

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

OF

Color Changing Bluetooth Rechargeable Mini Speaker

Model No.: iBT59, iBT59X, iBT59XC (X denotes as color of cabinet)

Trade Mark: iHome

FCC ID: EMOIBT59

Report No.: KAD150608019E

Issue Date: July 18, 2015

Prepared for

**SDI Technologies Inc
1299, Main Street, Rahway, NJ 07065, U.S.A.**

Prepared by

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DONGGUAN EMTEK CO., LTD.**

VERIFICATION OF COMPLIANCE

Applicant:	SDI Technologies Inc 1299, Main Street, Rahway, NJ 07065, U.S.A.
Manufacturer:	SDI Technologies Inc 1299, Main Street, Rahway, NJ 07065, U.S.A.
Product Description:	Color Changing Bluetooth Rechargeable Mini Speaker
Trade Mark:	iHome
Model Number:	iBT59, iBT59X, iBT59XC (X denotes as color of cabinet) (Note: The samples are the same except model number. So iBT59 was selected for full test.)

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 : June 08, 2015 to July 11, 2015

Prepared by : 
Ivy Huang/Editor

Reviewer : 
Hong Yang/Supervisor

Approved & Authorized Signer : 
Sam Lv/Manager

Modified Information

Version	Summary	Revision Date	Report No.
Ver.1.0	Original Report	/	KAD150608019E

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Appendix I (Photos of EUT) (4 pages)

1. GENERAL INFORMATION

1.1 Product Description

Characteristics	Description
Product Name	Color Changing Bluetooth Rechargeable Mini Speaker
Model number	iBT59
Power Supply	DC 5V, 1A OR DC 3.7V, 500mA Lithium Battery
Kind of Device	Bluetooth Ver. 4.1+EDR
Modulation	GFSK, $\pi/4$ -DQPSK, 8DPSK
Operating Frequency Range	2402-2480MHz
Number of Channels	79
Transmit Power Max	2.98dBm(0.001986W)
Antenna Type	Internal PCB antenna
Antenna Gain	0 dBi
Product Hardware version	BT059-AB1511-D
Product Software version	V1.0
Radio Hardware Version	V1.0
Radio Software Version	V1.0
Test Software Version	V1.3.0.0

1.1 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.10-2013 and FCC Public Notice DA 00-705. Radiated testing was performed at an antenna to EUT distance 3 meters.

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

1.3 Configuration of Tested System



Table 2-1 Equipment Used in Tested System

Item	Equipment	Trade Mark	Model No.	FCC ID	Note
1.	Color Changing Bluetooth Rechargeable Mini Speaker	iHome	iBT59	EMOIBT59	EUT
2	Adapter	N/A	Model : AK00G-0500100BU Input: AC 100-240V, 50/60Hz, 0.2A Output: DC 5V, 1000mA	N/A	Support Equipment
3	Notebook	Dell	Inspiron 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.

2. Summary of Test Results

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

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 EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

For Radiated: The EUT's antenna was pre-tested under the following modes:

Test Mode	Description
Mode A	X-Y axis
Mode B	Y-Z axis
Mode C	X-Z axis

From the above modes, the worst case was found in Mode A. Therefore only the test data of the mode was recorded in this report.

This EUT is a FHSS system, were conducted to determine the final configuration from all possible combinations. We use a notebook which had installed the fixed frequency software, and then combined the EUT and notebook by a fixed frequency tool, finally run the software to control the EUT, Let EUT fixed at the lowest, middle, or highest channel. All the modes GFSK, $\pi/4$ -DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT.

The below 3 channels were chosen for test.

Channel	Frequency(MHz)
1	2402
40	2441
79	2480

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	$\pm 3\%$

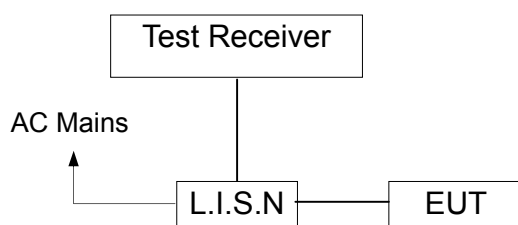
Remark: The coverage Factor ($k=2$), and measurement Uncertainty for a level of Confidence of 95%.

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:

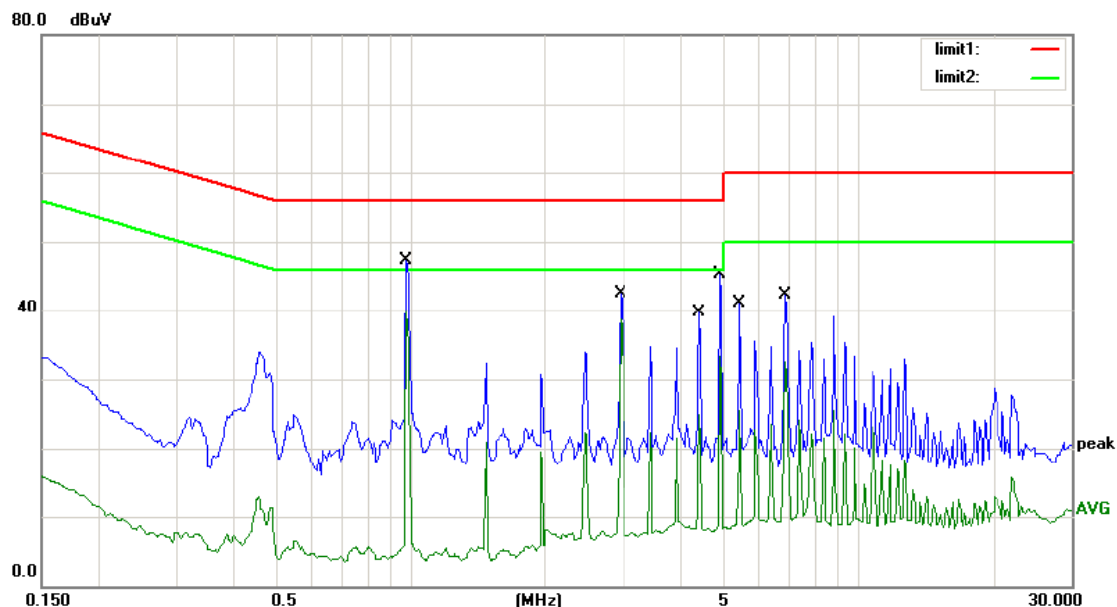
Conducted Emission Test Site						
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	Last Cal.	Due date
Test Receiver	Rohde & Schwarz	ESCS30	100018	9kHz~3GHz	03/15/2015	03/14/2016
L.I.S.N	Rohde & Schwarz	ENV216	100017	9KHz-300MHz	03/15/2015	03/14/2016
RF Switching Unit	CDS	RSU-M2	38401	9KHz-300MHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	9kHz~3GHz	03/15/2015	03/14/2016

5.4 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 15B_QP

Power: AC 120V/60Hz

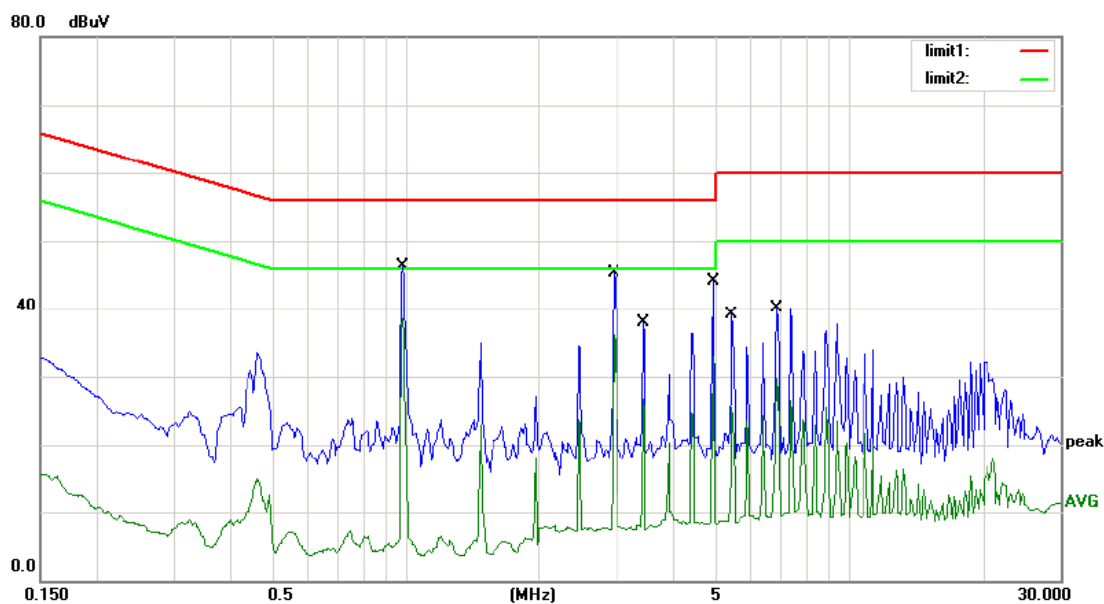
Humidity: 55 %

Mode: TX2402

Note:

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1		0.9825	44.10	0.00	44.10	56.00	-11.90	QP	
2	*	0.9825	39.86	0.00	39.86	46.00	-6.14	AVG	
3		2.9600	41.30	0.00	41.30	56.00	-14.70	QP	
4		2.9600	38.65	0.00	38.65	46.00	-7.35	AVG	
5		4.4200	37.41	0.00	37.41	56.00	-18.59	QP	
6		4.4200	24.82	0.00	24.82	46.00	-21.18	AVG	
7		4.9200	39.20	0.00	39.20	56.00	-16.80	QP	
8		4.9200	33.23	0.00	33.23	46.00	-12.77	AVG	
9		5.4200	38.65	0.00	38.65	60.00	-21.35	QP	
10		5.4200	25.48	0.00	25.48	50.00	-24.52	AVG	
11		6.9000	40.14	0.00	40.14	60.00	-19.86	QP	
12		6.9000	32.44	0.00	32.44	50.00	-17.56	AVG	

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



Site site #1 Phase: **N** Temperature: 24
 Limit: (CE)FCC PART 15B_QP Power: AC 120V/60Hz Humidity: 55 %
 Mode: TX2402
 Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector Comment
1		0.9870	45.24	0.00	45.24	56.00	-10.76	QP
2	*	0.9870	38.49	0.00	38.49	46.00	-7.51	AVG
3		2.9600	44.10	0.00	44.10	56.00	-11.90	QP
4		2.9600	36.14	0.00	36.14	46.00	-9.86	AVG
5		3.4500	35.41	0.00	35.41	56.00	-20.59	QP
6		3.4500	26.70	0.00	26.70	46.00	-19.30	AVG
7		4.9300	43.24	0.00	43.24	56.00	-12.76	QP
8		4.9300	32.82	0.00	32.82	46.00	-13.18	AVG
9		5.4400	37.14	0.00	37.14	60.00	-22.86	QP
10		5.4400	32.82	0.00	32.82	50.00	-17.18	AVG
11		6.9000	38.24	0.00	38.24	60.00	-21.76	QP
12		6.9000	29.67	0.00	29.67	50.00	-20.33	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 testing follows the guidelines in Spurious Radiated Emissions of FCC Public Notice DA 00-705 Measurement Guidelines.
2. 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.
3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) 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 to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.
7. Test Procedure of measurement (For Above 1GHz):
 - 1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).
 - 2) Change the antenna polarization and repeat 1) with vertical polarization.
 - 3) Make a hardcopy of the spectrum.
 - 4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
 - 5) Change the analyser mode to Clear/ Write and found the cone of emission.
 - 6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.
 - 7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.
 - 8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

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:

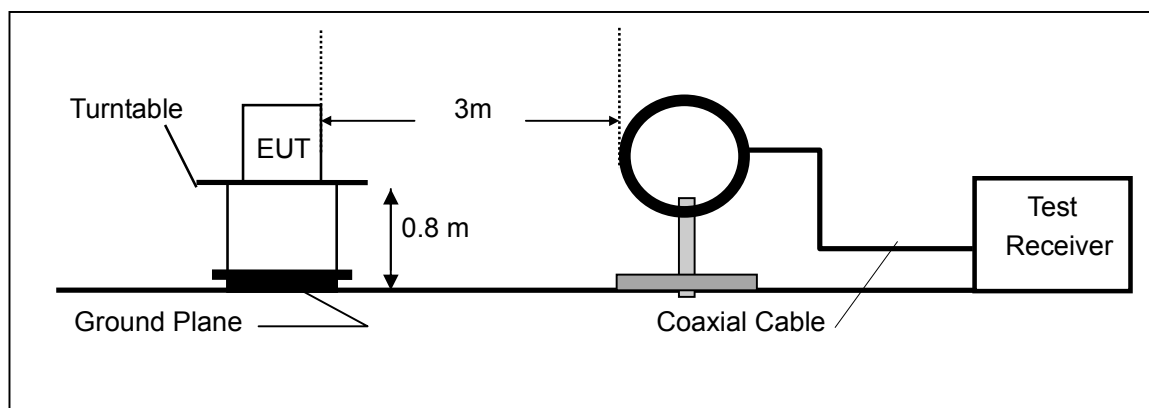
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

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

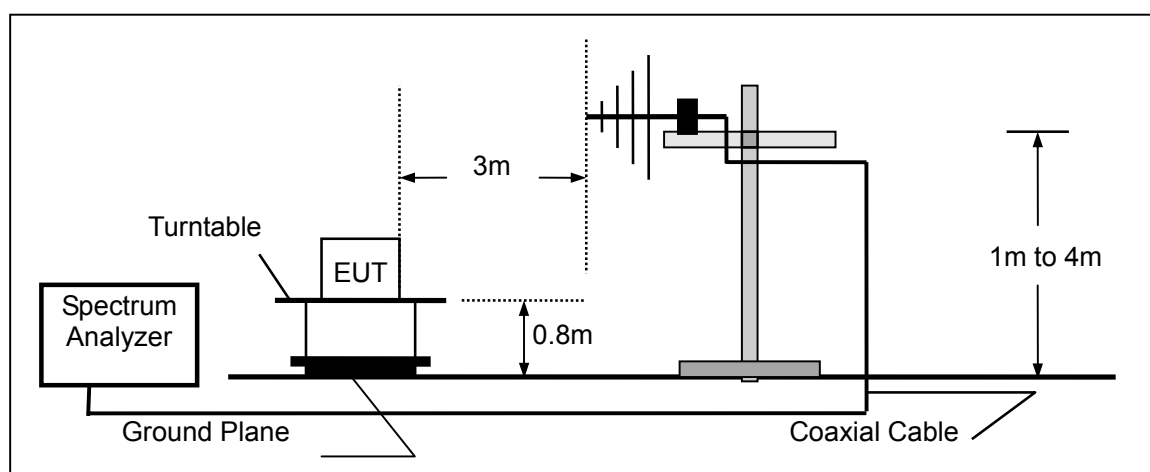
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

6.2 Test SET-UP (Block Diagram of Configuration)

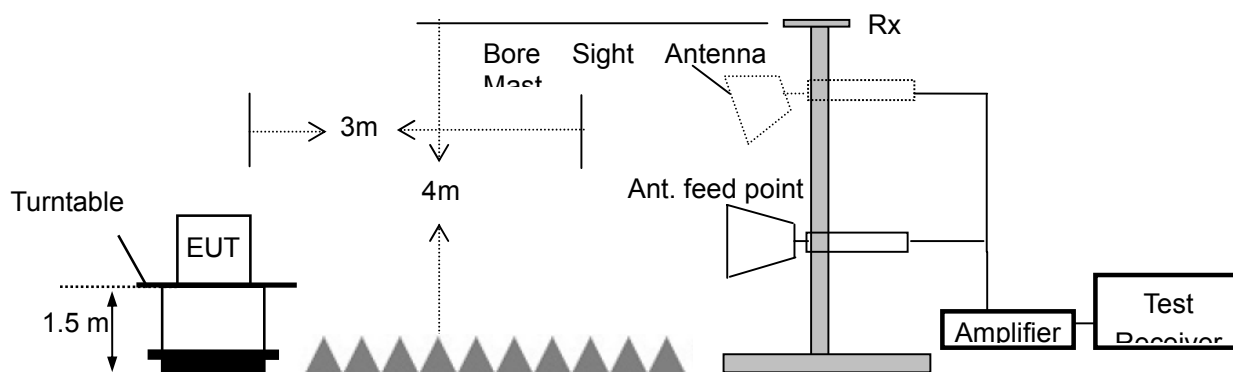
(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



