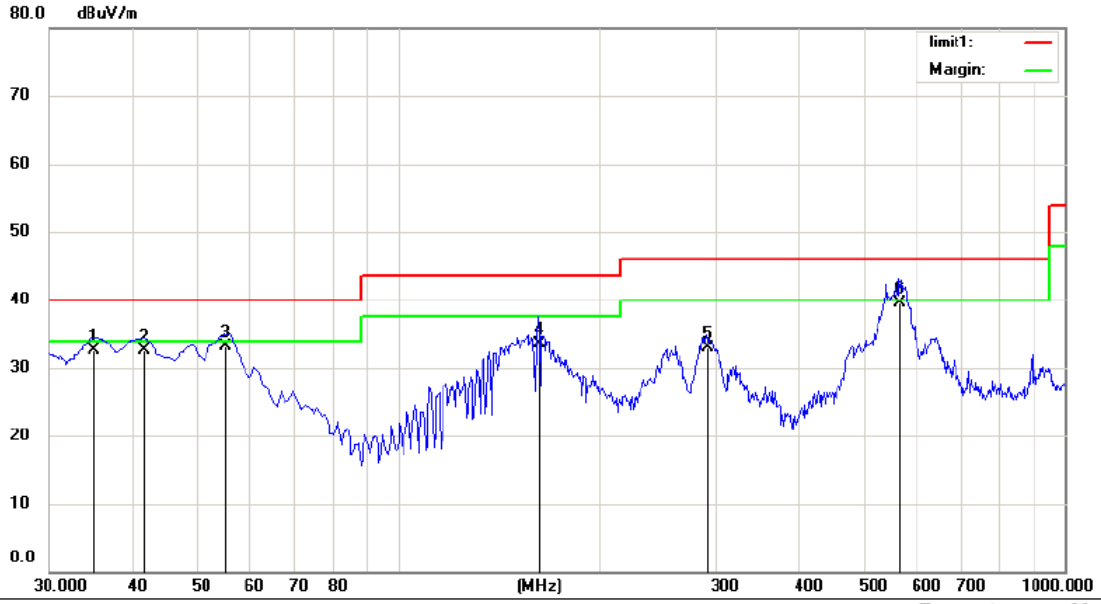
Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT(TX2402)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		118.2700	47.36	-17.07	30.29	43.50	-13.21	QP			
2		143.4900	46.07	-17.29	28.78	43.50	-14.72	QP			
3		268.6200	48.17	-15.24	32.93	46.00	-13.07	QP			
4		296.7500	50.00	-14.54	35.46	46.00	-10.54	QP			
5		318.0900	48.80	-13.17	35.63	46.00	-10.37	QP			
6	*	566.4100	49.28	-8.81	40.47	46.00	-5.53	QP			

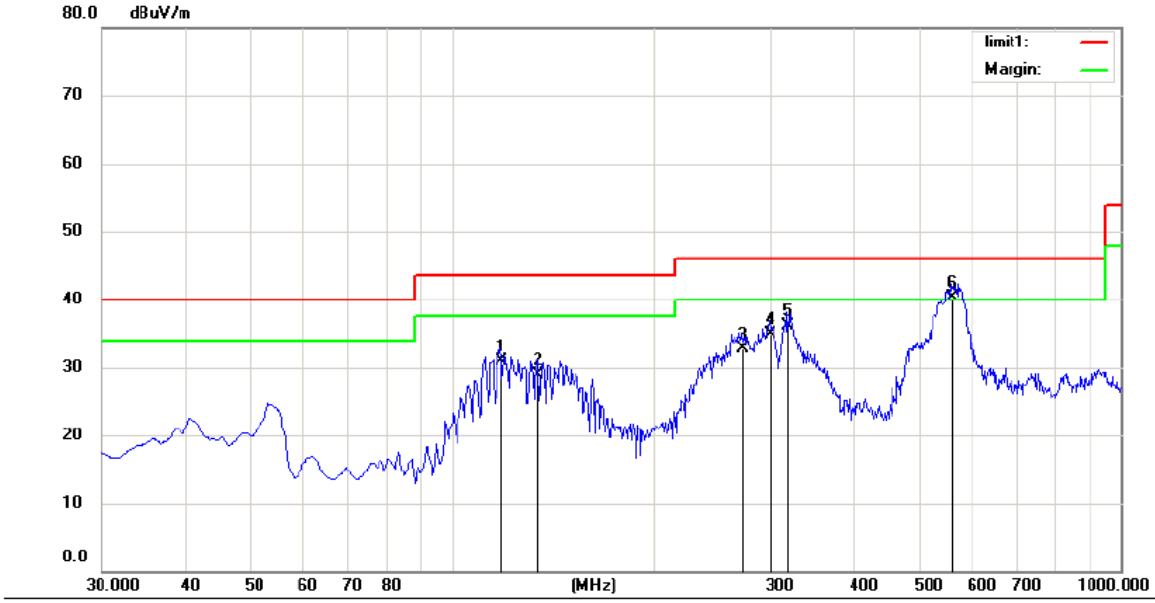
*:Maximum data x:Over limit !:over margin Operator: Snake



Site Chamber #1 Polarization: **Vertical** Temperature: 26
Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %
Mode:BT(TX2402)
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.8823	46.75	-14.18	32.57	40.00	-7.43	QP			
2		41.6400	46.05	-13.58	32.47	40.00	-7.53	QP			
3		55.2200	50.50	-17.46	33.04	40.00	-6.96	QP			
4		162.8900	51.85	-18.41	33.44	43.50	-10.06	QP			
5		290.9300	47.62	-14.71	32.91	46.00	-13.09	QP			
6	*	565.4400	48.58	-9.01	39.57	46.00	-6.43	QP			

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



Site Chamber #1 Polarization: **Horizontal** Temperature: 26

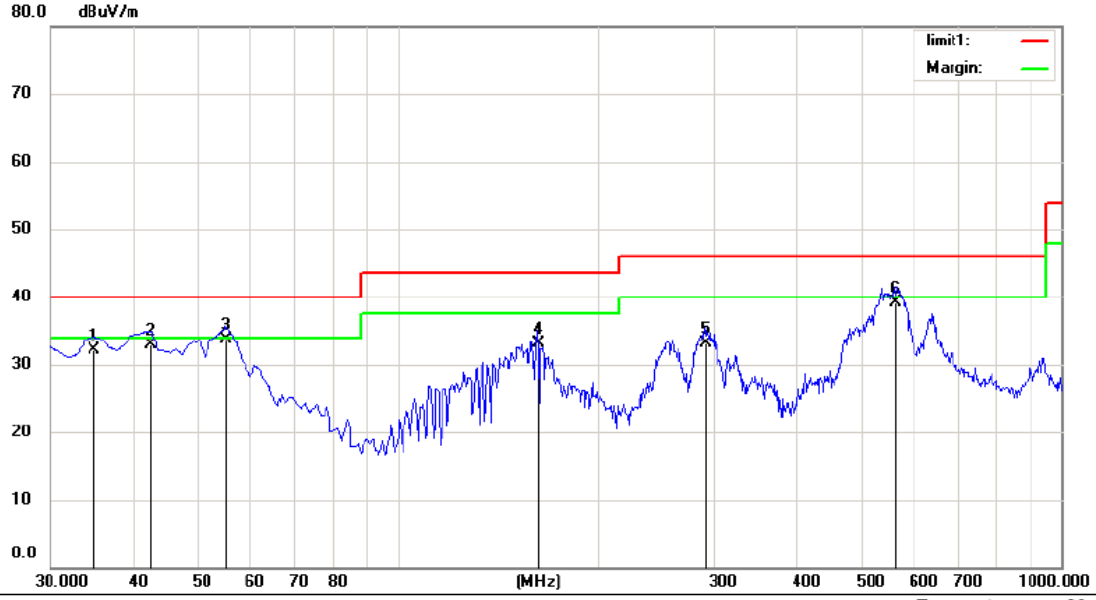
Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT(TX2441)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		118.2700	47.94	-17.07	30.87	43.50	-12.63	QP			
2		134.7600	45.49	-16.49	29.00	43.50	-14.50	QP			
3		272.5000	47.80	-15.12	32.68	46.00	-13.32	QP			
4		298.6900	49.33	-14.42	34.91	46.00	-11.09	QP			
5		318.0900	49.34	-13.17	36.17	46.00	-9.83	QP			
6	*	560.5900	49.25	-8.87	40.38	46.00	-5.62	QP			

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



Site Chamber #1 Polarization: **Vertical** Temperature: 26

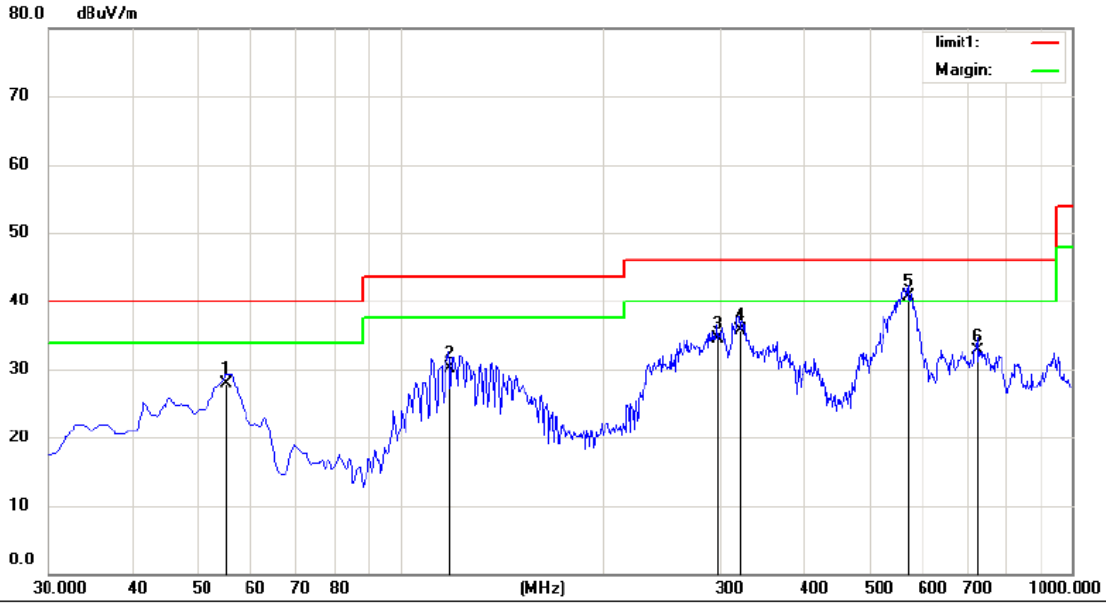
Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT(TX2441)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.8500	46.25	-14.19	32.06	40.00	-7.94	QP			
2		42.4508	46.35	-13.50	32.85	40.00	-7.15	QP			
3	*	55.2200	51.10	-17.46	33.64	40.00	-6.36	QP			
4		162.8900	51.52	-18.41	33.11	43.50	-10.39	QP			
5		290.9300	47.74	-14.71	33.03	46.00	-12.97	QP			
6		562.5300	48.09	-9.08	39.01	46.00	-6.99	QP			

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



Site Chamber #1 Polarization: **Horizontal** Temperature: 26

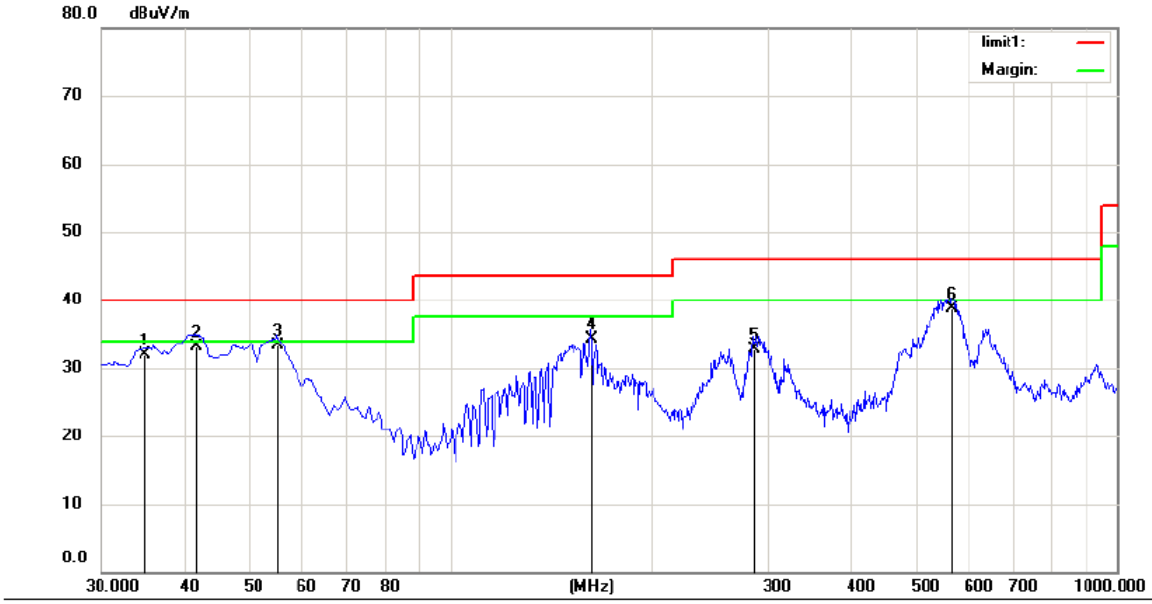
Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT(TX2480)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		55.2200	45.35	-17.46	27.89	40.00	-12.11	QP			
2		118.2700	47.09	-17.07	30.02	43.50	-13.48	QP			
3		296.7500	48.96	-14.54	34.42	46.00	-11.58	QP			
4		321.0000	48.79	-13.07	35.72	46.00	-10.28	QP			
5	*	572.2300	49.45	-8.75	40.70	46.00	-5.30	QP			
6		724.5200	39.28	-6.50	32.78	46.00	-13.22	QP			

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



Site Chamber #1 Polarization: **Vertical** Temperature: 26

Limit: (RE)FCC PART 15 class B 3m Power: AC 120V/60Hz Humidity: 55 %

Mode:BT(TX2480)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	cm	degree	Comment
1		34.8822	46.02	-14.18	31.84	40.00	-8.16	QP			
2		41.6400	46.60	-13.58	33.02	40.00	-6.98	QP			
3	*	55.2200	50.80	-17.46	33.34	40.00	-6.66	QP			
4		162.8900	52.69	-18.41	34.28	43.50	-9.22	QP			
5		285.1100	47.55	-14.85	32.70	46.00	-13.30	QP			
6		566.4100	47.69	-8.99	38.70	46.00	-7.30	QP			

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

Above 1000MHz

Operation Mode:	TX Mode (CH1: 2402MHz)	Test Date :	December 05, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq.	Ant. Pol.	Emission Level(dBuV/m		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4804	V	63.55	46.23	74	54	-10.45	-7.77
7206	V	62.74	45.17	74	54	-11.26	-8.83
9608	V	61.75	44.05	74	54	-12.25	-9.95
12010	V	60.59	43.92	74	54	-13.41	-10.08
14412	V	59.71	42.17	74	54	-14.29	-11.83
16814	V	58.36	40.58	74	54	-15.64	-13.42
4804	H	64.85	45.39	74	54	-9.15	-8.61
7206	H	63.95	44.38	74	54	-10.05	-9.62
9608	H	62.72	43.18	74	54	-11.28	-10.82
12010	H	61.03	42.08	74	54	-12.97	-11.92
14412	H	60.82	41.85	74	54	-13.18	-12.15
16814	H	59.72	40.39	74	54	-14.28	-13.61

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 (CH40: 2441MHz)	Test Date :	December 05, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

Freq.	Ant. Pol.	Emission Level(dBuV/m		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4882	V	64.39	45.29	74	54	-9.61	-8.71
7323	V	63.85	44.15	74	54	-10.15	-9.85
9764	V	62.71	43.62	74	54	-11.29	-10.38
12205	V	61.08	42.72	74	54	-12.92	-11.28
14646	V	60.39	41.08	74	54	-13.61	-12.92
17087	V	59.71	40.72	74	54	-14.29	-13.28
4882	H	65.95	46.85	74	54	-8.05	-7.15
7323	H	64.28	45.39	74	54	-9.72	-8.61
9764	H	63.82	44.15	74	54	-10.18	-9.85
12205	H	61.08	43.98	74	54	-12.92	-10.02
14646	H	60.72	42.19	74	54	-13.28	-11.81
17087	H	58.06	41.08	74	54	-15.94	-12.92

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.

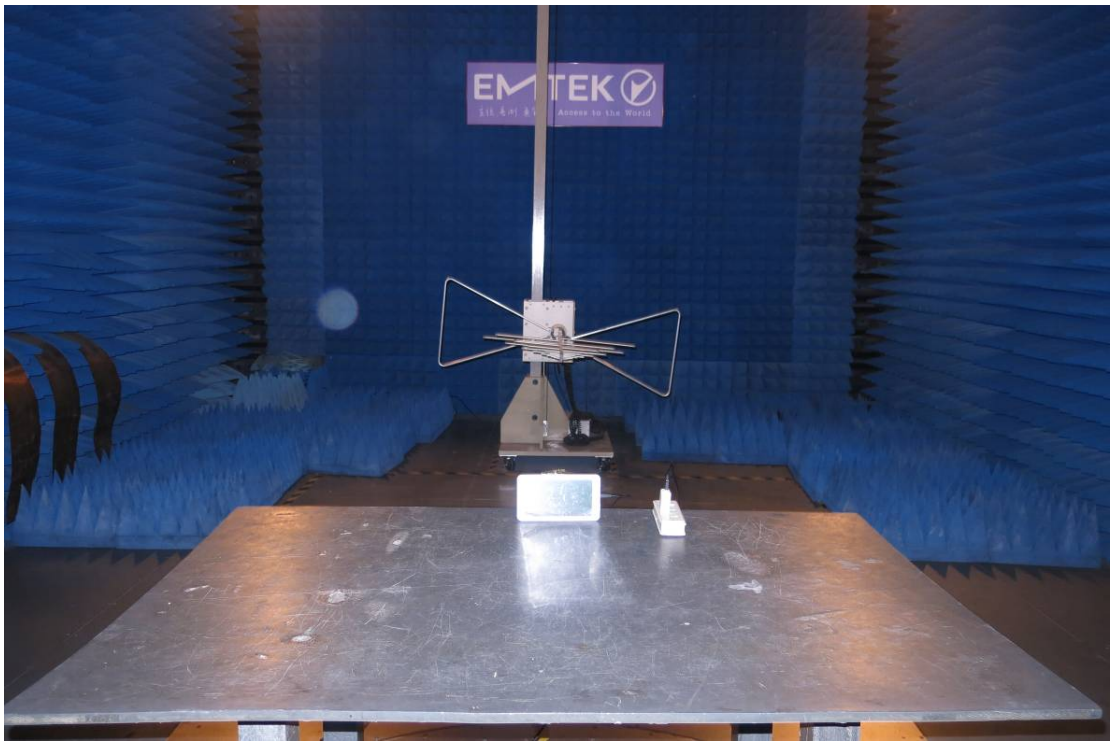
Operation Mode:	TX Mode (CH79: 2480MHz)	Test Date :	December 05, 2014
Frequency Range:	1-25GHz	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Measured Distance:	3m	Test By:	Andy

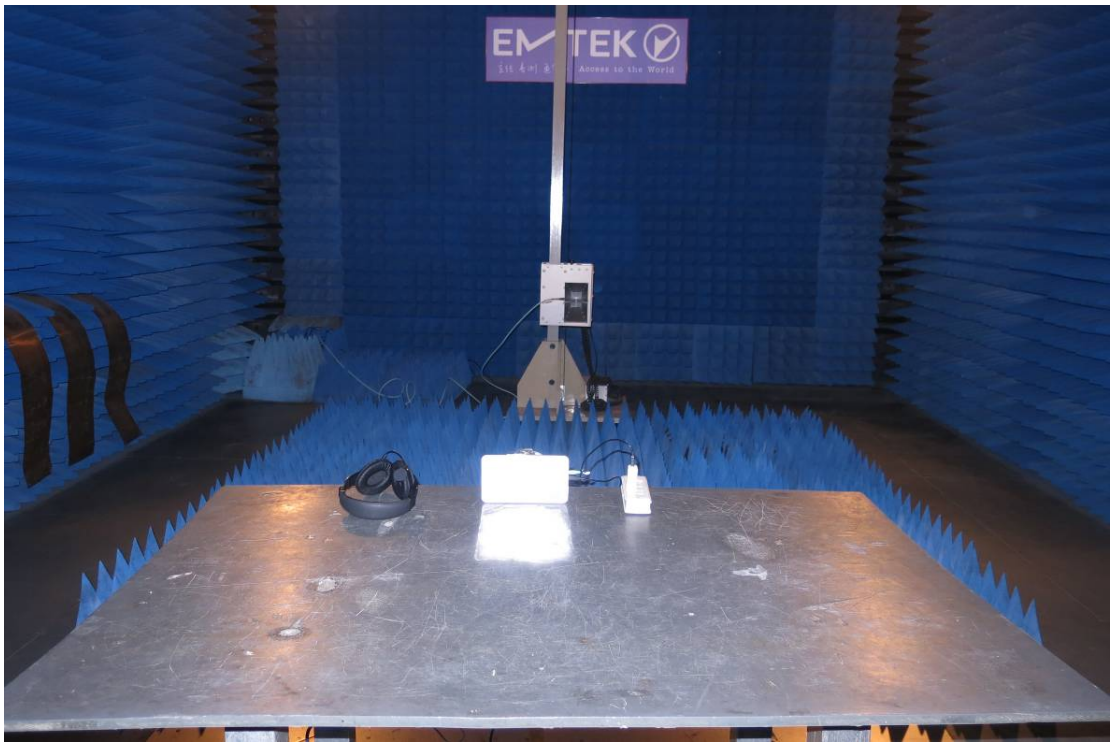
Freq.	Ant. Pol.	Emission Level(dBuV/m		Limit 3m(dBuV/m)		Margin(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4960	V	66.33	46.23	74	54	-7.67	-7.77
7440	V	65.18	45.18	74	54	-8.82	-8.82
9920	V	64.08	44.05	74	54	-9.92	-9.95
12400	V	63.72	43.26	74	54	-10.28	-10.74
14880	V	62.86	42.18	74	54	-11.14	-11.82
17360	V	61.04	41.08	74	54	-12.96	-12.92
4960	H	65.39	45.29	74	54	-8.61	-8.71
7440	H	64.02	44.82	74	54	-9.98	-9.18
9920	H	63.72	43.05	74	54	-10.28	-10.95
12400	H	62.85	41.29	74	54	-11.15	-12.71
14880	H	61.07	40.33	74	54	-12.93	-13.67
17360	H	60.85	38.59	74	54	-13.15	-15.41

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.

