FCC Test Report

Product Name ： Freescan

Trade Name ： maisense

Model No. ： Freescan, 211111, 211121, 211112, 211122, 311020

FCC ID. ： 2AOWE-MS1101

Applicant ： Maisense Inc.

Address ： 5F., No.333, Wenxing Rd., Zhubei City, Hsinchu County 30264, Taiwan (R.O.C.)

Date of Receipt ： Oct. 03, 2017

Issued Date ： Jan. 25, 2018

Report No. ： 1810176R-RFUSP01V00

Report Version ： V1.0

Testing Laboratory 3024

The test results relate only to the samples tested.
The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Test Report Certification

Issued Date : Jan. 25, 2018
Report No. : 1810176R-RFUSP01V00

Product Name	:	Freescan
Applicant	:	Maisense Inc.
Address	:	5F., No.333, Wenxing Rd., Zhubei City, Hsinchu County 30264, Taiwan (R.O.C.)
Manufacturer	:	Kentec
Model No.	:	Freescan, 211111, 211121, 211112, 211122, 311020
FCC ID.	:	2AOWE-MS1101
EUT Voltage	:	DC 5V (Power by Notebook PC)
Testing Voltage	:	DC 5V (Power by Notebook PC)
Trade Name	:	maisense
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2016
Laboratory Name	:	Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C. TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result	:	Complied

Documented By : Lyla Yang

(Lyla Yang / Engineering Adm. Specialist)

Tested By : Ricky Lee

(Ricky Lee / Senior Engineer)

Approved By : Roy Wang

(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1810176R-RFUSP01V00	V1.0	Initial issue of report	Jan. 25, 2018

TABLE OF CONTENTS

Description		Page
1.	General Information	6
1.1.	EUT Description	6
1.2.	Test Mode	8
1.3.	Tested System Details	9
1.4.	Configuration of tested System	9
1.5.	EUT Exercise Software	9
1.6.	Test Facility	10
1.7.	List of Test Equipment	11
1.8.	Measurement Uncertainty	13
2.	Conducted Emission	14
2.1.	Test Specification	14
2.2.	Test Setup	14
2.3.	Limits	14
2.4.	Test Procedure	15
2.5.	Test Result	16
3.	Peak Power Output	20
3.1.	Test Specification	20
3.2.	Test Setup	20
3.3.	Test procedures	20
3.4.	Limits	20
3.5.	Test Result	21
4.	Radiated Emission	22
4.1.	Test Specification	22
4.2.	Test Setup	22
4.3.	Limits	23
4.4.	Test Procedure	23
4.5.	Test Result	24
5.	RF antenna conducted test	40
5.1.	Test Specification	40
5.2.	Test Setup	40
5.3.	Limits	40
5.4.	Test Procedure	40
5.5.	Test Result	41
6.	Band Edge	45
6.1.	Test Specification	45
6.2.	Test Setup	45
6.3.	Limits	45
6.4.	Test Procedure	45
6.5.	Test Result	46

7. Occupied Bandwidth & DTS Bandwidth 52
7.1. Test Specification 52
7.2. Test Setup 52
7.3. Limits 52
7.4. Test Procedures 52
7.5. Test Result 53
8. Power Density 55
8.1. Test Specification 55
8.2. Test Setup 55
8.3. Limits 55
8.4. Test Procedures 55
8.5. Test Result 56
Attachment 1 58
Test Setup Photograph 58
Attachment 2 64
EUT External Photograph 64
Attachment 3 75
EUT Internal Photograph 75

1. General Information

1.1. EUT Description

Product Name	Freescan
Trade Name	maisense
Model No.	Freescan, 211111, 211121, 211112, 211122, 311020
Frequency Range	2402~2480MHz
Channel Number	40 Channels
Type of Modulation	Bluetooth 4.0(GFSK)

Antenna Information	
MFR. /Model No.	WIESON / A04 2.4GHz LTCC Chip Antenna for Monopole Type
Antenna Type	Chip Antenna
Antenna Gain	7.4 dBi

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

Note:

1. This device is a Freescan support BT4.0 transmitting and receiving function.
2. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.
3. The different of the each model is shown as below:

Diversity Description	Original Model	Series Model				
	Freescan	211111	211121	211112	211122	311020
Market	Export sales	O	O	O	O	Domestic sales
Brand name / Trademark	maisense	O	O	O	O	O
Circuit diagram	Refer annex	O	O	O	O	O
Block Diagram	Refer annex	O	O	O	O	O
Components	Refer annex	O	O	O	O	O
Enclosure Shape		O	O			O
Electrode Material of plating	Rhodium	Rhodium	Gold	Rhodium	Gold	Gold

1.2. Test Mode

DEKRA has verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Test Mode	Mode 1: Transmit Mode Mode 2: Recever Mode

Test Items	Modulation	Channel	Result
Conducted Emission	GFSK	19	Complies
Peak Power Output	GFSK	00/19/39	Complies
Radiated Emission	GFSK	00/19/39	Complies
RF antenna conducted test	GFSK	00/19/39	Complies
Radiated Emission Band Edge	GFSK	00/19/39	Complies
Occupied Bandwidth	GFSK	00/19/39	Complies
DTS Bandwidth	GFSK	00/19/39	Complies
Power Density	GFSK	00/19/39	Complies

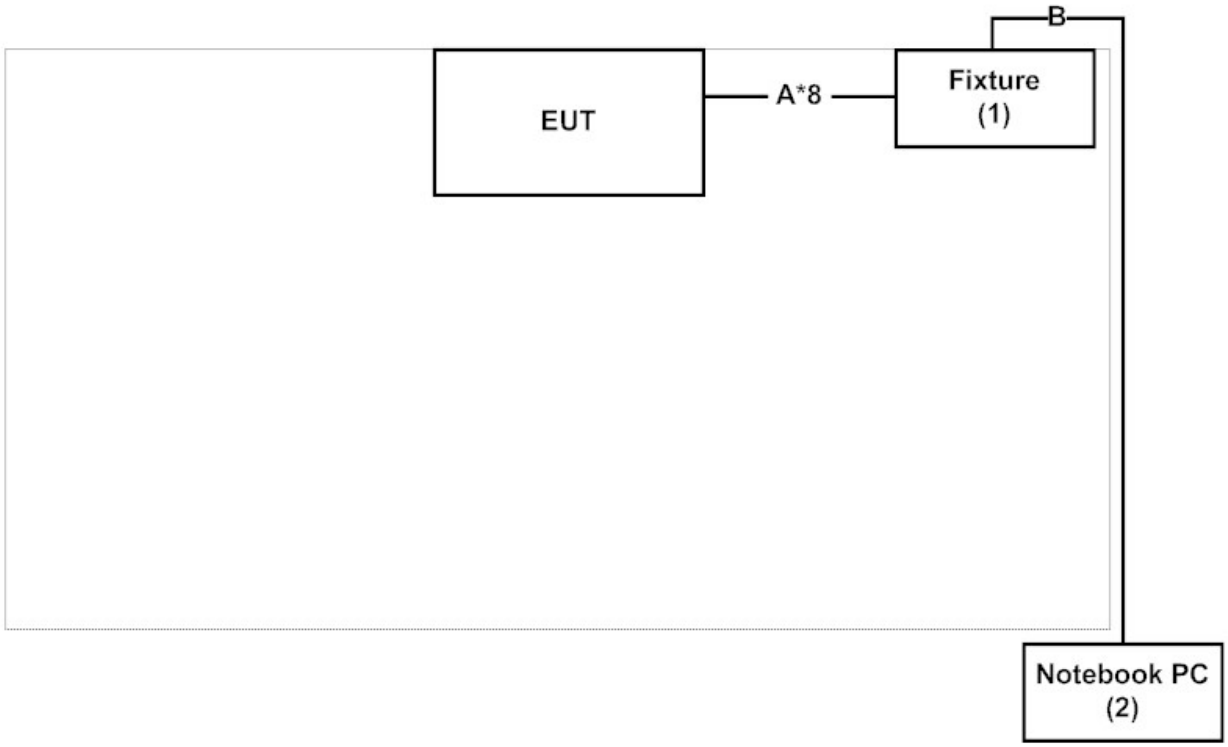
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product		Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1	Fixture	Freescan	N/A	N/A	DoC	--
2	Notebook PC	ASUS	X522EP	E5N0CV0432 64197	DoC	Non-Shielded, 1.8m, one ferrite core bonded

1.4. Configuration of tested System

Connection Diagram



Signal Cable Type		Signal cable Description
A	Signal Cable	Non-Shielded, 0.6m, 8 Pcs
B	USB Cable	Non-Shielded, 2m

1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the “ISRT Ver 2.1.29.4784” on the laptop.
3	Configure the test mode, the test channel, and the data rate.
4	Press “Start TX” and “Start RX” to start the continuous transmitting.
5	Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual	Test Site
Temperature (°C)	FCC PART 15 C 15.207 Conducted Emission	15 - 35	20	3
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission	15 - 35	25	2
Humidity (%RH)		25 - 75	54	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 RF antenna conducted test	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Band Edge	15 - 35	25	2
Humidity (%RH)		25 - 75	50	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 DTS Bandwidth	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	
Temperature (°C)	FCC PART 15 C 15.247 Power Density	15 - 35	24	3
Humidity (%RH)		25 - 75	45	
Barometric pressure (mbar)		860 - 1060	950-1000	

Note: Test site information refers to Laboratory Information.

The related certificate for our laboratories about the test site and management system can be downloaded from DEKRA Testing and Certification Co., Ltd. Web Site :
http://www.dekra.com.tw/english/about/certificates.aspx?bval=5
The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site : http://www.dekra.com.tw/index_en.aspx

If you have any comments, Please don't hesitate to contact us. Our test sites as below:

1 No. 75-2, 3rd Lin, WangYe Keng, Yonghxing Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan (R.O.C.)
TEL:+886-3-592-8858 / FAX:+886-3-592-8859 E-Mail : info.tw@dekra.com
2 No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com
3 No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com

1.7. List of Test Equipment

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2017/02/06	2018/02/05
Test Receiver	R&S	ESCS 30	836858/022	2017/04/12	2018/04/11
LISN	R&S	ENV216	100092	2017/07/31	2018/07/30

Peak Power Output / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531043	2017/01/20	2018/01/19
Pulse Power Sensor	Anritsu	MA2411B	1531044	2017/01/20	2018/01/19

Radiated Emission / CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Band Edge / CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2016/11/28	2017/11/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12
Bilog Antenna	Teseq	CBL6112D	23191	2017/06/28	2018/06/27
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2017/06/14	2018/06/13
Horn Antenna	Schwarzbeck	BBHA 9170	202	2017/02/15	2018/02/14
Pre-Amplifier	RF Bay Inc.	LNA-1330	12162511	2017/03/09	2018/03/08
Pre-Amplifier	EMCI	EMCI 1830I	980366	2017/01/23	2018/01/22
Pre-Amplifier	MITEQ	JS44-45-8P	2014754	2016/12/26	2017/12/25

Occupied Bandwidth & DTS Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

Power Density / SR10-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal & Spectrum Analyzer	R&S	FSV40	101049	2017/01/23	2018/01/22
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2017/03/13	2018/03/12

1.8. Measurement Uncertainty

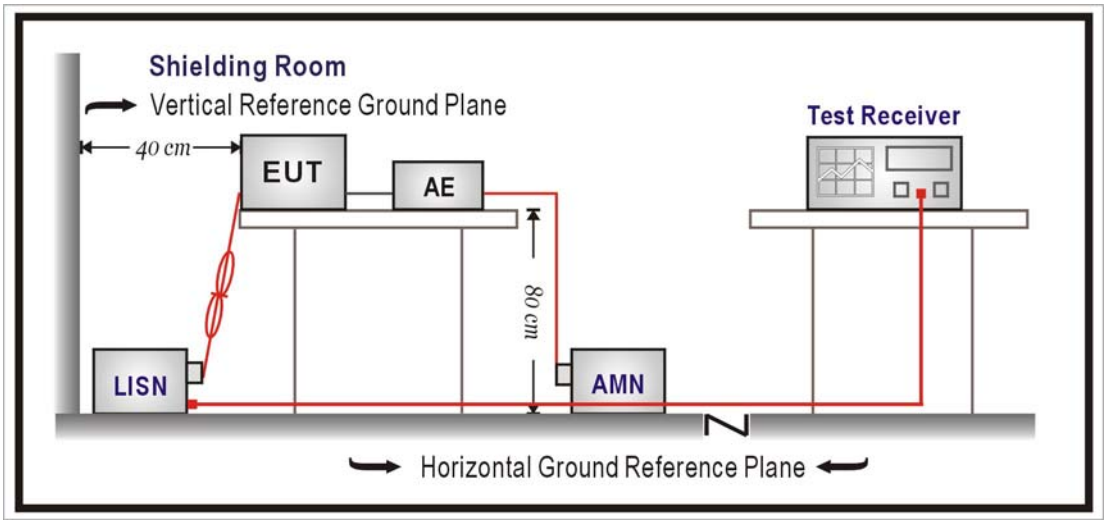
Test Item	Uncertainty
Conducted Emission	± 2.26 dB
Peak Power Output	± 1.27 dB
Radiated Emission (30MHz～1GHz)	± 3.43 dB
Radiated Emission (1GHz～26.5GHz)	± 3.65 dB
RF antenna conducted test	± 1.27 dB
Band Edge	Conducted is defined as ± 1.27 dB Radiated is defined as ± 3.9 dB
Occupied Bandwidth & DTS Bandwidth	± 50 kHz
Power Density	± 1.27 dB

2. Conducted Emission

2.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207: 2016.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

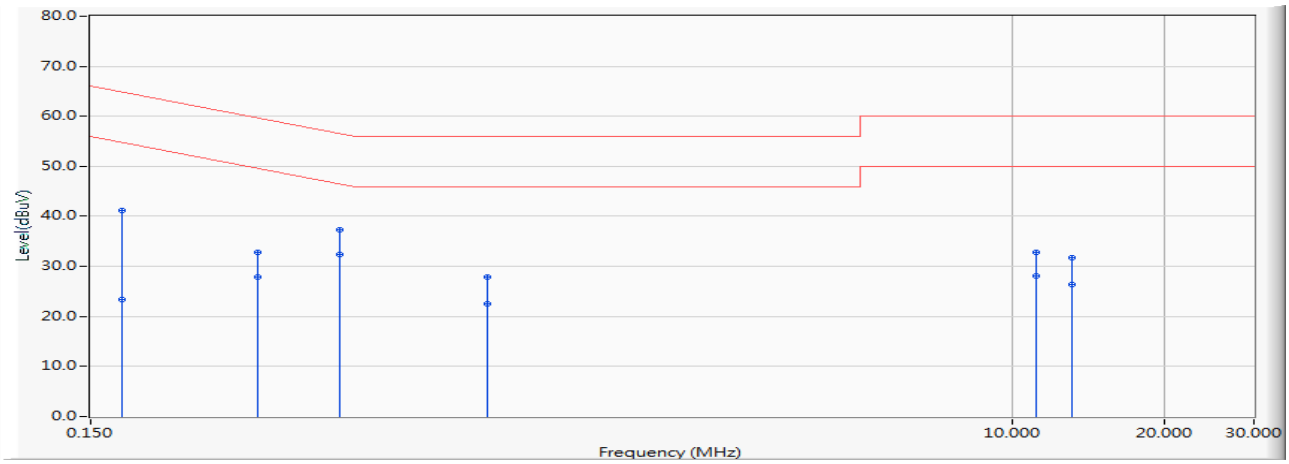
Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Result

Site : SR2-H	**Time : 2017/10/19**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-6_0712 - Line1	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode _802.15.1_BLE_2440MHz**

