

FCC Test Report

Product Name : Lyra
Trade Name : ASUS
Model No. : MAP-AC2200
FCC ID. : MSQ-RTACBX00

Applicant : ASUSTeK COMPUTER INC.
Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan

Date of Receipt : Mar. 06, 2017
Issued Date : Jun. 07, 2017
Report No. : 1730116R-RFUSP01V00-A
Report Version : V1.0



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 : Jun. 07, 2017


Report No. : 1730116R-RFUSP01V00-A



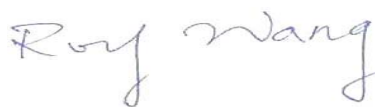
Product Name : Lyra
Applicant : ASUSTeK COMPUTER INC.
Address : 4F, No. 150, Li-Te Rd., Peitou, Taipei, Taiwan
Manufacturer : ASUSTeK COMPUTER INC.
Model No. : MAP-AC2200
FCC ID. : MSQ-RTACBX00
EUT Voltage : AC 100-240V, 50-60Hz
Testing Voltage : AC 120V/60Hz
Trade Name : ASUS
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2015
Test Result : Complied
Laboratory Name : Hsin Chu Laboratory
Address : 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

Documented By : 

(Demi Chang / Senior Engineering Adm. Specialist)

Tested By : 

(Clemens Fang / Engineer)

Approved By : 

(Roy Wang / Director)

Revision History

Report No.	Version	Description	Issued Date
1730116R-RFUSP01V00-A	V1.0	Initial issue of report	Jun. 07, 2017

Laboratory Information

We, **DEKRA Testing and Certification Co., Ltd.**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	:	TAF, Accreditation Number: 3024
USA	:	FCC, Registration Number: 834100
Canada	:	IC, Submission No: 181665 IC Registration Number: 22397-1 / 22397-2 / 22397-3

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 contact information is 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
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
TEL: +886-3-582-8001 / FAX: +886-3-582-8958 E-Mail : info.tw@dekra.com

TABLE OF CONTENTS

Description	Page
1. General Information.....	7
1.1. EUT Description	7
1.2. Test Mode	9
1.3. Tested System Details	10
1.4. Configuration of tested System	10
1.5. EUT Exercise Software	10
1.6. Test Facility.....	11
2. Conducted Emission	12
2.1. Test Equipment.....	12
2.2. Test Setup	12
2.3. Limits	13
2.4. Test Procedure	13
2.5. Test Specification.....	13
2.6. Uncertainty	13
2.7. Test Result.....	14
3. Peak Power Output	18
3.1. Test Equipment.....	18
3.2. Test Setup	18
3.3. Test procedures	18
3.4. Limits	18
3.5. Test Specification.....	18
3.6. Test Result.....	19
4. Radiated Emission	20
4.1. Test Equipment.....	20
4.2. Test Setup	21
4.3. Limits	22
4.4. Test Procedure	22
4.5. Test Specification.....	22
4.6. Test Result.....	23
5. RF antenna conducted test	39
5.1. Test Equipment.....	39
5.2. Test Setup	39
5.3. Limits	40
5.4. Test Procedure	40
5.5. Test Specification.....	40
5.6. Test Result.....	41
6. Band Edge.....	46
6.1. Test Equipment.....	46
6.2. Test Setup	46
6.3. Limits	47
6.4. Test Procedure	47

6.5.	Test Specification.....	47
6.6.	Test Result.....	48
7.	Occupied Bandwidth	60
7.1.	Test Equipment.....	60
7.2.	Test Setup	60
7.3.	Limits	60
7.4.	Test Procedures	60
7.5.	Test Specification.....	60
7.6.	Test Result.....	61
8.	Power Density	64
8.1.	Test Equipment.....	64
8.2.	Test Setup	64
8.3.	Limits	64
8.4.	Test Procedures	64
8.5.	Test Specification.....	64
8.6.	Uncertainty	64
8.7.	Test Result.....	65
Attachment 1	68
	Test Setup Photograph.....	68
Attachment 2	73
	EUT External Photograph.....	73
Attachment 3	79
	EUT Internal Photograph.....	79

1. General Information

1.1. EUT Description

Product Name	Lyra
Trade Name	ASUS
Model No.	MAP-AC2200
Frequency Range/Channel Number	2402~2480MHz / 40 Channels
Type of Modulation	Bluetooth 4.0(GFSK)

Antenna Information	
Antenna Type	PCB Antenna
Antenna Gain	ANT0: 0.97dBi

Accessories Information	
LAN Cable	Non-Shielded, 2m
Power Adapter	ASUS, AD2055320 I/P: 100-240V~50/60Hz, 0.6A O/P: 12V \equiv 2.0A Cable Out: Non-Shielded, 2.2m
Power Adapter	ASUS, ADP-24EW B I/P: 100-240V ~50-60Hz, 0.9A O/P: 12V \equiv 2.0A Cable Out: Non-Shielded, 2.2m

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 Lyra including 2.4GHz b/g/n (2x2), BT2.0, BT4.0 and 5GHz a/n/ac (2x2) 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. This device is a composite device in accordance with Part 15 regulations. The receiving function was tested and its number is 1730116R-RFUSP12V00.

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: Tx-AD2055320 Mode 2: Tx-ADP-24EW B
-----------	---

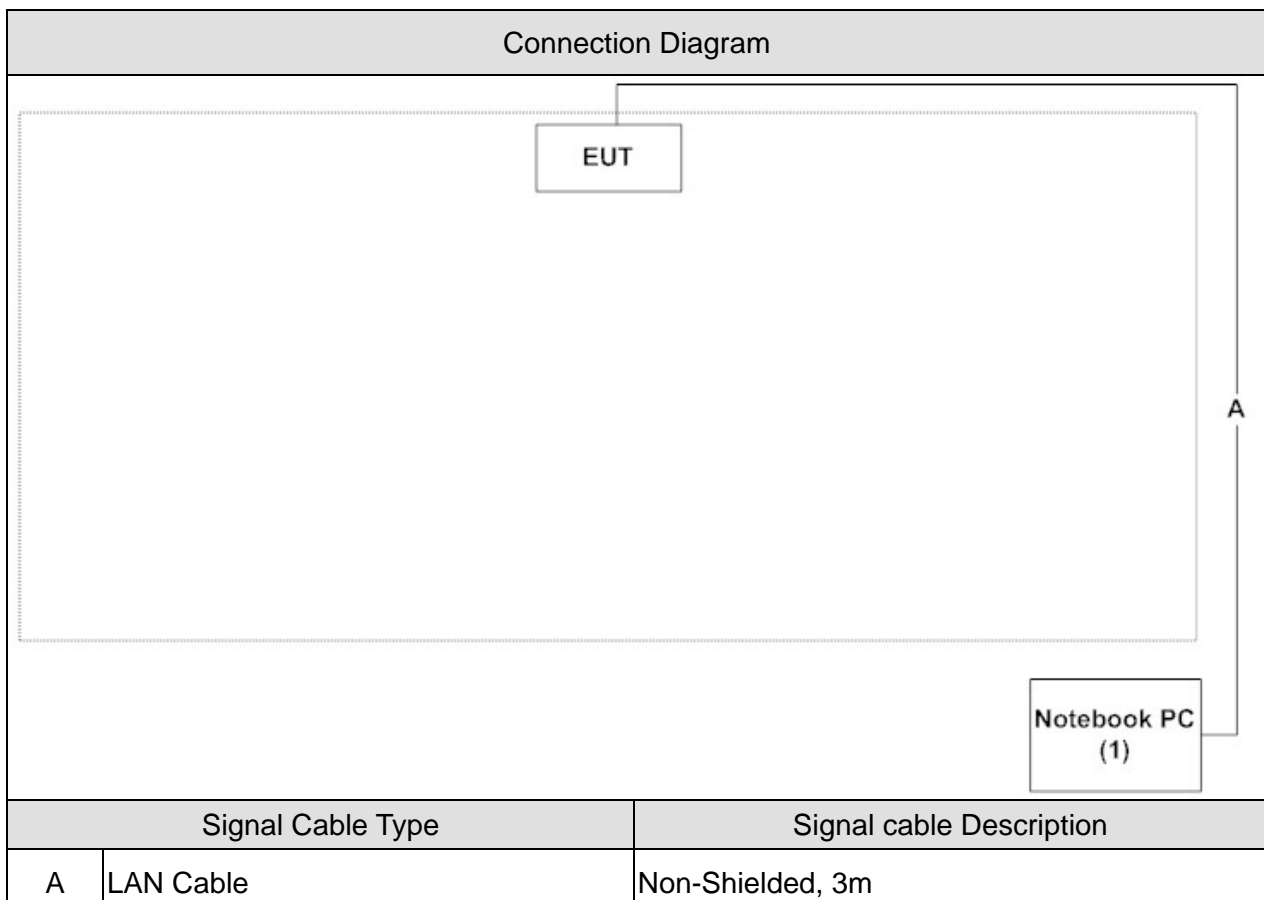
Test Items	Mode	Modulation	Channel	Antenna	Result
Conducted Emission	1/2	GFSK	19	0	Complies
Peak Power Output	1	GFSK	00/19/39	0	Complies
Radiated Emission	1/2	GFSK	00/19/39	0	Complies
RF antenna conducted test	1	GFSK	00/19/39	0	Complies
Radiated Emission Band Edge	1	GFSK	00/39	0	Complies
Occupied Bandwidth	1	GFSK	00/19/39	0	Complies
Power Density	1	GFSK	00/19/39	0	Complies

1.3. Tested System Details

The types for all equipments, 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 Notebook PC	ASUS	X522EP	E5N0CV04 3264197	DoC	Non-Shielded, 1.8m, one ferrite core bonded

1.4. Configuration of tested System



1.5. EUT Exercise Software

1	Setup the EUT as shown in Section 1.4.
2	Execute the test command .
3	Configure the test mode, the test channel, and the data rate.
4	Press "Start TX" 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 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 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 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.

2. Conducted Emission

2.1. Test Equipment

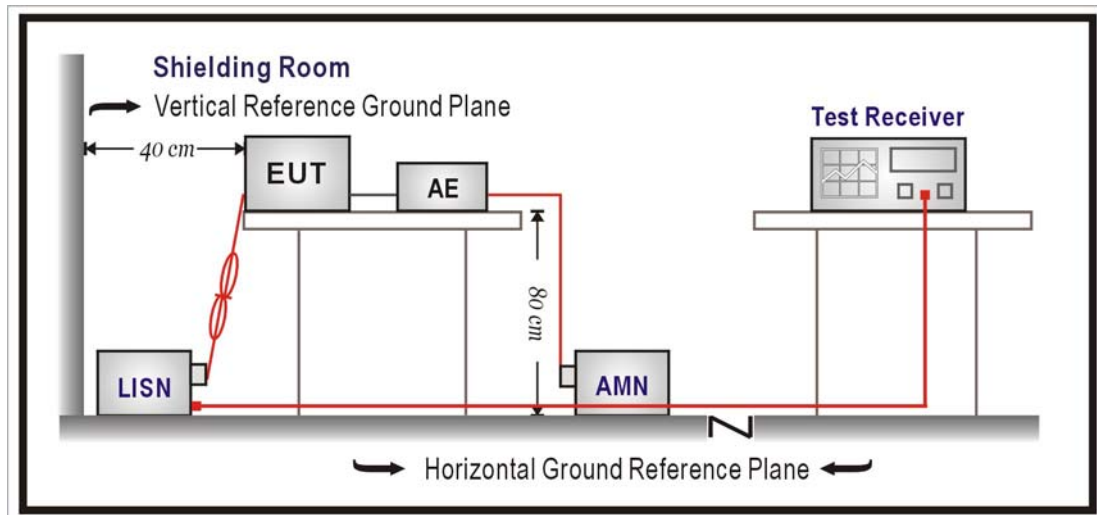
The following test equipments are used during the test:

Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2018/02/05
LISN	R&S	ENV216	100092	2017/08/16
Test Receiver	R&S	ESCS 30	836858/022	2018/04/11

Note: All equipments that need to calibrate are with calibration period of 1 year.

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 Specification

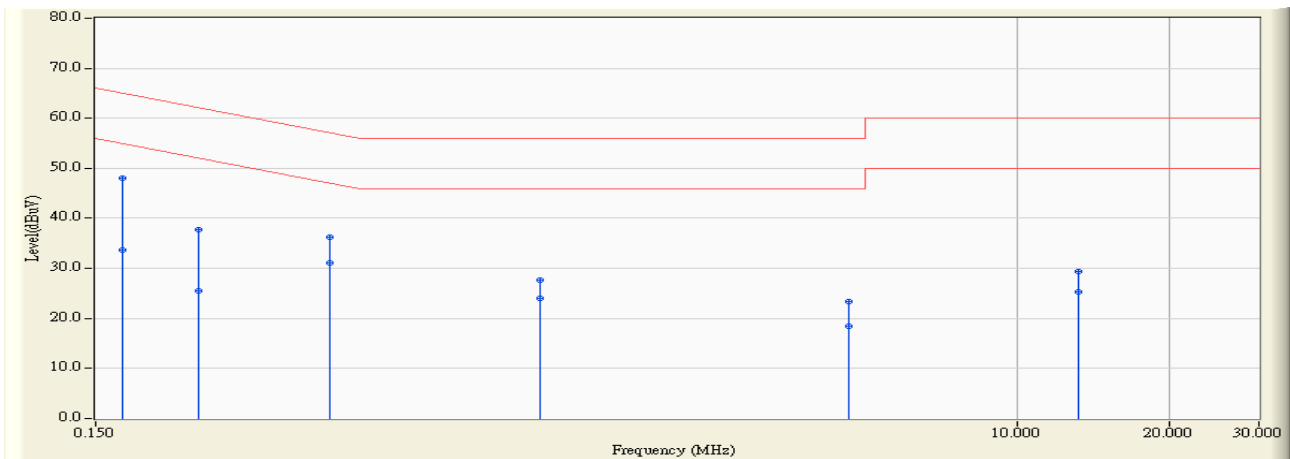
According to FCC Part 15 Subpart C Paragraph 15.207: 2015

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2-H	Time : 2017/04/11
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line1	Power : AC120V/60Hz
EUT : Lyra	Note : 802.15.1_BLE_2441MHz Mode 1: Tx-AD2055320

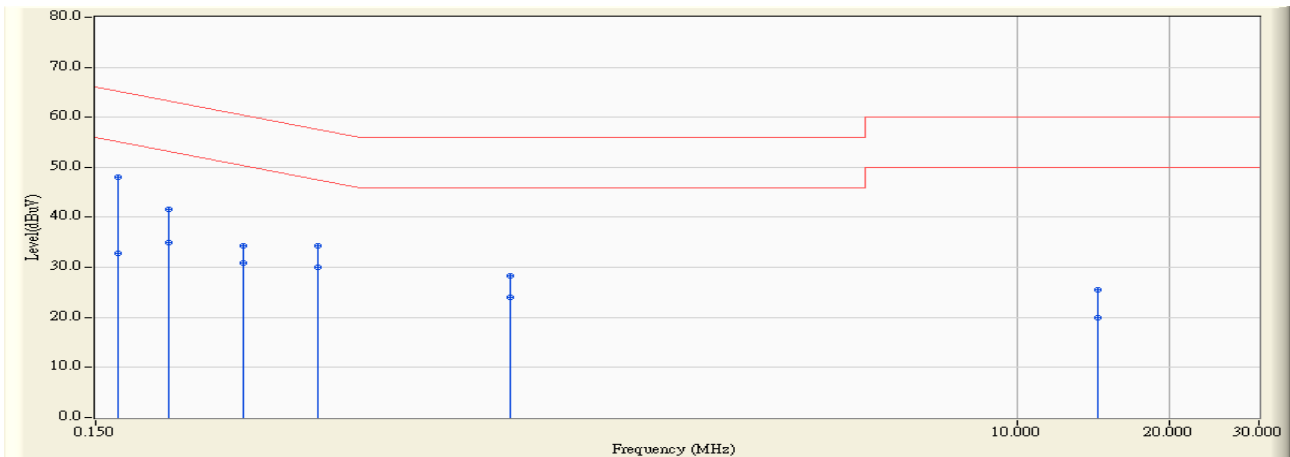


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.170	9.753	38.200	47.953	-17.030	64.983	QUASPEAK
2	0.170	9.753	23.850	33.603	-21.380	54.983	AVERAGE
3	0.240	9.746	28.030	37.776	-24.326	62.102	QUASPEAK
4	0.240	9.746	15.740	25.486	-26.616	52.102	AVERAGE
5	0.435	9.729	26.590	36.319	-20.834	57.154	QUASPEAK
6	* 0.435	9.729	21.440	31.169	-15.984	47.154	AVERAGE
7	1.138	9.826	17.830	27.656	-28.344	56.000	QUASPEAK
8	1.138	9.826	14.140	23.966	-22.034	46.000	AVERAGE
9	4.630	9.921	13.520	23.441	-32.559	56.000	QUASPEAK
10	4.630	9.921	8.620	18.541	-27.459	46.000	AVERAGE
11	13.162	10.187	19.150	29.337	-30.663	60.000	QUASPEAK
12	13.162	10.187	15.080	25.267	-24.733	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 : 2017/04/11
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line2	Power : AC120V/60Hz
EUT : Lyra	Note : 802.15.1_BLE_2441MHz Mode 1: Tx-AD2055320