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



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



6.3 Measurement Equipment Used:

Item	Equipment	Manufacturer	Model No.	Serial No.	Characteristics	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI	1166.5950.03	9KHz-3GHz	3/15/2015	1 Year
2.	Loop Antenna	Schwarzbeck	FMZB 1519	012	9 KHz -30MHz	12/29/2014	1 Year
3.	Bilog Antenna	Schwarzbeck	VULB9163	000141	25MHz-2GHz	3/15/2015	1 Year
4.	Power Amplifier	CDS	RSU-M352	818	1MHz-1GHz	3/15/2015	1 Year
5.	Power Amplifier	HP	8447F	OPT H64	1GHz-26.5GHz	3/15/2015	1 Year
6.	Color Monitor	SUNSPO	SP-140A	N/A	--	3/15/2015	1 Year
7.	Single Line Filter	JIANLI	XL-3	N/A	--	3/15/2015	1 Year
8.	Single Phase Power Line Filter	JIANLI	DL-2X100B	N/A	--	3/15/2015	1 Year
9.	3 Phase Power Line Filter	JIANLI	DL-4X100B	N/A	--	3/15/2015	1 Year
10.	DC Power Filter	JIANLI	DL-2X50B	N/A	--	3/15/2015	1 Year
11.	Cable	Schwarzbeck	PLF-100	549489	9KHz-3GHz	3/15/2015	1 Year
12.	Cable	Rosenberger	CIL02	A0783566	9KHz-3GHz	3/15/2015	1 Year
13.	Cable	Rosenberger	RG 233/U	525178	9KHz-3GHz	3/15/2015	1 Year
14.	Signal Analyzer	Rohde & Schwarz	FSV30	103040	9KHz-40GHz	12/29/2014	1 Year
15.	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	1GHz-18GHz	12/29/2014	1 Year
16.	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA9170399	14GHz -26.5GHz	12/29/2014	1 Year
17.	Boresight Antenna Tower	EMEC	AM-BS-4500-D	N/A	N/A	12/29/2014	1 Year
18.	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	12/29/2014	1 Year
19.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year
20.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year
21.	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year

6.4 Measurement Result

Below 30MHz:

Operation Mode:	TX	Test Date :	June 28, 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)
--	--	--	--	--

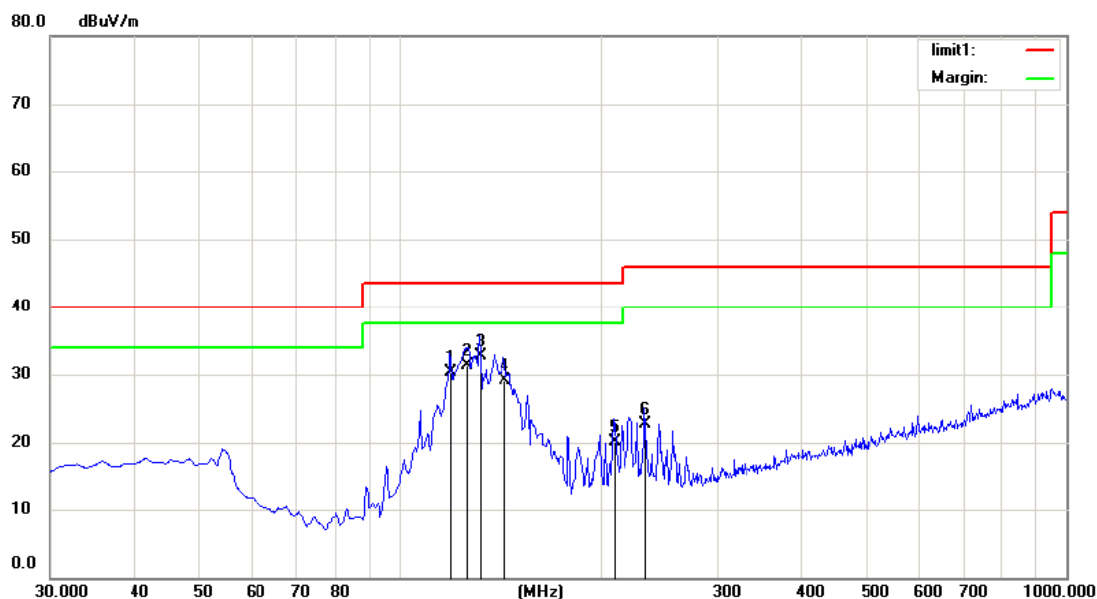
Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Below 1000MHz:

Pass.

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

Please refer to the following data.



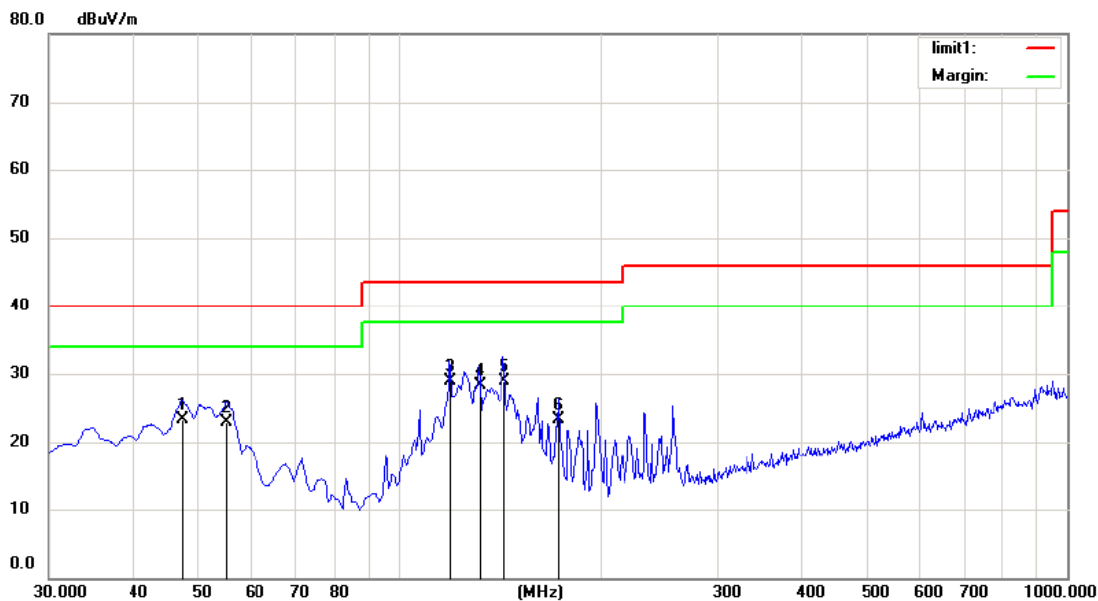
Site: Chamber #1
Limit: (RE)FCC PART 15B 3m
Mode: GFSK(TX2402)
Note:

Polarization: **Horizontal**
Power: Battery 3.7V
Temperature: 24
Humidity: 55 %

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		119.2400	47.32	-17.01	30.31	43.50	-13.19	QP		
2		126.0300	47.60	-16.37	31.23	43.50	-12.27	QP		
3	*	131.8500	49.04	-16.34	32.70	43.50	-10.80	QP		
4		143.4900	46.38	-17.29	29.09	43.50	-14.41	QP		
5		209.4500	37.21	-17.06	20.15	43.50	-23.35	QP		
6		233.7000	38.69	-15.92	22.77	46.00	-23.23	QP		

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

Operator: Snake

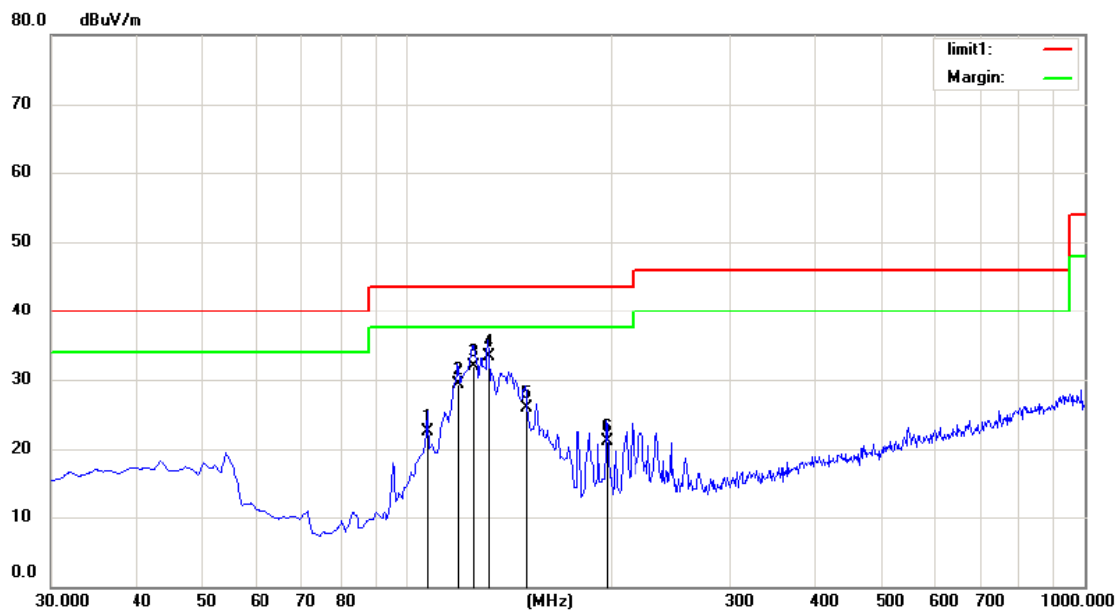


Site Chamber #1 Polarization: **Vertical** Temperature: 24
 Limit: (RE)FCC PART 15B 3m Power: Battery 3.7V Humidity: 55 %
 Mode: GFSK(TX2402)
 Note:

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		47.4600	37.62	-14.38	23.24	40.00	-16.76	QP		
2		55.2200	40.28	-17.46	22.82	40.00	-17.18	QP		
3	*	119.2400	45.96	-17.01	28.95	43.50	-14.55	QP		
4		131.8500	44.73	-16.40	28.33	43.50	-15.17	QP		
5		143.4900	46.15	-17.29	28.86	43.50	-14.64	QP		
6		173.5600	41.85	-18.61	23.24	43.50	-20.26	QP		

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

Operator: Snake



Site Chamber #1

Polarization: **Horizontal**

Temperature: 24

Limit: (RE)FCC PART 15B 3m

Power: Battery 3.7V

Humidity: 55 %

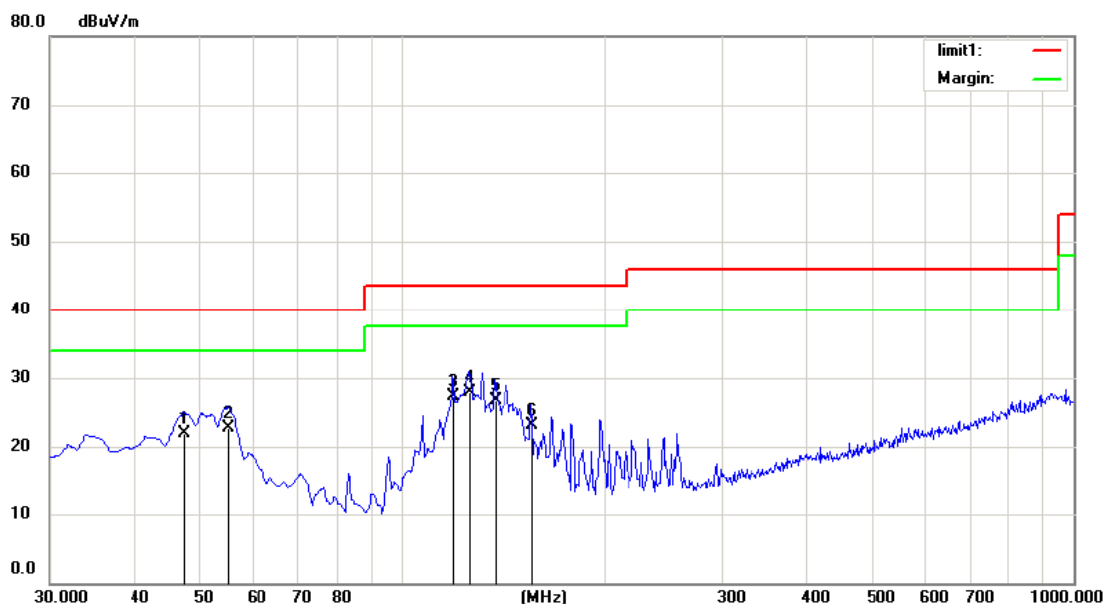
Mode: Pi/4-DQPSK(TX2402)

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		107.6000	40.35	-17.87	22.48	43.50	-21.02	QP		
2		119.2400	46.28	-17.01	29.27	43.50	-14.23	QP		
3		125.0600	48.31	-16.40	31.91	43.50	-11.59	QP		
4	*	131.8500	49.64	-16.34	33.30	43.50	-10.20	QP		
5		150.2800	43.70	-17.77	25.93	43.50	-17.57	QP		
6		197.8100	38.96	-17.78	21.18	43.50	-22.32	QP		

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

Operator: Lin

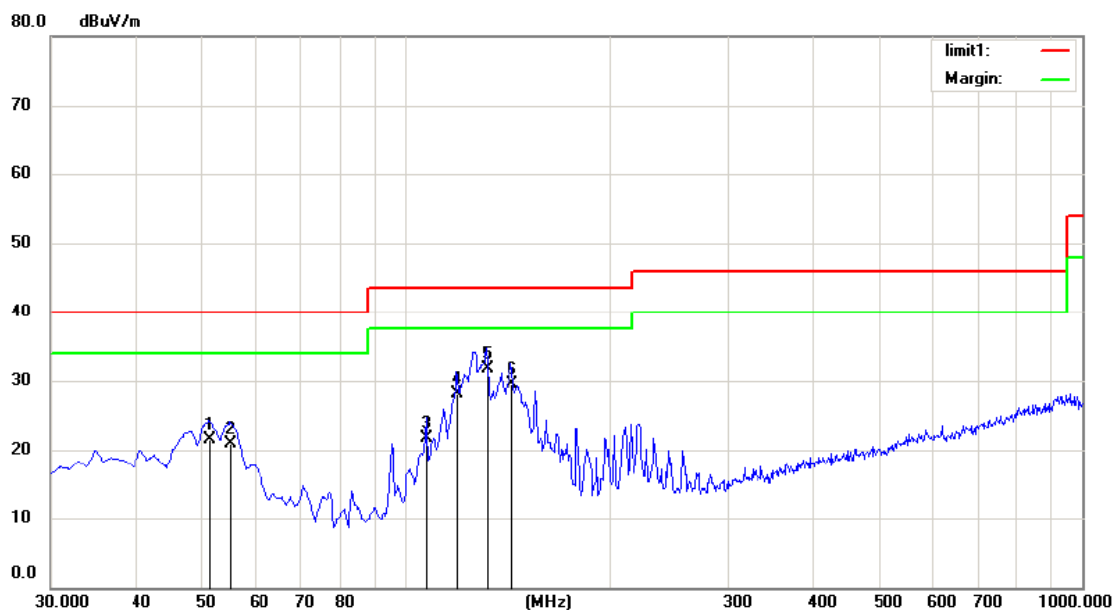


Site Chamber #1 Polarization: **Vertical** Temperature: 24
 Limit: (RE)FCC PART 15B 3m Power: Battery 3.7V Humidity: 55 %
 Mode: Pi/4-DQPSK(TX2402)
 Note:

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		47.4600	36.28	-14.38	21.90	40.00	-18.10	QP		
2		55.2200	40.21	-17.46	22.75	40.00	-17.25	QP		
3		119.2400	44.38	-17.01	27.37	43.50	-16.13	QP		
4	*	126.0300	44.29	-16.39	27.90	43.50	-15.60	QP		
5		137.6700	43.52	-16.79	26.73	43.50	-16.77	QP		
6		156.1000	41.27	-18.25	23.02	43.50	-20.48	QP		