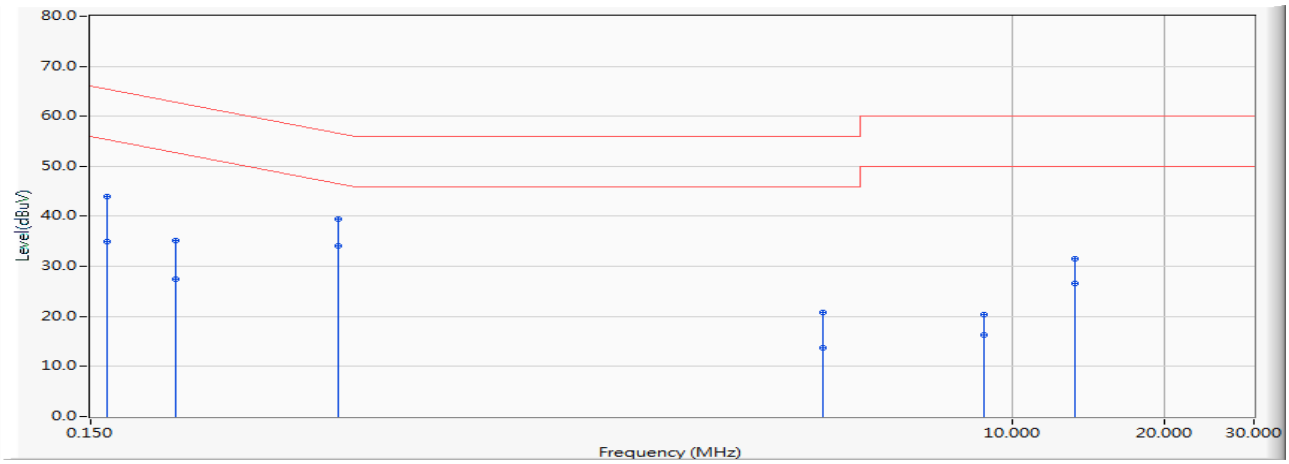


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.173	9.753	31.360	41.113	-23.681	64.794	QUASIPEAK
2		0.173	9.753	13.690	23.443	-31.351	54.794	AVERAGE
3		0.322	9.738	23.100	32.838	-26.820	59.658	QUASIPEAK
4		0.322	9.738	18.110	27.848	-21.810	49.658	AVERAGE
5		0.466	9.729	27.660	37.389	-19.189	56.578	QUASIPEAK
6	*	0.466	9.729	22.670	32.399	-14.179	46.578	AVERAGE
7		0.916	9.804	18.140	27.944	-28.056	56.000	QUASIPEAK
8		0.916	9.804	12.730	22.534	-23.466	46.000	AVERAGE
9		11.146	10.151	22.570	32.721	-27.279	60.000	QUASIPEAK
10		11.146	10.151	17.900	28.051	-21.949	50.000	AVERAGE
11		13.127	10.187	21.500	31.686	-28.314	60.000	QUASIPEAK
12		13.127	10.187	16.170	26.356	-23.644	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2-H	**Time : 2017/10/19**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-6_0712 - Line2	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode _802.15.1_BLE_2440MHz**

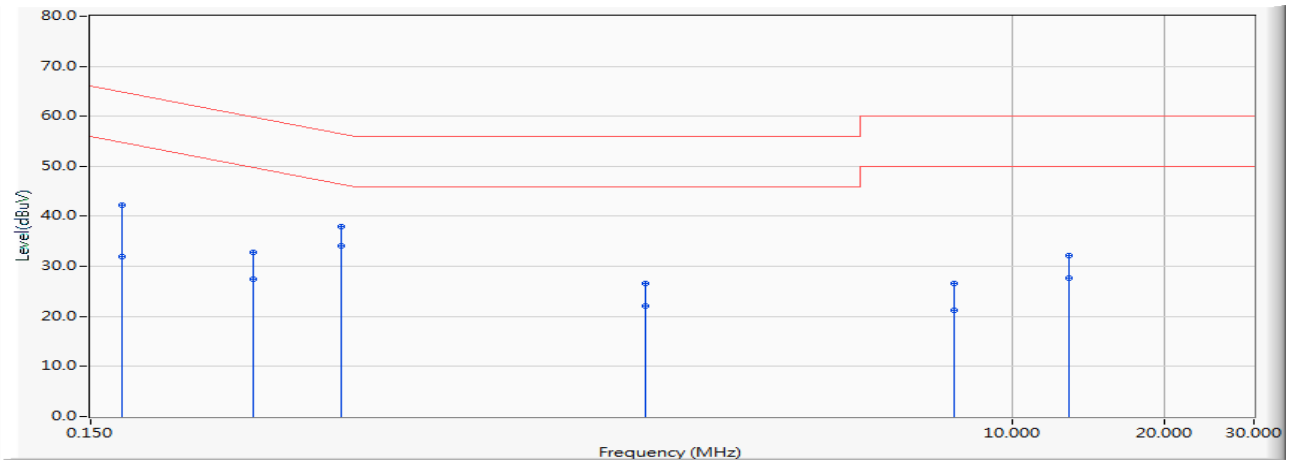


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.754	34.240	43.994	-21.381	65.375	QUASIPEAK
2		0.162	9.754	25.260	35.014	-20.361	55.375	AVERAGE
3		0.220	9.750	25.380	35.130	-27.677	62.807	QUASIPEAK
4		0.220	9.750	17.610	27.360	-25.447	52.807	AVERAGE
5		0.463	9.747	29.710	39.457	-17.191	56.648	QUASIPEAK
6	*	0.463	9.747	24.270	34.017	-12.631	46.648	AVERAGE
7		4.213	9.844	10.890	20.734	-35.266	56.000	QUASIPEAK
8		4.213	9.844	3.910	13.754	-32.246	46.000	AVERAGE
9		8.744	10.077	10.260	20.337	-39.663	60.000	QUASIPEAK
10		8.744	10.077	6.280	16.357	-33.643	50.000	AVERAGE
11		13.236	10.254	21.260	31.514	-28.486	60.000	QUASIPEAK
12		13.236	10.254	16.300	26.554	-23.446	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2-H	**Time : 2017/10/19**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-6_0712 - Line1	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_802.15.1_BLE_2440MHz**

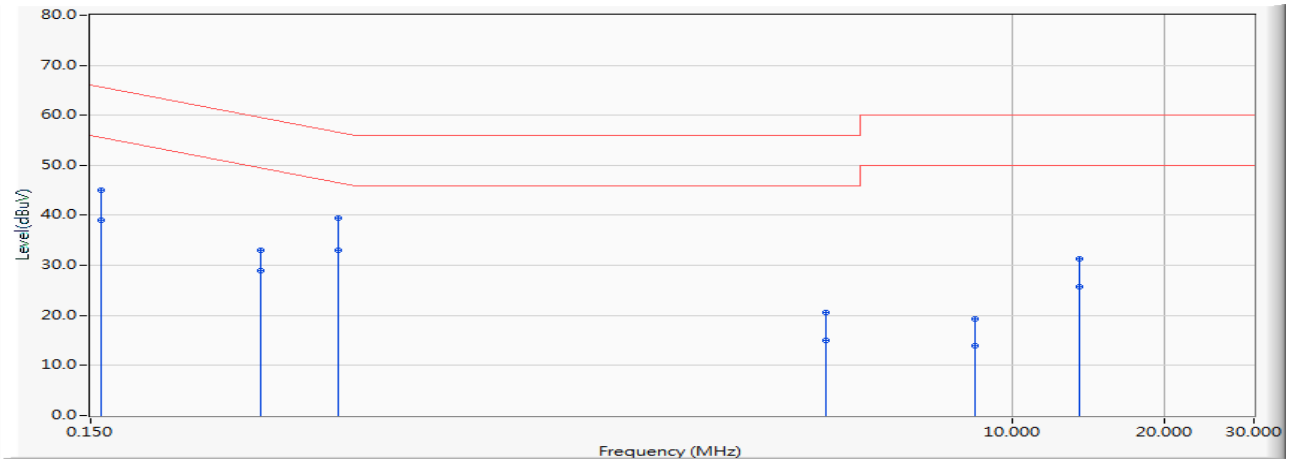


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.173	9.753	32.450	42.203	-22.591	64.794	QUASIPEAK
2		0.173	9.753	22.270	32.023	-22.771	54.794	AVERAGE
3		0.314	9.739	23.130	32.869	-26.994	59.862	QUASIPEAK
4		0.314	9.739	17.690	27.429	-22.434	49.862	AVERAGE
5		0.470	9.729	28.190	37.919	-18.590	56.508	QUASIPEAK
6	*	0.470	9.729	24.340	34.069	-12.440	46.508	AVERAGE
7		1.880	9.855	16.670	26.525	-29.475	56.000	QUASIPEAK
8		1.880	9.855	12.200	22.055	-23.945	46.000	AVERAGE
9		7.662	10.032	16.470	26.503	-33.497	60.000	QUASIPEAK
10		7.662	10.032	11.280	21.313	-28.687	50.000	AVERAGE
11		12.904	10.182	21.930	32.112	-27.888	60.000	QUASIPEAK
12		12.904	10.182	17.420	27.602	-22.398	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2-H	**Time : 2017/10/19**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-6_0712 - Line2	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_802.15.1_BLE_2440MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.158	9.751	35.270	45.021	-20.557	65.578	QUASIPEAK
2		0.158	9.751	29.230	38.981	-16.597	55.578	AVERAGE
3		0.326	9.750	23.200	32.950	-26.608	59.558	QUASIPEAK
4		0.326	9.750	19.280	29.030	-20.528	49.558	AVERAGE
5		0.463	9.747	29.610	39.357	-17.291	56.648	QUASIPEAK
6	*	0.463	9.747	23.240	32.987	-13.661	46.648	AVERAGE
7		4.279	9.845	10.770	20.615	-35.385	56.000	QUASIPEAK
8		4.279	9.845	5.210	15.055	-30.945	46.000	AVERAGE
9		8.412	10.057	9.280	19.337	-40.663	60.000	QUASIPEAK
10		8.412	10.057	3.900	13.957	-36.043	50.000	AVERAGE
11		13.537	10.263	21.000	31.263	-28.737	60.000	QUASIPEAK
12		13.537	10.263	15.520	25.783	-24.217	50.000	AVERAGE

Note:

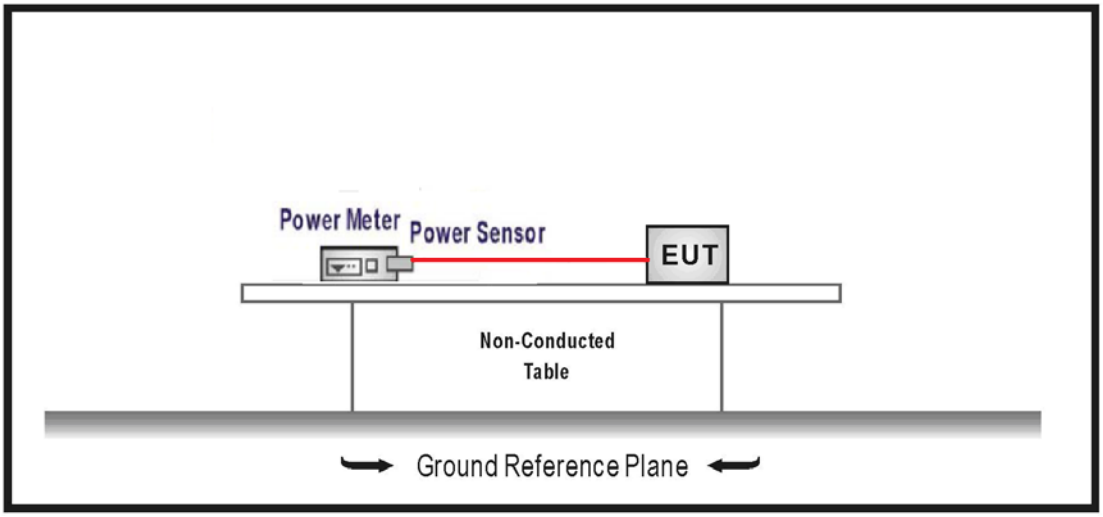
1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Peak Power Output

3.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

3.2. Test Setup



3.3. Test procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Result

Product	Freescan		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/10/03	Test Site	SR10-H

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	-1.18	30	Pass
19	2440	-1.51	30	Pass
39	2480	-2.33	30	Pass

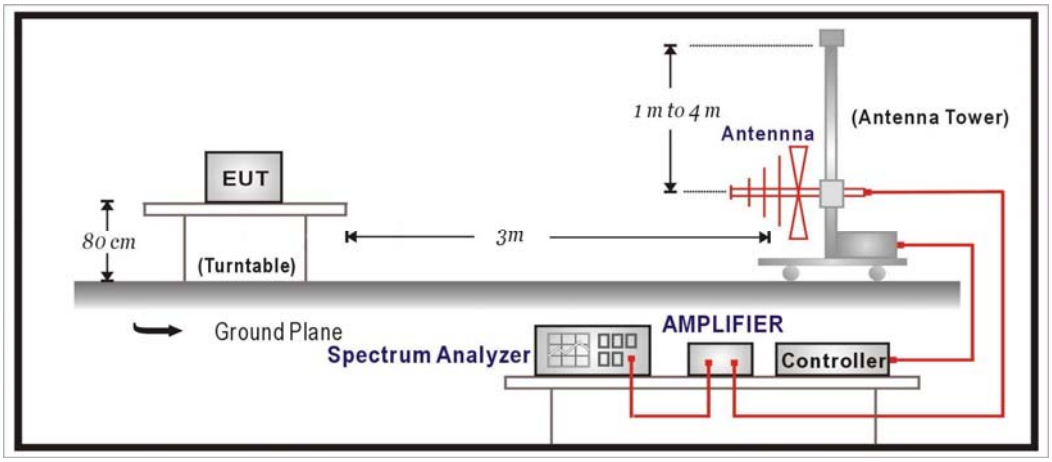
4. Radiated Emission

4.1. Test Specification

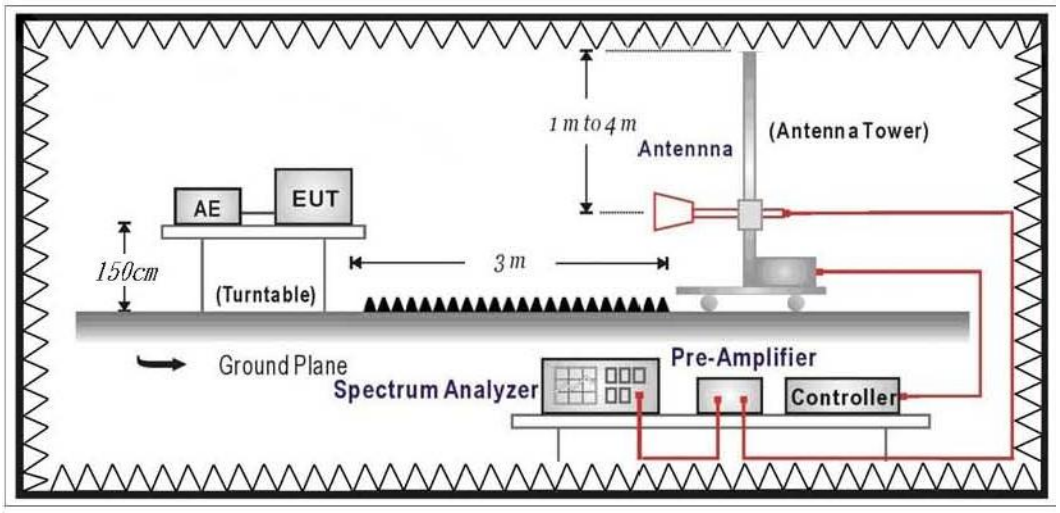
According to FCC Part 15 Subpart C Paragraph 15.247.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	uV/m	dBuV/m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)
2. In the Above Table, the tighter limit applies at the band edges.
3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