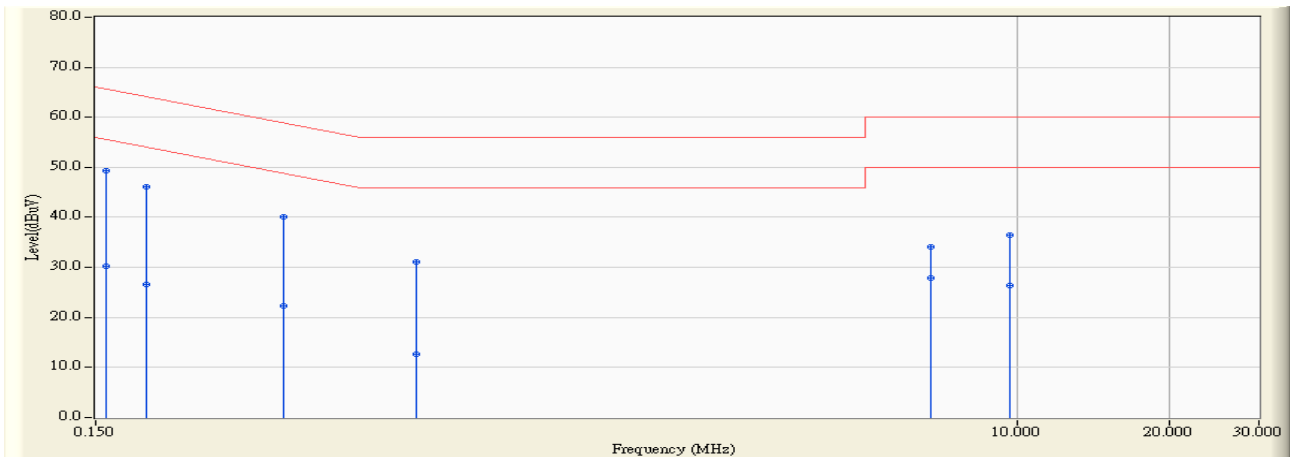


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.166	9.753	38.260	48.013	-17.164	65.177	QUASPEAK
2		0.166	9.753	23.090	32.843	-22.334	55.177	AVERAGE
3		0.209	9.750	31.890	41.640	-21.621	63.261	QUASPEAK
4		0.209	9.750	25.310	35.060	-18.201	53.261	AVERAGE
5		0.295	9.750	24.470	34.220	-26.176	60.396	QUASPEAK
6		0.295	9.750	21.050	30.800	-19.596	50.396	AVERAGE
7		0.412	9.749	24.530	34.279	-23.334	57.614	QUASPEAK
8		0.412	9.749	20.330	30.079	-17.534	47.614	AVERAGE
9		0.990	9.818	18.500	28.318	-27.682	56.000	QUASPEAK
10		0.990	9.818	14.240	24.058	-21.942	46.000	AVERAGE
11		14.384	10.291	15.190	25.480	-34.520	60.000	QUASPEAK
12		14.384	10.291	9.670	19.960	-30.040	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 : 2017/04/11
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line1	Power : AC120V/60Hz
EUT : Lyra	Note : 802.15.1_BLE_2441MHz Mode 2: Tx-ADP-24EW B

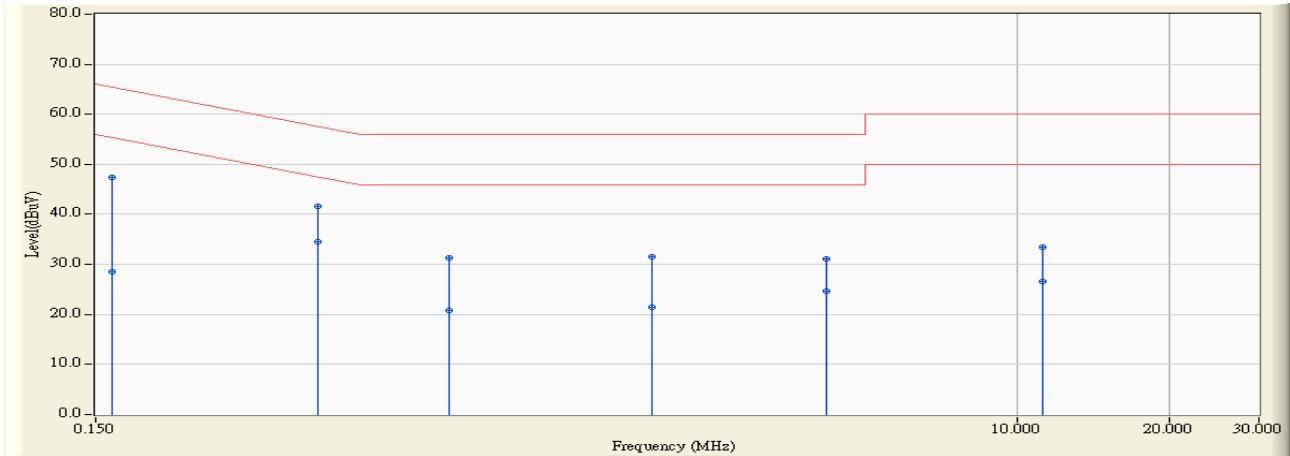


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	*	0.158	9.751	39.600	49.351	-16.227	65.578	QUASPEAK
2		0.158	9.751	20.530	30.281	-25.297	55.578	AVERAGE
3		0.189	9.751	36.370	46.121	-17.957	64.078	QUASPEAK
4		0.189	9.751	16.900	26.651	-27.427	54.078	AVERAGE
5		0.353	9.735	30.390	40.125	-18.764	58.889	QUASPEAK
6		0.353	9.735	12.600	22.335	-26.554	48.889	AVERAGE
7		0.646	9.755	21.370	31.125	-24.875	56.000	QUASPEAK
8		0.646	9.755	2.870	12.625	-33.375	46.000	AVERAGE
9		6.740	9.995	24.100	34.094	-25.906	60.000	QUASPEAK
10		6.740	9.995	17.810	27.804	-22.196	50.000	AVERAGE
11		9.634	10.114	26.320	36.435	-23.565	60.000	QUASPEAK
12		9.634	10.114	16.160	26.275	-23.725	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 : 2017/04/11
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-6_0712 - Line2	Power : AC120V/60Hz
EUT : Lyra	Note : 802.15.1_BLE_2441MHz Mode 2: Tx-ADP-24EW B



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1	0.162	9.754	37.740	47.494	-17.881	65.375	QUASPEAK
2	0.162	9.754	18.850	28.604	-26.771	55.375	AVERAGE
3	0.412	9.749	31.910	41.659	-15.954	57.614	QUASPEAK
4	*	9.749	24.700	34.449	-13.164	47.614	AVERAGE
5	0.752	9.782	21.540	31.323	-24.677	56.000	QUASPEAK
6	0.752	9.782	11.110	20.893	-25.107	46.000	AVERAGE
7	1.888	9.847	21.770	31.617	-24.383	56.000	QUASPEAK
8	1.888	9.847	11.600	21.447	-24.553	46.000	AVERAGE
9	4.185	9.843	21.290	31.133	-24.867	56.000	QUASPEAK
10	4.185	9.843	14.790	24.633	-21.367	46.000	AVERAGE
11	11.213	10.189	23.250	33.439	-26.561	60.000	QUASPEAK
12	11.213	10.189	16.450	26.639	-23.361	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 Equipment

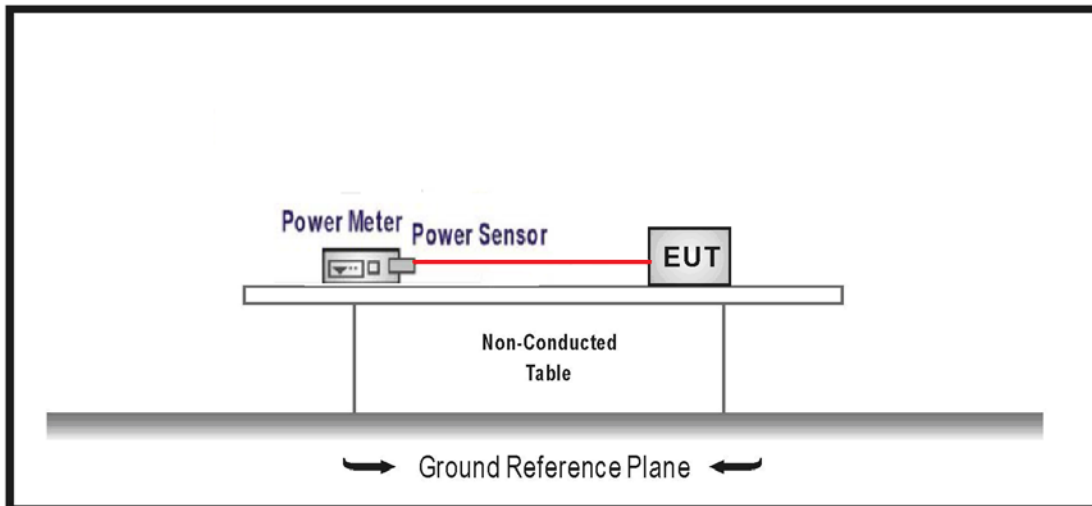
The following test equipment is used during the test:

Peak Power Output / SR10-H

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

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

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 V03R02 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

3.6. Test Result

Product	Lyra		
Test Item	Peak Power Output		
Test Mode	Mode 1: Tx-AD2055320		
Date of Test	2017/04/14	Test Site	SR10-H

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
00	2402	2.71	30	Pass
19	2440	4.05	30	Pass
39	2480	4.98	30	Pass

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the test:

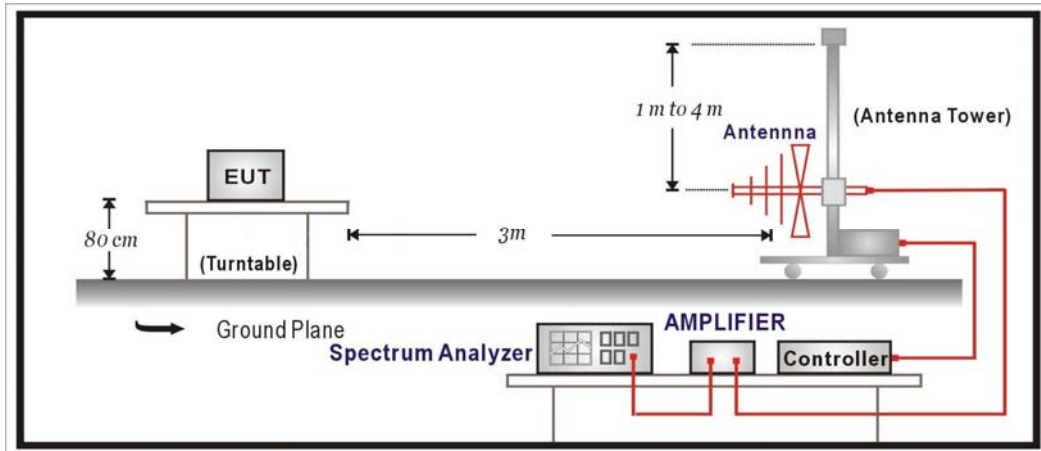
Radiated Emission / CB2-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2891	2017/08/14
Horn Antenna	Schwarzbeck	BBHA 9120	D312	2017/10/25
Pre-Amplifier	EMCI	EMC0031835	980233	2018/02/02
Pre-Amplifier	Schwarzbeck	DBL-1840N506	013	2017/09/29
Pre-Amplifier	Miteq	JS41-00104000 0-58-5P	1573954	2017/10/04
Horn Antenna	Schwarzbeck	BBHA 9170	203	2017/08/28
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/22

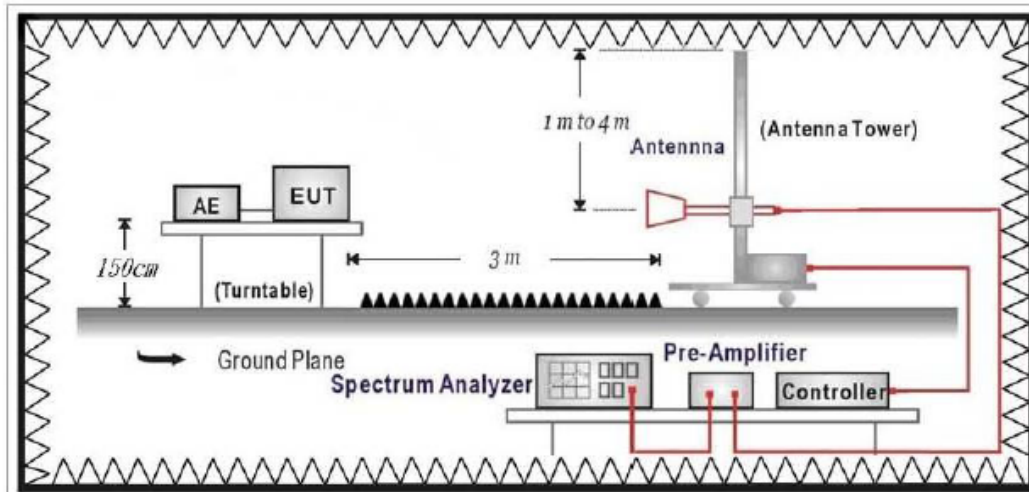
Note: All equipments that need to calibrate are with calibration period of 1 year.

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 V03R02 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 below or equal 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.

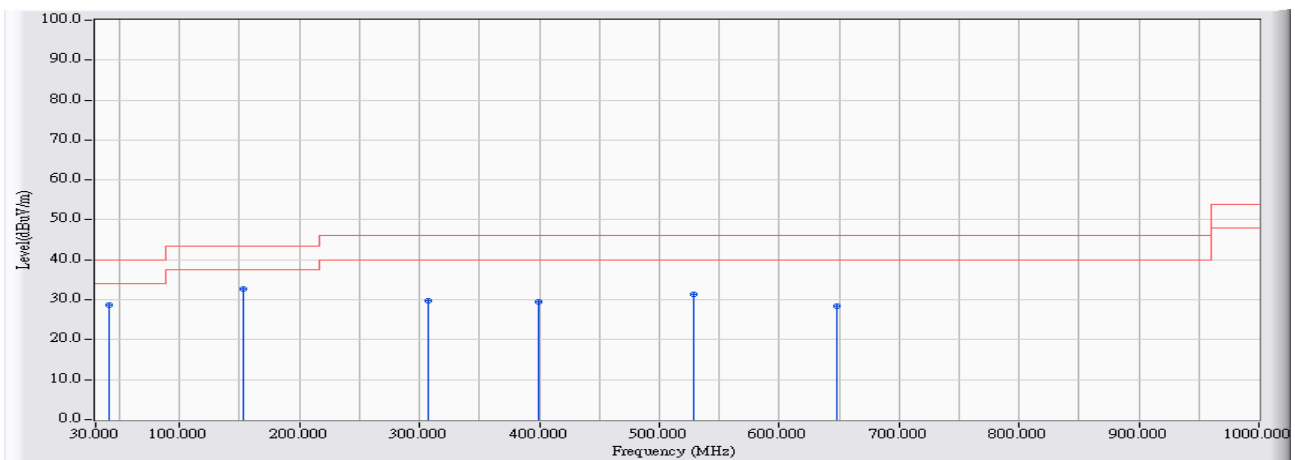
4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

4.6. Test Result

30MHz-1GHz Spurious

Site : CB4-H	Time : 2017/04/25
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.1.15_BLE_2440MHz Mode 1: Tx-AD2055320

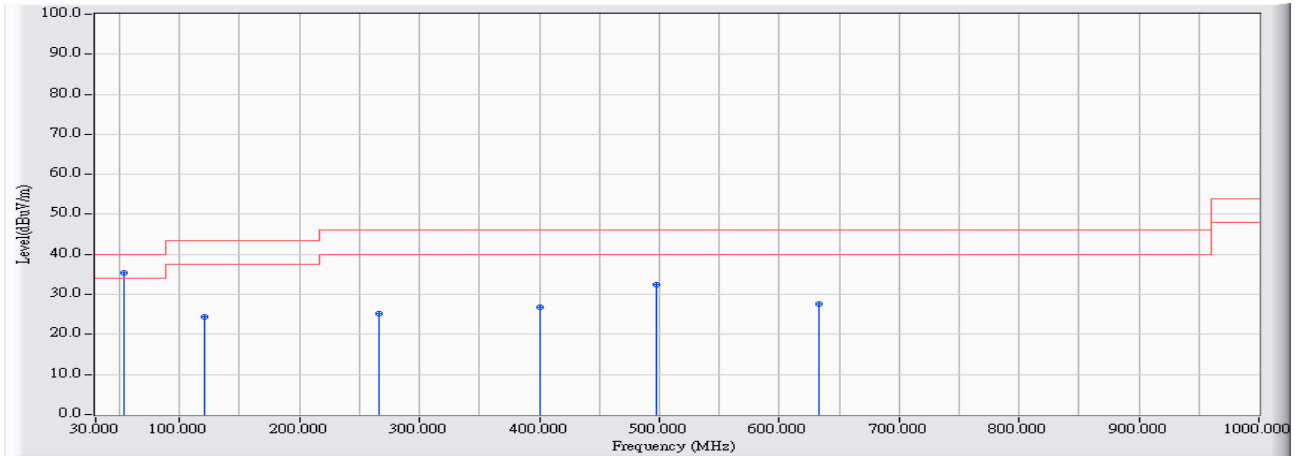


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	40.670	-17.178	45.788	28.610	-11.390	40.000	QUASPEAK
2	* 153.675	-22.460	55.232	32.773	-10.727	43.500	QUASPEAK
3	307.420	-19.282	49.048	29.767	-16.233	46.000	QUASPEAK
4	399.570	-15.764	45.306	29.543	-16.457	46.000	QUASPEAK
5	528.095	-13.848	45.230	31.381	-14.619	46.000	QUASPEAK
6	647.890	-12.893	41.231	28.338	-17.662	46.000	QUASPEAK

