TEST REPORT

Applicant	:	Ryvfit inc.
Address	:	251 Little Falls Drive, Wilmington, New Castle Country, Delaware, America
Manufacturer	:	Billionsports Technology Zhongshan Co.,Ltd
Address	:	8-3, Fuze Road, Sanjiao Town, Zhongshan City, Guangdong Province, China
Product Name	:	Smart Helmet
Model Number	:	RYV-1
Trademark	:	RYVFit
FCC ID	:	2BV8K-RYV-1
Test Date	:	May 07, 2026 - May 20, 2026
Date of Report	:	May 20, 2026
Test Result	:	This device described above has been tested by BKC, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report.

Test Procedure Used:

Standards	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10:2020+Cor1:2023

Prepared by(Test Engineer):
Sten Huang

Sten Huang

Approved(Manager):
Casey Wang

Casey Wang

Approved(Manager):
Jerry Liao

Jerry Liao

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Revision History of This Test Report		
Report Number	Description	Issued Date
BKC26052317EE-1	Initial Issue	2026-05-20

1. General Information

1.1.Description of Device (EUT)

EUT Name	:	Smart Helmet
Model No.	:	RYV-1
Model Difference	:	N/A
Power supply	:	Input: DC 5V From Adapter DC 3.8V From Battery
Operation frequency	:	2402-2480MHz
Max. RF output power:	:	-6.58dBm
Modulation	:	GFSK
Antenna Type	:	PCB Antenna, Maximum Gain is 2.34dBi
Intend use environment	:	Residential, commercial and light industrial environment

1.2.Channel List

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

1.3.Summary of test result

RF PART		
Test Items	**Test Requirement**	**Result**
Antenna requirement	FCC part 15.203/15.247 (c)	PASS
AC Power Line Conducted Emission	FCC part 15.207	PASS
Conducted Peak Output Power	FCC part 15.247 (b)(3)	PASS
Channel Bandwidth& 99% OCB	FCC part 15.247 (a)(2)	PASS
Power Spectral Density	FCC part 15.247 (e)	PASS
Band Edge	FCC part 15.247(d)	PASS
Spurious Emission	FCC part 15.205/15.209	PASS
Remark: N/A is an abbreviation for Not Applicable. Measurement Uncertainty is not taken into account for conformity statement		

1.4.Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Hardware Version	Software Version
Computer	HP	14s	/	/
Serial port	DOREWIN	CH 340		

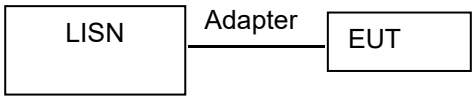
1.5.Test mode

The special RF test software was used to control EUT work in Continuous BLE TX mode, and select test channel, wireless mode.

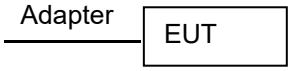
Test mode	Low channel	Middle channel	High channel
GFSK	2402MHz	2440MHz	2480MHz
Note：Only the worst Data Record in the report			

1.6.Block Diagram

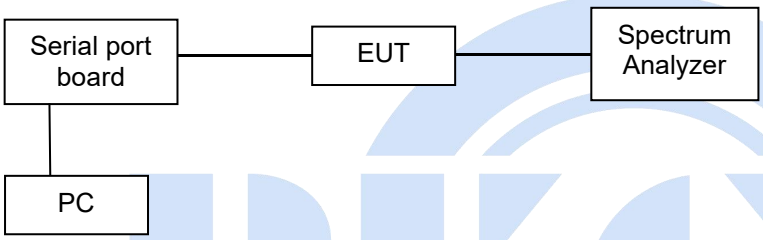
AC Power Line Conducted Emission



Radiated Emission



RF Conducted Test



1.7.Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35℃	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	DC 3.8V	N/A
Note: N/A is an abbreviation for Not Applicable.		

1.8.Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for radio frequency	±7×10-8	
Conducted Emissions (150kHz~30MHz)	±2.54dB	
Radiated Emission(9KHz~30MHz)	±1.6 dB	
Radiated Emission(30MHz~1GHz)	Vertical:±4.14dB Horizontal:±4.25dB	
Radiated Emission(1GHz~6GHz)	±3.9dB	
Radiated Emission(6GHz~18GHz)	±4.3dB	
Radiated Emission(18GHz~40GHz)	±3.38dB	
Uncertainty for conducted RF Power	±0.20dB	
Conducted spurious emissions	±0.24dB	

Uncertainty for temperature	0.6℃	
Uncertainty for humidity	1%	
Bandwidth	± 1.5 x 10-6	
Time	±2%	
Duty Cycle	±2%	
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%		

1.9.Test Facility

Site Description		
Name of Firm	:	Shenzhen BKC Testing Co., Ltd.
Site Location	:	Room 103, 1/F, Huaya Building, Huaya Industrial Park, Longhua Community, Longhua District, Shenzhen, Guangdong, China.
ISED CAB identifier	:	CN0188
ISED Company Number	:	34333
FCC Designation Number	:	CN1416
FCC Test Firm Registration Number	:	701543

1.10.Test Equipment

Conducted Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	102762	Mar. 10. 2026	Mar. 09. 2027
2	EMI Test Receiver	R&S	ESCI	101424	Mar. 10. 2026	Mar. 09. 2027
3	Rf cables	HTEC	HCE 2M-CE	N/A	Mar. 10. 2026	Mar. 09. 2027
4	Coupling/ Decoupling Network	Diamond	CX210	N/A	Mar. 10. 2026	Mar. 09. 2027
5	CE Testing software	EZ	EZ-EMC	N/A	N/A	N/A

Radiated Test Site(Below 1G and Above 1G)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Antenna	Schwarzbeck	VULB 9168	01321	Mar. 20. 2025	Mar. 19. 2028
2	EMI Test Receiver	R&S	ESRP	101478	Mar. 10. 2026	Mar. 09. 2027
3	Preamplifier	HP	8447D	2727A05345	Mar. 10. 2026	Mar. 09. 2027
4	Double Ridged Broadband	SCHWARZBECK	BBHA 9120D	02621	Mar. 10. 2025	Mar. 19. 2028
5	Preamplifier	Schwarzbeck	BBV 9718D	00041	Mar. 10. 2026	Mar. 09. 2027
6	Rf cables	HUBER+SUHNER	8M-RE	N/A	Mar. 10. 2026	Mar. 09. 2027
7	Rf cables	HUBER+SUHNER	1.5M-RE	N/A	Mar. 10. 2026	Mar. 09. 2027
8	Rf cables	HUBER+SUHNER	1.5M-AP-RE	N/A	Mar. 10. 2026	Mar. 09. 2027
9	Loop antenna	TESEQ	HLA6121	58357	Mar. 16. 2026	Mar. 15. 2027
10	Spectrum analyzer	R&S	FSP40	200061	Mar. 09. 2026	Mar. 10. 2027
11	Double Ridged Broadband Horn Antenna	COM-POWER	AH-1840	10100009	Mar. 10. 2026	Mar. 09. 2027
12	Spectrum	Agilent	N9020A	MY50510311	Mar. 10. 2026	Mar. 09. 2027
13	RE Testing software	EZ	EZ-EMC	N/A	N/A	N/A

RF Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum	Agilent	N9020A	MY50510311	Mar. 10. 2026	Mar. 09. 2027
2	Vector source	Agilent	N5182A	MY47420223	Mar. 10. 2026	Mar. 09. 2027
3	All instrument	Rohde & Schwarz	CMW 500	101131	Mar. 10. 2026	Mar. 09. 2027
4	RF Automatic Test System	TST	TSTRF562	MW200411BK-34	Mar. 09. 2026	Mar. 10. 2027
5	Spectrum analyzer	R&S	FSP40	200061	Mar. 09. 2026	Mar. 10. 2027

Test software

Software name	RF Testing software
Software version	2.0.0.0

Software name	RE Testing software
Software version	EMEC-03A2 RE+
Software name	CE Testing software
Software version	EMEC-3A1+

Software Configuration Version

Software name	FCC_1022
Software version	V1022

Power setting

Channel	Power Level
Lowest	Default
Middle	Default
Highest	Default

2. Conducted emission at the mains terminals test

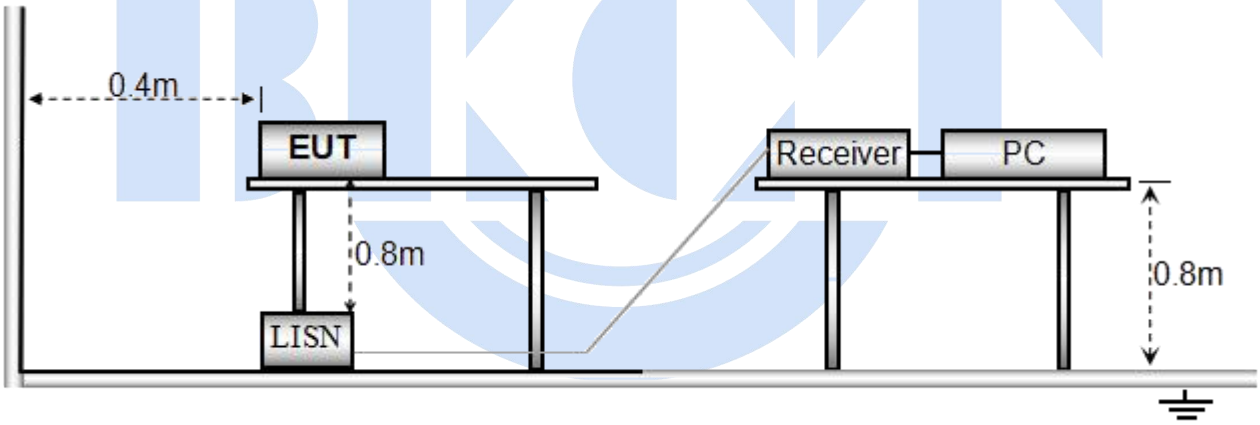
2.1.Limit

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2020+Cor1:2023
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz			Limits dB(μV)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66 ~ 56*	56 ~ 46*
0.50	~	5.00	56	46
5.00	~	30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

2.2.Test Setup

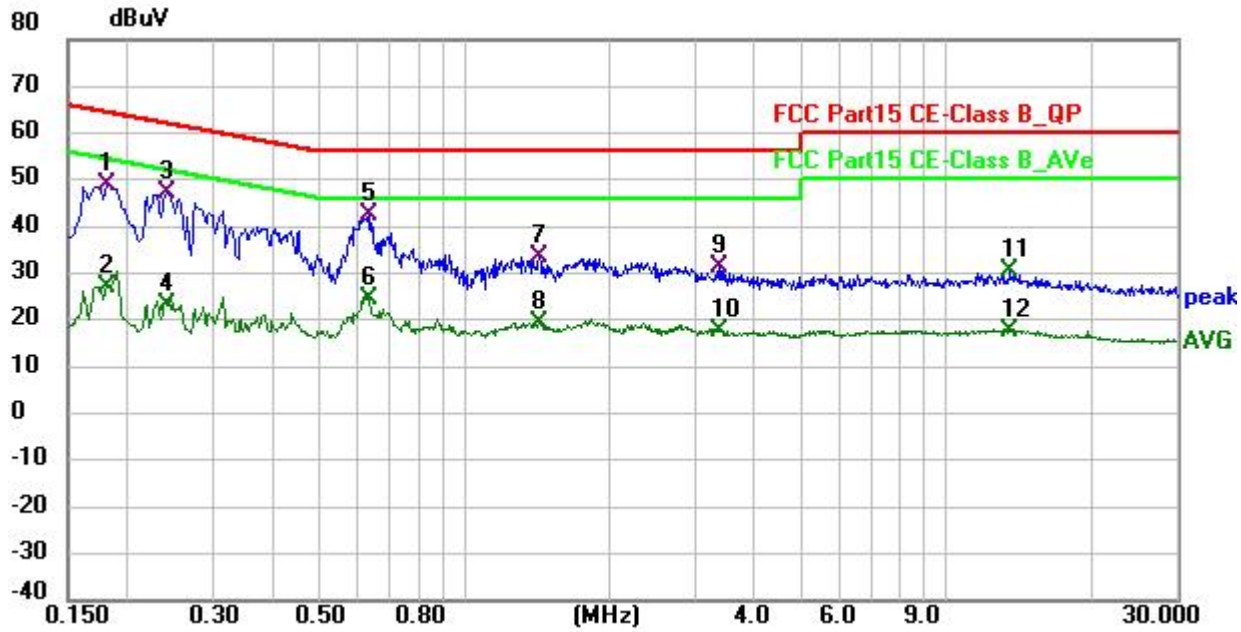


2.3.Test Procedure

1. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
3. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
4. LISN at least 80 cm from nearest part of EUT chassis.
5.For the actual test configuration, please refer to the related Item – EUT Test Photos.