6.5 Radiated Measurement Photos:



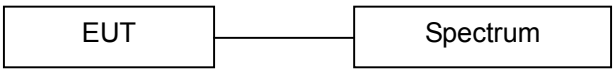


7. Channel Separation test

7.1 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.

7.2 Test SET-UP (Block Diagram of Configuration)



7.3 Measurement Equipment Used:

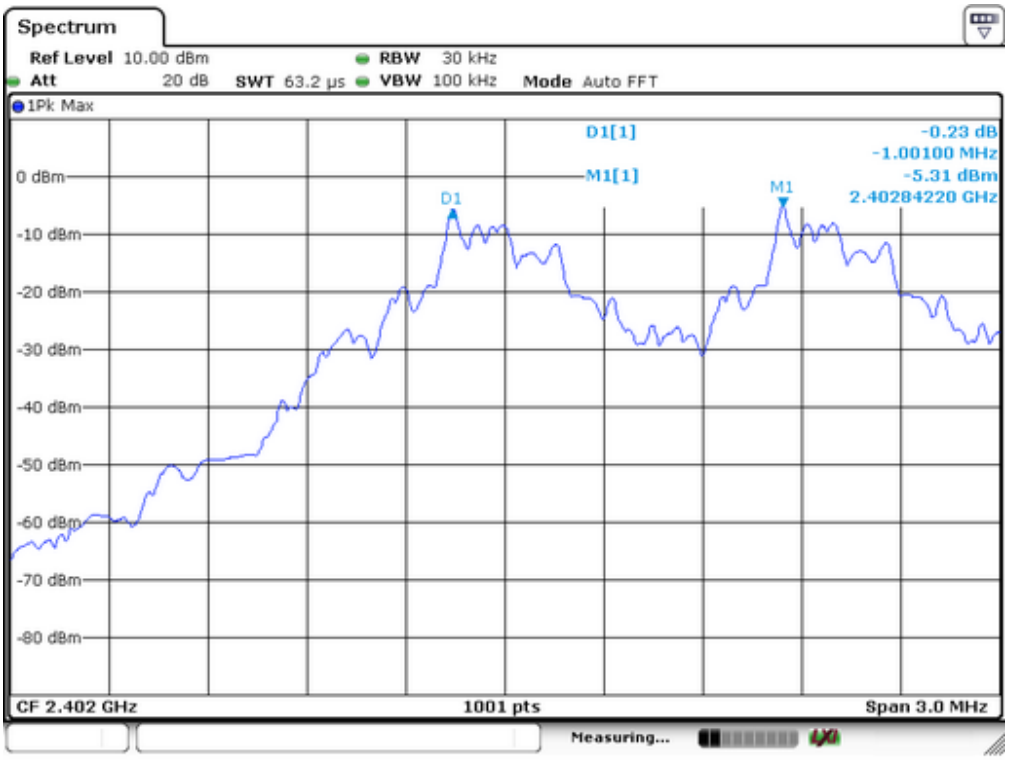
Same as 6.3 Radiated Emission Measurement.

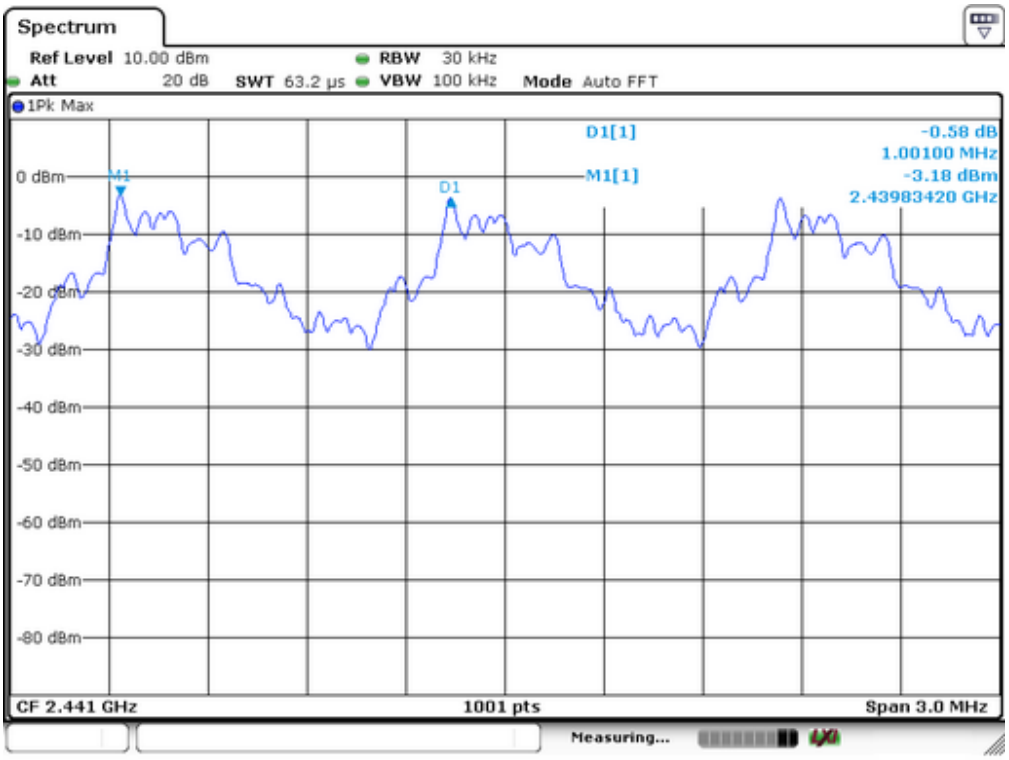
7.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Modulation:	GFSK		

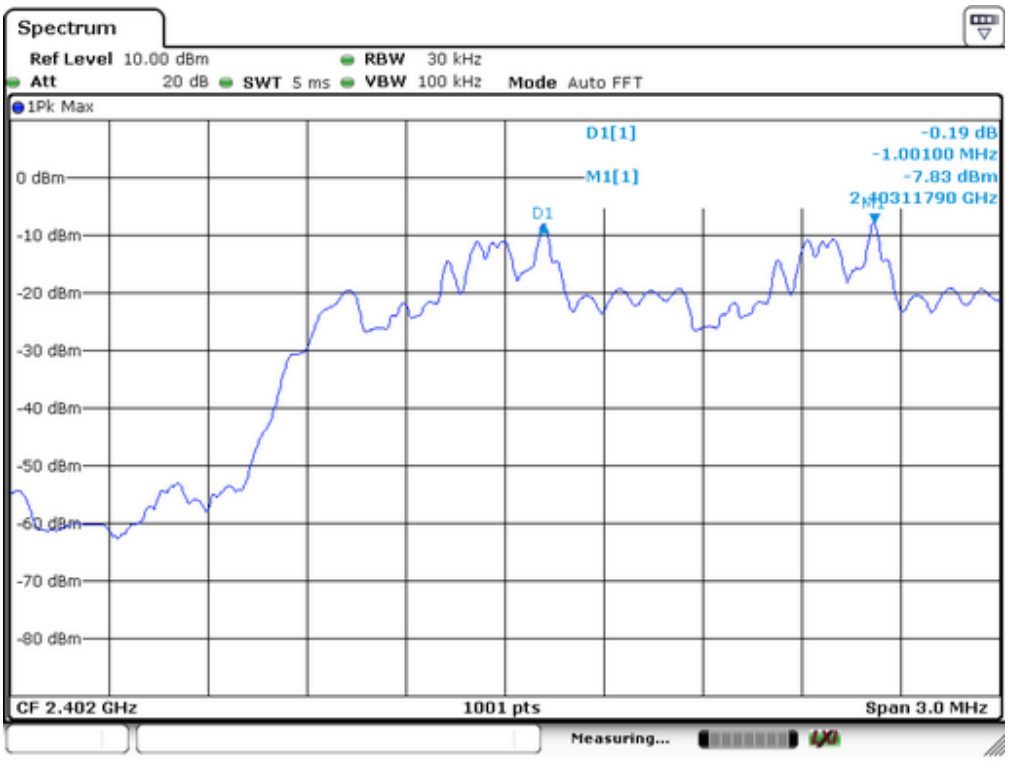
Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
1	2402	1001	>722
40	2441	1001	>725
79	2480	1001	>719

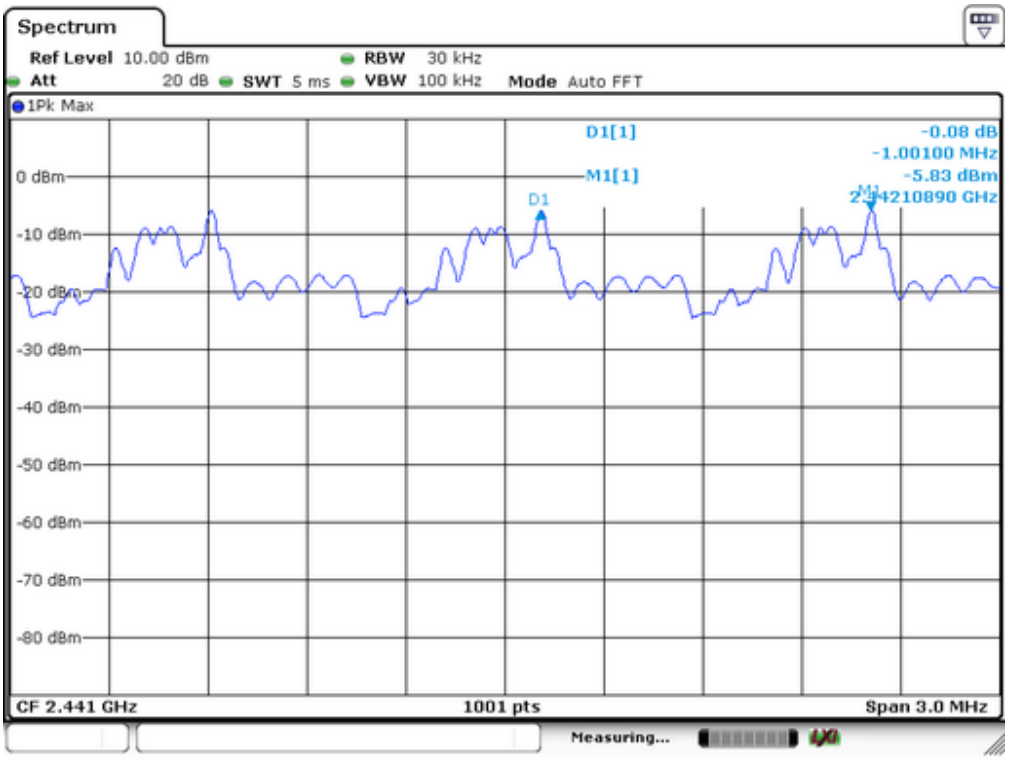

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D1[1]
-0.23 dB
-1.00100 MHz
M1[1]
-5.31 dBm
2.40284220 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1
M1
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Measuring...

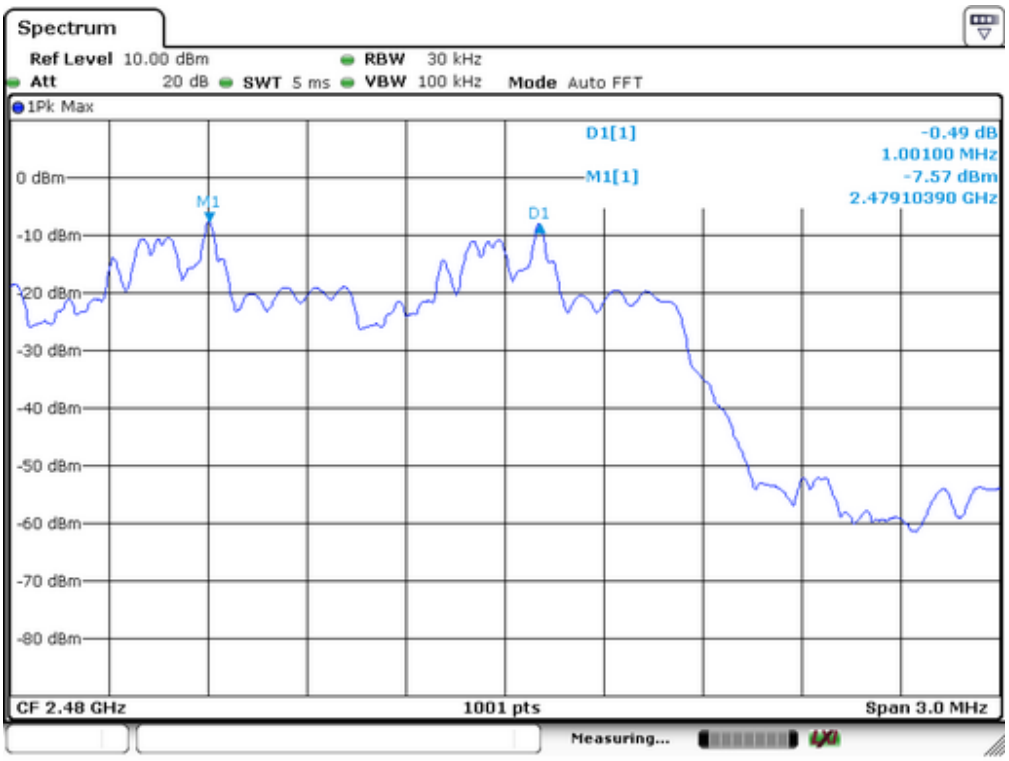

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D1[1]
-0.58 dB
1.00100 MHz
M1[1]
-3.18 dBm
2.43983420 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
D1
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Measuring...

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	24℃
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	>768
40	2441	1001	>770
79	2480	1001	>770

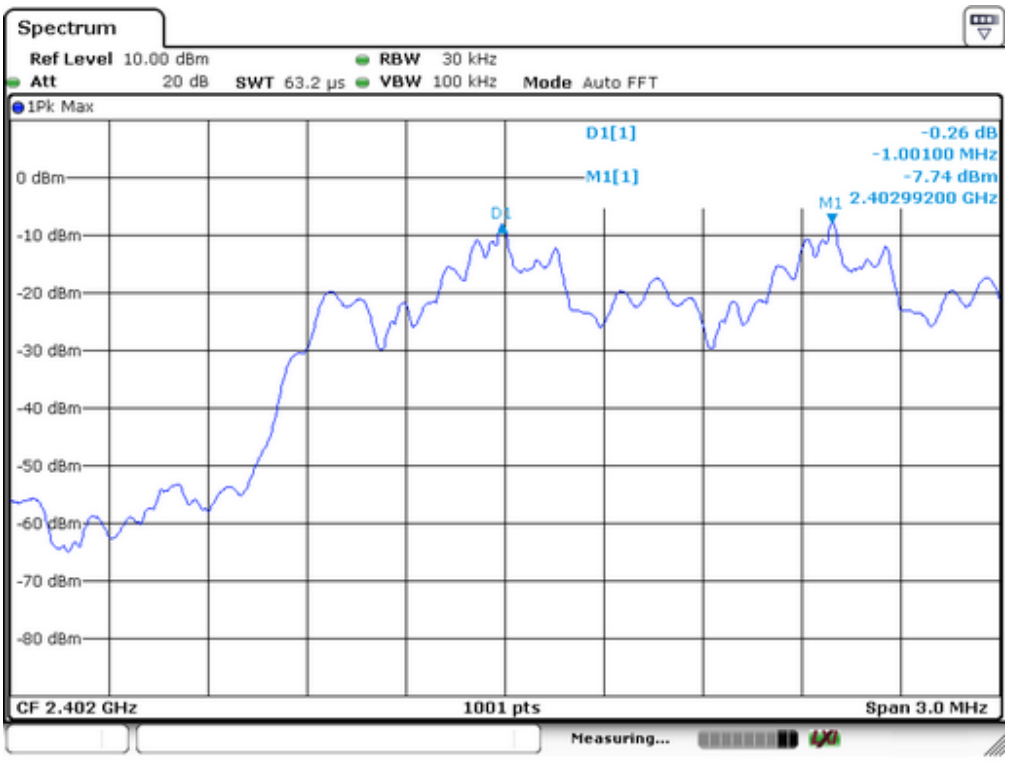

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB SWT 5 ms VBW 100 kHz Mode Auto FFT
1Pk Max
D1[1] -0.19 dB
-1.00100 MHz
M1[1] -7.83 dBm
2.40311790 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Measuring...