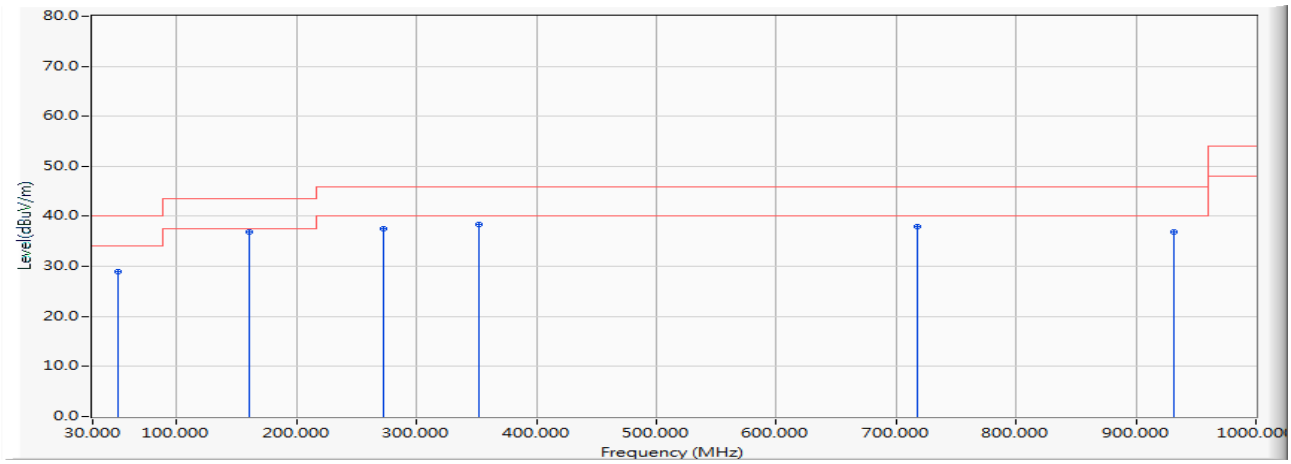
4.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements.
The EUT and its simulators are placed on a turn table which is 0.8 or 1.5 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.
On any frequency or frequencies form 9KHz(inculde The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.
The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.5. Test Result

30MHz-1GHz Spurious

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB2_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

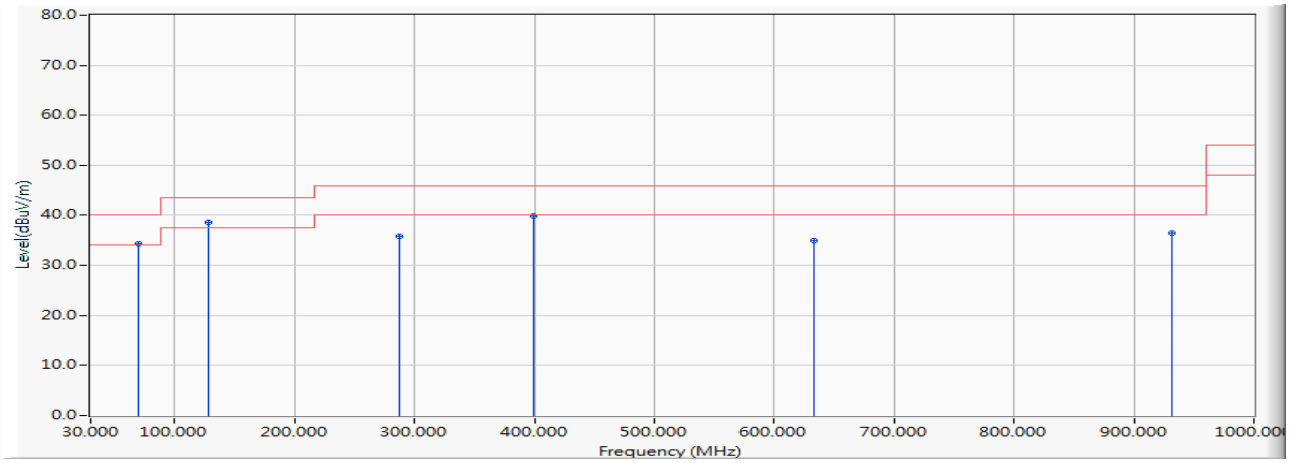


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		51.631	-26.118	55.015	28.897	-11.103	40.000	QUASIPEAK
2	*	159.980	-23.032	59.985	36.954	-6.546	43.500	QUASIPEAK
3		272.015	-19.853	57.333	37.480	-8.520	46.000	QUASIPEAK
4		352.040	-17.457	55.892	38.435	-7.565	46.000	QUASIPEAK
5		718.215	-12.010	49.969	37.959	-8.041	46.000	QUASIPEAK
6		932.003	-9.143	46.098	36.955	-9.045	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB2_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

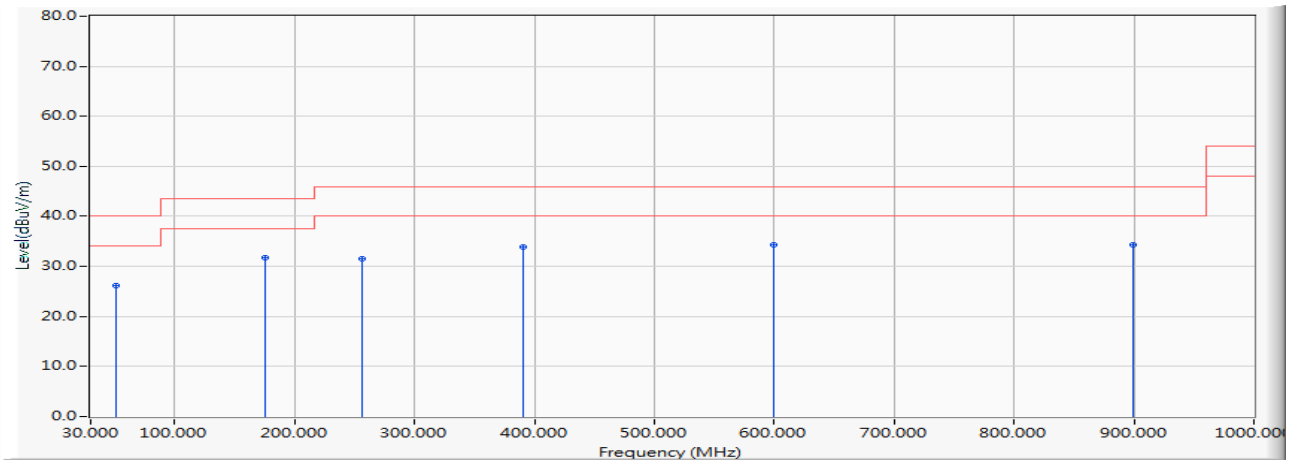


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		69.770	-28.248	62.563	34.315	-5.685	40.000	QUASIPEAK
2	*	127.970	-21.696	60.199	38.503	-4.997	43.500	QUASIPEAK
3		288.020	-19.474	55.210	35.736	-10.264	46.000	QUASIPEAK
4		399.182	-15.969	55.804	39.835	-6.165	46.000	QUASIPEAK
5		633.340	-12.906	47.840	34.934	-11.066	46.000	QUASIPEAK
6		931.809	-9.149	45.590	36.441	-9.559	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB2_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2440MHz**

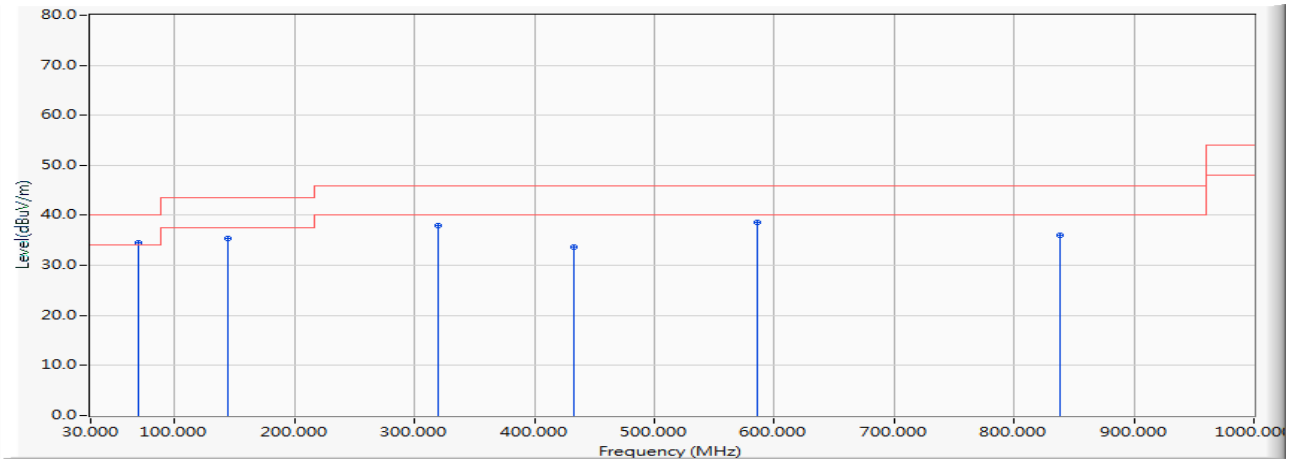


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		50.952	-25.939	52.030	26.091	-13.909	40.000	QUASIPEAK
2		175.985	-24.010	55.728	31.718	-11.782	43.500	QUASIPEAK
3		256.010	-20.241	51.826	31.586	-14.414	46.000	QUASIPEAK
4		390.646	-16.258	50.233	33.975	-12.025	46.000	QUASIPEAK
5		599.196	-13.265	47.593	34.328	-11.672	46.000	QUASIPEAK
6	*	899.799	-9.829	44.160	34.331	-11.669	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB2_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2440MHz**



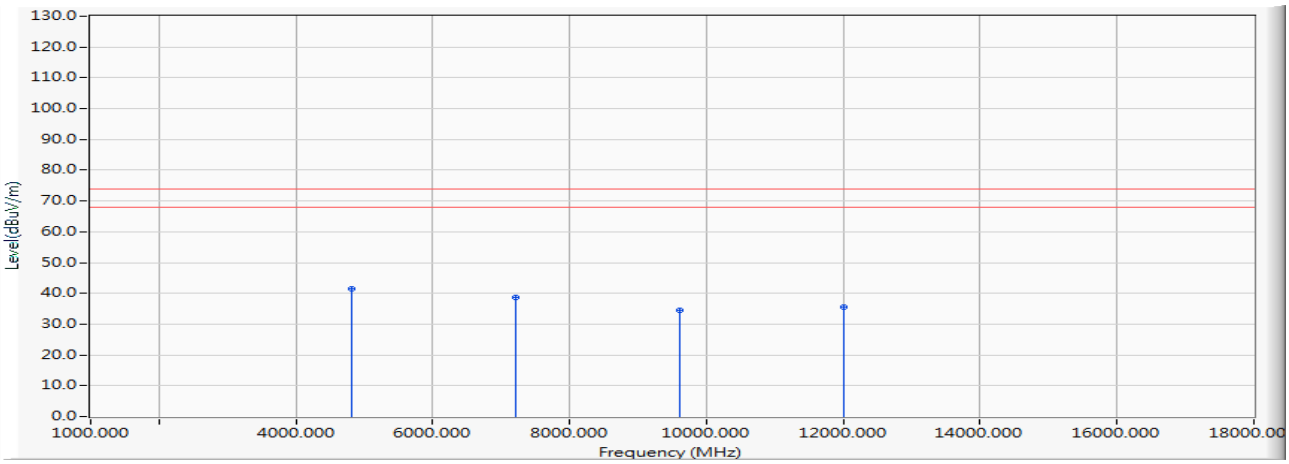
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	69.770	-28.248	62.797	34.549	-5.451	40.000	QUASIPEAK
2		143.975	-22.152	57.637	35.485	-8.015	43.500	QUASIPEAK
3		320.030	-18.443	56.363	37.919	-8.081	46.000	QUASIPEAK
4		433.326	-15.424	49.154	33.729	-12.271	46.000	QUASIPEAK
5		586.489	-13.360	51.888	38.529	-7.471	46.000	QUASIPEAK
6		838.592	-10.647	46.592	35.946	-10.054	46.000	QUASIPEAK

Note:

1. All Reading Levels is Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor
4. The Emission under 30MHz were not included is because their levels are too low.

Above 1GHz Spurious

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2402MHz**

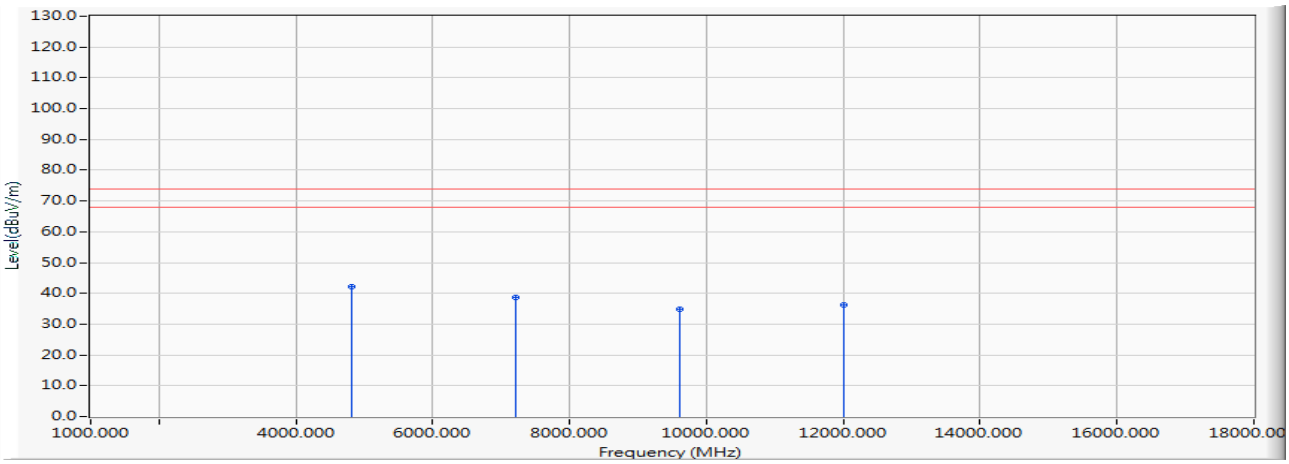


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4805.280	-0.205	41.736	41.530	-32.470	74.000	PEAK
2		7205.120	6.959	31.660	38.620	-35.380	74.000	PEAK
3		9608.820	12.543	21.897	34.440	-39.560	74.000	PEAK
4		12009.340	15.519	19.951	35.470	-38.530	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2402MHz**

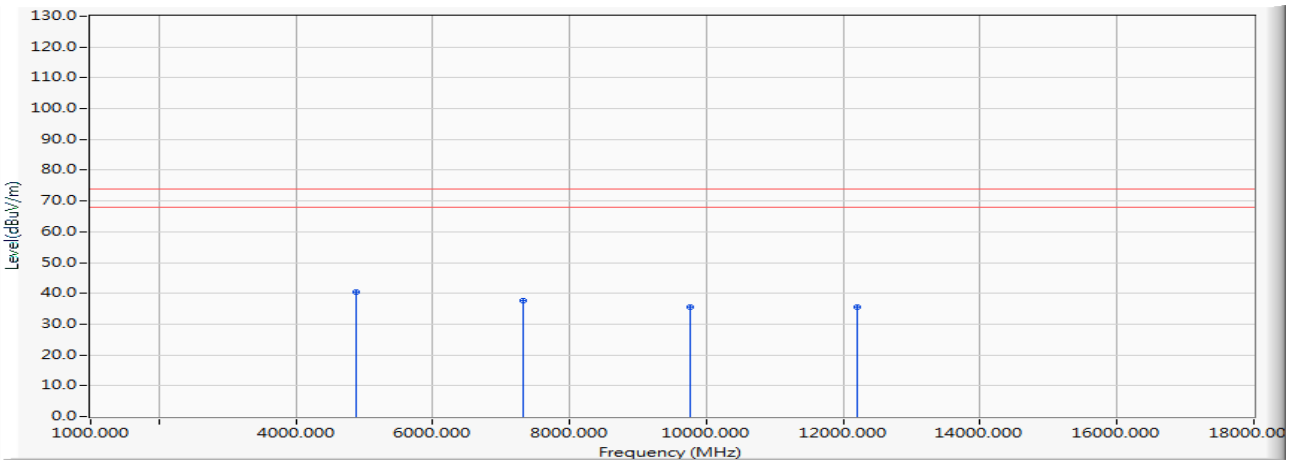


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4803.870	-0.208	42.518	42.310	-31.690	74.000	PEAK
2		7204.020	6.955	31.734	38.690	-35.310	74.000	PEAK
3		9609.240	12.544	22.416	34.960	-39.040	74.000	PEAK
4		12009.600	15.518	20.742	36.260	-37.740	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