Note:

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

Site : CB4-H	Time : 2017/06/07
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_CE_Sub_S2_30M-1GHz_1116 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.1.15_BLE_2440MHz Mode 1: Tx-AD2055320

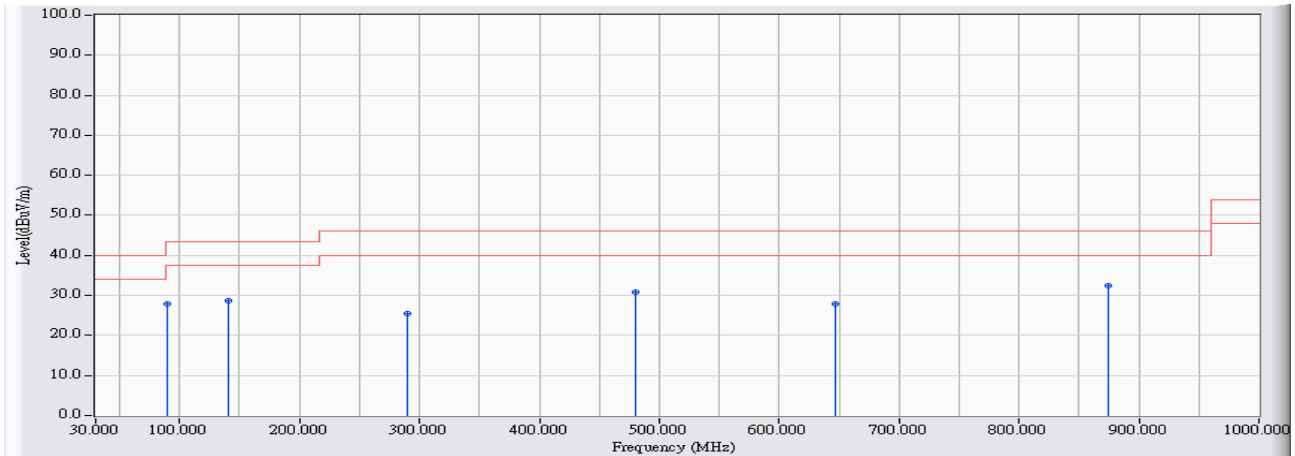


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	53.785	-33.365	68.843	35.478	-4.522	40.000	QUASPEAK
2		120.471	-21.730	46.044	24.314	-19.186	43.500	QUASPEAK
3		266.374	-21.815	47.055	25.241	-20.759	46.000	QUASPEAK
4		401.071	-16.443	43.339	26.896	-19.104	46.000	QUASPEAK
5		498.076	-14.011	46.537	32.526	-13.474	46.000	QUASPEAK
6		633.347	-11.795	39.495	27.699	-18.301	46.000	QUASPEAK

Note:

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

Site : CB4-H	Time : 2017/04/25
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.1.15_BLE_2440MHz Mode 2: Tx-ADP-24EW B

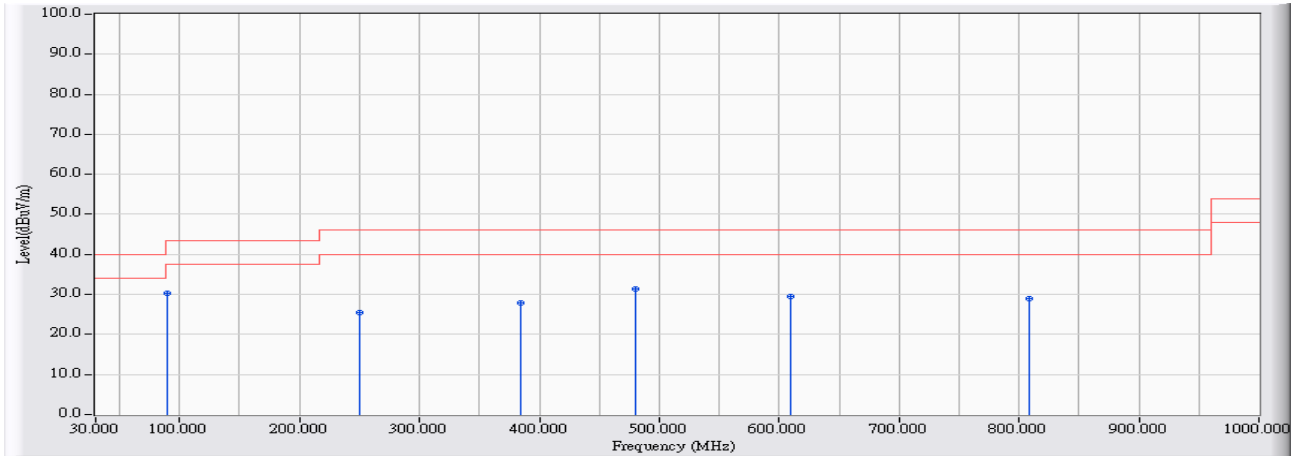


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	90.140	-25.489	53.419	27.930	-15.570	43.500	QUASPEAK
2	141.065	-21.658	50.244	28.586	-14.914	43.500	QUASPEAK
3	290.445	-19.304	44.786	25.483	-20.517	46.000	QUASPEAK
4	480.080	-14.513	45.315	30.802	-15.198	46.000	QUASPEAK
5	647.405	-12.883	40.662	27.780	-18.220	46.000	QUASPEAK
6	* 874.870	-9.092	41.481	32.389	-13.611	46.000	QUASPEAK

Note:

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

Site : CB4-H	Time : 2017/04/25
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB4_FCC_EFS_S2_30M-1GHz_1116 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.1.15_BLE_2440MHz Mode 2: Tx-ADP-24EW B



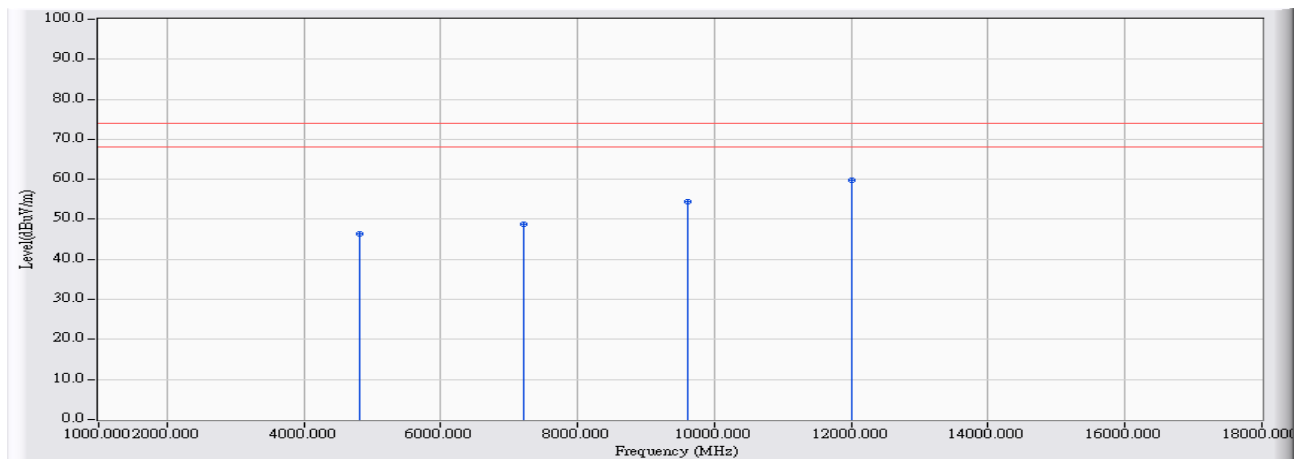
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	90.140	-25.489	55.705	30.216	-13.284	43.500	PEAK
2		250.190	-20.117	45.614	25.497	-20.503	46.000	PEAK
3		384.050	-16.465	44.468	28.004	-17.996	46.000	PEAK
4		480.080	-14.513	45.897	31.384	-14.616	46.000	PEAK
5		609.575	-12.256	41.795	29.540	-16.460	46.000	PEAK
6		808.425	-10.431	39.439	29.008	-16.992	46.000	PEAK

Note:

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

Harmonic & Spurious:

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

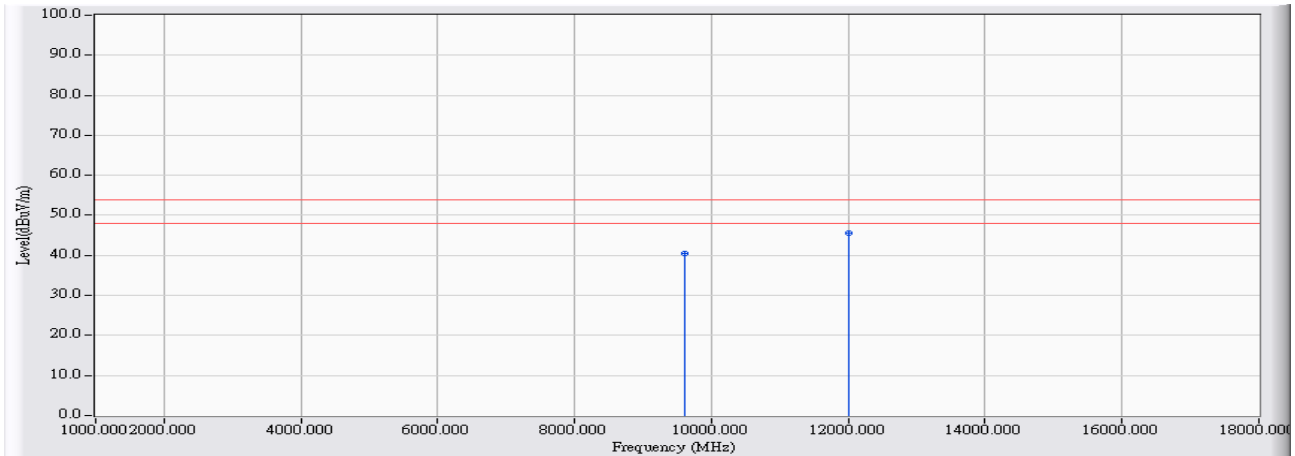


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	5.750	40.570	46.321	-27.679	74.000	PEAK
2		7206.000	12.860	36.050	48.909	-25.091	74.000	PEAK
3		9608.000	18.890	35.590	54.480	-19.520	74.000	PEAK
4	*	12010.000	22.963	36.740	59.703	-14.297	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

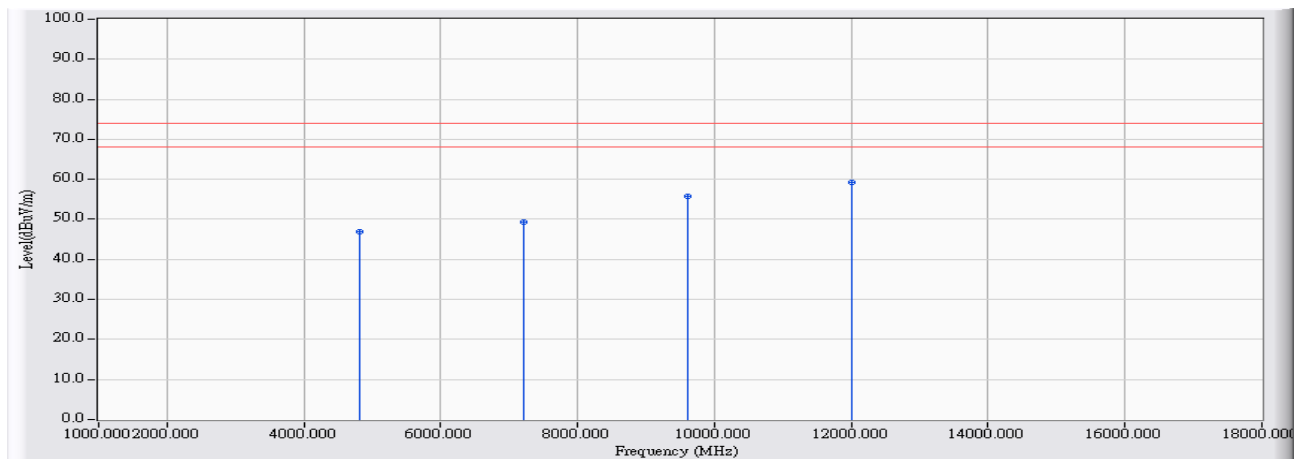


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9608.000	18.890	21.690	40.580	-13.420	54.000	AVERAGE
2	*	12010.000	22.963	22.580	45.543	-8.457	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

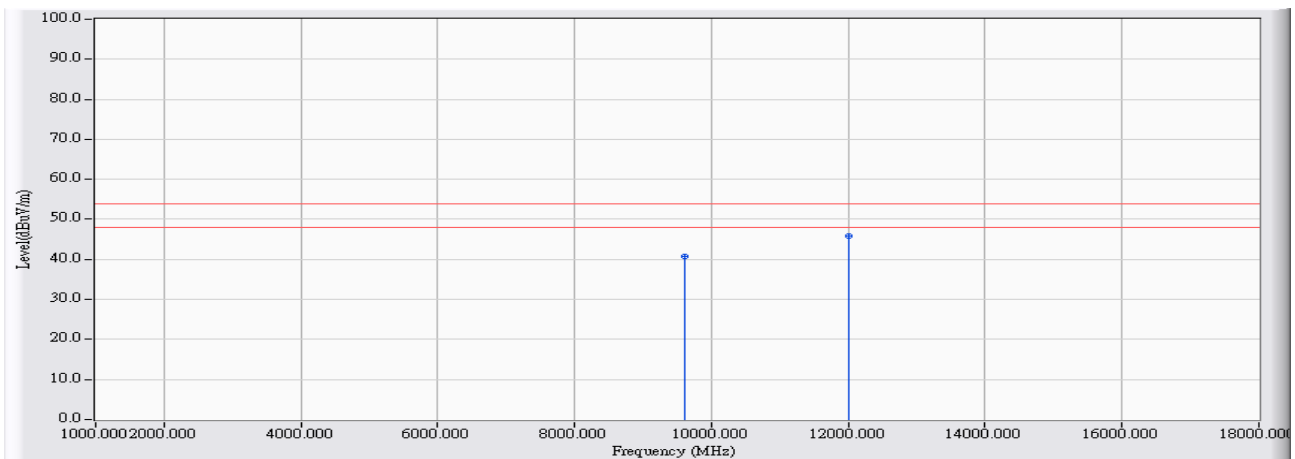


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4804.000	5.750	41.210	46.961	-27.039	74.000	PEAK
2		7206.000	12.860	36.580	49.439	-24.561	74.000	PEAK
3		9608.000	18.890	36.920	55.810	-18.190	74.000	PEAK
4	*	12010.000	22.963	36.160	59.123	-14.877	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

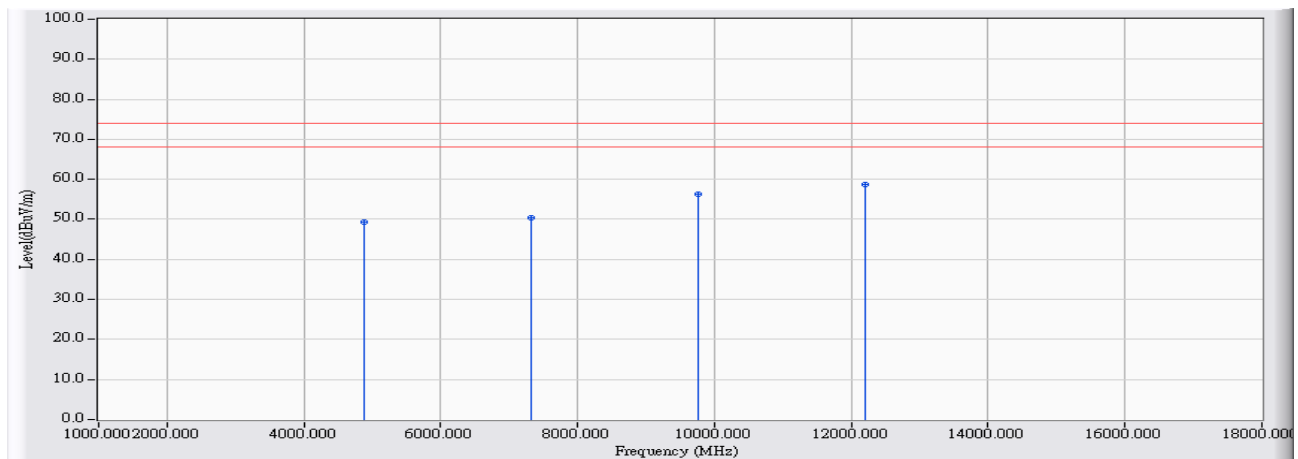


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9608.000	18.890	21.730	40.620	-13.380	54.000	AVERAGE
2	*	12010.000	22.963	22.950	45.913	-8.087	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