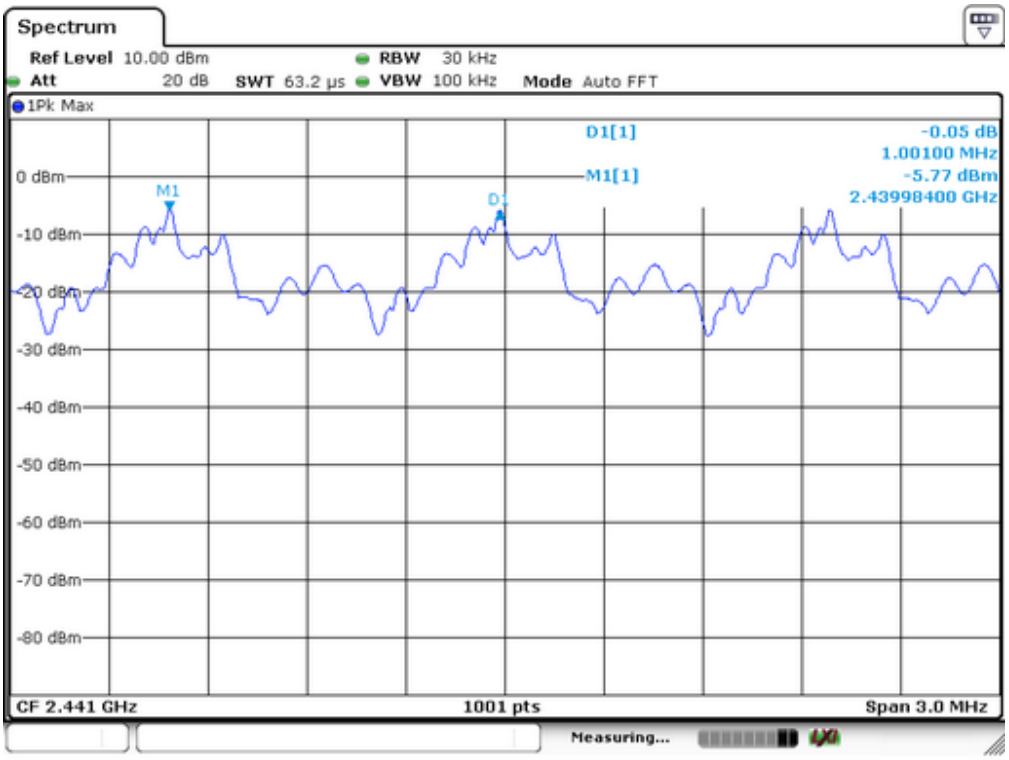

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB SWT 5 ms VBW 100 kHz Mode Auto FFT
1Pk Max
D1[1] -0.08 dB
-1.00100 MHz
M1[1] -5.83 dBm
2.44210890 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Measuring...

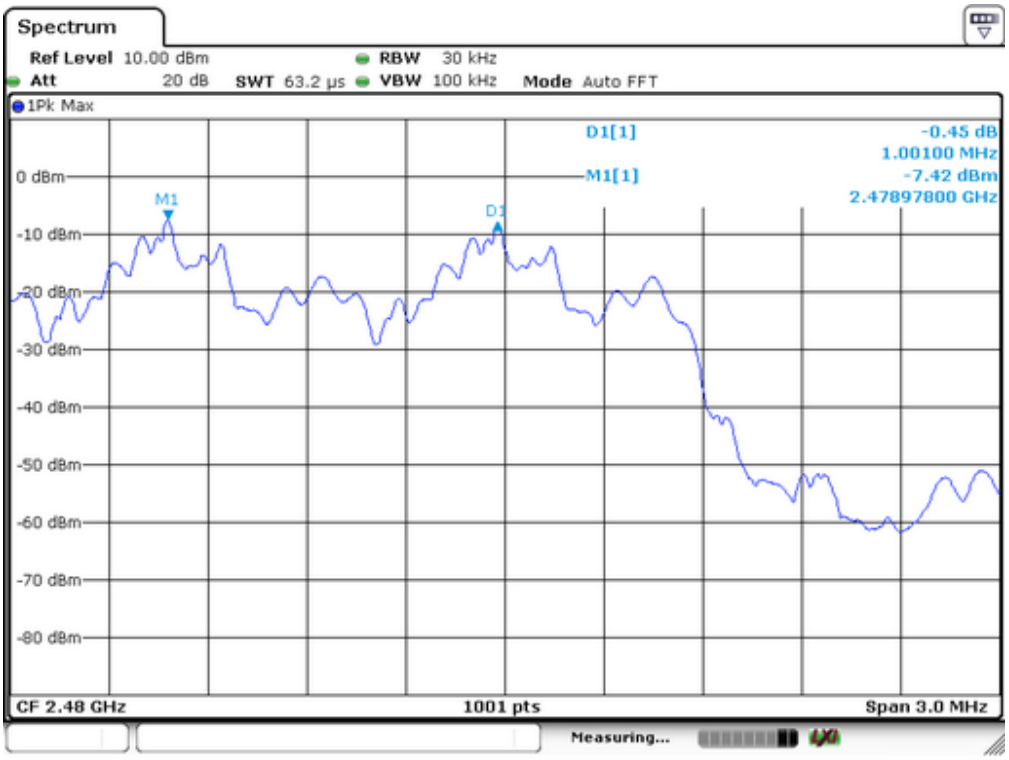


Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1001	>816
40	2441	1001	>806
79	2480	1001	>822


Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D1[1]
-0.26 dB
-1.00100 MHz
M1[1]
-7.74 dBm
2.40299200 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D1[1]
-0.05 dB
1.00100 MHz
M1[1]
-5.77 dBm
2.43998400 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Measuring...

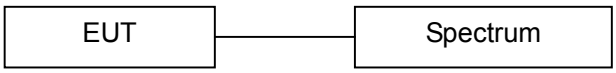

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
D1[1]
-0.45 dB
1.00100 MHz
M1[1]
-7.42 dBm
2.47897800 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
D1
CF 2.48 GHz
1001 pts
Span 3.0 MHz
Measuring...

8. 20dB Bandwidth 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:

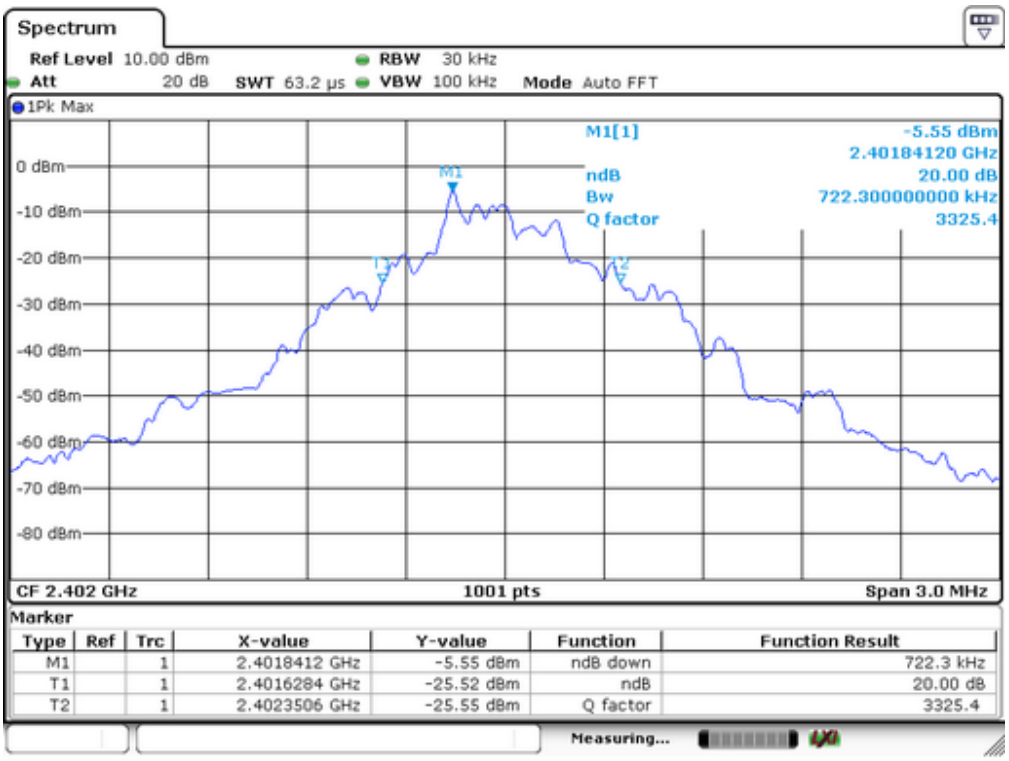
Same as 6.3 Radiated Emission Measurement.

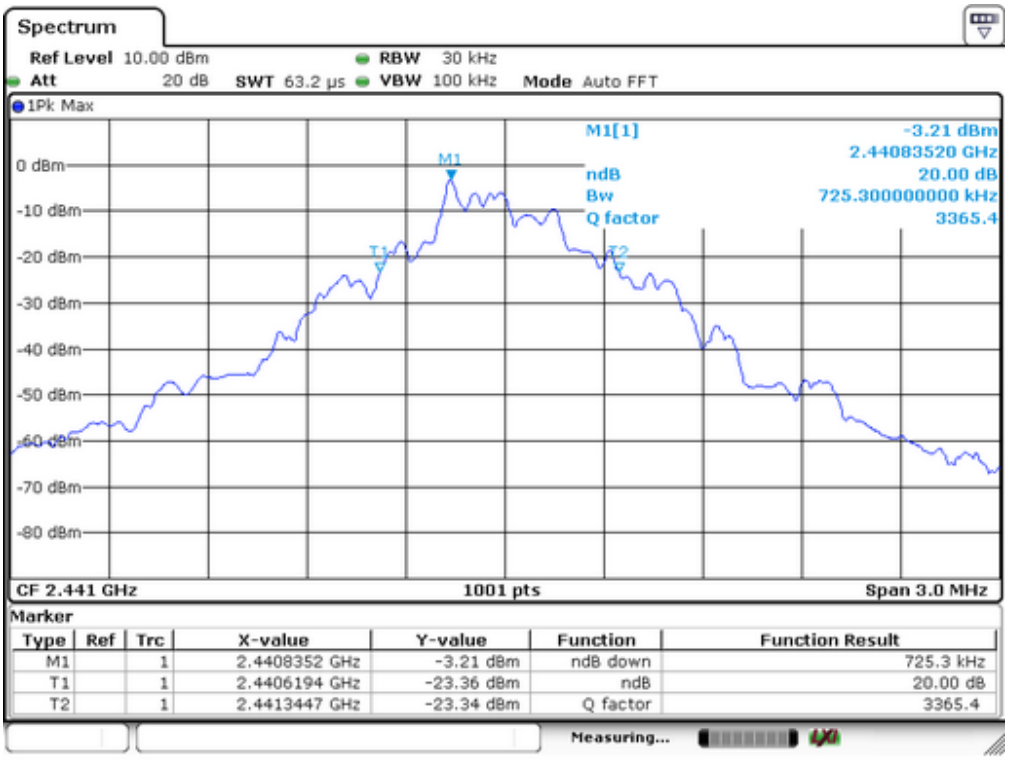
8.4 Measurement Results:

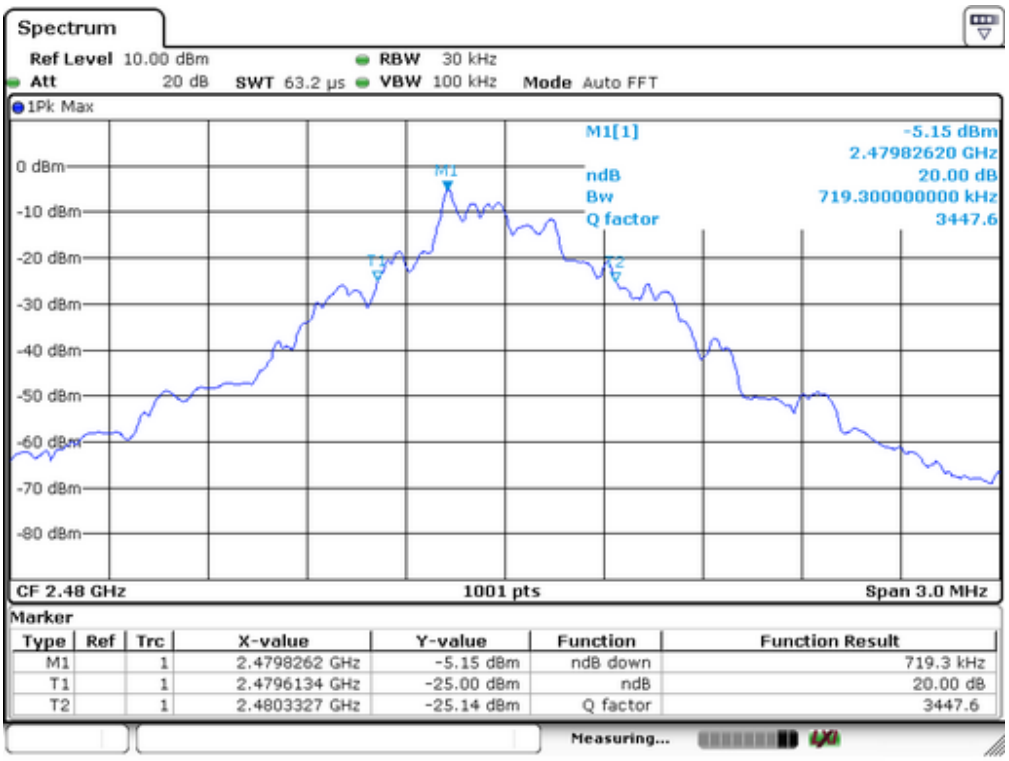
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	GFSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	722
40	2441	725
79	2480	719

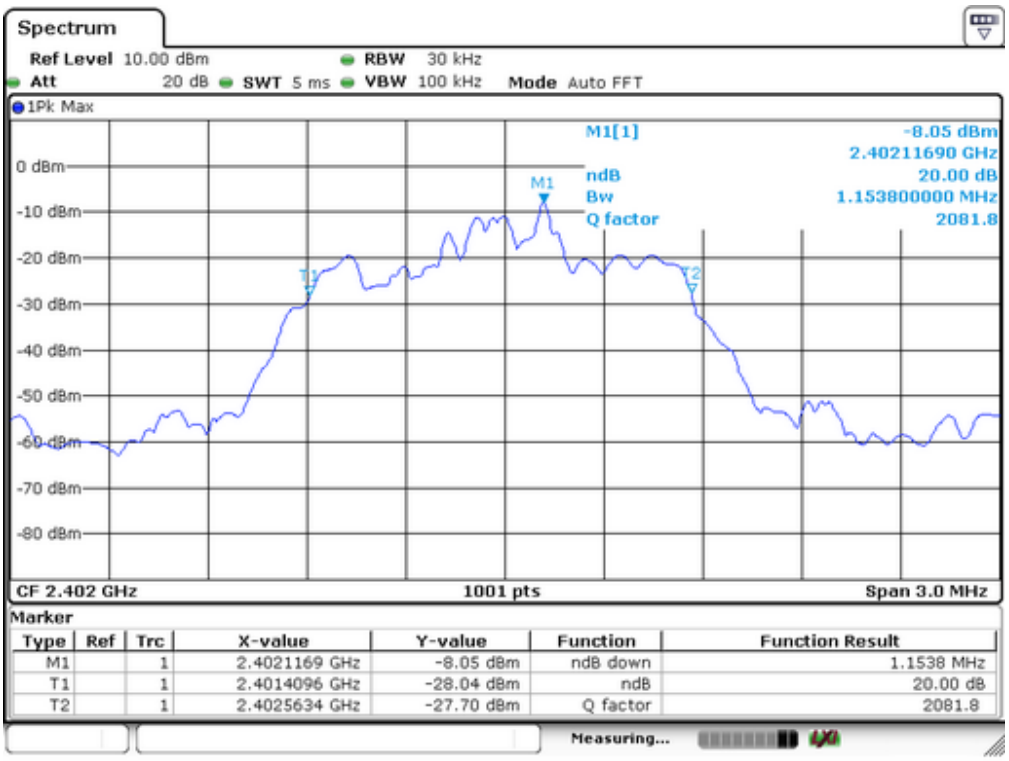

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
M1[1]
-5.55 dBm
2.40184120 GHz
ndB 20.00 dB
Bw 722.300000000 kHz
Q factor 3325.4
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4018412 GHz -5.55 dBm ndB down 722.3 kHz
T1 1 2.4016284 GHz -25.52 dBm ndB 20.00 dB
T2 1 2.4023506 GHz -25.55 dBm Q factor 3325.4
Measuring...

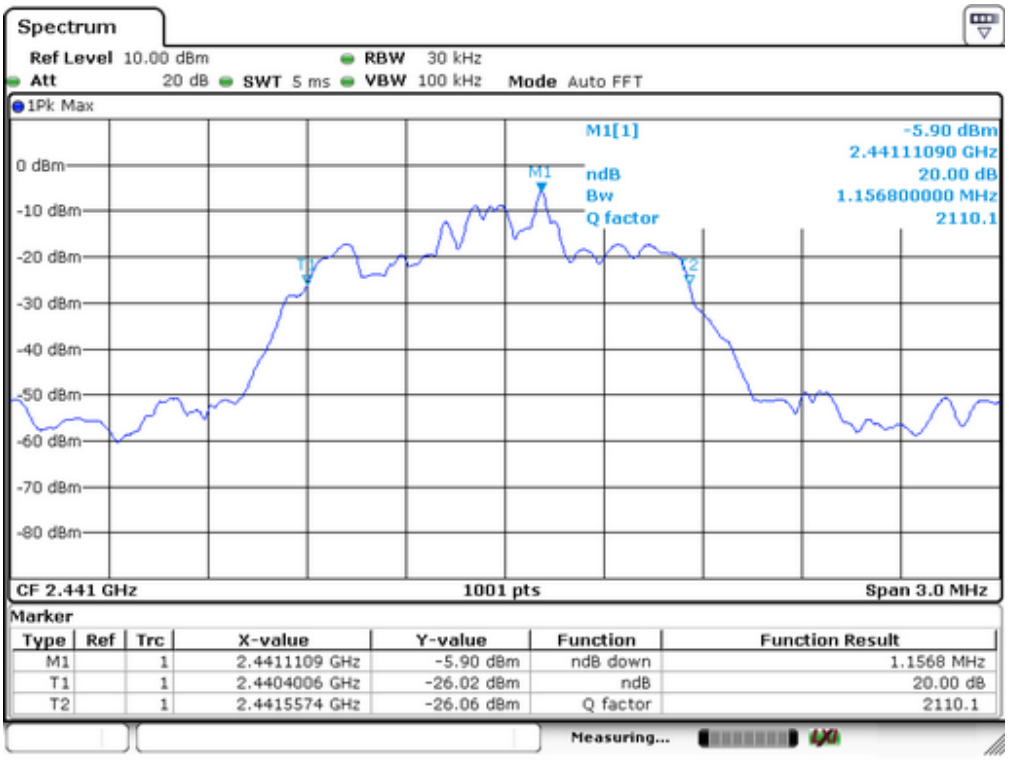

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
M1[1]
-3.21 dBm
2.44083520 GHz
ndB 20.00 dB
Bw 725.300000000 kHz
Q factor 3365.4
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4408352 GHz -3.21 dBm ndB down 725.3 kHz
T1 1 2.4406194 GHz -23.36 dBm ndB 20.00 dB
T2 1 2.4413447 GHz -23.34 dBm Q factor 3365.4
Measuring...