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

Operator: Lin



Site Chamber #1

Polarization: **Horizontal**

Temperature: 24

Limit: (RE)FCC PART 15B 3m

Power: Battery 3.7V

Humidity: 55 %

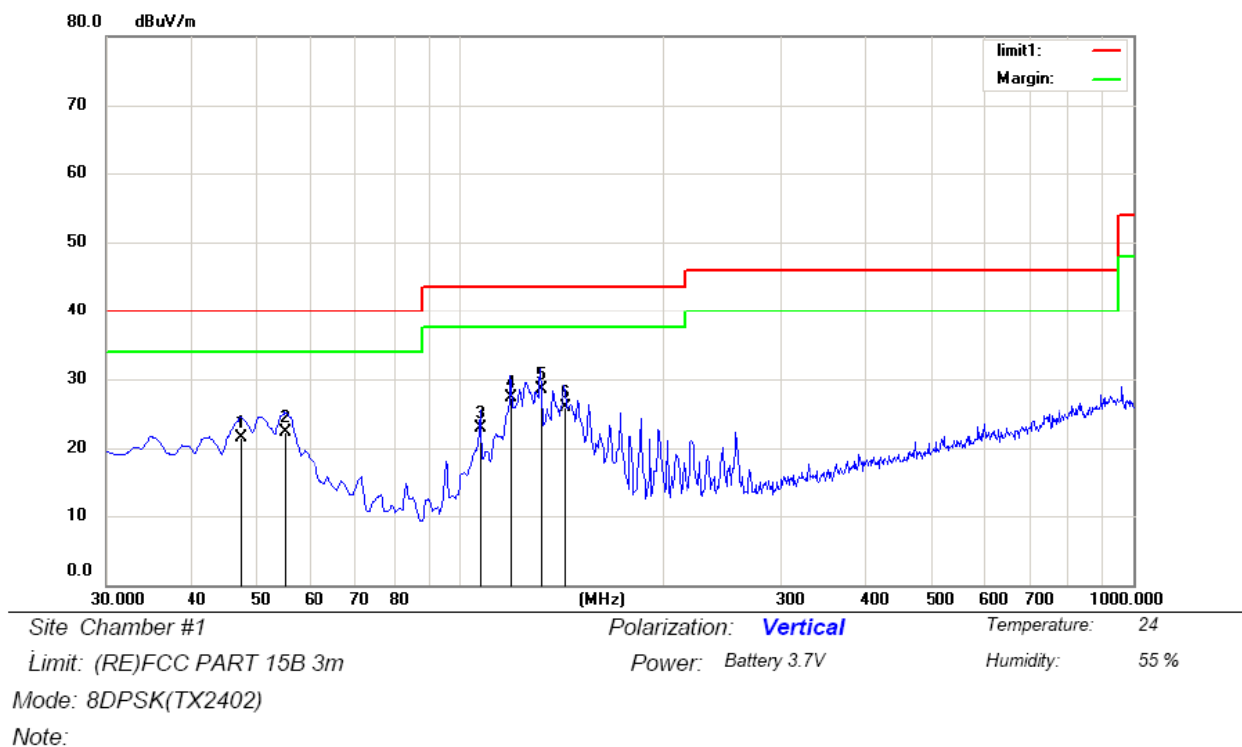
Mode: 8DPSK(TX2402)

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
1		51.3400	37.51	-15.96	21.55	40.00	-18.45	QP		
2		55.2207	38.46	-17.46	21.00	40.00	-19.00	QP		
3		107.6000	39.57	-17.87	21.70	43.50	-21.80	QP		
4		119.2400	45.21	-17.01	28.20	43.50	-15.30	QP		
5	*	131.8500	48.00	-16.34	31.66	43.50	-11.84	QP		
6		143.4900	46.72	-17.29	29.43	43.50	-14.07	QP		

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

Operator: Lin



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		47.4600	35.92	-14.38	21.54	40.00	-18.46	QP		
2		55.2200	39.74	-17.46	22.28	40.00	-17.72	QP		
3		107.6000	40.81	-17.87	22.94	43.50	-20.56	QP		
4		119.2400	44.26	-17.01	27.25	43.50	-16.25	QP		
5	*	131.8500	44.91	-16.40	28.51	43.50	-14.99	QP		
6		143.4900	43.27	-17.29	25.98	43.50	-17.52	QP		

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

Operator: Lin

Above 1000MHz~10th Harmonics:

Operation Mode: GFSK (CH1: 2402MHz) Test Date : June 28, 2015

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	46.35	74	54	-8.99	-7.65
7206	V	63.42	42.7	74	54	-10.58	-11.3
9608	V	62.85	41	74	54	-11.15	-13
12010	V	61.35	40.27	74	54	-12.65	-13.73
14412	V	60.58	38.92	74	54	-13.42	-15.08
16814	V	57.42	37.42	74	54	-16.58	-16.58
4804	H	64.35	45.38	74	54	-9.65	-8.62
7206	H	63.2	42.1	74	54	-10.8	-11.9
9608	H	61.82	40.82	74	54	-12.18	-13.18
12010	H	58.49	38.49	74	54	-15.51	-15.51
14412	H	56.37	35.28	74	54	-17.63	-18.72
16814	H	52.74	34.72	74	54	-21.26	-19.28

Operation Mode: GFSK (CH40: 2441MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4882	V	63.22	46.35	74	54	-10.78	-7.65
7323	V	61.05	44.15	74	54	-12.95	-9.85
9764	V	60.72	43.62	74	54	-13.28	-10.38
12205	V	59.35	42.07	74	54	-14.65	-11.93
14646	V	58.47	41.82	74	54	-15.53	-12.18
17087	V	57.05	40.72	74	54	-16.95	-13.28
4882	H	64.72	45.3	74	54	-9.28	-8.7
7323	H	63.28	42.07	74	54	-10.72	-11.93
9764	H	62.18	41.28	74	54	-11.82	-12.72
12205	H	61.04	40.92	74	54	-12.96	-13.08
14646	H	60.72	38.48	74	54	-13.28	-15.52
17087	H	59.35	37.62	74	54	-14.65	-16.38

Operation Mode: GFSK (CH79: 2480MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Margin(dB)	
		PK	AV	PK	AV	PK	AV
4960	V	64.3	44.15	74	54	-9.7	-9.85
7440	V	62.15	43.62	74	54	-11.85	-10.38
9920	V	61.74	42.17	74	54	-12.26	-11.83
12400	V	60.25	41.05	74	54	-13.75	-12.95
14880	V	59.72	40.72	74	54	-14.28	-13.28
17360	V	58.72	38.48	74	54	-15.28	-15.52
4960	H	65.35	44.62	74	54	-8.65	-9.38
7440	H	64.15	43.15	74	54	-9.85	-10.85
9920	H	63.28	42.07	74	54	-10.72	-11.93
12400	H	62.07	41.62	74	54	-11.93	-12.38
14880	H	61.2	40.25	74	54	-12.8	-13.75
17360	H	60.82	38.78	74	54	-13.18	-15.22

Operation Mode: Pi/4-DQPSK (CH1: 2402MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4804	V	66.25	45.15	74	54	-7.75	-8.85
7206	V	62.47	43.08	74	54	-11.53	-10.92
9608	V	61.82	41.74	74	54	-12.18	-12.26
12010	V	60.72	40.25	74	54	-13.28	-13.75
14412	V	59.35	39.27	74	54	-14.65	-14.73
16814	V	58.74	38.42	74	54	-15.26	-15.58
4804	H	65.28	44.72	74	54	-8.72	-9.28
7206	H	63.7	41.39	74	54	-10.3	-12.61
9608	H	62.92	40.28	74	54	-11.08	-13.72
12010	H	61.74	38.72	74	54	-12.26	-15.28
14412	H	60.36	34.62	74	54	-13.64	-19.38
16814	H	59.28	32.18	74	54	-14.72	-21.82

Operation Mode: Pi/4-DQPSK (CH40: 2441MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4882	V	66.36	44.15	74	54	-7.64	-9.85
7323	V	65.17	43.07	74	54	-8.83	-10.93
9764	V	62.84	42.17	74	54	-11.16	-11.83
12205	V	61.75	40.07	74	54	-12.25	-13.93
14646	V	60.25	38.72	74	54	-13.75	-15.28
17087	V	59.72	37.05	74	54	-14.28	-16.95
4882	H	65.35	45.62	74	54	-8.65	-8.38
7323	H	64.18	44.37	74	54	-9.82	-9.63
9764	H	63.07	43.67	74	54	-10.93	-10.33
12205	H	62.92	42.08	74	54	-11.08	-11.92
14646	H	58.46	41.92	74	54	-15.54	-12.08
17087	H	57.9	38.72	74	54	-16.1	-15.28

Operation Mode: Pi/4-DQPSK (CH79: 2480MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4960	V	64.35	46.35	74	54	-9.65	-7.65
7440	V	63.08	45.17	74	54	-10.92	-8.83
9920	V	62.71	43.69	74	54	-11.29	-10.31
12400	V	60.28	42.17	74	54	-13.72	-11.83
14880	V	58.92	40.57	74	54	-15.08	-13.43
17360	V	57.42	39.72	74	54	-16.58	-14.28
4960	H	65.35	45.71	74	54	-8.65	-8.29
7440	H	64.17	44.62	74	54	-9.83	-9.38
9920	H	63.08	43.07	74	54	-10.92	-10.93
12400	H	62.74	42.85	74	54	-11.26	-11.15
14880	H	61.92	41.72	74	54	-12.08	-12.28
17360	H	59.72	40.92	74	54	-14.28	-13.08

Operation Mode: 8DPSK (CH1: 2402MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4804	V	66.33	44.32	74	54	-7.67	-9.68
7206	V	65.85	43.62	74	54	-8.15	-10.38
9608	V	64.27	42.15	74	54	-9.73	-11.85
12010	V	63.17	41.08	74	54	-10.83	-12.92
14412	V	62.71	40.82	74	54	-11.29	-13.18
16814	V	60.7	38.78	74	54	-13.3	-15.22
4804	H	64.72	46.3	74	54	-9.28	-7.7
7206	H	63.18	44.01	74	54	-10.82	-9.99
9608	H	62.85	43.92	74	54	-11.15	-10.08
12010	H	60.72	42.92	74	54	-13.28	-11.08
14412	H	58.92	40.72	74	54	-15.08	-13.28
16814	H	57.43	38.69	74	54	-16.57	-15.31

Operation Mode: 8DPSK (CH40: 2441MHz) Test Date : June 28, 2015

Freq. (MHz)	Ant. Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4882	V	64.35	45.15	74	54	-9.65	-8.85
7323	V	63.04	44.38	74	54	-10.96	-9.62
9764	V	62.18	42.1	74	54	-11.82	-11.9
12205	V	61.72	40.25	74	54	-12.28	-13.75
14646	V	60.28	38.72	74	54	-13.72	-15.28
17087	V	59.37	37.49	74	54	-14.63	-16.51
4882	H	65.82	46.37	74	54	-8.18	-7.63
7323	H	64.27	45.17	74	54	-9.73	-8.83
9764	H	63	43.2	74	54	-11	-10.8
12205	H	62.59	41.28	74	54	-11.41	-12.72
14646	H	61.72	40	74	54	-12.28	-14
17087	H	60	38.49	74	54	-14	-15.51

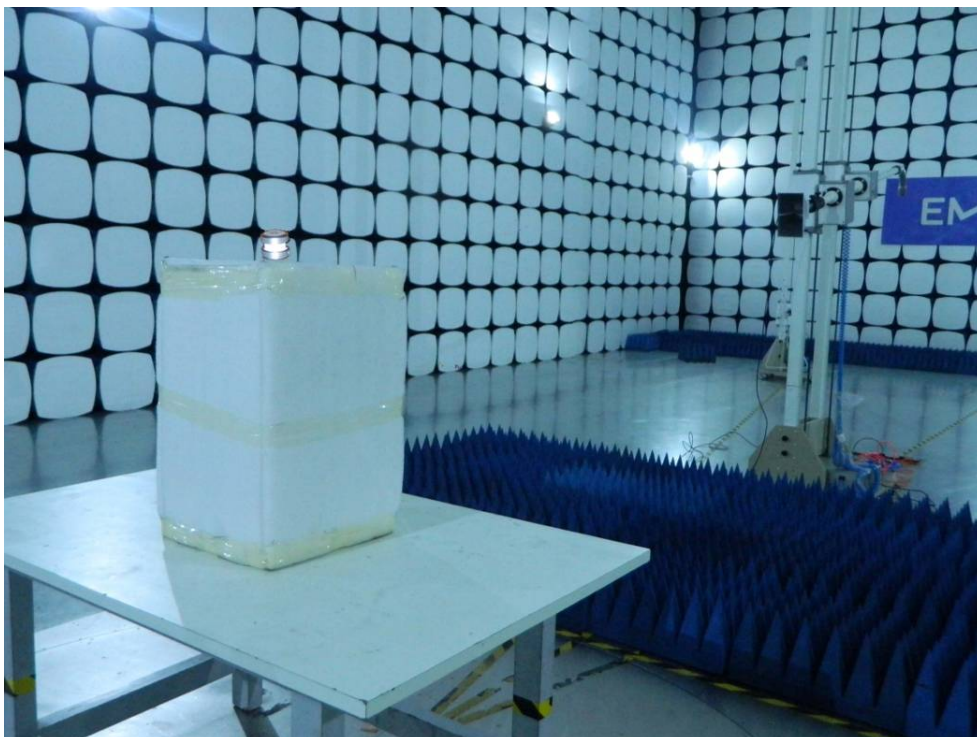
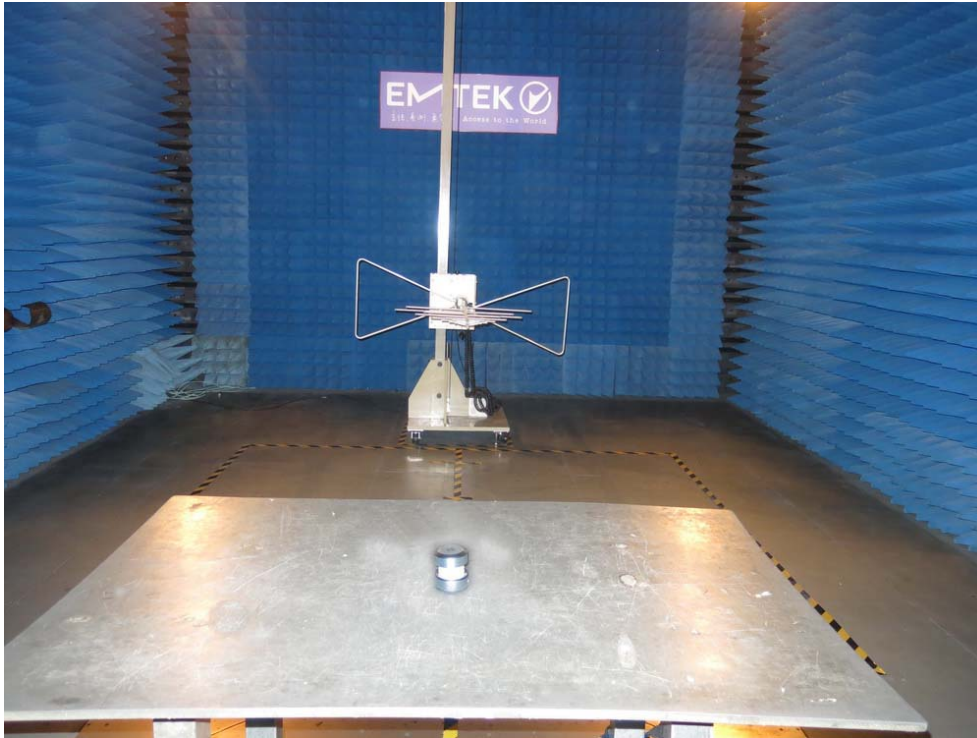
Operation Mode: 8DPSK (CH79: 2480MHz) Test Date : June 28, 2015

