FCC Test Report

Product Name	:	TracKing V5
Brand Name	:	Thermo King
Model No.	:	TKV5C4
FCC ID	:	Q37TKV5C4
Applicant	:	Thermo King Corporation
Address	:	314 West 90th Street, Minneapolis, MN USA 55420
Date of Receipt	:	Dec. 09, 2021
Issued Date	:	May 24, 2022
Report No.	:	21C0364R-RFUSBLEV01-A
Report Version	:	V1.0

The test results relate only to the samples tested.
The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.
This report must not be used to claim product endorsement by TAF or any agency of the government.
Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.
The test report shall not be reproduced except in full without the written approval of DEKRA Testing and Certification Co., Ltd.

Product Name	:	TracKing V5
Applicant	:	Thermo King Corporation
Address	:	314 West 90th Street, Minneapolis, MN USA 55420
Manufacturer	:	Thermo King Corporation
Address	:	314 West 90th Street, Minneapolis, MN USA 55420
Brand Name	:	Thermo King
Model No.	:	TKV5C4
FCC ID	:	Q37TKV5C4
EUT Voltage	:	DC 14.2V
Testing Voltage	:	DC 14.2V
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10: 2013
Laboratory Name	:	DEKRA Testing and Certification Co., Ltd. Hsin Chu Laboratory
Address	:	No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 310, Taiwan, R.O.C.
Test Result	:	Complied

Documented By : Hailey Peng

(Hailey Peng / Senior Engineer)

Approved By : Rueyyan. Lin

(Rueyyan Lin / Supervisor)

The test results relate only to the samples tested.

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Revision History

Version	Description	Issued Date
V1.0	Initial issue of report	May 24, 2022

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1. General Information

1.1 EUT Description

Product Name	TracKing V5
Brand Name	Thermo King
Model No.	TKV5C4
Frequency Range	1 Mbps: 2402 ~ 2480 MHz 2 Mbps: 2402 ~ 2480 MHz
Channel Number	1 Mbps: 40 Channels 2 Mbps: 40 Channels
Type of Modulation	GFSK

Antenna Information				
Ant.	Trade Name	Model No.	Type	Gain (dBi)
0	N/A	N/A	PCB	2.80

GFSK (1 Mbps/2 Mbps)

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

Note:

1. 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.
2. The above EUT information is declared by the manufacturer.

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

Test Items	Test Mode	Modulation	Channel	Result
AC Power Line Conducted Emission	It was supplied power by DC-Powered for EUT. It's not necessary to apply to AC Power Line Conducted Emission test.			
Maximum Conducted Output Power	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass
Radiated Emission Below 1 GHz	Mode 1	GFSK (1 Mbps)	19	Pass
Radiated Emission Above 1 GHz	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass
Antenna Port Conducted Emission	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass
Radiated Emission Band Edge	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass
Occupied Bandwidth & DTS Bandwidth	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass
Maximum Power Spectral Density	Mode 1	GFSK (1 Mbps)	00/19/39	Pass
		GFSK (2 Mbps)	00/19/39	Pass

Note:

1. Determining compliance shall be based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. For below 1 GHz radiated emission have performed all modes of operation were investigated and the worst-case emissions are reported.
3. The EUT was performed at X axis and Z axis position for radiated emission and band edge tests. The worst case was found at Z axis, so the measurement will follow this same test configuration.
4. The EUT could be applied with Bluetooth function and WWAN function; therefore Co-location Maximum Permissible Exposure (Please refer to DEKRA Report No.: 21C0364R-RFUSMPEV02-A) and Radiated Emission Co-location (Please refer to Appendix A) tests are added for simultaneously transmit between Bluetooth function and WWAN function. <Simultaneous Transmission Analysis Mode: 1. Bluetooth function + WWAN WCDMA function, 2. Bluetooth function + WWAN LTE function>

1.3 Comments and Remarks

The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

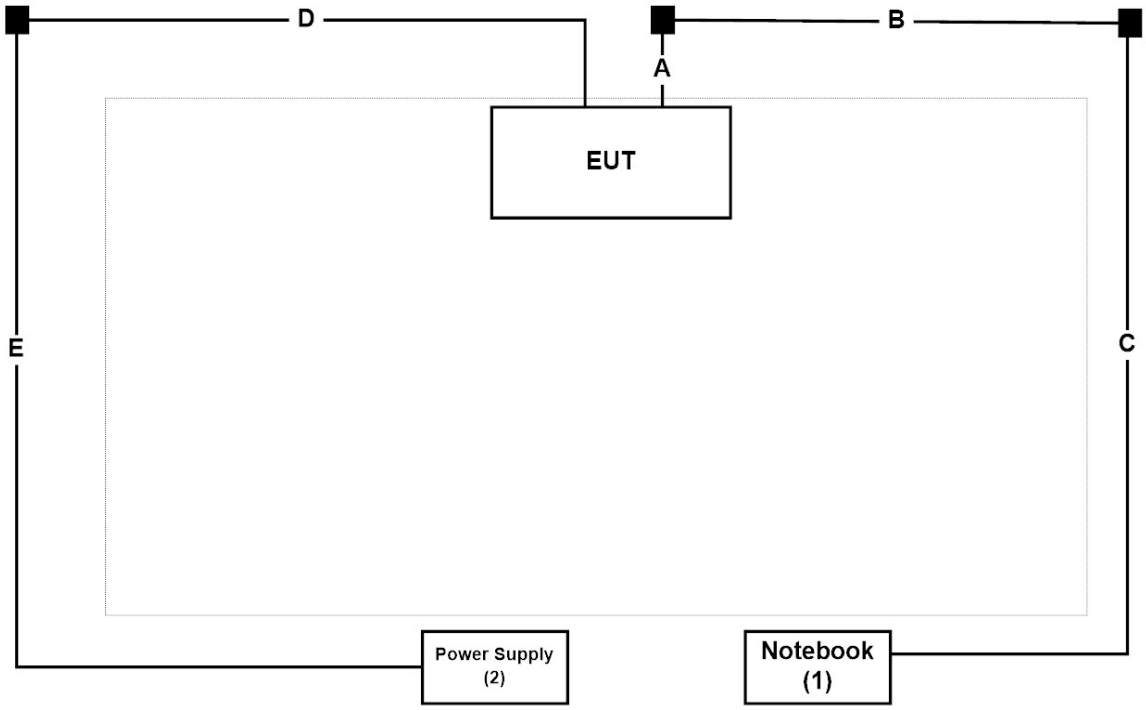
1.4 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system.

Product		Manufacturer	Model No.	Serial No.	FCC ID
1	Notebook	DELL	Latitude E6320	8611271467	N/A
2	Power Supply	Topward	6303D	8095908	N/A

1.5 Configuration of tested System

Connection Diagram



Signal Cable Type		Signal cable Description
A	Signal Cable	Non-Shielded, 0.2m
B	Control Cable	Shielded, 1.8m
C	USB Cable	Shielded, 10m
D	DC Cable	Non-Shielded, 3.15m
E	DC Cable	Non-Shielded, 10m

1.6 EUT Operation of during Test

1	Set the EUT as shown.
2	Execute control command by software “bgtool”.
3	Configure test mode, test channel and data rate.
4	Let the EUT start transmitting signal continuously.
5	Verify that device is working properly.

1.7 Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Actually	Tested by	Test Date	Test Site
Temperature (°C)	Maximum Peak Conducted Output Power	22.5	Elwin Lin	2021/12/14	HC-SR12
Humidity (%RH)		60			
Temperature (°C)	Radiated Emission	21.4 ~ 21.8	Rueyyan Lin	2021/12/10 ~ 2021/12/15	HC-CB02
Humidity (%RH)		57 ~ 61			
Temperature (°C)	Antenna Port Conducted Emission	22.5	Elwin Lin	2021/12/14	HC-SR12
Humidity (%RH)		60			
Temperature (°C)	Radiated Emission Band Edge	21.6	Rueyyan Lin	2021/12/10	HC-CB02
Humidity (%RH)		57			
Temperature (°C)	Occupied Bandwidth & DTS Bandwidth	22.5	Elwin Lin	2021/12/14	HC-SR12
Humidity (%RH)		60			
Temperature (°C)	Maximum Power Spectral Density	22.5	Elwin Lin	2021/12/14	HC-SR12
Humidity (%RH)		60			

Note: Test site information refers to Laboratory Information.

Laboratory Information

USA	**:**	**FCC Registration Number: TW3024**
Canada	**:**	**CAB identifier : TW3024**

The address and introduction of DEKRA Testing and Certification Co., Ltd. laboratories can be founded in our Web site: http://www.dekra.com.tw

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

Test Laboratory	DEKRA Testing and Certification Co., Ltd.
Address	1. No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C. 2. No.372, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu County 31061, Taiwan, R.O.C.
Phone number	1. +886-3-582-8001 2. +886-3-582-8001
Fax number	1. +886-3-582-8958 2. +886-3-582-8958
Email address	info.tw@dekra.com
Website	http://www.dekra.com.tw
Note: Test site number for address 1 includes HC-SR02. Test site number for address 2 includes HC-CB02, HC-CB03, HC-CB04, HC-SR10 and HC-SR12.	

1.8 List of Test Equipment

HC-SR12

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2021/11/12	2022/11/11
Pulse Power Sensor	Anritsu	MA2411B	1531043	2021/11/12	2022/11/11
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Pulse Power Sensor	Anritsu	MA2411B	1531044	2021/11/12	2022/11/11
Power Meter	Keysight	8990B	MY51000248	2021/05/21	2022/05/20
Power Sensor	Keysight	N1923A	MY57240005	2021/05/21	2022/05/20
Spectrum Analyzer	Keysight	N9030B	MY57140404	2021/05/14	2022/05/13
Spectrum Analyzer	Keysight	N9010B	MY57110159	2021/03/29	2022/03/28
Spectrum Analyzer	Agilent	N9010A	US47140172	2021/05/28	2022/05/27
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30

HC-CB02

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2021/10/22	2022/10/21
Signal & Spectrum Analyzer	R&S	FSV40	101049	2021/03/31	2022/03/30
Signal Analyzer	R&S	FSVA40	101435	2021/06/04	2022/06/03
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Trilog Broadband Antenna	Schwarzbeck	VULB 9168	1272	2021/08/20	2022/08/19
Bilog Antenna	Teseq	CBL6112D	23191	2021/02/26	2022/02/25
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2021/05/17	2022/05/16
Horn Antenna	Schwarzbeck	BBHA 9170	202	2021/12/01	2022/11/30
Pre-Amplifier	EMCI	EMC01820I	980365	2021/05/28	2022/05/27
Pre-Amplifier	EMEC	EM01G18GA	060741	2021/07/02	2022/07/01
Pre-Amplifier	DEKRA	AP-400C	201801231	2021/11/12	2022/11/11
EMI Test Receiver	R&S	ESR7	102260	2020/12/28	2021/12/27
Magnetic Loop Antenna	Teseq	HLA 6121	44287	2021/09/06	2022/09/05
Coaxial Cable(13m)	Huber+Suhner	SF104	HC-CB02	2021/08/17	2022/08/16
Coaxial Cable(3m)	Suhnerr,Rosnol	SF102_Rosnol	HC-CB02	2021/08/17	2022/08/18
Radiated Software	AUDIX	e3 V9	HC-CB02	N/A	N/A

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

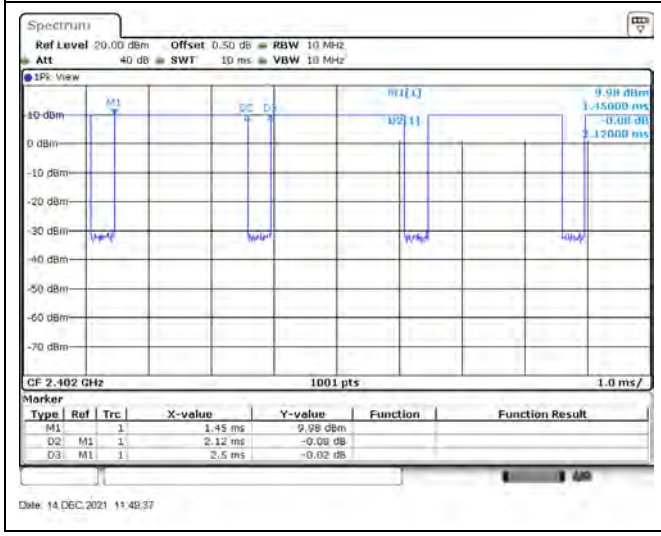
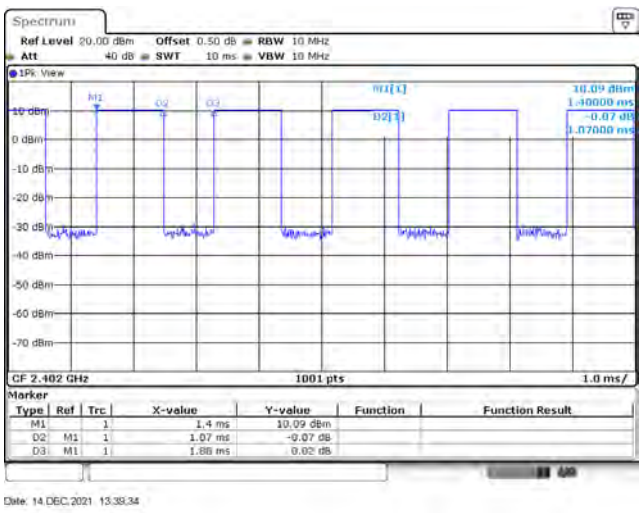
1.9 Measurement Uncertainty

Uncertainties have been calculated according to the DEKRA internal document with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2).