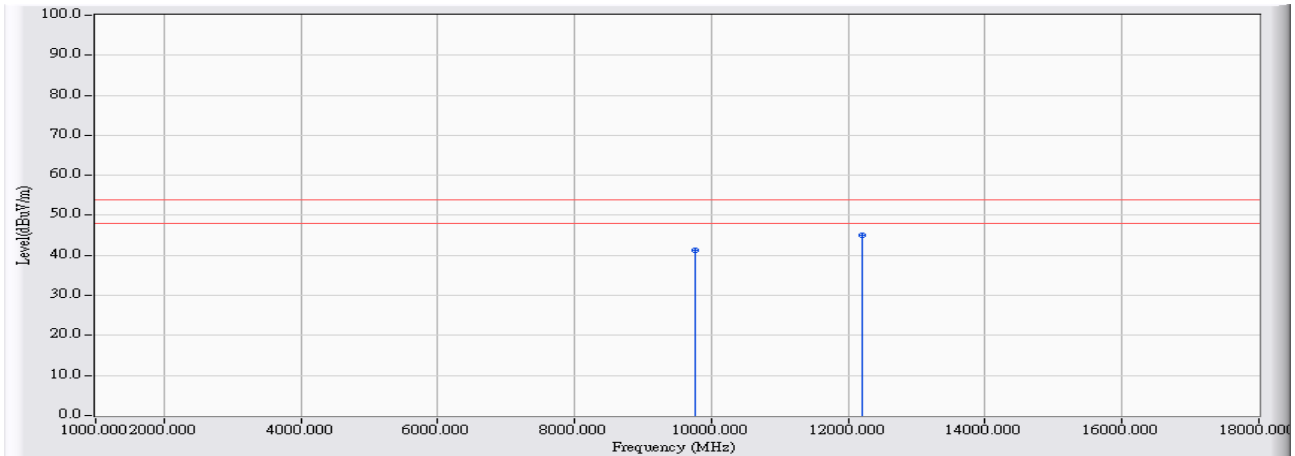


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	5.862	43.580	49.443	-24.557	74.000	PEAK
2		7320.000	13.296	37.140	50.436	-23.564	74.000	PEAK
3		9760.000	19.268	37.010	56.278	-17.722	74.000	PEAK
4	*	12200.000	22.432	36.150	58.582	-15.418	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

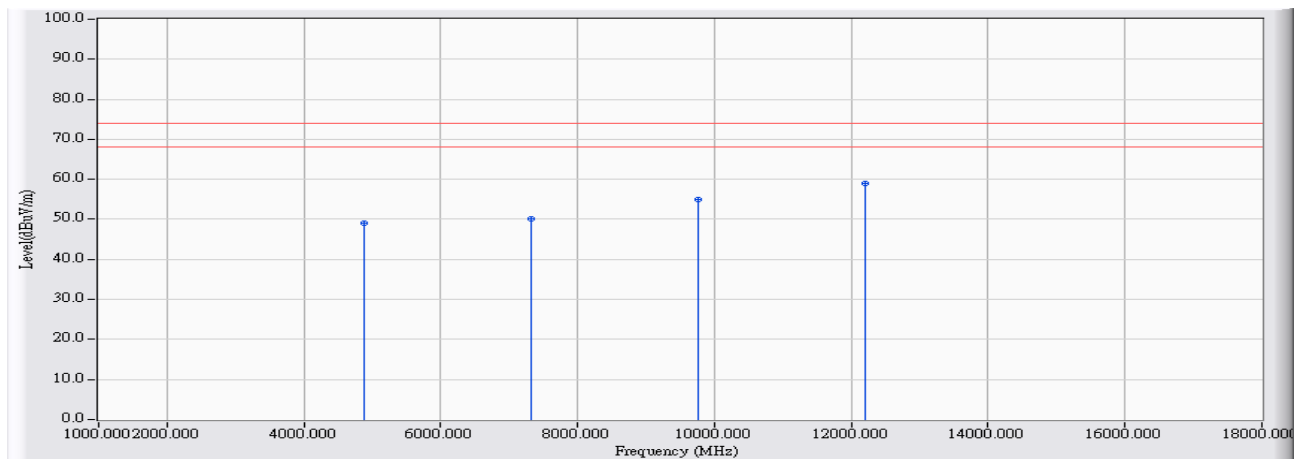


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9760.000	19.268	21.900	41.168	-12.832	54.000	AVERAGE
2	*	12200.000	22.432	22.710	45.142	-8.858	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

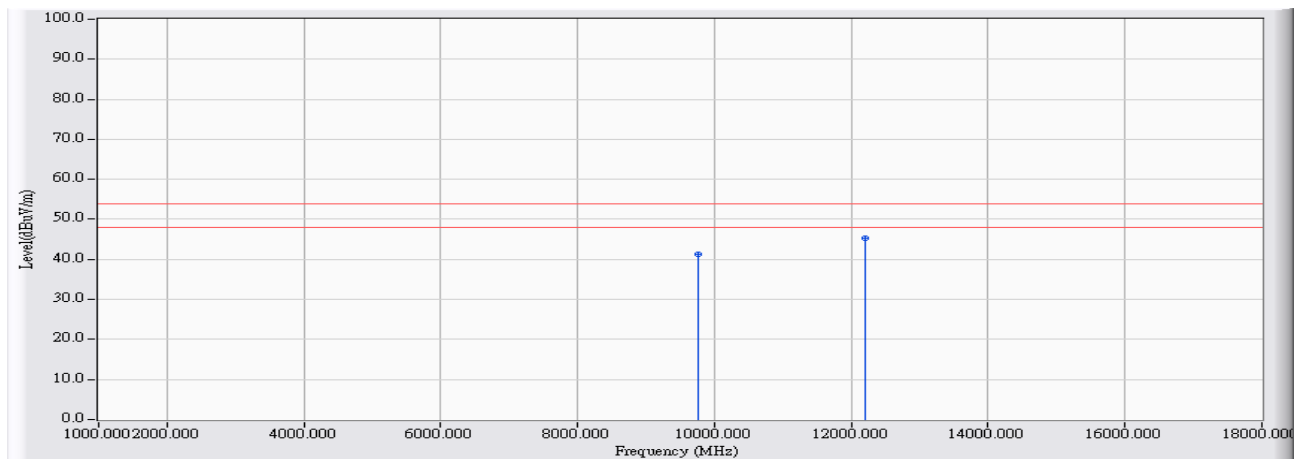


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	5.862	43.160	49.023	-24.977	74.000	PEAK
2		7320.000	13.296	36.950	50.246	-23.754	74.000	PEAK
3		9760.000	19.268	35.770	55.038	-18.962	74.000	PEAK
4	*	12200.000	22.432	36.660	59.092	-14.908	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

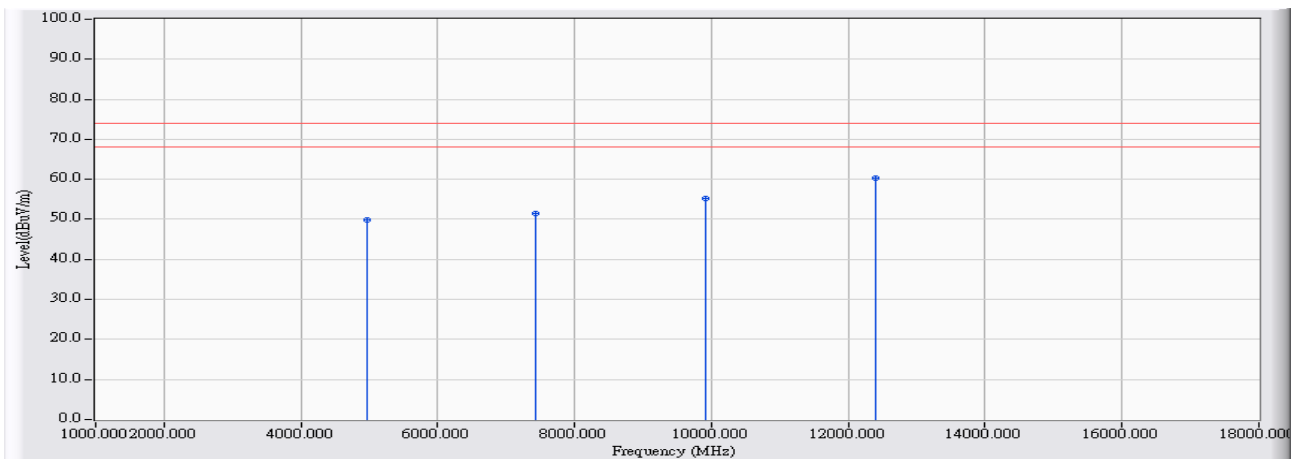


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9760.000	19.268	21.890	41.158	-12.842	54.000	AVERAGE
2	*	12200.000	22.432	22.810	45.242	-8.758	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

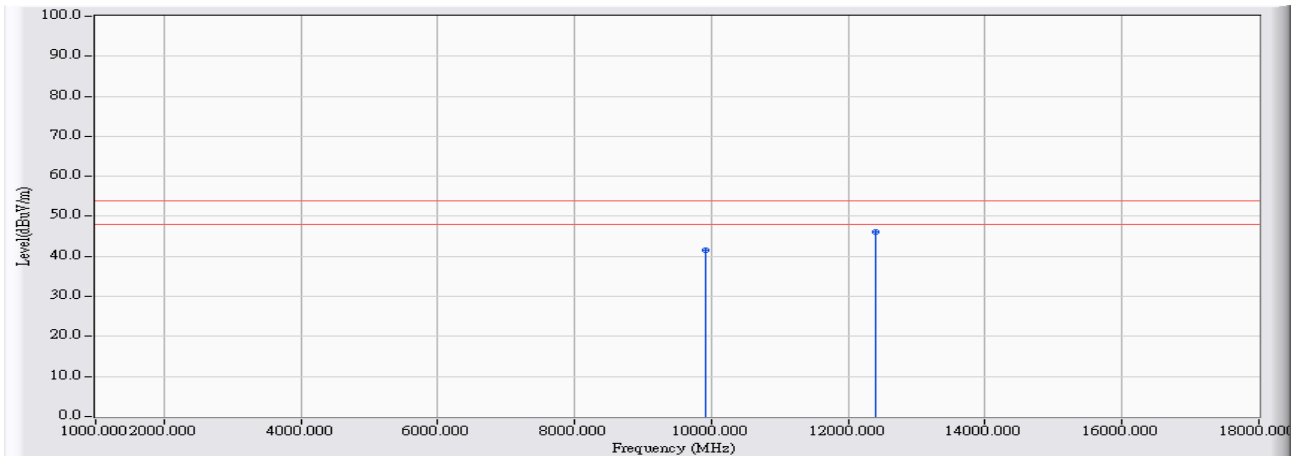


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	5.981	43.860	49.840	-24.160	74.000	PEAK
2		7440.000	13.760	37.760	51.520	-22.480	74.000	PEAK
3		9920.000	19.677	35.520	55.198	-18.802	74.000	PEAK
4	*	12400.000	23.508	36.780	60.288	-13.712	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

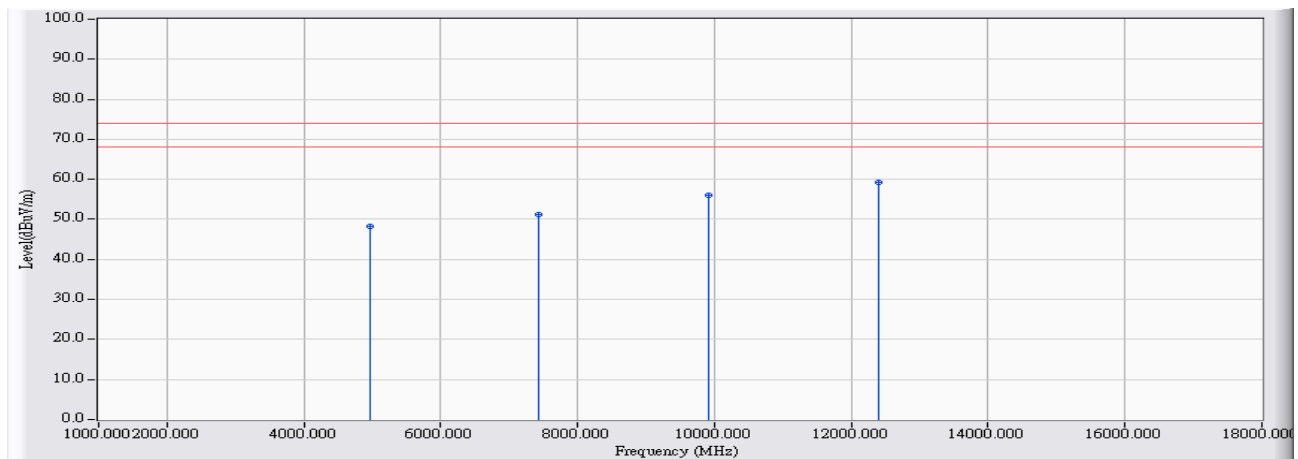


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9920.000	19.677	21.960	41.638	-12.362	54.000	AVERAGE
2	*	12400.000	23.508	22.480	45.988	-8.012	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

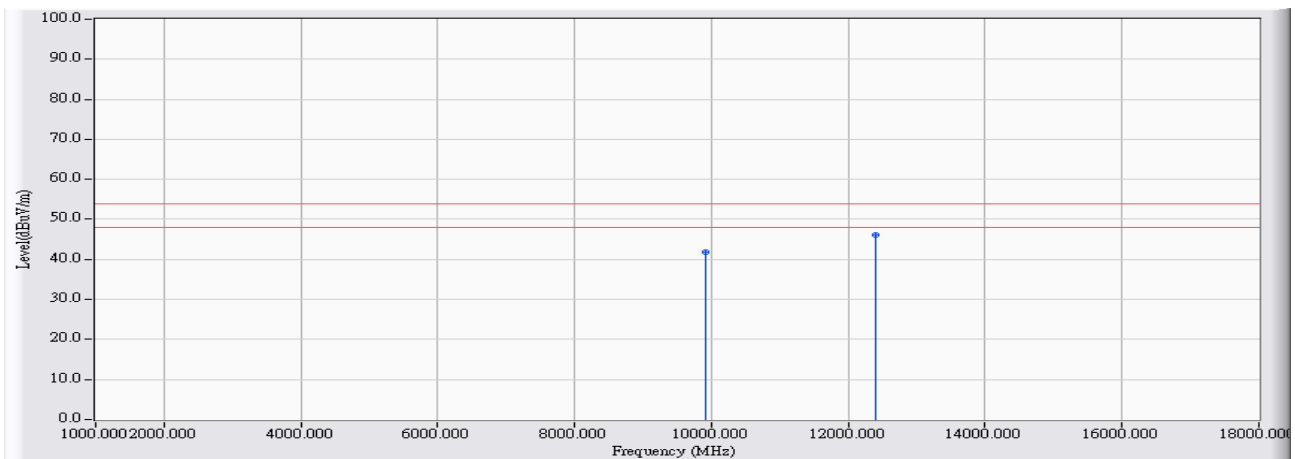


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4960.000	5.981	42.380	48.360	-25.640	74.000	PEAK
2		7440.000	13.760	37.350	51.110	-22.890	74.000	PEAK
3		9920.000	19.677	36.440	56.118	-17.882	74.000	PEAK
4	*	12400.000	23.508	35.640	59.148	-14.852	74.000	PEAK

Note:

1. All readings above 1GHz are 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 : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		9920.000	19.677	22.040	41.718	-12.282	54.000	AVERAGE
2	*	12400.000	23.508	22.590	46.098	-7.902	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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 Equipment

The following test equipment is used during the test:

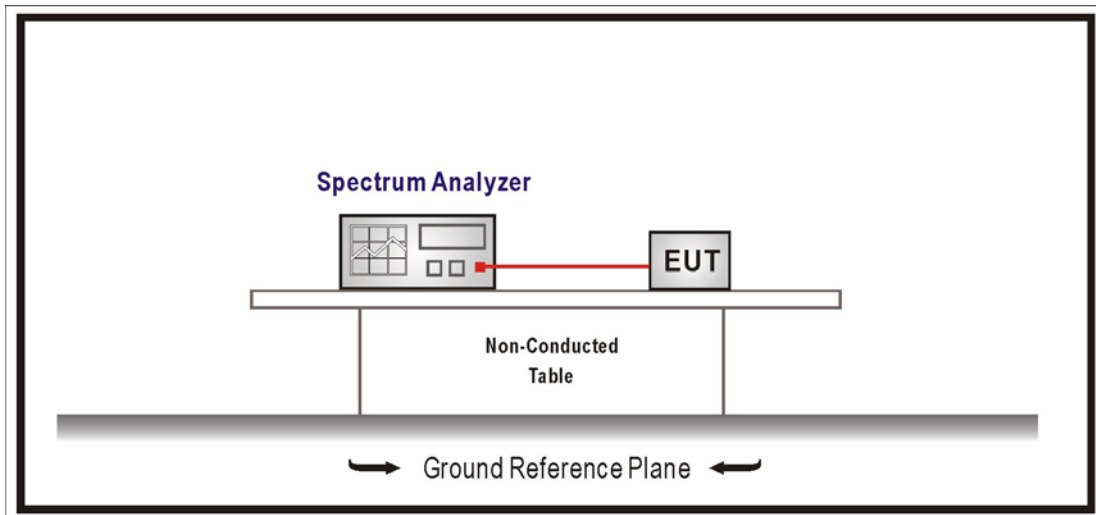
RF antenna conducted test / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2018/03/12

Note: All equipments that need to calibrate are with calibration period of 1 year.