Freq.	Ant. Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
(MHz)	H/V	PK	AV	PK	AV	PK	AV
4960	V	64.25	44.15	74	54	-9.75	-9.85
7440	V	63.15	43.04	74	54	-10.85	-10.96
9920	V	62	42.28	74	54	-12	-11.72
12400	V	61.76	41.72	74	54	-12.24	-12.28
14880	V	60.27	40.25	74	54	-13.73	-13.75
17360	V	59.73	38.49	74	54	-14.27	-15.51
4960	H	63	46.37	74	54	-11	-7.63
7440	H	62.18	42.18	74	54	-11.82	-11.82
9920	H	61.04	41.08	74	54	-12.96	-12.92
12400	H	60.28	38.26	74	54	-13.72	-15.74
14880	H	59.72	36.92	74	54	-14.28	-17.08
17360	H	56.92	35.7	74	54	-17.08	-18.3

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:

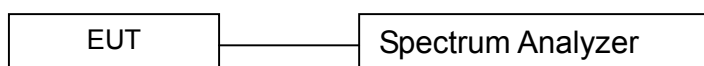


7. Channel Separation test

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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

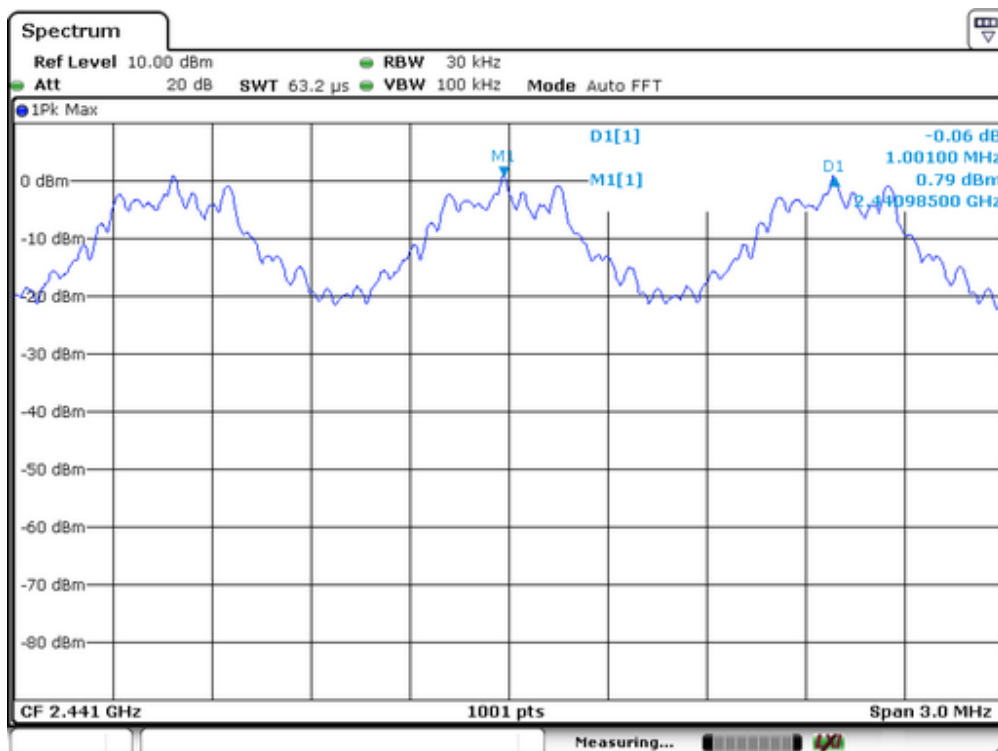
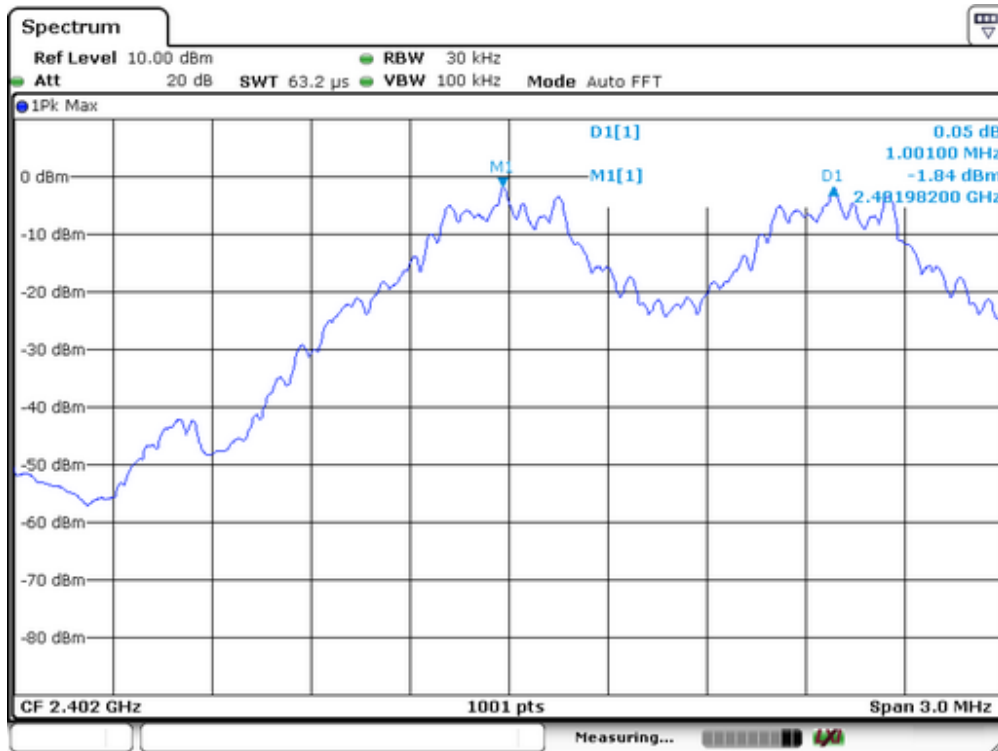
Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.
The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

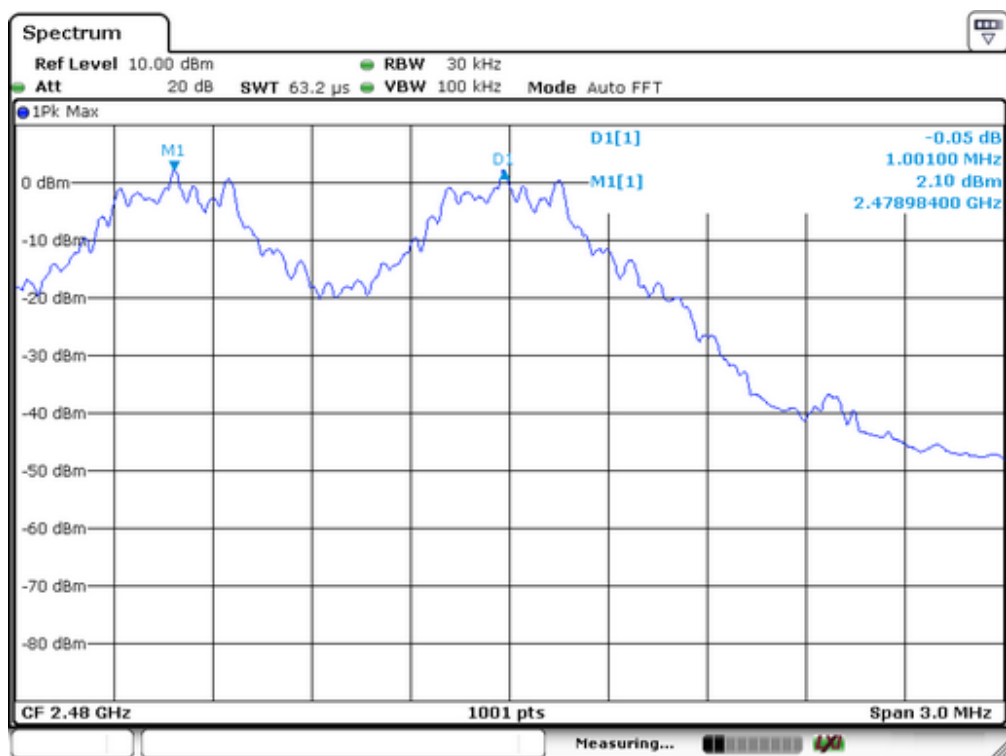
7.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %
Modulation:	GFSK		

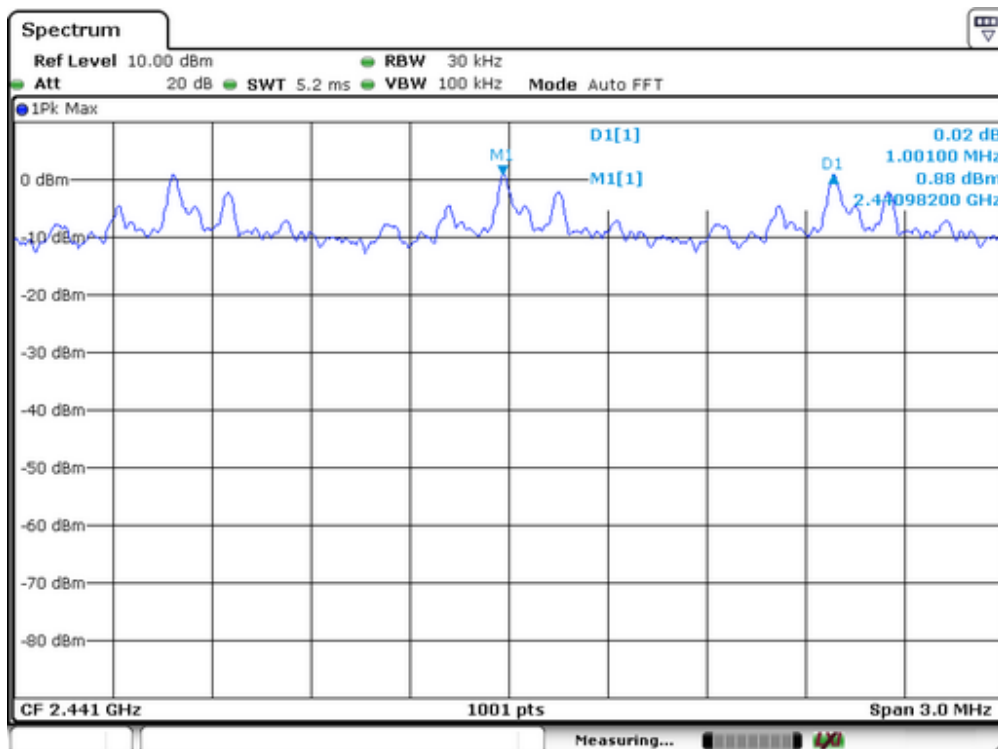
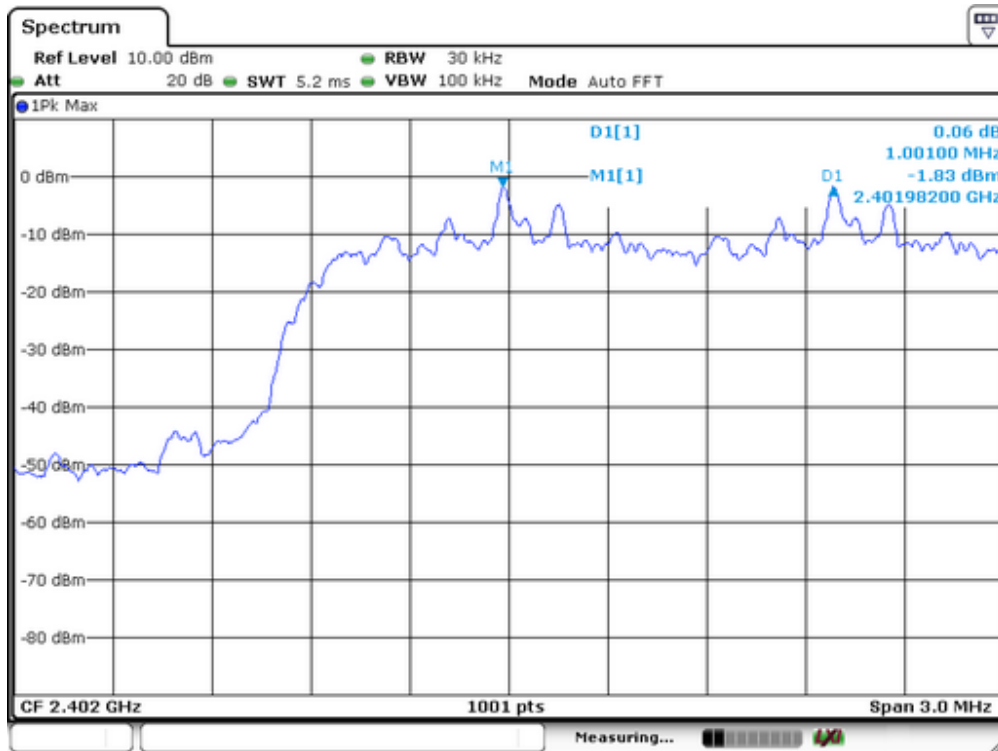
Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit (kHz)
1	2402	1001	>815
40	2441	1001	>812
79	2480	1001	>822