Test item	Uncertainty
AC Power Line Conducted Emission	± 2.10 dB
Maximum Conducted Output Power	± 1.16 dB
Radiated Emission	± 3.25 dB below 1 GHz ± 3.32 dB above 1 GHz
Antenna Port Conducted Emission	± 1.60 dB
Radiated Emission Band Edge	± 3.32 dB
Occupied Bandwidth & DTS Bandwidth	± 282.55 Hz
Maximum Power Spectral Density	± 1.60 dB

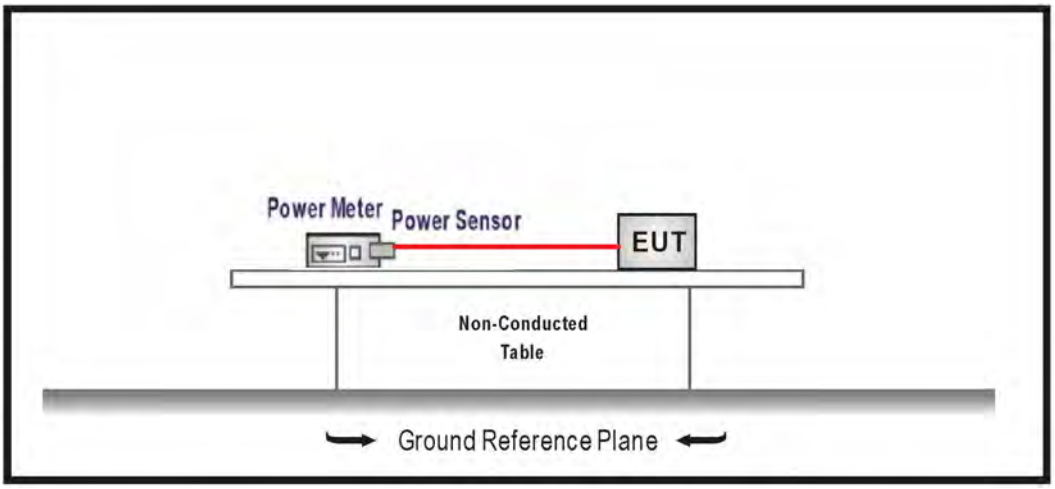
1.10 Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor (dB)	1/T Minimum VBW (kHz)
GFSK (1 Mbps)	2.120	2.500	84.80	0.72	0.472
GFSK (2 Mbps)	1.060	1.880	56.38	2.49	0.943

GFSK (1 Mbps)	GFSK (2 Mbps)
	

2. Maximum Conducted Output Power

2.1 Test Setup



2.2 Test Limit

The Maximum Conducted Output Power shall be less 1 Watt.

2.3 Test procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.

2.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

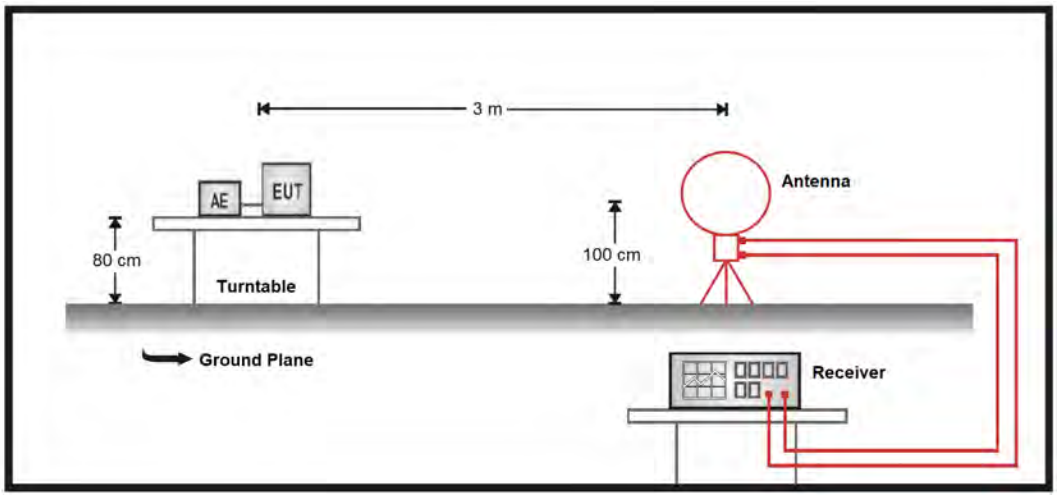
2.5 Test Result of Maximum Conducted Output Power

Modulation	Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
GFSK (1 Mbps)	00	2402	10.890	≦30.00	Pass
	19	2440	8.270	≦30.00	Pass
	39	2480	8.360	≦30.00	Pass
GFSK (2 Mbps)	00	2402	10.980	≦30.00	Pass
	19	2440	9.590	≦30.00	Pass
	39	2480	8.890	≦30.00	Pass

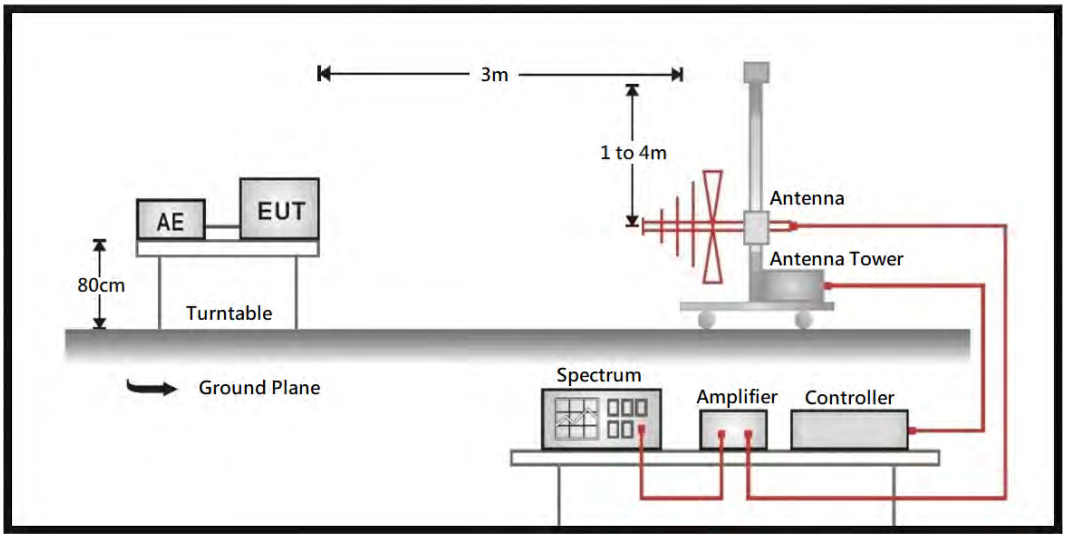
3. Radiated Emission

3.1 Test Setup

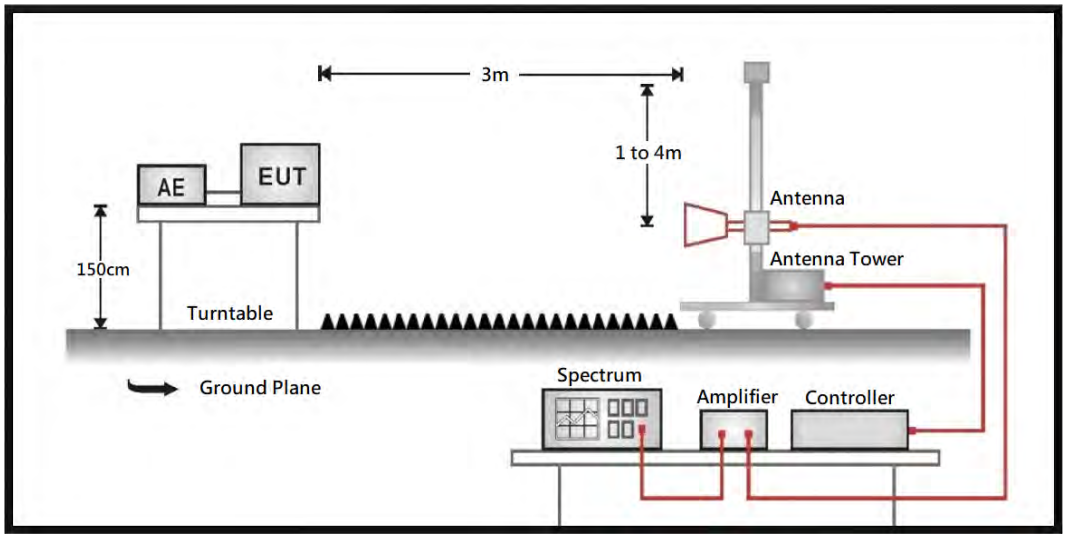
9 kHz ~ 30 MHz



30 MHz ~ 1 GHz



Above 1 GHz



3.2 Test Limit

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

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
0.009 – 0.490	2400/F(kHz)	20 log (2400/F(kHz))	300
0.490 – 1.705	24000/F(kHz)	20 log (24000/F(kHz))	30
1.705 - 30	30	29.5	30
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
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

3.3 Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074 D01V05r02 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 9 kHz(inculde The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limit shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limit 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.

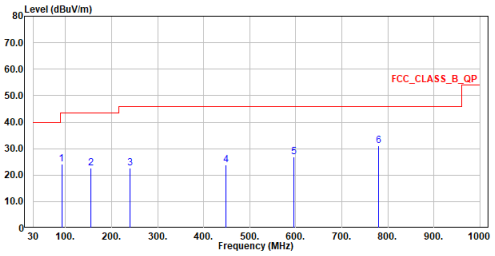
The bandwidth below 1 GHz setting on the field strength meter is 120 kHz and above 1 GHz is 1MHz.

3.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

3.5 Test Result of Radiated Emissions (30 MHz ~ 1 GHz)

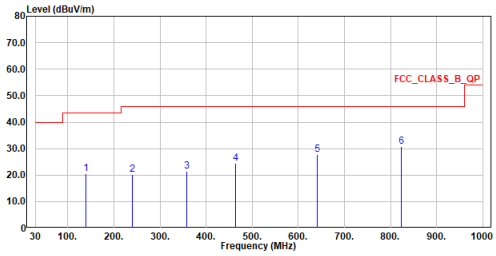
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	91.401	24.12	43.50	-19.38	32.43	-8.31	QP
2	155.324	22.61	43.50	-20.89	25.05	-2.44	QP
3	240.005	22.62	46.00	-23.38	26.67	-4.05	QP
4	447.876	23.81	46.00	-22.19	21.57	2.24	QP
5	596.189	26.90	46.00	-19.10	21.26	5.64	QP
6	779.519	31.08	46.00	-14.92	22.12	8.96	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan

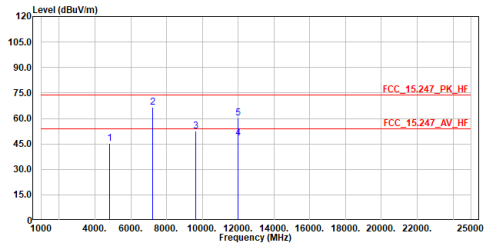


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	
1	139.028	20.64	43.50	-22.86	23.74	-3.10	QP
2	240.005	20.27	46.00	-25.73	24.32	-4.05	QP
3	357.278	21.36	46.00	-24.64	21.78	-0.42	QP
4	463.590	24.49	46.00	-21.51	21.75	2.74	QP
5	640.615	27.82	46.00	-18.18	21.25	6.57	QP
6	824.042	30.70	46.00	-15.30	21.30	9.40	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

3.6 Test Result of Radiated Emissions (1 GHz ~ 10th Harmonic)

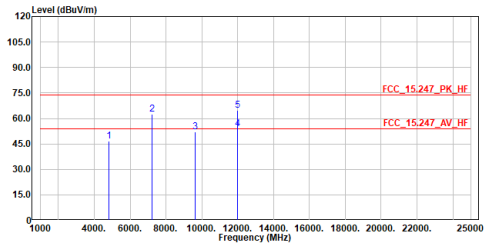
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4804.000	45.16	74.00	-28.84	58.99	-13.83	Peak
2	7206.000	66.45	74.00	-7.55	71.19	-4.74	Peak
3	9608.000	52.67	74.00	-21.33	55.06	-2.39	Peak
4	12010.000	48.44	54.00	-5.56	47.78	0.66	Average
5	12010.000	60.02	74.00	-13.98	59.36	0.66	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

