

FCC Test Report

Product Name : Dive computer
Trade Name : CREST
Model No. : CR-5
FCC ID : 2A2JL-EO-CR-5

Applicant : Eight Oceans Precision Industry Co., Ltd
Address : 10F.-10, No. 14, Lane 609, Section 5, Chongxin Road.,
Sanchong Dist., New Taipei City 24159, Taiwan 24159

Date of Receipt : Jan. 27, 2021
Issued Date : Nov. 10, 2021
Report No. : 2140963R-E3032110108
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.

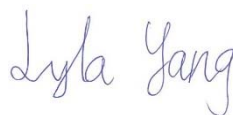
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Test Report Certification



Product Name : Dive computer
Applicant : Eight Oceans Precision Industry Co., Ltd
Address : 10F.-10, No. 14, Lane 609, Section 5, Chongxin Road.,
Sanchong Dist., New Taipei City 24159, Taiwan 24159
Manufacturer : TRANSYSTEM INC.
Address : 3F, NO.31, Ke Jung Rd., Hsinchu Science Park, Chu-Nan,
Miao-Li 350, Taiwan
Trade Name : CREST
Model No. : CR-5
FCC ID : 2A2JL-EO-CR-5
EUT Voltage : DC 5V (host equipment)
DC 3.8V for battery
Testing Voltage : DC 5V
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10: 2013
Laboratory Name : Hsin Chu Laboratory
Address : No.372-2, Sec. 4, Zhongxing Rd., Zhudong Township, Hsinchu
County 310, Taiwan, R.O.C.
TEL: +886-3-582-8001 / FAX: +886-3-582-8958
Test Result : Complied

Documented By :



(Lyla Yang / Engineering Adm. Specialist)

Approved By :



(Louis Hsu / Deputy Manager)

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	Nov. 10, 2021

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1. General Information

1.1 EUT Description

Product Name	Dive computer
Trade Name	CREST
Model No.	CR-5
Frequency Range	1Mbps: 2402~2480MHz
Channel Number	1Mbps: 40 Channels
Type of Modulation	GFSK

Accessories Information				
No.	Equipment Name	Brand	Model No.	Description
1	Charging Clip	TRANSYSTEM	1290406006B	-
2	USB Cable	TRANSYSTEM	6043057	Shielded, 0.5m
3	Battery (Lithium-ion Rechargeable Battery)	Routejade	FLPB493535R-P1	DC 3.8V / 480mAh / 1.82Wh

Antenna Information				
Ant.	Brand	Model No.	Type	Gain (dBi)
0	Xie Qin spring	2020406101A	Copper coil Antenna	-1.36

GFSK (1Mbps)

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	Mode 1	GFSK (1Mbps)	19	Pass
Maximum Peak Conducted Output Power	Mode 1	GFSK (1Mbps)	00/19/39	Pass
Radiated Emission Below 1GHz	Mode 1	GFSK (1Mbps)	19	Pass
Radiated Emission Above 1GHz	Mode 1	GFSK (1Mbps)	00/19/39	Pass
Antenna Port Conducted Emission	Mode 1	GFSK (1Mbps)	00/19/39	Pass
Band Edge	Mode 1	GFSK (1Mbps)	00/19/39	Pass
Occupied Bandwidth & DTS Bandwidth	Mode 1	GFSK (1Mbps)	00/19/39	Pass
Power Spectral Density	Mode 1	GFSK (1Mbps)	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. The EUT was performed at X axis, Y axis and Z axis position for radiated emission and band edge tests, and the worst case was found at X axis. So the measurement will follow this same test configuration.
3. For radiated emission below 1 GHz and AC power line conducted emission have performed all modes of operation were investigated and the worst-case emissions are reported.
4. Reference to DEKRA Project No.: 20C0852R.

1.3 Comments and Remarks

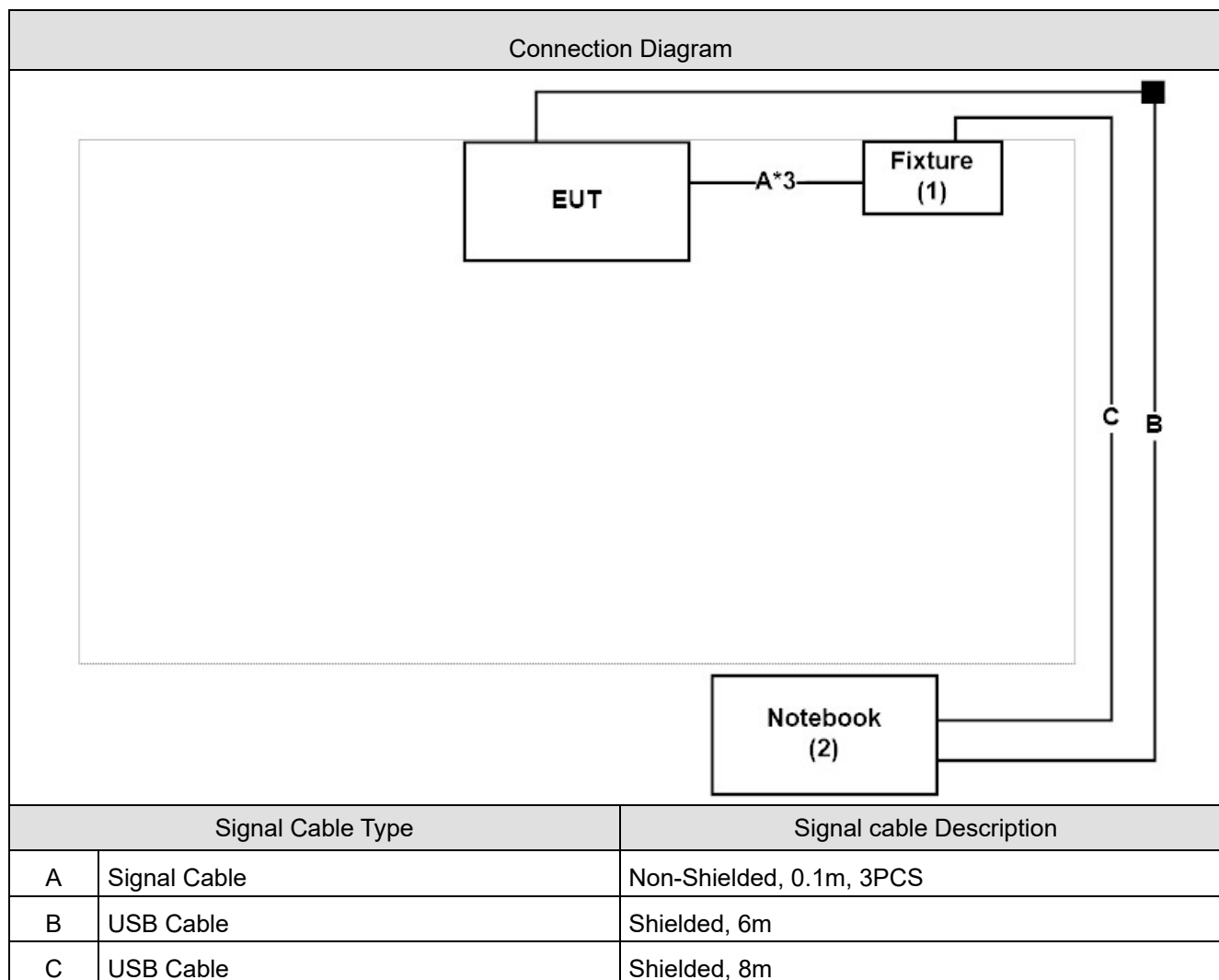
The product specification and testing instructions for the EUT declared in the report are provided by the manufacturer who will take all responsibilities for the accuracy.

1.4 Tested System Details

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

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Fixture	TRANSYSTEM	BT FIXTURE	N/A	N/A	--
2 Notebook	DELL	Latitude E6320	8611271467	N/A	Shielded, 2m

1.5 Configuration of tested System



1.6 EUT Operation of during Test

1	Set the EUT as shown.
2	Execute the control software WCN_Combo_Tool.
3	Configure test mode, test channel and packet.
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)	AC Power Line Conducted Emission	21.4	Lion Wang	2021/1/28	SR2-H
Humidity (%RH)		51.3			
Temperature (°C)	Maximum Peak Conducted Output Power	21.0	Lion Wang	2021/1/29	SR12-H
Humidity (%RH)		69.0			
Temperature (°C)	Radiated Emission	23.0	Marisa Chen	2021/1/27	CB2-H
Humidity (%RH)		58.0			
Temperature (°C)	Antenna Port Conducted Emission	21.0	Lion Wang	2021/1/29	SR12-H
Humidity (%RH)		69.0			
Temperature (°C)	Band Edge	23.0	Marisa Chen	2021/1/27	CB2-H
Humidity (%RH)		58.0			
Temperature (°C)	Occupied Bandwidth	22.0	Lion Wang	2021/2/4	SR12-H
Humidity (%RH)		65.0			
Temperature (°C)	DTS Bandwidth	21.0	Lion Wang	2021/1/29	SR12-H
Humidity (%RH)		69.0			
Temperature (°C)	Maximum Power Spectral Density	21.0	Lion Wang	2021/1/29	SR12-H
Humidity (%RH)		69.0			

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 SR2-H. Test site number for address 2 includes CB2-H, CB3-H, CB4-H, SR10-H and SR12-H.	

1.8 List of Test Equipment

AC power Line Conducted Emission / SR2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2020/12/24	2021/12/23
Test Receiver	R&S	ESCS 30	836858/022	2020/02/25	2021/02/24
LISN	R&S	ENV216	100092	2020/06/22	2021/06/21

Maximum Peak Conducted Output Power / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
High Speed Peak Power Meter Dual Input	Anritsu	ML2496A	1602004	2020/11/30	2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531043	2020/11/30	2021/11/29
Pulse Power Sensor	Anritsu	MA2411B	1531044	2020/11/30	2021/11/29
Power Meter	Keysight	8990B	MY51000248	2020/05/20	2021/05/19
Power Sensor	Keysight	N1923A	MY57240005	2020/05/20	2021/05/19

Radiated Emission; Band Edge / CB2-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Signal Analyzer	R&S	FSVA40	101455	2020/10/12	2021/10/11
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
EXA Signal Analyzer	Keysight	N9010A	MY51440132	2021/01/25	2022/01/24
Bilog Antenna	Teseq	CBL6112D	23191	2020/06/12	2021/06/11
Horn Antenna	Schwarzbeck	BBHA 9120D	639	2020/06/04	2021/06/03
Horn Antenna	Schwarzbeck	BBHA 9170	202	2020/12/16	2021/12/15
Pre-Amplifier	DEKRA	AP-025C	12183122	2020/09/03	2021/09/02
Pre-Amplifier	EMCI	EMC11830I	980366	2020/11/30	2021/11/29
Pre-Amplifier	DEKRA	AP-400C	201801231	2020/11/16	2021/11/15
Horn Antenna	Schwarzbeck	BBHA 9120D	01656	2020/10/14	2021/10/13
Signal Analyzer	R&S	FSV40	101435	2020/06/24	2021/06/23
Band Reject Filter	Micro-Tronics	BRM50702	G192	2020/03/09	2021/03/08
Coaxial Cable(13m)	Huber+Suhner	SF104	CB2-H	2020/07/25	2021/07/24
DEKRA Testing System	DEKRA	Version 1.2	CB2-H	NA	NA

Antenna Port Conducted Emission; Occupied Bandwidth & DTS Bandwidth; Power Spectral Density / SR12-H