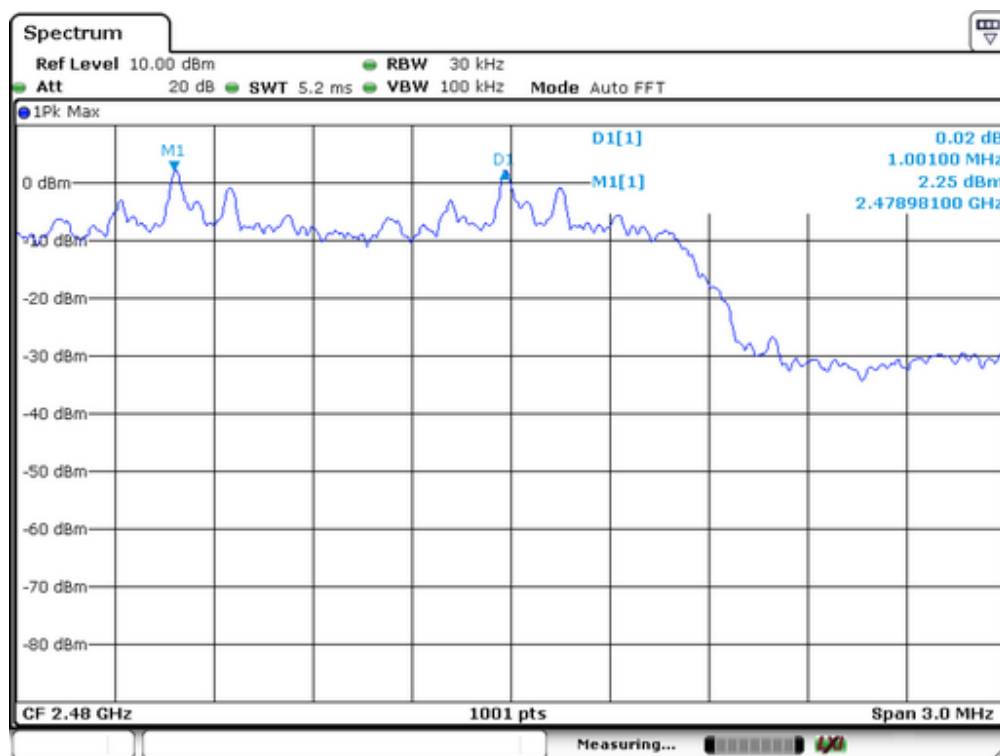




Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	$\Pi/4$ -DQPSK		

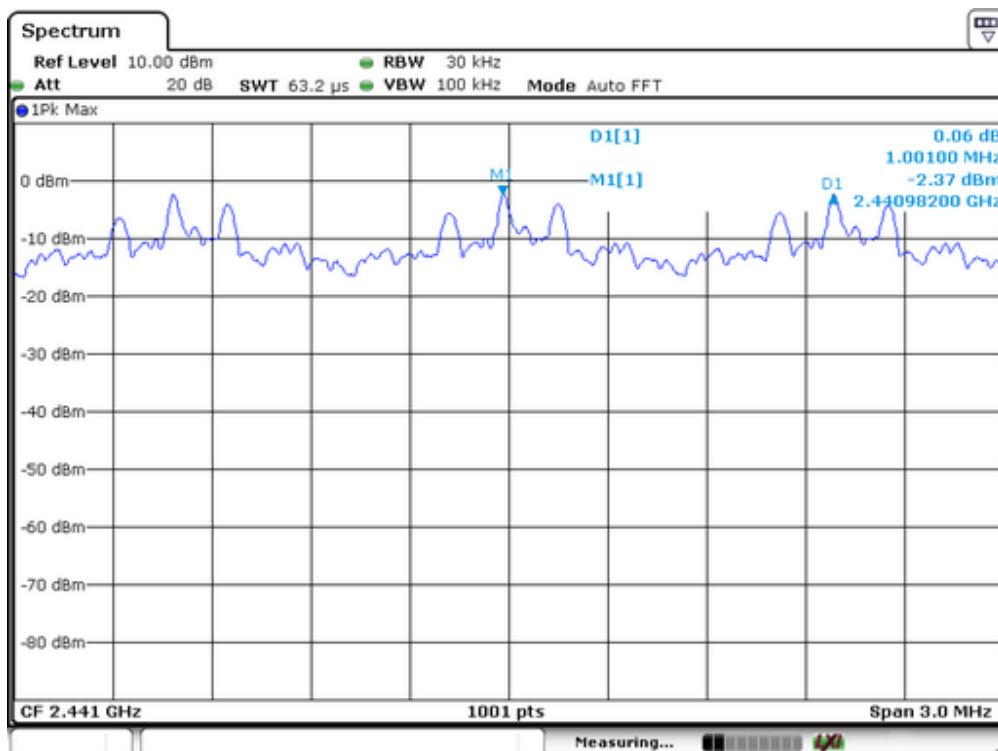
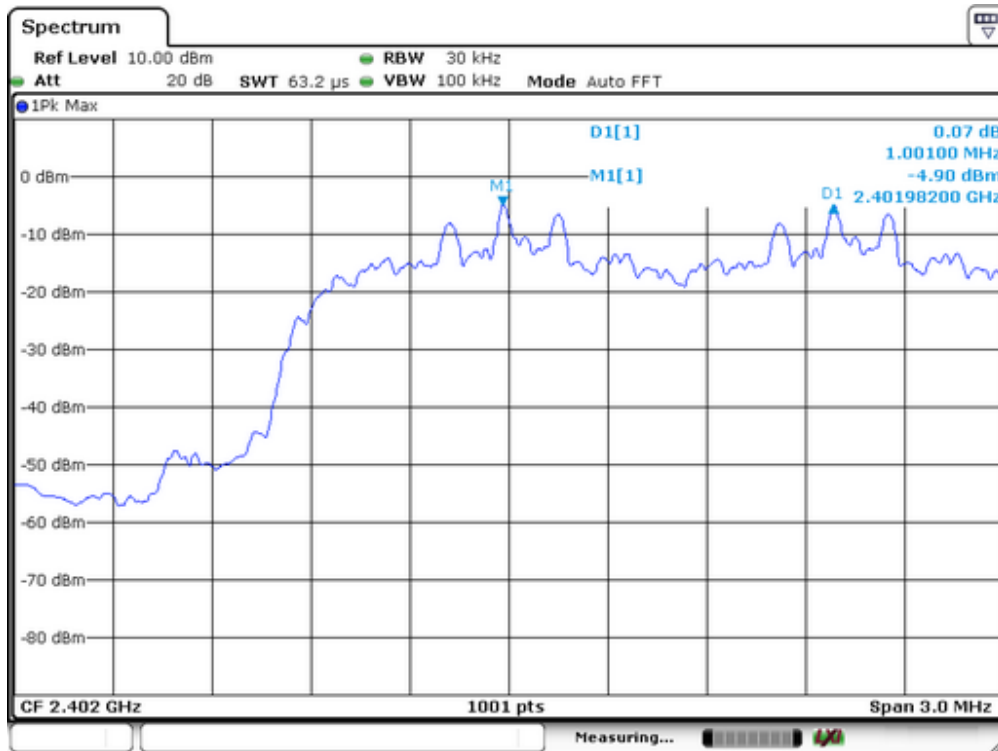
Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1001	>821
40	2441	1001	>821
79	2480	1001	>823

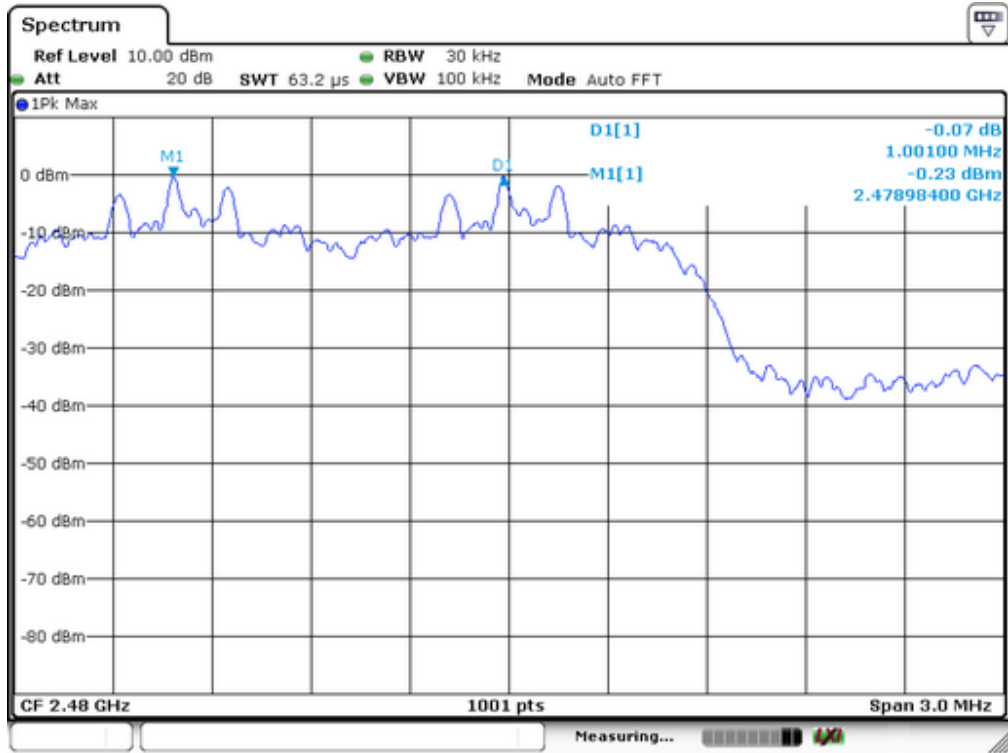




Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	8DPSK		

Channel number	Channel frequency (MHz)	Separation Read Value (kHz)	Separation Limit 2/3 20dB Down BW(kHz)
1	2402	1001	>807
40	2441	1001	>807
79	2480	1001	>807



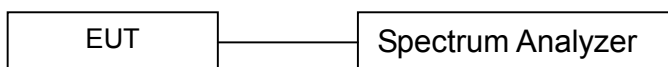


8. 20dB Bandwidth test

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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

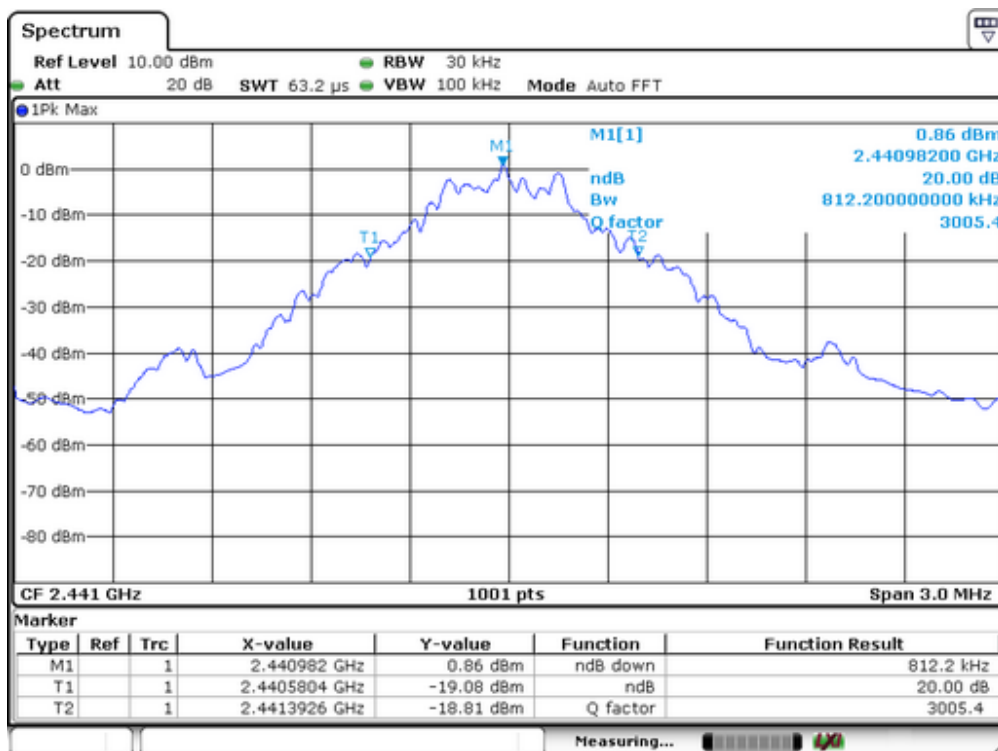
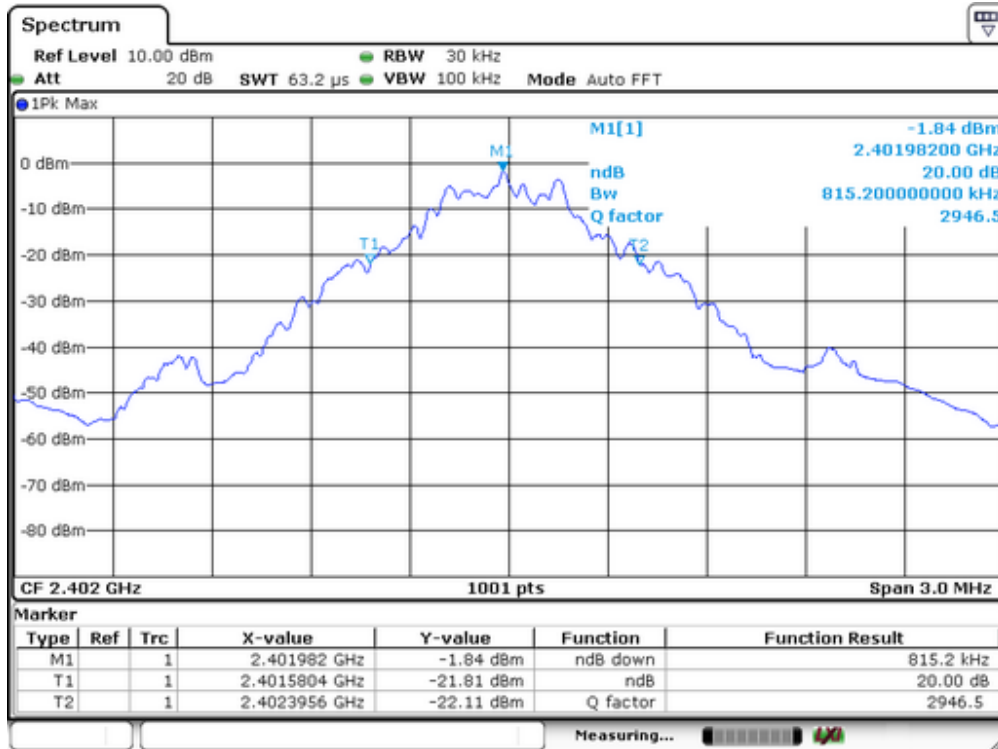
Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.
The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

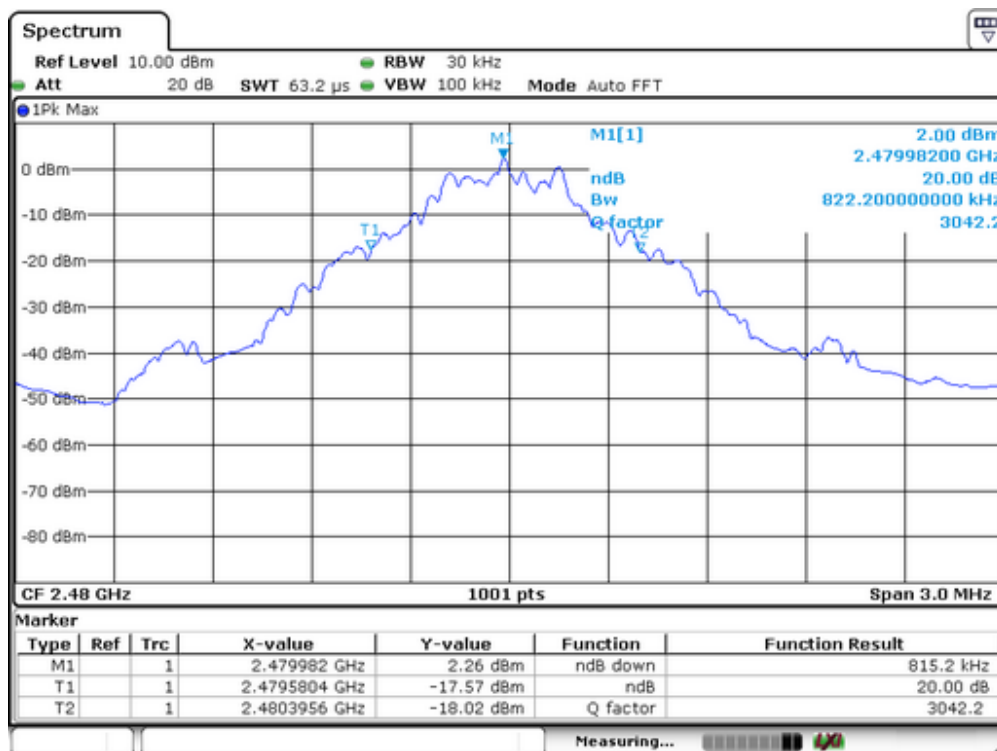
8.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	GFSK		