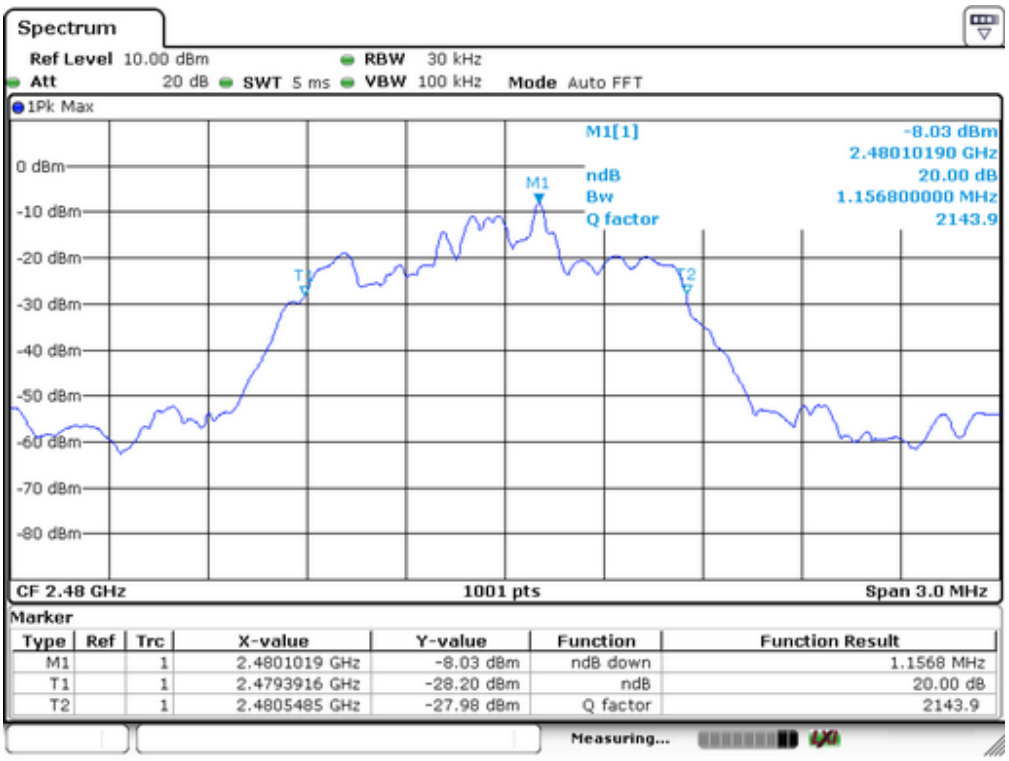


Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	Π/4-DQPSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1153
40	2441	1156
79	2480	1156

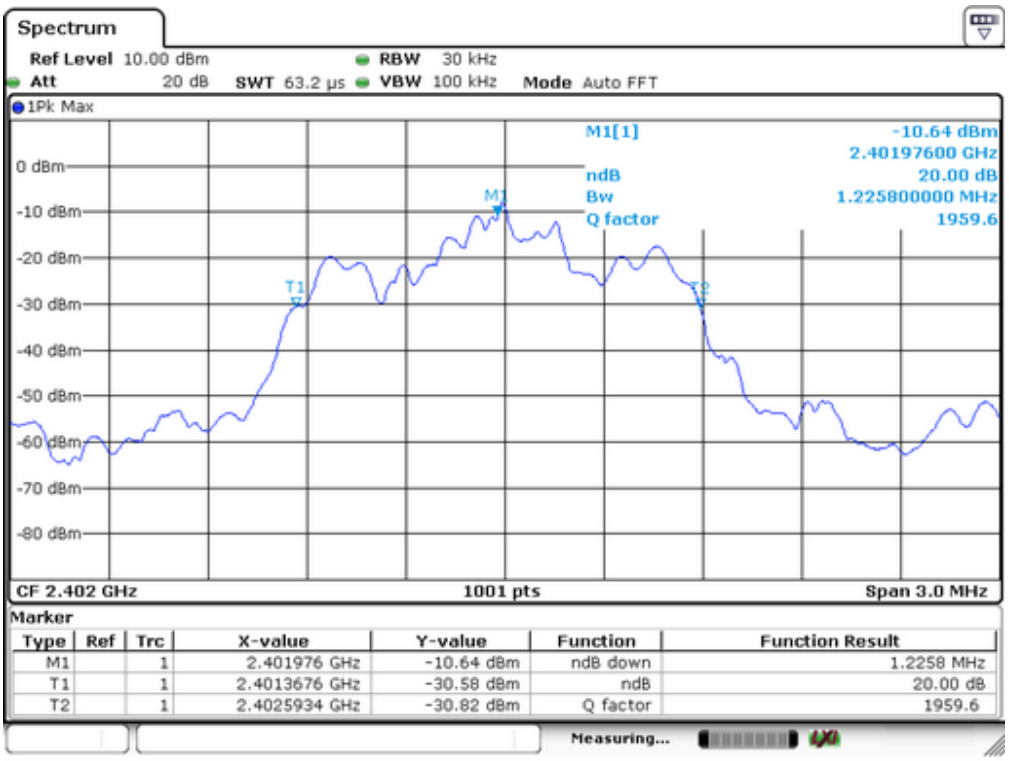

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB SWT 5 ms VBW 100 kHz Mode Auto FFT
1Pk Max
M1[1]
-8.05 dBm
2.40211690 GHz
ndB 20.00 dB
Bw 1.153800000 MHz
Q factor 2081.8
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4021169 GHz -8.05 dBm ndB down 1.1538 MHz
T1 1 2.4014096 GHz -28.04 dBm ndB 20.00 dB
T2 1 2.4025634 GHz -27.70 dBm Q factor 2081.8
Measuring...

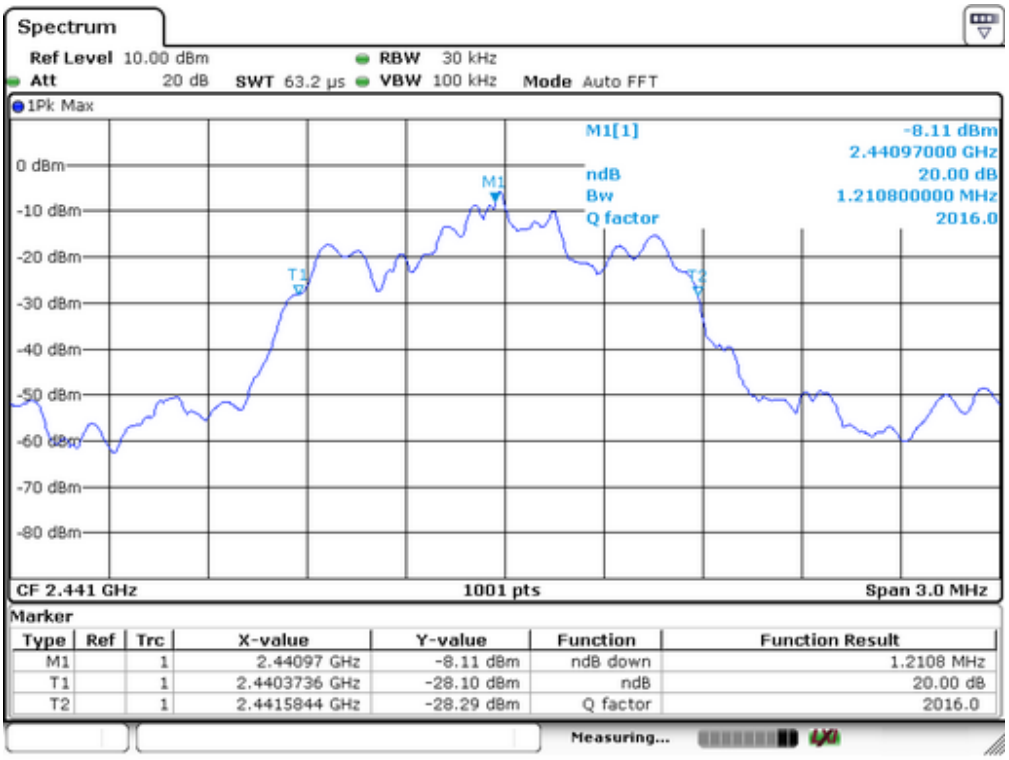

Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB SWT 5 ms VBW 100 kHz Mode Auto FFT
1Pk Max
M1[1]
-5.90 dBm
2.44111090 GHz
ndB 20.00 dB
Bw 1.156800000 MHz
Q factor 2110.1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.4411109 GHz -5.90 dBm ndB down 1.1568 MHz
T1 1 2.4404006 GHz -26.02 dBm ndB 20.00 dB
T2 1 2.4415574 GHz -26.06 dBm Q factor 2110.1
Measuring...

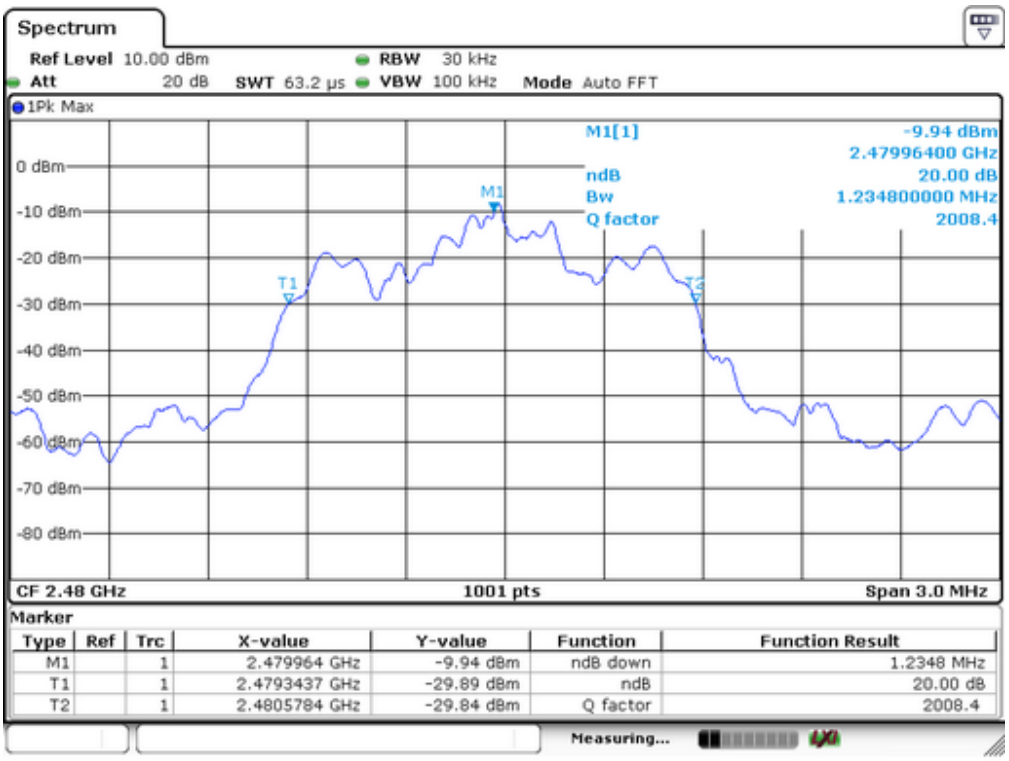


Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	24℃
Test Result:	PASS	Humidity :	53 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1225
40	2441	1210
79	2480	1234


Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
M1[1]
-10.64 dBm
2.40197600 GHz
ndB 20.00 dB
Bw 1.225800000 MHz
Q factor 1959.6
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.402 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.401976 GHz -10.64 dBm ndB down 1.2258 MHz
T1 1 2.4013676 GHz -30.58 dBm ndB 20.00 dB
T2 1 2.4025934 GHz -30.82 dBm Q factor 1959.6
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
M1[1]
-8.11 dBm
2.44097000 GHz
ndB 20.00 dB
Bw 1.210800000 MHz
Q factor 2016.0
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.44097 GHz -8.11 dBm ndB down 1.2108 MHz
T1 1 2.4403736 GHz -28.10 dBm ndB 20.00 dB
T2 1 2.4415844 GHz -28.29 dBm Q factor 2016.0
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 30 kHz
Att 20 dB
SWT 63.2 µs
VBW 100 kHz
Mode Auto FFT
1Pk Max
M1[1]
-9.94 dBm
2.47996400 GHz
ndB
20.00 dB
Bw
1.234800000 MHz
Q factor
2008.4
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M1
T1
T2
CF 2.48 GHz
1001 pts
Span 3.0 MHz
Marker
Type Ref Trc X-value Y-value Function Function Result
M1 1 2.479964 GHz -9.94 dBm ndB down 1.2348 MHz
T1 1 2.4793437 GHz -29.89 dBm ndB 20.00 dB
T2 1 2.4805784 GHz -29.84 dBm Q factor 2008.4
Measuring...

9. Quantity of Hopping Channel 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:

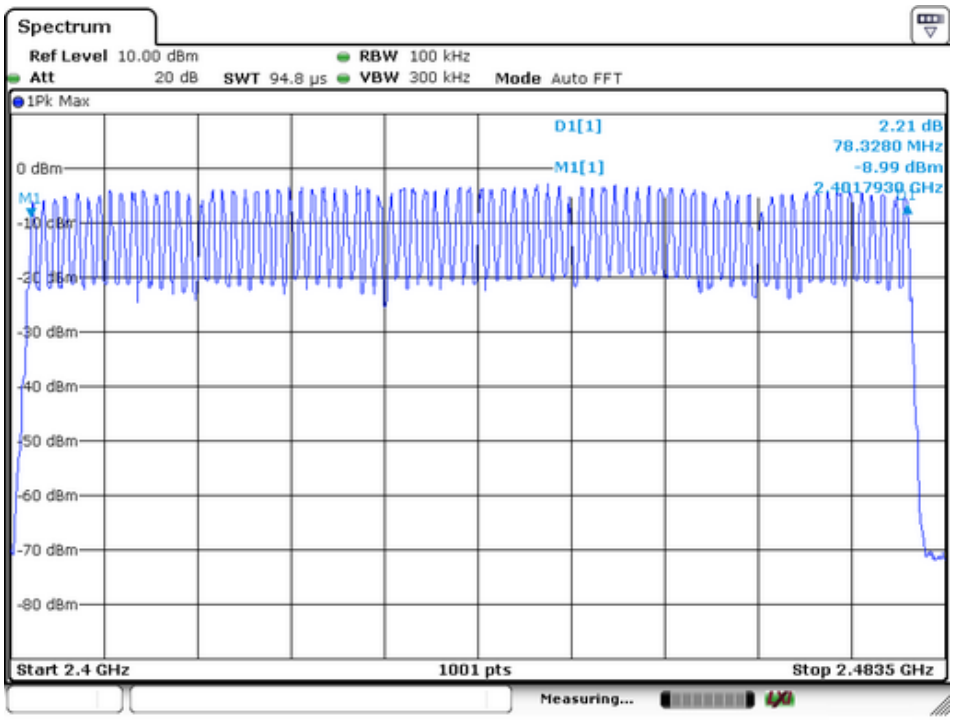
Same as 6.3 Radiated Emission Measurement.

9.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

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



10. Time of Occupancy (Dwell Time) test

10.1 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:

Dwell time = time slot length * hop rate / number of hopping channels * 31.6s

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

The highest value of the dwell time is reported.

10.2 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.

10.3 Test Protocol

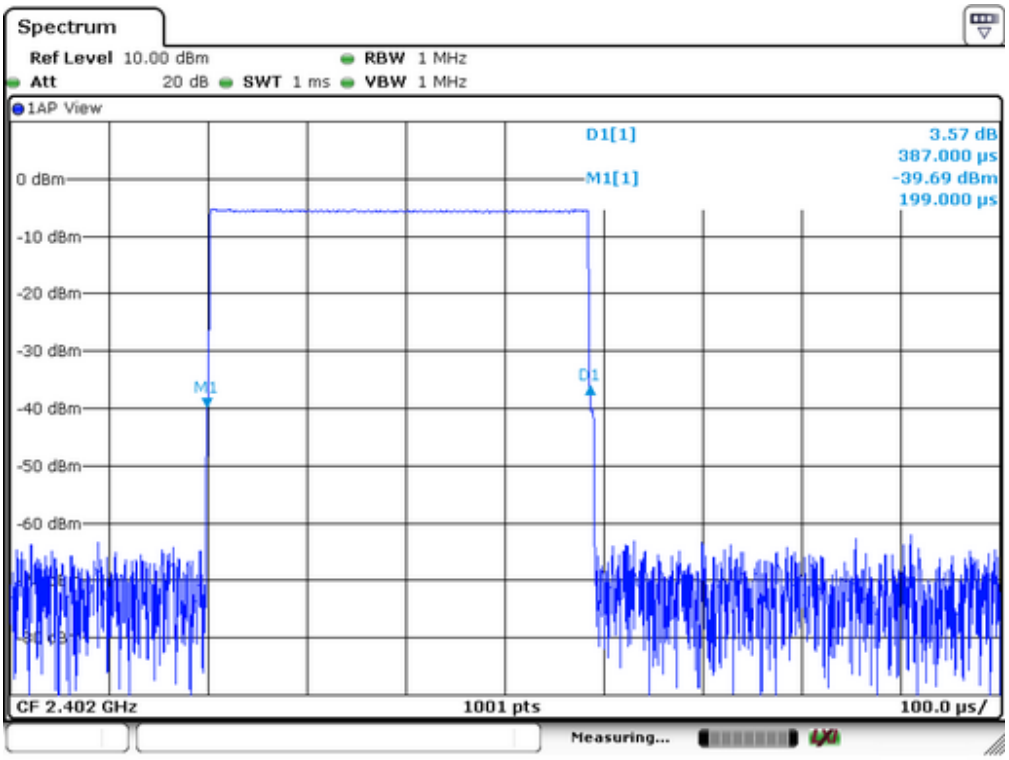
Mode	Number of transmission in a 31.6(79 Hopping*0.4)	Length of transmissions time(msec)	Result (msec)	Limit (msec)
DH1	1600/(2*79) x 31.6 = 320	0.387	123.84	400
DH3	1600/(4*79) x 31.6 =160	1.653	264.48	400
DH5	1600/(6*79) x 31.6 =106.67	2.895	308.80	400

Remark: The results of worst cased was recorded.

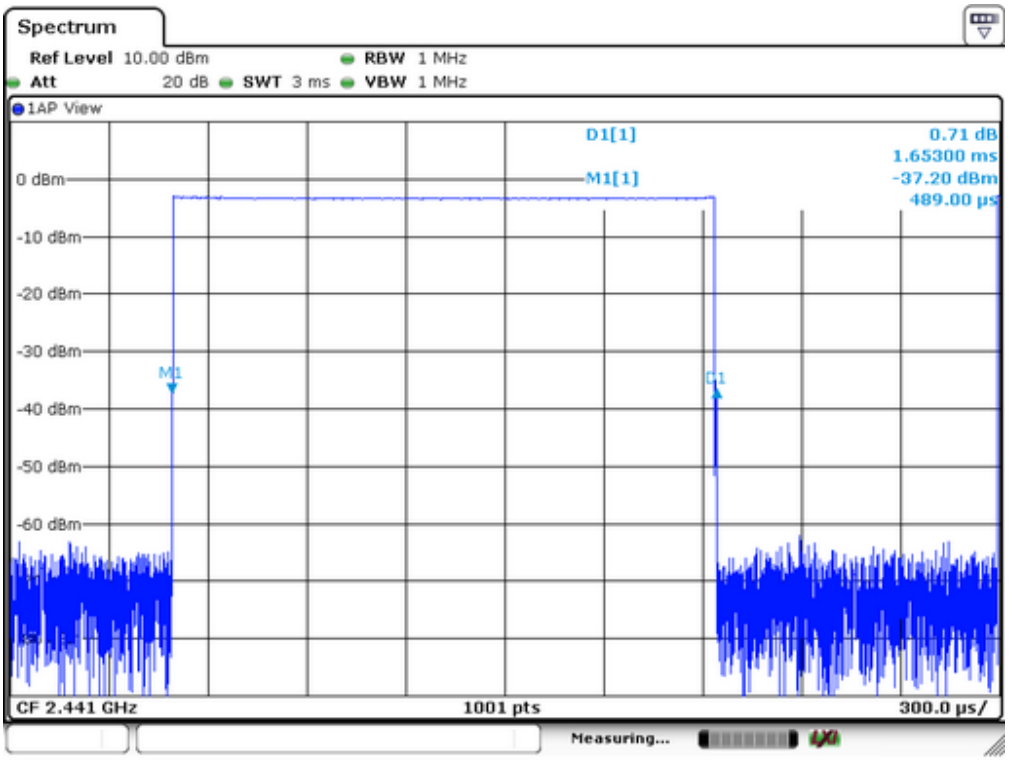
10.4 Test result: Dwell time

PASS.