Instrument	Manufacturer	Model No.	Serial No.	Cal. Date	Next Cal. Date
Spectrum Analyzer	Agilent	N9010A	US47140172	2020/06/18	2021/06/17
Signal & Spectrum Analyzer	R&S	FSV40	101049	2020/03/30	2021/03/29
Spectrum Analyzer	Keysight	N9030B	MY57140404	2020/06/03	2021/06/02
Spectrum Analyzer	Keysight	N9010B	MY57110159	2020/04/15	2021/04/14

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

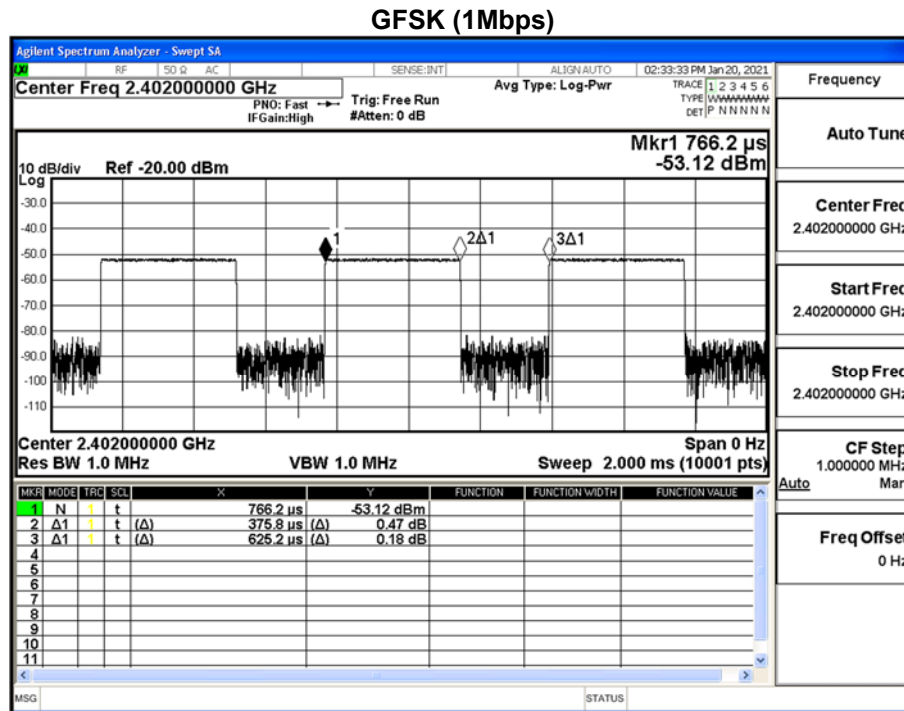
1.9 Uncertainty

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	± 2.26 dB
Maximum Conducted Output Power	± 1.27 dB
Radiated Emission	30MHz~1GHz as ± 3.43 dB 1GHz~26.5GHz as ± 3.65 dB
Antenna Port Conducted Emission	± 1.27 dB
Radiated Emission Band Edge	± 1.27 dB
Occupied Bandwidth & DTS Bandwidth	± 50 Hz
Maximum Power Spectral Density	± 1.27 dB

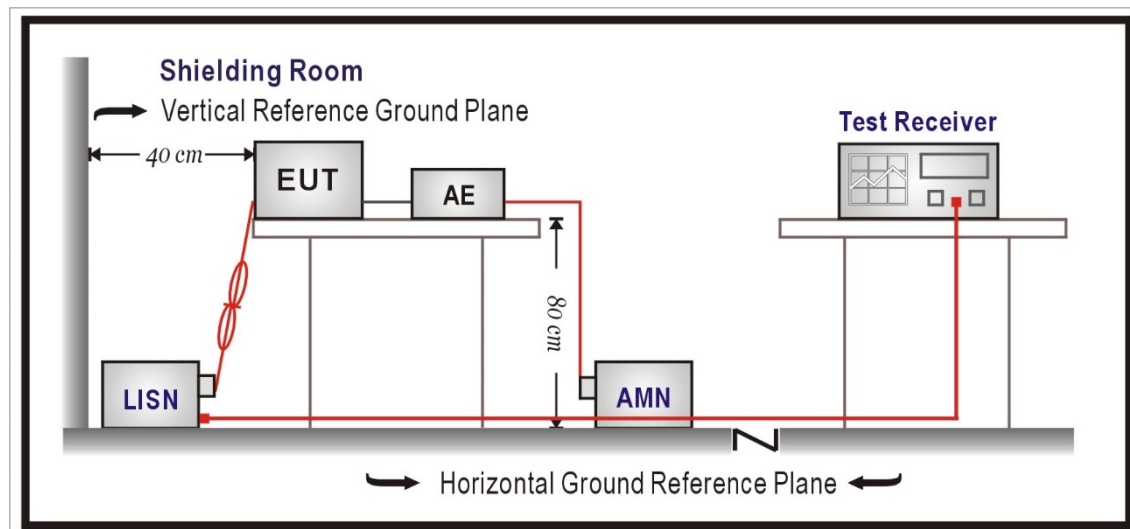
1.10 Duty Cycle

Mode	On Time (ms)	On+Off Time (ms)	Duty Cycle (%)	Duty Factor(dB) linear voltage	Power	1/T Minimum VBW (kHz)
GFSK (1Mbps)	0.376	0.625	60.11%	4.421244	2.21	2.661



2. AC Power Line Conducted Emission

2.1 Test Setup



2.2 Limits

Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
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.

2.3 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement.

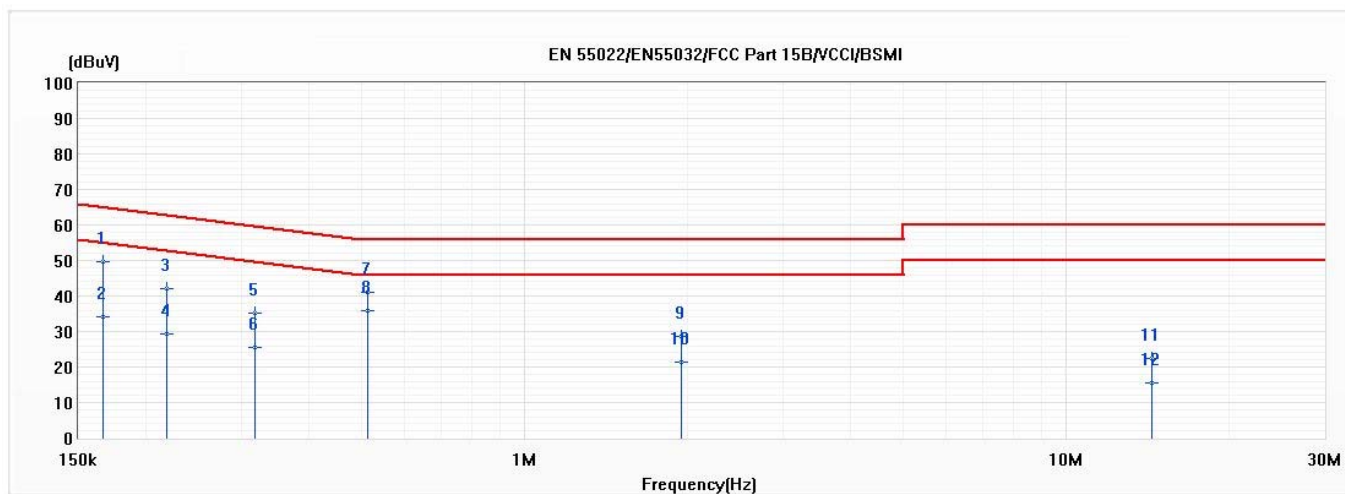
AC Power Line Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9KHz.

2.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.207.

2.5 Test Result

Test Mode	Mode 1: Transmit	Phase	Line
Test Condition	CH19_2440MHz		

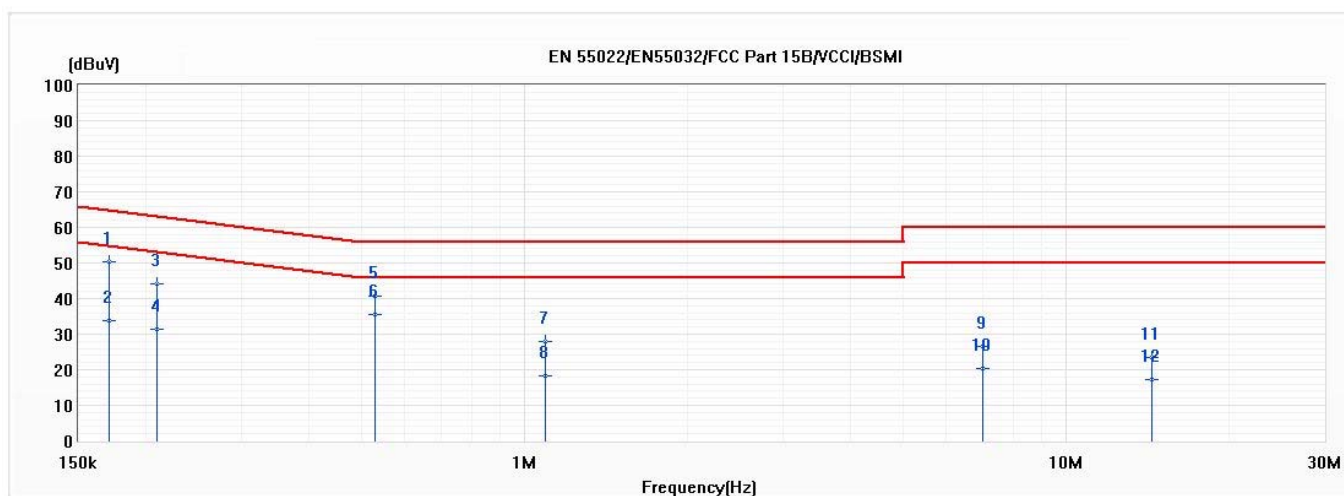


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.166	49.49	65.15	-15.67	39.84	9.65	QP
2	0.166	34.03	55.15	-21.13	24.38	9.65	AV
3	0.218	42.24	62.88	-20.63	32.60	9.65	QP
4	0.218	29.28	52.88	-23.59	19.63	9.65	AV
5	0.318	35.23	59.77	-24.54	25.57	9.67	QP
6	0.318	25.53	49.77	-24.24	15.86	9.67	AV
7	0.513	41.19	56.00	-14.81	31.50	9.69	QP
*8	0.513	35.96	46.00	-10.04	26.27	9.69	AV
9	1.950	28.67	56.00	-27.33	18.88	9.79	QP
10	1.950	21.51	46.00	-24.49	11.72	9.79	AV
11	14.364	22.30	60.00	-37.70	12.06	10.24	QP
12	14.364	15.40	50.00	-34.60	5.16	10.24	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