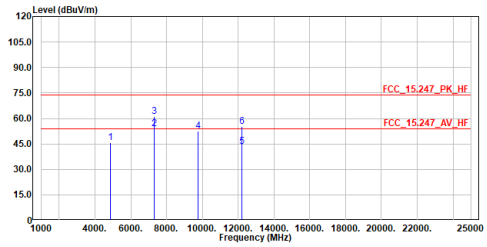
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4804.000	46.42	74.00	-27.58	60.25	-13.83	Peak
2	7206.000	62.68	74.00	-11.32	67.42	-4.74	Peak
3	9608.000	52.25	74.00	-21.75	54.64	-2.39	Peak
4	12010.000	53.81	54.00	-0.19	53.15	0.66	Average
5	12010.000	64.89	74.00	-9.11	64.23	0.66	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

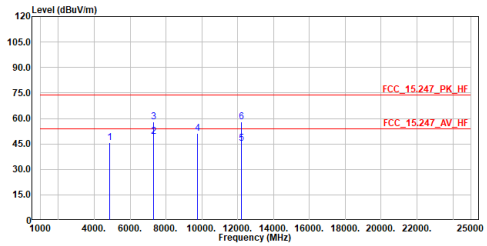
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4880.000	45.78	74.00	-28.22	59.32	-13.54	Peak
2	7320.000	53.98	54.00	-0.02	58.57	-4.59	Average
3	7320.000	61.23	74.00	-12.77	65.82	-4.59	Peak
4	9760.000	52.41	74.00	-21.59	54.44	-2.03	Peak
5	12200.000	43.26	54.00	-10.74	42.64	0.62	Average
6	12200.000	55.06	74.00	-18.94	54.44	0.62	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

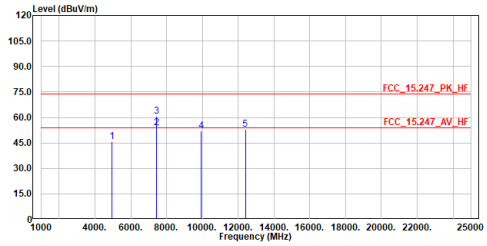
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4880.000	45.80	74.00	-28.20	59.34	-13.54	Peak
2	7320.000	49.33	54.00	-4.67	53.92	-4.59	Average
3	7320.000	57.84	74.00	-16.16	62.43	-4.59	Peak
4	9760.000	51.27	74.00	-22.73	53.30	-2.03	Peak
5	12200.000	45.51	54.00	-8.49	44.89	0.62	Average
6	12200.000	57.90	74.00	-16.10	57.28	0.62	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

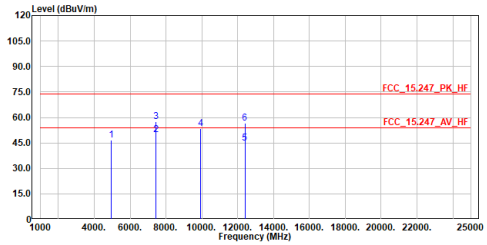
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4960.000	45.80	74.00	-28.20	59.03	-13.23	Peak
2	7440.000	53.73	54.00	-0.27	58.17	-4.44	Average
3	7440.000	60.49	74.00	-13.51	64.93	-4.44	Peak
4	9920.000	52.15	74.00	-21.85	53.79	-1.64	Peak
5	12400.000	53.01	74.00	-20.99	52.43	0.58	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

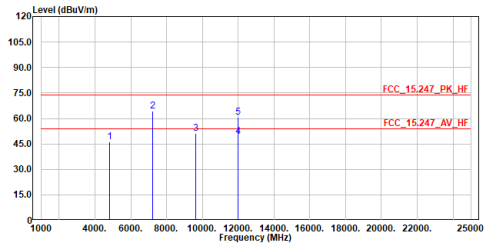
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4960.000	46.83	74.00	-27.17	60.06	-13.23	Peak
2	7440.000	49.72	54.00	-4.28	54.16	-4.44	Average
3	7440.000	57.36	74.00	-16.64	61.80	-4.44	Peak
4	9920.000	53.34	74.00	-20.66	54.98	-1.64	Peak
5	12400.000	44.69	54.00	-9.31	44.11	0.58	Average
6	12400.000	56.83	74.00	-17.17	56.25	0.58	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

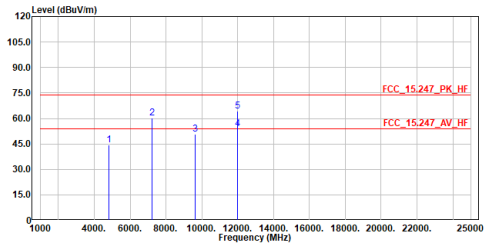
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4804.000	46.14	74.00	-27.86	59.97	-13.83	Peak
2	7206.000	64.49	74.00	-9.51	69.23	-4.74	Peak
3	9608.000	50.96	74.00	-23.04	53.35	-2.39	Peak
4	12010.000	49.29	54.00	-4.71	48.63	0.66	Average
5	12010.000	60.60	74.00	-13.40	59.94	0.66	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

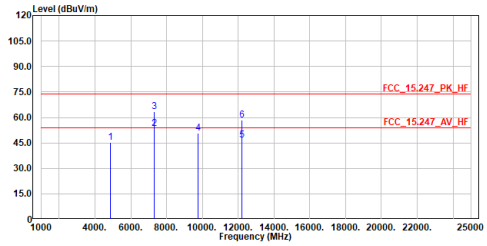
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	4804.000	44.52	74.00	-29.48	58.35	-13.83	Peak
2	7206.000	60.37	74.00	-13.63	65.11	-4.74	Peak
3	9608.000	50.88	74.00	-23.12	53.27	-2.39	Peak
4	12010.000	53.89	54.00	-0.11	53.23	0.66	Average
5	12010.000	64.52	74.00	-9.48	63.86	0.66	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

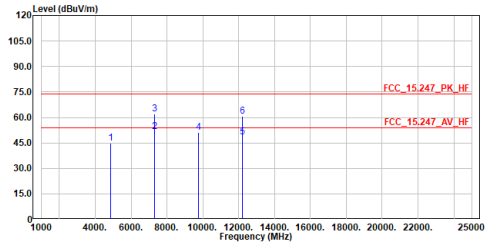
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	4880.000	45.46	74.00	-28.54	59.00	-13.54	Peak
2	7320.000	53.55	54.00	-0.45	58.14	-4.59	Average
3	7320.000	63.18	74.00	-10.82	67.77	-4.59	Peak
4	9760.000	50.72	74.00	-23.28	52.75	-2.03	Peak
5	12200.000	46.42	54.00	-7.58	45.80	0.62	Average
6	12200.000	58.54	74.00	-15.46	57.92	0.62	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

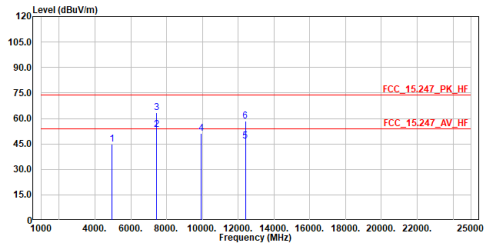
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	4880.000	44.95	74.00	-29.05	58.49	-13.54	Peak
2	7320.000	51.50	54.00	-2.50	56.09	-4.59	Average
3	7320.000	62.20	74.00	-11.80	66.79	-4.59	Peak
4	9760.000	51.25	74.00	-22.75	53.28	-2.03	Peak
5	12200.000	48.60	54.00	-5.40	47.98	0.62	Average
6	12200.000	60.48	74.00	-13.52	59.86	0.62	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

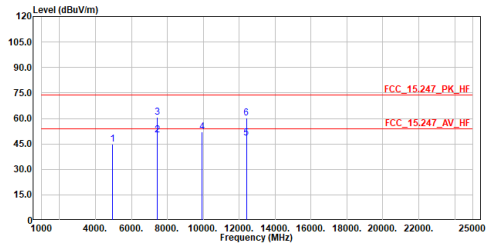
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	4960.000	45.01	74.00	-28.99	58.24	-13.23	Peak
2	7440.000	53.47	54.00	-0.53	57.91	-4.44	Average
3	7440.000	63.49	74.00	-10.51	67.93	-4.44	Peak
4	9920.000	51.38	74.00	-22.62	53.02	-1.64	Peak
5	12400.000	46.47	54.00	-7.53	45.89	0.58	Average
6	12400.000	58.38	74.00	-15.62	57.80	0.58	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan

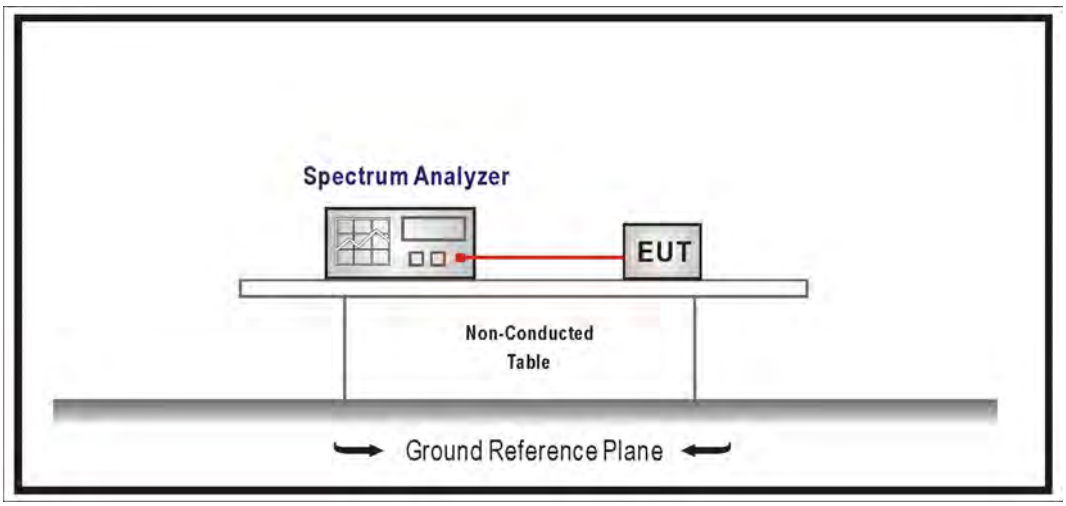


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	4960.000	45.03	74.00	-28.97	58.26	-13.23	Peak
2	7440.000	50.27	54.00	-3.73	54.71	-4.44	Average
3	7440.000	60.87	74.00	-13.13	65.31	-4.44	Peak
4	9920.000	52.25	74.00	-21.75	53.89	-1.64	Peak
5	12400.000	48.67	54.00	-5.33	48.09	0.58	Average
6	12400.000	60.15	74.00	-13.85	59.57	0.58	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

4. Antenna Port Conducted Emission

4.1 Test Setup



4.2 Test Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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 either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limit. If the transmitter complies with the conducted power limit based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limit specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limit specified in §15.209(a) (see §15.205(c)).

4.3 Test Procedure

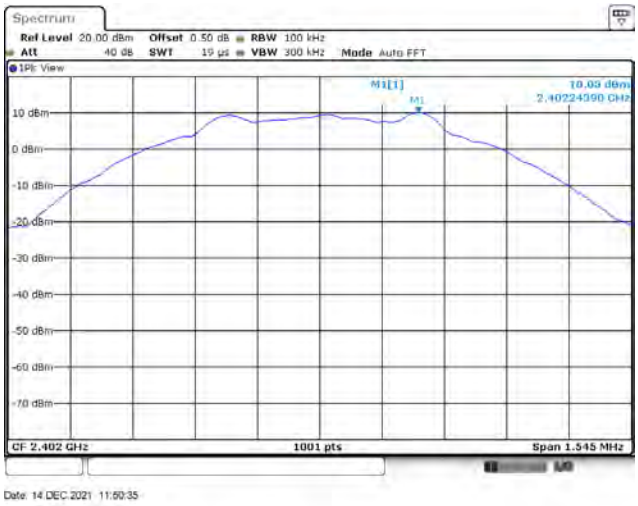
The EUT was setup according to ANSI C63.10: 2013 and tested according to DTS test procedure of KDB 558074 D01 V05r02 for compliance to FCC 47CFR 15.247 requirements.
Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

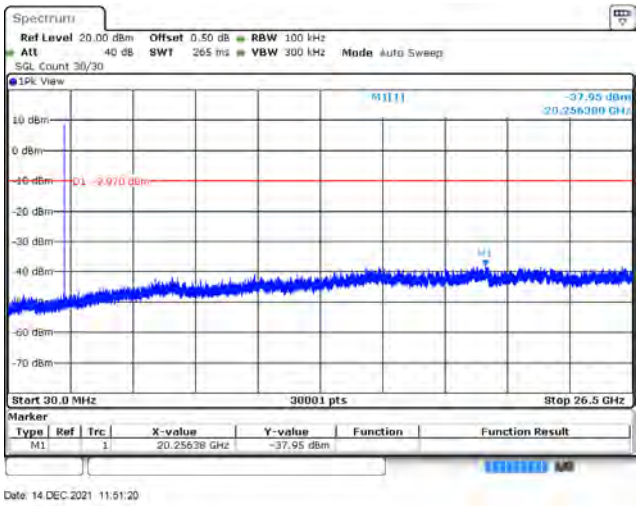
4.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