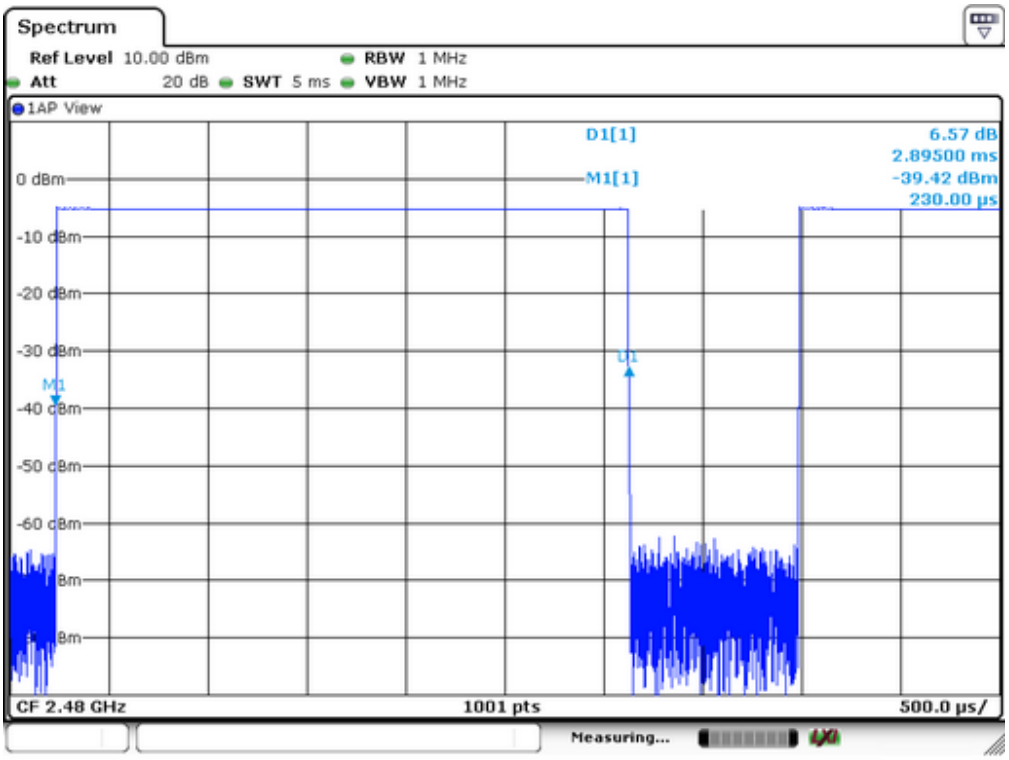
DH1:


Spectrum
Ref Level 10.00 dBm
RBW 1 MHz
Att 20 dB SWT 1 ms VBW 1 MHz
1AP View
D1[1] 3.57 dB
387.000 µs
M1[1] -39.69 dBm
199.000 µs
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
D1
CF 2.402 GHz
1001 pts
100.0 µs/
Measuring...

DH3:


Spectrum
Ref Level 10.00 dBm
RBW 1 MHz
Att 20 dB SWT 3 ms VBW 1 MHz
1AP View
D1[1] 0.71 dB
1.65300 ms
M1[1] -37.20 dBm
489.00 µs
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
D1
CF 2.441 GHz
1001 pts
300.0 µs/
Measuring...

DH5:


Spectrum
Ref Level 10.00 dBm
RBW 1 MHz
Att 20 dB SWT 5 ms VBW 1 MHz
1AP View
D1[1]
6.57 dB
M1[1]
2.89500 ms
-39.42 dBm
230.00 µs
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
D1
CF 2.48 GHz
1001 pts
500.0 µs/
Measuring...

11. MAXIMUM PEAK OUTPUT POWER TEST

11.1 Measurement Procedure

a. Check the calibration of the measuring instrument(SA) using either an internal calibrator or a known signal from an external generator.

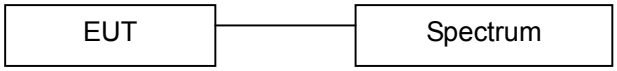
b. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

c. The center frequency of the spectrum analyzer is set to the fundamental frequency and using proper RBW and VBW setting.

d. Measure the captured power within the band and recording the plot.

e. Repeat above procedures until all frequencies required were complete.

11.2 Test SET-UP (Block Diagram of Configuration)



11.3 Measurement Equipment Used:

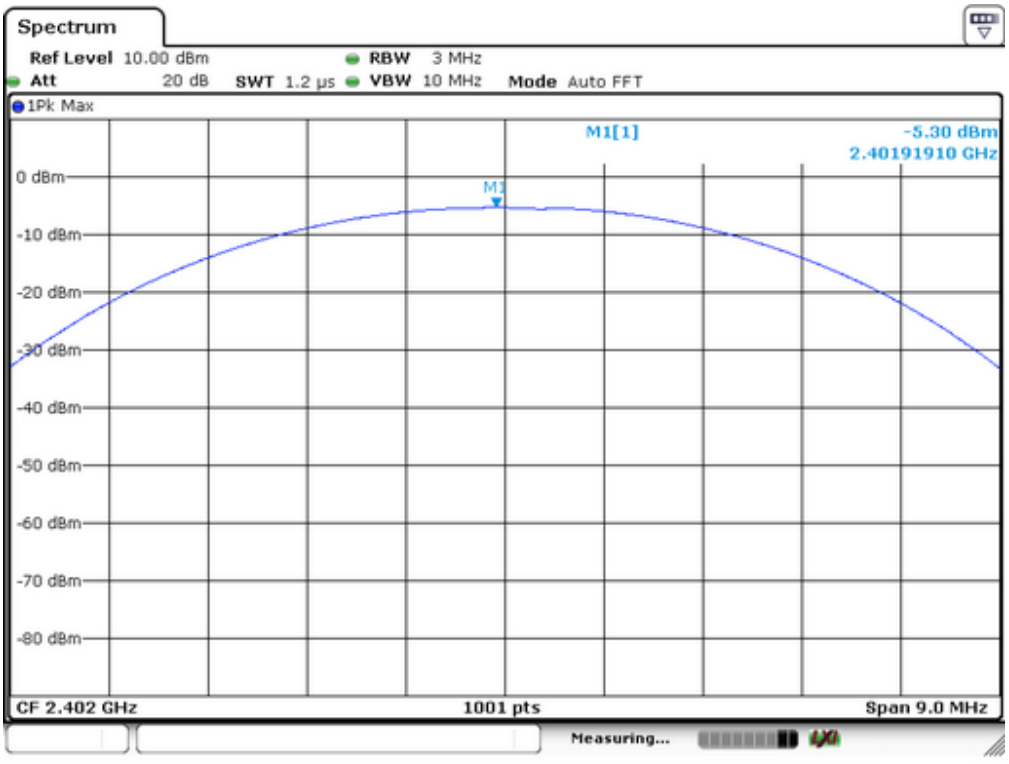
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	05/16/2014	05/15/2015

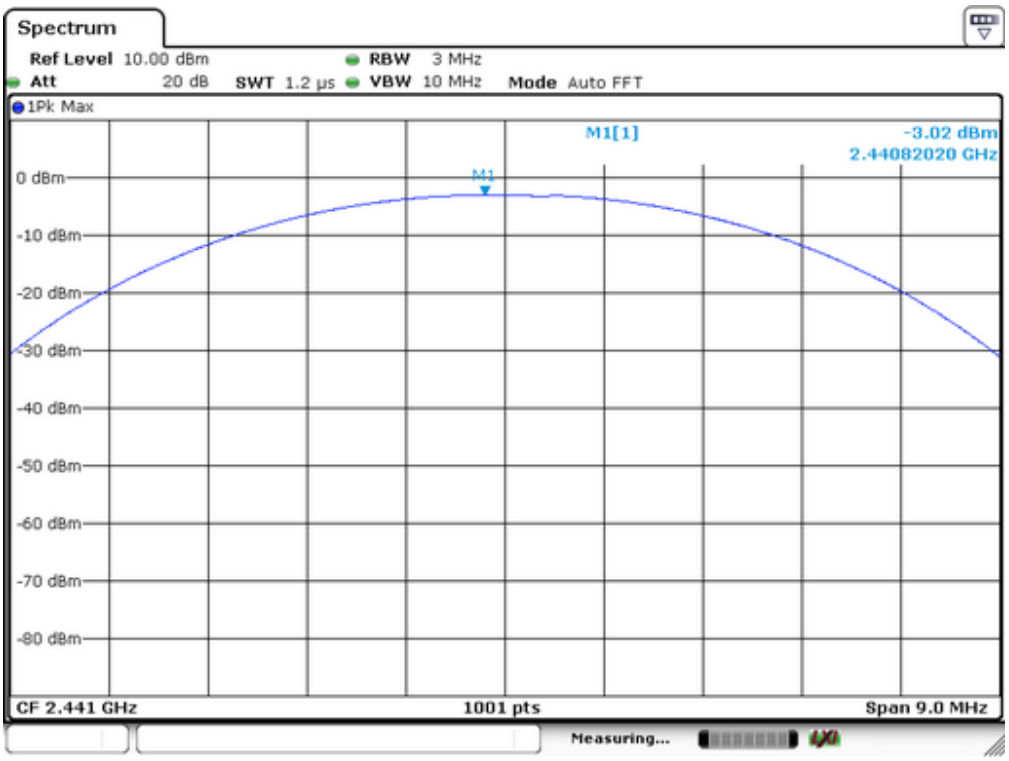
11.4Measurement Results:

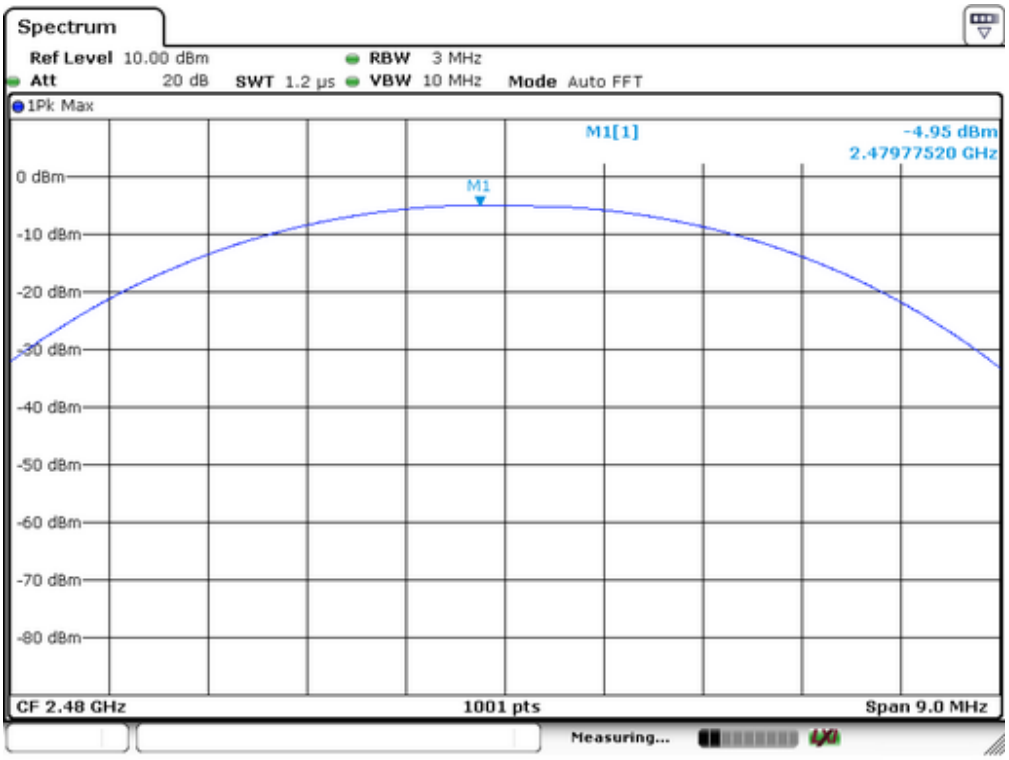
Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
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
1	2402	-5.30	0.295	1000	PASS
40	2441	**-3.02**	**0.499**	1000	PASS
79	2480	-4.95	0.320	1000	PASS

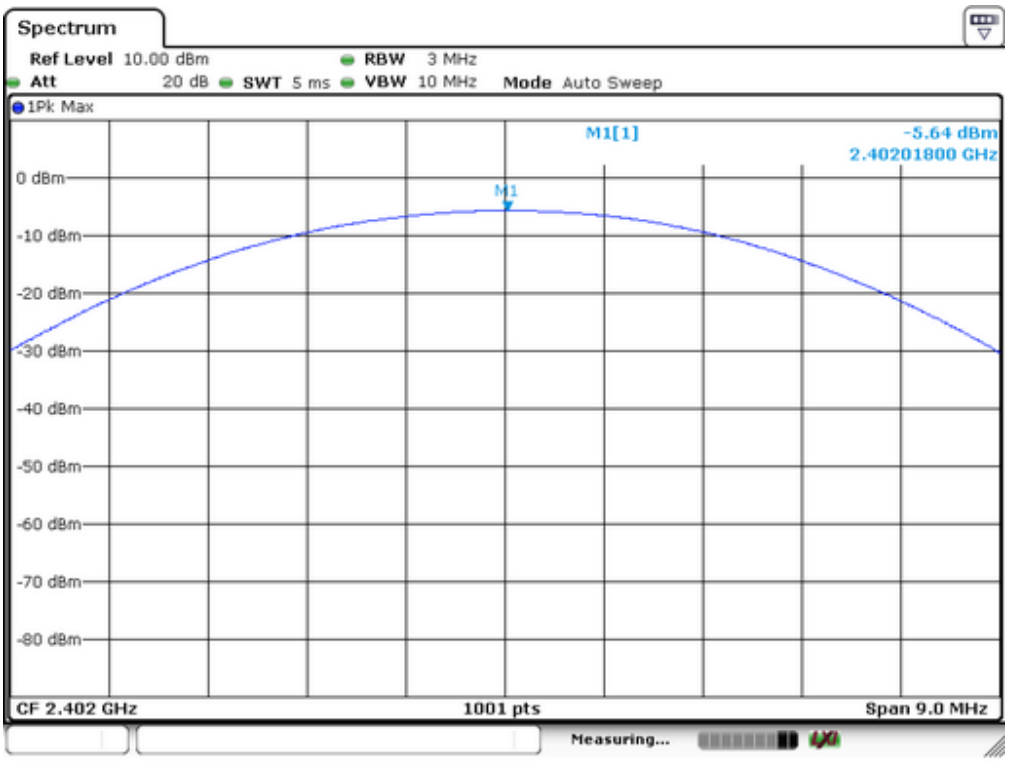


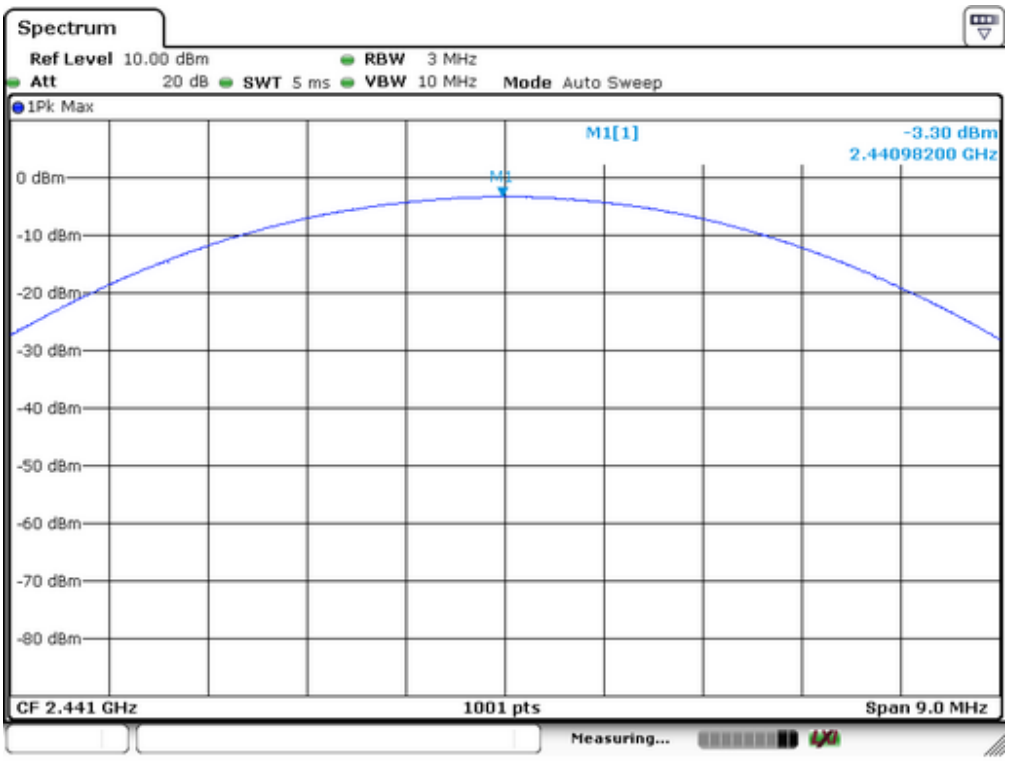

Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB
SWT 1.2 µs
VBW 10 MHz
Mode Auto FFT
1Pk Max
M1[1]
-3.02 dBm
2.44082020 GHz
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 9.0 MHz
Measuring...

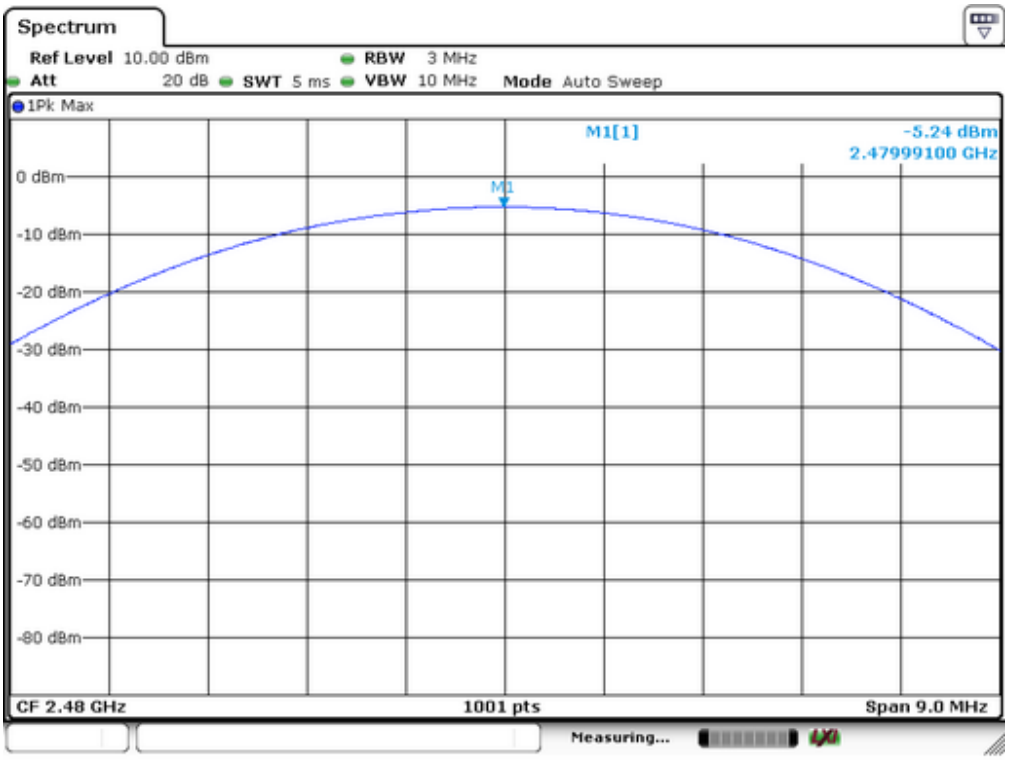

Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB
SWT 1.2 µs
VBW 10 MHz
Mode Auto FFT
1Pk Max
M1[1]
-4.95 dBm
2.47977520 GHz
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
1001 pts
Span 9.0 MHz
Measuring...