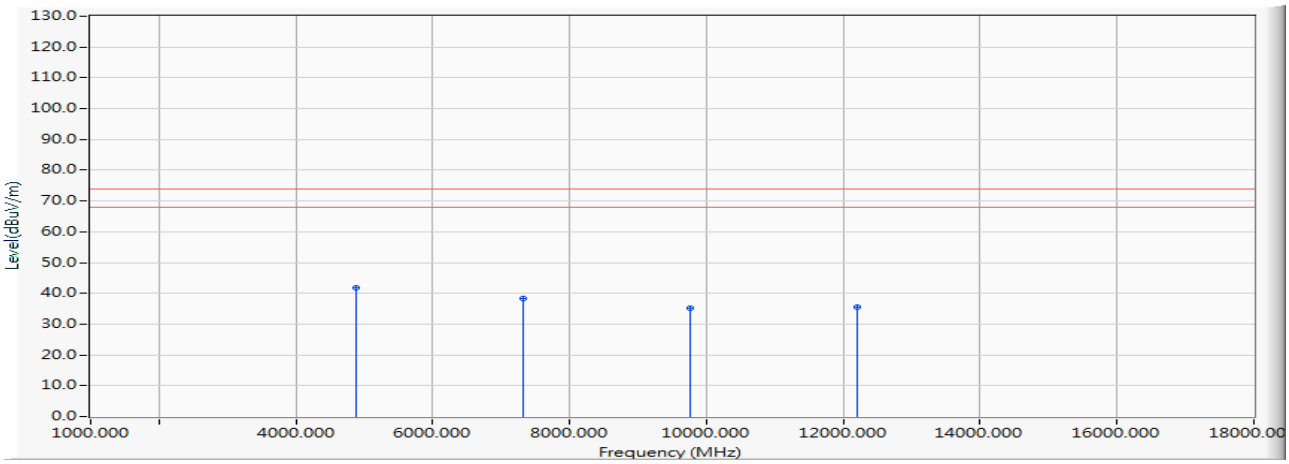


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4879.860	-0.126	40.696	40.570	-33.430	74.000	PEAK
2		7319.340	7.434	30.226	37.660	-36.340	74.000	PEAK
3		9760.090	12.866	22.604	35.470	-38.530	74.000	PEAK
4		12200.540	14.849	20.780	35.630	-38.370	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

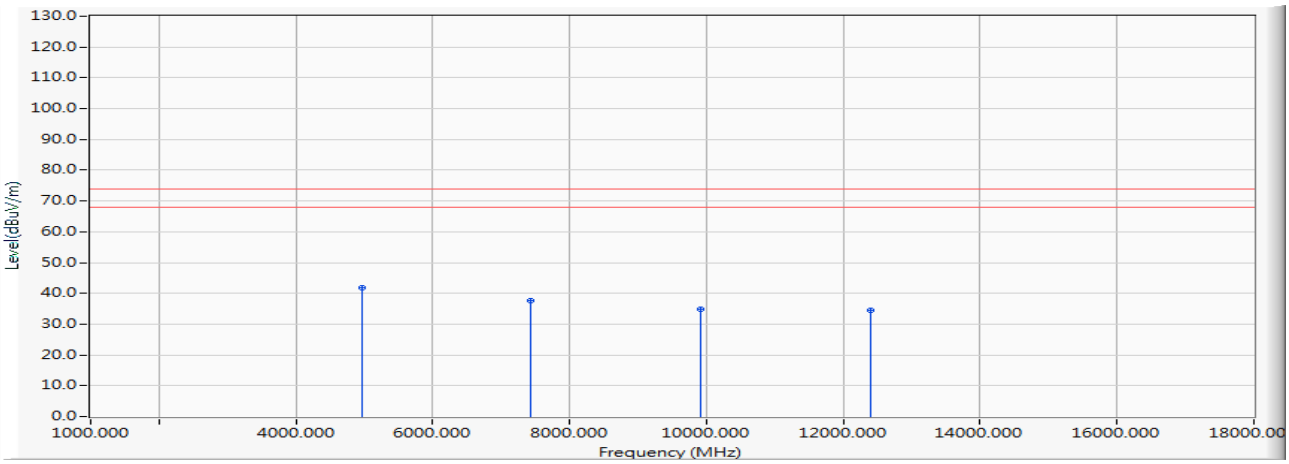


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4880.310	-0.125	41.865	41.740	-32.260	74.000	PEAK
2		7320.920	7.440	30.860	38.300	-35.700	74.000	PEAK
3		9758.660	12.863	22.496	35.360	-38.640	74.000	PEAK
4		12199.600	14.854	20.697	35.550	-38.450	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2480MHz**

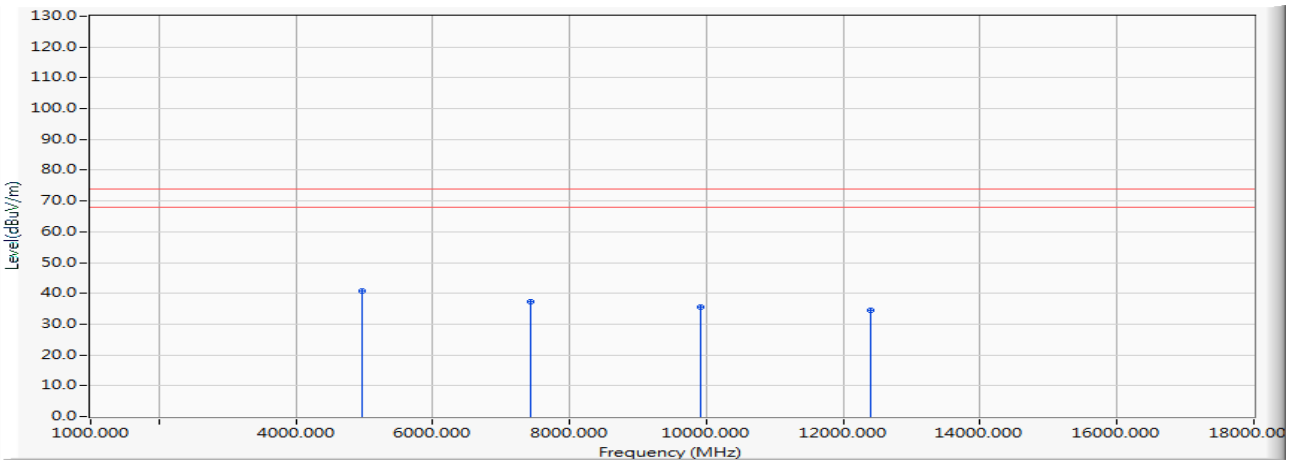


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.150	-0.035	41.904	41.870	-32.130	74.000	PEAK
2		7439.470	7.867	29.813	37.680	-36.320	74.000	PEAK
3		9918.700	13.089	21.721	34.810	-39.190	74.000	PEAK
4		12400.630	15.738	18.782	34.520	-39.480	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2480MHz**

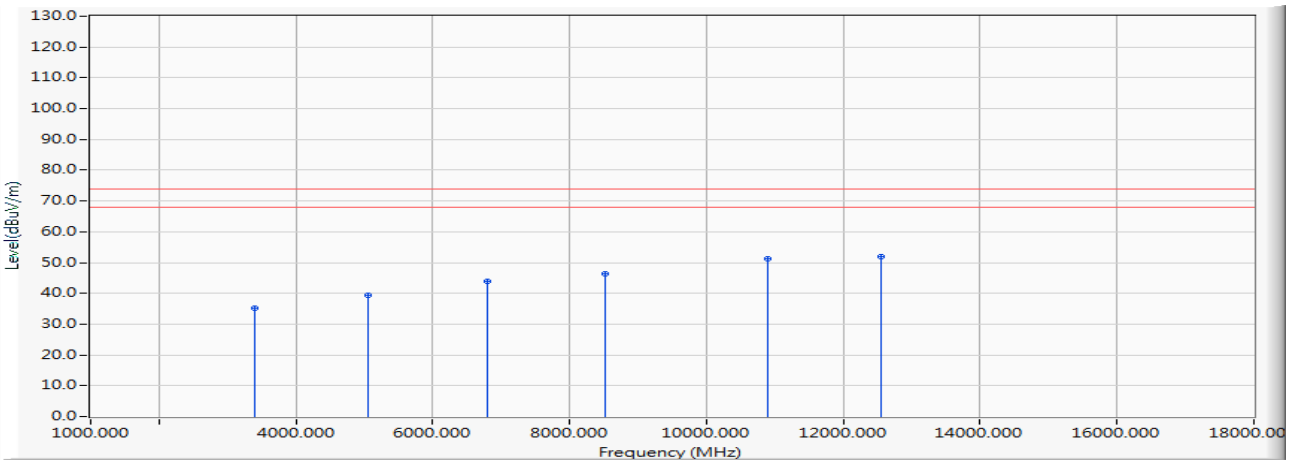


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	4960.050	-0.035	40.924	40.890	-33.110	74.000	PEAK
2		7438.720	7.864	29.256	37.120	-36.880	74.000	PEAK
3		9919.010	13.089	22.380	35.470	-38.530	74.000	PEAK
4		12398.730	15.724	18.926	34.650	-39.350	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2402MHz**

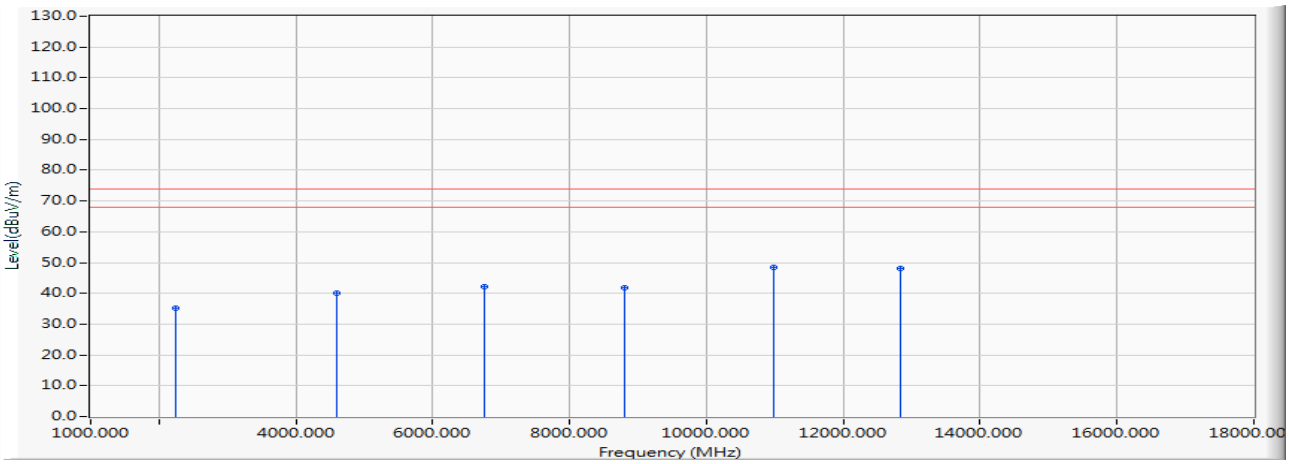


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		3405.500	-6.405	41.475	35.070	-38.930	74.000	PEAK
2		5051.100	0.009	39.313	39.322	-34.678	74.000	PEAK
3		6786.800	5.465	38.304	43.769	-30.231	74.000	PEAK
4		8524.200	9.569	36.854	46.422	-27.578	74.000	PEAK
5		10890.600	15.648	35.612	51.259	-22.741	74.000	PEAK
6	*	12558.300	16.455	35.609	52.064	-21.936	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2402MHz**

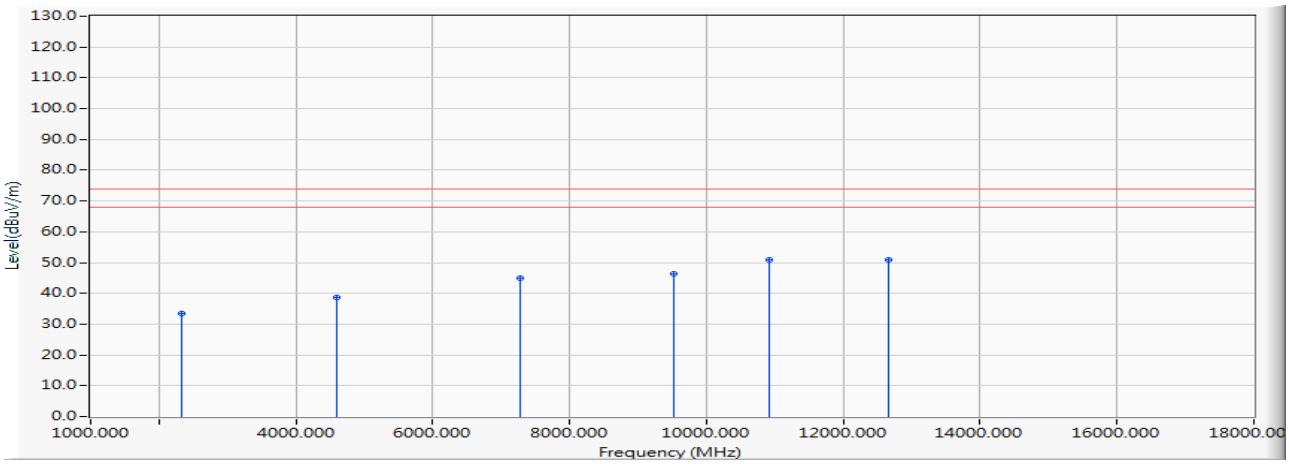


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2235.900	-9.929	45.179	35.250	-38.750	74.000	PEAK
2		4598.900	-1.258	41.232	39.974	-34.026	74.000	PEAK
3		6751.100	5.322	36.701	42.023	-31.977	74.000	PEAK
4		8794.500	10.583	31.152	41.735	-32.265	74.000	PEAK
5	*	10973.900	15.640	32.872	48.512	-25.488	74.000	PEAK
6		12833.700	16.437	31.567	48.004	-25.996	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2440MHz**

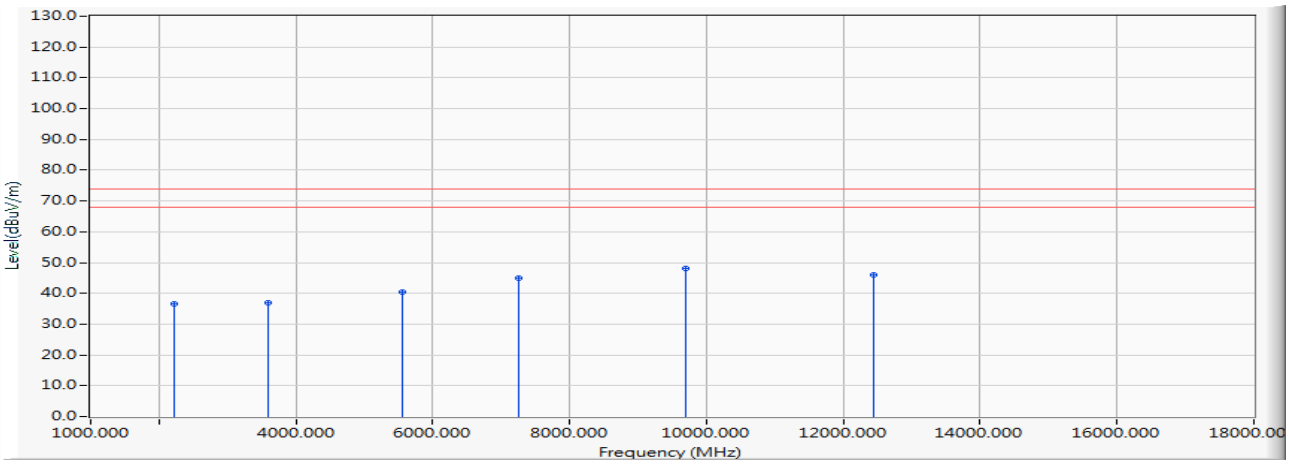


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2334.500	-9.448	42.876	33.429	-40.571	74.000	PEAK
2		4595.500	-1.280	39.861	38.581	-35.419	74.000	PEAK
3		7269.600	7.362	37.539	44.901	-29.099	74.000	PEAK
4		9511.900	12.265	34.025	46.290	-27.710	74.000	PEAK
5		10912.700	15.645	35.321	50.967	-23.033	74.000	PEAK
6	*	12662.000	16.449	34.536	50.984	-23.016	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2440MHz**