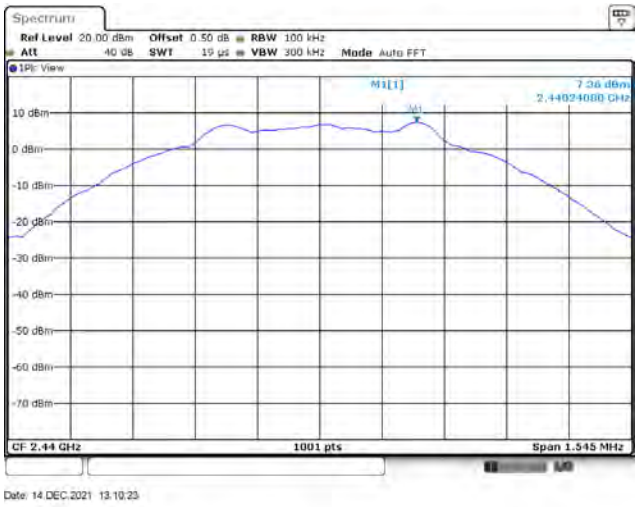
4.5 Test Result of Antenna Port Conducted Emission

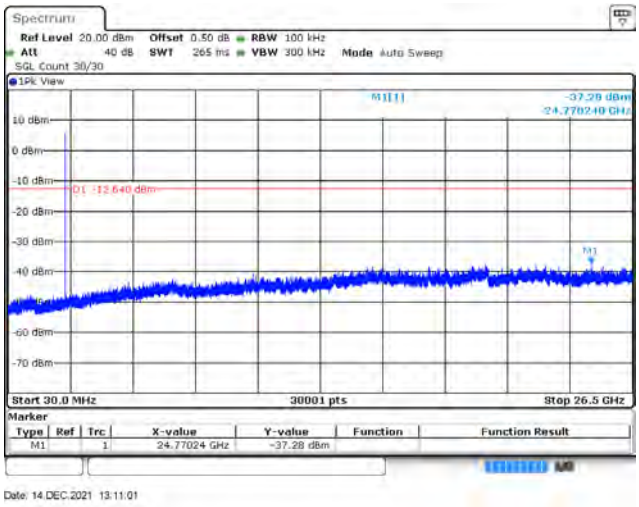
GFSK (1 Mbps) / 2402 MHz



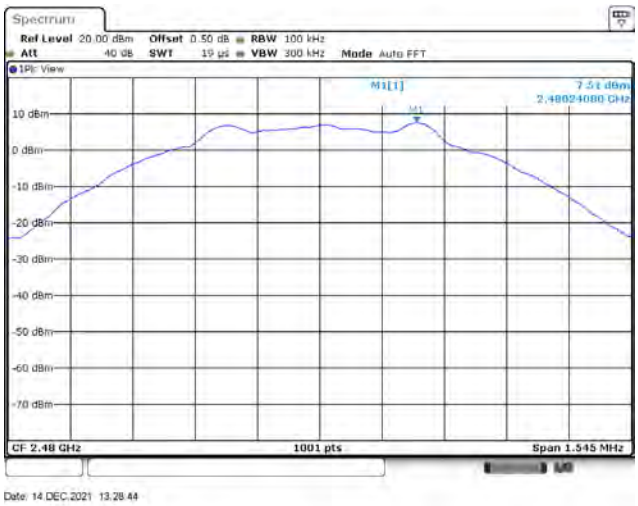


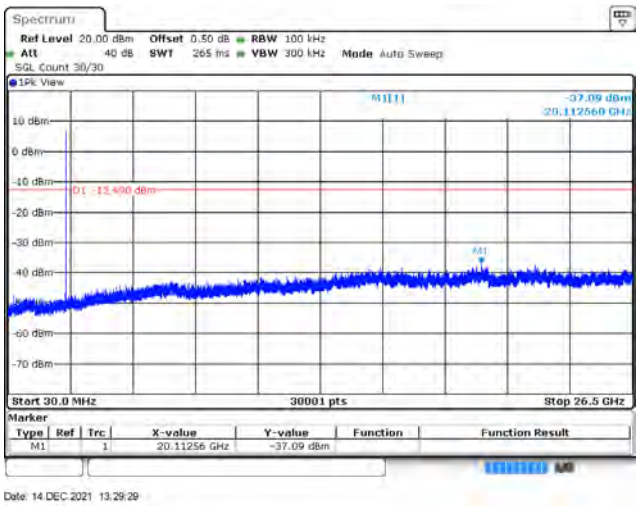
GFSK (1 Mbps) / 2440 MHz



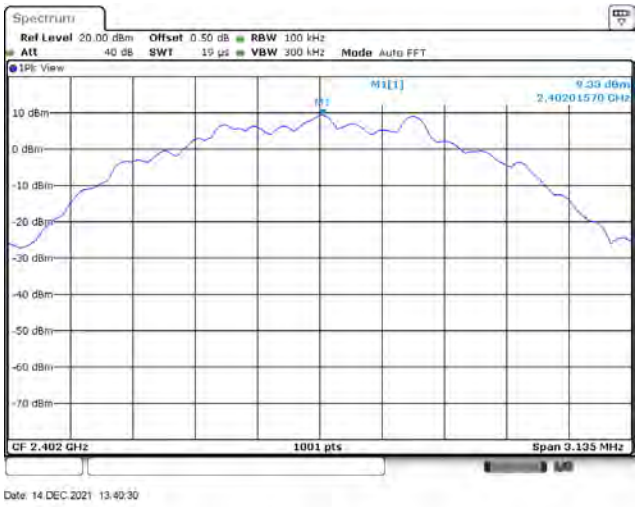


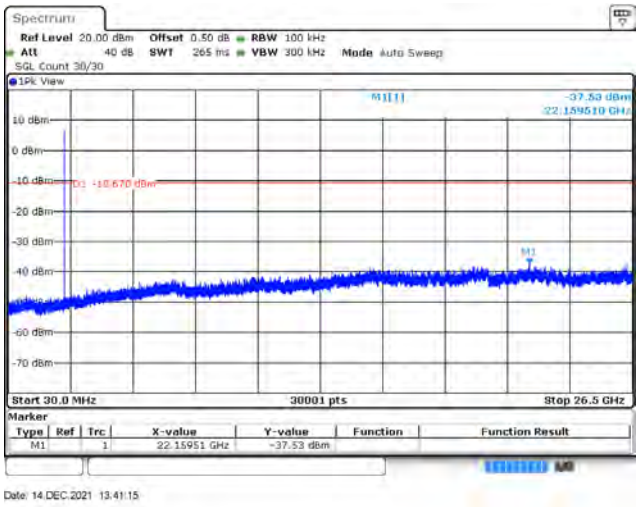
GFSK (1 Mbps) / 2480 MHz



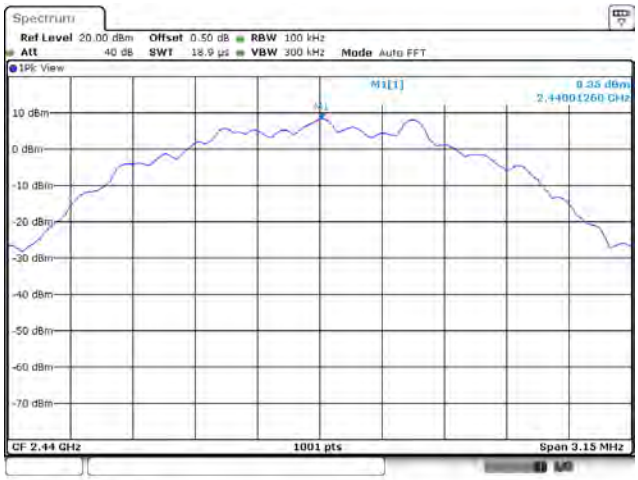


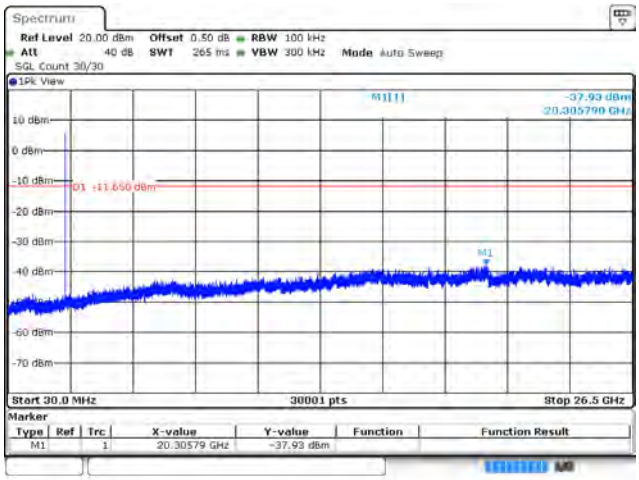
GFSK (2 Mbps) / 2402 MHz



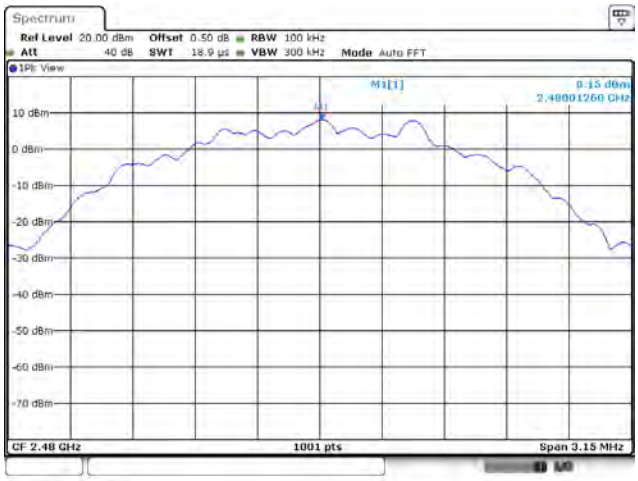


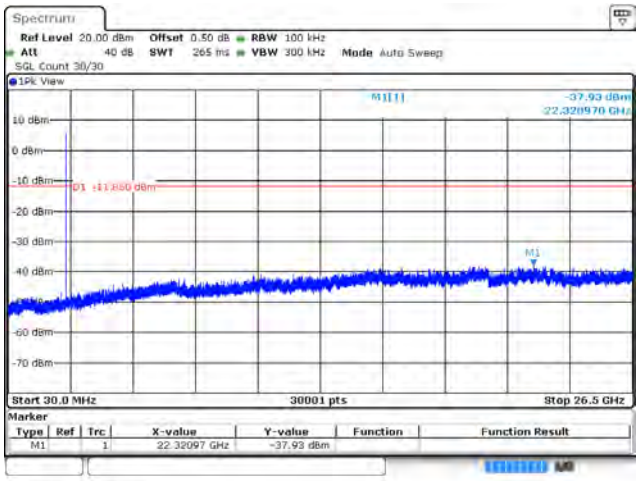
GFSK (2 Mbps) / 2440 MHz

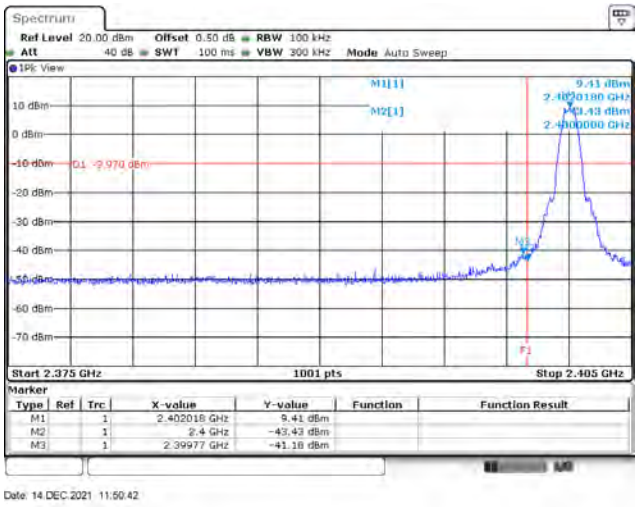
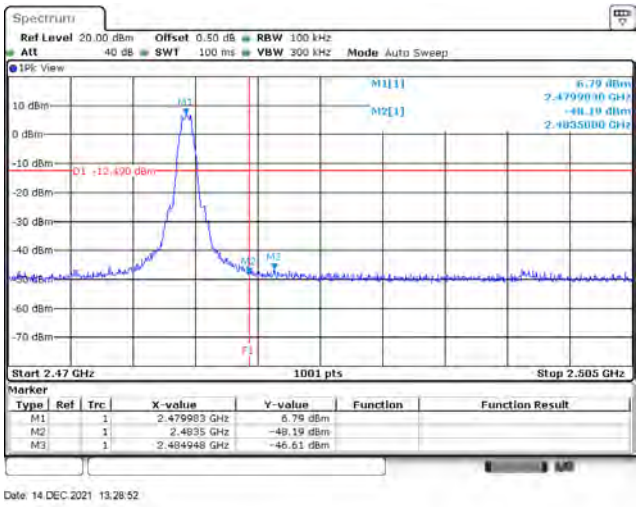
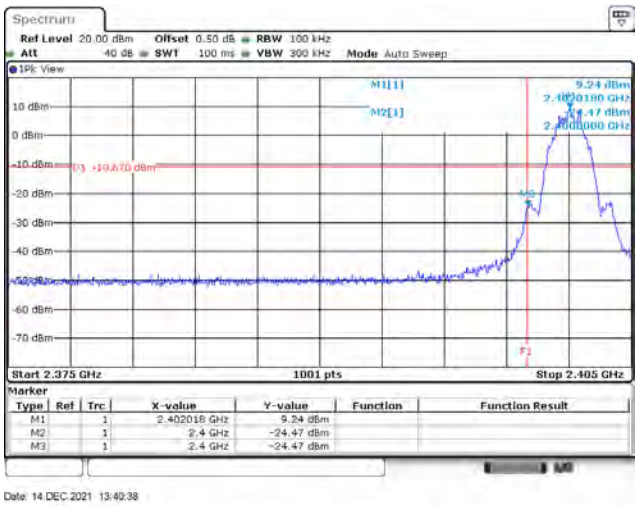
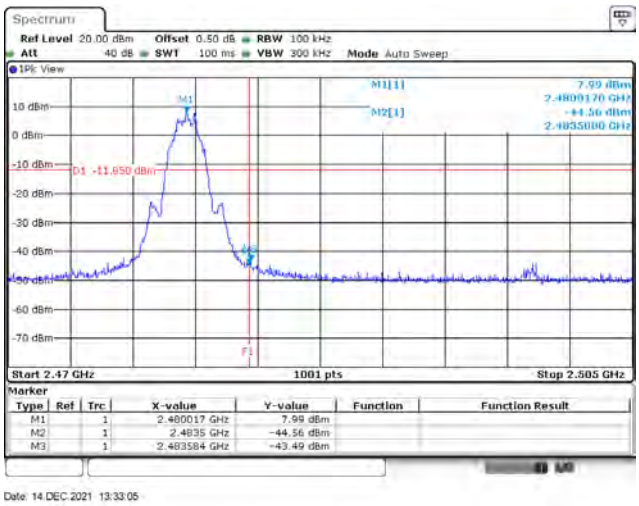