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Modulation:	Π/4-DQPSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
1	2402	-5.64	0.273	125	PASS
40	2441	-3.30	0.468	125	PASS
79	2480	-5.24	0.299	125	PASS

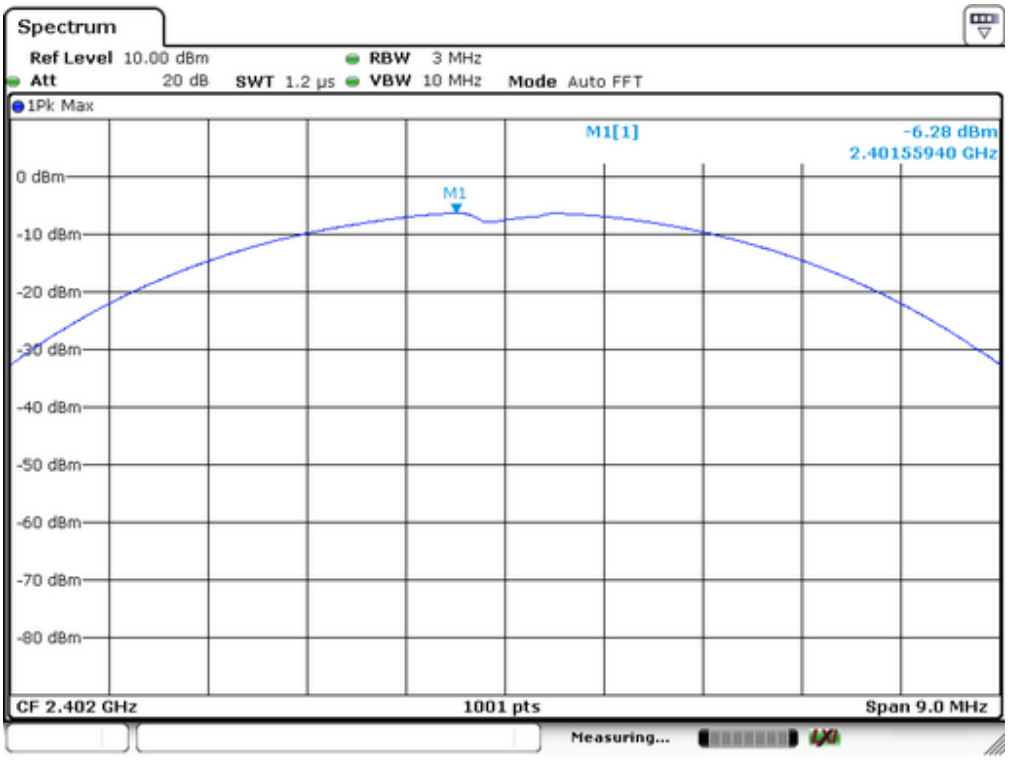


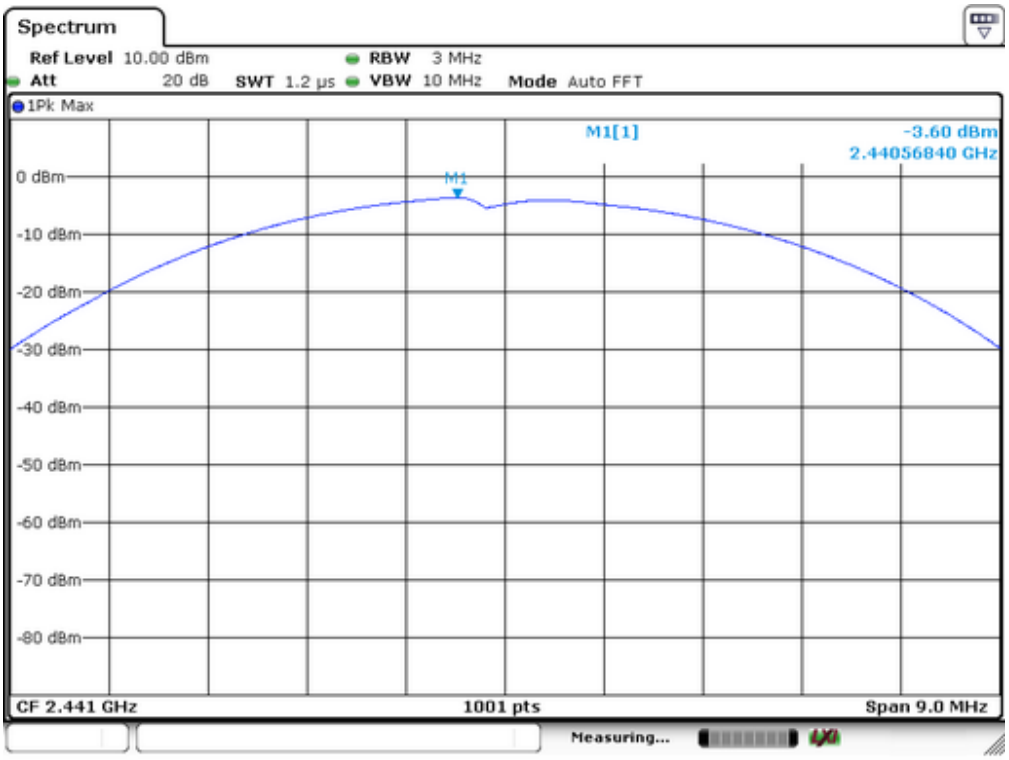

Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB SWT 5 ms VBW 10 MHz Mode Auto Sweep
1Pk Max
M1[1]
-3.30 dBm
2.44098200 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 9.0 MHz
Measuring...

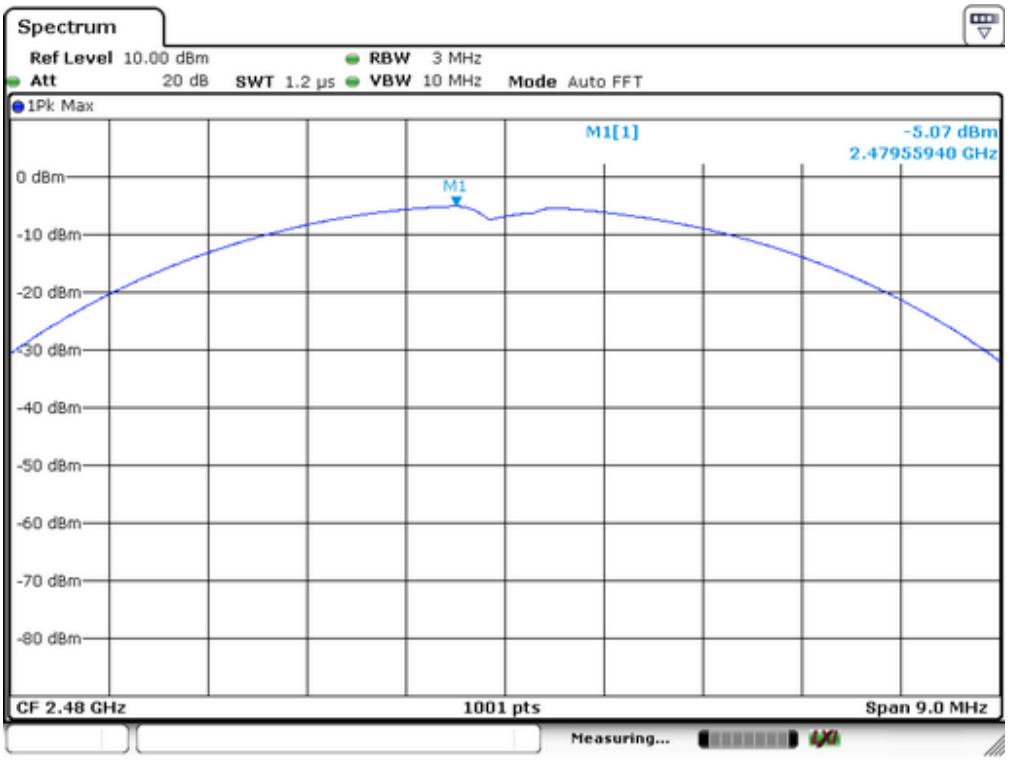

Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB SWT 5 ms VBW 10 MHz Mode Auto Sweep
1Pk Max
M1[1]
-5.24 dBm
2.47999100 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
1001 pts
Span 9.0 MHz
Measuring...

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %
Modulation:	8DPSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
1	2402	-6.28	0.236	125	PASS
40	2441	-3.60	0.437	125	PASS
79	2480	-5.07	0.311	125	PASS




Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB
SWT 1.2 µs
VBW 10 MHz
Mode Auto FFT
1Pk Max
M1[1]
-3.60 dBm
2.44056840 GHz
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.441 GHz
1001 pts
Span 9.0 MHz
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 3 MHz
Att 20 dB
SWT 1.2 µs
VBW 10 MHz
Mode Auto FFT
1Pk Max
M1[1]
-5.07 dBm
2.47955940 GHz
M1
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
CF 2.48 GHz
1001 pts
Span 9.0 MHz
Measuring...

12. Band EDGE test

12.1 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 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.
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

12.2 Test SET-UP (Block Diagram of Configuration)

Same as 6.2 Radiated Emission Set-up.

12.3 Measurement Equipment Used:

Same as 6.3 Radiated Emission Measurement.

12.4Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	December 05, 2014
Test By:	Andy	Temperature :	25 ℃
Test Result:	PASS	Humidity :	50 %

1. Conducted Test

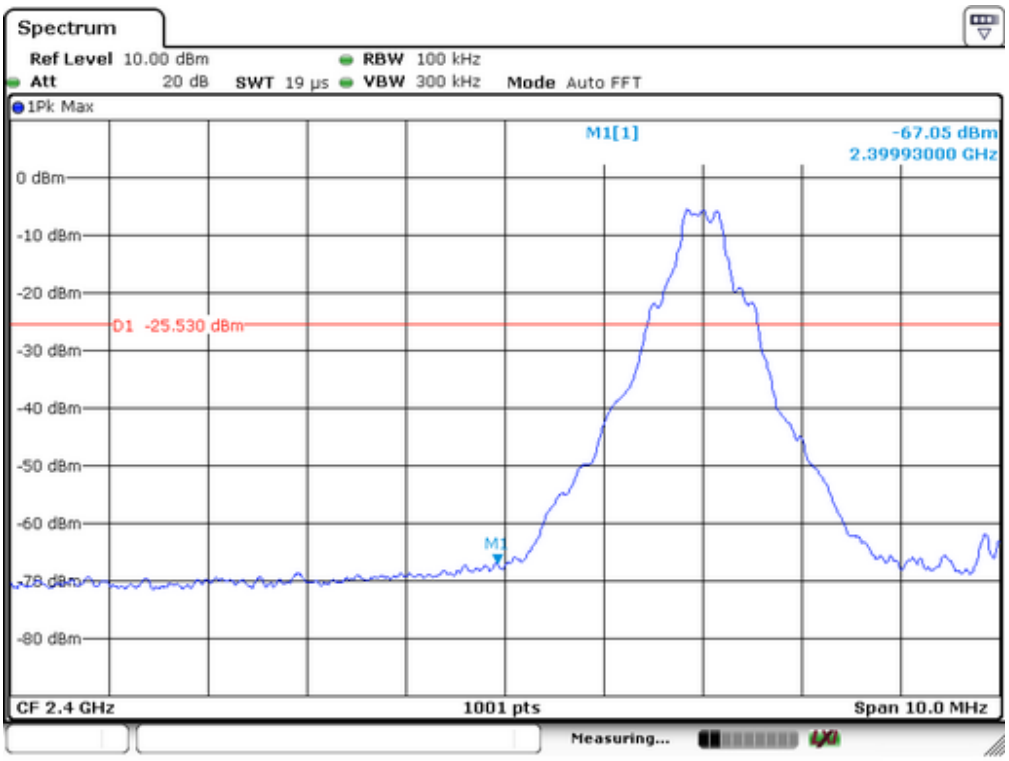
For Non-Hopping Mode:

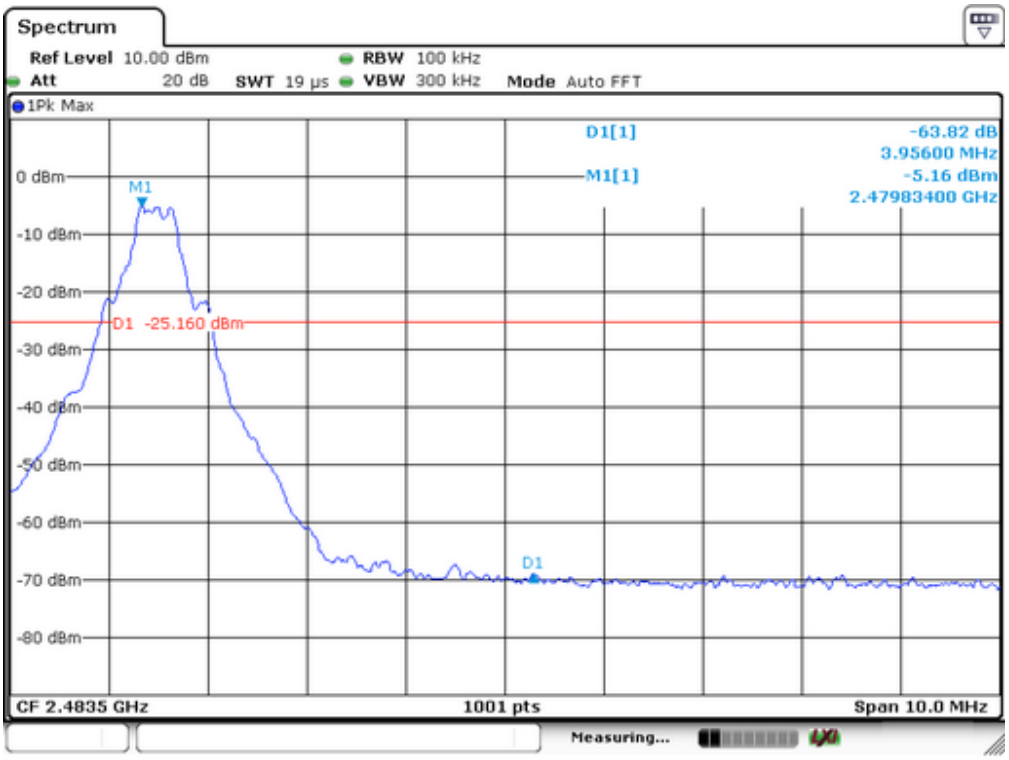
Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	-5.30	-67.05	61.75	>20dBc
	-7.72	-54.34	46.62	>20dBc
	-8.30	-54.31	46.01	>20dBc
>2483.5	-5.16	-63.82	58.66	>20dBc
	-7.60	-60.80	53.20	>20dBc
	-8.20	-60.26	52.06	>20dBc

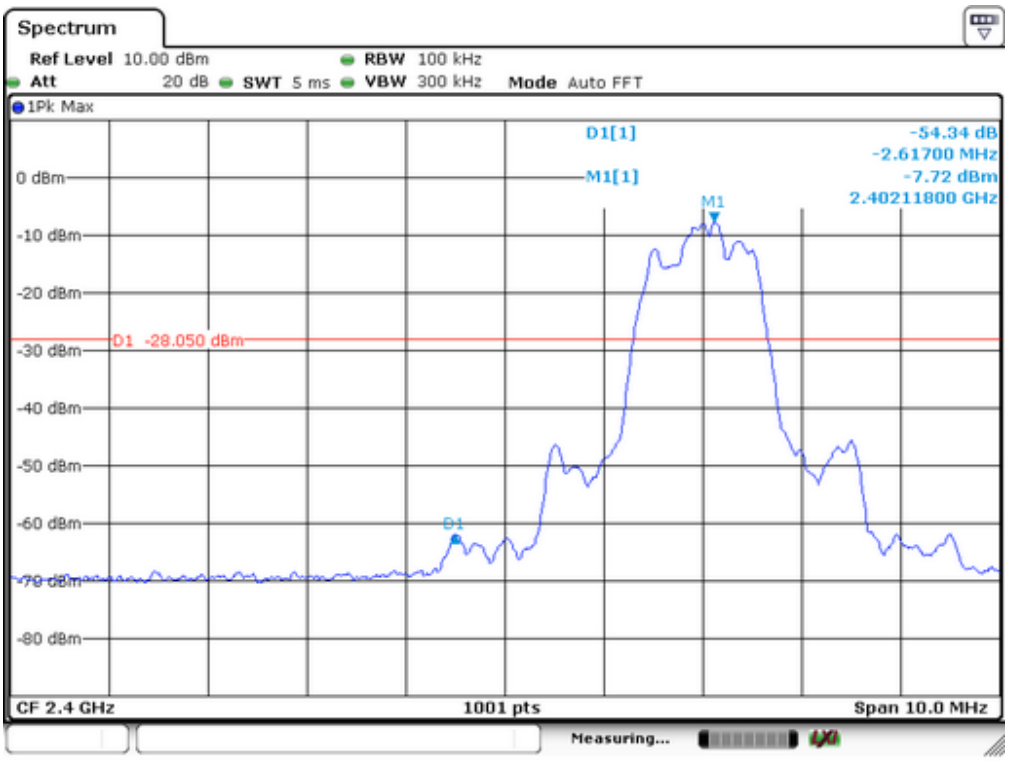
For Hopping Mode:

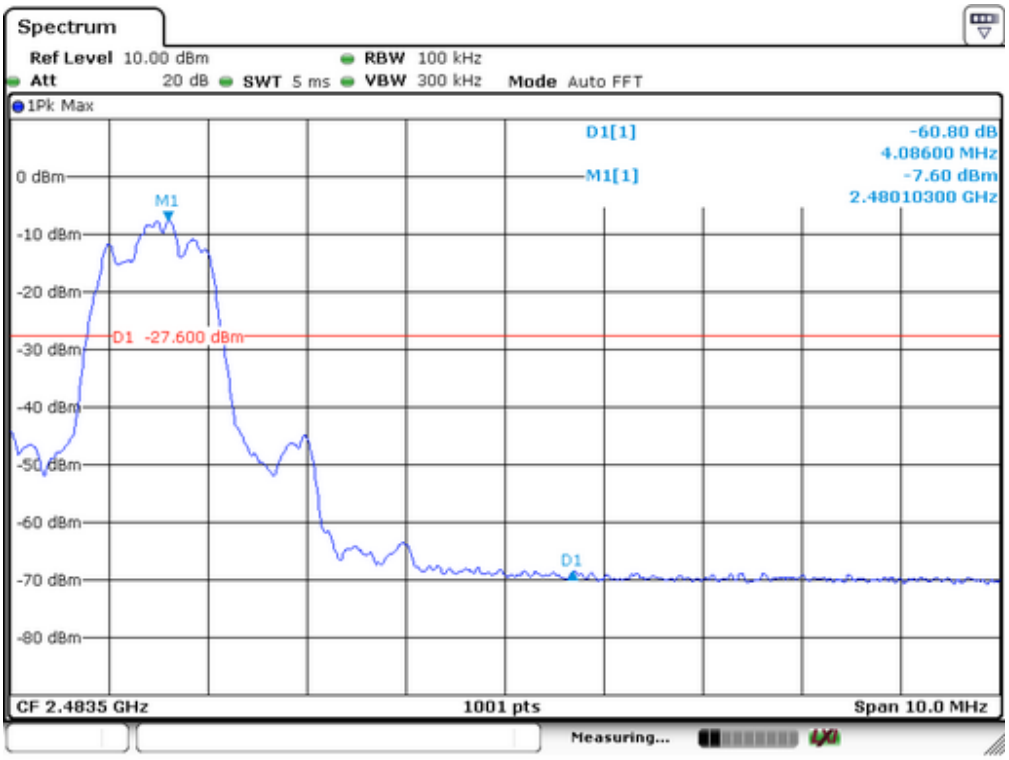
Frequency (MHz)	Peak Power Output(dBm)	Emission read Value(dBm)	Result of Band edge(dBc)	Band edge Limit(dBc)
<2400	-5.24	-64.05	58.81	>20dBc
	-5.74	-62.66	56.92	>20dBc
	-7.52	-56.84	49.32	>20dBc
>2483.5	-4.86	-64.41	59.55	>20dBc
	-7.27	-61.23	53.96	>20dBc
	-8.01	-61.60	53.59	>20dBc