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 V03R02 for compliance to FCC 47CFR 15.247 requirements. Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

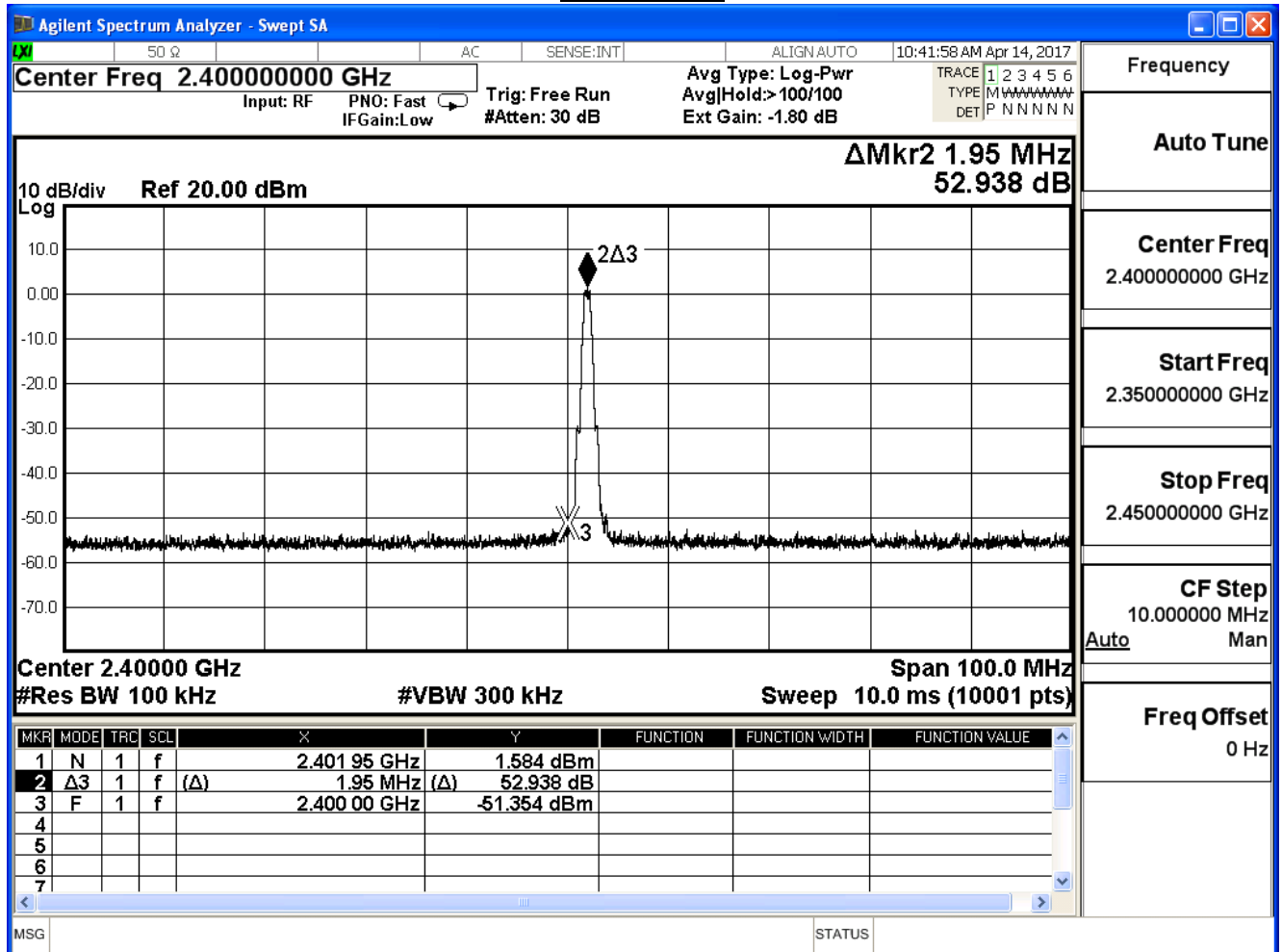
5.6. Test Result

Product	Lyra		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Tx-AD2055320		
Date of Test	2017/04/14	Test Site	SR10-H

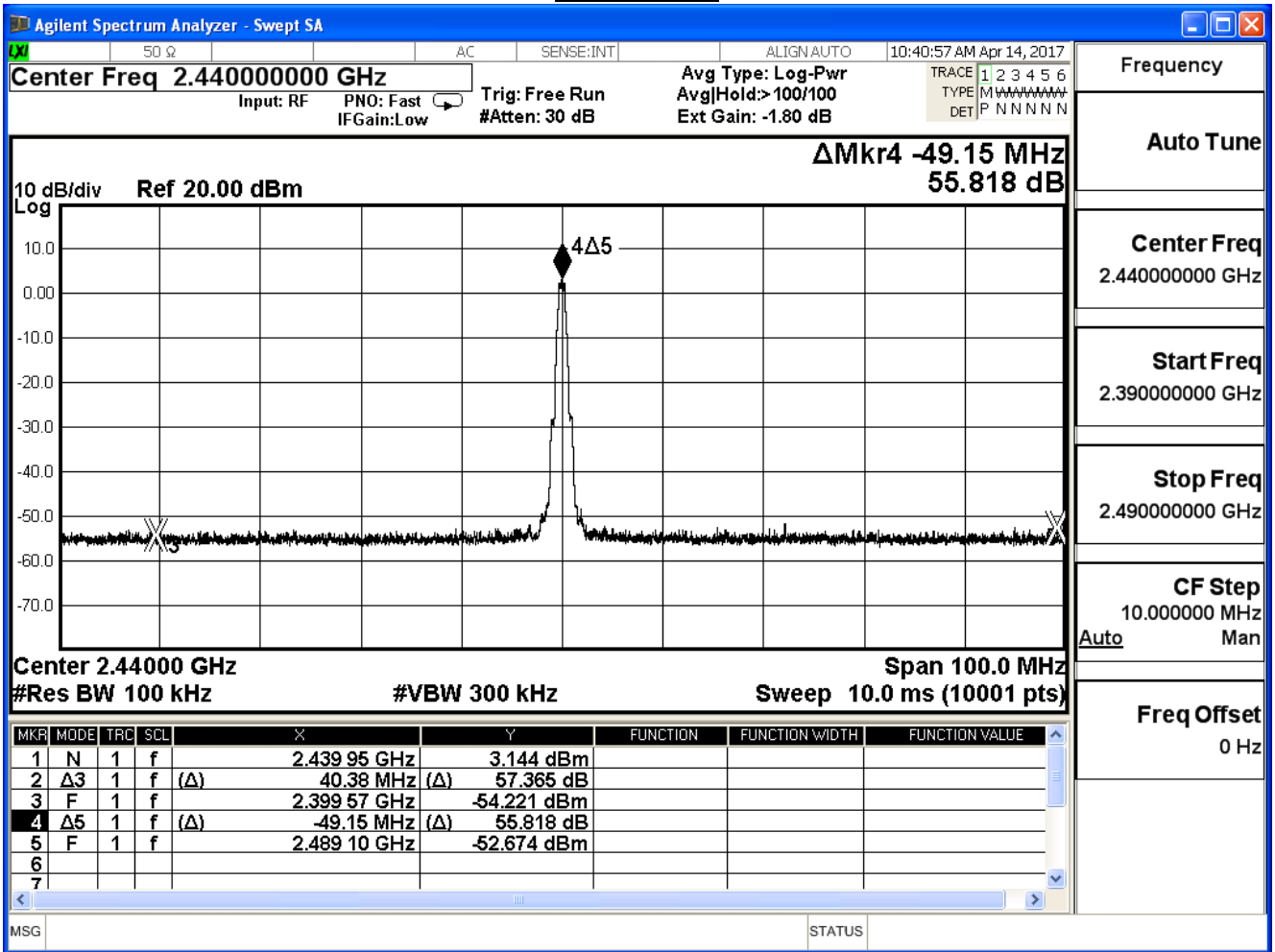
GFSK

Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
00	2402	52.938	≥ 20	Pass
19	2440	55.818	≥ 20	Pass
39	2480	56.894	≥ 20	Pass

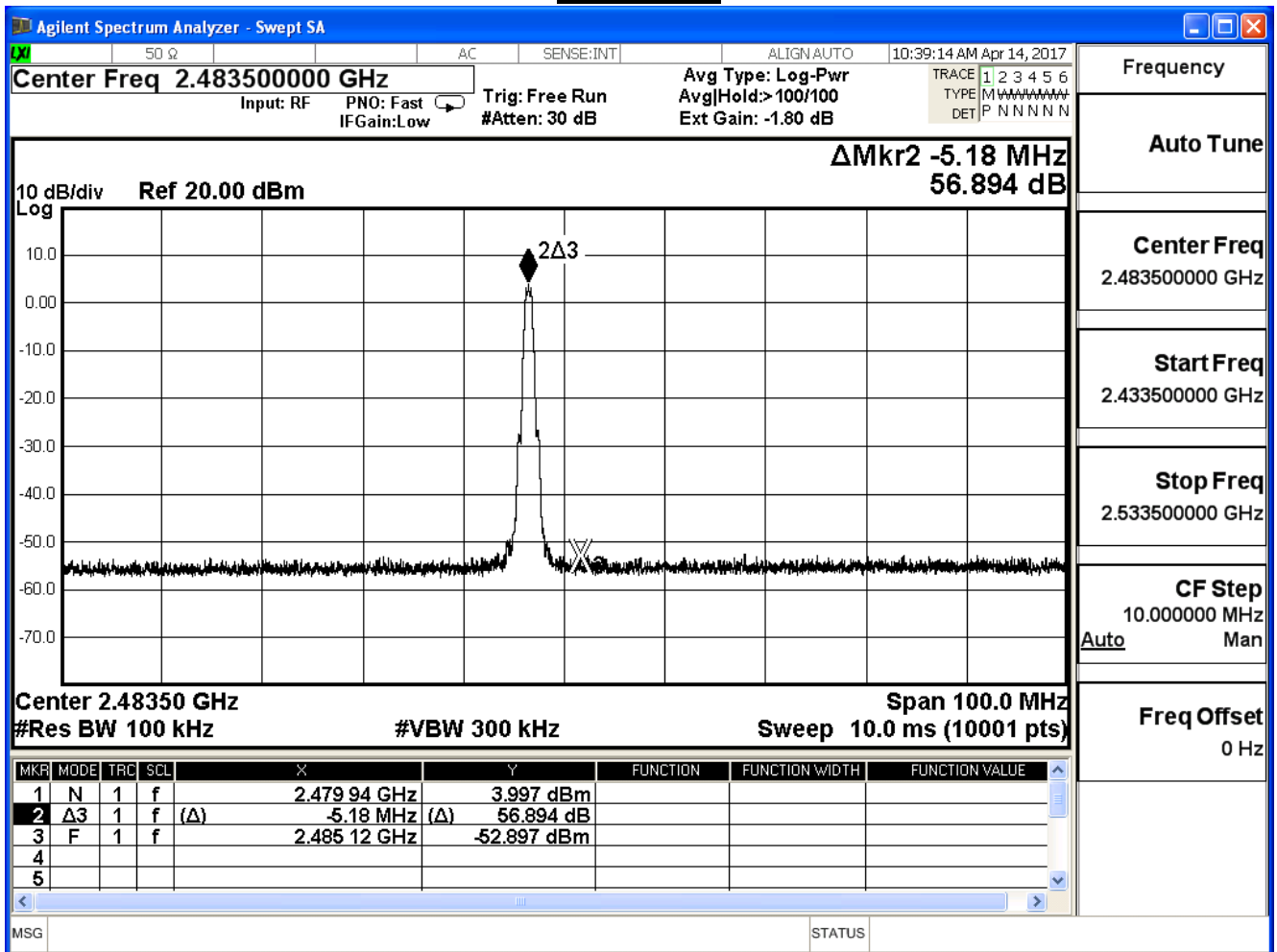
Channel 00



Channel 19

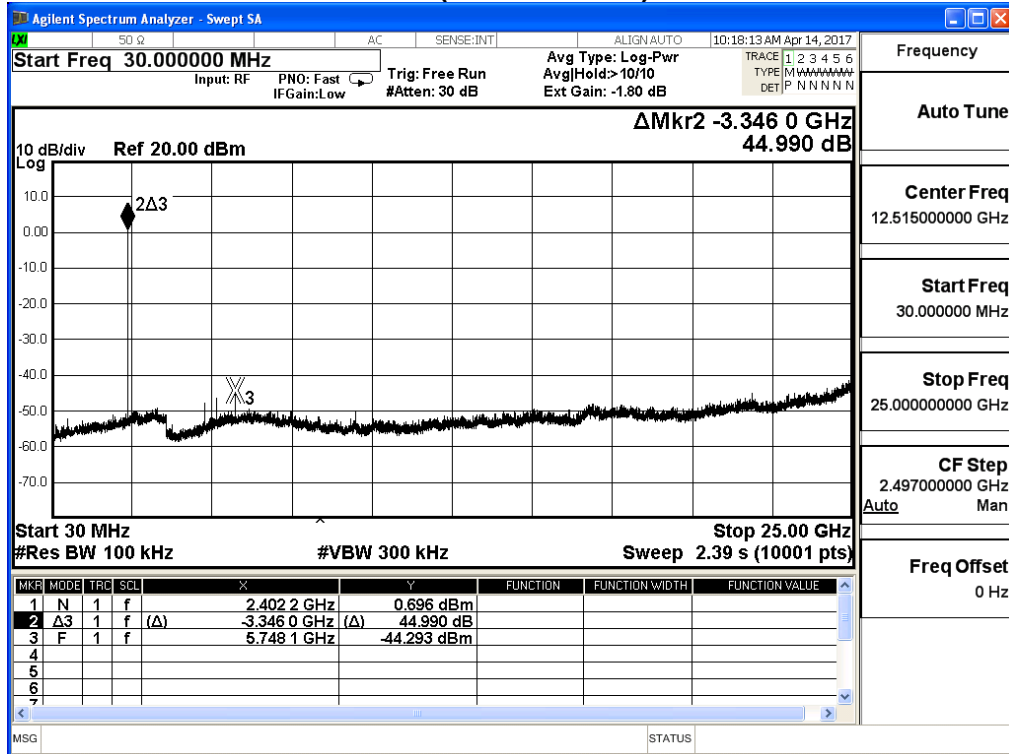


Channel 39

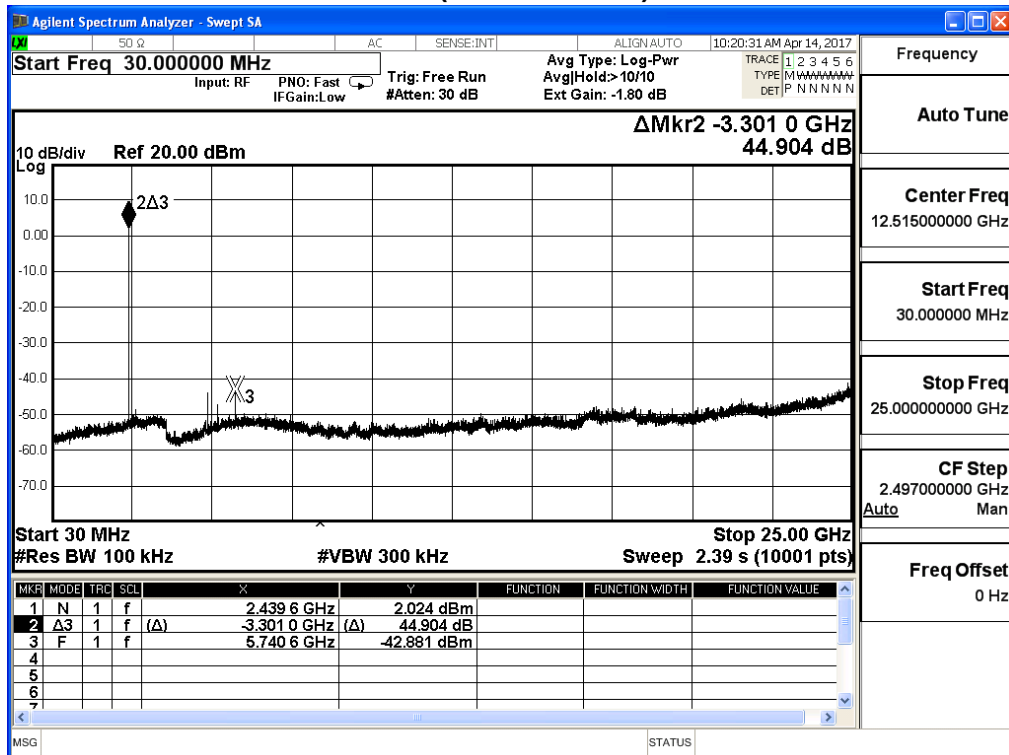


Product	Lyra		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Tx-AD2055320		
Date of Test	2017/04/14	Test Site	SR10-H