GFSK (2 Mbps) / 2480 MHz

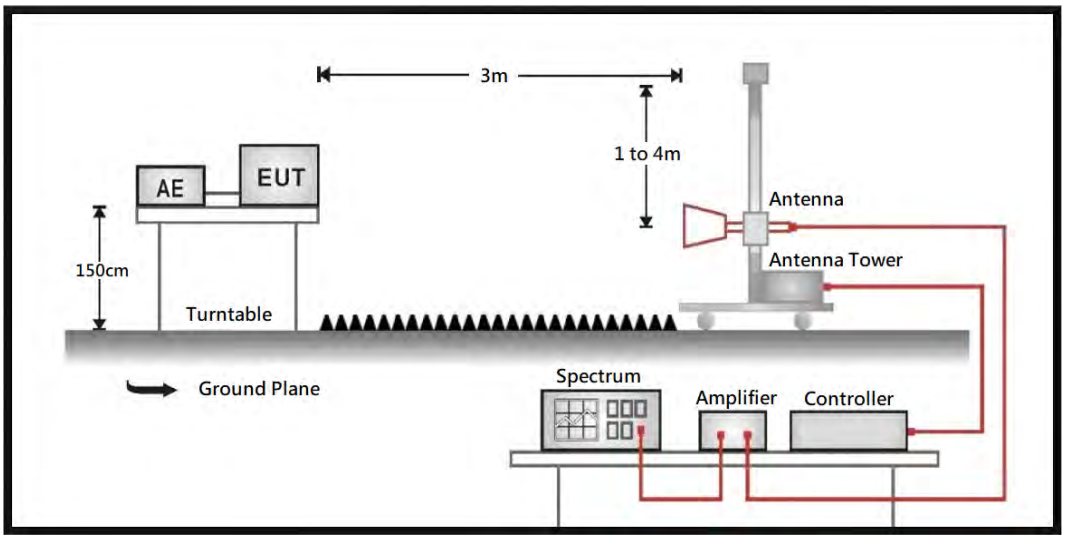




GFSK (1 Mbps) / 2402 MHz (Band Edge)	GFSK (1 Mbps) / 2480 MHz (Band Edge)
	
GFSK (2 Mbps) / 2402 MHz (Band Edge)	GFSK (2 Mbps) / 2480 MHz (Band Edge)
	

5. Radiated Emission Band Edge

5.1 Test Setup



5.2 Test Limit

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

Frequency (MHz)	Field strength (uV/m)	Field strength (dBuV/m)	Measurement distance (m)
30 - 88	100	40	3
88 - 216	150	43.5	3
216 - 960	200	46	3
Above 960	500	54	3

Remarks:

1. Field strength (dBuV/m) = 20 log Field strength (uV/m)
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

5.3 Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to FHSS test procedure of FCC KDB 558074 D01 v05r02 for compliance to FCC 47CFR 15.247 requirements.

The EUT and its simulators are placed on a turn table which is 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.

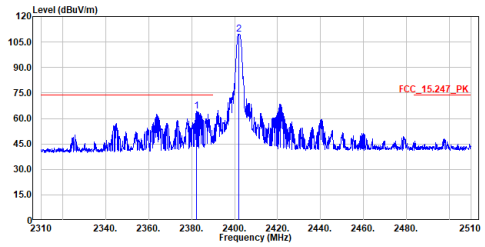
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

5.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

5.5 Test Result of Radiated Emission Band Edge

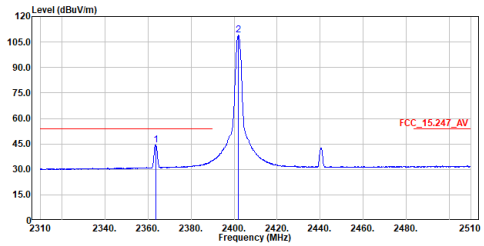
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2382.400	64.10	74.00	-9.90	50.66	13.44	Peak
2	2401.800	109.45	------	------	95.89	13.56	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

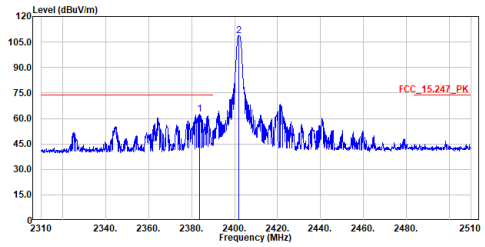
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2363.600	44.55	54.00	-9.45	31.23	13.32	Average
2	2402.000	109.00	------	------	95.44	13.56	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

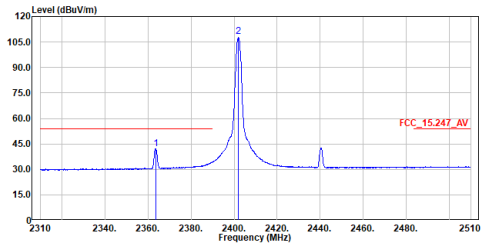
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2383.800	62.34	74.00	-11.66	48.90	13.44	Peak
2	2401.800	108.56	------	------	95.00	13.56	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

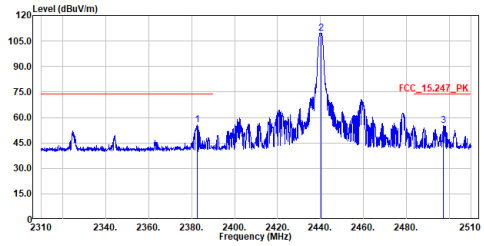
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2363.600	42.13	54.00	-11.87	28.81	13.32	Average
2	2402.000	108.02	------	------	94.46	13.56	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

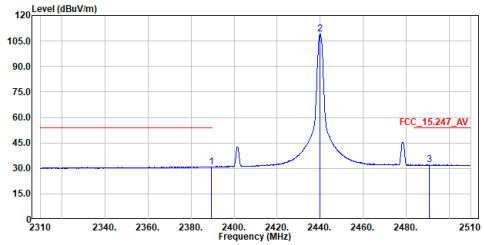
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2382.500	55.92	74.00	-18.08	42.48	13.44	Peak
2	2440.100	109.69	------	------	95.90	13.79	Peak
3	2497.300	55.21	74.00	-18.79	41.05	14.16	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

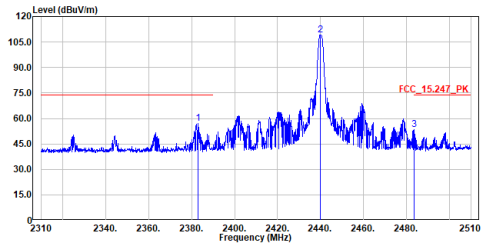
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2389.500	30.98	54.00	-23.02	17.50	13.48	Average
2	2440.000	109.22	------	------	95.43	13.79	Average
3	2490.600	32.06	54.00	-21.94	17.95	14.11	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

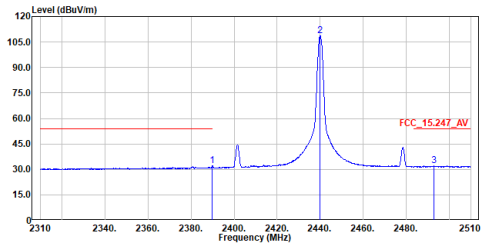
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2382.900	56.87	74.00	-17.13	43.43	13.44	Peak
2	2439.800	109.07	------	------	95.28	13.79	Peak
3	2483.600	53.34	74.00	-20.66	39.27	14.07	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

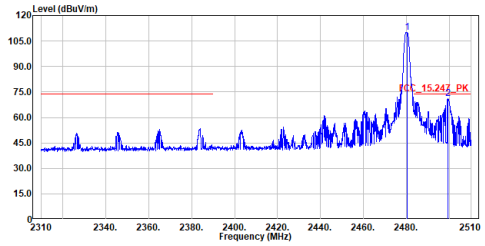
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2389.900	32.33	54.00	-21.67	18.85	13.48	Average
2	2440.000	108.62	------	------	94.83	13.79	Average
3	2492.900	32.00	54.00	-22.00	17.87	14.13	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

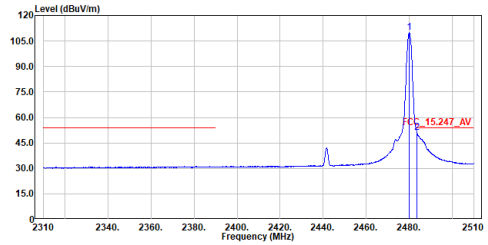
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2480.400	110.23	------	------	96.19	14.04	Peak
2	2499.400	71.28	74.00	-2.72	57.11	14.17	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

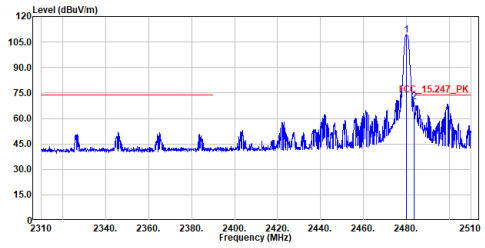
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2480.000	109.81	------	------	95.77	14.04	Average
2	2483.600	51.07	54.00	-2.93	37.00	14.07	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

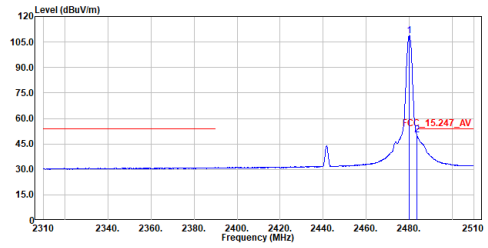
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2479.900	109.21	------	------	95.17	14.04	Peak
2	2483.600	69.60	74.00	-4.40	55.53	14.07	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

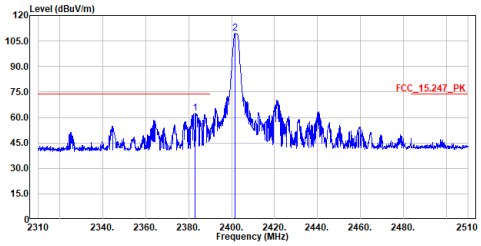
Site :CB2-H
Condition :3m Vertical
Mode :BLE_1M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2480.000	108.73	------	------	94.69	14.04	Average
2	2483.600	50.23	54.00	-3.77	36.16	14.07	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

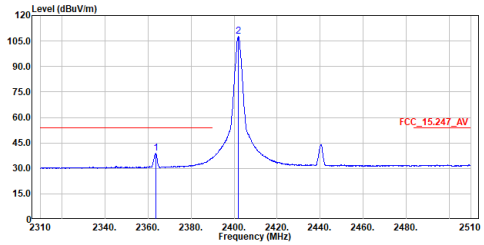
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2383.000	62.65	74.00	-11.35	49.21	13.44	Peak
2	2401.600	109.39	------	------	95.84	13.55	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

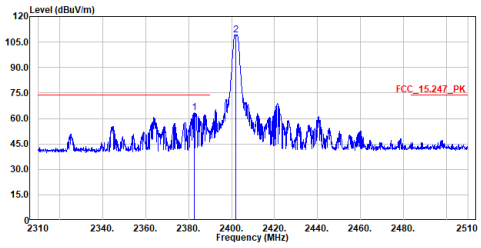
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2363.500	39.05	54.00	-14.95	25.73	13.32	Average
2	2401.900	107.55	------	------	93.99	13.56	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