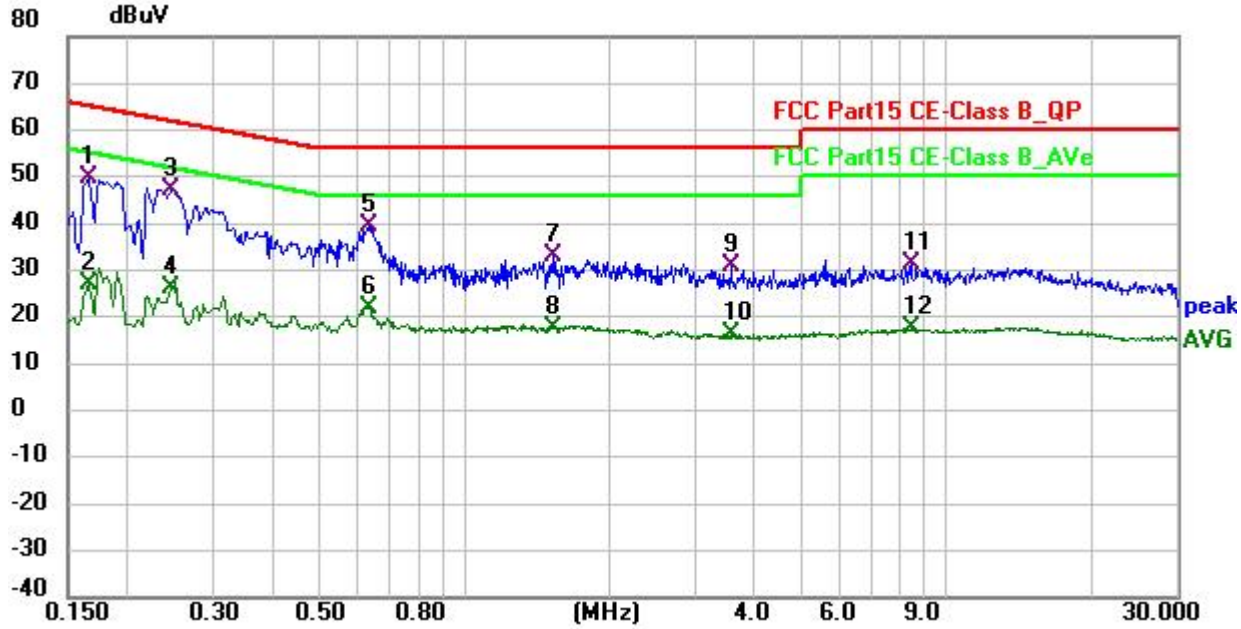
2.4.Test Result

Conducted Emission Test Data			
Temperature:	25.3℃	Relative Humidity:	55%
Pressure:	1008hPa	Phase :	L
Test Voltage :	DC 5V	Test Mode	Charging+GFSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1819	29.05	19.72	48.77	64.40	-15.63	QP
2	0.1819	7.23	19.72	26.95	54.40	-27.45	AVG
3	0.2420	27.40	19.68	47.08	62.03	-14.95	QP
4	0.2420	3.64	19.68	23.32	52.03	-28.71	AVG
5 *	0.6300	22.49	19.81	42.30	56.00	-13.70	QP
6	0.6300	4.81	19.81	24.62	46.00	-21.38	AVG
7	1.4260	13.78	19.67	33.45	56.00	-22.55	QP
8	1.4260	-0.33	19.67	19.34	46.00	-26.66	AVG
9	3.3780	11.67	19.75	31.42	56.00	-24.58	QP
10	3.3780	-2.14	19.75	17.61	46.00	-28.39	AVG
11	13.5860	10.63	19.77	30.40	50.00	-19.60	AVG
12	13.5860	-2.28	19.77	17.49	50.00	-32.51	AVG

Conducted Emission Test Data			
Temperature:	25.3℃	Relative Humidity:	55%
Pressure:	1008hPa	Phase :	N
Test Voltage :	DC 5V	Test Mode	Charging+GFSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	30.17	19.74	49.91	65.16	-15.25	QP
2	0.1660	7.35	19.74	27.09	55.16	-28.07	AVG
3 *	0.2460	27.50	19.70	47.20	61.89	-14.69	QP
4	0.2460	6.50	19.70	26.20	51.89	-25.69	AVG
5	0.6300	19.66	19.78	39.44	56.00	-16.56	QP
6	0.6300	2.29	19.78	22.07	46.00	-23.93	AVG
7	1.5260	13.27	19.87	33.14	56.00	-22.86	QP
8	1.5260	-2.17	19.87	17.70	46.00	-28.30	AVG
9	3.5740	11.30	19.79	31.09	56.00	-24.91	QP
10	3.5740	-3.58	19.79	16.21	46.00	-29.79	AVG
11	8.4500	11.65	19.83	31.48	60.00	-28.52	QP
12	8.4500	-2.04	19.83	17.79	50.00	-32.21	AVG

Note:1.Level = Reading + factor; Margin = Level - Limit

2.Have pre-scan all test channel, found CH00(GFSK) which it was worst case, so only show the worst case’s data on this report.

3. Radiated Spurious Emissions

3.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247

Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019; ANSI C63.10:2020+Cor1:2023

Test Result: PASS

Measurement Distance: 3m

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

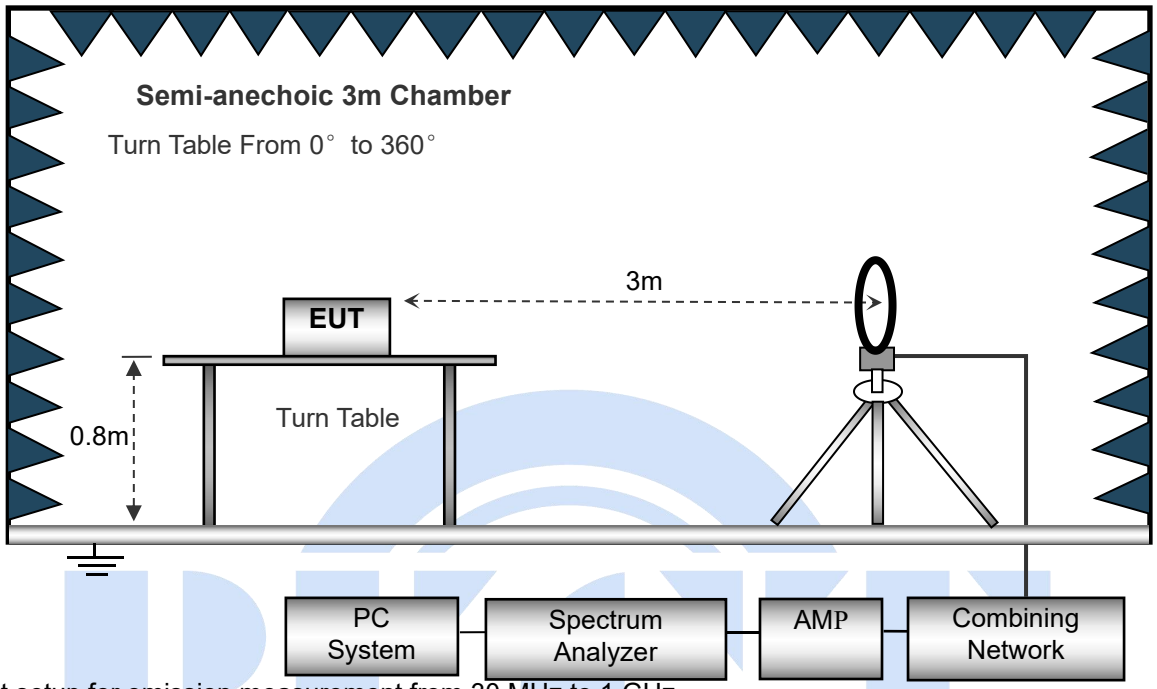
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log(2400/F(kHz)) + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log(24000/F(kHz)) + 40
1.705 ~ 30	30	30	100 * 30	20log(30) + 40
30 ~ 88	100	3	100	20log(100)
88 ~ 216	150	3	150	20log(150)
216 ~ 960	200	3	200	20log(200)
Above 960	500	3	500	20log(500)

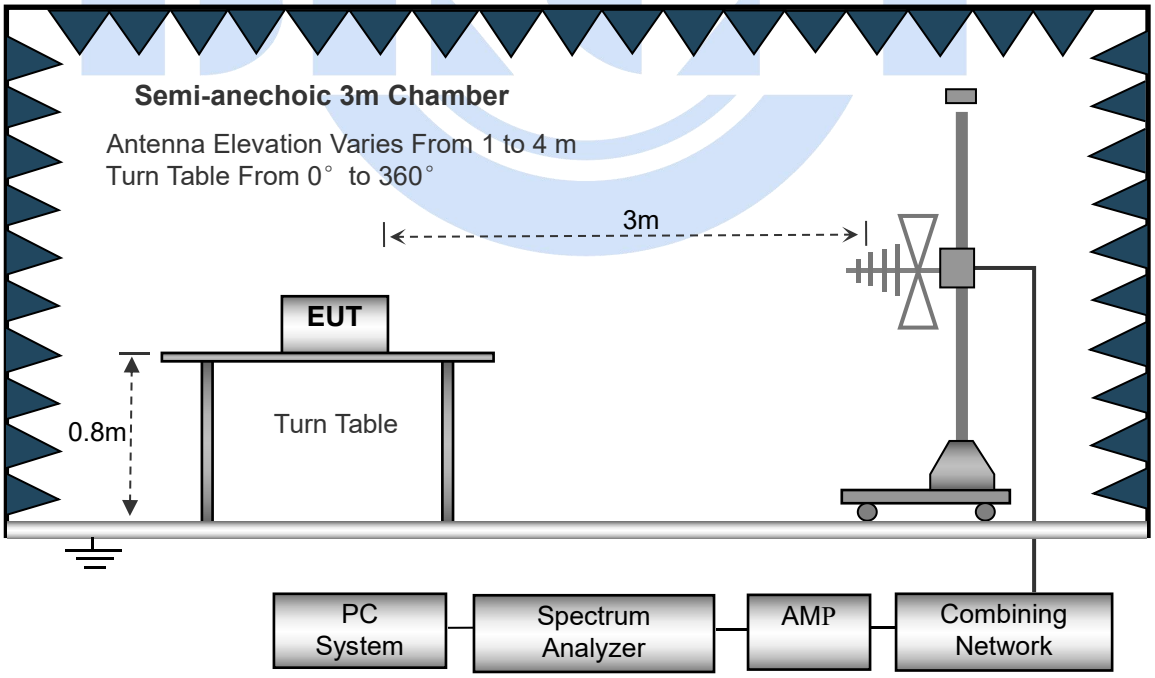
3.2.Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

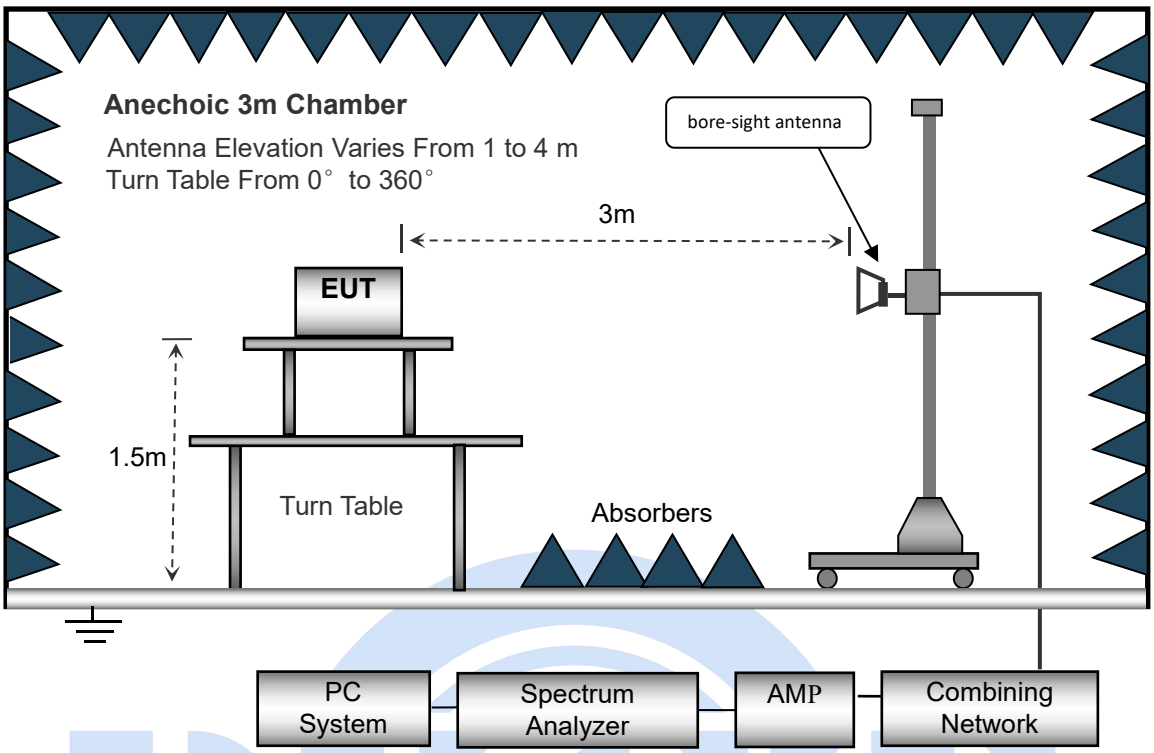
The test setup for emission measurement below 30MHz.

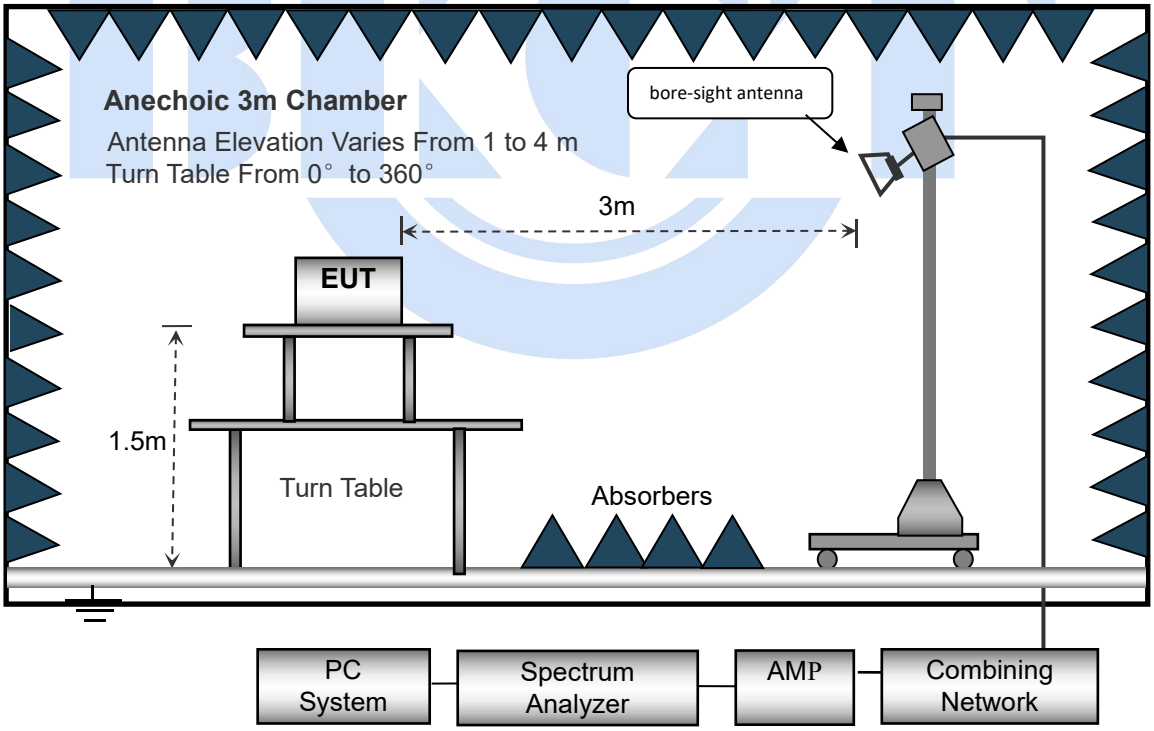


The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.





3.3.Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.

2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.

3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions.

4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.