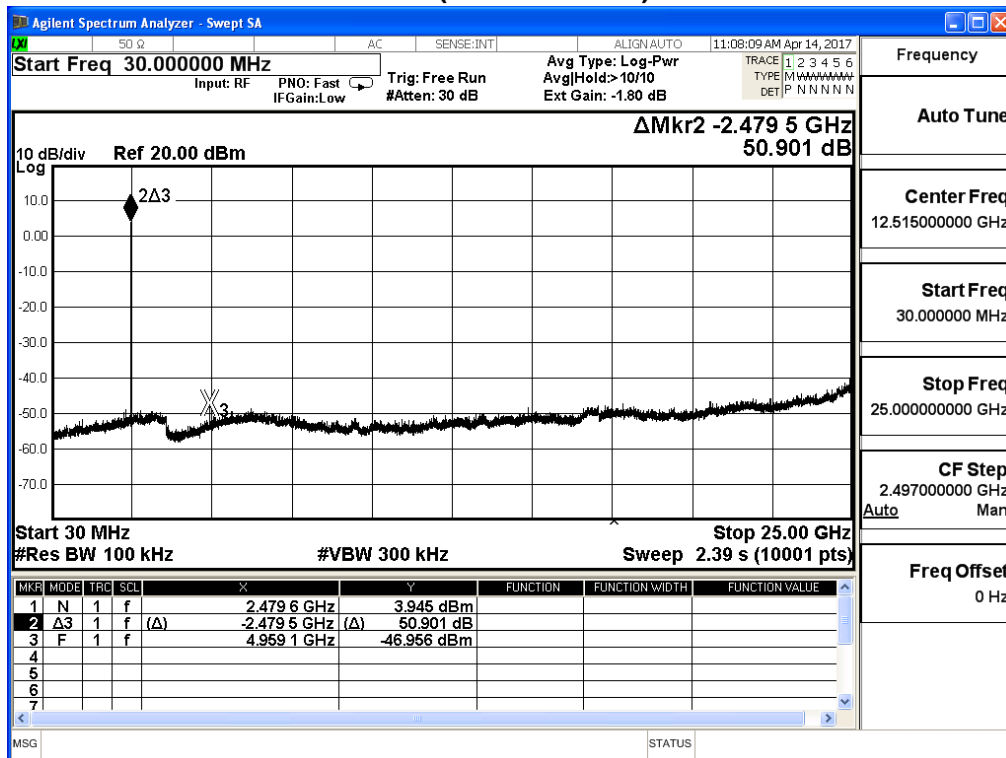
Channel 00 (30MHz-25GHz)- GFSK



Channel 19 (30MHz-25GHz)- GFSK



Channel 39 (30MHz-25GHz)- GFSK



6. Band Edge

6.1. Test Equipment

The following test equipments are used during the test:

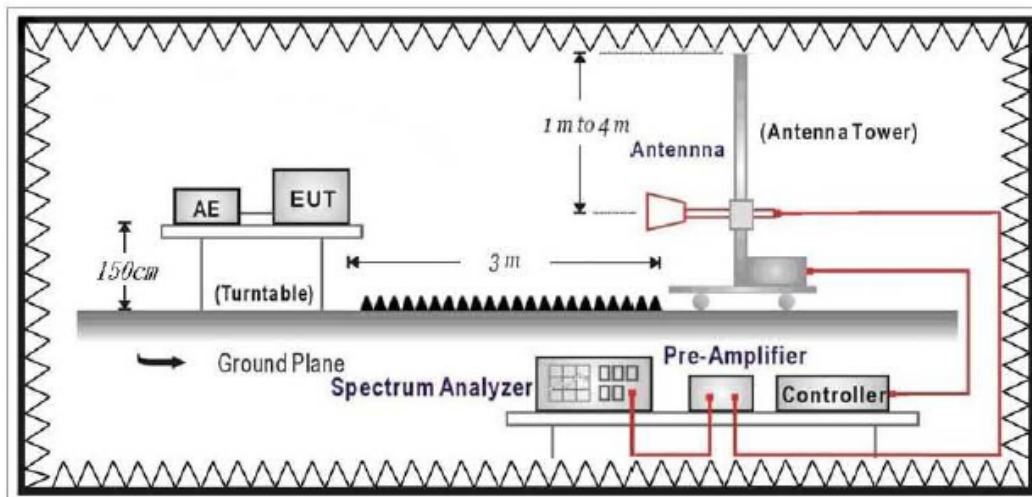
Band Edge / CB2-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	Schaffner	CBL6112B	2891	2017/08/14
Horn Antenna	Schwarzbeck	BBHA 9120	D312	2017/10/25
Pre-Amplifier	EMCI	EMC0031835	980233	2018/02/02
Pre-Amplifier	Schwarzbeck	DBL-1840N506	013	2017/09/29
Pre-Amplifier	Miteq	JS41-00104000 0-58-5P	1573954	2017/10/04
Horn Antenna	Schwarzbeck	BBHA 9170	203	2017/08/28
Signal & Spectrum Analyzer	R&S	FSV40	101049	2018/01/22

Note: All equipments that need to calibrate are with calibration period of 1 year.

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 V03R02 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.

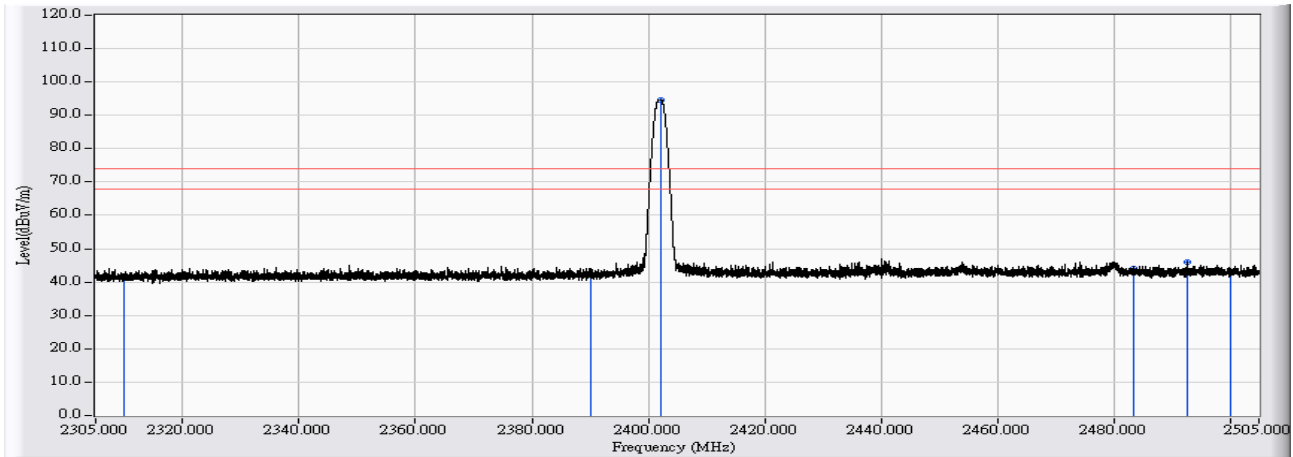
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10:2013 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

6.6. Test Result

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

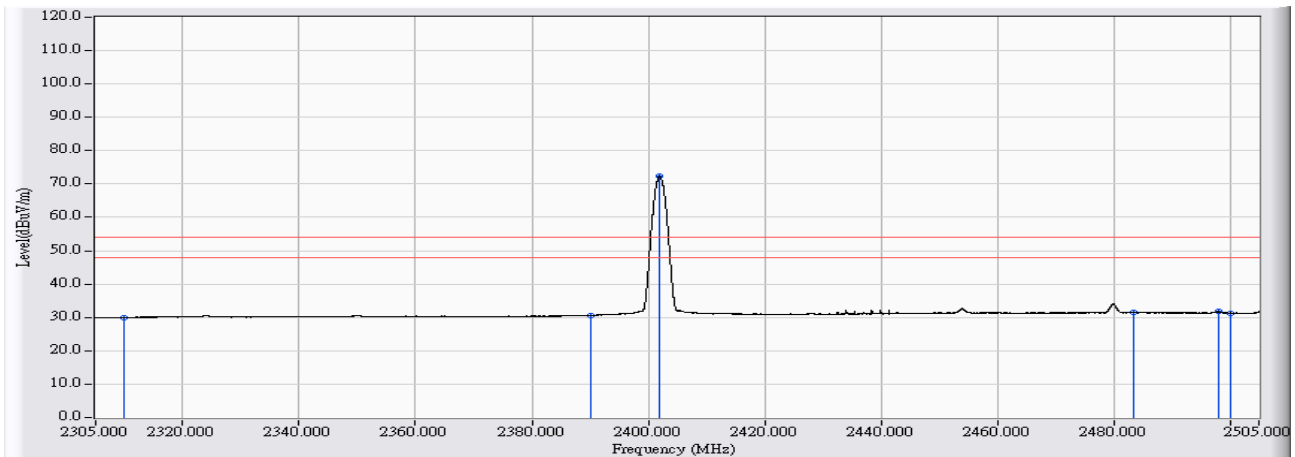


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	29.066	41.521	-32.479	74.000	PEAK
2	2390.000	13.127	29.260	42.388	-31.612	74.000	PEAK
3	* 2402.210	13.140	81.432	94.572	20.572	74.000	PEAK
4	2483.500	13.725	30.498	44.223	-29.777	74.000	PEAK
5	2492.681	13.685	32.261	45.946	-28.054	74.000	PEAK
6	2500.000	13.617	29.425	43.042	-30.958	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

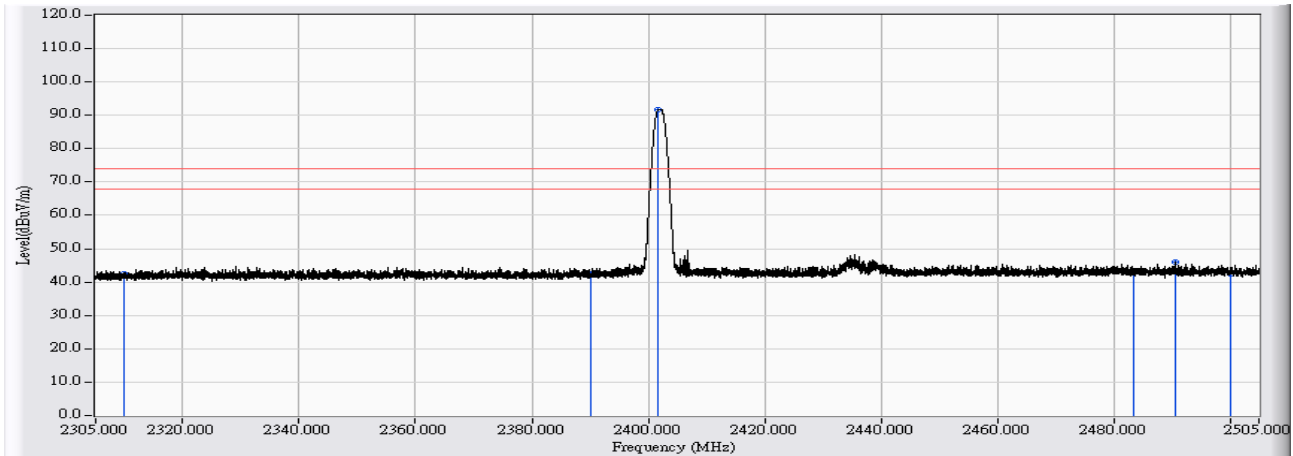


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	17.543	29.998	-24.002	54.000	AVERAGE
2	2390.000	13.127	17.539	30.667	-23.333	54.000	AVERAGE
3	* 2401.950	13.138	59.173	72.312	18.312	54.000	AVERAGE
4	2483.500	13.725	17.705	31.430	-22.570	54.000	AVERAGE
5	2498.001	13.621	18.128	31.750	-22.250	54.000	AVERAGE
6	2500.000	13.617	17.737	31.354	-22.646	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

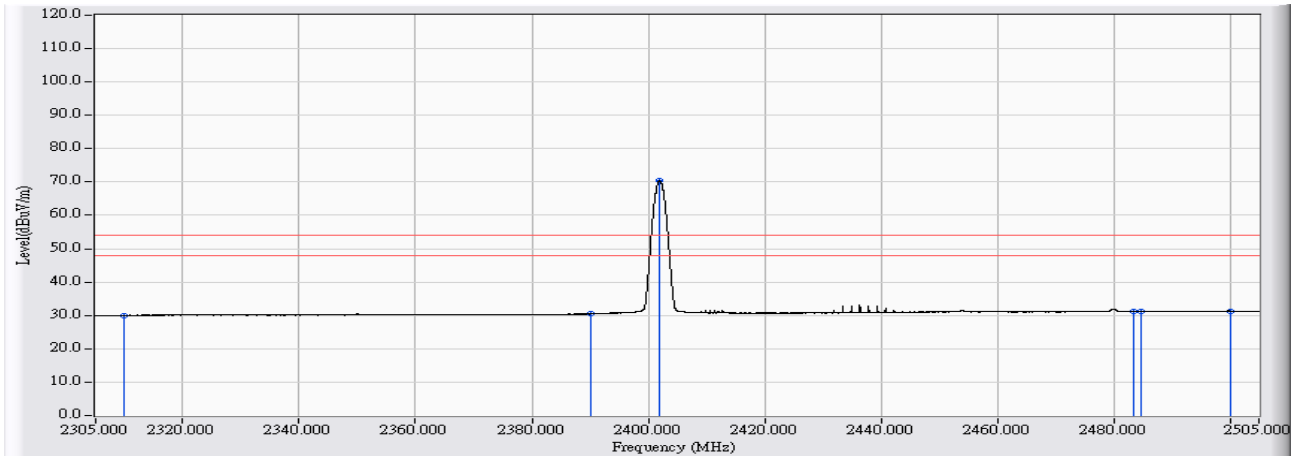


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	29.975	42.430	-31.570	74.000	PEAK
2	2390.000	13.127	29.482	42.610	-31.390	74.000	PEAK
3	* 2401.750	13.137	78.572	91.709	17.709	74.000	PEAK
4	2483.500	13.725	29.042	42.767	-31.233	74.000	PEAK
5	2490.641	13.705	32.455	46.161	-27.839	74.000	PEAK
6	2500.000	13.617	28.734	42.351	-31.649	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2402MHz Mode 1: Tx-AD2055320

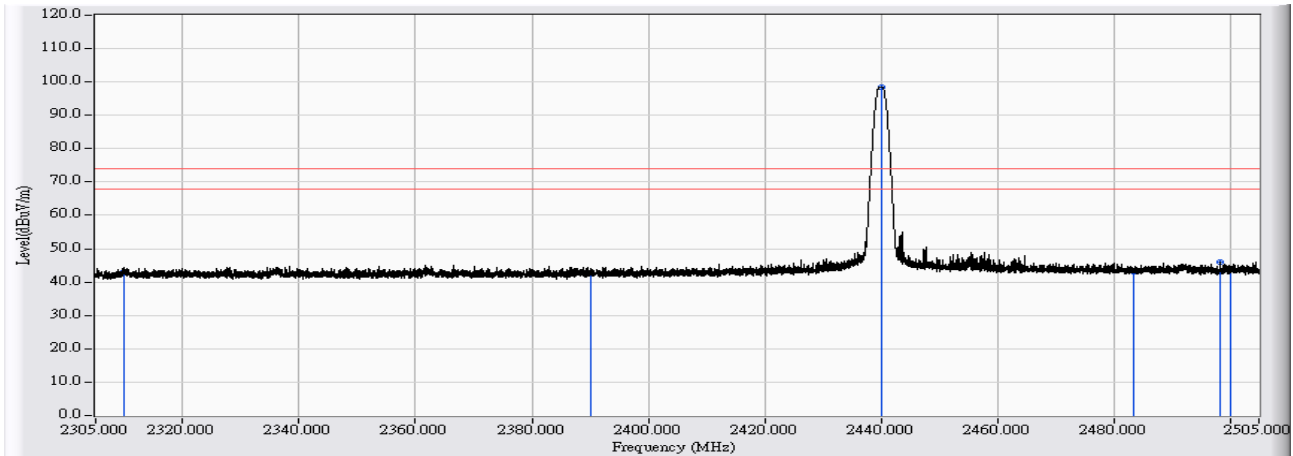


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	17.556	30.011	-23.989	54.000	AVERAGE
2	2390.000	13.127	17.371	30.499	-23.501	54.000	AVERAGE
3	* 2401.970	13.138	57.286	70.425	16.425	54.000	AVERAGE
4	2483.500	13.725	17.527	31.252	-22.748	54.000	AVERAGE
5	2484.782	13.725	17.591	31.317	-22.683	54.000	AVERAGE
6	2500.000	13.617	17.721	31.338	-22.662	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