Test Mode	Mode 1: Transmit	Phase	Neutral
Test Condition	CH19_2440MHz		



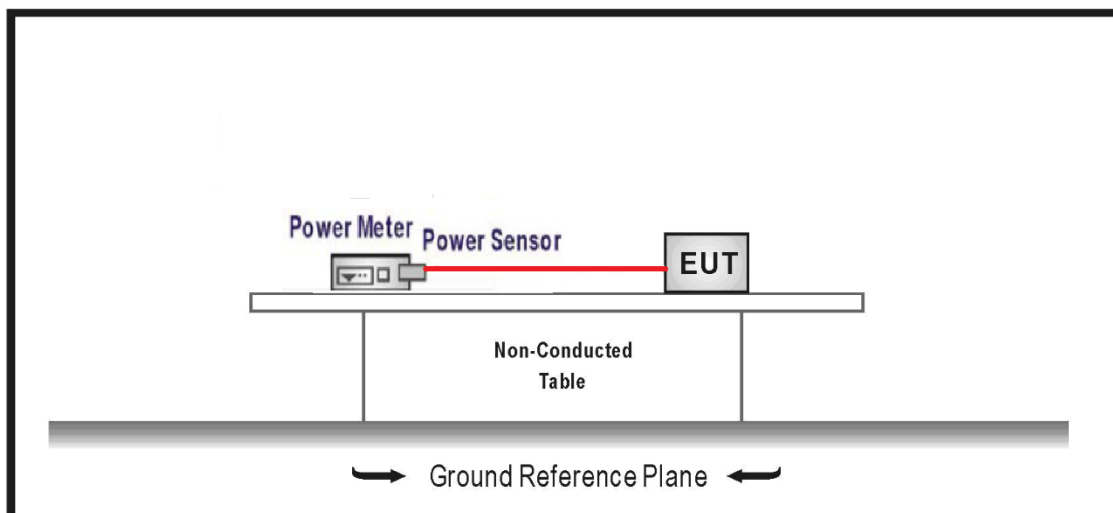
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.171	50.43	64.92	-14.50	40.79	9.64	QP
2	0.171	33.85	54.92	-21.07	24.21	9.64	AV
3	0.209	44.17	63.24	-19.08	34.53	9.64	QP
4	0.209	31.31	53.24	-21.94	21.67	9.64	AV
5	0.529	40.68	56.00	-15.32	31.00	9.68	QP
*6	0.529	35.45	46.00	-10.55	25.77	9.68	AV
7	1.089	28.01	56.00	-27.99	18.29	9.72	QP
8	1.089	18.30	46.00	-27.70	8.57	9.72	AV
9	7.018	26.69	60.00	-33.31	16.67	10.02	QP
10	7.018	20.35	50.00	-29.65	10.33	10.02	AV
11	14.412	23.42	60.00	-36.58	13.10	10.32	QP
12	14.412	17.19	50.00	-32.81	6.87	10.32	AV

Remark:

1. "*" means this data is the worst emission level.
2. Emission Level = Reading Level + Correct Factor (Correct Factor = LISN Insertion Loss + Cable Loss).
3. Margin = Emission Level - Limit.

3. Maximum Peak Conducted Output Power

3.1 Test Setup



3.2 Limits

The Maximum Peak Conducted Output Power shall be less 1 Watt.

3.3 Test procedures

The EUT was setup according to ANSI C63.10: 2013; tested according to DTS test procedure of KDB 558074 D01V05r02 for compliance to FCC 47CFR 15.247 requirements.

3.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

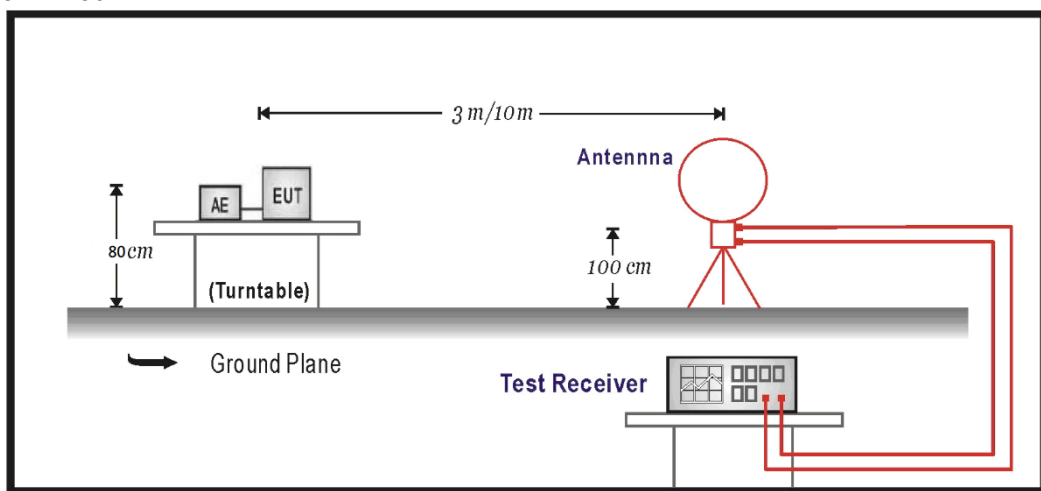
3.5 Test Result of Maximum Conducted Output Power

Modulation	Channel	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
GFSK (1Mbps)	00	2402	-2.590	≤ 30	Pass
	19	2440	-2.690	≤ 30	Pass
	39	2480	-4.160	≤ 30	Pass

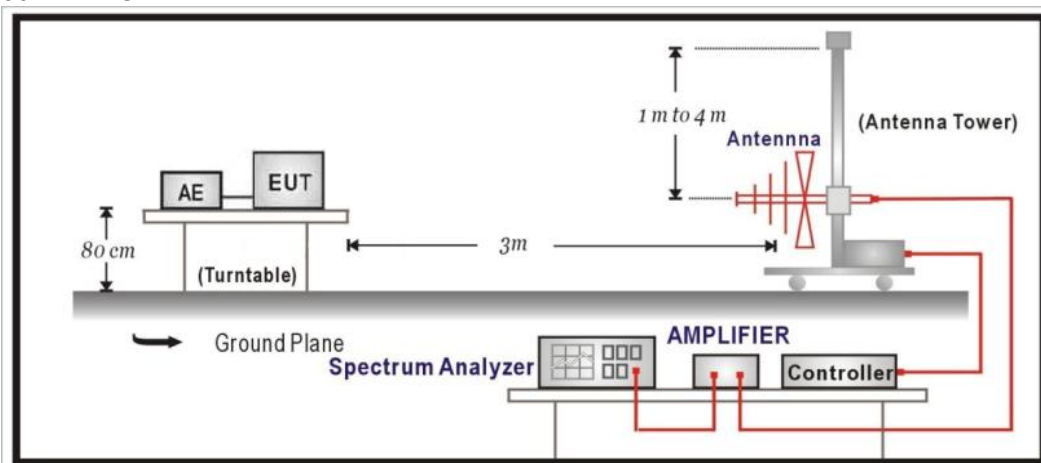
4. Radiated Emission

4.1 Test Setup

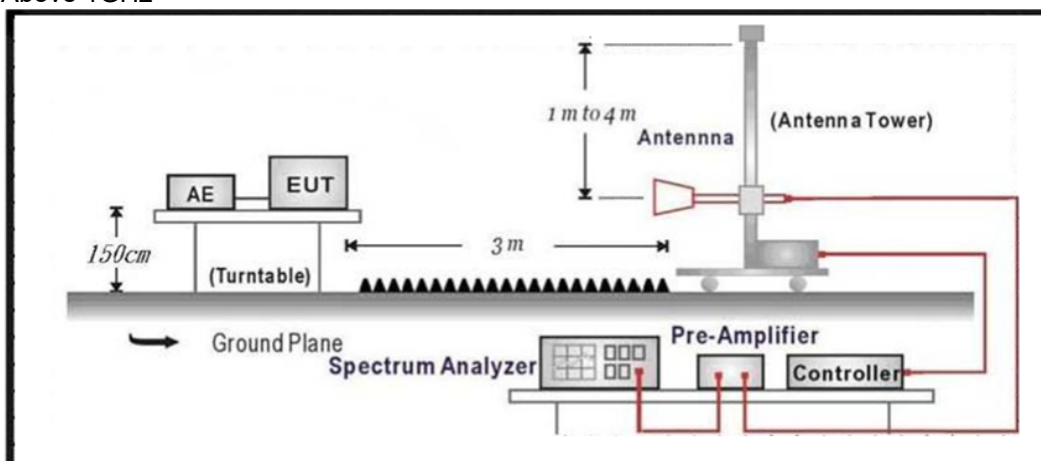
9kHz~30MHz



30MHz~1GHz



Above 1GHz



4.2 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.

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 Bandedges.
 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.

4.3 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 from 9kHz(include The the lowest oscillator frequency generated within the device up to the 10th harmonic) to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit.

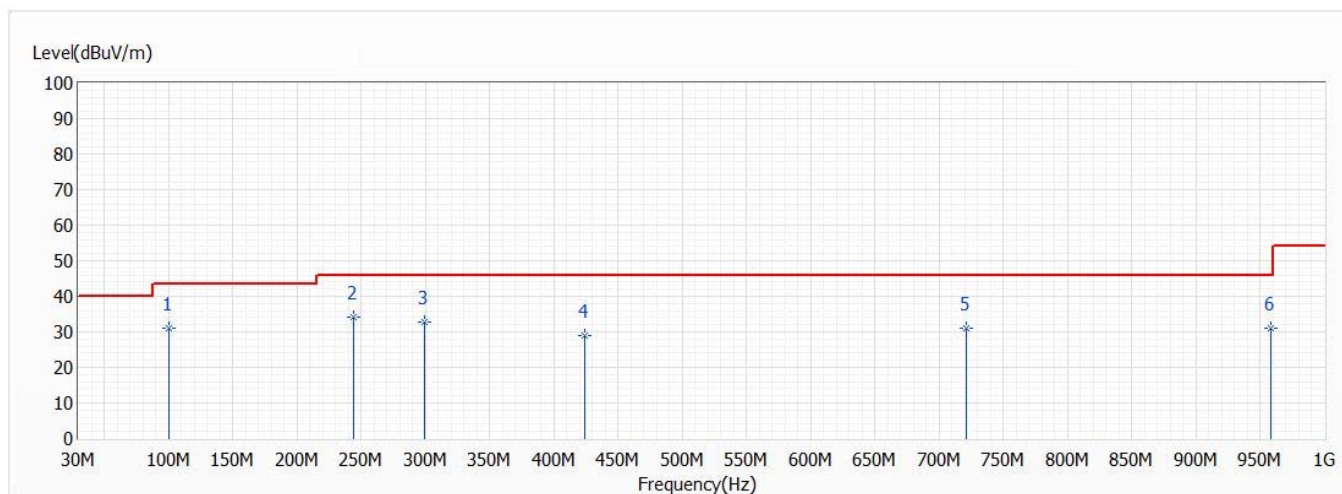
The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

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

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0,Ch 19,2.44G,BW1M_X axis		

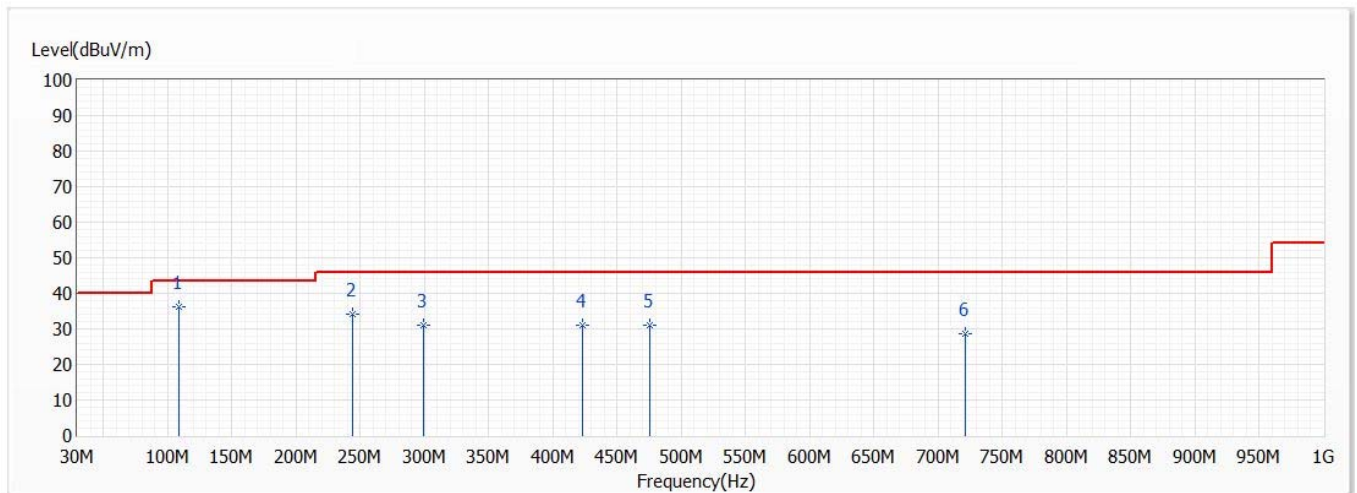


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	100.810	31.18	43.50	-12.32	36.04	-4.86	QP
* 2	243.885	34.06	46.00	-11.94	37.93	-3.87	QP
3	299.660	32.71	46.00	-13.29	34.94	-2.23	QP
4	423.820	29.12	46.00	-16.88	27.49	1.63	QP
5	720.640	30.98	46.00	-15.02	25.59	5.39	QP
6	958.290	30.93	46.00	-15.07	22.89	8.04	QP

Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor (Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 19, 2.44G, BW1M, X axis		



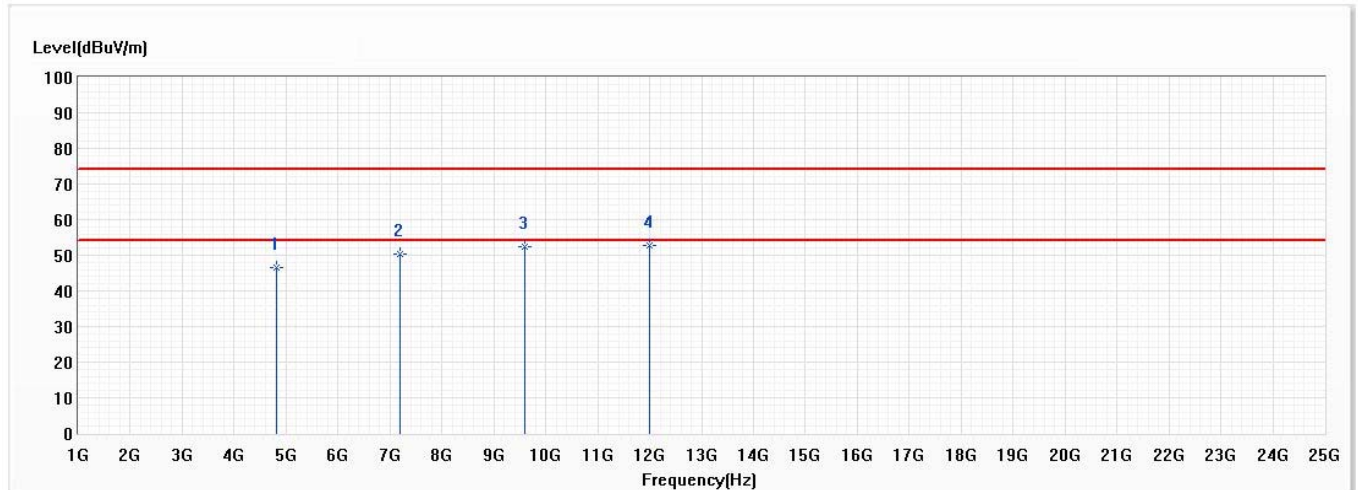
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
* 1	109.055	36.09	43.50	-7.41	39.99	-3.90	QP
2	243.885	34.22	46.00	-11.78	38.09	-3.87	QP
3	299.660	30.95	46.00	-15.05	33.18	-2.23	QP
4	422.850	31.03	46.00	-14.97	29.41	1.62	QP
5	475.230	30.93	46.00	-15.07	28.31	2.62	QP
6	720.640	28.77	46.00	-17.23	23.38	5.39	QP

Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor (Correct Factor=Ant Factor+Cable Loss-Pre Amp).
3. Margin=Limit -Emission Level.

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

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 0, 2.402G, BW1M, X axis		

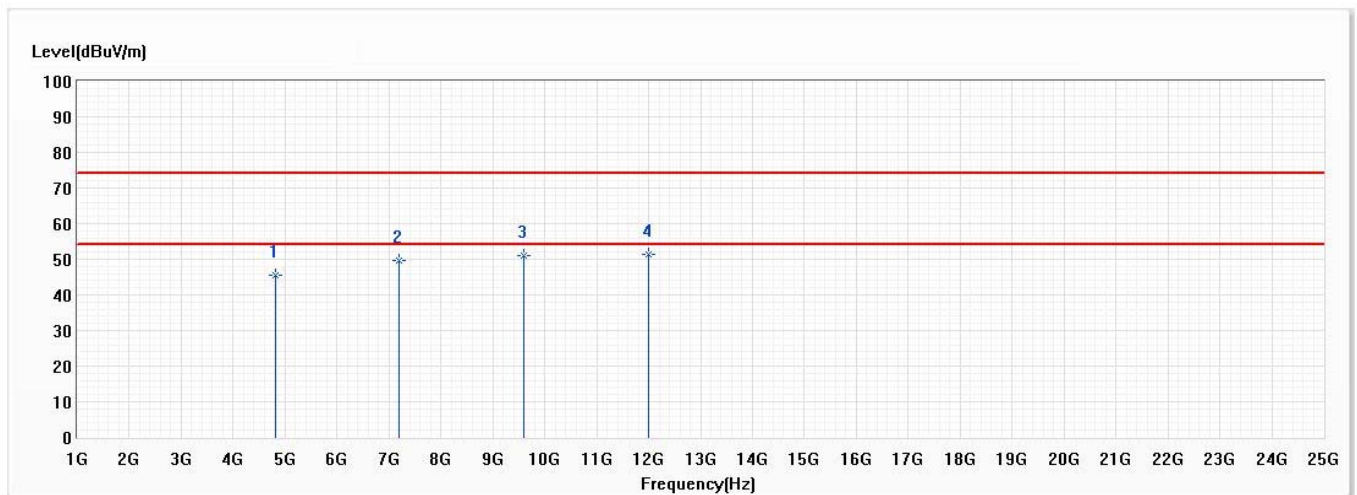


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4804.000	46.50	74.00	-27.50	58.53	-12.03	PK
2	7206.000	50.30	74.00	-23.70	54.98	-4.68	PK
3	9608.000	52.28	74.00	-21.72	53.61	-1.33	PK
* 4	12010.000	52.85	74.00	-21.15	50.04	2.81	PK

Note:

1. " * ", means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 0, 2.402G, BW1M_X axis		

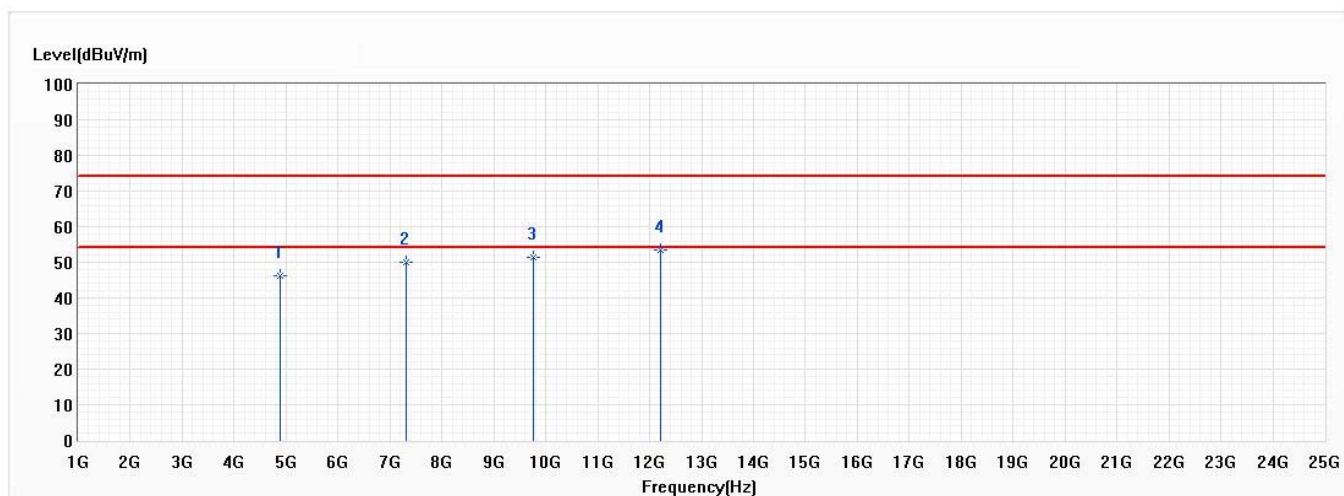


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4804.000	45.44	74.00	-28.56	57.47	-12.03	PK
2	7206.000	49.78	74.00	-24.22	54.46	-4.68	PK
3	9608.000	51.02	74.00	-22.98	52.35	-1.33	PK
* 4	12010.000	51.21	74.00	-22.79	48.40	2.81	PK

Note:

1. “ * ”, means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 19, 2.44G, BW1M_X axis		

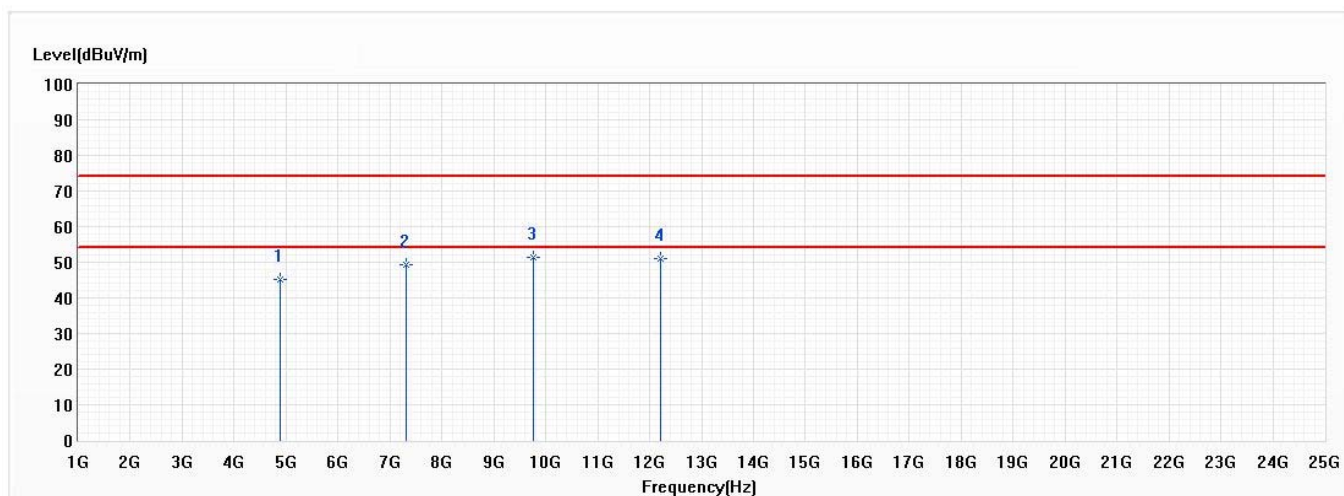


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4880.000	46.29	74.00	-27.71	58.12	-11.83	PK
2	7320.000	50.10	74.00	-23.90	54.45	-4.35	PK
3	9760.000	51.49	74.00	-22.51	52.76	-1.27	PK
* 4	12200.000	53.48	74.00	-20.52	50.90	2.58	PK

Note:

1. " * ", means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 19, 2.44G, BW1M_X axis		