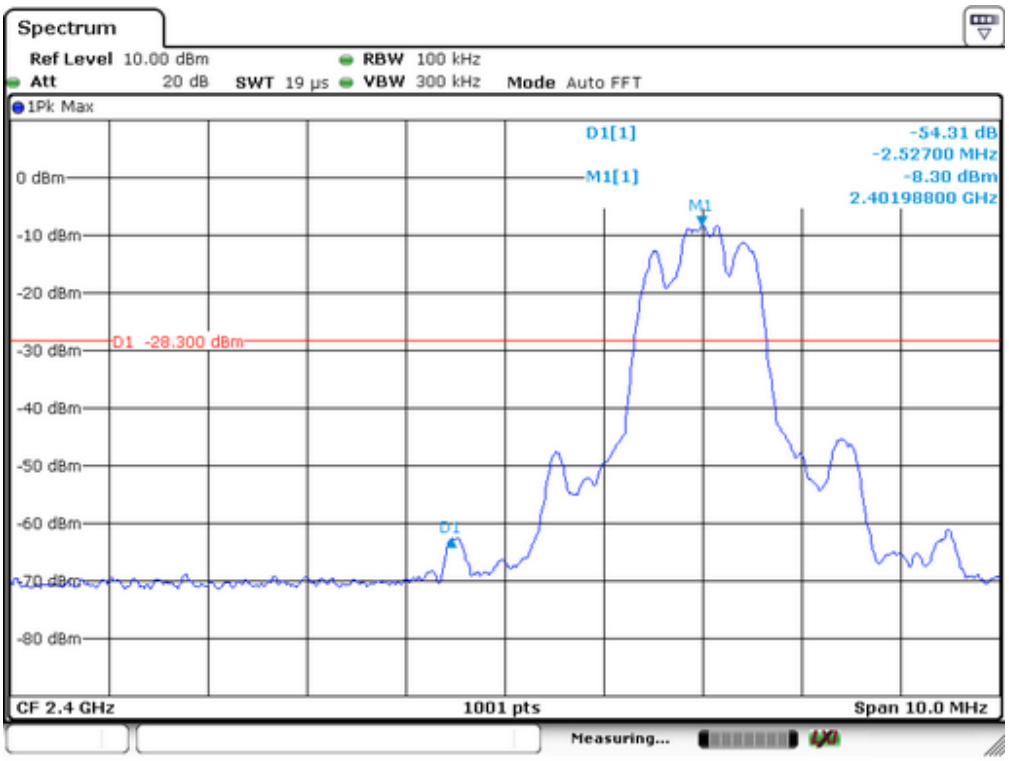
Test Plot For Non-Hopping Mode

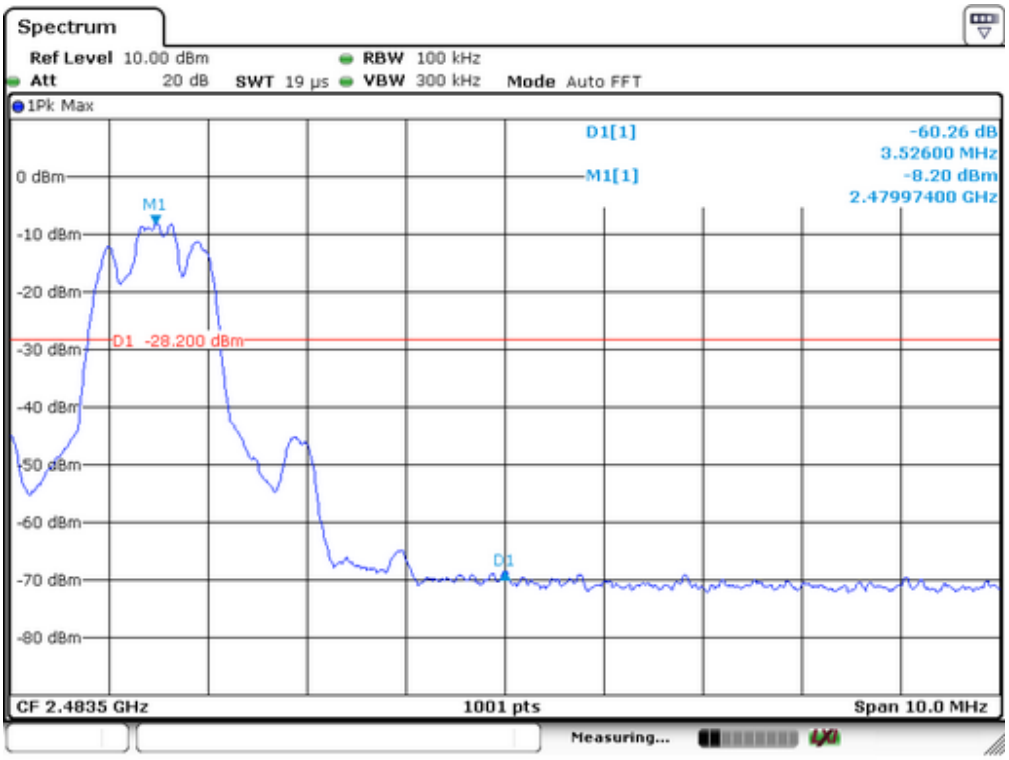




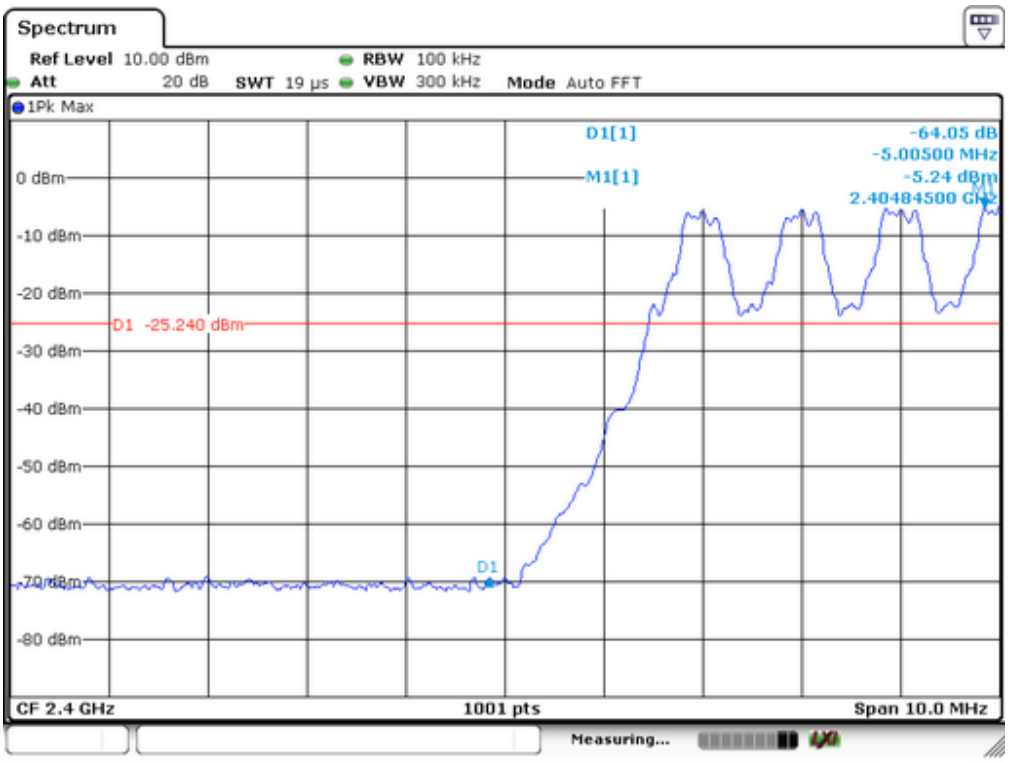

Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB SWT 5 ms VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -54.34 dB
-2.61700 MHz
M1[1] -7.72 dBm
2.40211800 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -28.050 dBm
CF 2.4 GHz
1001 pts
Span 10.0 MHz
Measuring...

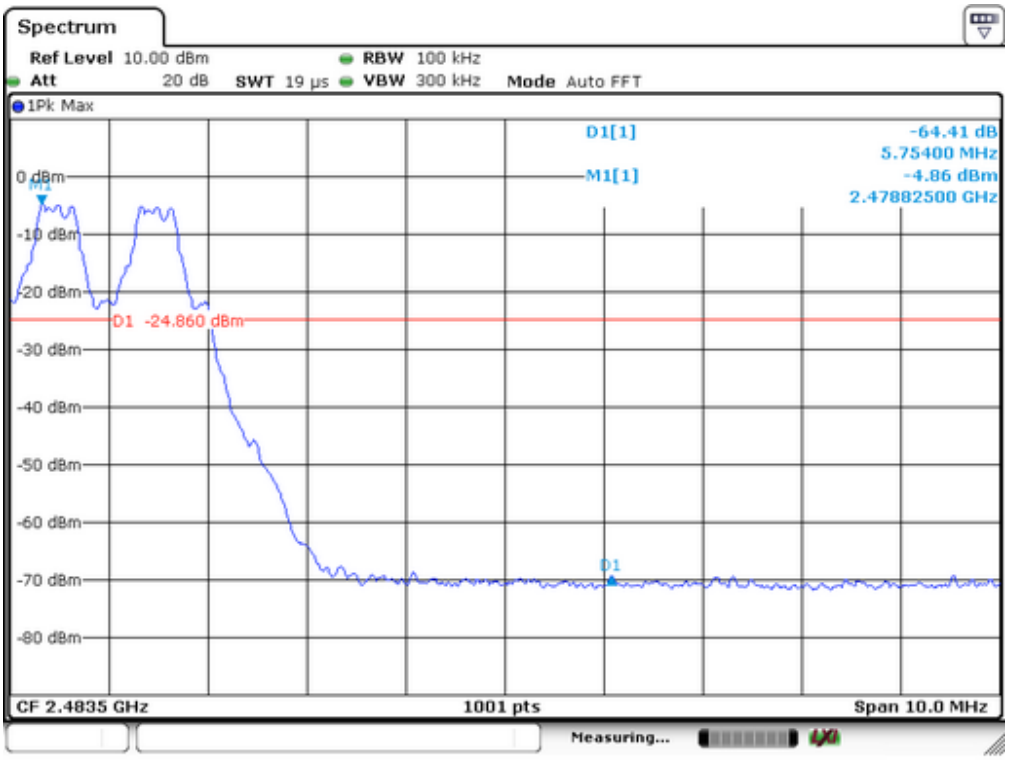

Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB SWT 5 ms VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1] -60.80 dB
4.08600 MHz
M1[1] -7.60 dBm
2.48010300 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -27.600 dBm
CF 2.4835 GHz
1001 pts
Span 10.0 MHz
Measuring...

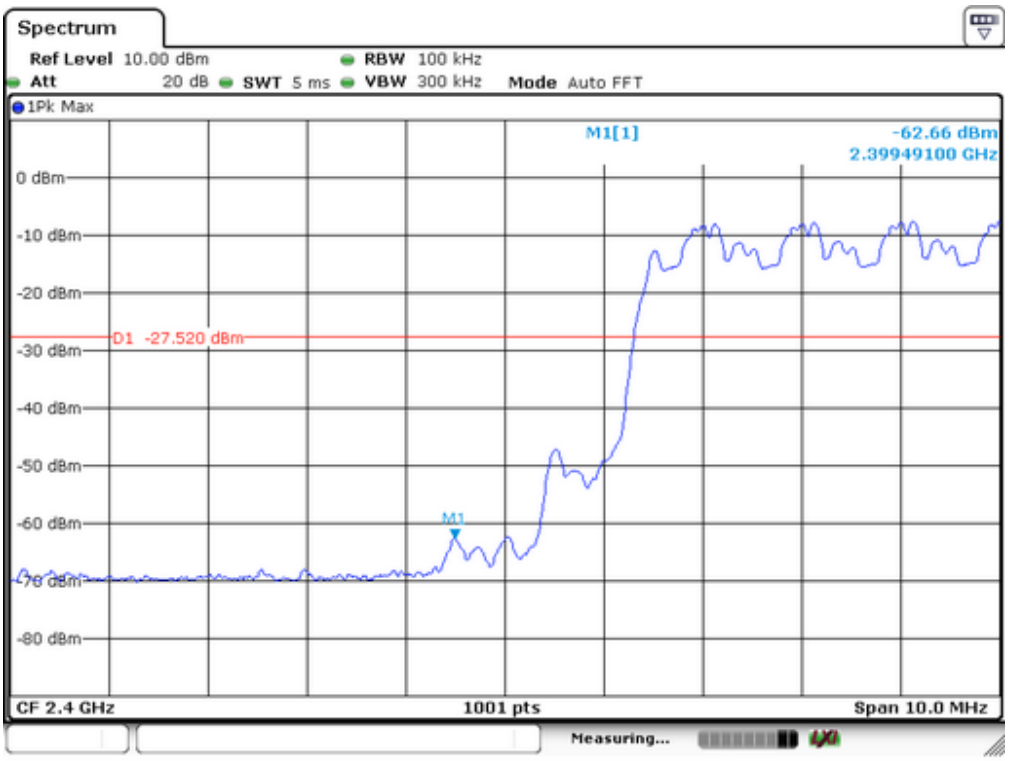

Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 19 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
D1[1]
-54.31 dB
-2.52700 MHz
M1[1]
-8.30 dBm
2.40198800 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -28.300 dBm
CF 2.4 GHz
1001 pts
Span 10.0 MHz
Measuring...

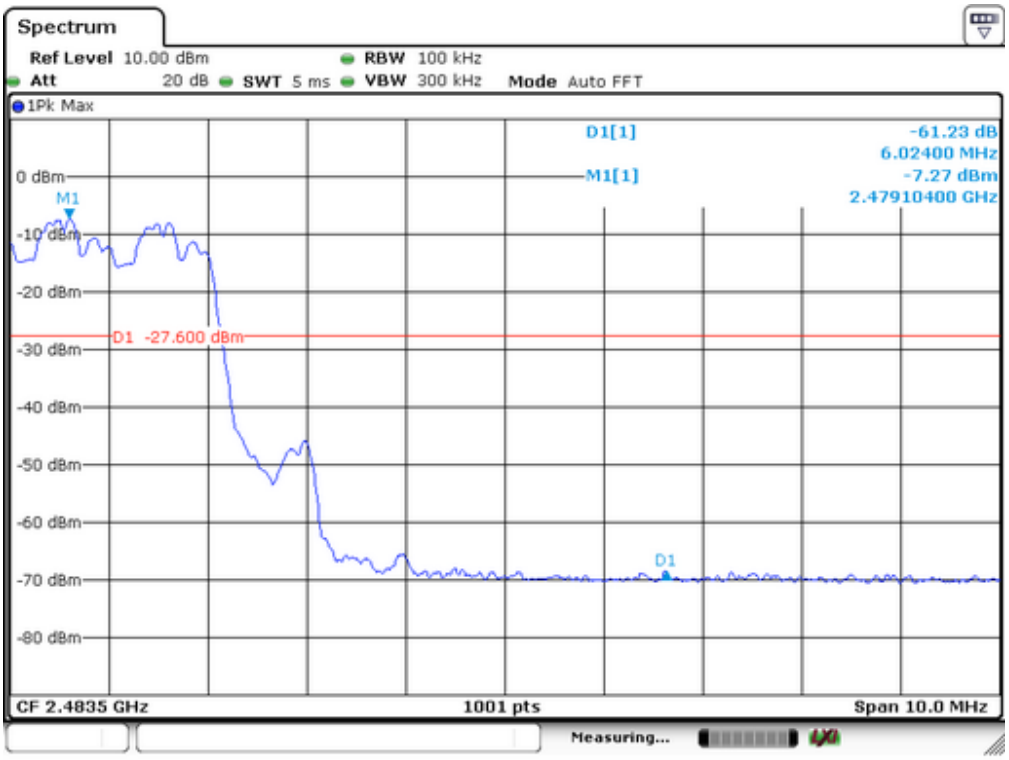

Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 19 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
D1[1]
-60.26 dB
3.52600 MHz
M1[1]
-8.20 dBm
2.47997400 GHz
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
D1 -28.200 dBm
CF 2.4835 GHz
1001 pts
Span 10.0 MHz
Measuring...

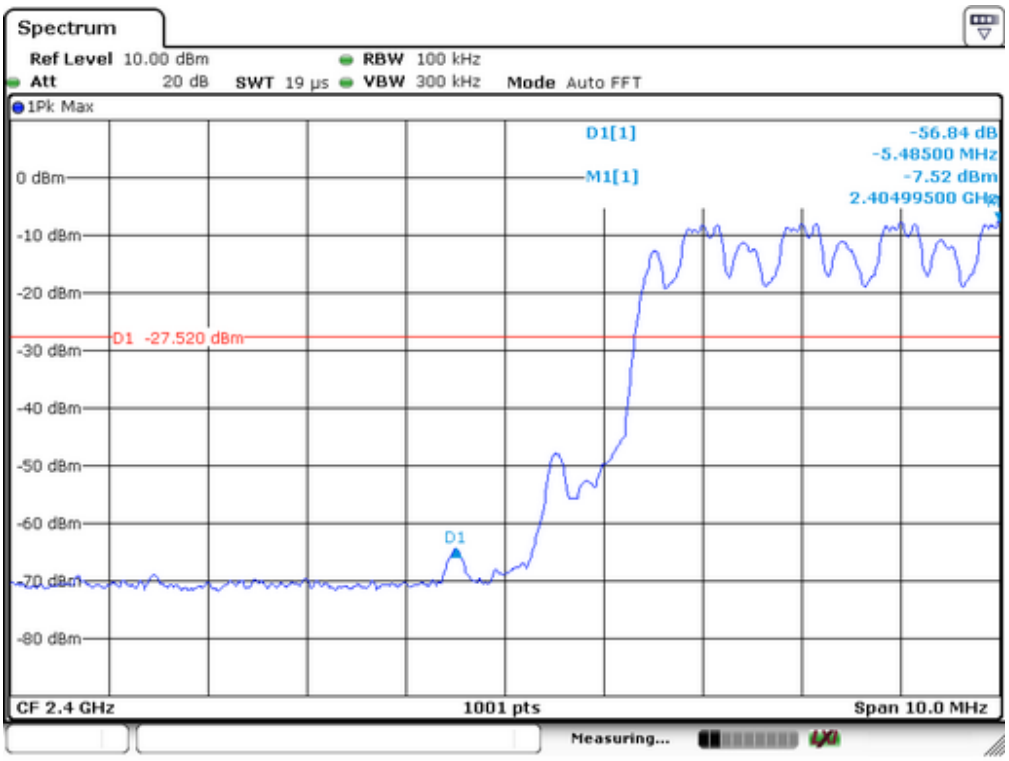
Test Plot For Hopping Mode:
:

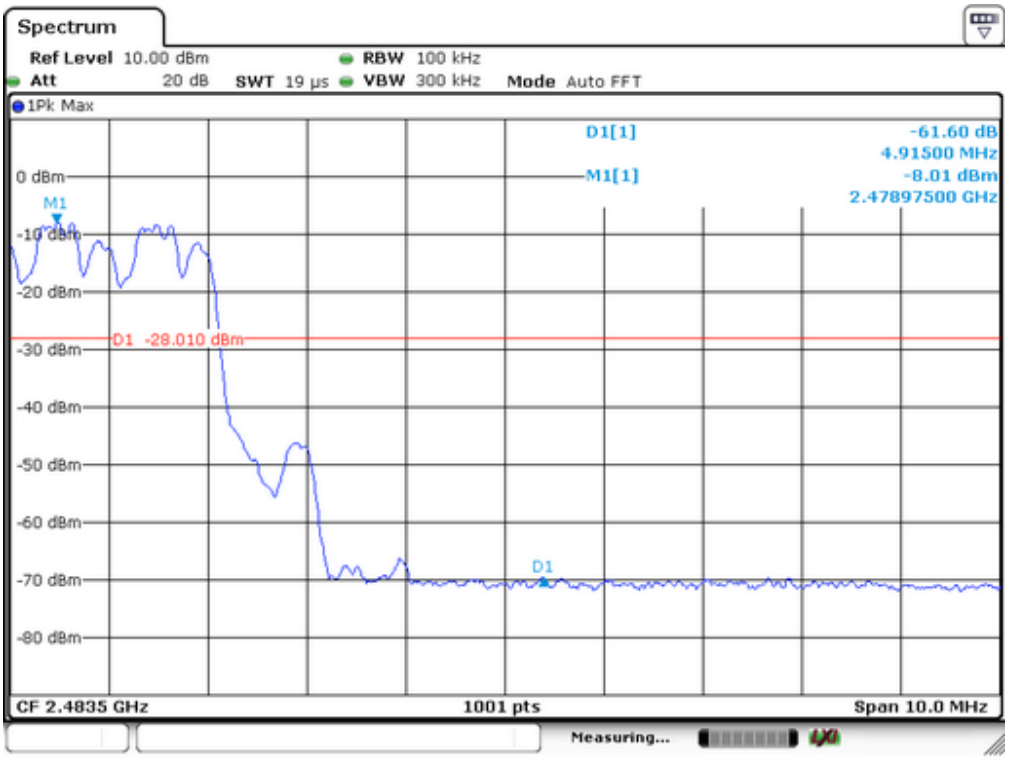





Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB SWT 5 ms VBW 300 kHz Mode Auto FFT
1Pk Max
M1[1]
-62.66 dBm
2.39949100 GHz
0 dBm
-10 dBm
-20 dBm
D1 -27.520 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
M1
-70 dBm
-80 dBm
CF 2.4 GHz
1001 pts
Span 10.0 MHz
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB SWT 5 ms VBW 300 kHz Mode Auto FFT
1Pk Max
D1[1]
-61.23 dB
6.02400 MHz
M1[1]
-7.27 dBm
2.47910400 GHz
0 dBm
M1
-10 dBm
-20 dBm
D1 -27.600 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1
-80 dBm
CF 2.4835 GHz
1001 pts
Span 10.0 MHz
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 19 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
D1[1]
-56.84 dB
-5.48500 MHz
M1[1]
-7.52 dBm
2.40499500 GHz
0 dBm
-10 dBm
-20 dBm
D1 -27.520 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
D1
-70 dBm
-80 dBm
CF 2.4 GHz
1001 pts
Span 10.0 MHz
Measuring...