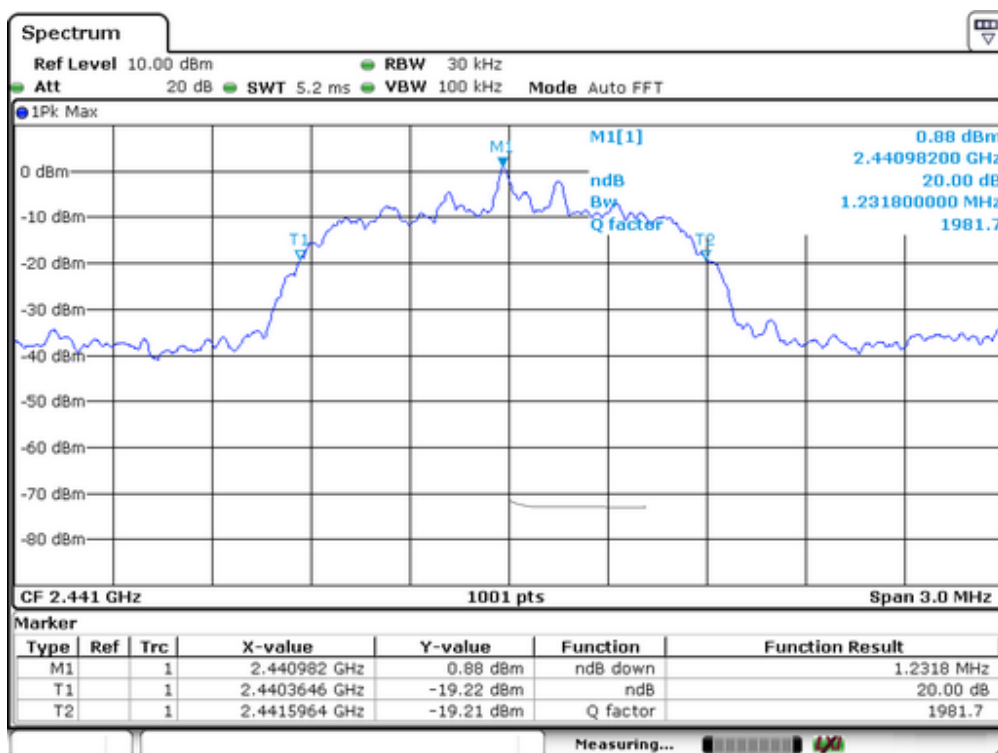
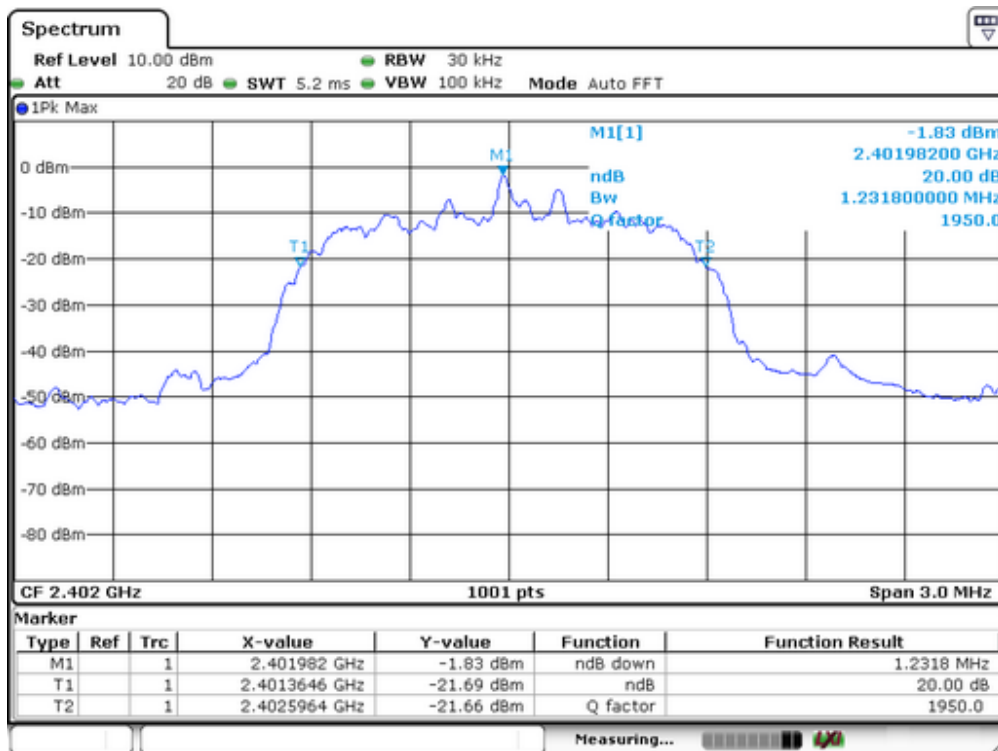
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	815
40	2441	812
79	2480	822

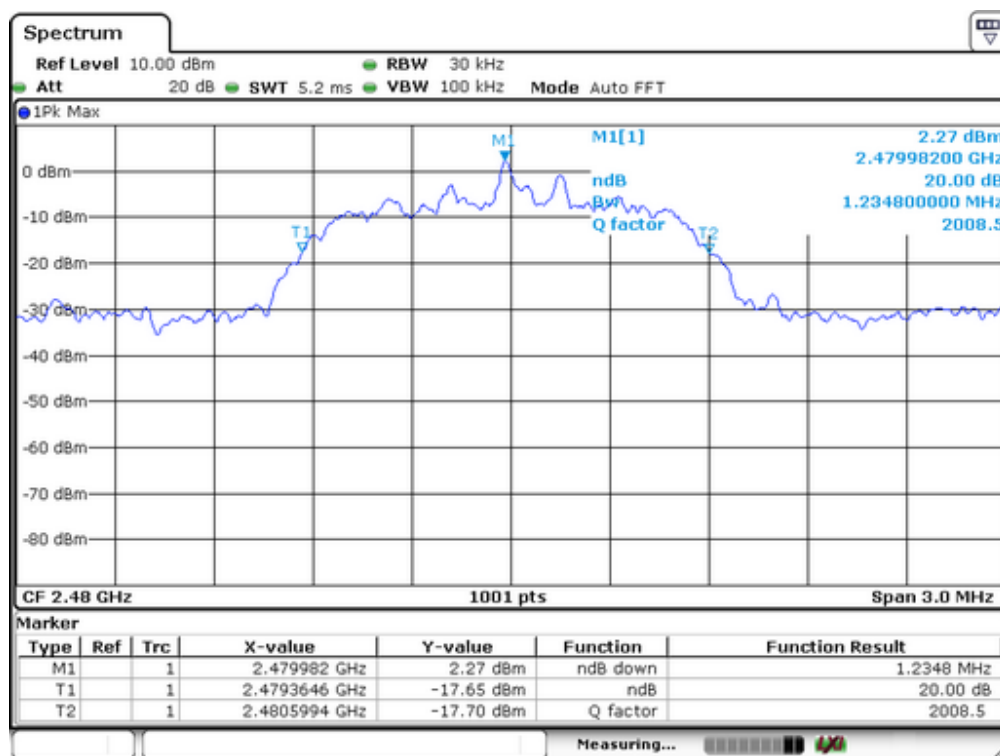




Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	24°C
Test Result:	PASS	Humidity :	53 %
Modulation:	$\Pi/4$ -DQPSK		

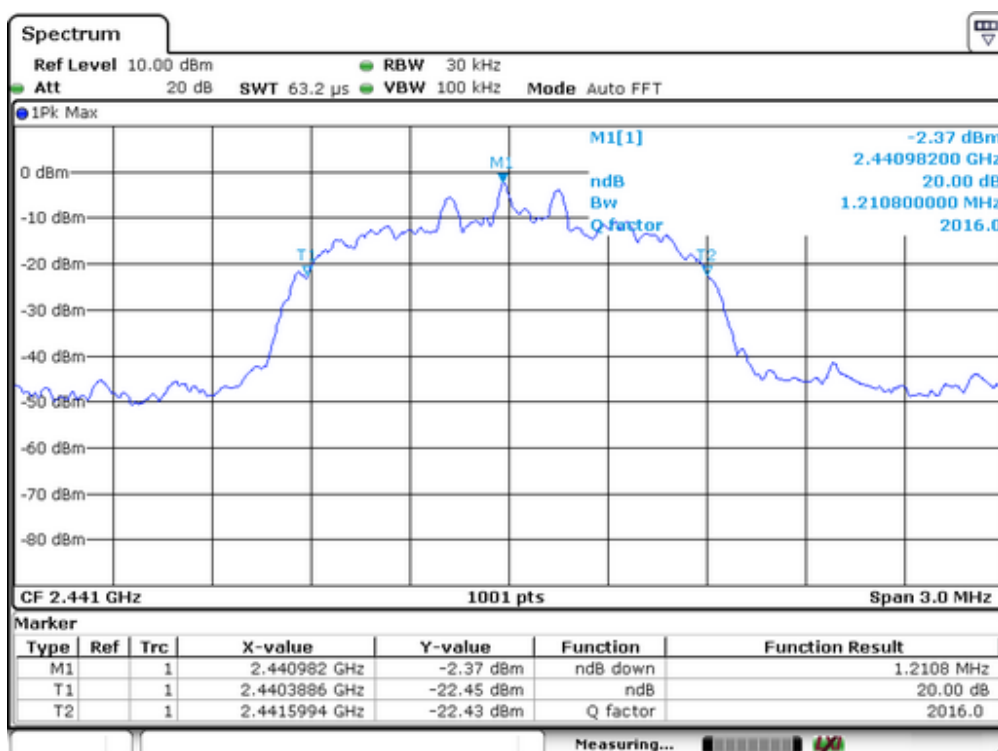
Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1232
40	2441	1232
79	2480	1235

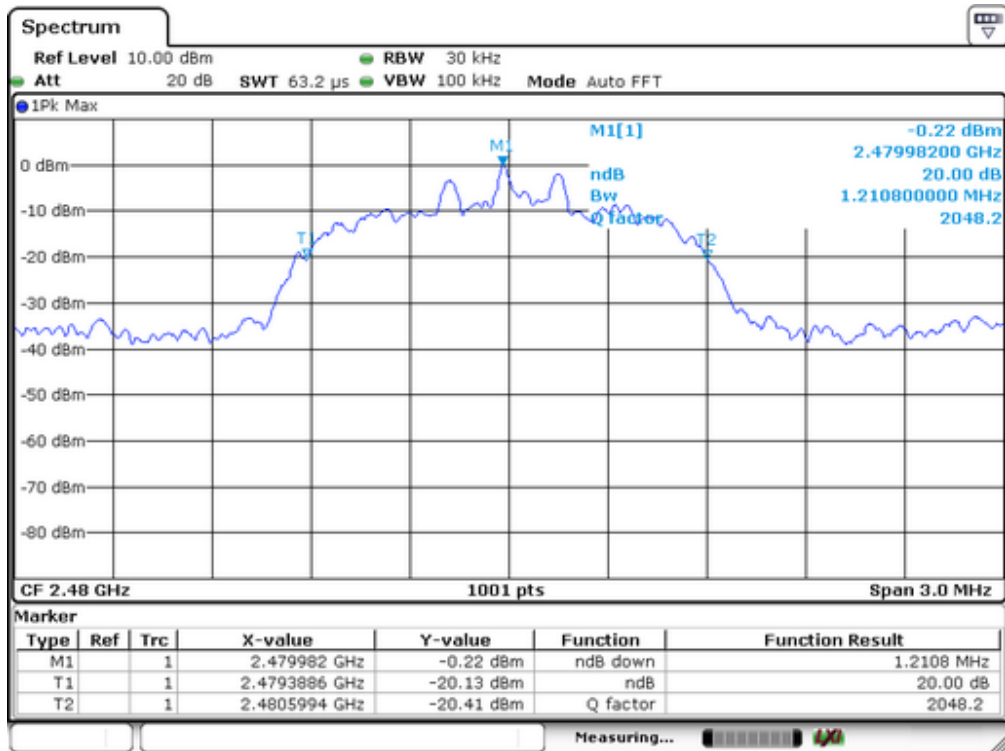




Spectrum Detector: PK Test Date : June 28, 2015
 Test By: Andy Temperature : 24°C
 Test Result: PASS Humidity : 53 %
 Modulation: 8DPSK

Channel number	Channel frequency (MHz)	20dB Down BW(kHz)
1	2402	1211
40	2441	1211
79	2480	1211



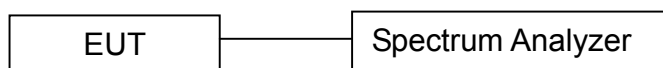


9. Quantity of Hopping Channel Test

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:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

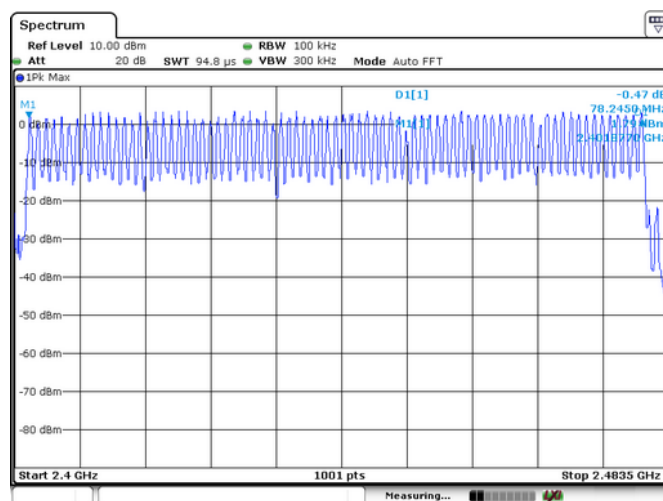
Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

9.4 Measurement Results:

Worst Test Mode	GFSK	Test Date :	June 28, 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



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:

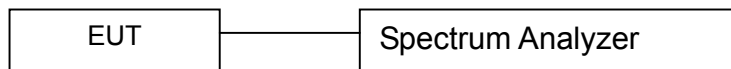
$$\text{Dwell time} = \text{time slot length} * \text{hop rate} / \text{number of hopping channels} * 31.6\text{s}$$

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.

10.2 Test SET-UP (Block Diagram of Configuration)



10.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

The cable loss is 0.4dBm, and impedance is 50Ω for the antenna connector.

10.2 Test Requirements / Limits

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

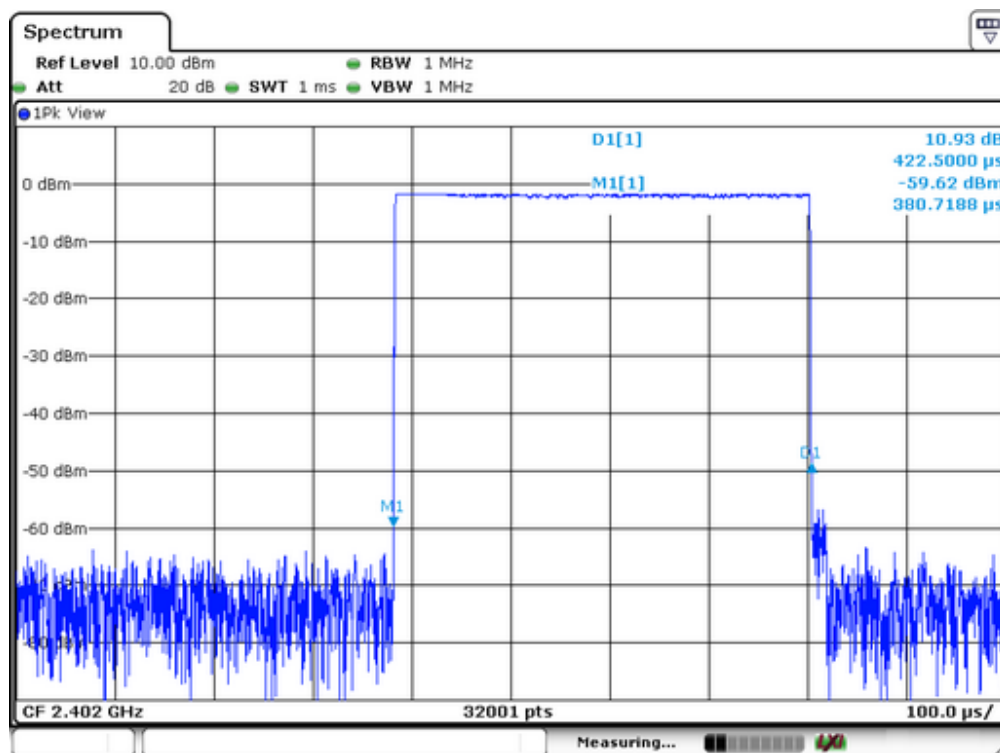
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Since the Bluetooth technology uses 79 channels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

10.3 Test result

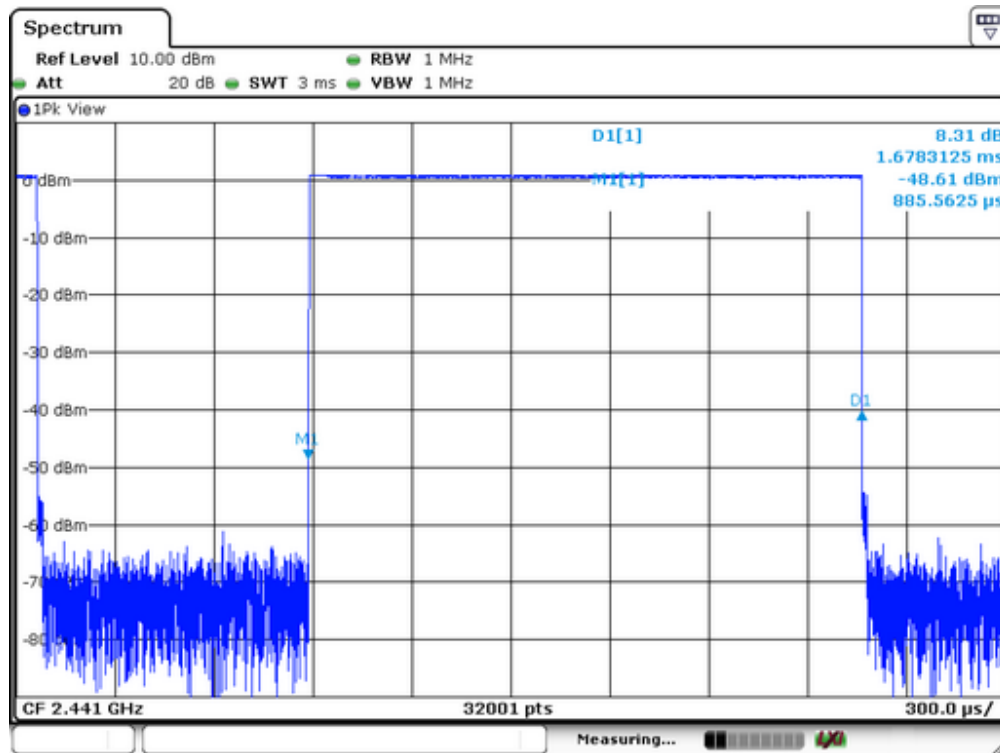
Mode	Number of transmission in a 31.6(79 Hopping*0.4)	Length of transmissions time(msec)	Result (msec)	Limit (msec)
DH1	$1600/(2*79) \times 31.6 = 320$	0.422	135.04	400
DH3	$1600/(4*79) \times 31.6 = 160$	1.678	268.48	400
DH5	$1600/(6*79) \times 31.6 = 106.67$	2.926	312.11	400

Remark: The results of worst cased was recorded.