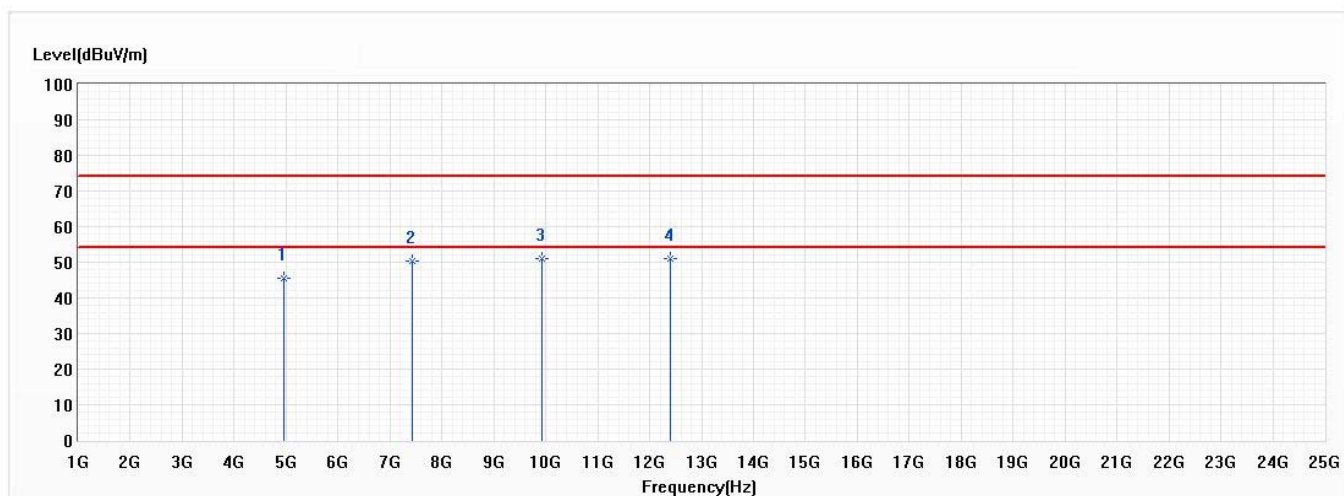


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4880.000	45.16	74.00	-28.84	56.99	-11.83	PK
2	7320.000	49.35	74.00	-24.65	53.70	-4.35	PK
* 3	9760.000	51.53	74.00	-22.47	52.80	-1.27	PK
4	12200.000	50.93	74.00	-23.07	48.35	2.58	PK

Note:

1. " * ", means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 39, 2.48G, BW1M, X axis		

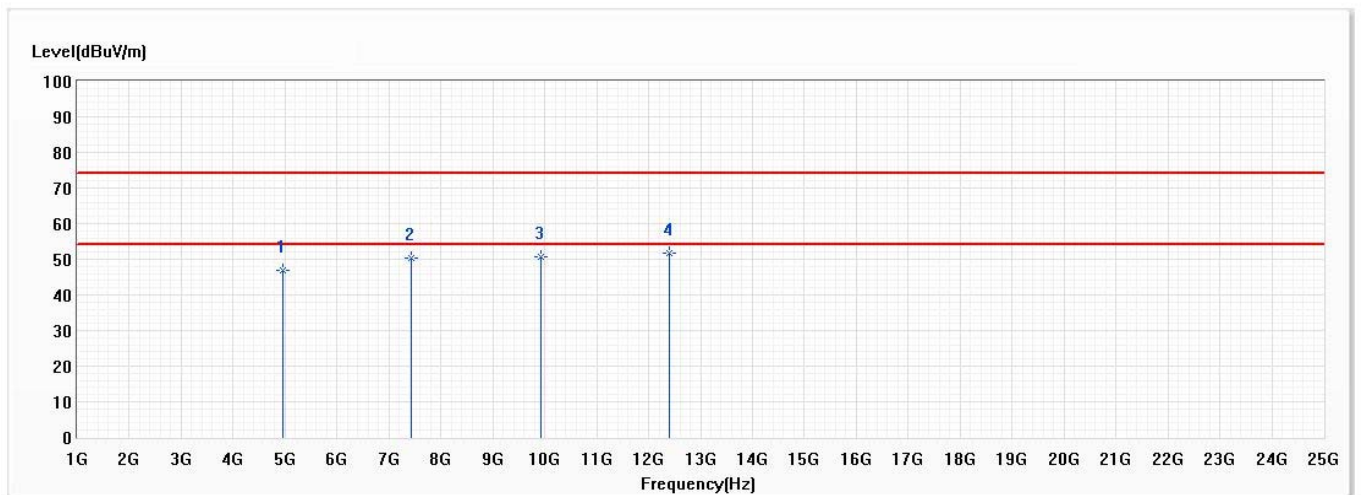


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4960.000	45.60	74.00	-28.40	57.20	-11.60	PK
2	7440.000	50.41	74.00	-23.59	54.42	-4.01	PK
3	9920.000	50.95	74.00	-23.05	52.14	-1.19	PK
* 4	12400.000	51.06	74.00	-22.94	48.72	2.34	PK

Note:

1. " * ", means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 39, 2.48G, BW1M_X axis		



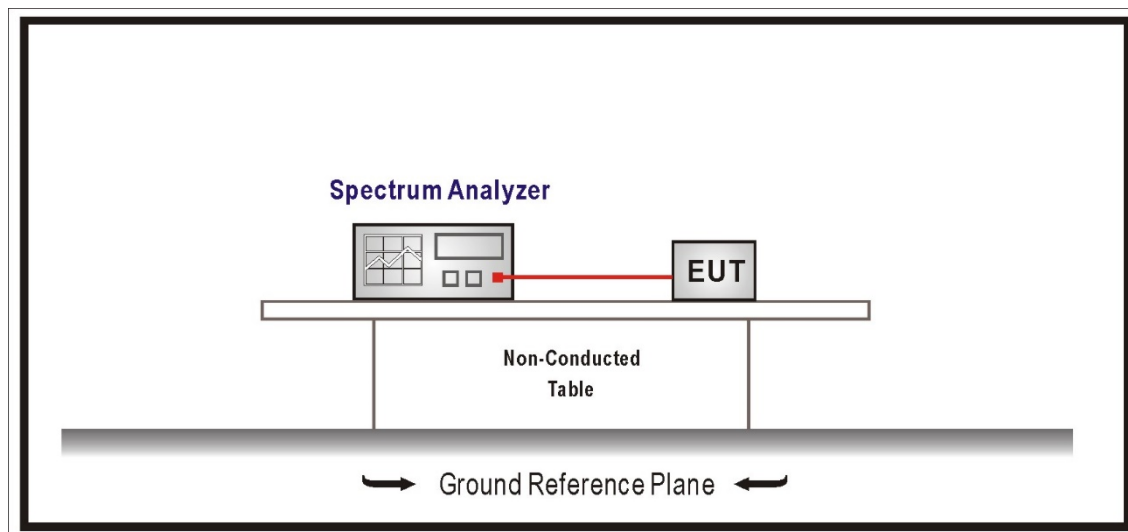
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	4960.000	46.85	74.00	-27.15	58.45	-11.60	PK
2	7440.000	50.42	74.00	-23.58	54.43	-4.01	PK
3	9920.000	50.81	74.00	-23.19	52.00	-1.19	PK
* 4	12400.000	51.63	74.00	-22.37	49.29	2.34	PK

Note:

1. “ * ”, means this data is the worst value.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.
4. The emission above 13GHz were not included is because their levels are lower than 20dB form limit.

5. Antenna Port Conducted Emission

5.1 Test Setup



5.2 Limits

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 limits. If the transmitter complies with the conducted power limits 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 limits 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 limits specified in §15.209(a) (see §15.205(c)).

5.3 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.

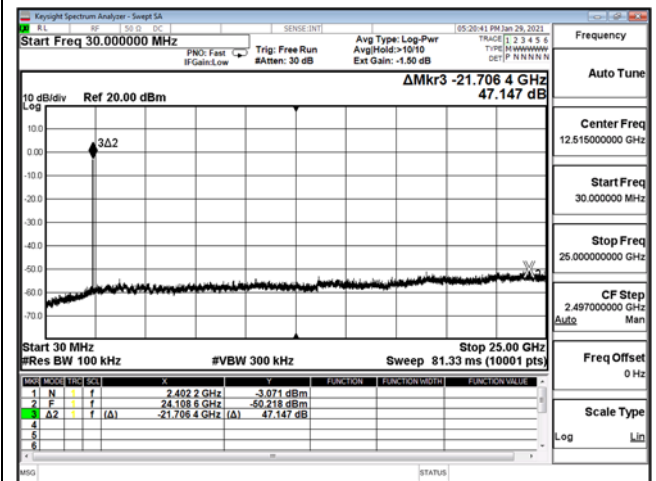
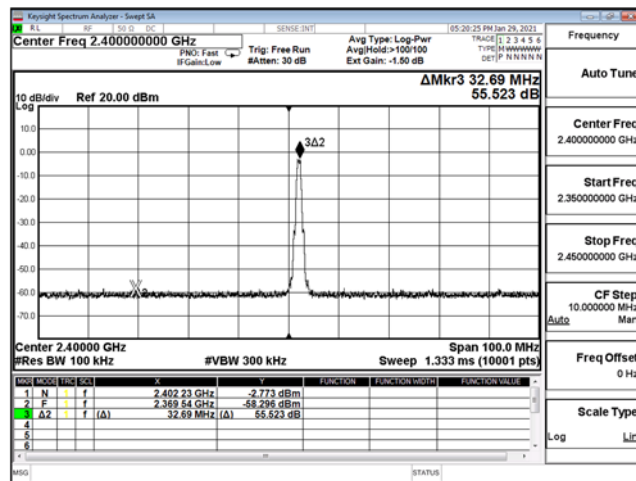
5.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

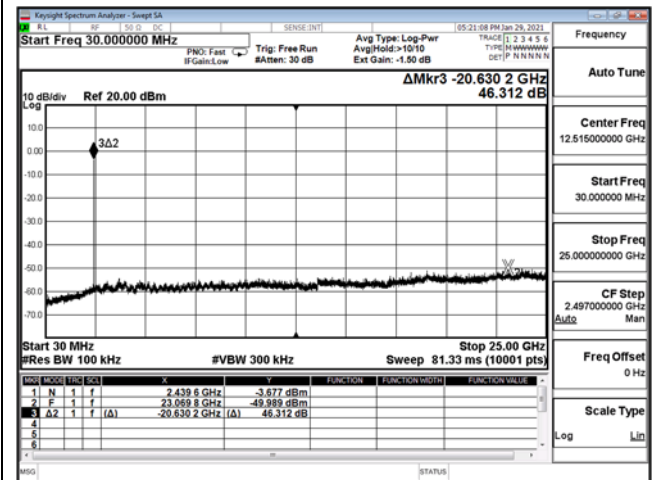
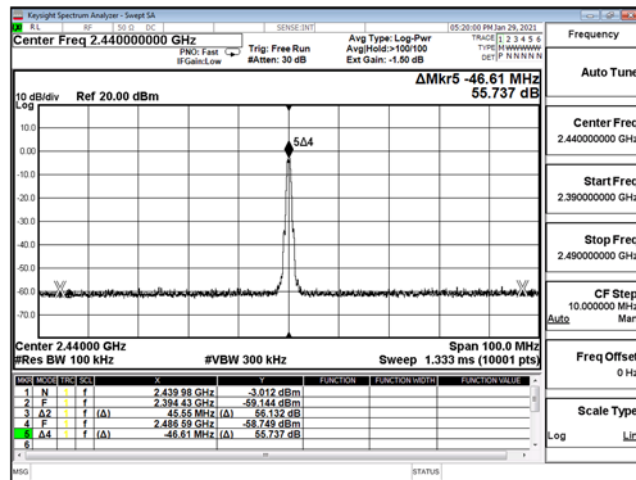
5.5 Test Result of Antenna Port Conducted Emission