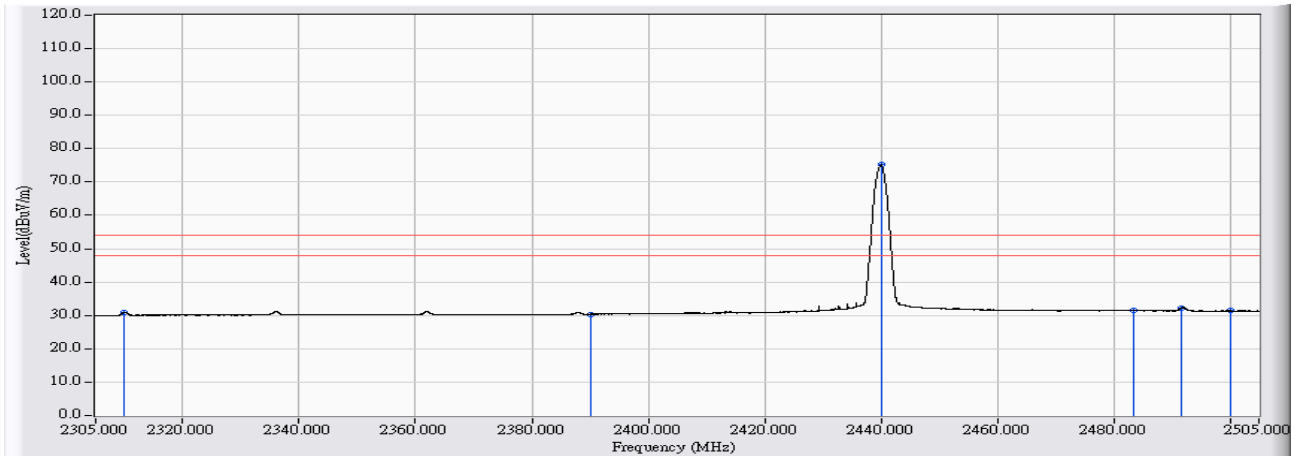


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	30.507	42.962	-31.038	74.000	PEAK
2	2390.000	13.127	29.394	42.522	-31.478	74.000	PEAK
3	* 2440.226	13.392	85.088	98.480	24.480	74.000	PEAK
4	2483.500	13.725	29.410	43.135	-30.865	74.000	PEAK
5	2498.461	13.620	32.373	45.994	-28.006	74.000	PEAK
6	2500.000	13.617	30.022	43.639	-30.361	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

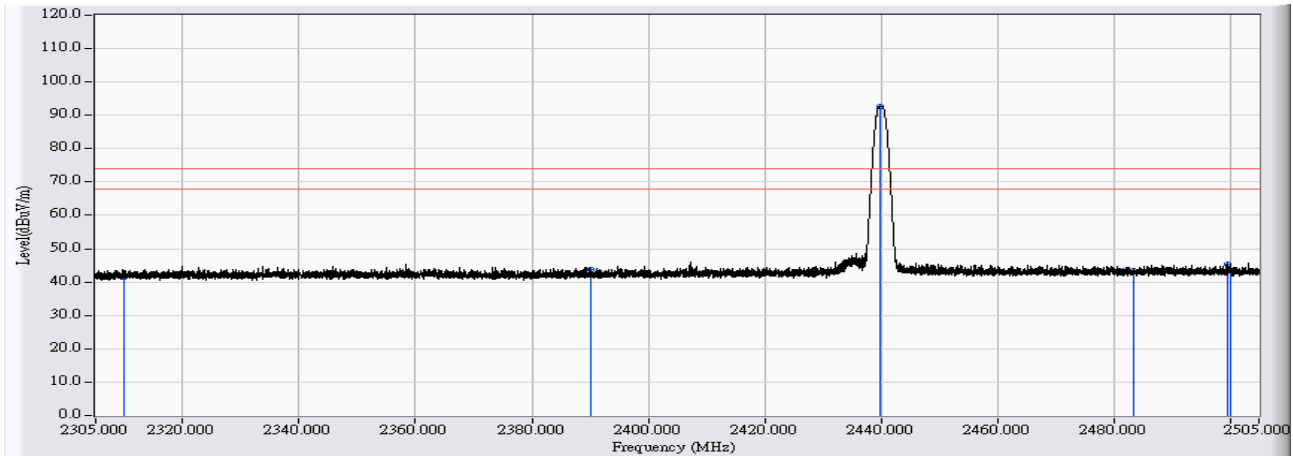


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	18.519	30.974	-23.026	54.000	AVERAGE
2	2390.000	13.127	17.197	30.325	-23.675	54.000	AVERAGE
3	* 2440.166	13.392	61.782	75.173	21.173	54.000	AVERAGE
4	2483.500	13.725	17.794	31.519	-22.481	54.000	AVERAGE
5	2491.761	13.695	18.554	32.250	-21.750	54.000	AVERAGE
6	2500.000	13.617	17.756	31.373	-22.627	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

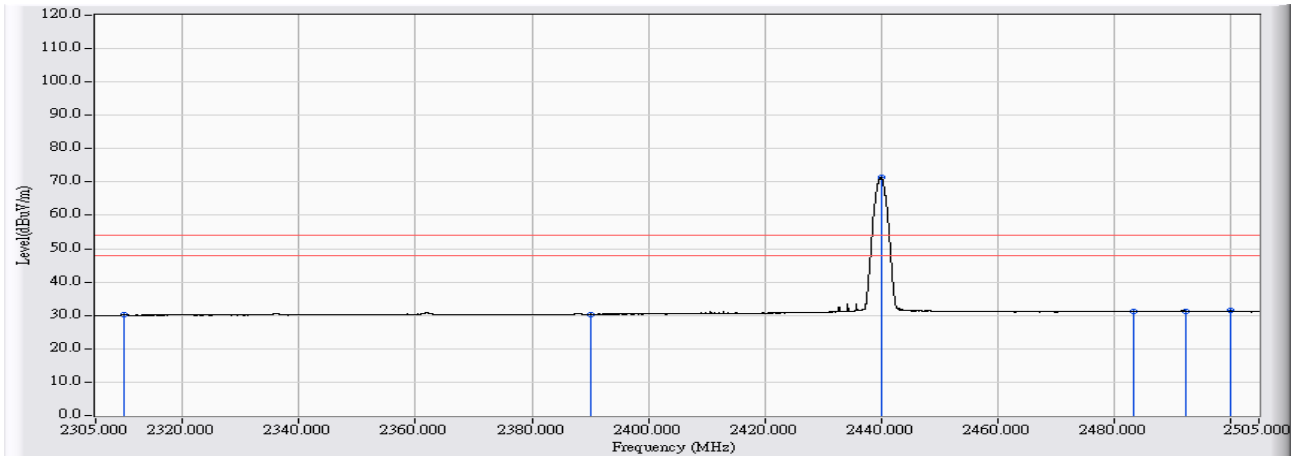


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	29.003	41.458	-32.542	74.000	PEAK
2	2390.000	13.127	30.643	43.771	-30.229	74.000	PEAK
3	* 2439.746	13.386	79.421	92.808	18.808	74.000	PEAK
4	2483.500	13.725	29.755	43.480	-30.520	74.000	PEAK
5	2499.680	13.618	31.779	45.397	-28.603	74.000	PEAK
6	2500.000	13.617	29.687	43.304	-30.696	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2440MHz Mode 1: Tx-AD2055320

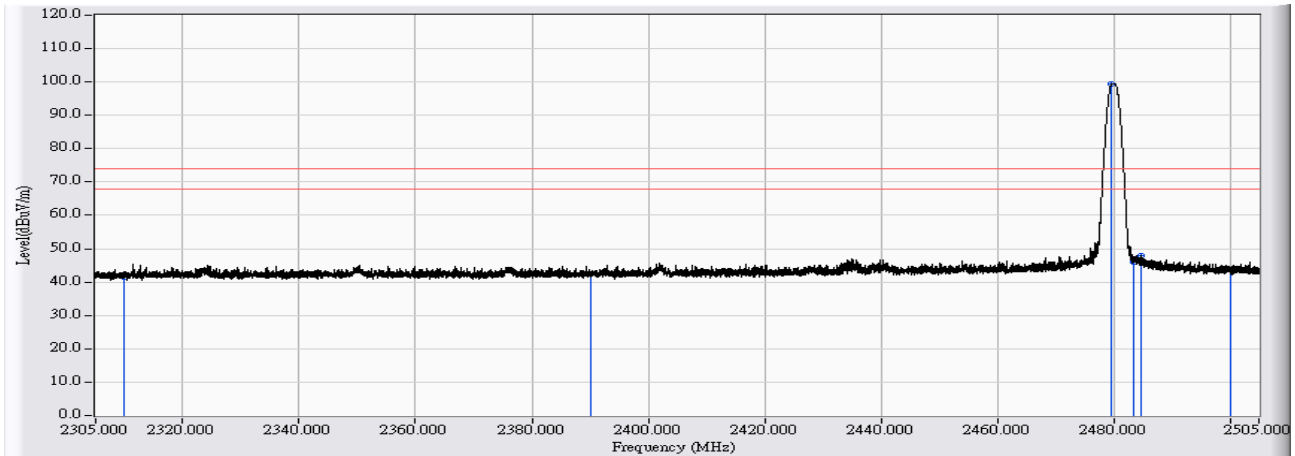


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	17.779	30.234	-23.766	54.000	AVERAGE
2	2390.000	13.127	17.175	30.303	-23.697	54.000	AVERAGE
3	* 2440.186	13.392	58.088	71.480	17.480	54.000	AVERAGE
4	2483.500	13.725	17.542	31.267	-22.733	54.000	AVERAGE
5	2492.321	13.689	17.644	31.333	-22.667	54.000	AVERAGE
6	2500.000	13.617	17.758	31.375	-22.625	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

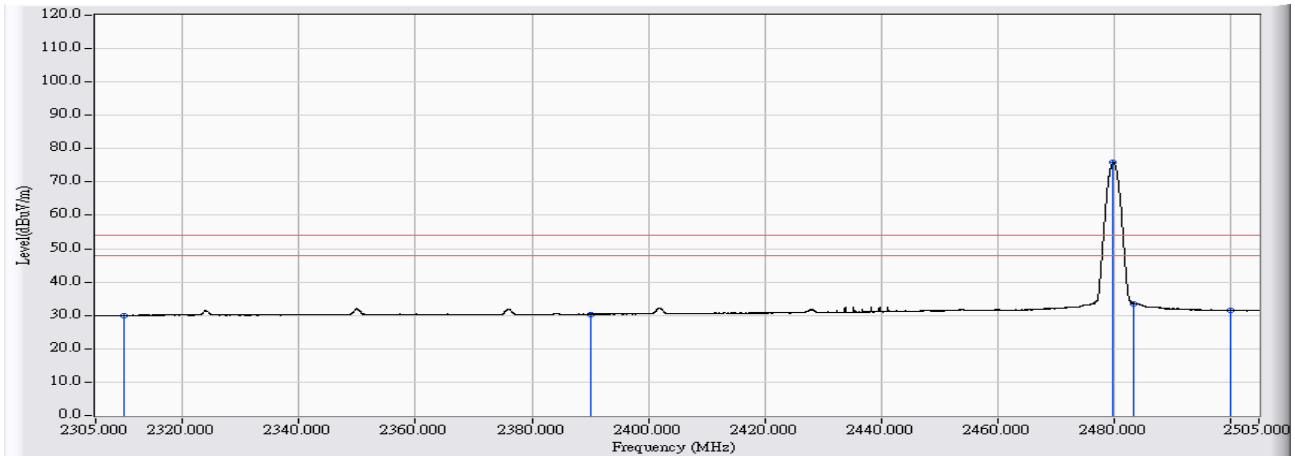


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	29.204	41.659	-32.341	74.000	PEAK
2	2390.000	13.127	29.391	42.519	-31.481	74.000	PEAK
3	* 2479.742	13.700	85.820	99.520	25.520	74.000	PEAK
4	2483.500	13.725	32.349	46.074	-27.926	74.000	PEAK
5	2484.722	13.726	34.197	47.923	-26.077	74.000	PEAK
6	2500.000	13.617	30.029	43.646	-30.354	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - HORIZONTAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

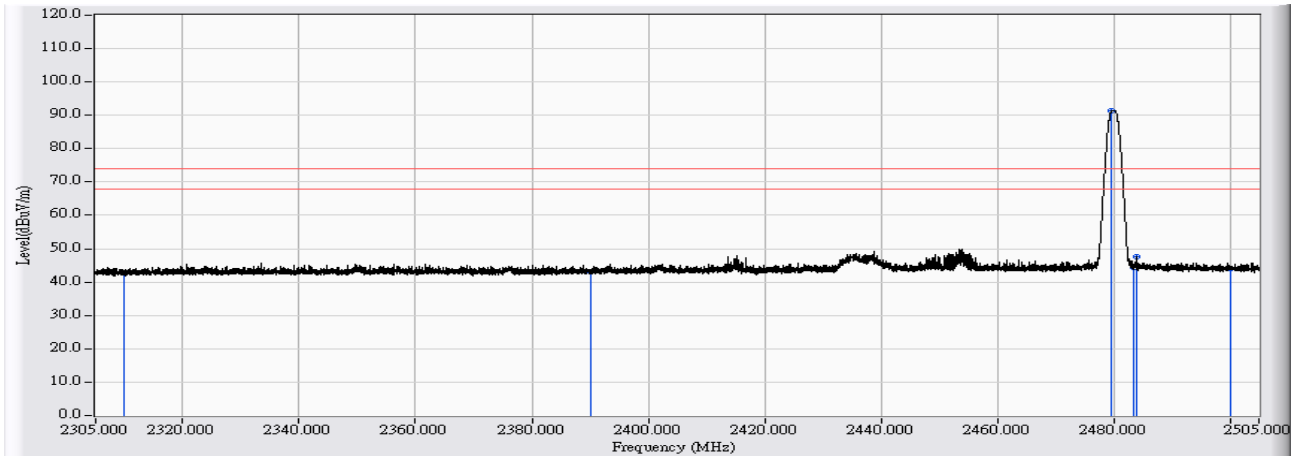


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	17.482	29.937	-24.063	54.000	AVERAGE
2	2390.000	13.127	17.256	30.384	-23.616	54.000	AVERAGE
3	* 2479.982	13.701	62.188	75.889	21.889	54.000	AVERAGE
4	2483.500	13.725	19.768	33.493	-20.507	54.000	AVERAGE
5	2483.562	13.725	19.787	33.512	-20.488	54.000	AVERAGE
6	2500.000	13.617	17.937	31.554	-22.446	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_PK	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320

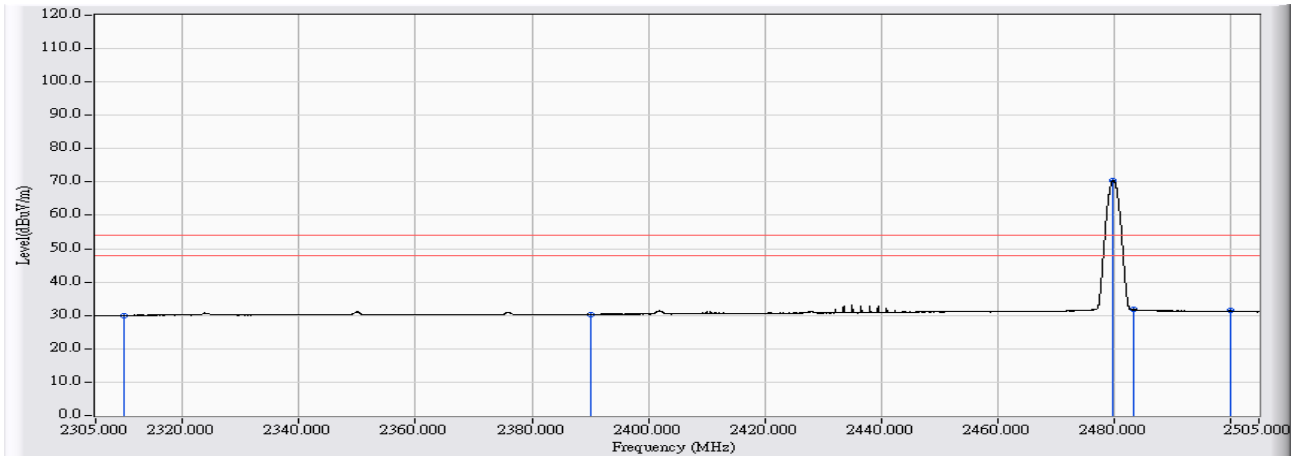


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	30.359	42.814	-31.186	74.000	PEAK
2	2390.000	13.127	30.003	43.131	-30.869	74.000	PEAK
3	* 2479.742	13.700	77.780	91.480	17.480	74.000	PEAK
4	2483.500	13.725	30.700	44.425	-29.575	74.000	PEAK
5	2483.982	13.728	33.988	47.716	-26.284	74.000	PEAK
6	2500.000	13.617	30.332	43.949	-30.051	74.000	PEAK

Note:

1. All readings above 1GHz are 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.

Site : CB2-H	Time : 2017/04/12
Limit : FCC_SpartC_15.209_03M_AV	Margin : 6
Probe : CB2_FCC_EFS_B091_1-18GHz_3M_0117 - VERTICAL	Power : AC 120V / 60Hz
EUT : Lyra	Note : 802.15.1_BLE_2480MHz Mode 1: Tx-AD2055320