5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

6. Repeat above procedures until the measurements for all frequencies are complete.

7. The radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.

8. A 2.4GHz high –pass filter is used druing radiated emissions above 1GHz measurement.

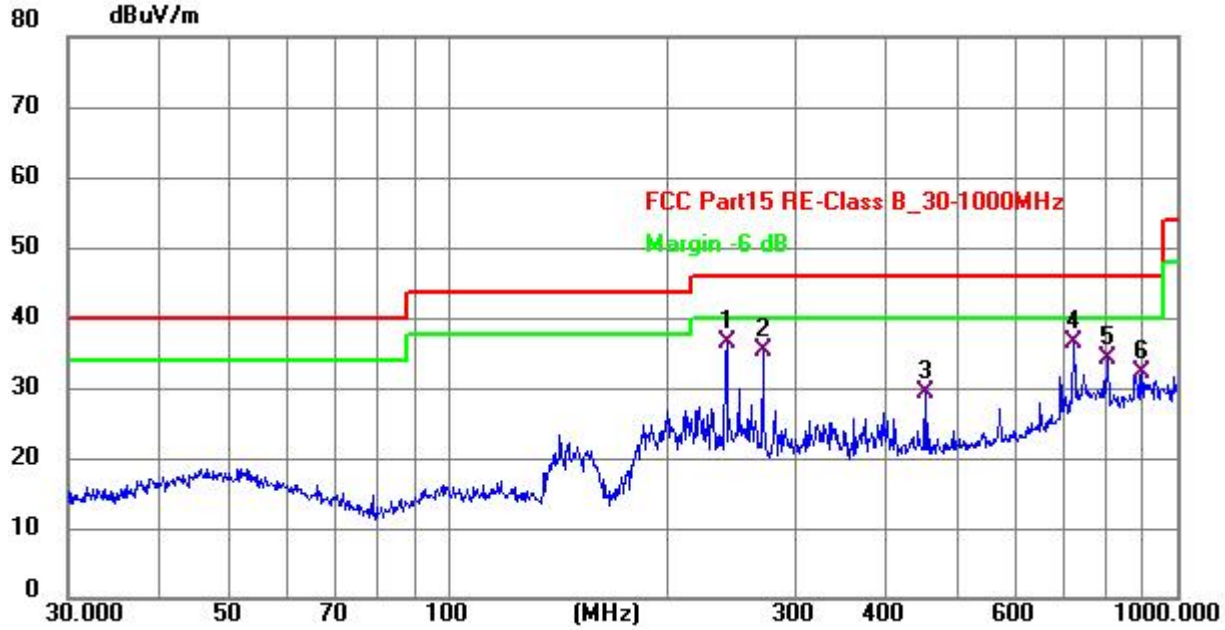
3.4.Test Result

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

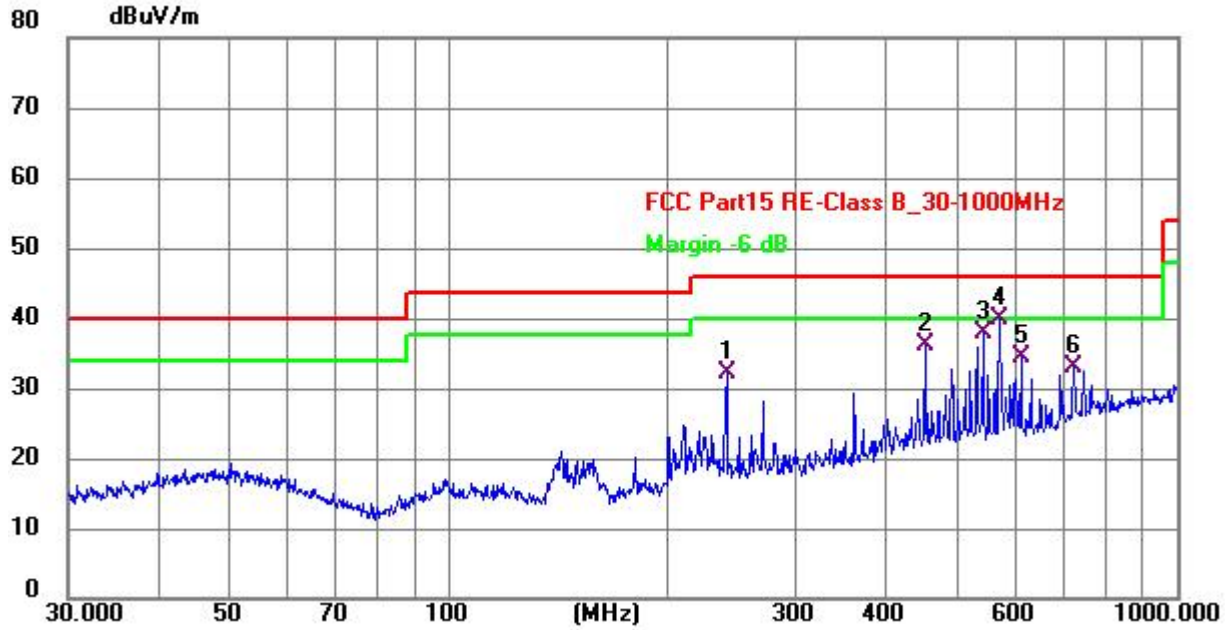
Test Frequency : 30MHz ~ 1GHz

Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	DC 3.8V	Test Mode	Working+GFSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	240.8304	46.98	-10.60	36.38	46.00	-9.62	QP
2	270.3748	45.49	-10.14	35.35	46.00	-10.65	QP
3	451.1350	36.53	-7.35	29.18	46.00	-16.82	QP
4	721.7259	39.94	-3.44	36.50	46.00	-9.50	QP
5	804.6028	35.90	-1.70	34.20	46.00	-11.80	QP
6	896.9965	32.67	-0.50	32.17	46.00	-13.83	QP

Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	DC 3.8V	Test Mode	Working+GFSK



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	240.8304	42.84	-10.60	32.24	46.00	-13.76	QP
2	451.1350	43.50	-7.35	36.15	46.00	-9.85	QP
3	541.3725	44.43	-6.43	38.00	46.00	-8.00	QP
4	572.6144	45.90	-6.00	39.90	46.00	-6.10	QP
5	612.0642	39.16	-4.80	34.36	46.00	-11.64	QP
6	721.7259	36.31	-3.44	32.87	46.00	-13.13	QP

Note:

1.Level = Reading + factor; Margin = Level - Limit

2.Have pre-scan all test channel, found CH00(GFSK) which it was worst case, so only show the worst case’s data on this report.

1GHz~25GHz

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2402MHz									
V	4804.00	65.37	30.55	5.77	24.66	65.25	74.00	-8.75	Pk
V	4804.00	46.32	30.55	5.77	24.66	46.20	54.00	-7.80	AV
V	7206.00	66.26	30.33	6.32	24.55	66.80	74.00	-7.20	Pk
V	7206.00	45.84	30.33	6.32	24.55	46.38	54.00	-7.62	AV
V	9608.00	66.49	30.85	7.45	24.69	67.78	74.00	-6.22	Pk
V	9608.00	46.16	30.85	7.45	24.69	47.45	54.00	-6.55	AV
V	12010.00	65.56	31.02	8.99	25.57	69.10	74.00	-4.90	Pk
V	12010.00	46.62	31.02	8.99	25.57	50.16	54.00	-3.84	AV
H	4804.00	65.83	30.55	5.77	24.66	65.71	74.00	-8.29	Pk
H	4804.00	46.86	30.55	5.77	24.66	46.74	54.00	-7.26	AV
H	7206.00	66.48	30.33	6.32	24.55	67.02	74.00	-6.98	Pk
H	7206.00	46.14	30.33	6.32	24.55	46.68	54.00	-7.32	AV
H	9608.00	66.03	30.85	7.45	24.69	67.32	74.00	-6.68	Pk
H	9608.00	46.06	30.85	7.45	24.69	47.35	54.00	-6.65	AV
H	12010.00	66.30	31.02	8.99	25.57	69.84	74.00	-4.16	Pk
H	12010.00	45.85	31.02	8.99	25.57	49.39	54.00	-4.61	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2440MHz									
V	4880.00	66.00	30.55	5.77	24.66	65.88	74.00	-8.12	Pk
V	4880.00	45.51	30.55	5.77	24.66	45.39	54.00	-8.61	AV
V	7320.00	66.18	30.33	6.32	24.55	66.72	74.00	-7.28	Pk
V	7320.00	46.15	30.33	6.32	24.55	46.69	54.00	-7.31	AV
V	9760.00	65.97	30.85	7.45	24.69	67.26	74.00	-6.74	Pk
V	9760.00	46.37	30.85	7.45	24.69	47.66	54.00	-6.34	AV
V	12200.00	65.88	31.02	8.99	25.57	69.42	74.00	-4.58	Pk
V	12200.00	46.58	31.02	8.99	25.57	50.12	54.00	-3.88	AV
H	4880.00	65.94	30.55	5.77	24.66	65.82	74.00	-8.18	Pk
H	4880.00	45.77	30.55	5.77	24.66	45.65	54.00	-8.35	AV
H	7320.00	66.53	30.33	6.32	24.55	67.07	74.00	-6.93	Pk
H	7320.00	46.29	30.33	6.32	24.55	46.83	54.00	-7.17	AV
H	9760.00	66.47	30.85	7.45	24.69	67.76	74.00	-6.24	Pk
H	9760.00	46.13	30.85	7.45	24.69	47.42	54.00	-6.58	AV
H	12200.00	66.25	31.02	8.99	25.57	69.79	74.00	-4.21	Pk
H	12200.00	46.81	31.02	8.99	25.57	50.35	54.00	-3.65	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:2480MHz									
V	4960.00	65.84	30.55	5.77	24.66	65.72	74.00	-8.28	Pk
V	4960.00	45.85	30.55	5.77	24.66	45.73	54.00	-8.27	AV
V	7440.00	65.94	30.33	6.32	24.55	66.48	74.00	-7.52	Pk
V	7440.00	46.08	30.33	6.32	24.55	46.62	54.00	-7.38	AV
V	9920.00	65.92	30.85	7.45	24.69	67.21	74.00	-6.79	Pk
V	9920.00	46.61	30.85	7.45	24.69	47.90	54.00	-6.10	AV
V	12400.00	66.07	31.02	8.99	25.57	69.61	74.00	-4.39	Pk
V	12400.00	45.65	31.02	8.99	25.57	49.19	54.00	-4.81	AV
H	4960.00	65.95	30.55	5.77	24.66	65.83	74.00	-8.17	Pk
H	4960.00	46.02	30.55	5.77	24.66	45.90	54.00	-8.10	AV
H	7440.00	65.92	30.33	6.32	24.55	66.46	74.00	-7.54	Pk
H	7440.00	46.28	30.33	6.32	24.55	46.82	54.00	-7.18	AV
H	9920.00	65.94	30.85	7.45	24.69	67.23	74.00	-6.77	Pk
H	9920.00	46.01	30.85	7.45	24.69	47.30	54.00	-6.70	AV
H	12400.00	65.93	31.02	8.99	25.57	69.47	74.00	-4.53	Pk
H	12400.00	46.54	31.02	8.99	25.57	50.08	54.00	-3.92	AV

Note: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier;
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.
4.Have pre-scan all test channel, found GFSK-1M which it was worst case, so only show the worst case’s data on this report.

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Detector Type	Result
GFSK	Low Channel: 2402MHz									
	H	2310.00	65.44	30.22	4.85	23.98	64.05	74.00	PK	PASS
	H	2310.00	45.91	30.22	4.85	23.98	44.52	54.00	AV	PASS
	H	2390.00	63.07	30.22	4.85	23.98	61.68	74.00	PK	PASS
	H	2390.00	46.04	30.22	4.85	23.98	44.65	54.00	AV	PASS
	H	2400.00	64.73	30.22	4.85	23.98	63.34	74.00	PK	PASS
	H	2400.00	46.34	30.22	4.85	23.98	44.95	54.00	AV	PASS
	V	2310.00	66.53	30.22	4.85	23.98	65.14	74.00	PK	PASS
	V	2310.00	46.09	30.22	4.85	23.98	44.70	54.00	AV	PASS
	V	2390.00	58.65	30.22	4.85	23.98	57.26	74.00	PK	PASS
	V	2390.00	45.67	30.22	4.85	23.98	44.28	54.00	AV	PASS
	V	2400.00	60.87	30.22	4.85	23.98	59.48	74.00	PK	PASS
	V	2400.00	46.72	30.22	4.85	23.98	45.33	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	63.74	30.22	4.85	23.98	62.35	74.00	PK	PASS
	H	2483.50	46.67	30.22	4.85	23.98	45.28	54.00	AV	PASS
	H	2500.00	64.84	30.22	4.85	23.98	63.45	74.00	PK	PASS
	H	2500.00	45.76	30.22	4.85	23.98	44.37	54.00	AV	PASS
	V	2483.50	65.91	30.22	4.85	23.98	64.52	74.00	PK	PASS
	V	2483.50	46.30	30.22	4.85	23.98	44.91	54.00	AV	PASS
	V	2500.00	58.84	30.22	4.85	23.98	57.45	74.00	PK	PASS
	V	2500.00	46.18	30.22	4.85	23.98	44.79	54.00	AV	PASS

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier; Margin= Emission Level - Limit
2. Have pre-scan all test channel, found GFSK-1M which it was worst case, so only show the worst case’s data on this report.