Modulation	Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
GFSK (1Mbps)	00	2402	47.570	≥ 20	Pass
	19	2440	55.730	≥ 20	Pass
	39	2480	47.820	≥ 20	Pass

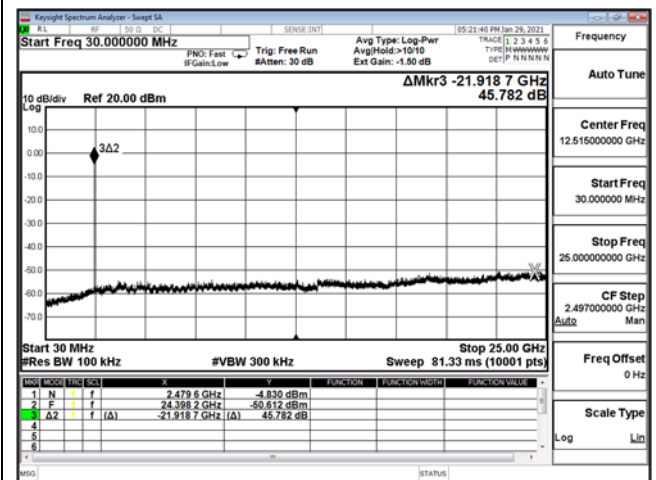
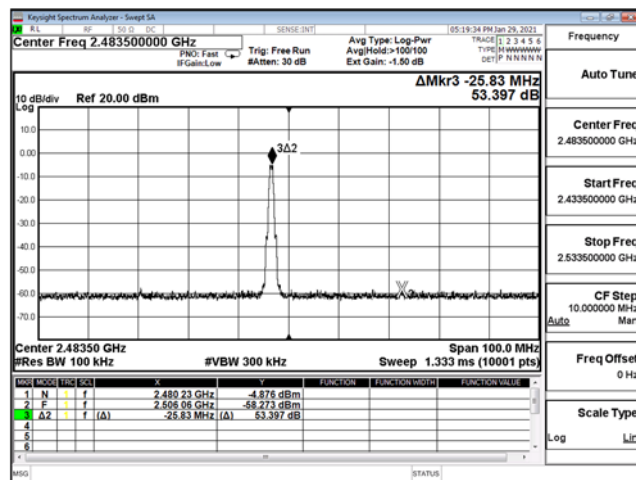
GFSK (1Mbps) / 2402 MHz



GFSK (1Mbps) / 2440 MHz

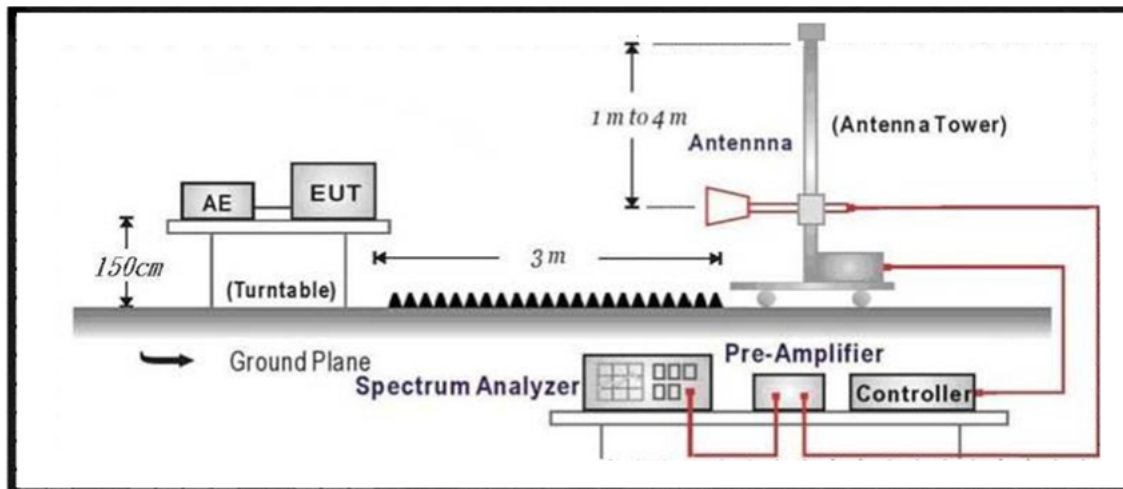


GFSK (1Mbps) / 2480 MHz



6. Radiated Emission Band Edge

6.1 Test Setup



6.2 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.

6.3 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.

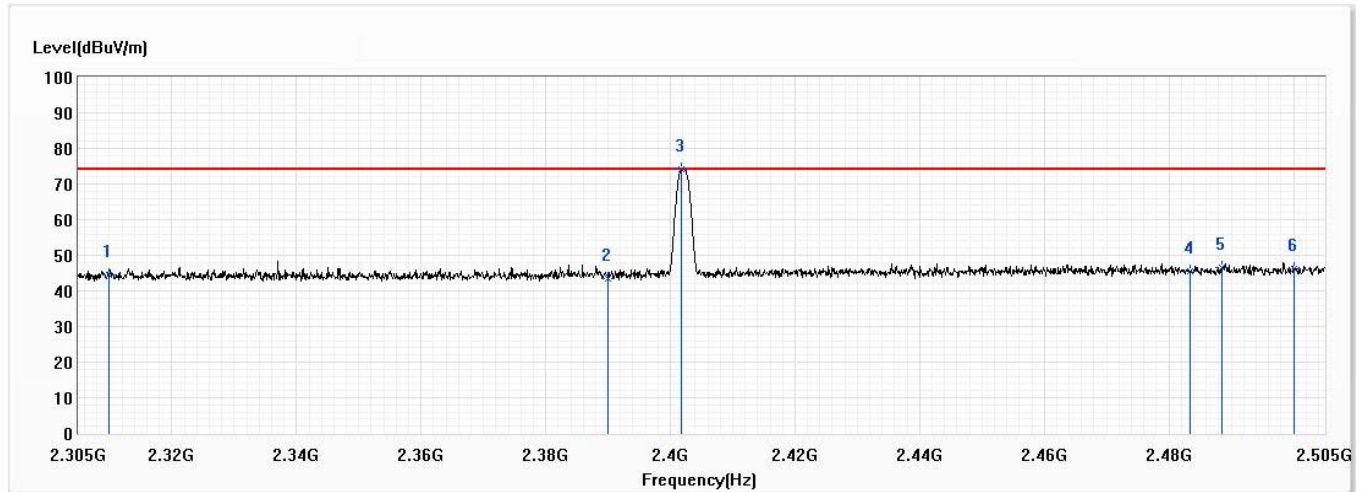
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.10: 2013 on radiated measurement.

6.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

6.5 Test Result of Radiated Emission Band Edge

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 0, 2.402G, BW1M, X axis		

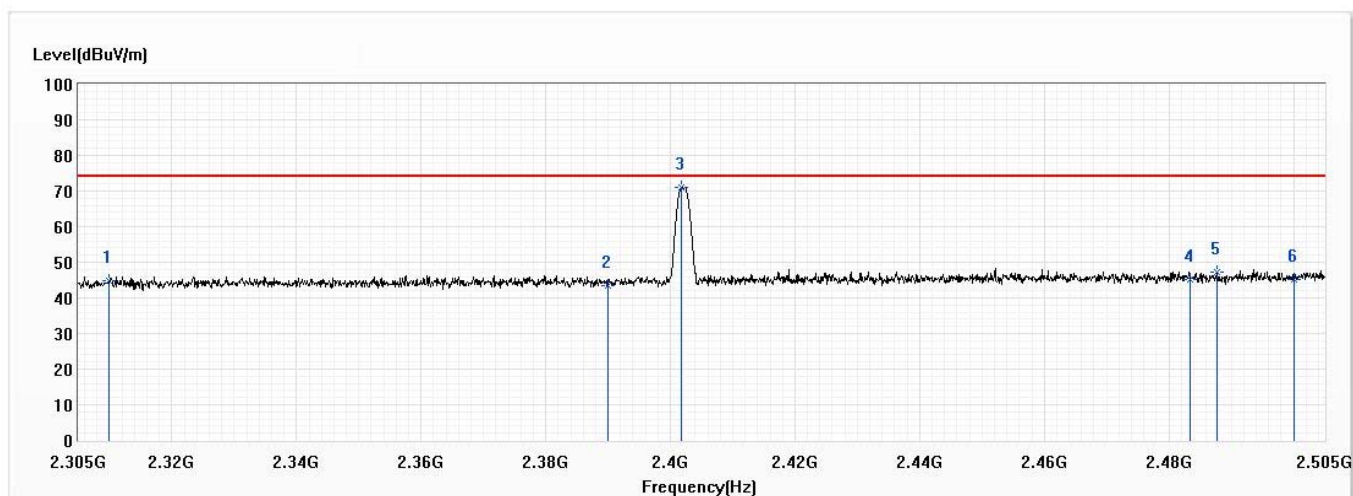


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.38	74.00	-29.62	31.23	13.15	PK
2	2390.000	43.62	74.00	-30.38	29.92	13.70	PK
! 3	2401.800	74.04	74.00	0.04	60.25	13.79	PK
4	2483.500	45.56	74.00	-28.44	31.20	14.36	PK
5	2488.600	46.68	74.00	-27.32	32.28	14.40	PK
6	2500.000	46.15	74.00	-27.85	31.67	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 0, 2.402G, BW1M, X axis		

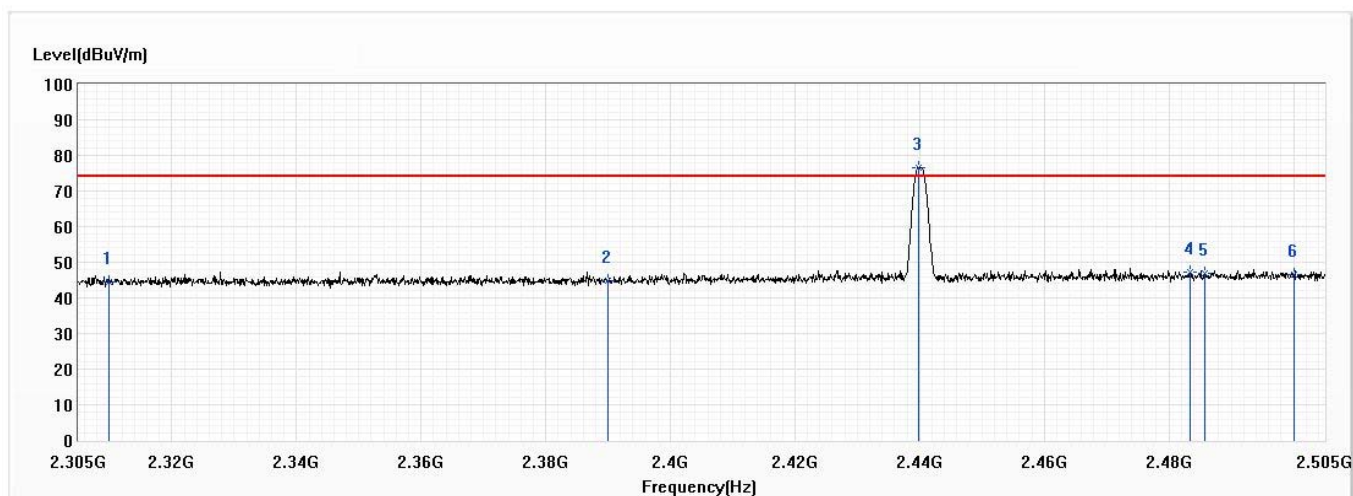


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.72	74.00	-29.28	31.57	13.15	PK
2	2390.000	43.49	74.00	-30.51	29.79	13.70	PK
* 3	2401.800	71.03	74.00	-2.97	57.24	13.79	PK
4	2483.500	45.33	74.00	-28.67	30.97	14.36	PK
5	2487.700	47.22	74.00	-26.78	32.82	14.40	PK
6	2500.000	45.27	74.00	-28.73	30.79	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 19, 2.44G, BW1M_X axis		