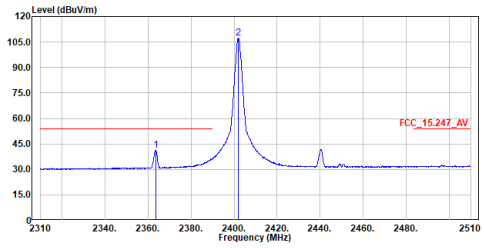
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2382.600	63.33	74.00	-10.67	49.89	13.44	Peak
2	2402.100	109.16	------	------	95.60	13.56	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

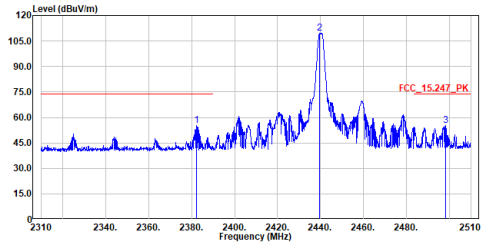
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2402MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2363.600	41.31	54.00	-12.69	27.99	13.32	Average
2	2402.000	107.33	------	------	93.77	13.56	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

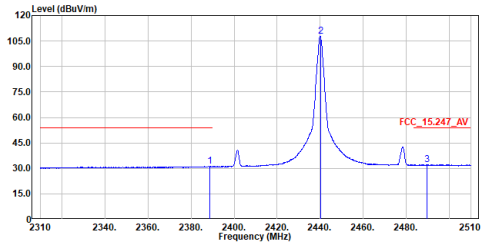
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2382.400	55.28	74.00	-18.72	41.84	13.44	Peak
2	2439.600	109.48	------	------	95.69	13.79	Peak
3	2498.100	55.04	74.00	-18.96	40.88	14.16	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

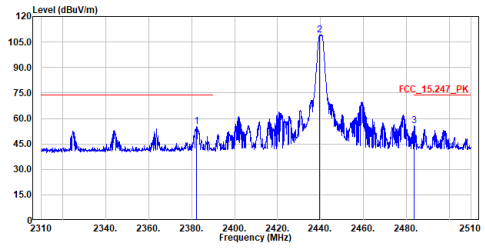
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2388.700	31.09	54.00	-22.91	17.61	13.48	Average
2	2440.100	107.76	------	------	93.97	13.79	Average
3	2489.500	32.28	54.00	-21.72	18.17	14.11	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

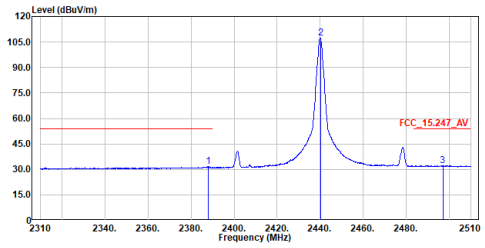
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2382.400	55.40	74.00	-18.60	41.96	13.44	Peak
2	2439.600	109.00	------	------	95.21	13.79	Peak
3	2483.700	55.66	74.00	-18.34	41.59	14.07	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

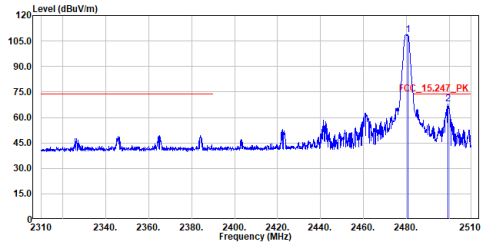
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2440MHz
Test by :Rueyyan



No.	Frequency MHz	Level dBuA/m	Limit Line dBuA/m	Over Limit dB	Read Level dBuA	Factor dB	Remark
1	2388.000	31.79	54.00	-22.21	18.32	13.47	Average
2	2440.100	107.38	------	------	93.59	13.79	Average
3	2497.000	32.16	54.00	-21.84	18.01	14.15	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

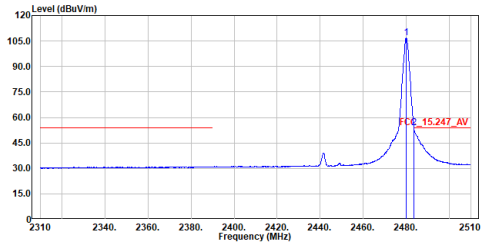
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2480.600	108.74	------	------	94.69	14.05	Peak
2	2499.200	68.03	74.00	-5.97	53.86	14.17	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

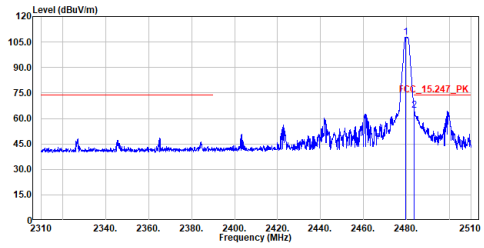
Site :CB2-H
Condition :3m Horizontal
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2480.000	106.79	------	------	92.75	14.04	Average
2	2483.600	53.80	54.00	-0.20	39.73	14.07	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

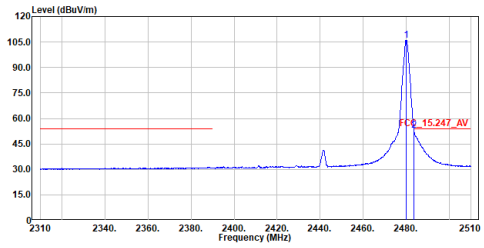
Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan



No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2479.600	107.96	------	------	93.92	14.04	Peak
2	2483.600	64.60	74.00	-9.40	50.53	14.07	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :BLE_2M_TX_2480MHz
Test by :Rueyyan

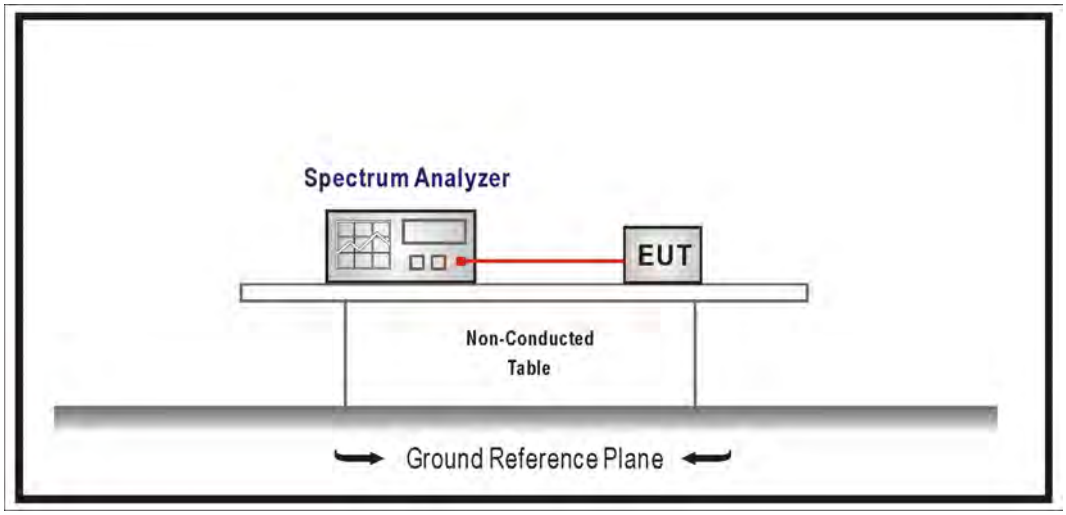


No.	Frequency	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuA/m	dBuA/m	dB	dBuA	dB	
1	2479.900	106.11	------	------	92.07	14.04	Average
2	2483.600	53.09	54.00	-0.91	39.02	14.07	Average

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Aux Factor
3. Over Limit = Level - Limit Line
4. Aux Factor = Distance convert formula + Unit convert formula
5. The other emission levels were very low against the limit.

6. Occupied Bandwidth & DTS Bandwidth

6.1 Test Setup



6.2 Test Limit

The 6 dB bandwidth: ≧ 500 kHz.

Occupied Bandwidth: NA

6.3 Test Procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 V05r02 for compliance to FCC 47CFR 15.247 requirements.

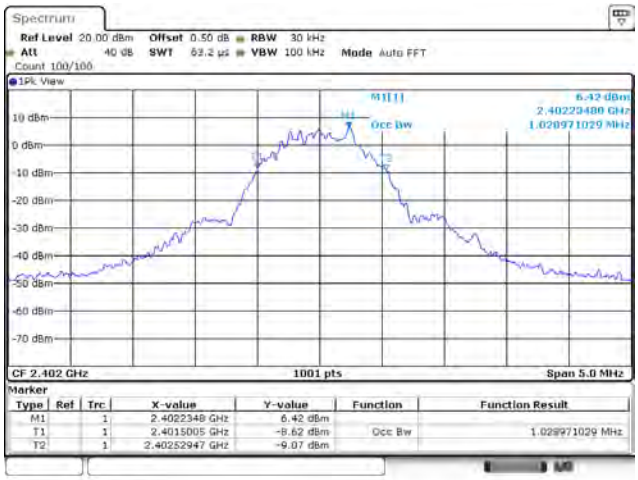
6.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

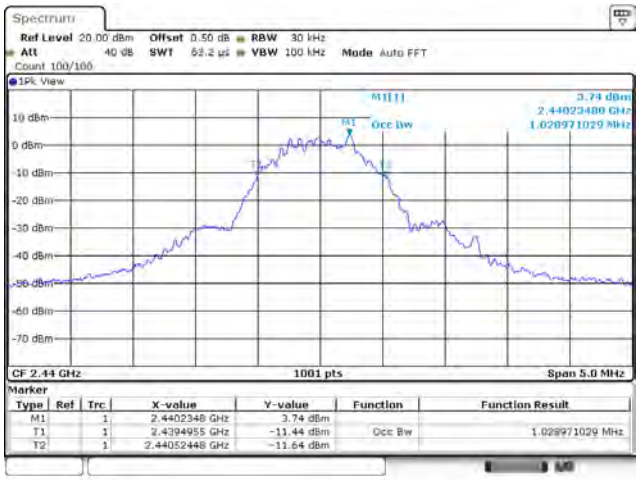
6.5 Test Result of Occupied Bandwidth

Modulation	Channel	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)
GFSK (1 Mbps)	00	2402	1.028	-
	19	2440	1.028	-
	39	2480	1.028	-
GFSK (2 Mbps)	00	2402	2.087	-
	19	2440	2.097	-
	39	2480	2.102	-