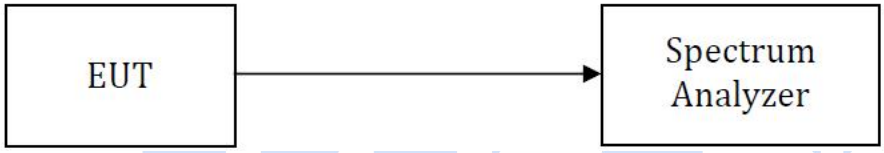
4. Conducted Spurious Emissions

4.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019; ANSI C63.10:2020+Cor1:2023
Test Result: PASS

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 limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

4.2.Test Setup

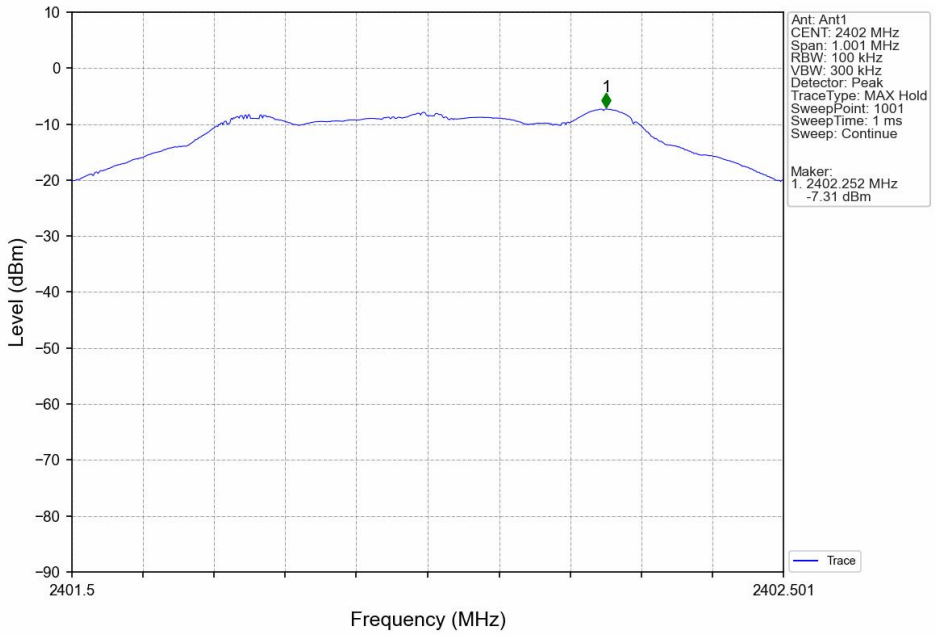


4.3.Test Procedure

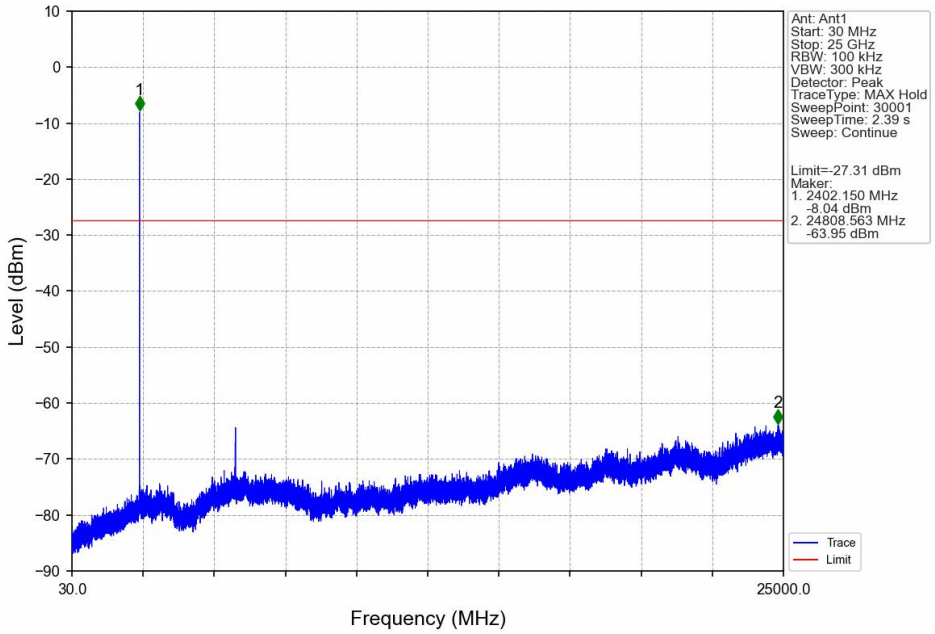
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer:
a) Set instrument center frequency to DTS channel center frequency.
b) Set the span to _ 1.5 times the DTS bandwidth.
c) Set the RBW = 100 kHz.
d) Set the VBW _ [3 × RBW].
e) Detector = peak.
f) Sweep time = auto couple.
g) Trace mode = max hold.
h) Allow trace to fully stabilize.
i) Use the peak marker function to determine the maximum PSD level.
Note that the channel found to contain the maximum PSD level can be used to establish the reference level.

4.4.Test Result

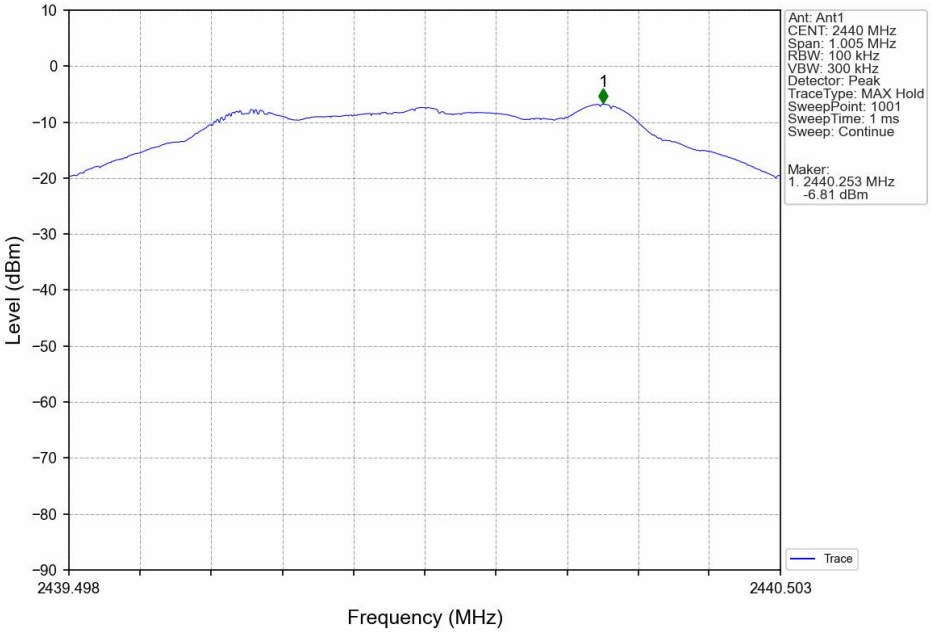
Mode	Frequency (MHz)	Max Value (dBm)	Limit (dBm)	Margin(dBm)	Verdict
BLE 1M	2402	-63.96	-27.31	-36.65	Pass
BLE 1M	2440	-63.61	-26.81	-36.80	Pass
BLE 1M	2480	-63.33	-27.17	-36.16	Pass
BLE 2M	2402	-63.79	-27.85	-35.94	Pass
BLE 2M	2440	-55.06	-27.34	-27.72	Pass
BLE 2M	2480	-64.19	-27.47	-36.72	Pass



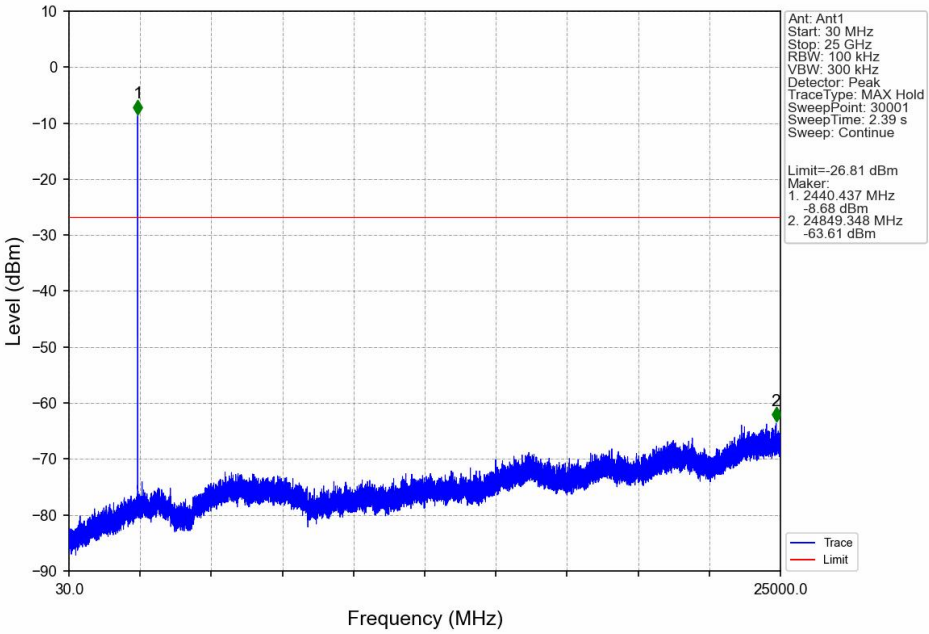
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



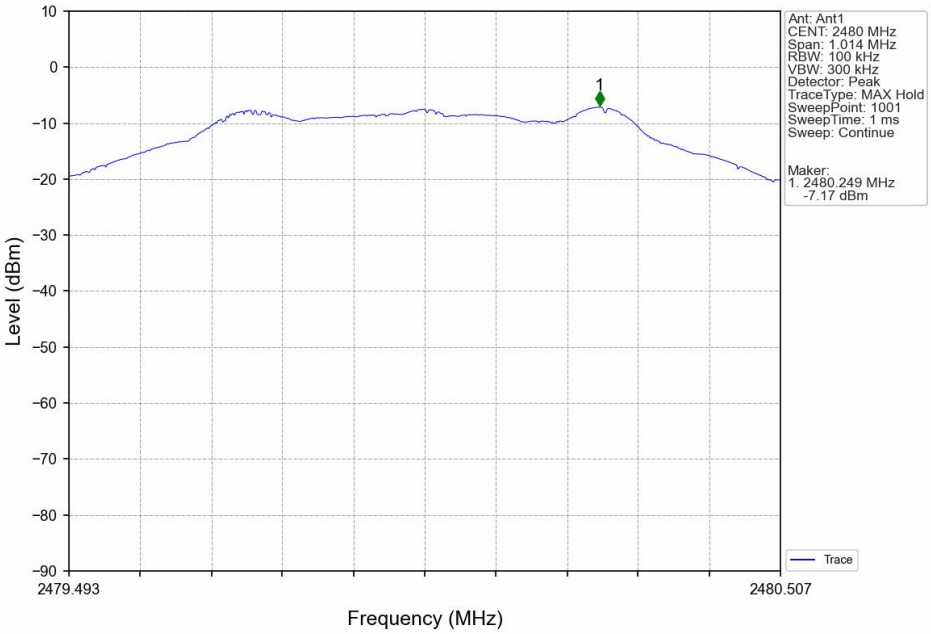
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



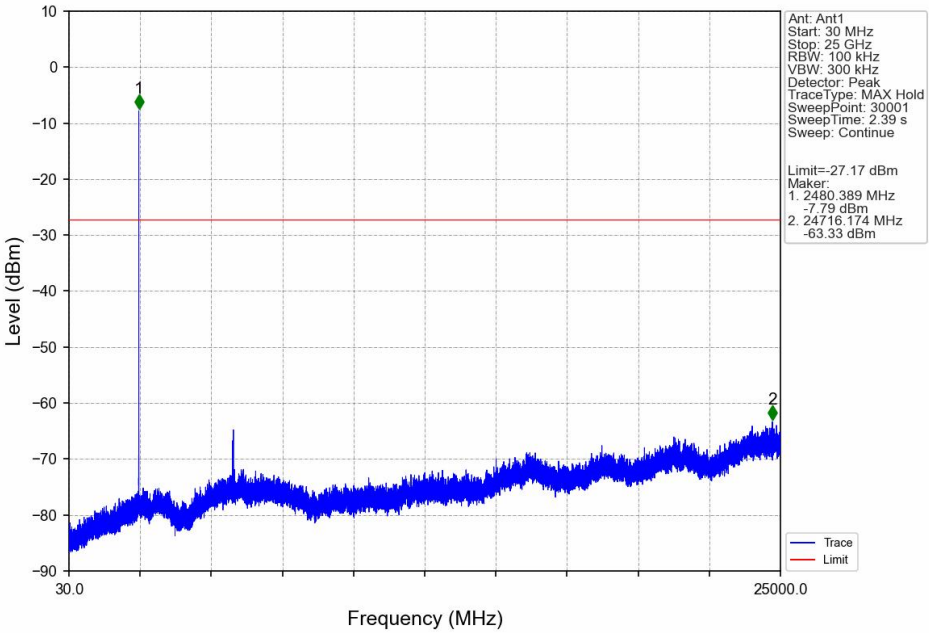
Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 1M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



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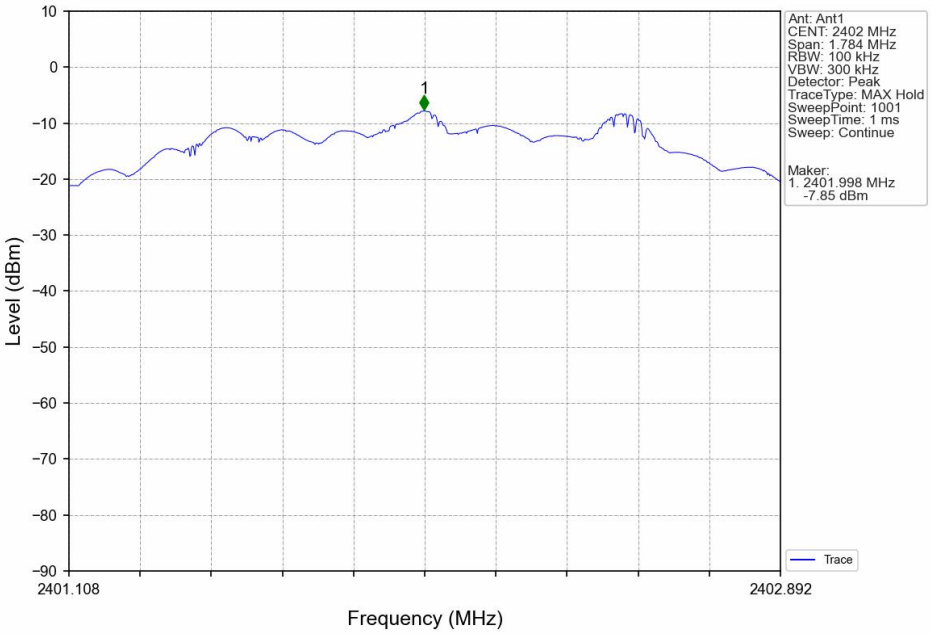
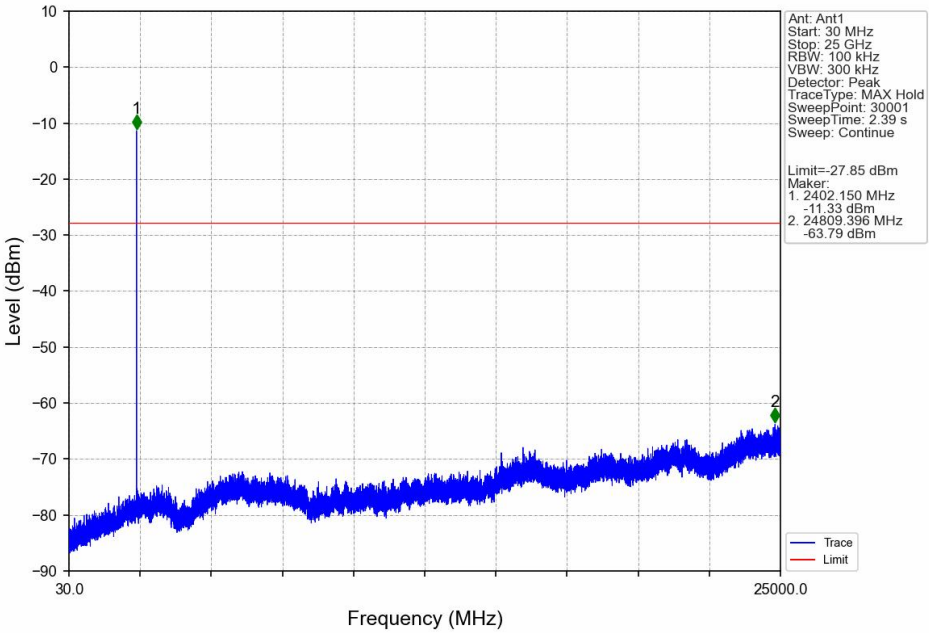
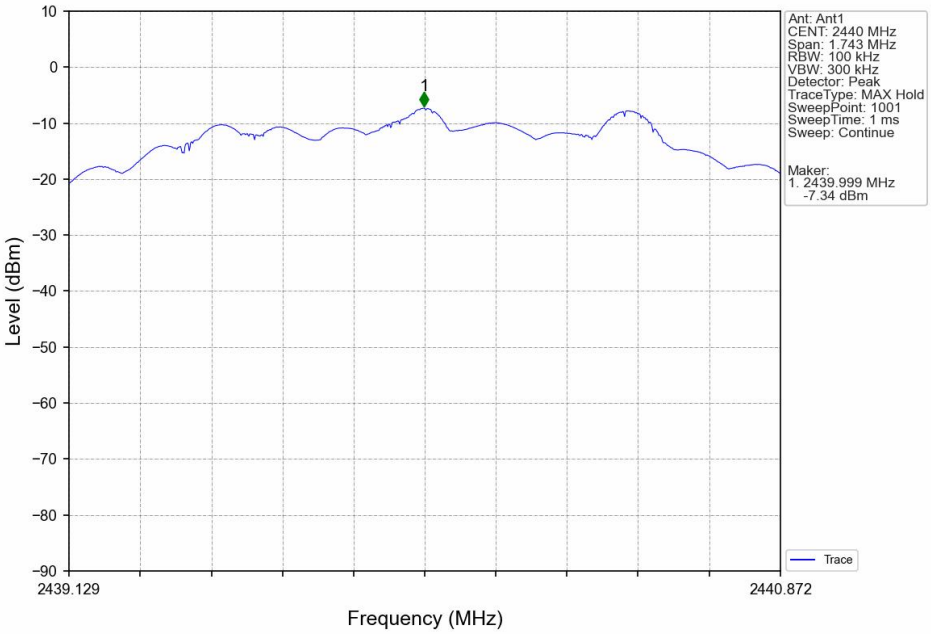