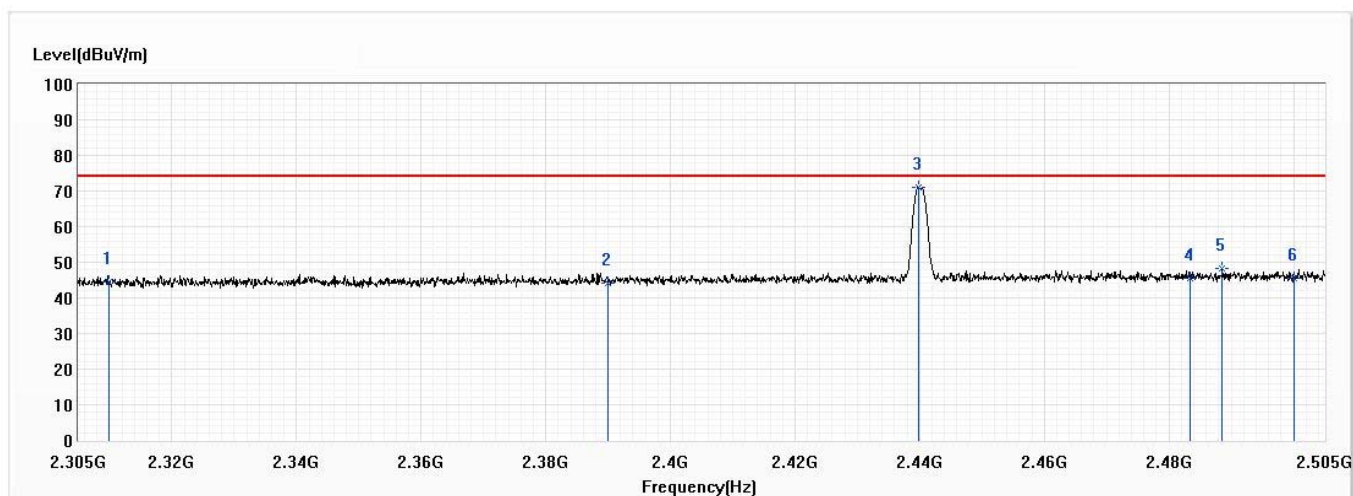


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.43	74.00	-29.57	31.28	13.15	PK
2	2390.000	44.90	74.00	-29.10	31.20	13.70	PK
! 3	2439.900	76.56	74.00	2.56	62.51	14.05	PK
4	2483.500	47.10	74.00	-26.90	32.74	14.36	PK
5	2485.700	47.01	74.00	-26.99	32.63	14.38	PK
6	2500.000	46.54	74.00	-27.46	32.06	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 19, 2.44G, BW1M, X axis		

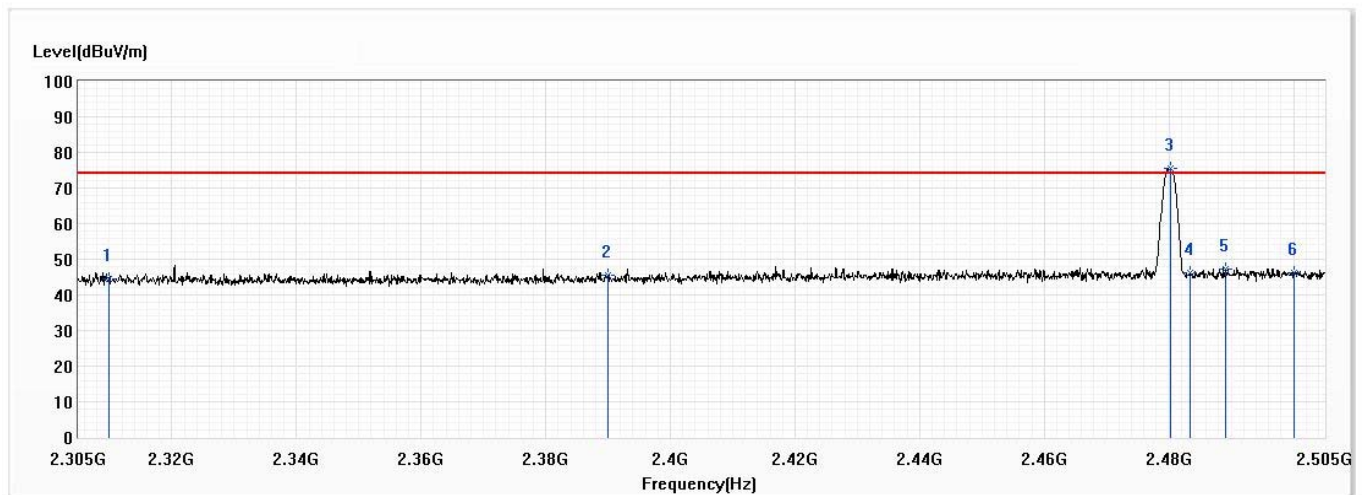


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.32	74.00	-29.68	31.17	13.15	PK
2	2390.000	44.29	74.00	-29.71	30.59	13.70	PK
* 3	2439.900	71.01	74.00	-2.99	56.96	14.05	PK
4	2483.500	45.50	74.00	-28.50	31.14	14.36	PK
5	2488.600	48.40	74.00	-25.60	34.00	14.40	PK
6	2500.000	45.62	74.00	-28.38	31.14	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

Test Mode	Mode 1: Transmit	Polarity	Horizontal
Test Condition	BT 4.0, Ch 39, 2.48G, BW1M, X axis		

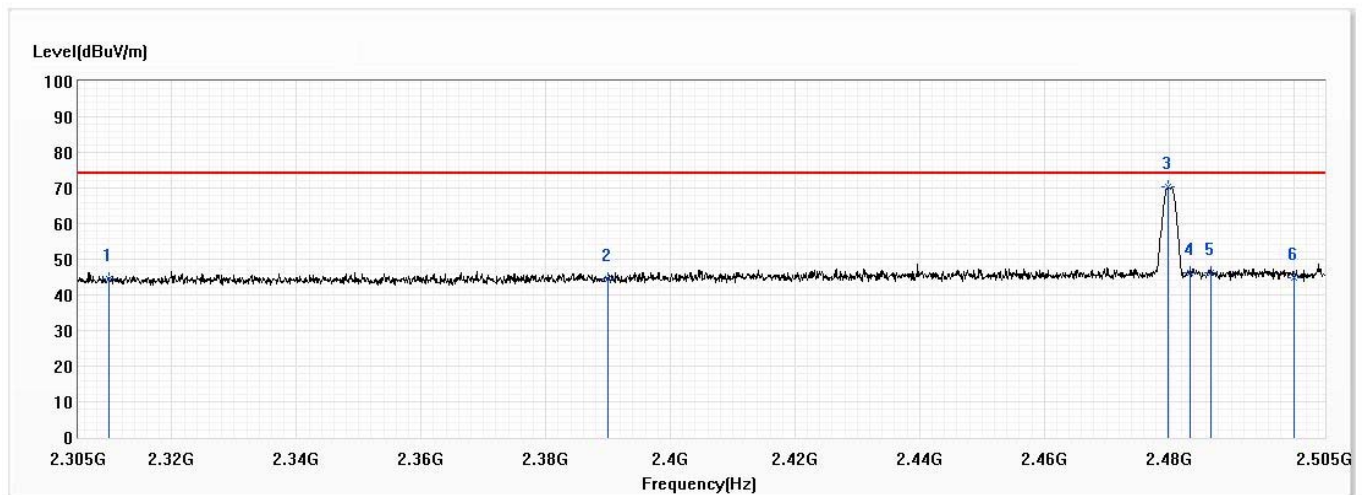


No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.64	74.00	-29.36	31.49	13.15	PK
2	2390.000	45.65	74.00	-28.35	31.95	13.70	PK
! 3	2480.300	75.37	74.00	1.37	61.03	14.34	PK
4	2483.500	46.21	74.00	-27.79	31.85	14.36	PK
5	2489.200	47.34	74.00	-26.66	32.94	14.40	PK
6	2500.000	46.23	74.00	-27.77	31.75	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

Test Mode	Mode 1: Transmit	Polarity	Vertical
Test Condition	BT 4.0, Ch 39, 2.48G, BW1M, X axis		



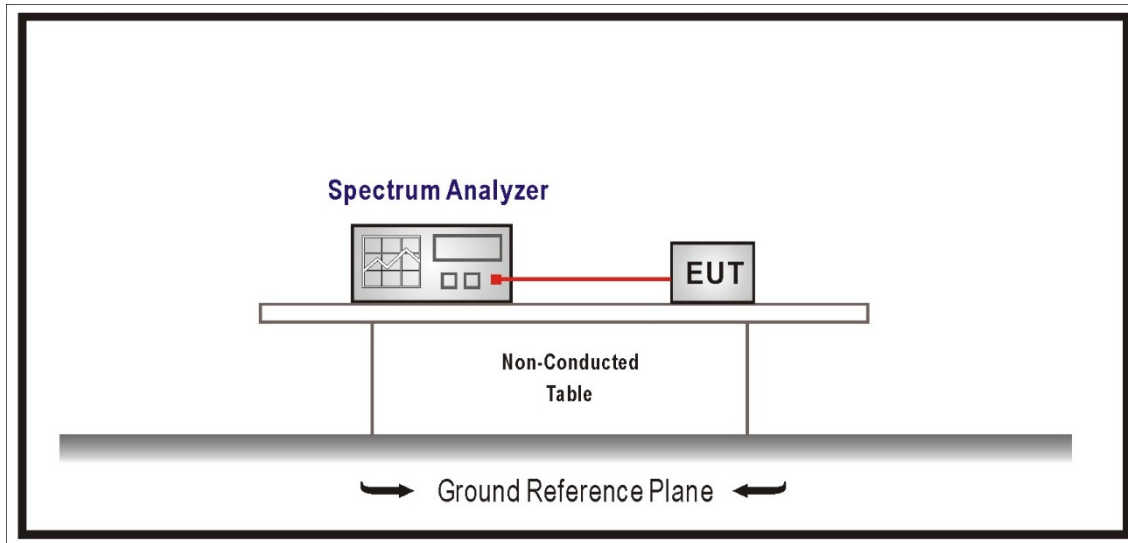
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	2310.000	44.57	74.00	-29.43	31.42	13.15	PK
2	2390.000	44.44	74.00	-29.56	30.74	13.70	PK
* 3	2479.900	70.19	74.00	-3.81	55.85	14.34	PK
4	2483.500	46.17	74.00	-27.83	31.81	14.36	PK
5	2486.800	46.22	74.00	-27.78	31.83	14.39	PK
6	2500.000	44.92	74.00	-29.08	30.44	14.48	PK

Note:

1. Emission Level = Reading Level + Correct Factor.
2. The fundamental for reference only, it's not restricted by unwanted emission limit.

7. Occupied Bandwidth & DTS Bandwidth

7.1 Test Setup



7.2 Limits

The 6 dB bandwidth: ≥ 500 kHz.

Occupied Bandwidth: NA

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.