	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	12.455	17.534	29.989	-24.011	54.000	AVERAGE
2	2390.000	13.127	17.195	30.323	-23.677	54.000	AVERAGE
3	* 2479.982	13.701	56.799	70.500	16.500	54.000	AVERAGE
4	2483.500	13.725	18.053	31.778	-22.222	54.000	AVERAGE
5	2483.502	13.725	18.052	31.777	-22.223	54.000	AVERAGE
6	2500.000	13.617	17.779	31.396	-22.604	54.000	AVERAGE

Note:

1. All readings above 1GHz are 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. Occupied Bandwidth

7.1. Test Equipment

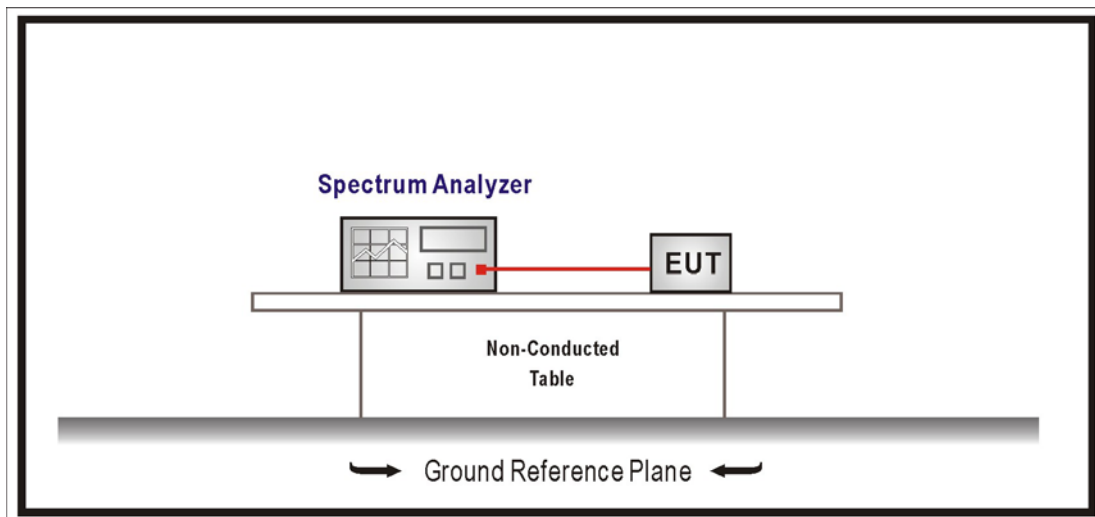
The following test equipment is used during the test:

Occupied Bandwidth / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2018/03/12

Note: All equipments that need to calibrate are with calibration period of 1 year.

7.2. Test Setup



7.3. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.4. Test Procedures

The EUT was setup according to ANSI C63.10:2013; tested according to DTS test procedure of KDB558074 V03R02 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1% of EBW, Span greater than RBW.

7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

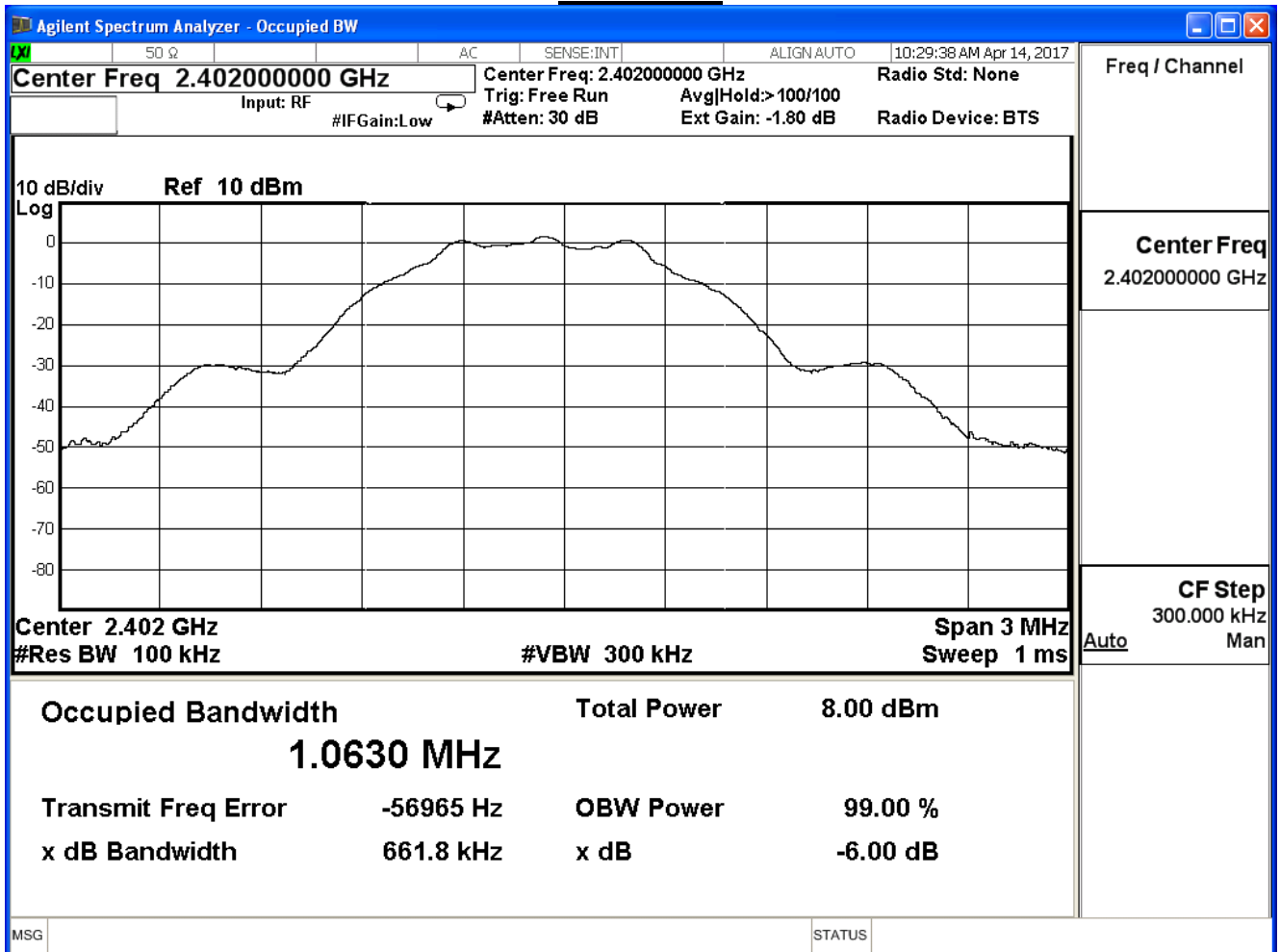
7.6. Test Result

Product	Lyra		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Tx-AD2055320		
Date of Test	2017/04/14	Test Site	SR10-H

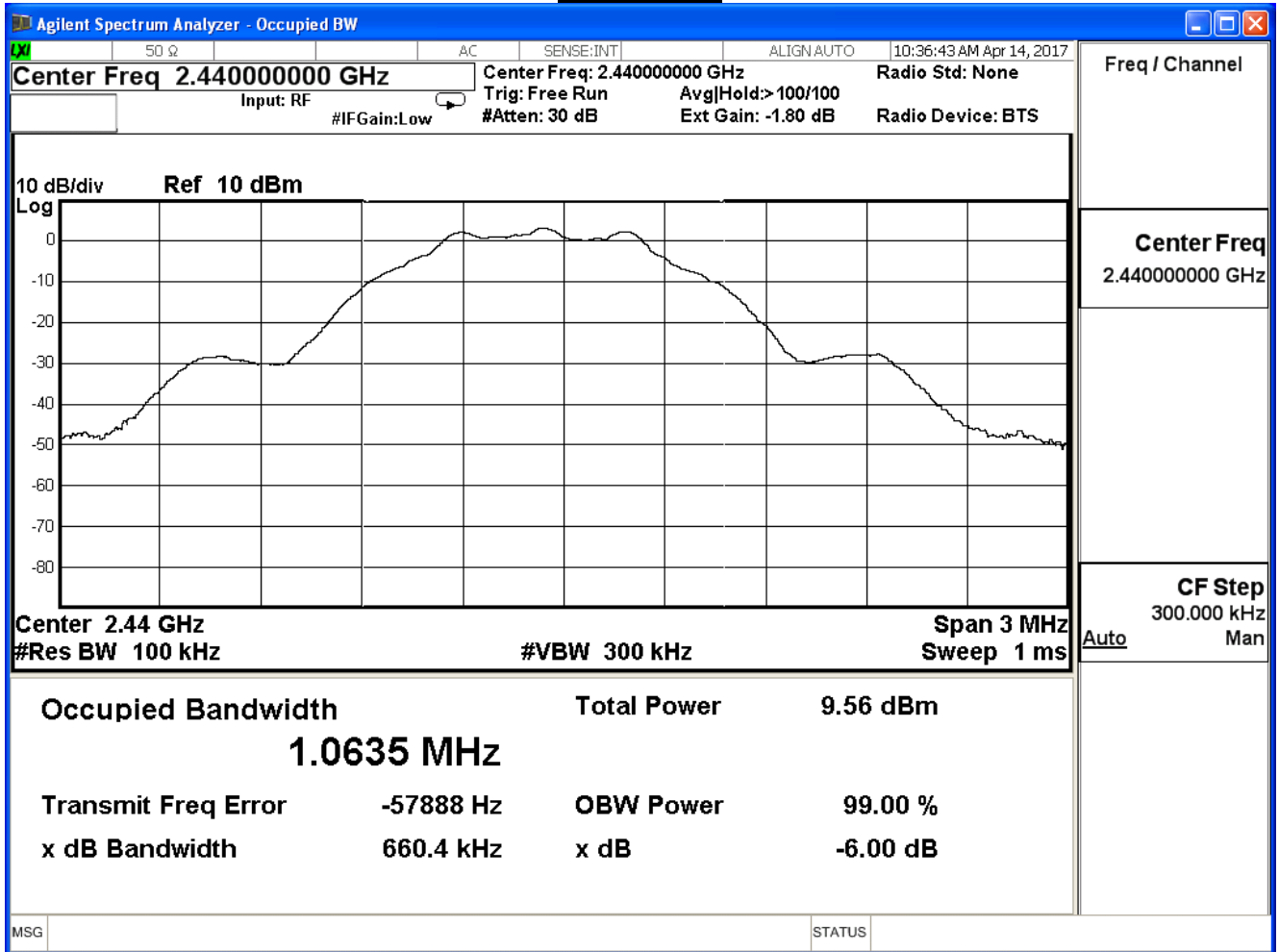
GFSK

Channel No.	Frequency (MHz)	Measure Level (KHz)	Limit (KHz)	Result
00	2402	661.80	≥ 500	Pass
19	2440	660.40	≥ 500	Pass
39	2480	660.00	≥ 500	Pass

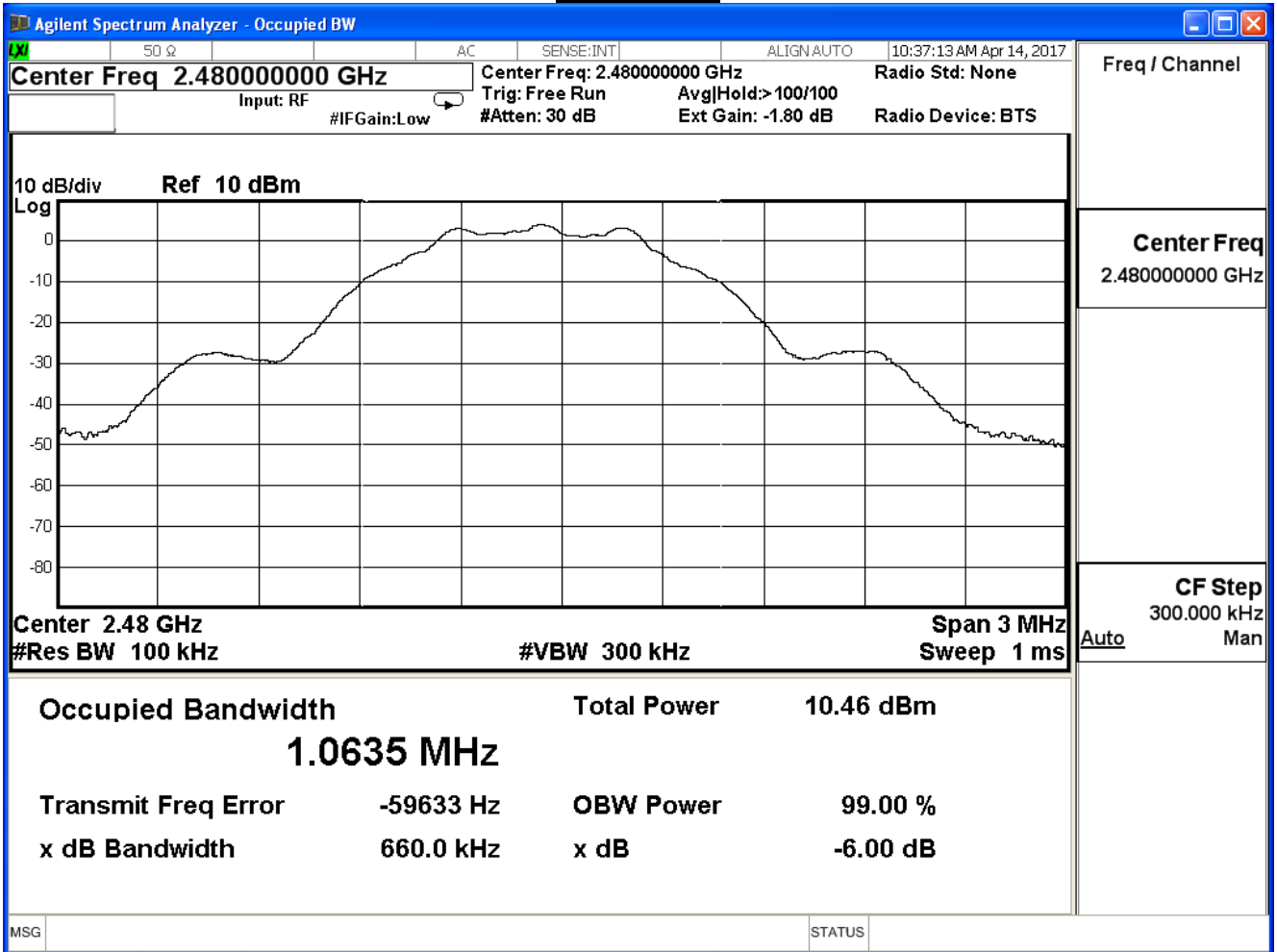
Channel 00



Channel 19



Channel 39



8. Power Density

8.1. Test Equipment

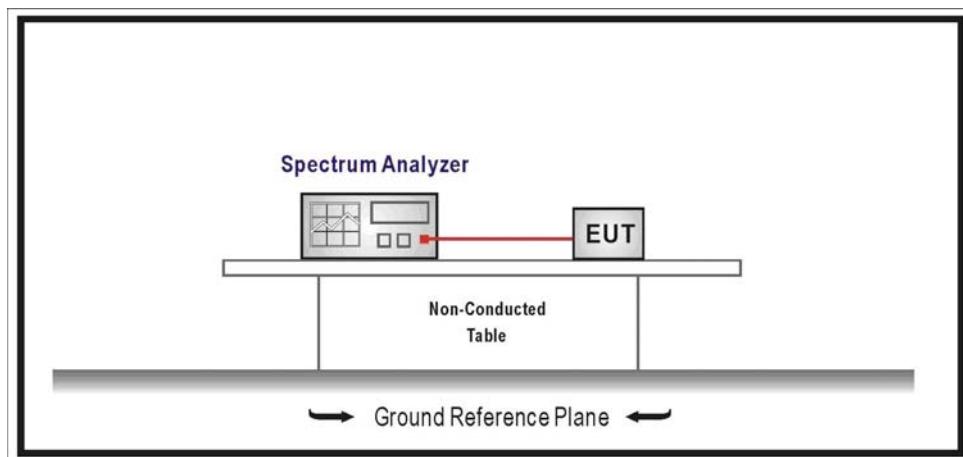
The following test equipment is used during the test:

Power Density / SR10-H

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2017/08/08
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2018/03/12

Note: All equipments that need to calibrate are with calibration period of 1 year.

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 V03R02 for compliance to FCC 47CFR 15.247 requirements.

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247

8.6. Uncertainty

The measurement uncertainty is defined as ± 1.27 dB.

8.7. Test Result

Product	Lyra		
Test Item	Power Density		
Test Mode	Mode 1: Tx-AD2055320		
Date of Test	2017/04/14	Test Site	SR7

Channel No.	Frequency (MHz)	Measure Level (dBm/3KHz)	Limit (dBm/3KHz)	Result
00	2402	-5.226	≤ 8	Pass
19	2440	-3.685	≤ 8	Pass
39	2480	-2.838	≤ 8	Pass

Channel 00