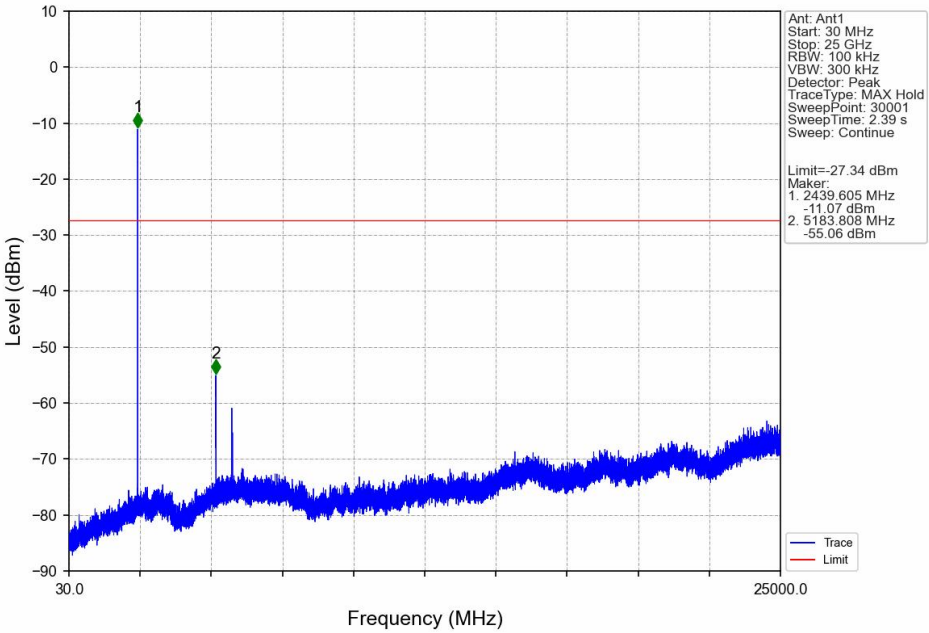
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Ref



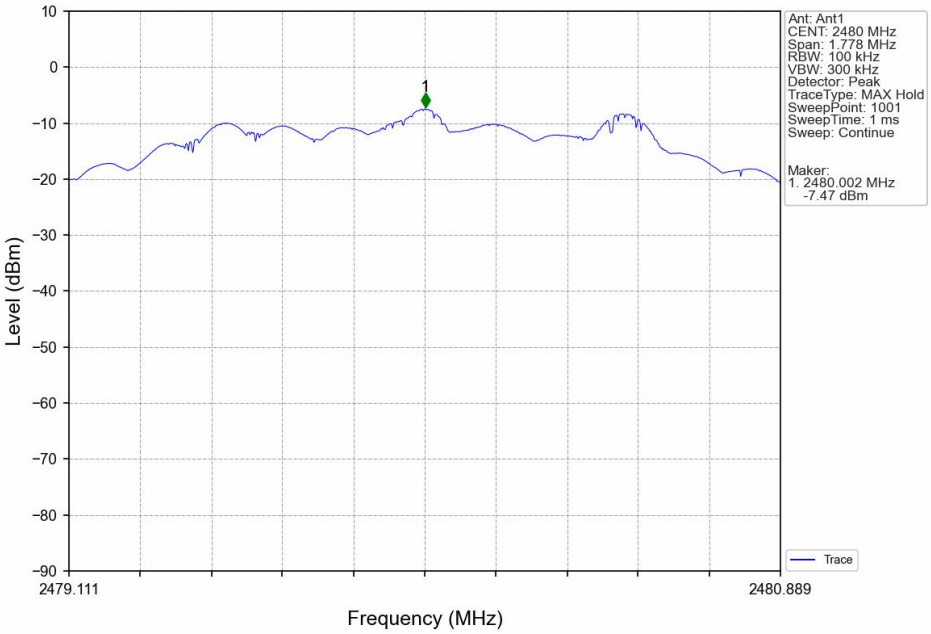
Tx. Spurious NVNT BLE 2M 2402MHz Ant1 Emission



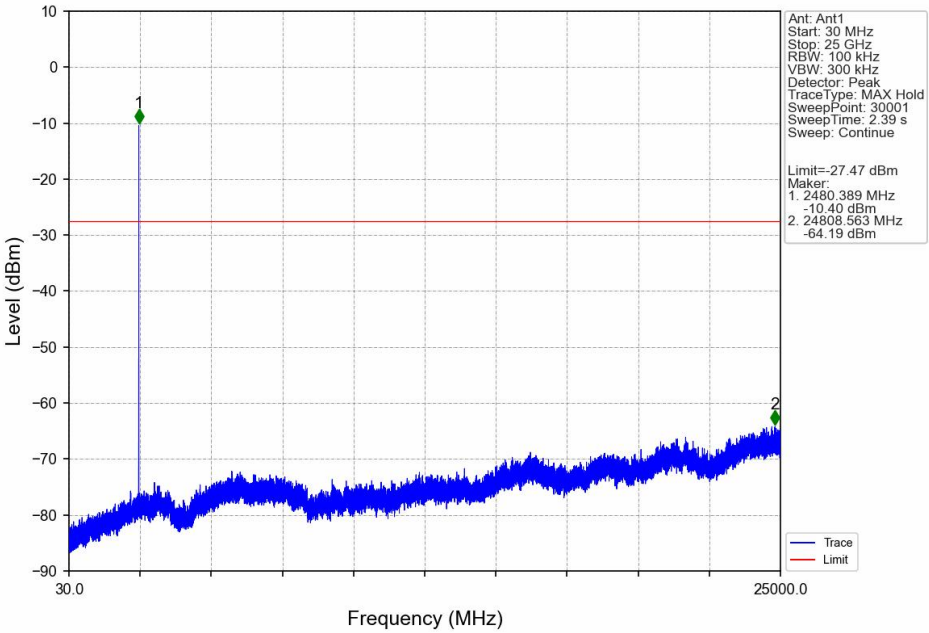
Tx. Spurious NVNT BLE2M 2440MHz Ant1 Ref



Tx. Spurious NVNT BLE 2M 2440MHz Ant1 Emission



Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Ref



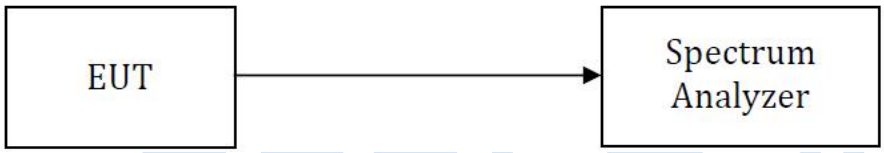
Tx. Spurious NVNT BLE 2M 2480MHz Ant1 Emission

5. Band Edge Measurement

5.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;
ANSI C63.10:2020+Cor1:2023
Test Limit: Regulation 15.247 (d),In any 100 kHz bandwidth outside the frequency band 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, as permitted under paragraph (b)(3) of this section, 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)).
Test Mode: Transmitting

5.2.Test setup

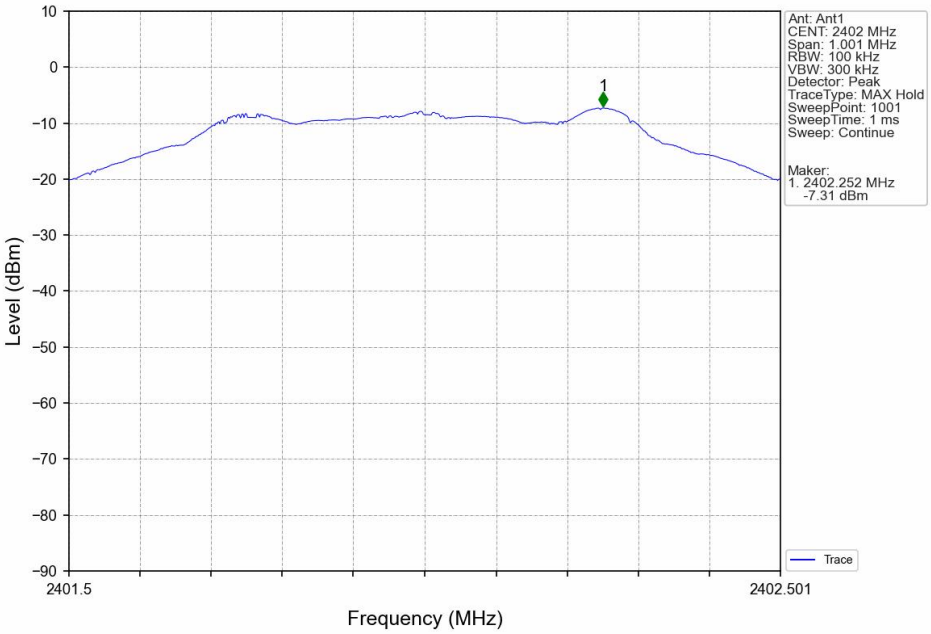


5.3.Test Procedure

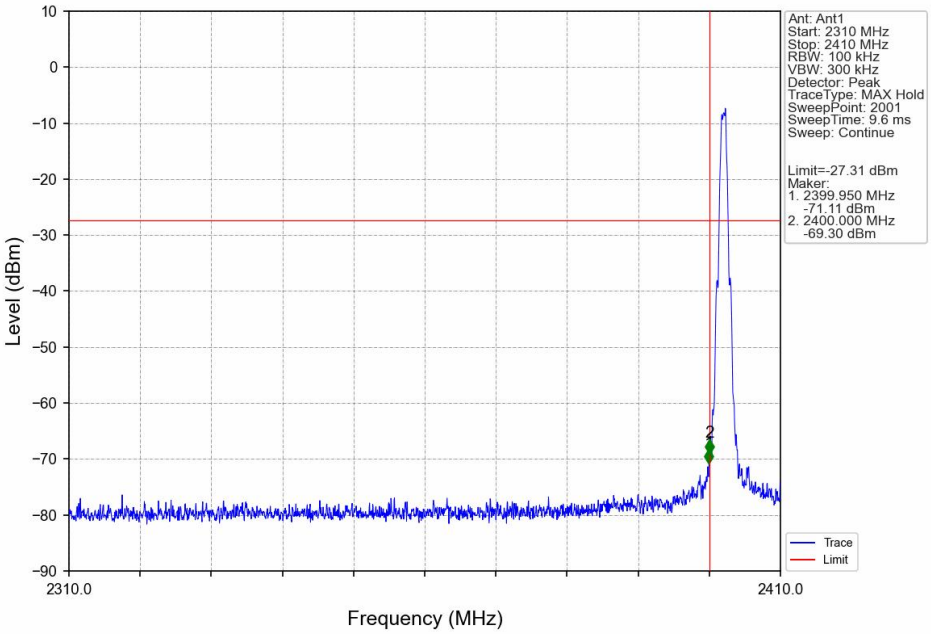
1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

5.4.Test Result

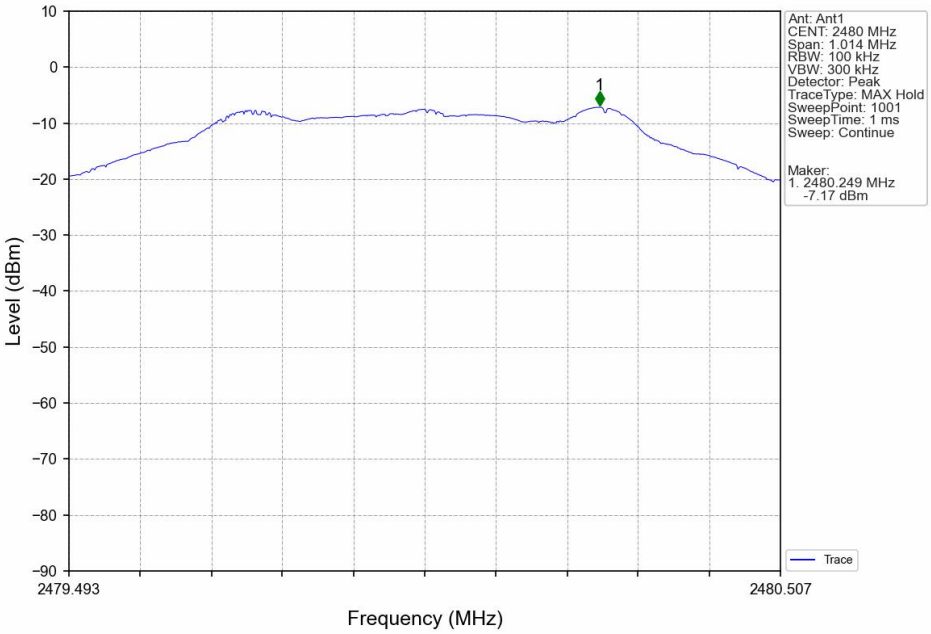
Mode	Frequency (MHz)	Max Value (dBm)	Limit (dBm)	Margin(dBm)	Verdict
BLE 1M	2402	-71.11	-27.31	-43.80	Pass
BLE 1M	2480	-73.12	-27.17	-45.95	Pass
BLE 2M	2402	-41.55	-27.85	-13.70	Pass
BLE 2M	2480	-69.87	-27.47	-42.40	Pass