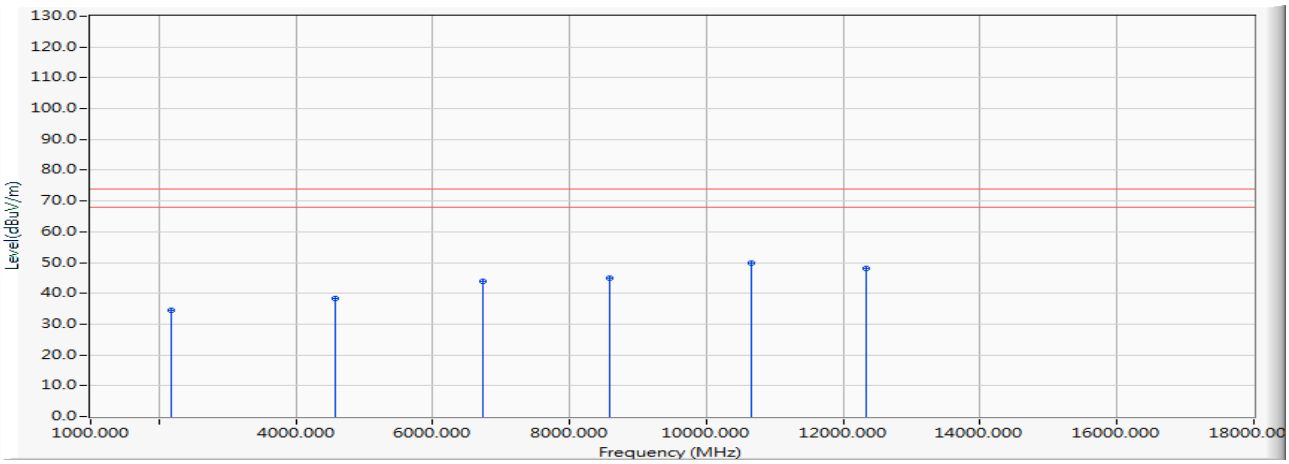


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2213.800	-10.041	46.799	36.758	-37.242	74.000	PEAK
2		3585.700	-5.884	42.782	36.897	-37.103	74.000	PEAK
3		5557.700	0.482	39.804	40.286	-33.714	74.000	PEAK
4		7262.800	7.347	37.763	45.110	-28.890	74.000	PEAK
5	*	9685.300	12.764	35.368	48.133	-25.867	74.000	PEAK
6		12442.700	16.036	30.119	46.155	-27.845	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2480MHz**

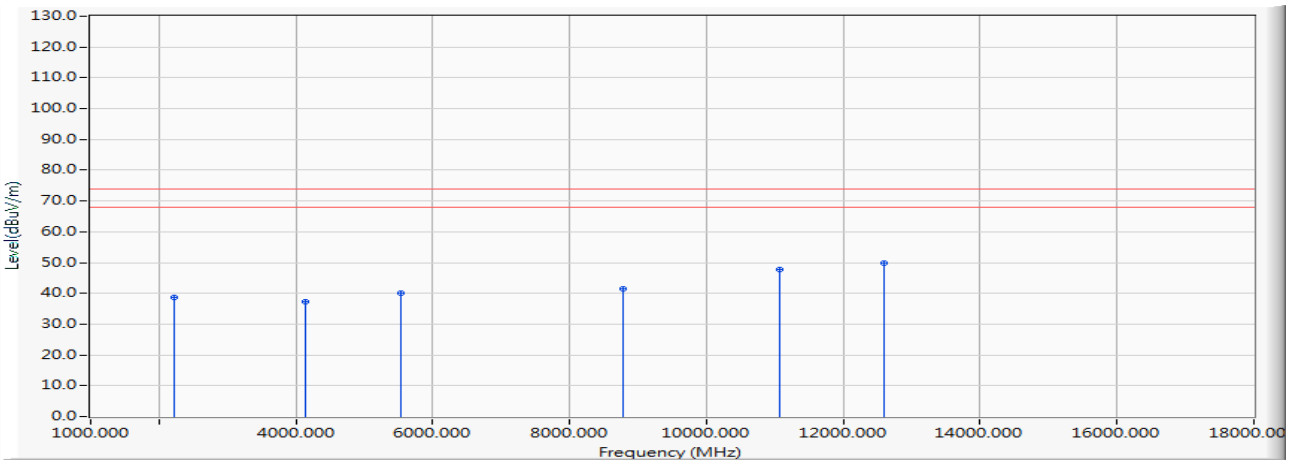


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2184.900	-10.187	44.621	34.434	-39.566	74.000	PEAK
2		4581.900	-1.366	39.578	38.212	-35.788	74.000	PEAK
3		6742.600	5.290	38.620	43.910	-30.090	74.000	PEAK
4		8578.600	9.430	35.644	45.075	-28.925	74.000	PEAK
5	*	10652.600	15.290	34.569	49.859	-24.141	74.000	PEAK
6		12339.000	15.301	32.680	47.981	-26.019	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 2: Recever Mode_BLE_2480MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2224.000	-9.990	48.805	38.816	-35.184	74.000	PEAK
2		4136.500	-3.627	41.037	37.411	-36.589	74.000	PEAK
3		5525.400	0.369	39.793	40.162	-33.838	74.000	PEAK
4		8777.500	10.551	31.052	41.603	-32.397	74.000	PEAK
5		11058.900	15.571	32.199	47.770	-26.230	74.000	PEAK
6	*	12585.500	16.453	33.386	49.839	-24.161	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

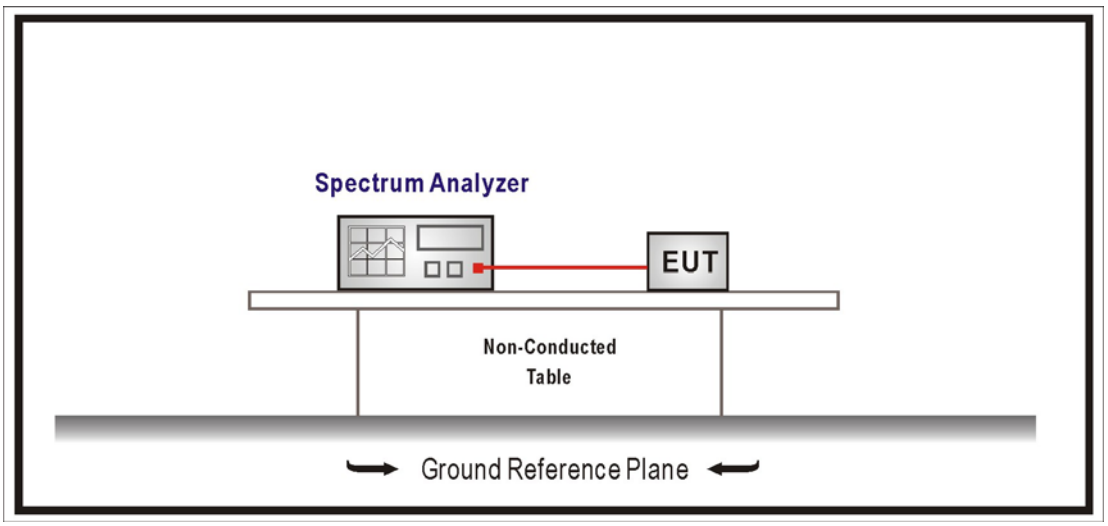
5. RF antenna conducted test

5.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

5.2. Test Setup

RF Conducted Measurement:



5.3. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on an RF conducted or 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) (see Section 15.205(c)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

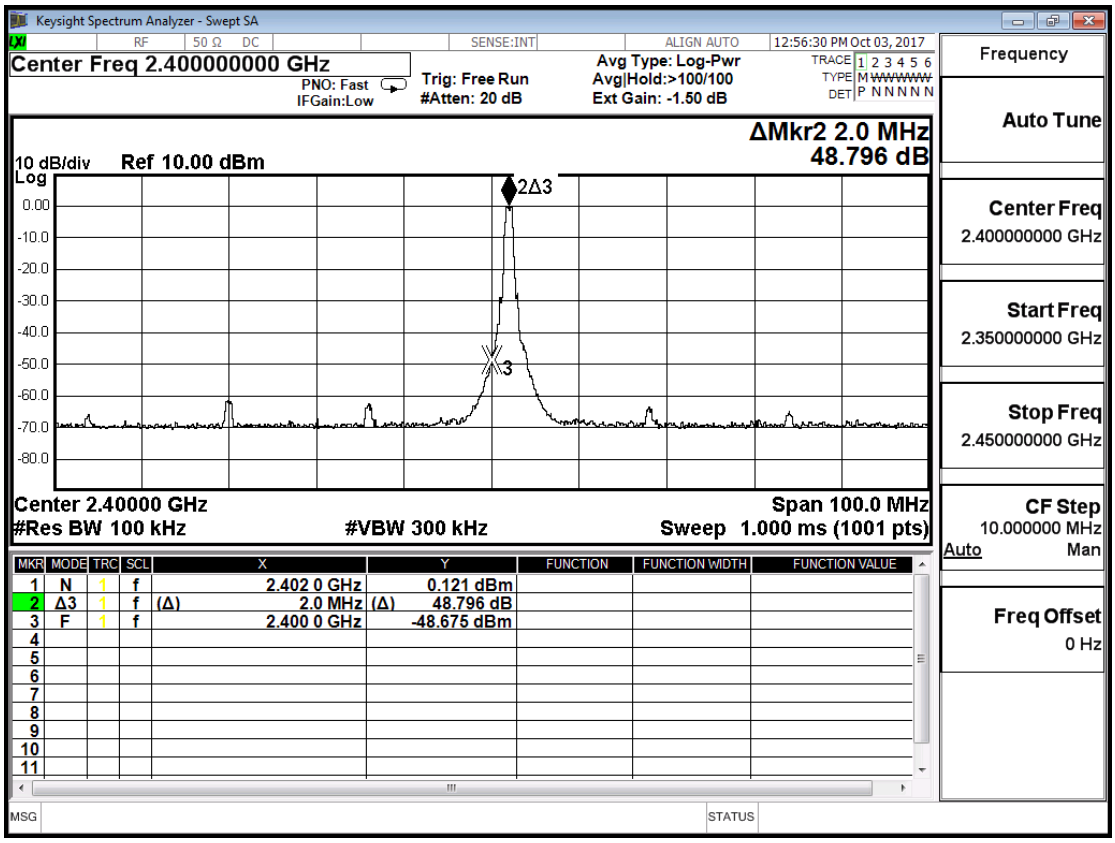
5.5. Test Result

Product	Freescan		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/10/03	Test Site	SR10-H

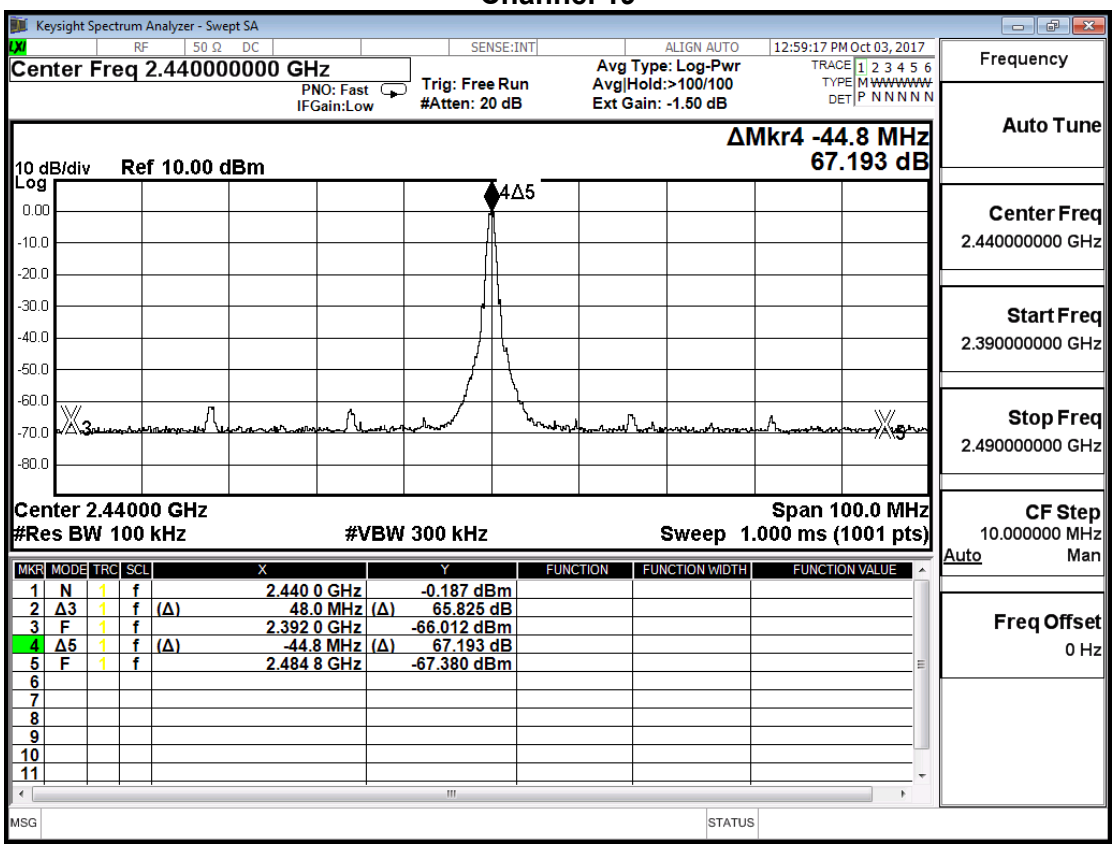
GFSK

Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
00	2402	48.796	≧20	Pass
19	2440	65.825	≧20	Pass
39	2480	62.170	≧20	Pass