Spectrum
Ref Level 10.00 dBm
RBW 100 kHz
Att 20 dB
SWT 19 µs
VBW 300 kHz
Mode Auto FFT
1Pk Max
D1[1]
-61.60 dB
4.91500 MHz
M1[1]
-8.01 dBm
2.47897500 GHz
0 dBm
M1
-10 dBm
-20 dBm
D1 -28.010 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
D1
-80 dBm
CF 2.4835 GHz
1001 pts
Span 10.0 MHz
Measuring...

2. Radiated emission Test

For Non-Hopping Mode:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	V	63.13	43.01	74.00	54.00
	H	57.05	38.56	74.00	54.00
>2483.5	V	64.28	46.18	74.00	54.00
	H	59.05	40.25	74.00	54.00

For Hopping Mode:

Frequency (MHz)	Antenna polarization (H/V)	Emission (dBuV/m)		Band edge Limit (dBuV/m)	
		PK	AV	PK	AV
<2400	V	64.06	45.13	74.00	54.00
	H	60.85	40.82	74.00	54.00
>2483.5	V	65.15	42.82	74.00	54.00
	H	57.19	37.45	74.00	54.00

13. Antenna Application

13.1 Antenna requirement

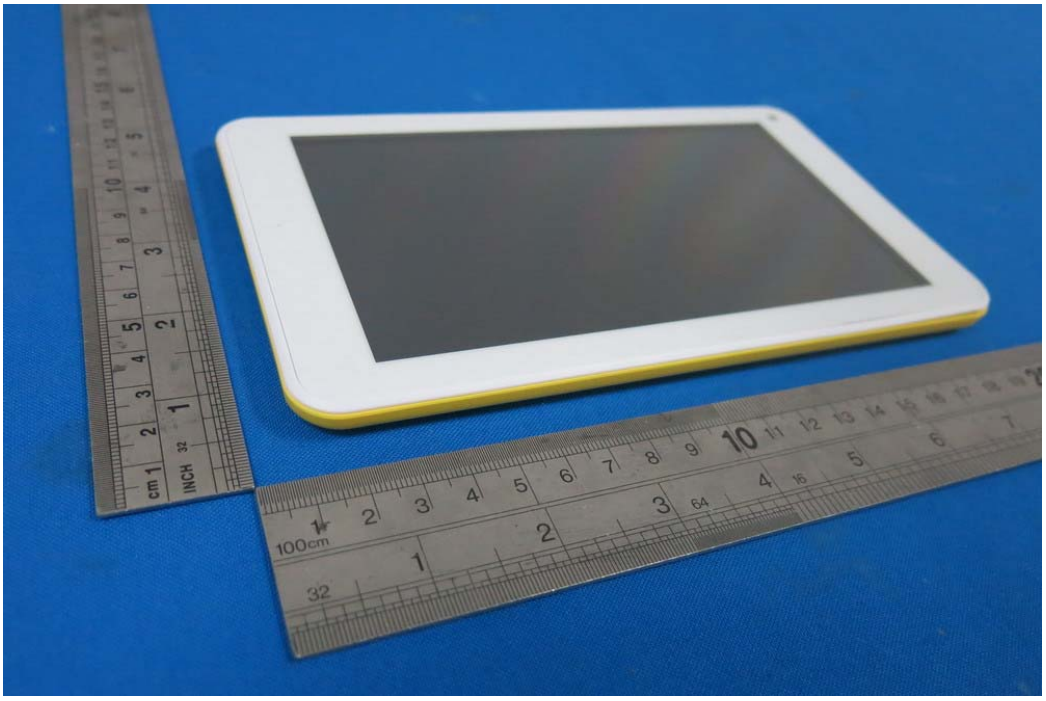
The EUT'S antenna is met the requirement of FCC part 15C section 15.203 and 15.247.

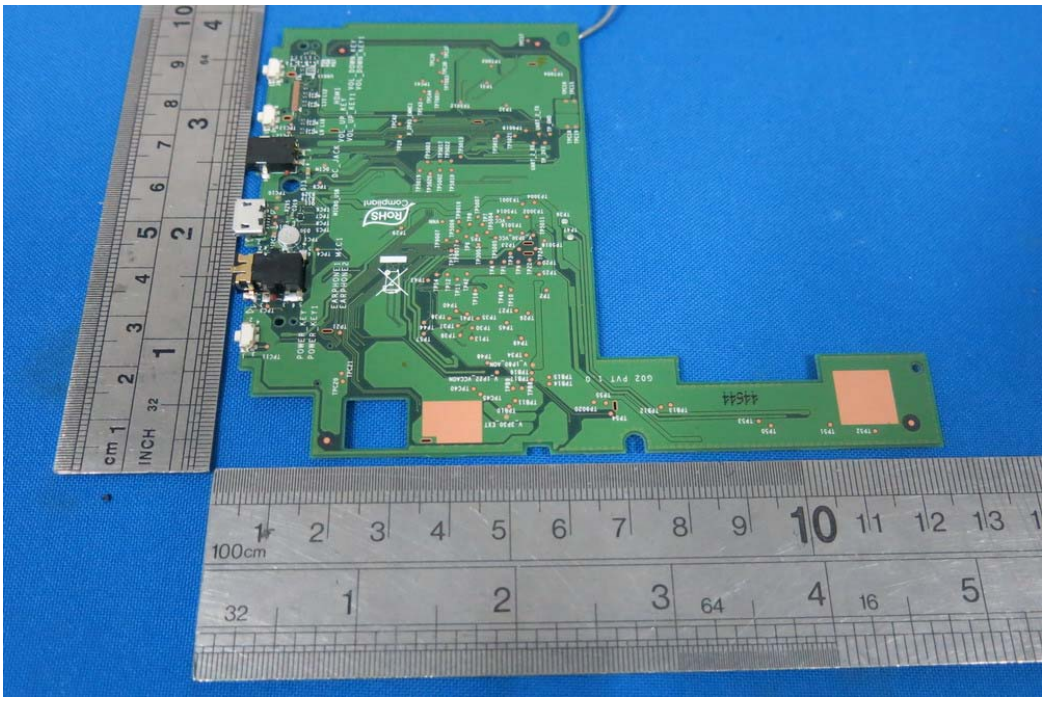
FCC part 15C section 15.247 requirements:
Systems operating in the 2402-2480MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

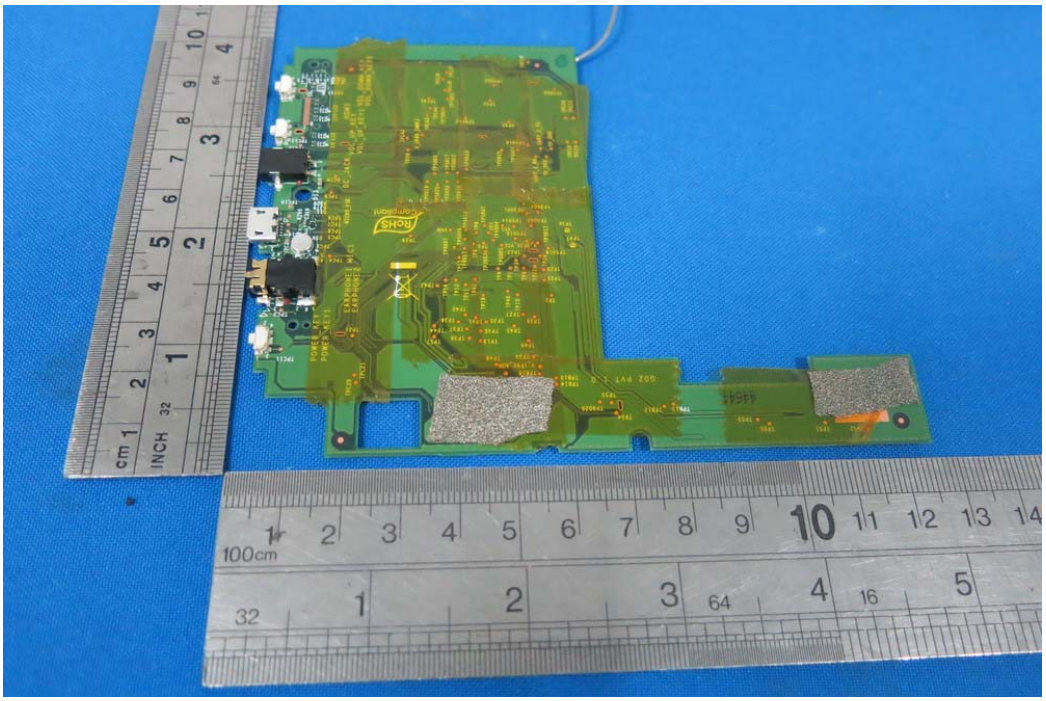
13.2 Result

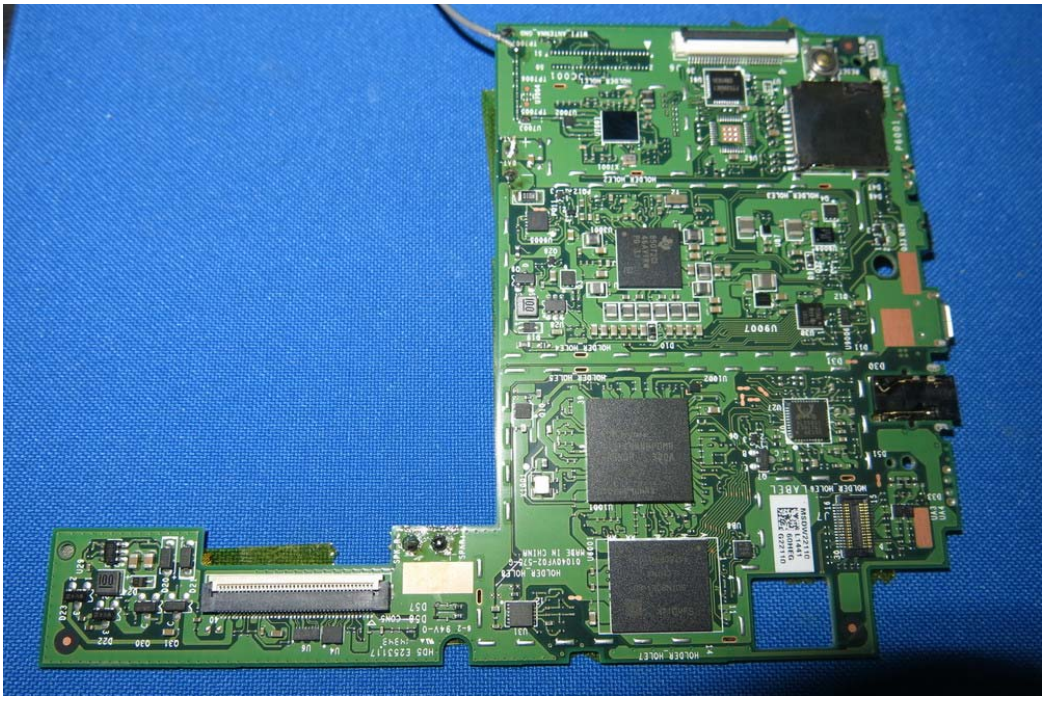
The EUT's antenna used a PCB antenna and integrated on PCB, The antenna's gain is 0 dBi and meets the requirement.

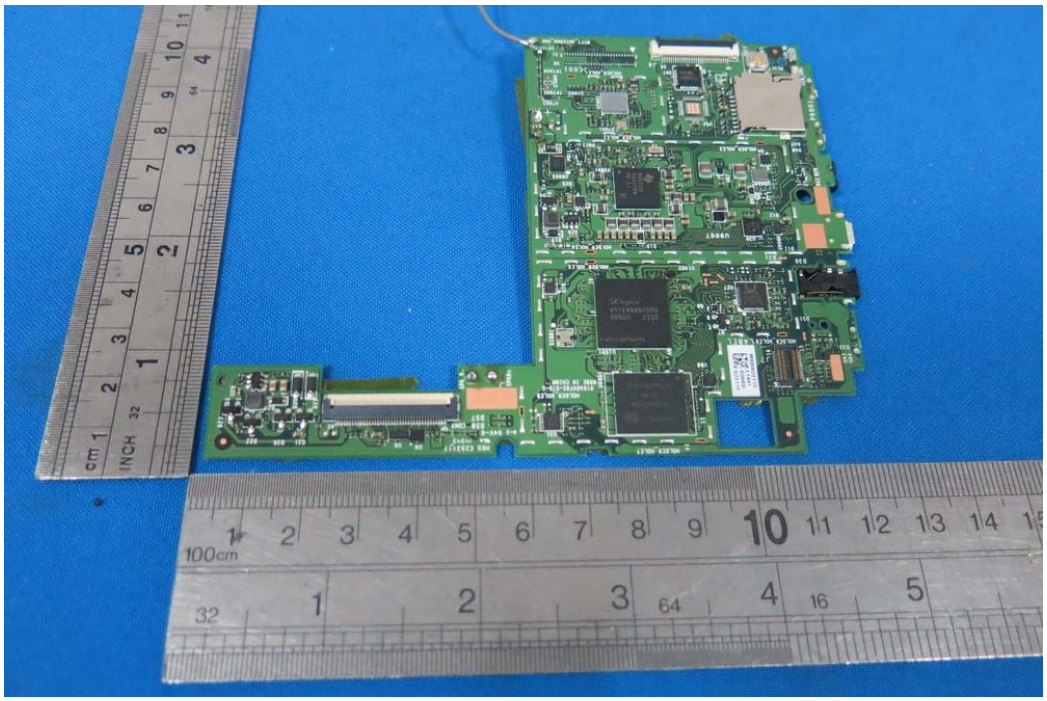
APPENDIX I
(Photos of EUT)

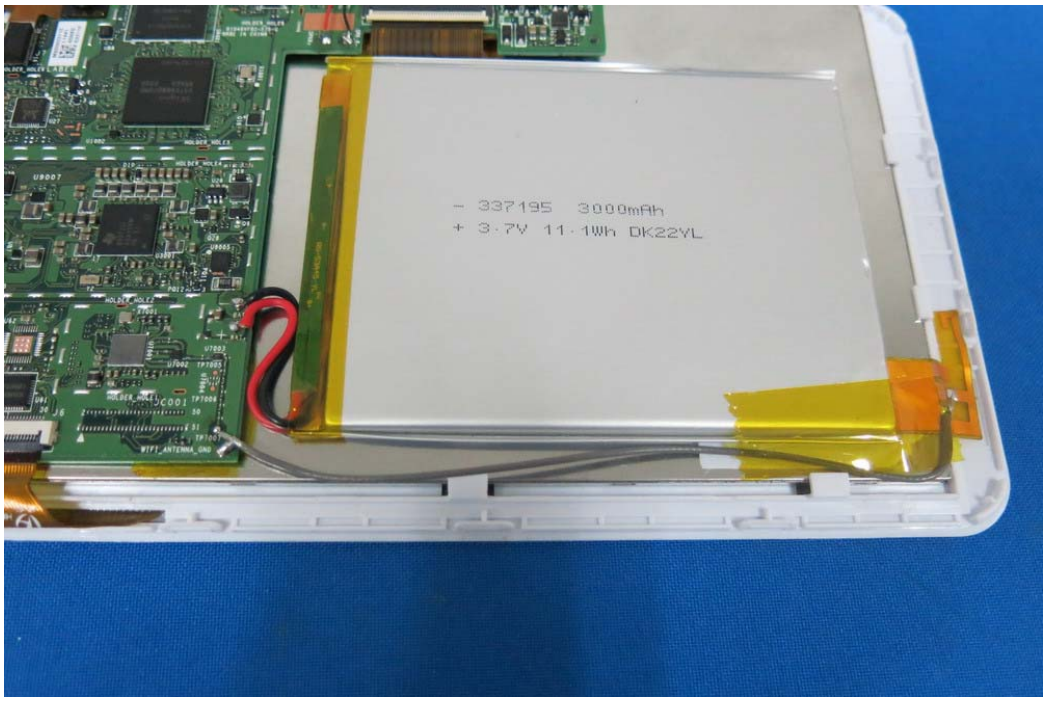


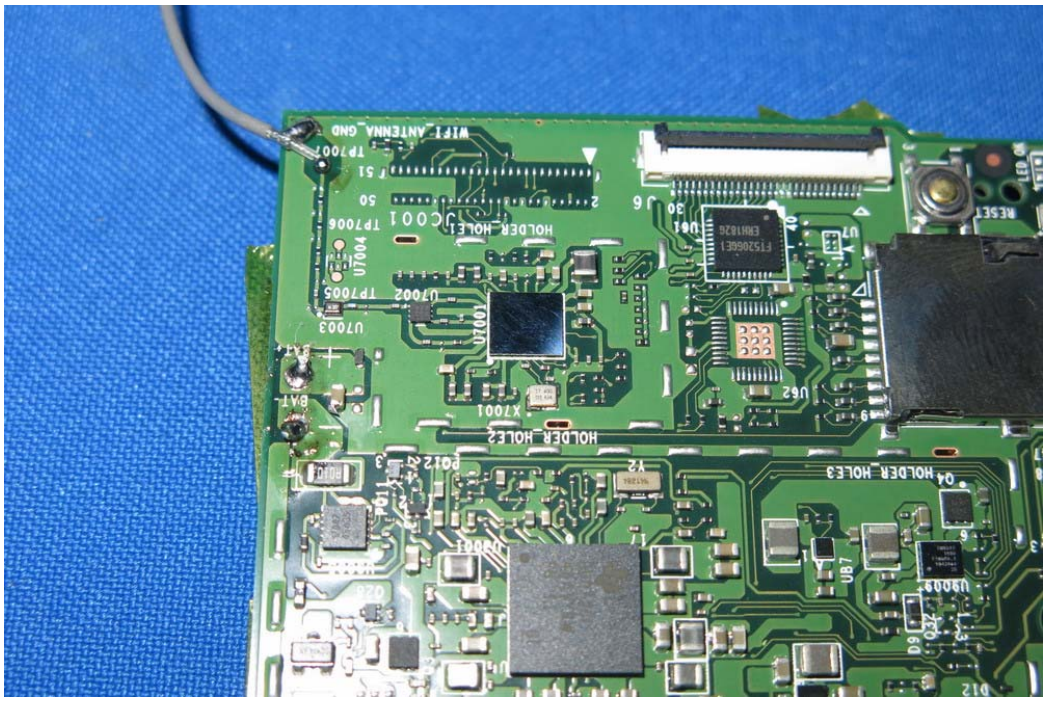



cm 1
INCH 32
100cm
10




cm 1 2 3 4 5 6 7 8 9 10 11
INCH 32 1 2 3 4 5
100cm 1 2 3 4 5 6 7 8 9 10 11 12 13 14
32 1 2 64 3 4 16 5


- 337195 3000mAh
+ 3.7V 11.1Wh DK22YL


WIFI_ANTENNA_GND
HOLDER_HOLE1
HOLDER_HOLE2
HOLDER_HOLE3
RESET