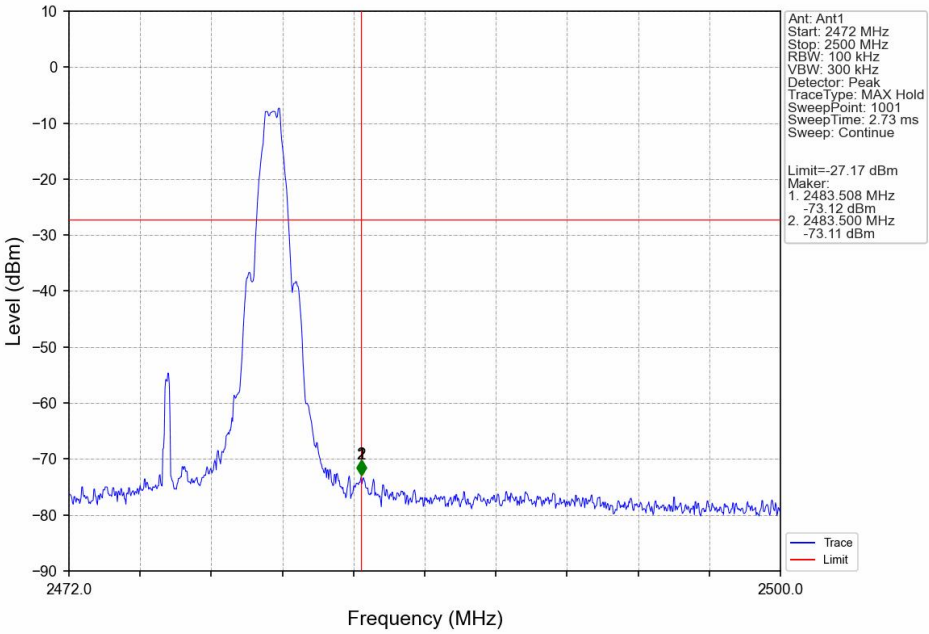
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



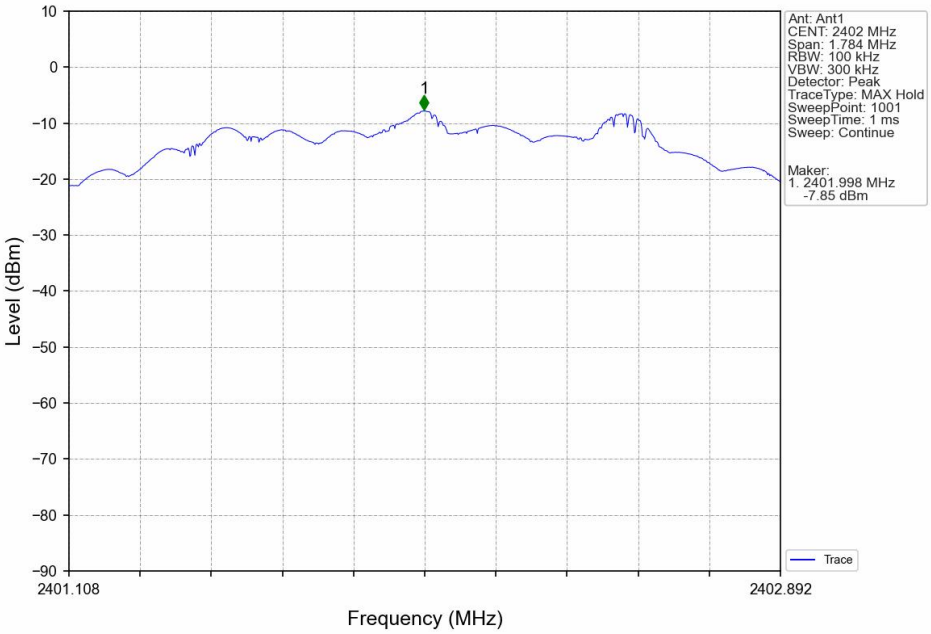
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



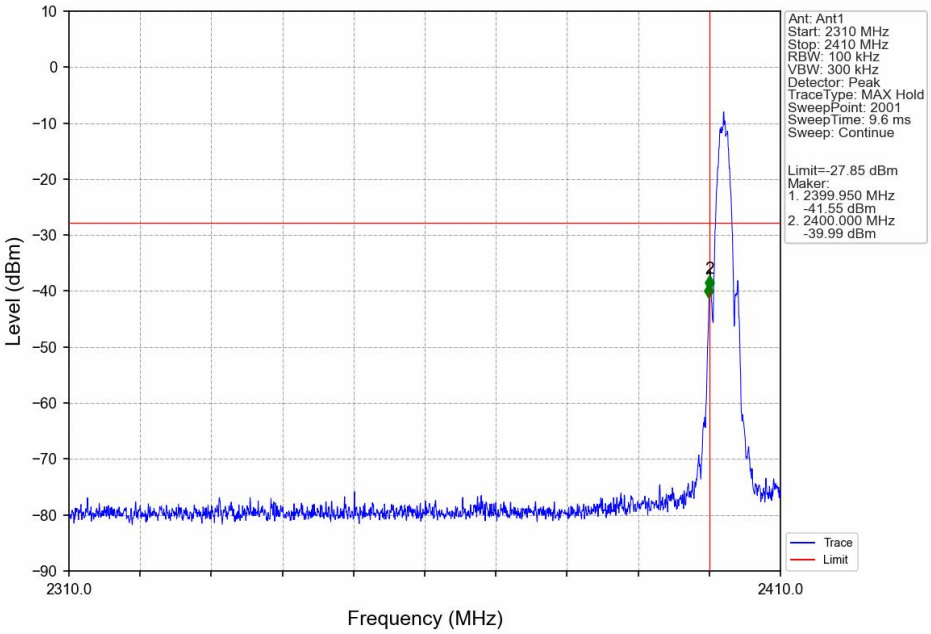
Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



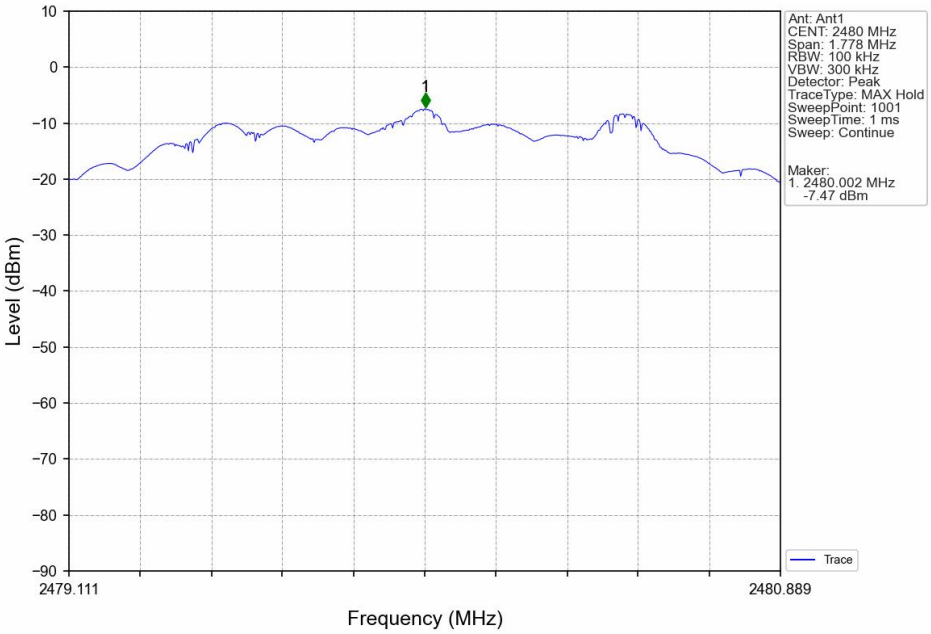
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



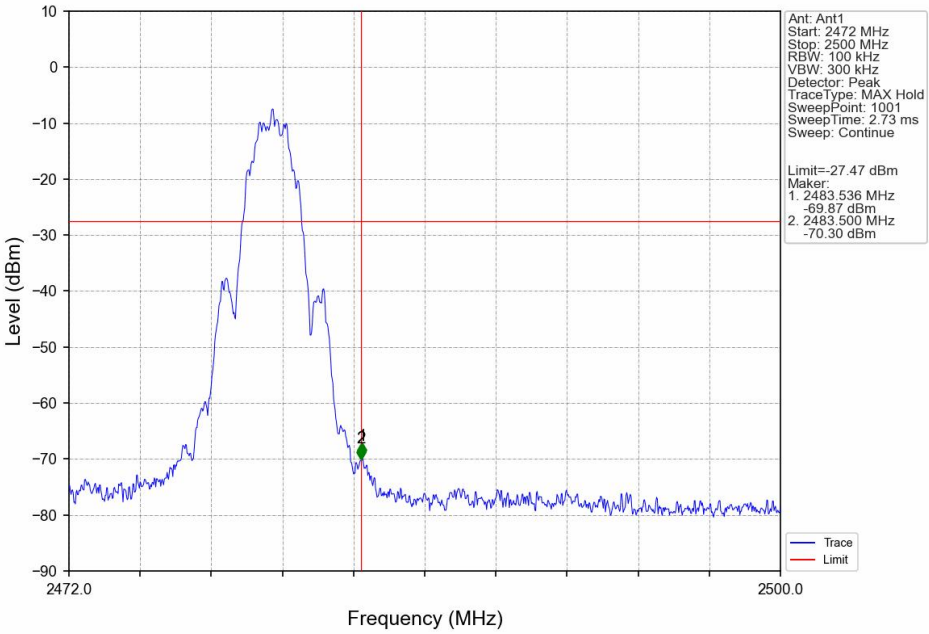
Band Edge NVNT BLE 2M 2402MHz Ant1 Ref



Band Edge NVNT BLE 2M 2402MHz Ant1 Emission



Band Edge NVNT BLE 2M 2480MHz Ant1 Ref



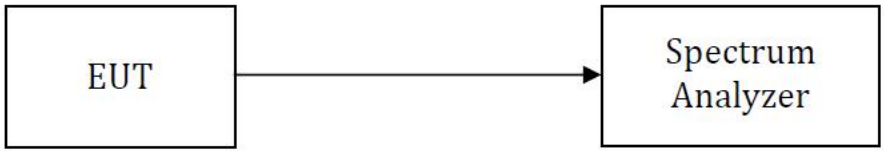
Band Edge NVNT BLE 2M 2480MHz Ant1 Emission

6. -6 dB Bandwidth and 99% Bandwidth Measurement

6.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019; ANSI C63.10:2020+Cor1:2023

6.2.Test Setup

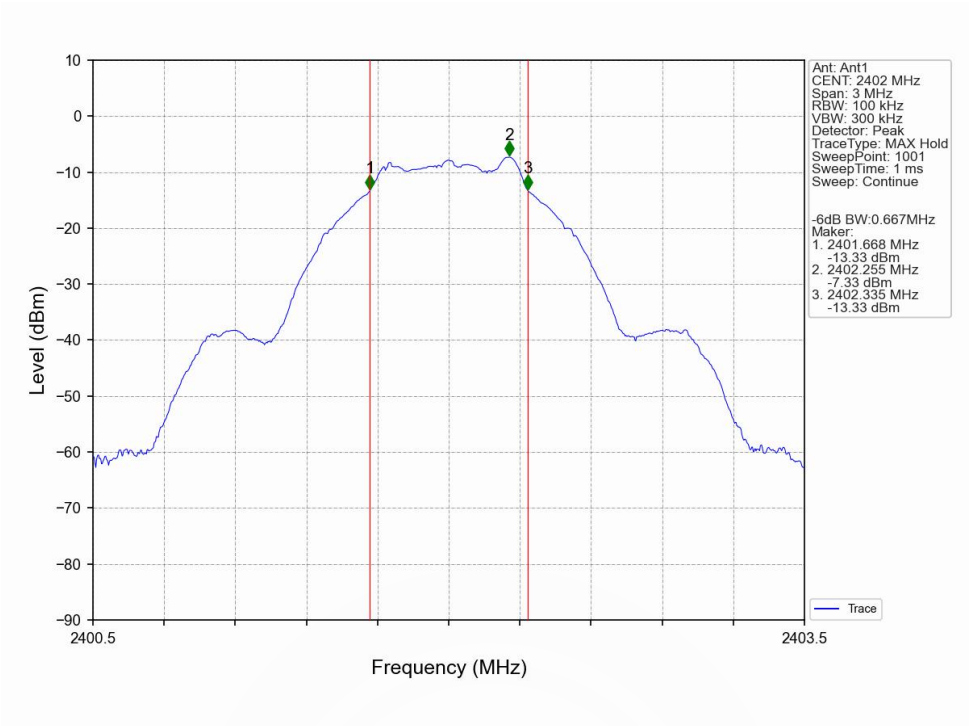


6.3.Test Procedure

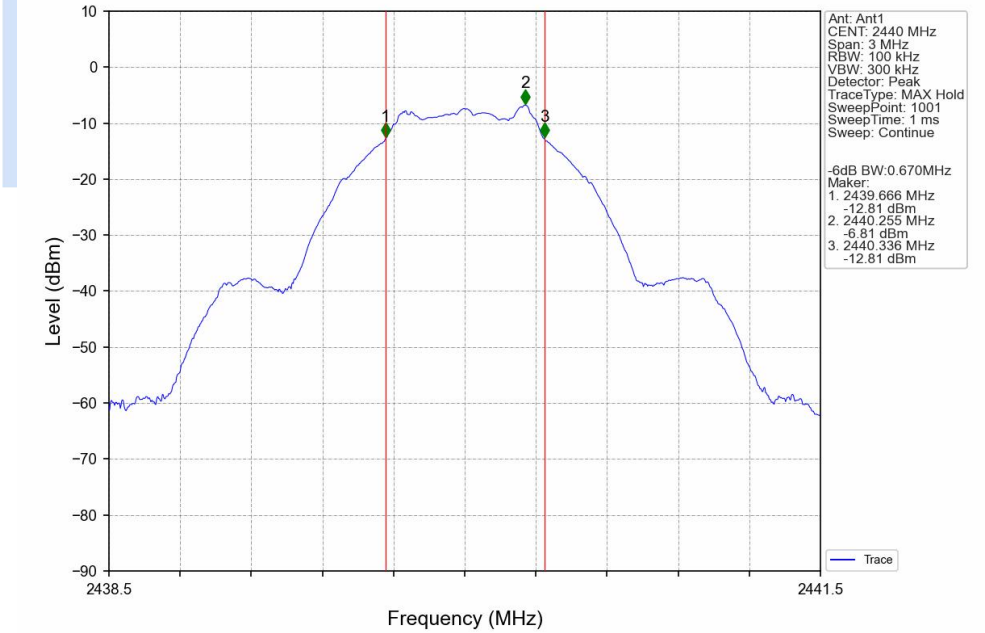
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz
3. 99% OBW:Set the spectrum analyzer: RBW = 1 % to 5 % of the OBW, VBW ≥ 3*RBW.