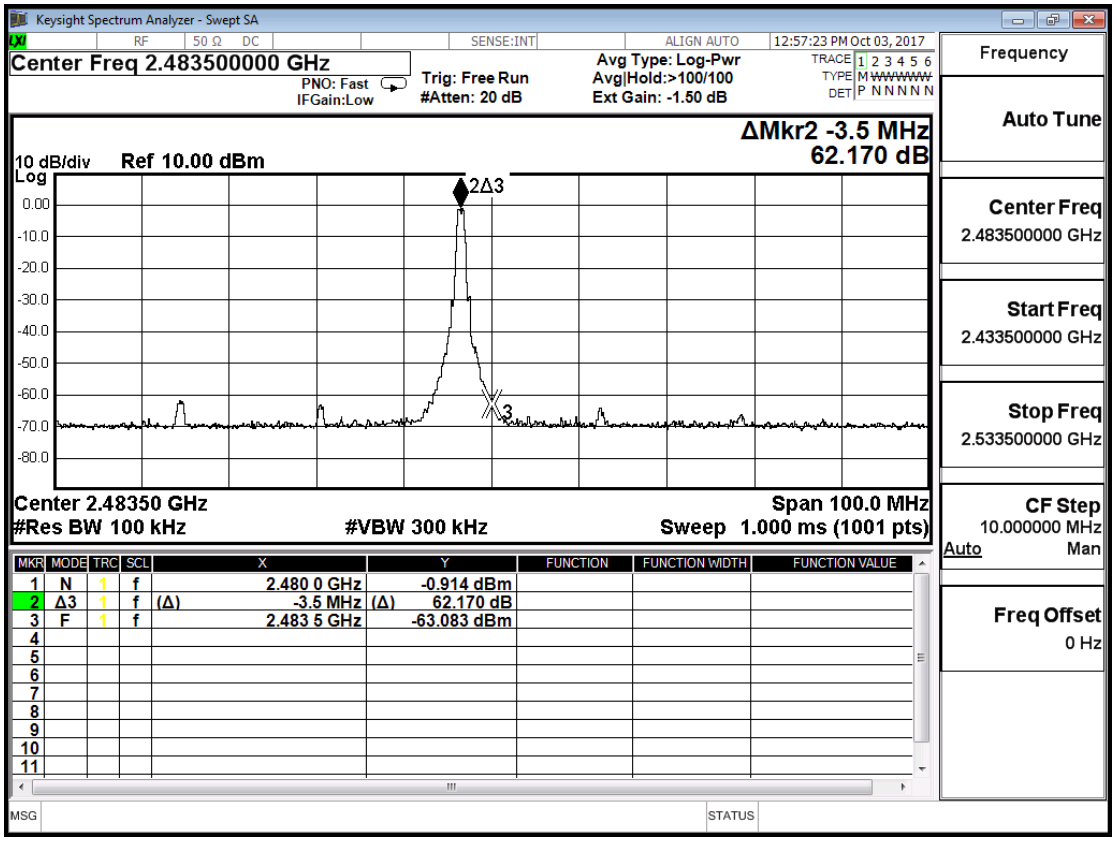
Channel 00



Channel 19

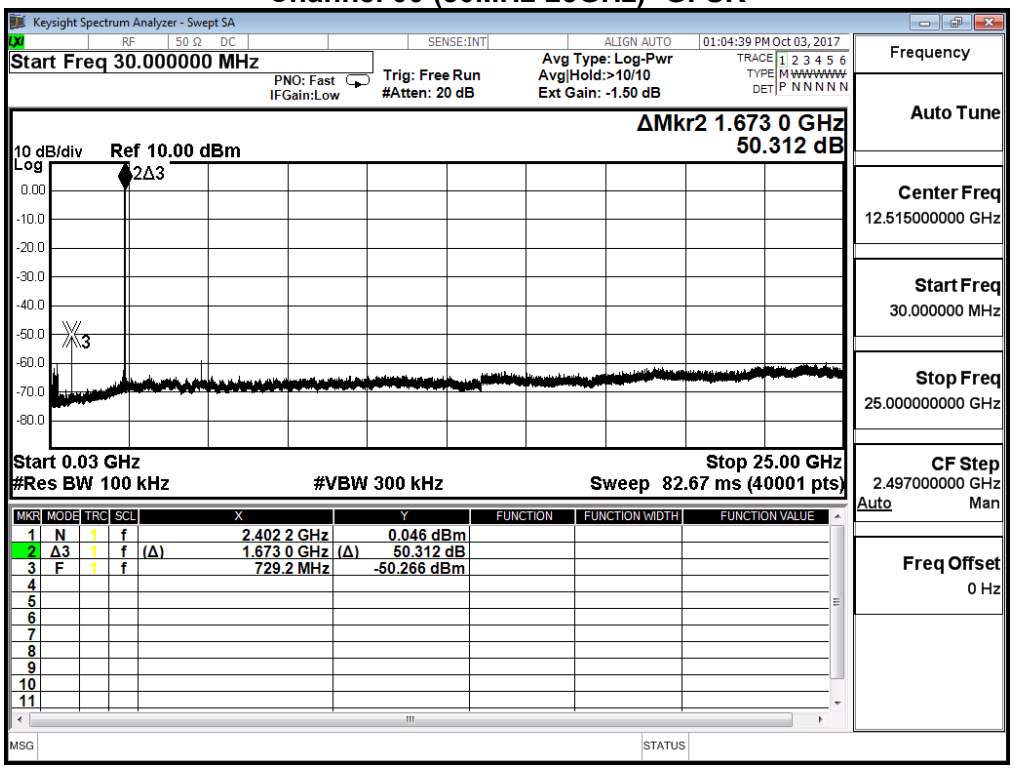


Channel 39

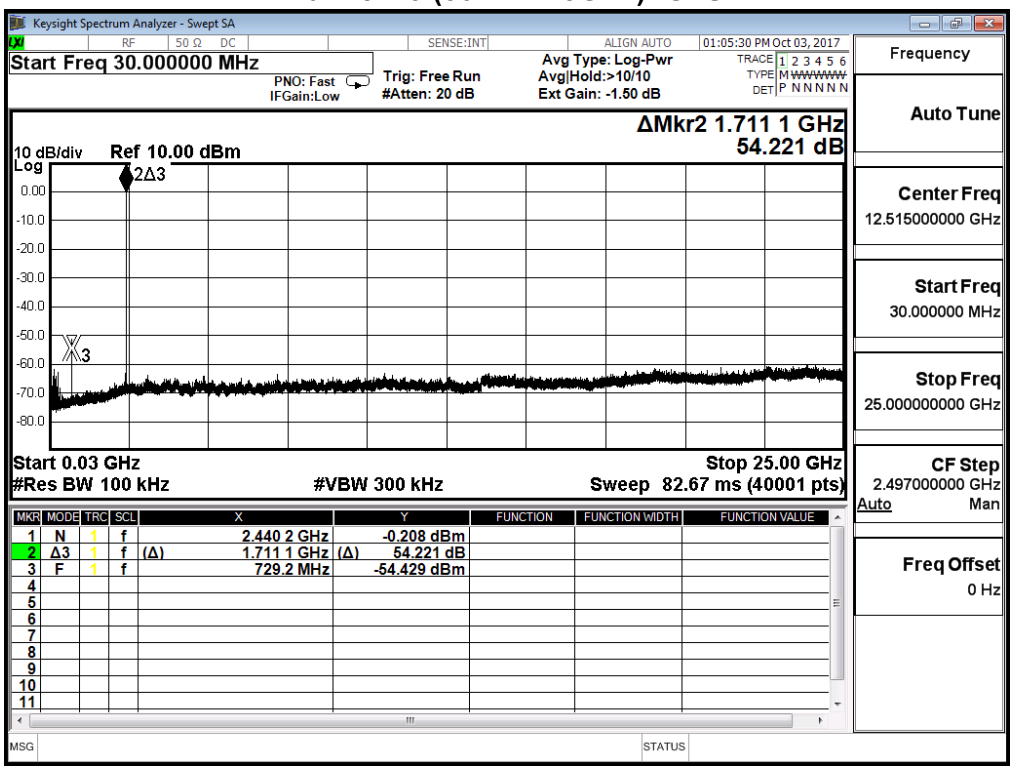


Product	Freescan		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/10/03	Test Site	SR10-H

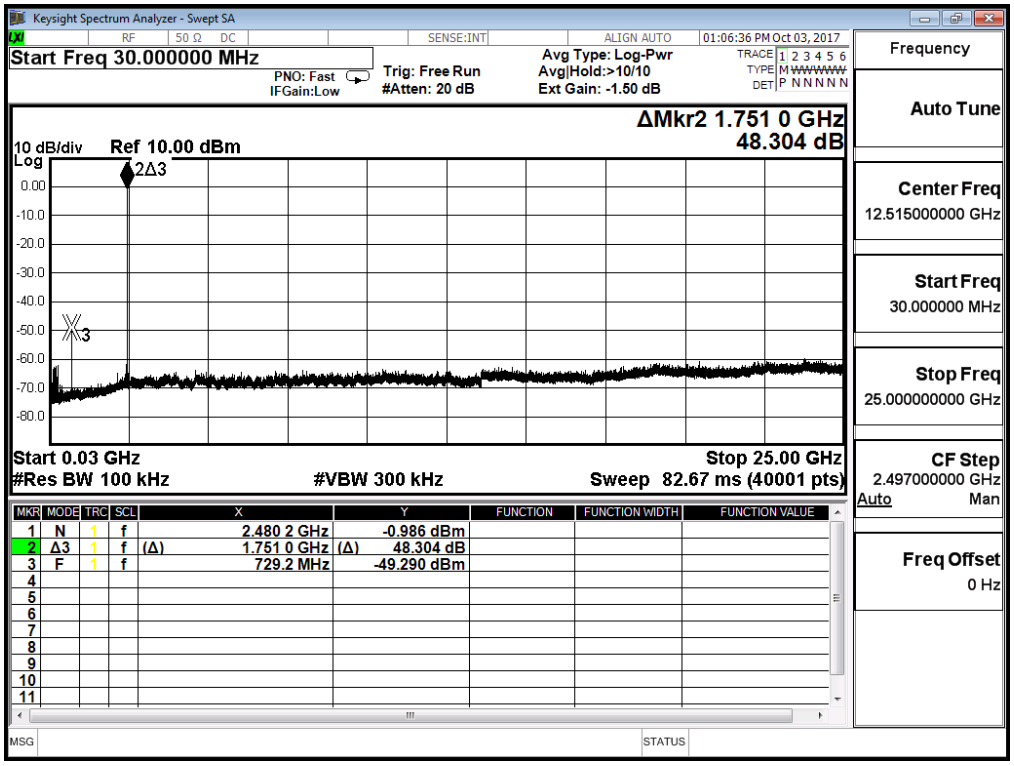
Channel 00 (30MHz-25GHz)- GFSK



Channel 19 (30MHz-25GHz)- GFSK



Channel 39 (30MHz-25GHz)- GFSK



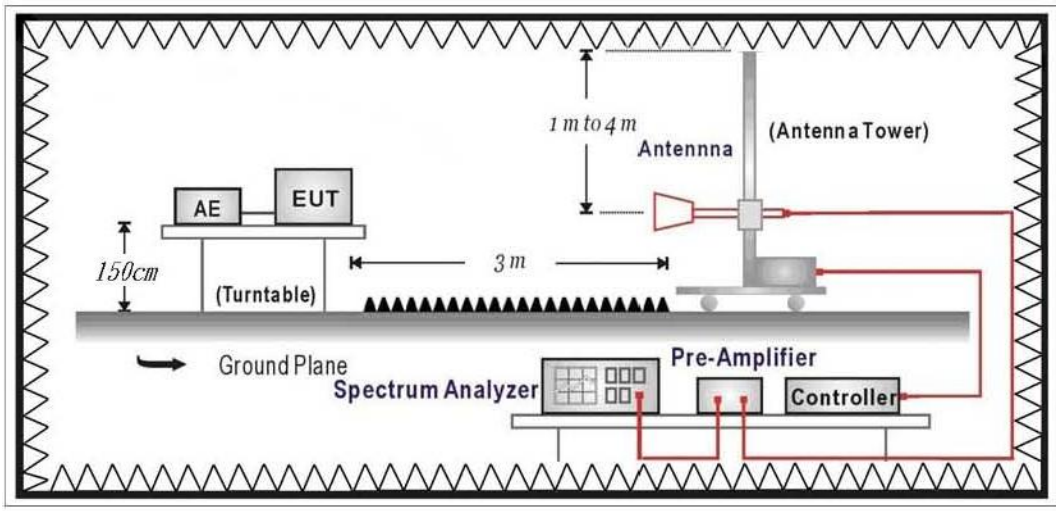
6. Band Edge

6.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements.

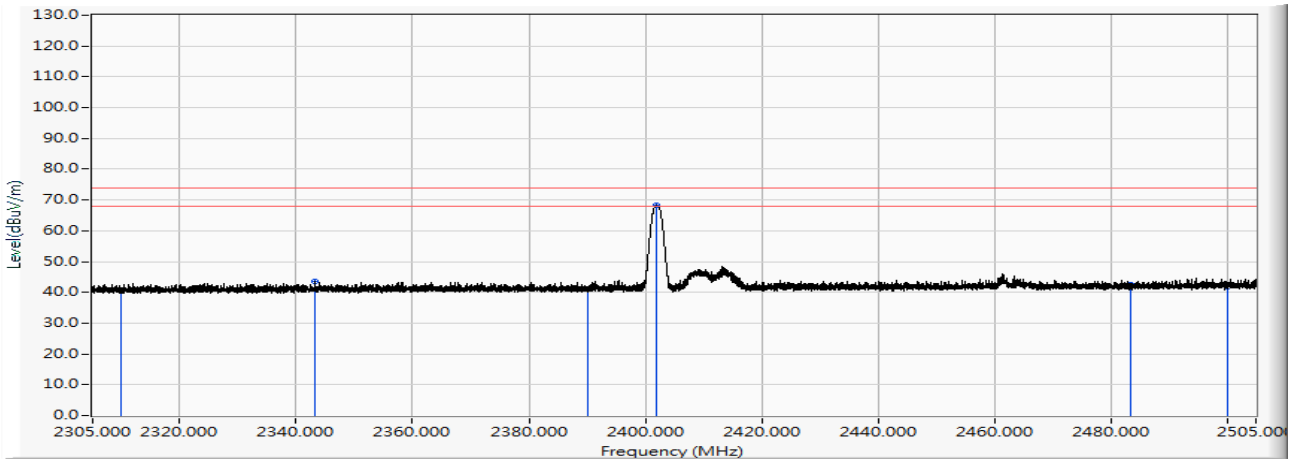
The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

6.5. Test Result

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2402MHz**

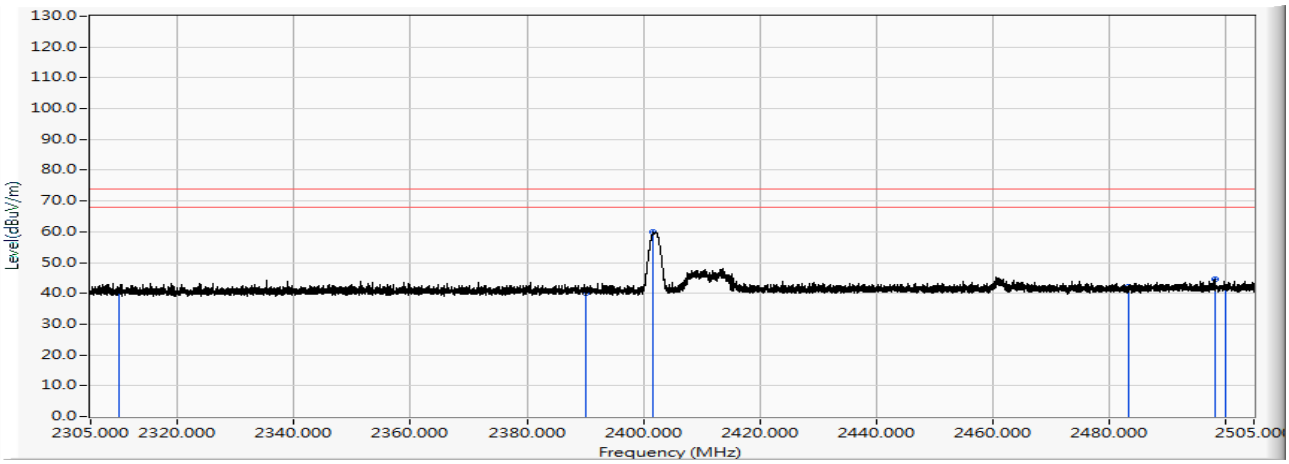


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	29.392	40.407	-33.593	74.000	PEAK
2		2343.300	11.235	32.490	43.725	-30.275	74.000	PEAK
3		2390.000	11.544	29.510	41.054	-32.946	74.000	PEAK
4	*	2401.840	11.623	56.521	68.144	-5.856	74.000	PEAK
5		2483.500	12.172	30.442	42.614	-31.386	74.000	PEAK
6		2500.000	12.274	29.525	41.800	-32.200	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2402MHz**