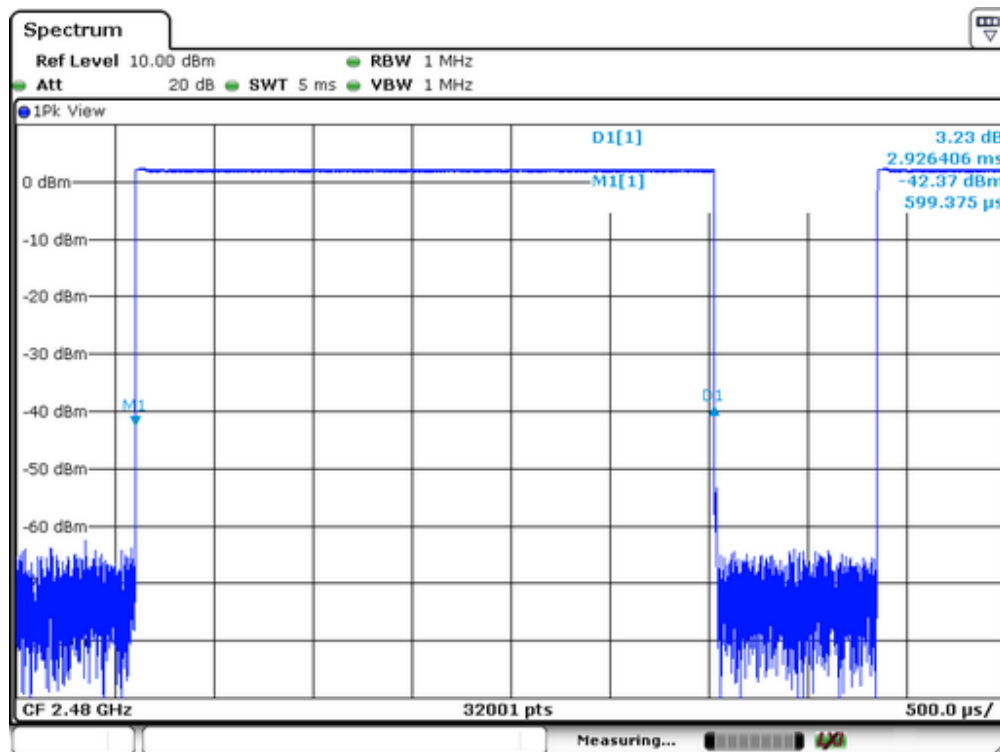
DH1:



DH3:



DH5:

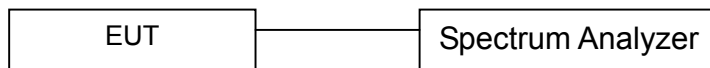


11. MAXIMUM PEAK OUTPUT POWER TEST

11.1 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.

11.2 Test SET-UP (Block Diagram of Configuration)



11.3 Measurement Equipment Used:

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

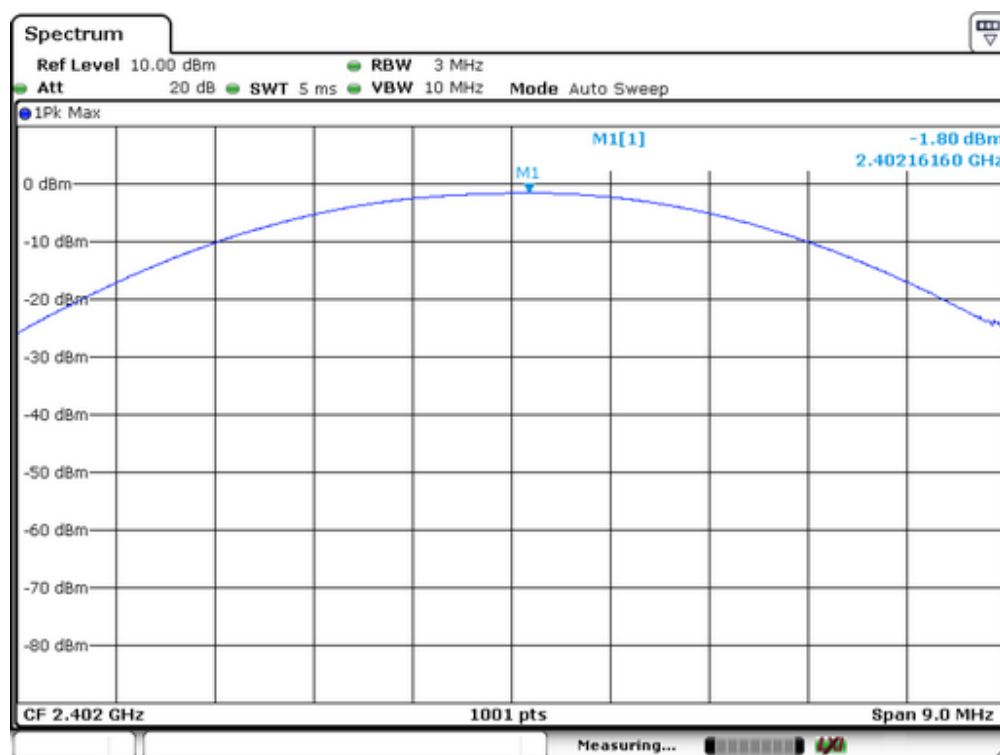
Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.
The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

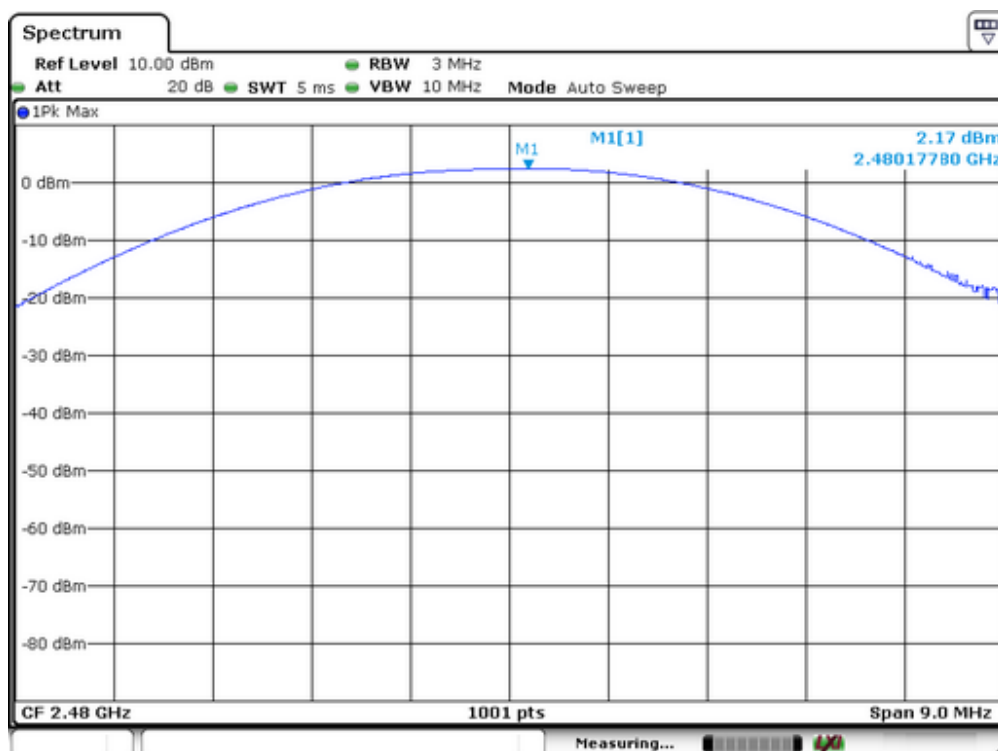
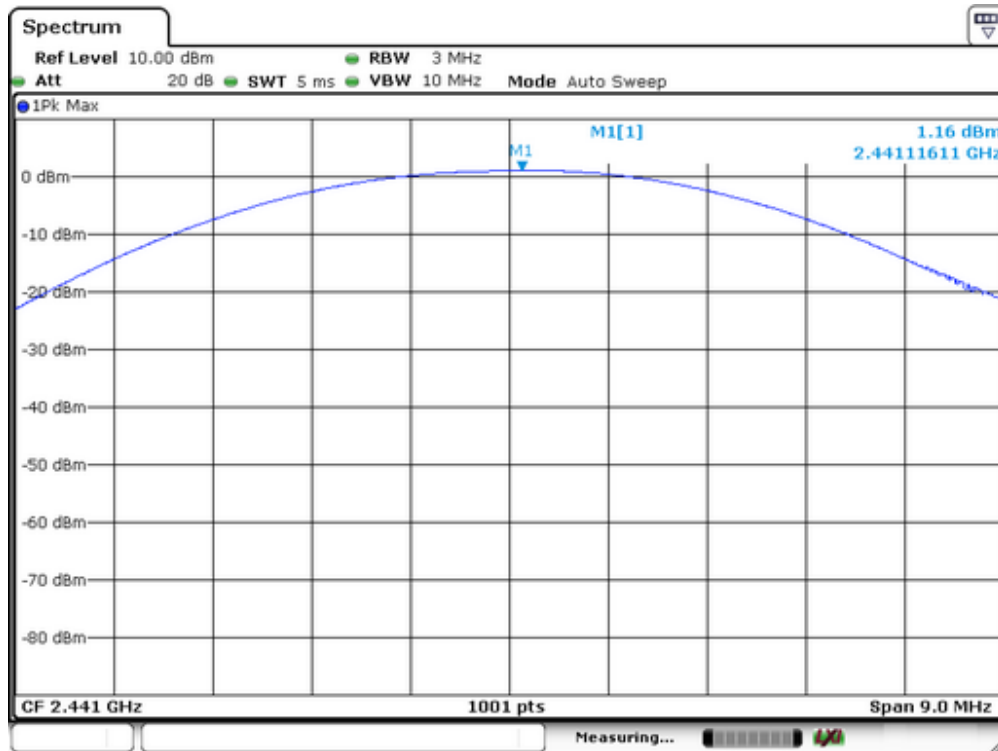
11.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %
Modulation:	GFSK		

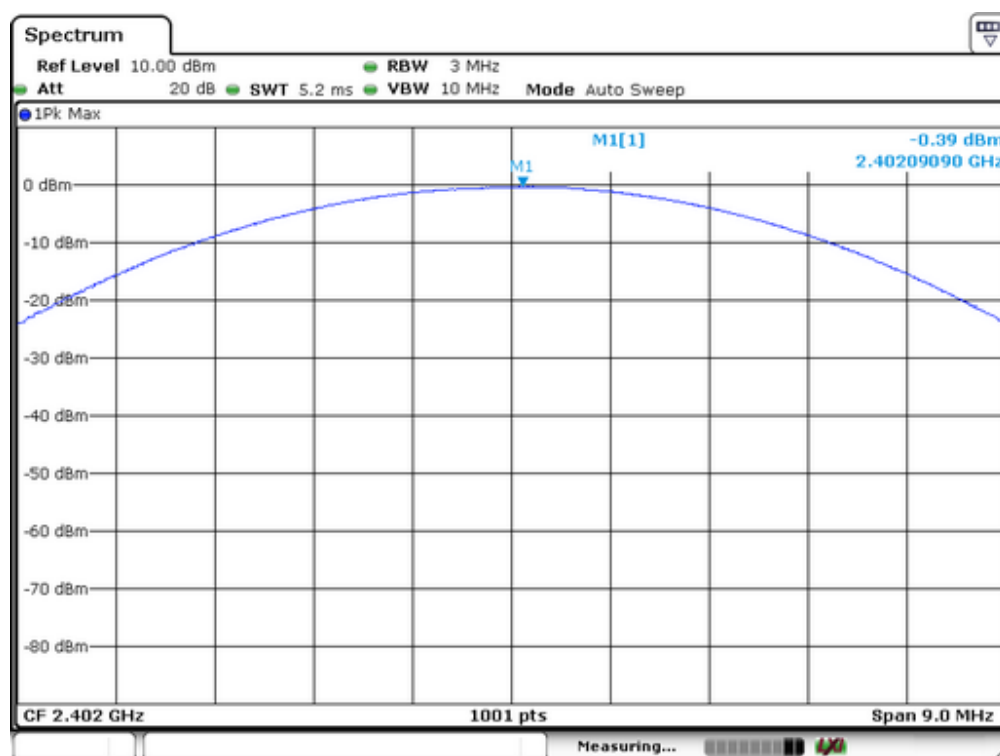
Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
01	2402	-1.8	0.661	1000	PASS
40	2441	1.16	1.306	1000	PASS
79	2480	2.17	1.648	1000	PASS