6.4.Test Result

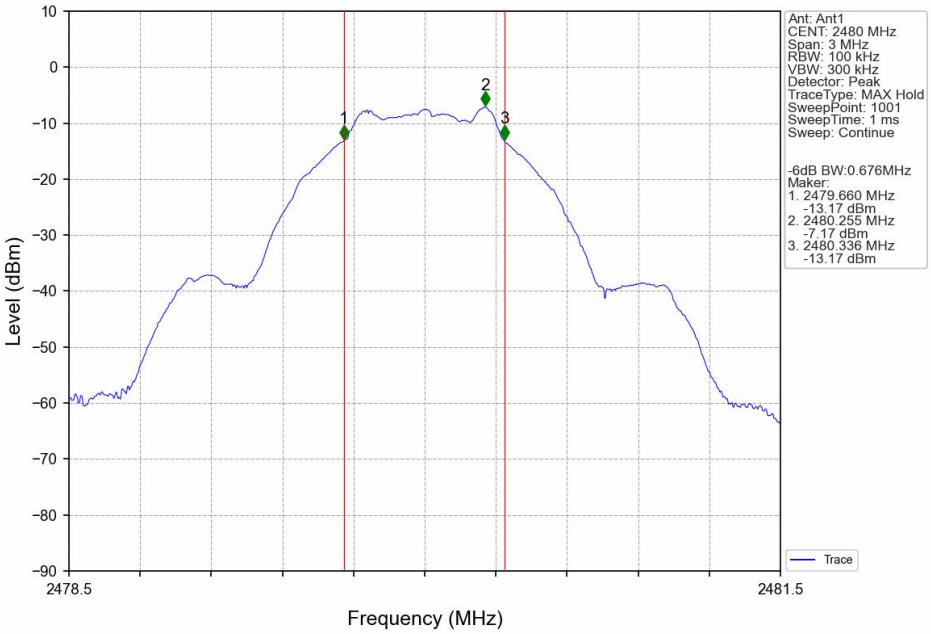
Mode	Frequency (MHz)	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	99% OBW (MHz)	Verdict
BLE 1M	2402	0.667	0.5	1.034	Pass
BLE 1M	2440	0.670	0.5	1.034	Pass
BLE 1M	2480	0.676	0.5	1.035	Pass
BLE 2M	2402	1.189	0.5	2.067	Pass
BLE 2M	2440	1.162	0.5	2.067	Pass
BLE 2M	2480	1.185	0.5	2.068	Pass



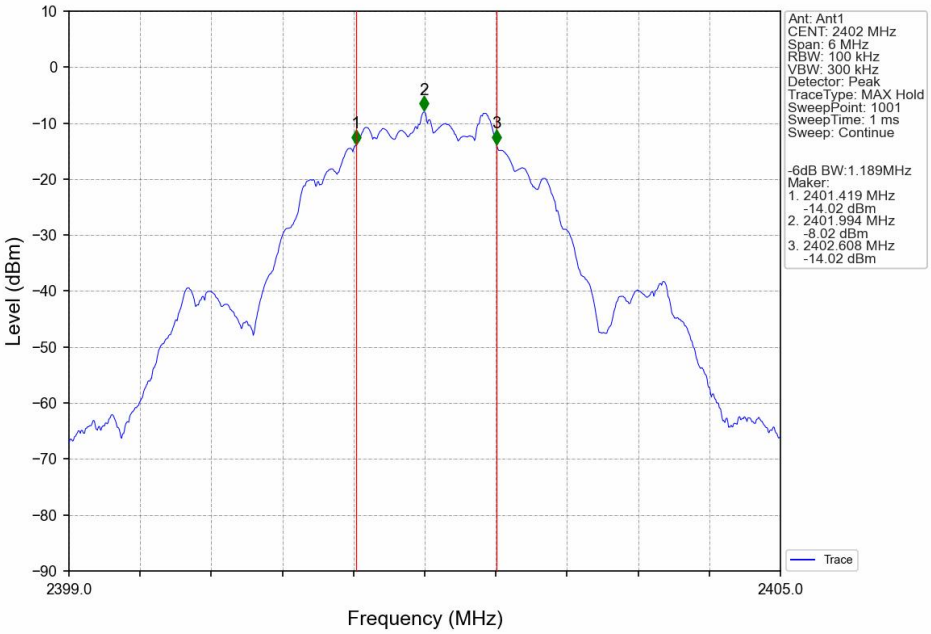
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



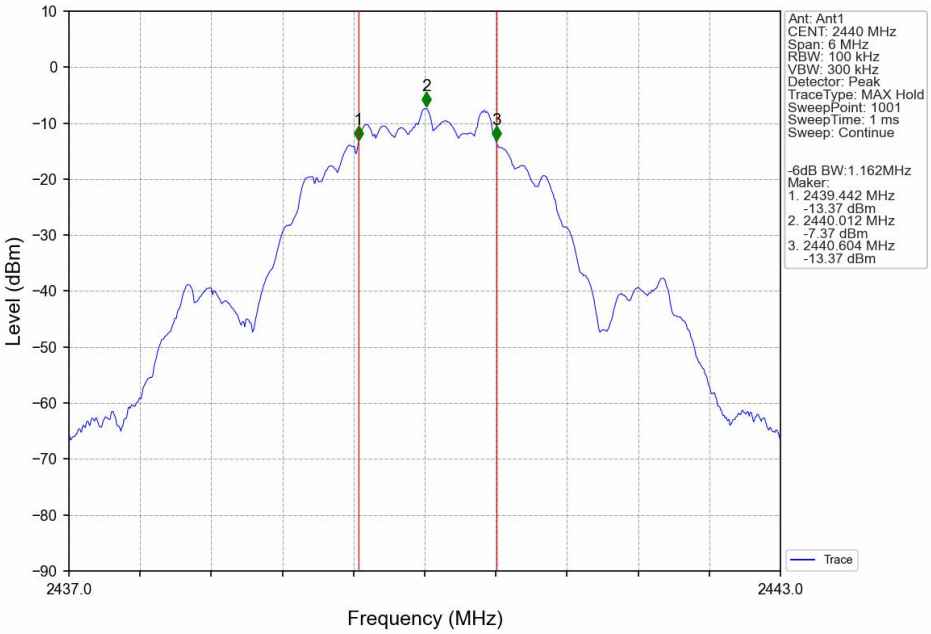
-6dB Bandwidth NVNT BLE 1M 2440MHz Ant1



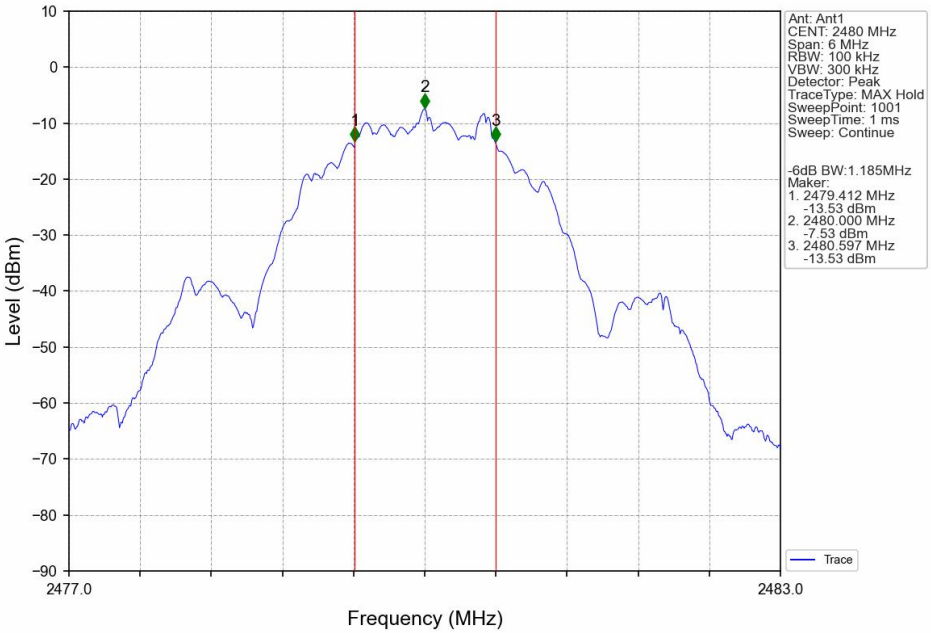
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