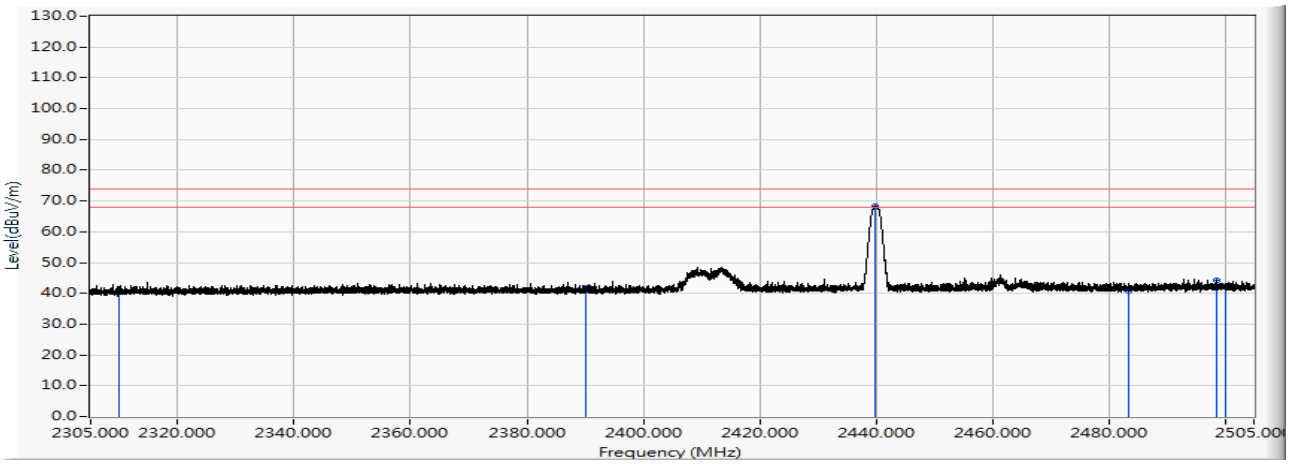


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	30.093	41.108	-32.892	74.000	PEAK
2		2390.000	11.544	28.659	40.203	-33.797	74.000	PEAK
3	*	2401.780	11.622	48.237	59.860	-14.140	74.000	PEAK
4		2483.500	12.172	29.871	42.043	-31.957	74.000	PEAK
5		2498.260	12.266	32.435	44.701	-29.299	74.000	PEAK
6		2500.000	12.274	29.782	42.057	-31.943	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

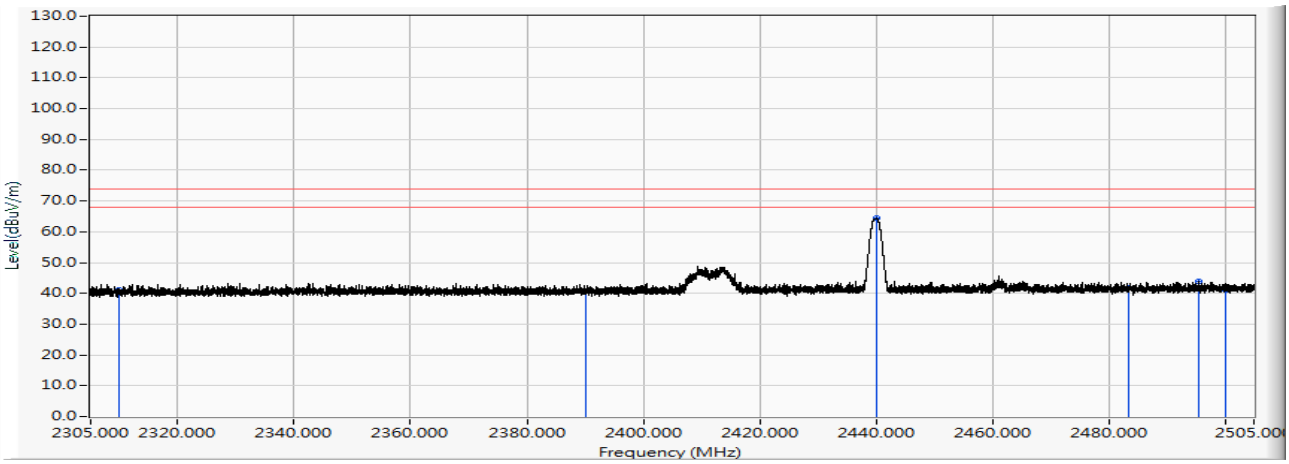


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	29.714	40.729	-33.271	74.000	PEAK
2		2390.000	11.544	30.208	41.752	-32.248	74.000	PEAK
3	*	2439.860	11.878	56.481	68.360	-5.640	74.000	PEAK
4		2483.500	12.172	28.711	40.883	-33.117	74.000	PEAK
5		2498.580	12.269	31.896	44.164	-29.836	74.000	PEAK
6		2500.000	12.274	29.998	42.273	-31.727	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2440MHz**

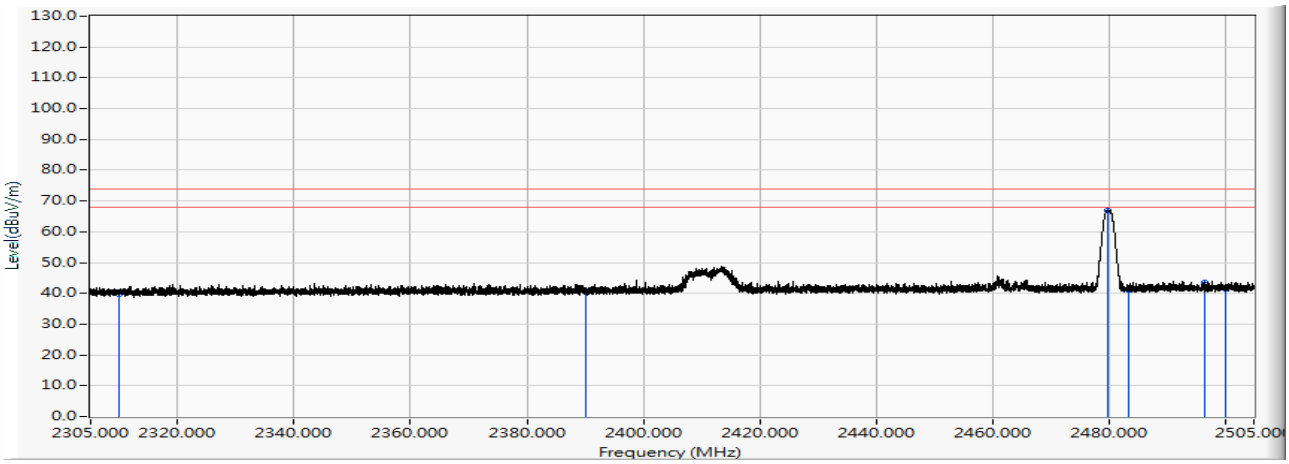


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	30.055	41.070	-32.930	74.000	PEAK
2		2390.000	11.544	29.220	40.764	-33.236	74.000	PEAK
3	*	2440.020	11.880	52.506	64.386	-9.614	74.000	PEAK
4		2483.500	12.172	29.663	41.835	-32.165	74.000	PEAK
5		2495.500	12.252	31.548	43.800	-30.200	74.000	PEAK
6		2500.000	12.274	28.852	41.127	-32.873	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2480MHz**

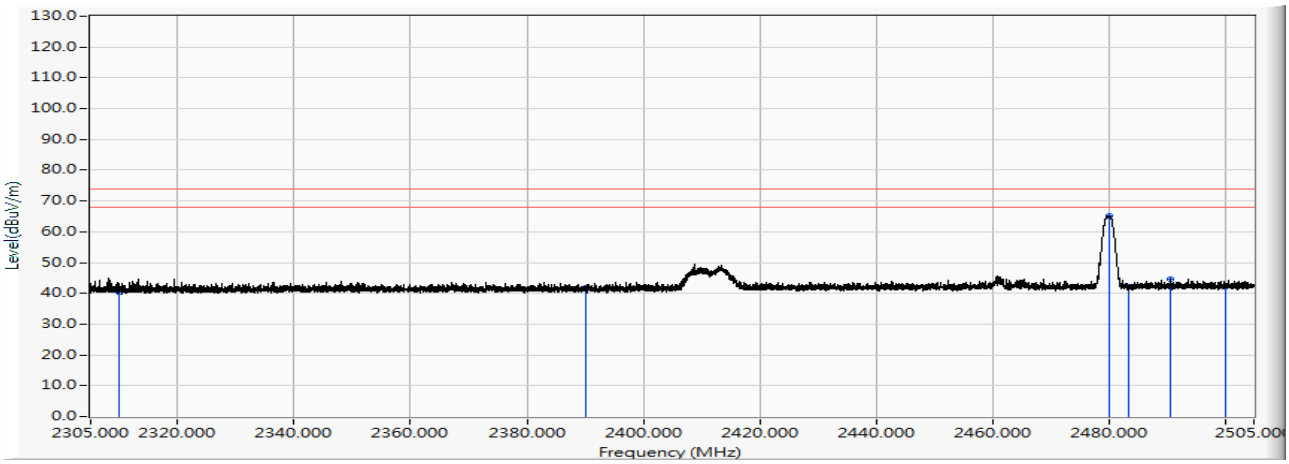


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	28.635	39.650	-34.350	74.000	PEAK
2		2390.000	11.544	29.230	40.774	-33.226	74.000	PEAK
3	*	2479.820	12.147	54.782	66.930	-7.070	74.000	PEAK
4		2483.500	12.172	28.968	41.140	-32.860	74.000	PEAK
5		2496.420	12.257	31.456	43.713	-30.287	74.000	PEAK
6		2500.000	12.274	29.345	41.620	-32.380	74.000	PEAK

Note:

1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

Site : CB2-H	**Time : 2017/10/06**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	**Power : AC 120V/60Hz**
EUT : Freescan	**Note : Mode 1: Transmit Mode_BLE_2480MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	11.014	29.380	40.395	-33.605	74.000	PEAK
2		2390.000	11.544	30.185	41.729	-32.271	74.000	PEAK
3	*	2480.060	12.149	53.000	65.149	-8.851	74.000	PEAK
4		2483.500	12.172	30.091	42.263	-31.737	74.000	PEAK
5		2490.560	12.219	32.536	44.755	-29.245	74.000	PEAK
6		2500.000	12.274	30.054	42.329	-31.671	74.000	PEAK

Note:

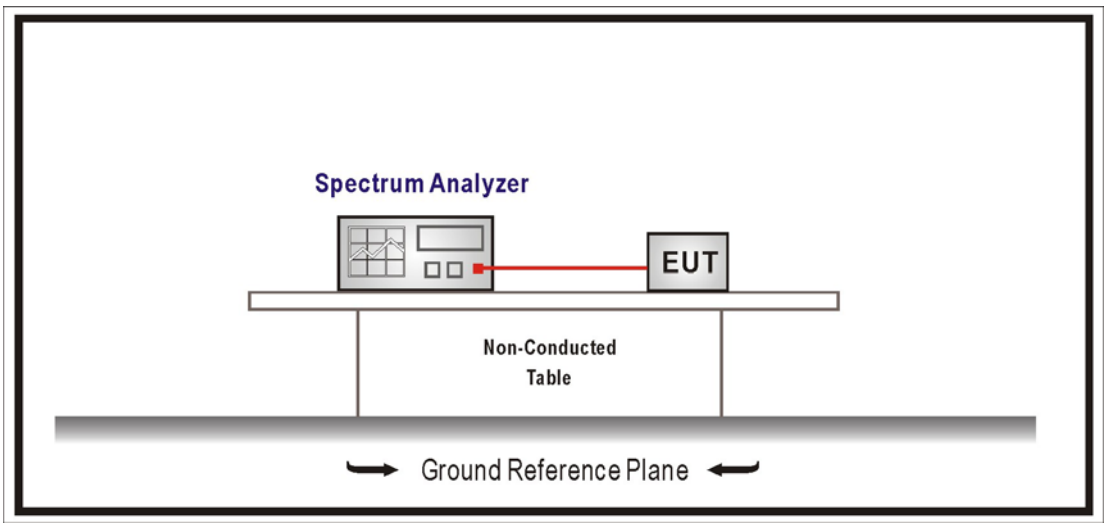
1. All reading above 1GHz is performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection. If the readings given are average, peak measurement should also be supplied.
7. The fundamental for reference only, it’s not restricted by unwanted emission limit.

7. Occupied Bandwidth & DTS Bandwidth

7.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

7.2. Test Setup



7.3. Limits

The 6 dB bandwidth: ≧ 500 kHz.
Occupied Bandwidth: NA.

7.4. Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 1% of EBW, Span greater than RBW.

7.5. Test Result

Product	Freescan		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/10/03	Test Site	SR10-H

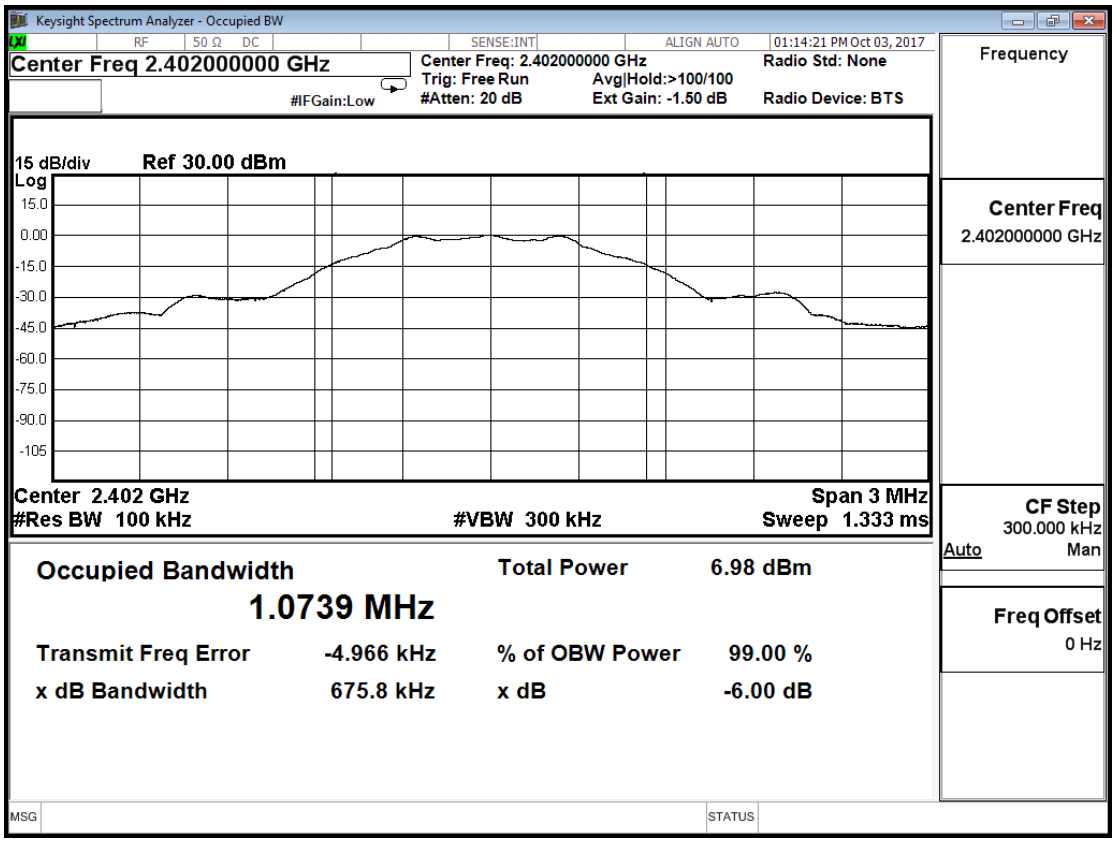
Occupied Bandwidth:

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
00	2402	1.074	--	Pass
19	2440	1.075	--	Pass
39	2480	1.075	--	Pass