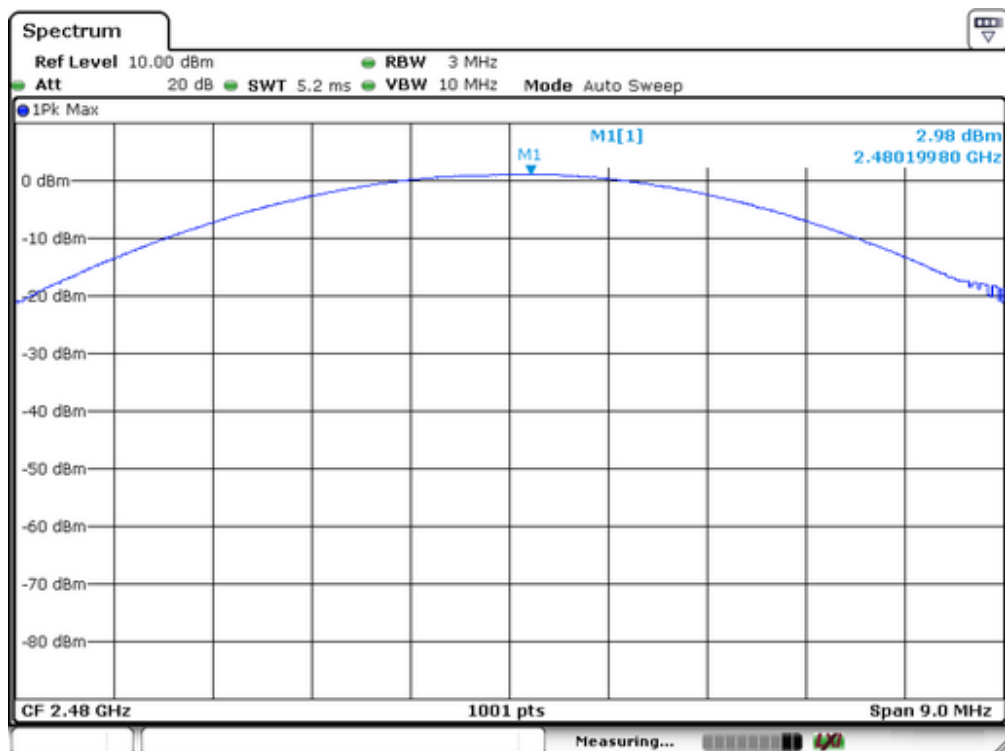
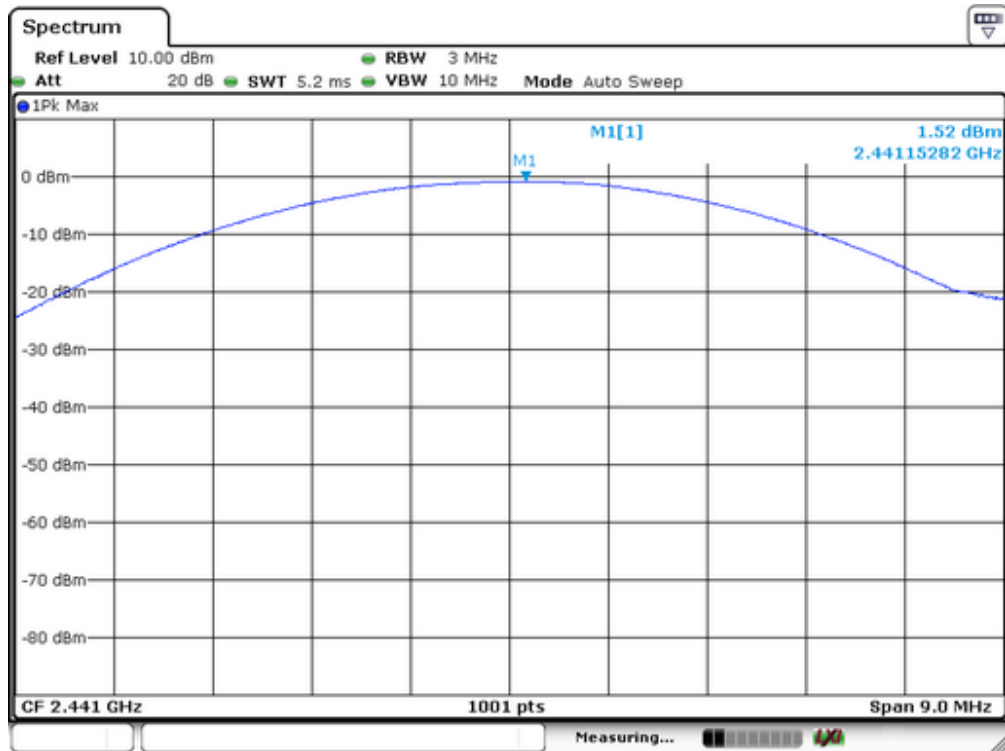




Spectrum Detector:	PK	Test Date :	June 28, 2015
Test By:	Andy	Temperature :	25 °C
Test Result:	PASS	Humidity :	50 %
Modulation:	Π/4-DQPSK		

Channel number	Channel Frequency (MHz)	Peak Power output(dBm)	Peak Power output(mW)	Peak Power Limit(mW)	Pass/Fail
01	2402	-0.39	0.914	125	PASS
40	2441	1.52	1.419	125	PASS
79	2480	2.98	1.986	125	PASS

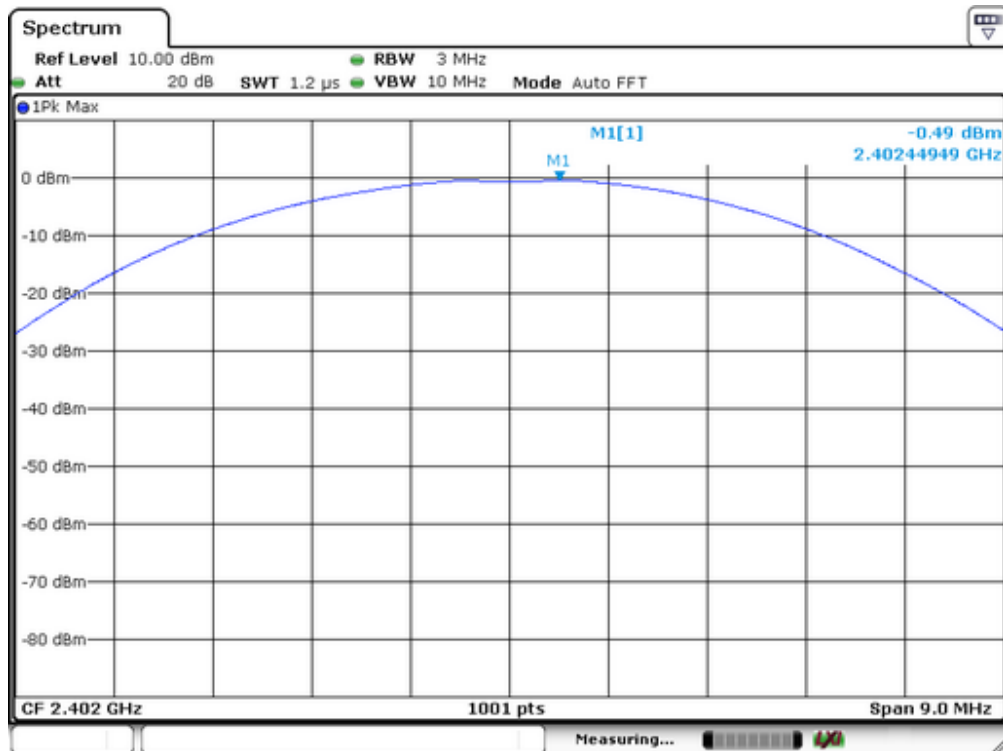


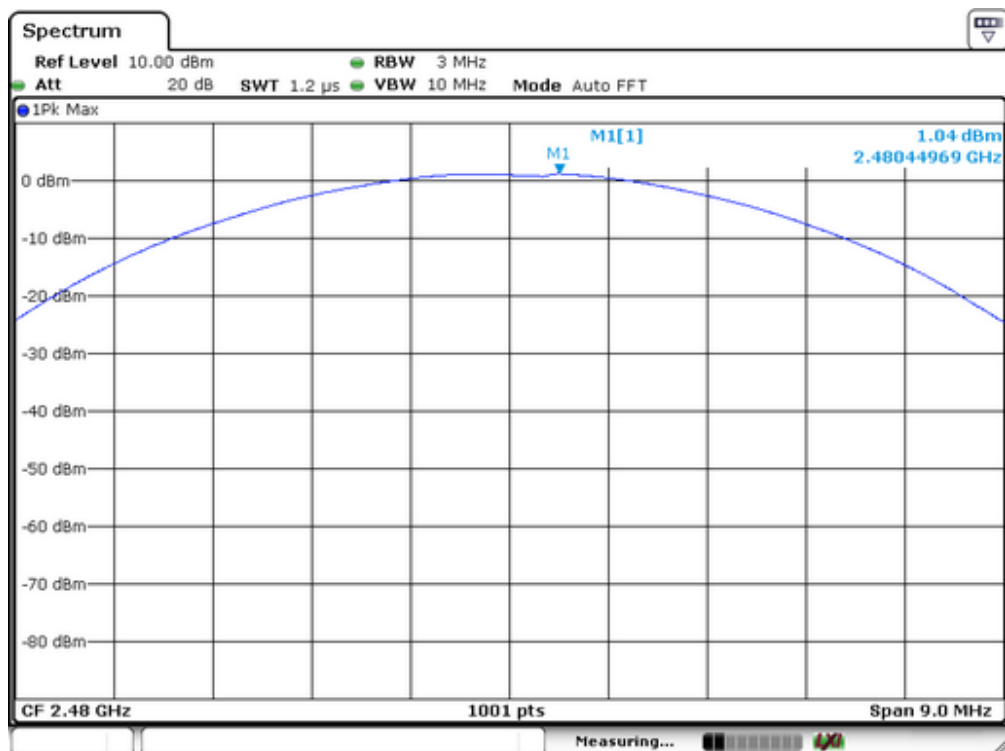
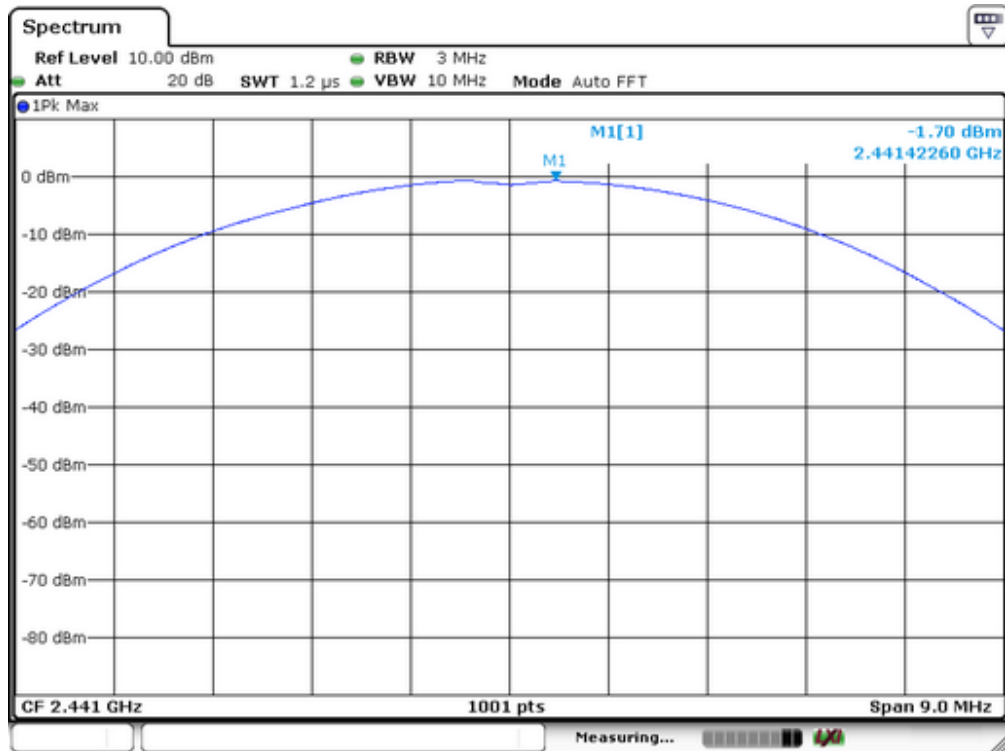


Spectrum Detector: PK
Test By: Andy
Test Result: PASS
Modulation: 8DPSK

Test Date : June 28, 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	-0.49	0.893	125	PASS
40	2441	-1.7	0.676	125	PASS
79	2480	1.04	1.271	125	PASS





12. Band EDGE test

12.1 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

The EUT was placed on a styrofoam table which is 1.5m above ground plane.

The measurement procedure at the ban edges was simplified by performing the measurement in just one plot. Both, the in-band-emission and the unwanted emission were be encompassed by the span. After trace stabilization, the maximum peak was be determined by a peak detector and the value was marked by an appropriate limit line. The second limit line, which is 20dB below the first, marks the limit for the emissions in the unrestricted band. A maximum-peak-detector marks the highest emission in the unrestricted band next to the band edge.

The measurements were performed at the lower end of the 2.4GHz band.
Use the following spectrum analyzer settings:

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

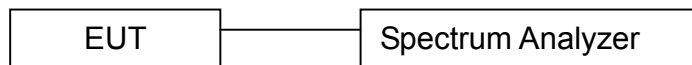
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	3MHz
Detector	Peak
Trace	Max hold

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

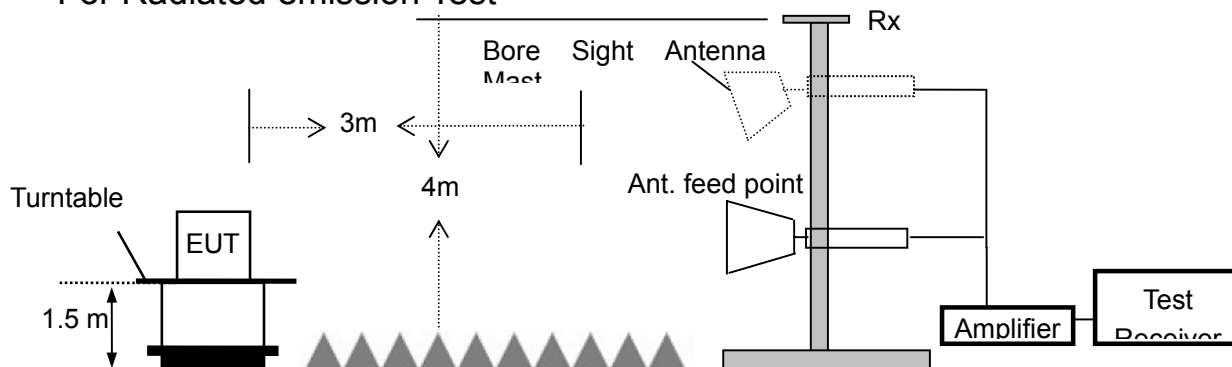
EMI Test Receiver	Setting
Attenuation	Auto
RB	1MHz
VB	10Hz
Detector	Peak
Trace	Max hold

12.2 Test SET-UP (Block Diagram of Configuration)

For Conducted Test



For Radiated emission Test



12.3 Measurement Equipment Used:

For Conducted Test

EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	Characteristics	LAST CAL.	CAL DUE.
Spectrum Analyzer	Rohde & Schwarz	FSV30	1321.3008K	10Hz-30GHz	03/15/2015	03/14/2016
Coaxial Cable	CDS	79254	46107086	10Hz-30GHz	03/15/2015	03/14/2016
Antenna Connector	ARTHUR-YANG	2244-N1TG1	N/A	10Hz-30GHz	03/15/2015	03/14/2016

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

The cable loss is 0.4dBm, and impedance is 50 Ω for the antenna connector.

For Radiated emission Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Characteristics	Last Cal.	Cal. Interval
1	Signal Analyzer	Rohde & Schwarz	FSV30	103040	9KHz-40GHz	12/29/2014	1 Year
2	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1272	1GHz-18GHz	12/29/2014	1 Year
3	Boresight Antenna Tower	EMEC	AM-BS-4500-D	N/A	N/A	12/29/2014	1 Year
4	Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	1GHz-26.5GHz	12/29/2014	1 Year
5	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year
6	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year
7	Cable	H+S	CBL-26	N/A	1GHz-26.5GHz	12/29/2014	1 Year

12.4 Measurement Results:

Refer to attached data chart.

Spectrum Detector:	PK	Test Date :	June 28, 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	-1.84	-40.15	38.31	>20dBc
2399.98	pi/4-DQPSK	-0.45	-42.01	41.56	>20dBc
2399.97	8DPSK	-0.58	-41.25	40.67	>20dBc
2483.51	GFSK	-1.89	-40.52	38.63	>20dBc
2483.51	pi/4-DQPSK	-0.43	-42.17	41.74	>20dBc
2483.53	8DPSK	-0.58	-43.08	42.5	>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	-1.95	-40.35	38.4	>20dBc
2399.95	pi/4-DQPSK	-0.48	-41.28	40.8	>20dBc
2399.98	8DPSK	-0.59	-40.72	40.13	>20dBc
2483.99	GFSK	-1.92	-46.25	44.33	>20dBc
2483.53	pi/4-DQPSK	-0.45	-47.04	46.59	>20dBc
2483.53	8DPSK	-0.58	-48.38	47.8	>20dBc

2. Radiated emission Test

Worst test modulation: pi/4-DQPSK

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
2399.52	H	64.36	45.35	74	54	-9.64	-8.65
2398.34	V	59.05	38.72	74	54	-14.95	-15.28
2484.01	H	63.48	44.15	74	54	-10.52	-9.85
2485.36	V	58.95	38.69	74	54	-15.05	-15.31

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
2399.58	H	64.05	44.05	74	54	-9.95	-9.95
2399.36	V	59.36	40.13	74	54	-14.64	-13.87
2484.15	H	65.13	45.28	74	54	-8.87	-8.72
2483.56	V	58.79	38.48	74	54	-15.21	-15.52

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, permanent attached 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)