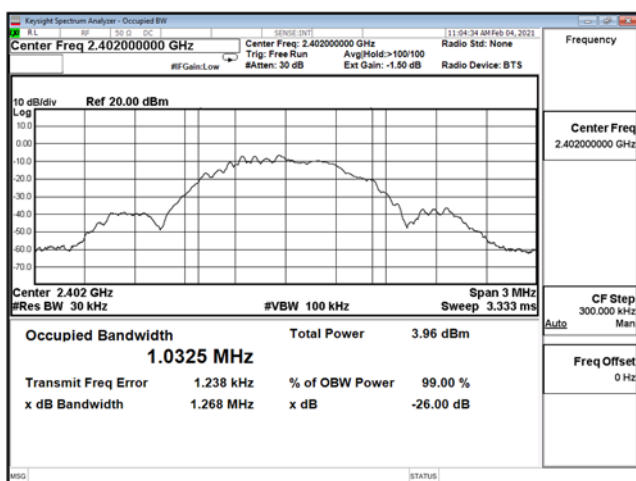
7.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

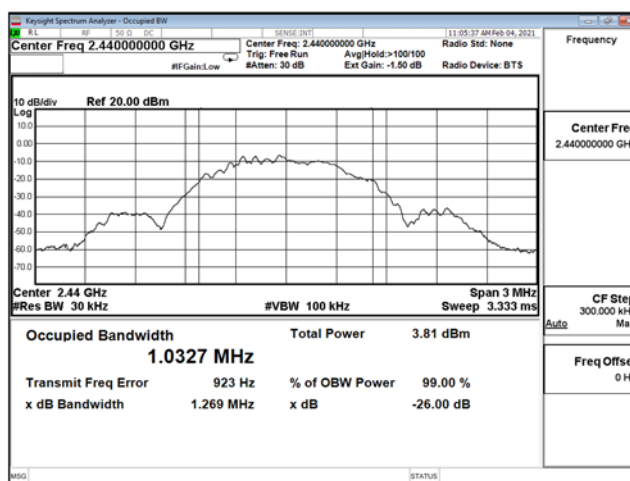
7.5 Test Result of Occupied Bandwidth

Modulation	Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
GFSK (1Mbps)	00	2402	1.032	-	Pass
	19	2440	1.032	-	Pass
	39	2480	1.032	-	Pass

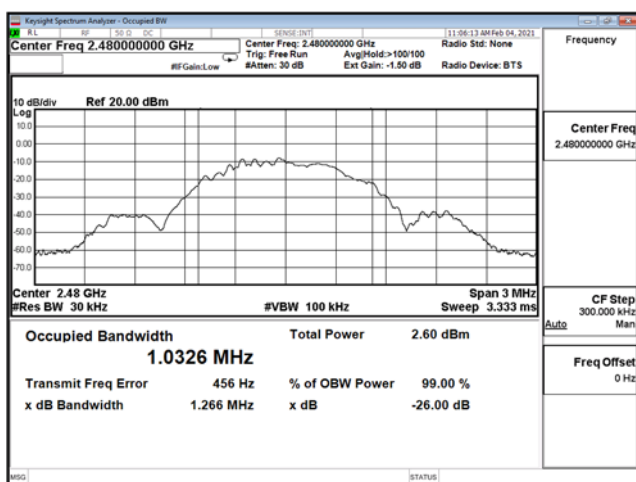
GFSK (1Mbps) / 2402 MHz



GFSK (1Mbps) / 2440 MHz



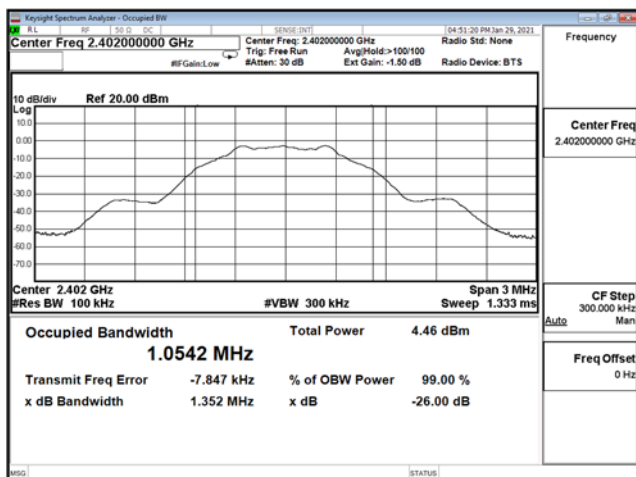
GFSK (1Mbps) / 2480 MHz



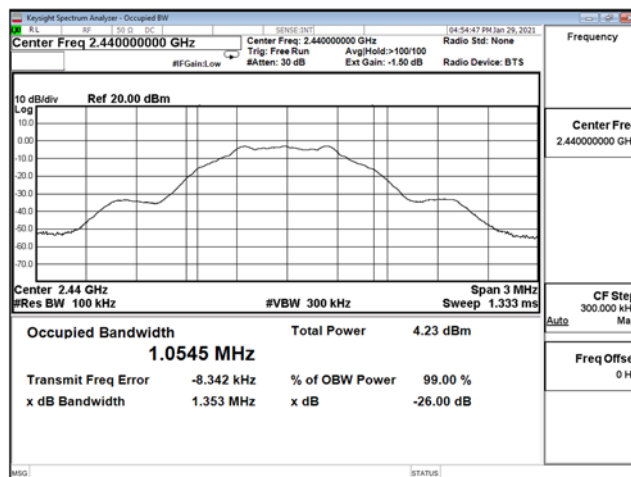
7.6 Test Result of DTS Bandwidth

Modulation	Channel	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
GFSK (1Mbps)	00	2402	1.352	≥ 0.500	Pass
	19	2440	1.353	≥ 0.500	Pass
	39	2480	1.350	≥ 0.500	Pass

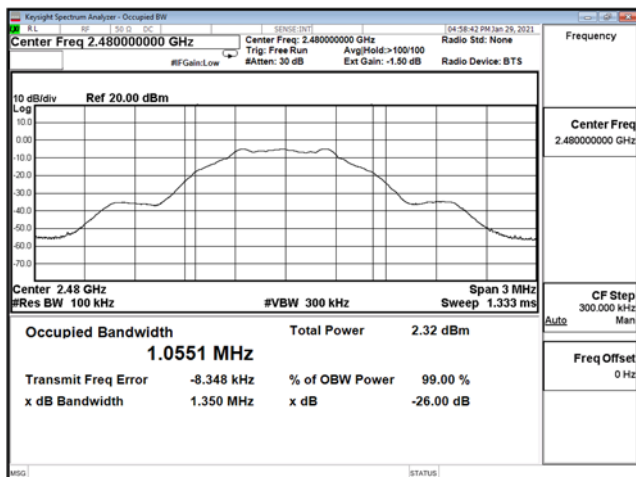
GFSK (1Mbps) / 2402 MHz



GFSK (1Mbps) / 2440 MHz

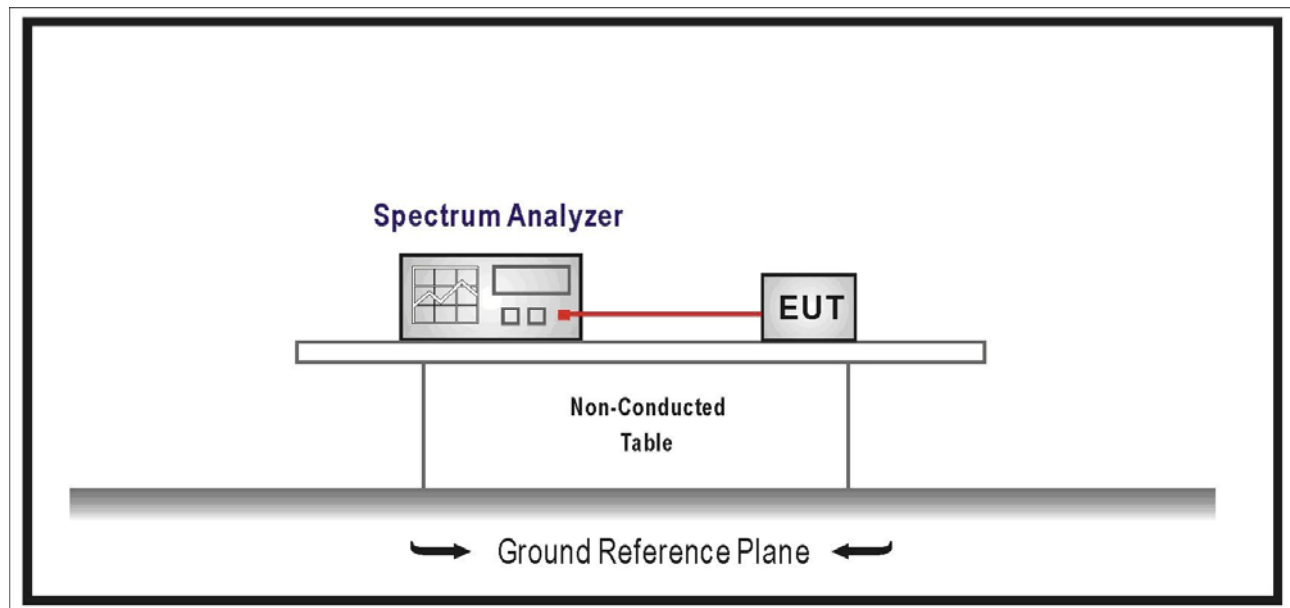


GFSK (1Mbps) / 2480 MHz



8. Maximum Power Spectral Density

8.1 Test Setup



8.2 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.

8.3 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.

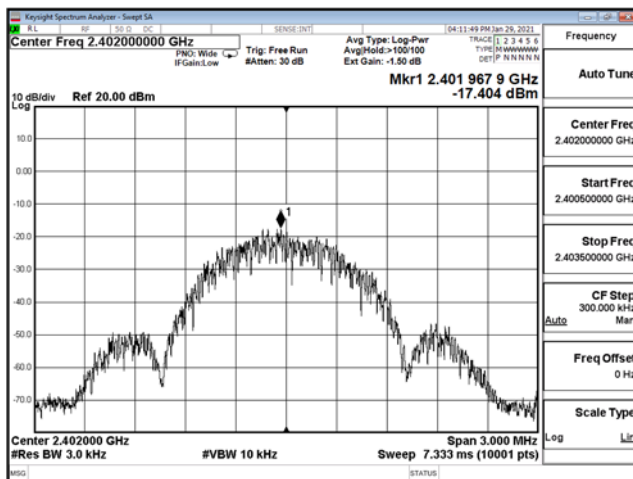
8.4 Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247.

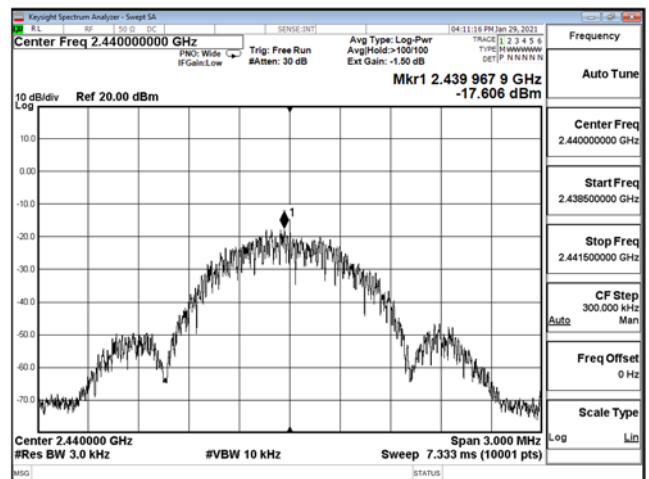
8.5 Test Result of Maximum Power Spectral Density

Modulation	Channel	Frequency (MHz)	Measure Value (dBm/3kHz)	Limit (dBm/3kHz)	Result
GFSK (1Mbps)	00	2402	-17.404	≤ 8.000	Pass
	19	2440	-17.606	≤ 8.000	Pass
	39	2480	-19.463	≤ 8.000	Pass

GFSK (1Mbps) / 2402 MHz



GFSK (1Mbps) / 2440 MHz



GFSK (1Mbps) / 2480 MHz