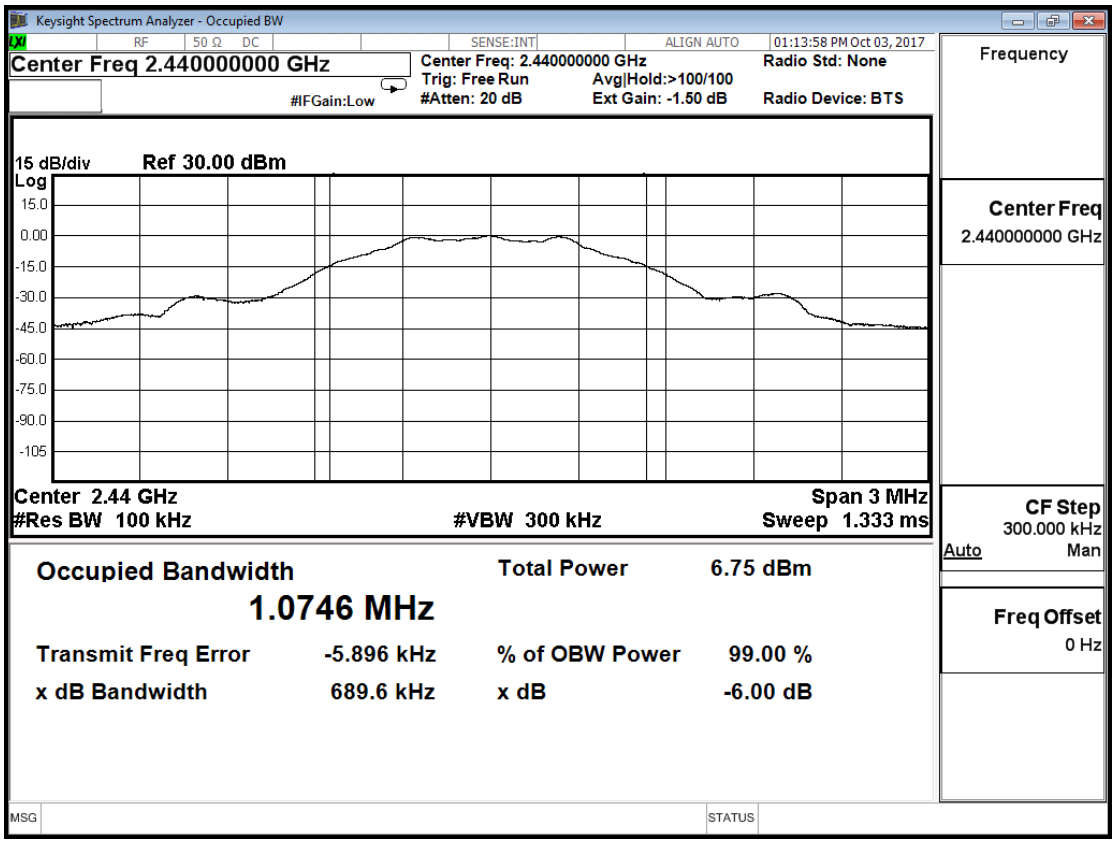
DTS Bandwidth:

Channel No.	Frequency (MHz)	Measure Level (KHz)	Limit (KHz)	Result
00	2402	675.800	≧500	Pass
19	2440	689.600	≧500	Pass
39	2480	689.100	≧500	Pass

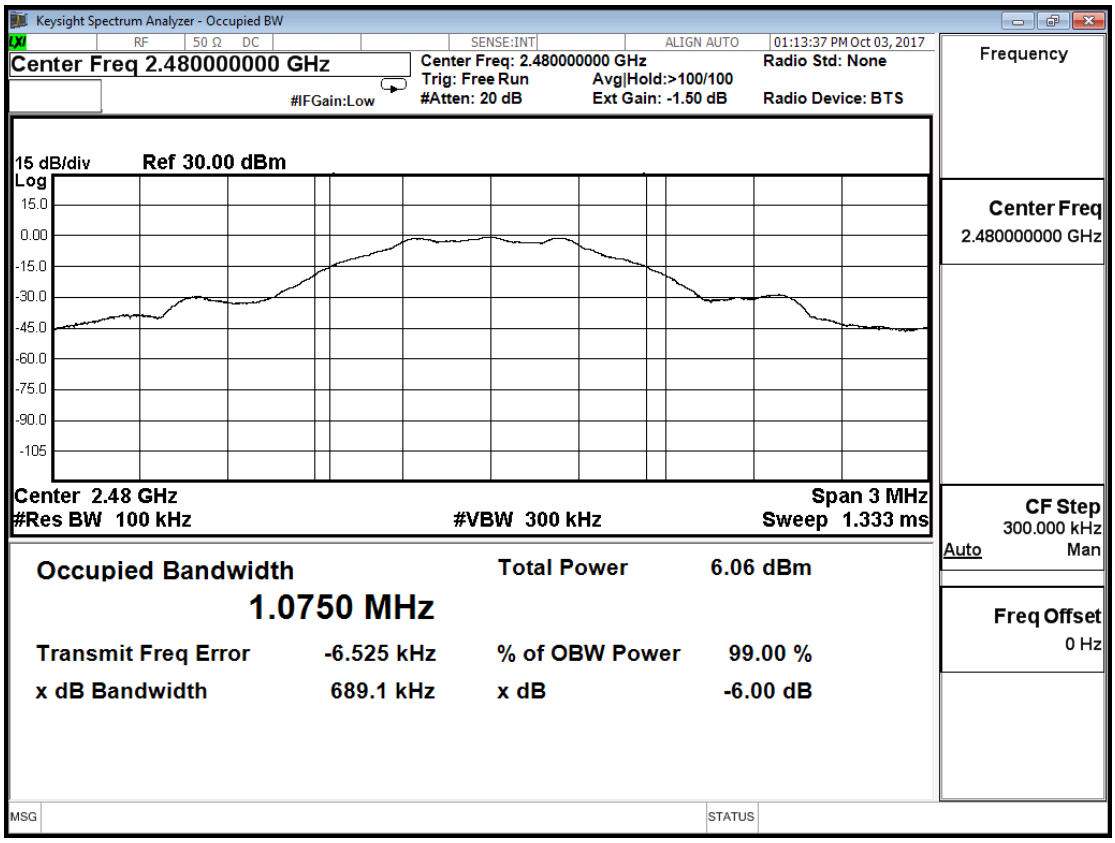
Channel 00



Channel 19



Channel 39

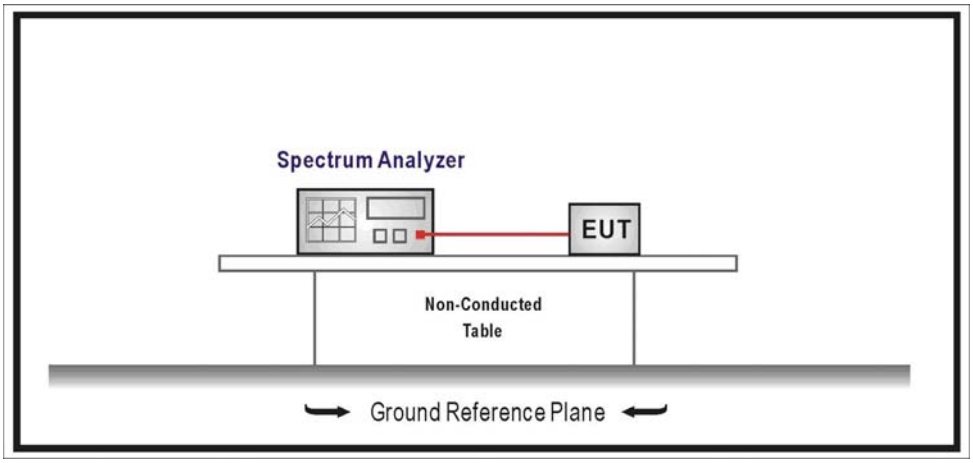


8. Power Density

8.1. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

8.2. Test Setup



8.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

8.4. Test Procedures

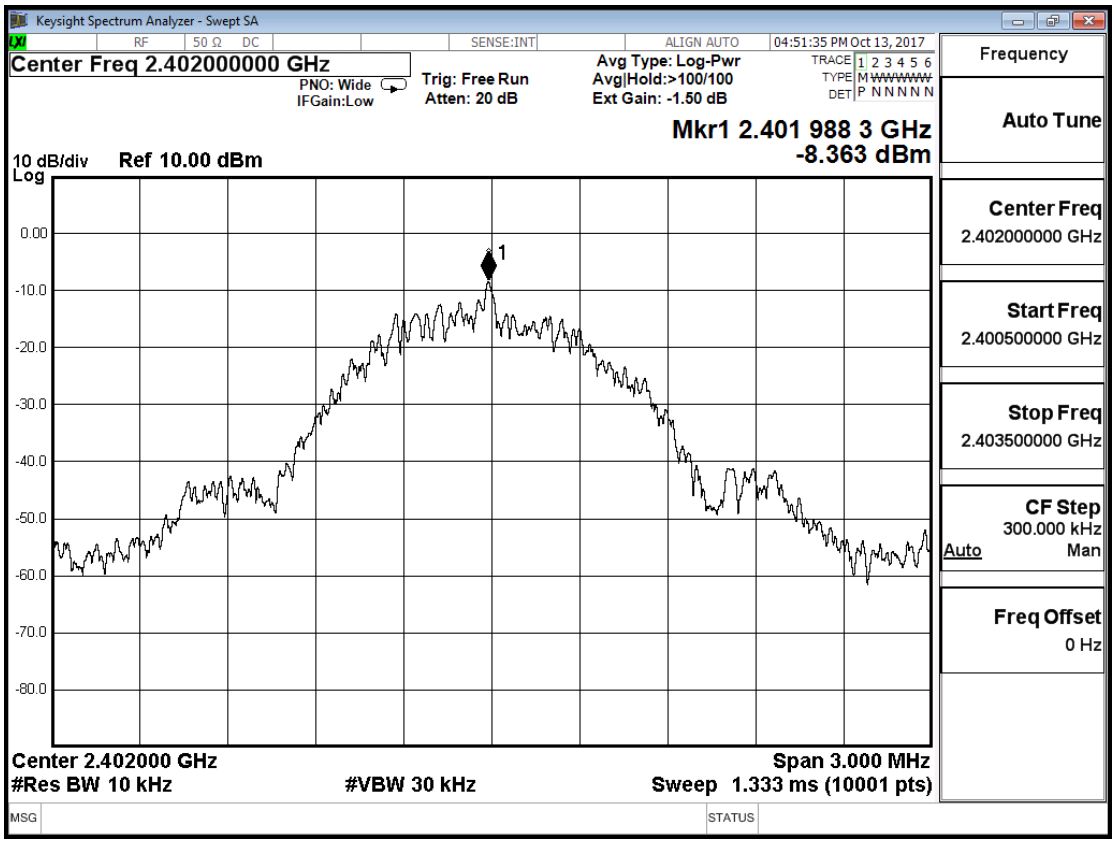
The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB558074 D01V04 for compliance to FCC 47CFR 15.247 requirements.

8.5. Test Result

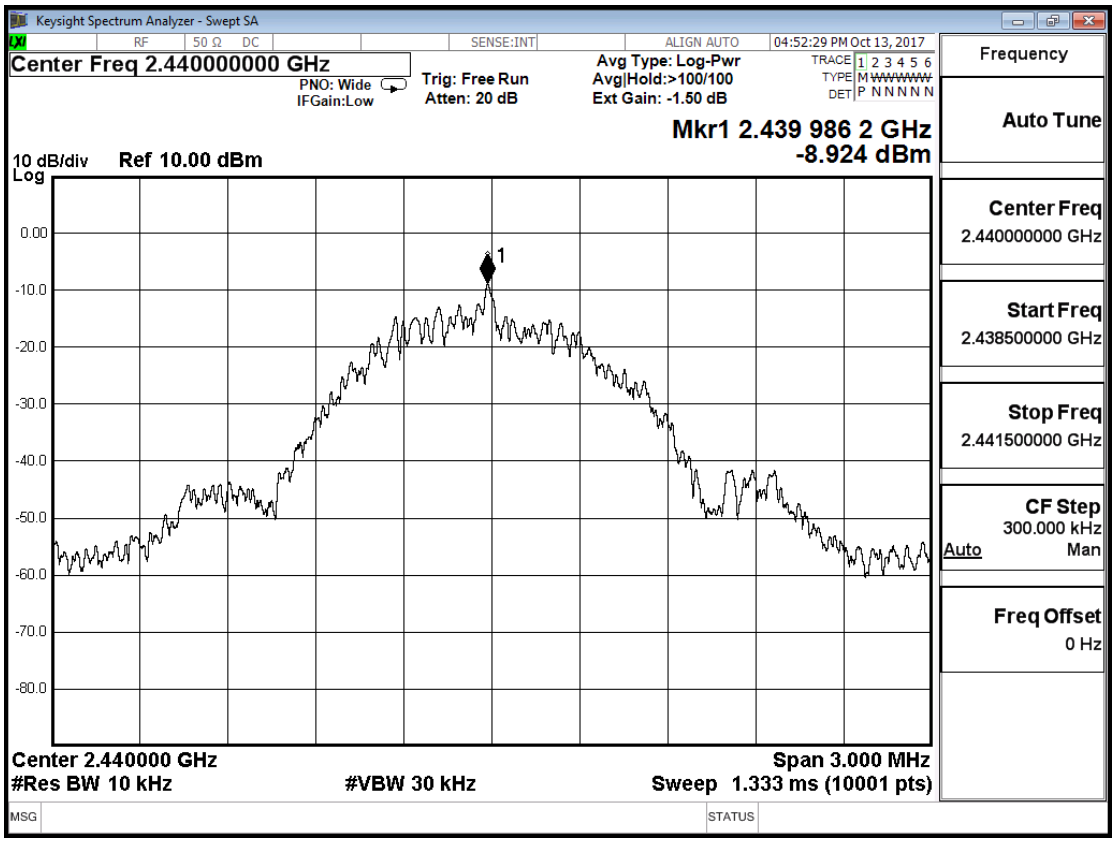
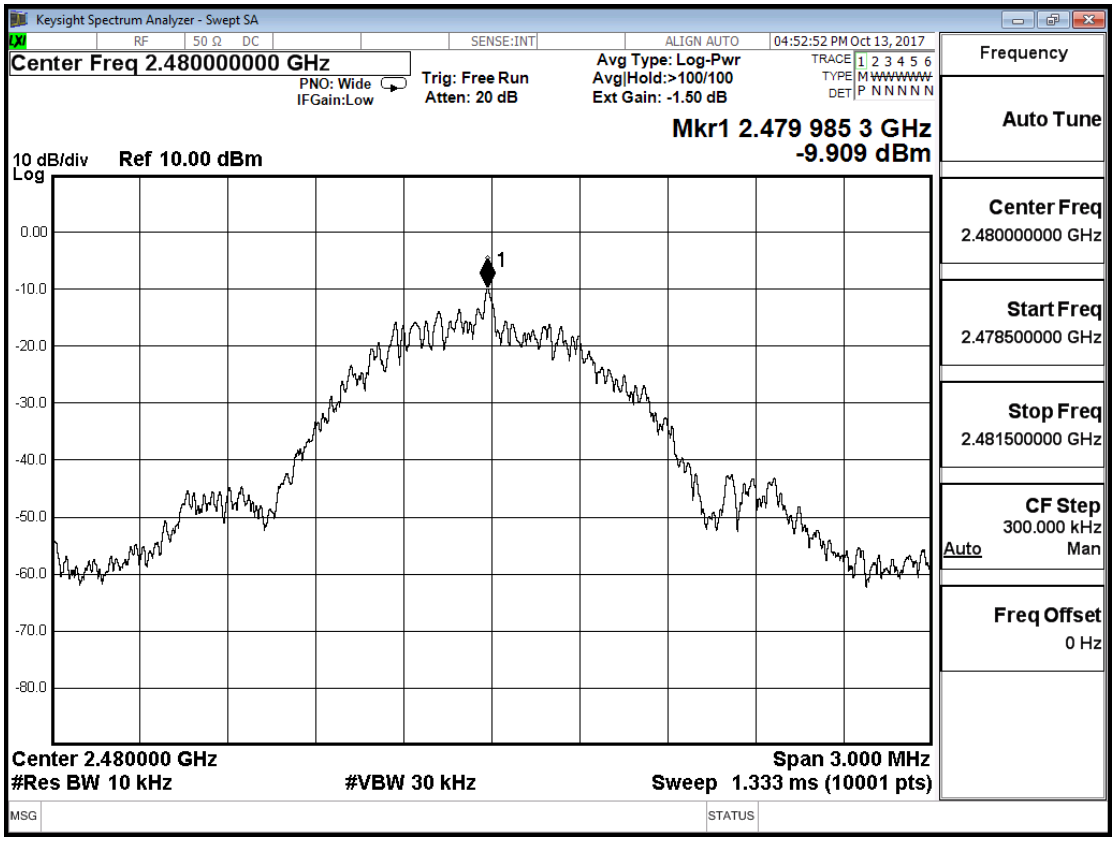
Product	Freescan		
Test Item	Power Density		
Test Mode	Mode 1: Transmit Mode		
Date of Test	2017/10/13	Test Site	SR10-H

Channel No.	Frequency (MHz)	Measure Level(dBm)	Limit (dBm)	Result
00	2402	-8.363	≦8	Pass
19	2440	-8.924	≦8	Pass
39	2480	-9.909	≦8	Pass

Channel 00



Channel 19



Channel 39