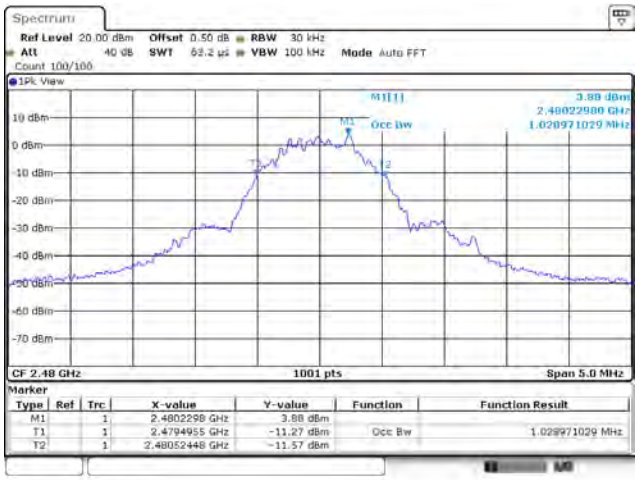
GFSK (1 Mbps) / 2402 MHz



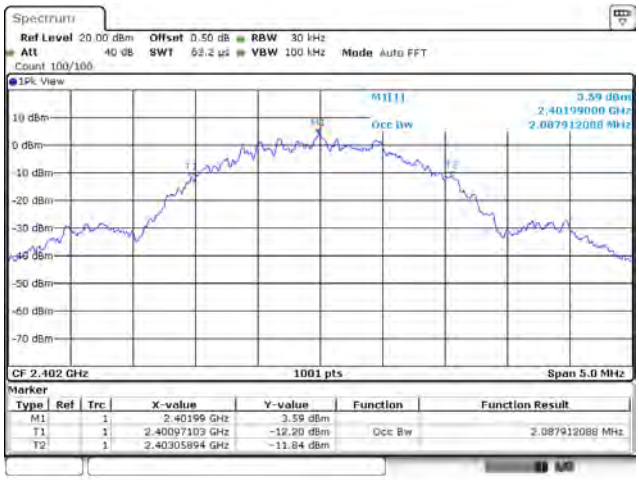
GFSK (1 Mbps) / 2440 MHz



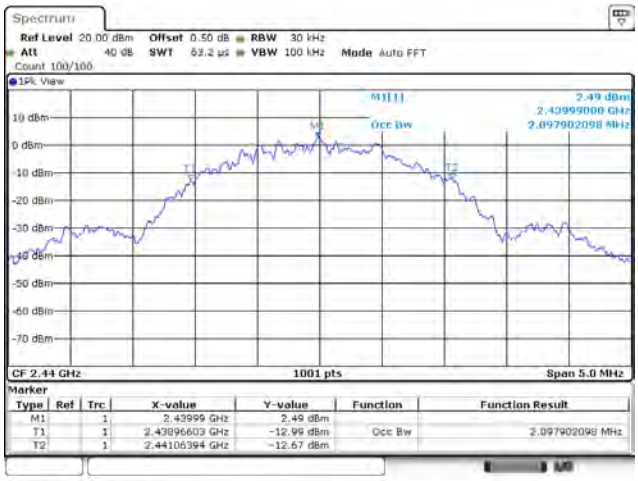
GFSK (1 Mbps) / 2480 MHz



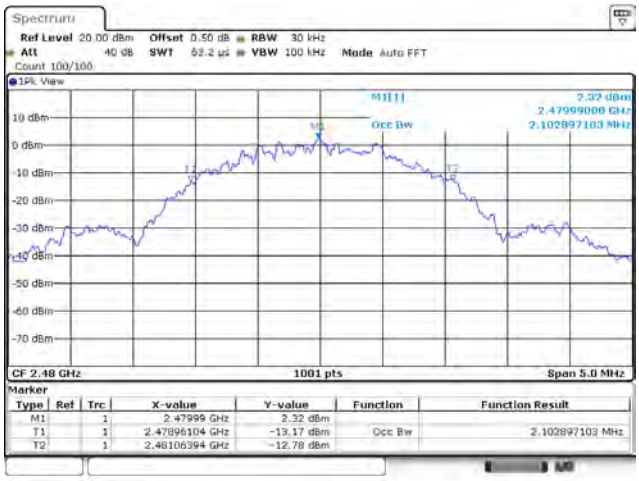
GFSK (2 Mbps) / 2402 MHz



GFSK (2 Mbps) / 2440 MHz



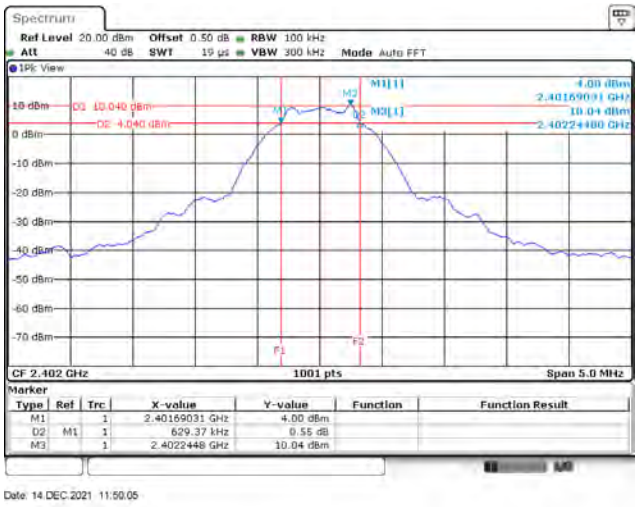
GFSK (2 Mbps) / 2480 MHz



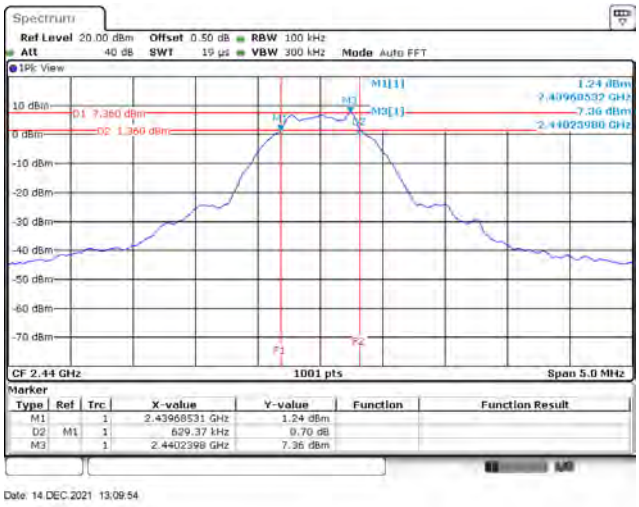
6.6 Test Result of DTS Bandwidth

Modulation	Channel	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
GFSK (1 Mbps)	00	2402	0.629	≧0.500	Pass
	19	2440	0.629	≧0.500	Pass
	39	2480	0.629	≧0.500	Pass
GFSK (2 Mbps)	00	2402	1.103	≧0.500	Pass
	19	2440	1.103	≧0.500	Pass
	39	2480	1.098	≧0.500	Pass

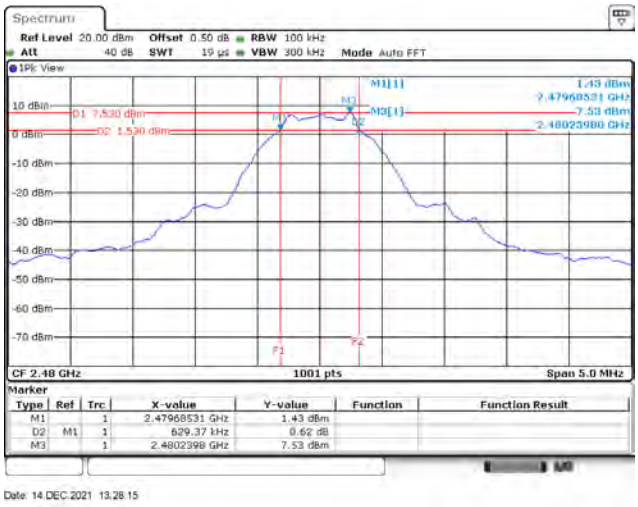
GFSK (1 Mbps) / 2402 MHz



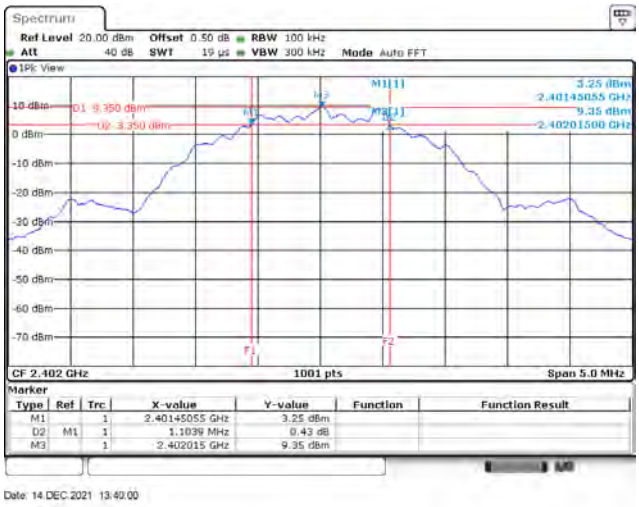
GFSK (1 Mbps) / 2440 MHz



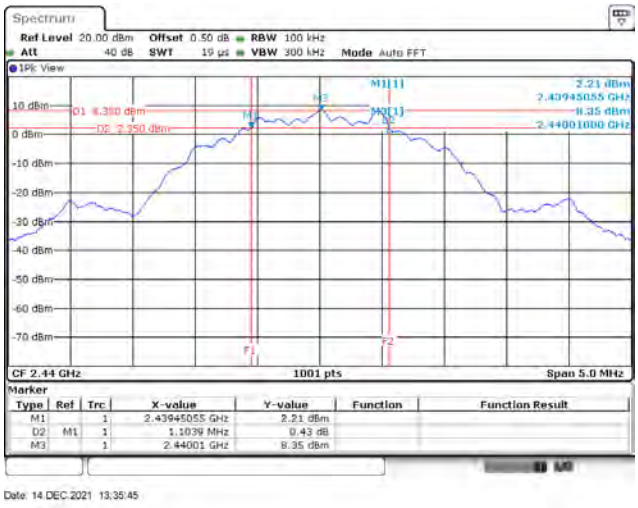
GFSK (1 Mbps) / 2480 MHz



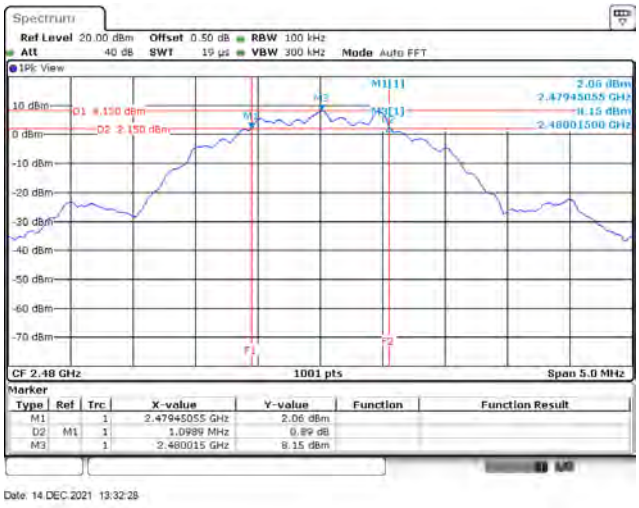
GFSK (2 Mbps) / 2402 MHz



GFSK (2 Mbps) / 2440 MHz

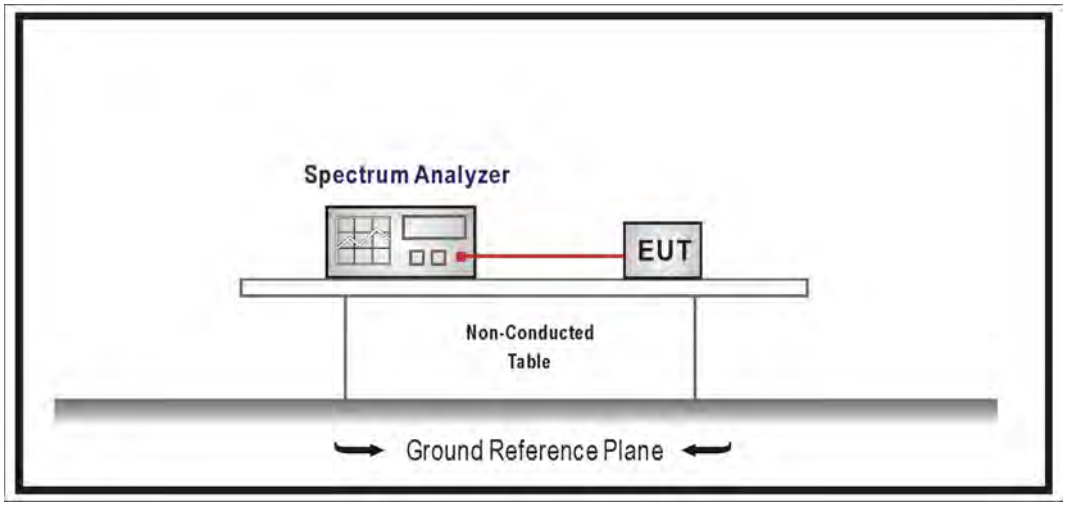


GFSK (2 Mbps) / 2480 MHz



7. Maximum Power Spectral Density

7.1 Test Setup



7.2 Test Limit

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

7.3 Test Procedures

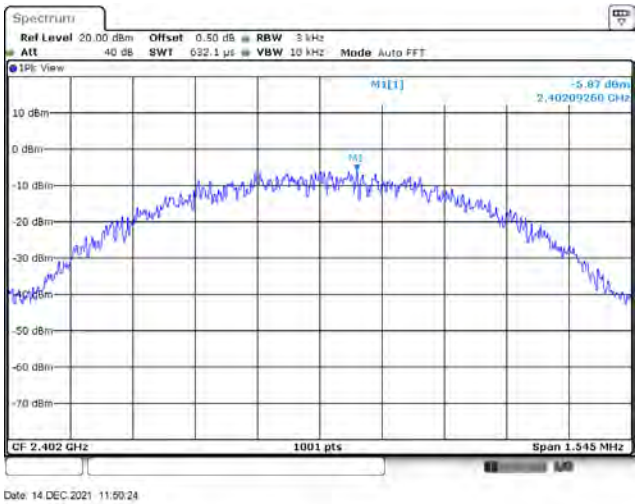
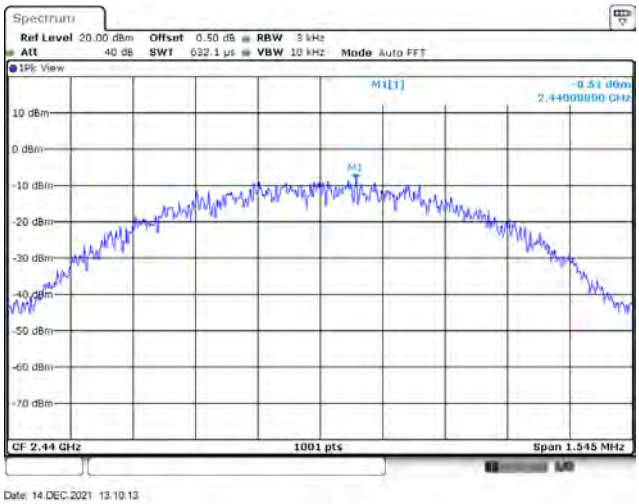
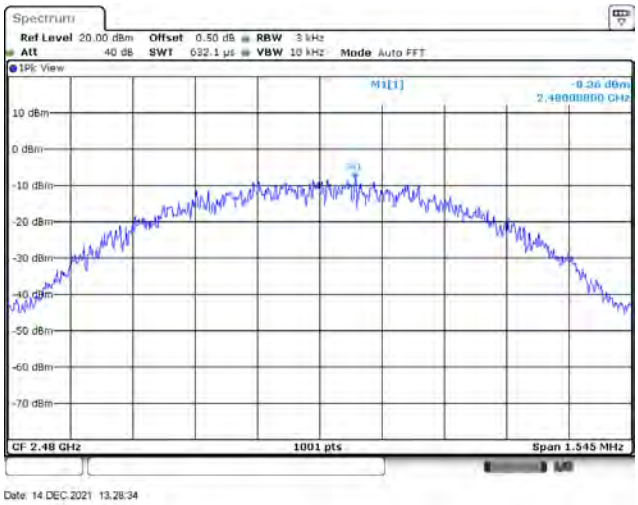
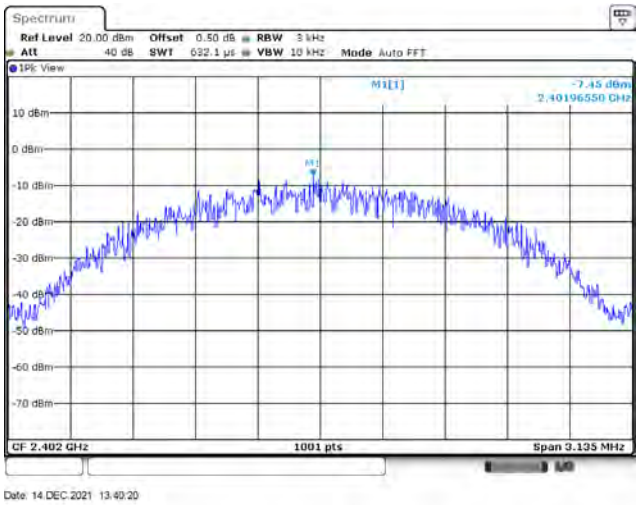
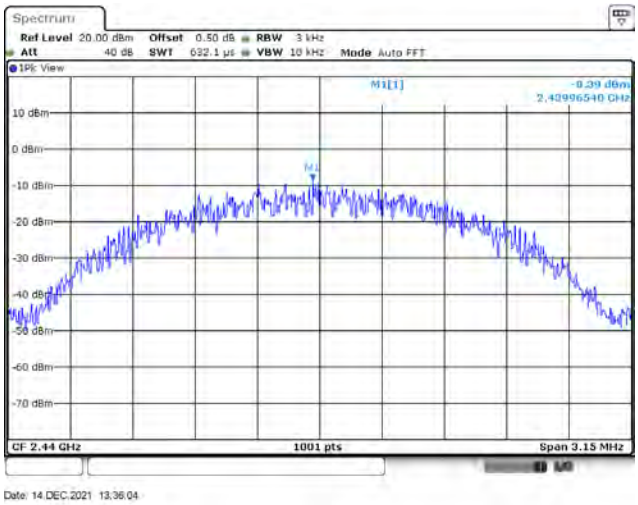
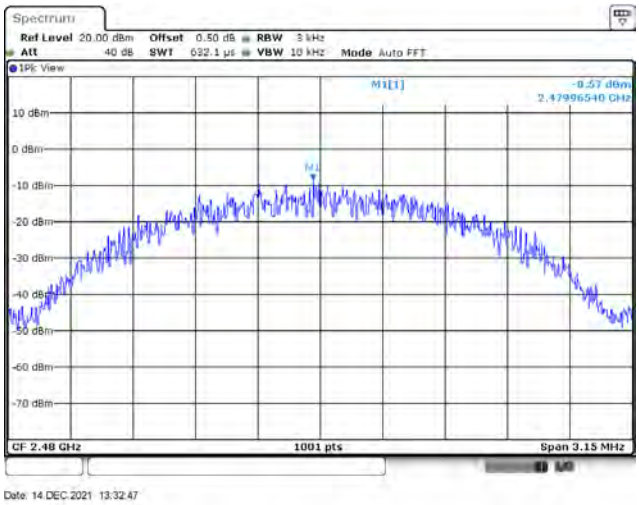
The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01 V05r02 for compliance to FCC 47CFR 15.247 requirements.

7.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

7.5 Test Result of Maximum Power Spectral Density

Modulation	Channel	Frequency (MHz)	Measure Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
GFSK (1 Mbps)	00	2402	-5.870	≦8.000	Pass
	19	2440	-8.510	≦8.000	Pass
	39	2480	-8.360	≦8.000	Pass
GFSK (2 Mbps)	00	2402	-7.450	≦8.000	Pass
	19	2440	-8.390	≦8.000	Pass
	39	2480	-8.570	≦8.000	Pass

GFSK (1 Mbps) / 2402 MHz	GFSK (1 Mbps) / 2440 MHz
	
GFSK (1 Mbps) / 2480 MHz	**GFSK (2 Mbps) / 2402 MHz**
	
GFSK (2 Mbps) / 2440 MHz	**GFSK (2 Mbps) / 2480 MHz**
	

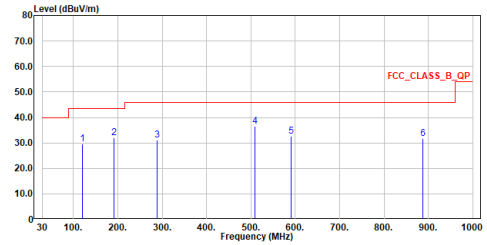
Appendix A

➢ Test Result of Radiated Emissions Co-location

1. Bluetooth function + WWAN WCDMA function

30MHz~1GHz:

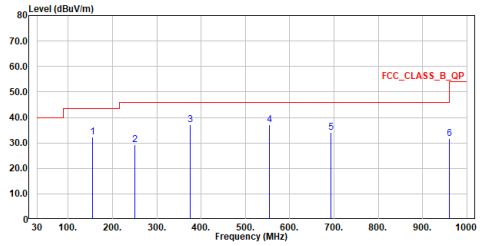
Site :CB2-H
Condition :3m Horizontal
Mode :WCDMA_B5+BLE_1M_TX_2440MHz
Test By :Ling



No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	120.113	29.48	43.50	-14.02	32.77	-3.29	QP
2	191.990	31.86	43.50	-11.64	38.40	-6.54	QP
3	288.020	31.05	46.00	-14.95	33.16	-2.11	QP
4	509.083	36.64	46.00	-9.36	33.31	3.33	QP
5	590.854	32.58	46.00	-13.42	27.91	4.67	QP
6	888.159	31.82	46.00	-14.18	24.19	7.63	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :WCDMA_B5+BLE_1M_TX_2440MHz
Test By :Ling

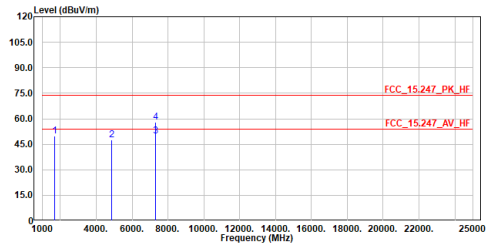


No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	154.645	32.29	43.50	-11.21	37.78	-5.49	QP
2	249.705	29.22	46.00	-16.78	32.17	-2.95	QP
3	374.641	37.28	46.00	-8.72	37.19	0.09	QP
4	553.897	37.21	46.00	-8.79	32.50	4.71	QP
5	693.092	34.17	46.00	-11.83	28.77	5.40	QP
6	960.133	31.77	54.00	-22.23	23.26	8.51	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Above 1GHz:

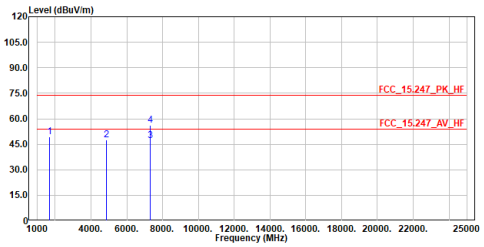
Site :CB2-H
Condition :3m Horizontal
Mode :WCDMA_B5+BLE_1M_TX_2440MHz
Test By :Ling



No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	1673.200	49.92	74.00	-24.08	74.42	-24.50	Peak
2	4880.000	47.75	74.00	-26.25	61.29	-13.54	Peak
3	7320.000	49.94	54.00	-4.06	54.53	-4.59	Average
4	7320.000	58.12	74.00	-15.88	62.71	-4.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :WCDMA_B5+BLE_1M_TX_2440MHz
Test By :Ling



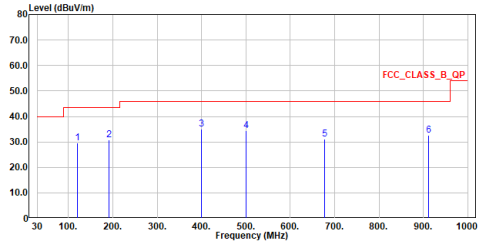
No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	1673.200	49.35	74.00	-24.65	73.85	-24.50	Peak
2	4880.000	47.55	74.00	-26.45	61.09	-13.54	Peak
3	7320.000	47.32	54.00	-6.68	51.91	-4.59	Average
4	7320.000	55.98	74.00	-18.02	60.57	-4.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

2. Bluetooth function + WWAN LTE function

30MHz~1GHz:

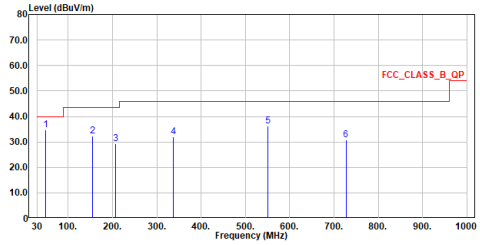
Site :CB2-H
Condition :3m Horizontal
Mode :LTE_B25+BLE_1M_TX_2440MHz
Test By :Ling



No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	120.113	29.48	43.50	-14.02	32.77	-3.29	QP
2	191.990	30.86	43.50	-12.64	37.40	-6.54	QP
3	399.376	34.92	46.00	-11.08	33.75	1.17	QP
4	500.062	34.33	46.00	-11.67	31.11	3.22	QP
5	677.281	31.11	46.00	-14.89	25.79	5.32	QP
6	912.021	32.59	46.00	-13.41	24.68	7.91	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :LTE_B25+BLE_1M_TX_2440MHz
Test By :Ling

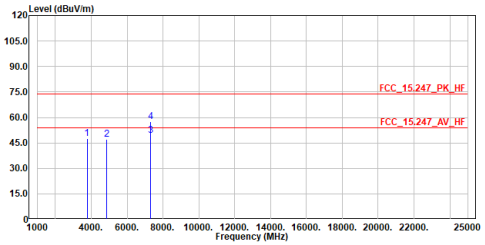


No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	48.721	34.63	40.00	-5.37	41.63	-7.00	QP
2	154.645	32.29	43.50	-11.21	37.78	-5.49	QP
3	207.316	29.35	43.50	-14.15	35.48	-6.13	QP
4	336.617	32.02	46.00	-13.98	32.92	-0.90	QP
5	550.017	36.29	46.00	-9.71	31.59	4.70	QP
6	726.848	30.72	46.00	-15.28	24.76	5.96	QP

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The emission under 30MHz was not included since the emission levels are very low against the limit.
5. The other emission levels were very low against the limit.

Above 1GHz:

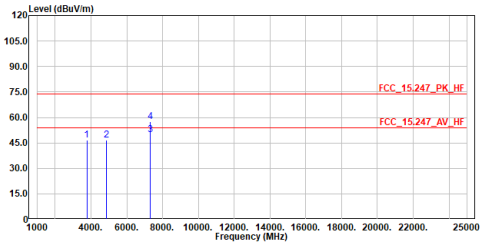
Site :CB2-H
Condition :3m Horizontal
Mode :LTE_B25+BLE_1M_TX_2440MHz
Test By :Ling



No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	3765.000	47.33	74.00	-26.67	64.67	-17.34	Peak
2	4880.000	47.04	74.00	-26.96	60.58	-13.54	Peak
3	7320.000	49.47	54.00	-4.53	54.06	-4.59	Average
4	7320.000	57.63	74.00	-16.37	62.22	-4.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.

Site :CB2-H
Condition :3m Vertical
Mode :LTE_B25+BLE_1M_TX_2440MHz
Test By :Ling



No.	Frequency MHz	Level dBuV/m	Limit Line dBuV/m	Over Limit dB	Read Level dBuV	Factor dB	Remark
1	3765.000	46.86	74.00	-27.14	64.20	-17.34	Peak
2	4880.000	46.70	74.00	-27.30	60.24	-13.54	Peak
3	7320.000	49.94	54.00	-4.06	54.53	-4.59	Average
4	7320.000	57.73	74.00	-16.27	62.32	-4.59	Peak

Note:
1. Level = Read Level + Factor
2. Factor = Antenna Factor + Cable Loss - Preamp Factor
3. Over Limit = Level - Limit Line
4. The peak result complies with AVG limit, AVG result is deemed to comply with AVG limit.
5. The other emission levels were very low against the limit.