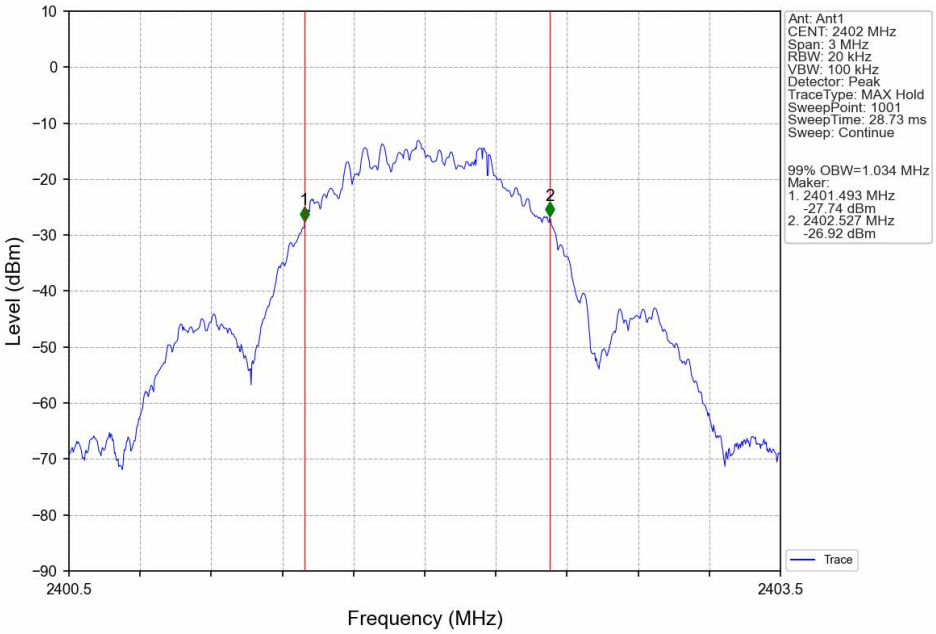
-6dB Bandwidth NVNT BLE 2M 2402MHz Ant1



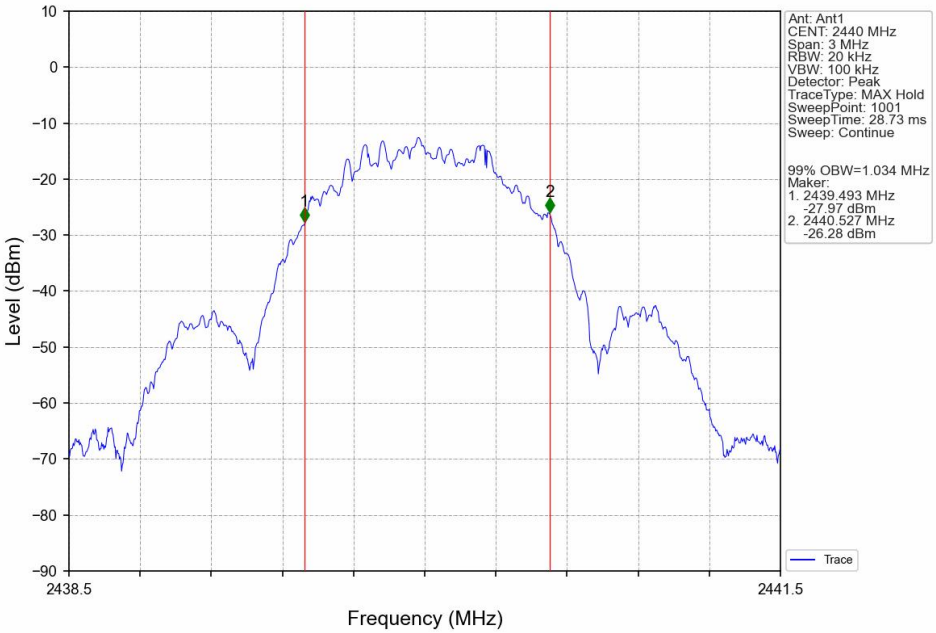
-6dB Bandwidth NVNT BLE 2M 2440MHz Ant1



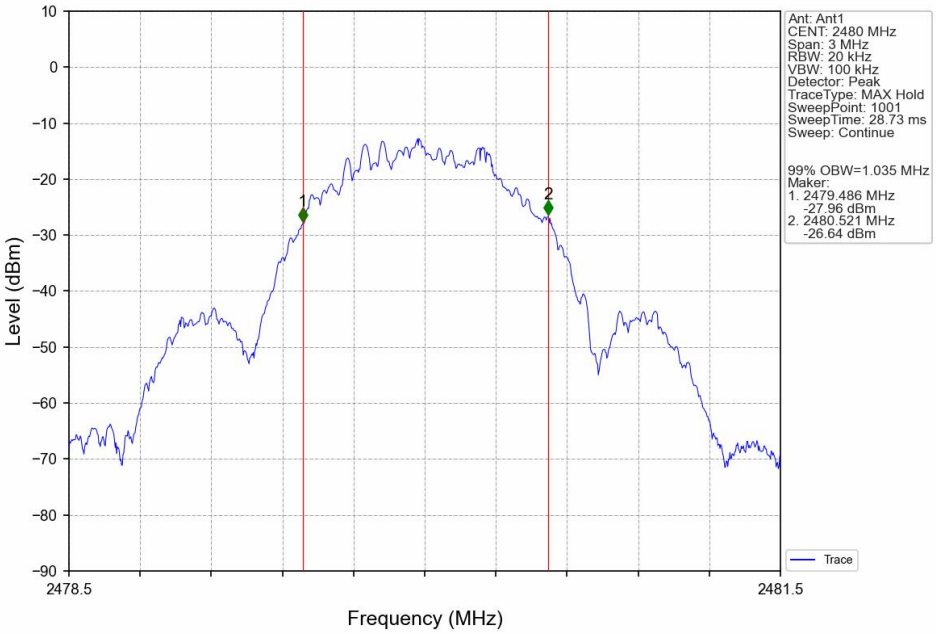
-6dB Bandwidth NVNT BLE 2M 2480MHz Ant1



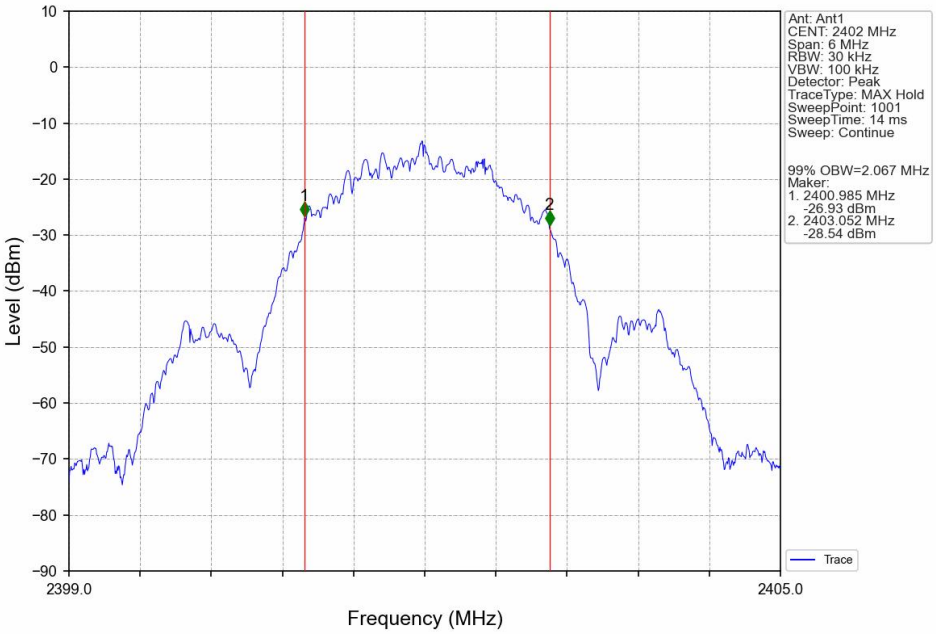
OBW NVNT BLE 1M 2402MHz Ant1



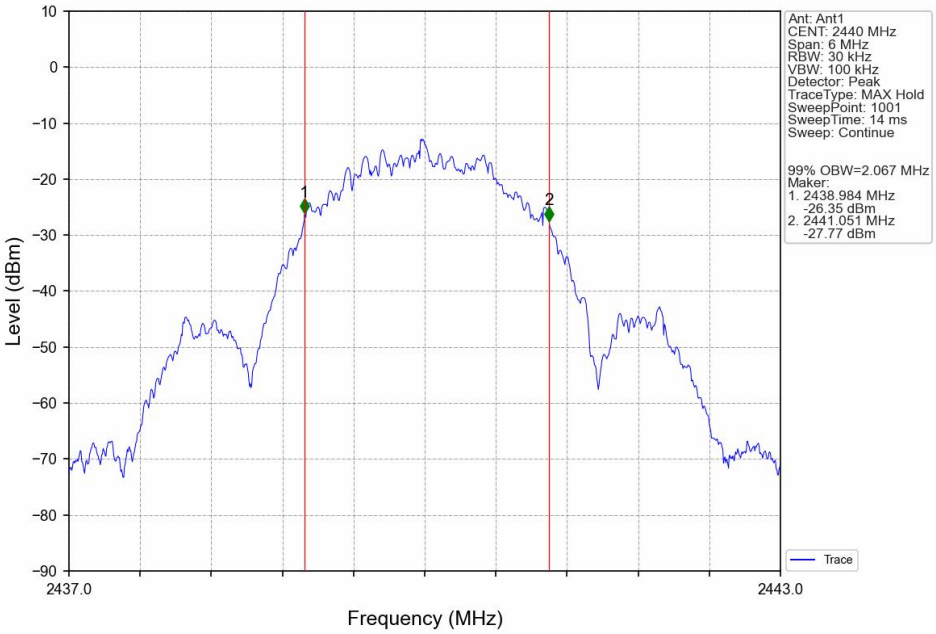
OBW NVNT BLE 1M 2440MHz Ant1



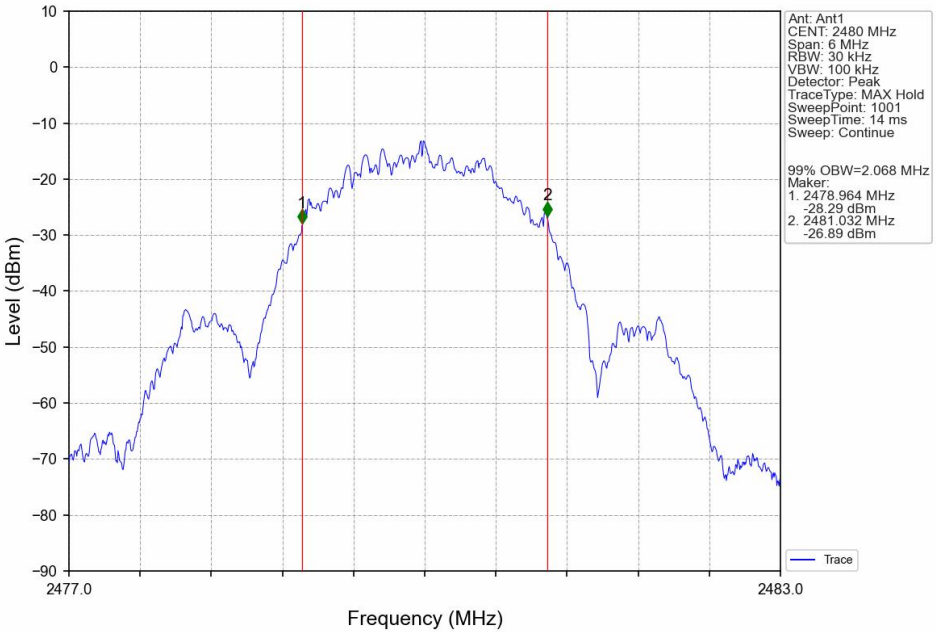
OBW NVNT BLE 1M 2480MHz Ant1



OBW NVNT BLE 2M 2402MHz Ant1



OBW NVNT BLE 2M 2440MHz Ant1



OBW NVNT BLE 2M 2480MHz Ant1

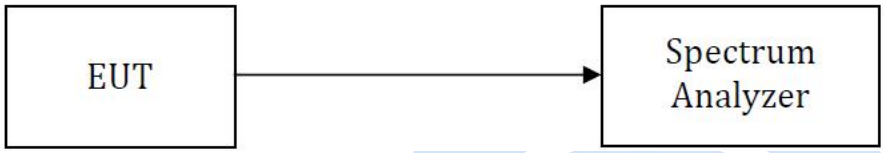
7. Maximum Peak Output Power

7.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019;
ANSI C63.10:2020+Cor1:2023

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 30dBm	2400-2483.5	PASS

7.2.Test Setup



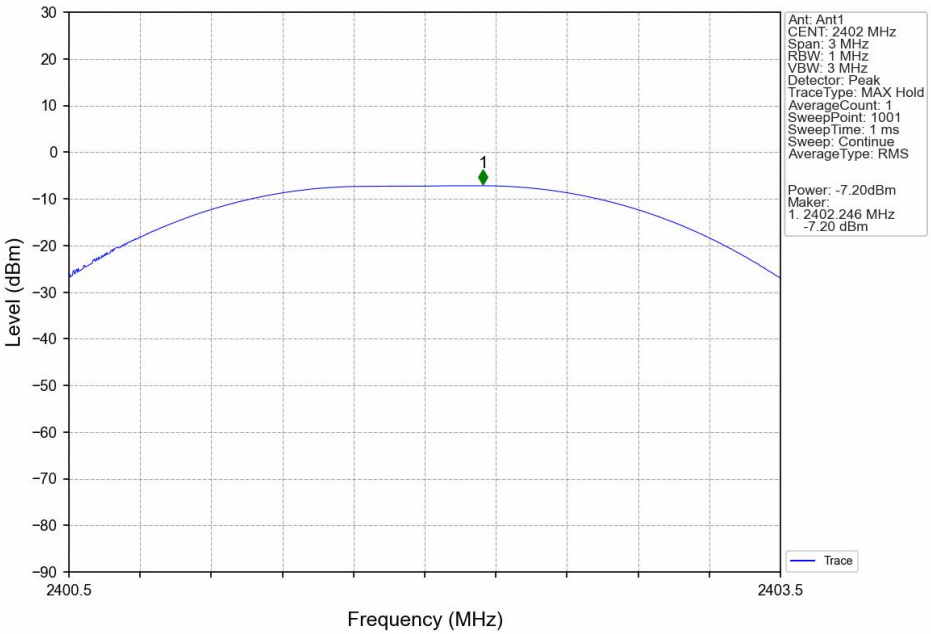
7.3.Test Procedure

KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019
section 8.3.1.1 (For BLE)
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.
a)Set the RBW ≥ DTS bandwidth.
b)Set VBW ≥ 3 RBW.
c)Set span ≥ 3 x RBW
d)Sweep time = auto couple.
e)Detector = peak.
f)Trace mode = max hold.
g)Allow trace to fully stabilize.
h)Use peak marker function to determine the peak amplitude level.
section 8.3.1.2 (For WIFI)
This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.
a)Set the RBW = 1% to 5% of the OBW, not to exceed 1 MHz..
b)Set the VBW ≥ 3 x RBW
c)Set the span ≥ 1.5 x OBW.
d)Detector = RMS.
e)Sweep time = auto couple.
f) trigger = free run..
g) Number of points in sweep _ [2 × span / RBW]. (This gives bin-to-bin spacing _ RBW / 2, so that narrowband signals are not lost between frequency bins.)
h) Trace average at least 100 traces in power averaging (rms) mode.
i) Compute power by integrating the spectrum across the OBW of the signal using the instrument’s band power measurement function, with band limits set equal to the OBW band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at intervals equal to the RBW extending across the entire OBW of the spectrum.

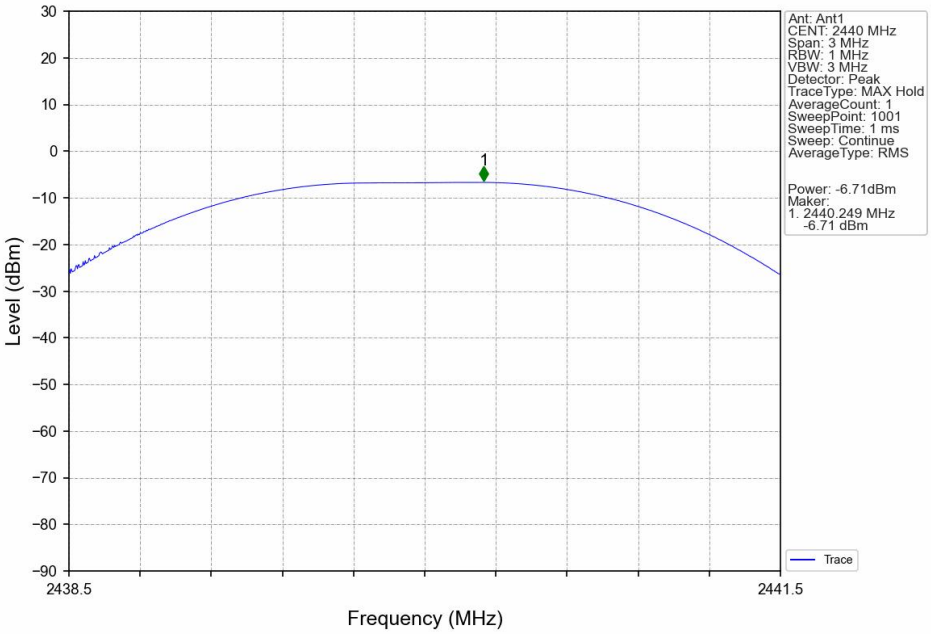
7.4.Test Result

Mode	Frequency (MHz)	Conducted Power (dBm)	Limit (dBm)	Test Result
BLE 1M	2402	-7.20	30	PASS
BLE 1M	2440	-6.71	30	PASS
BLE 1M	2480	-6.78	30	PASS
BLE 2M	2402	-7.10	30	PASS
BLE 2M	2440	-6.61	30	PASS
BLE 2M	2480	-6.58	30	PASS

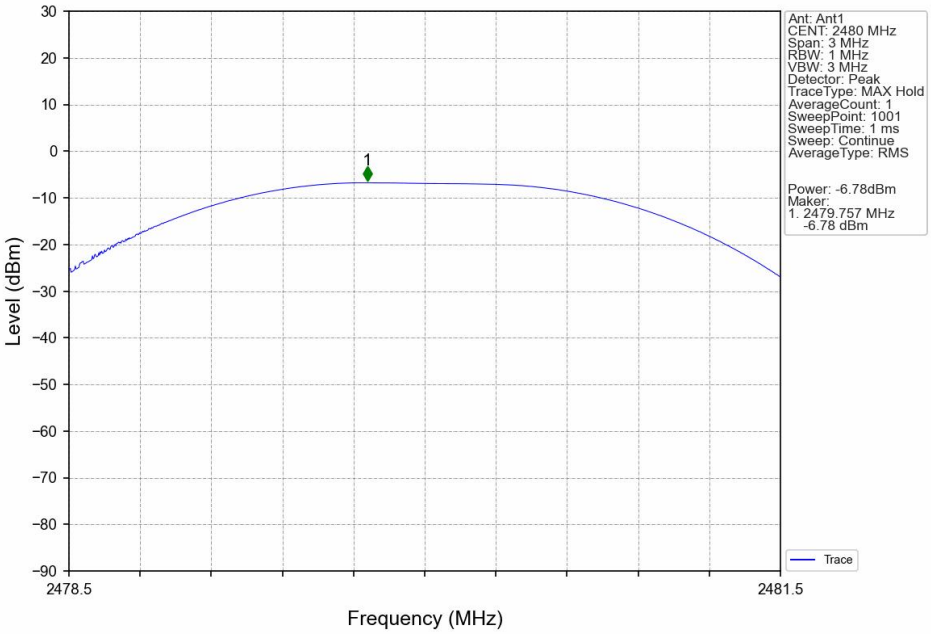
Note: ANT Gain =2.34dBi.



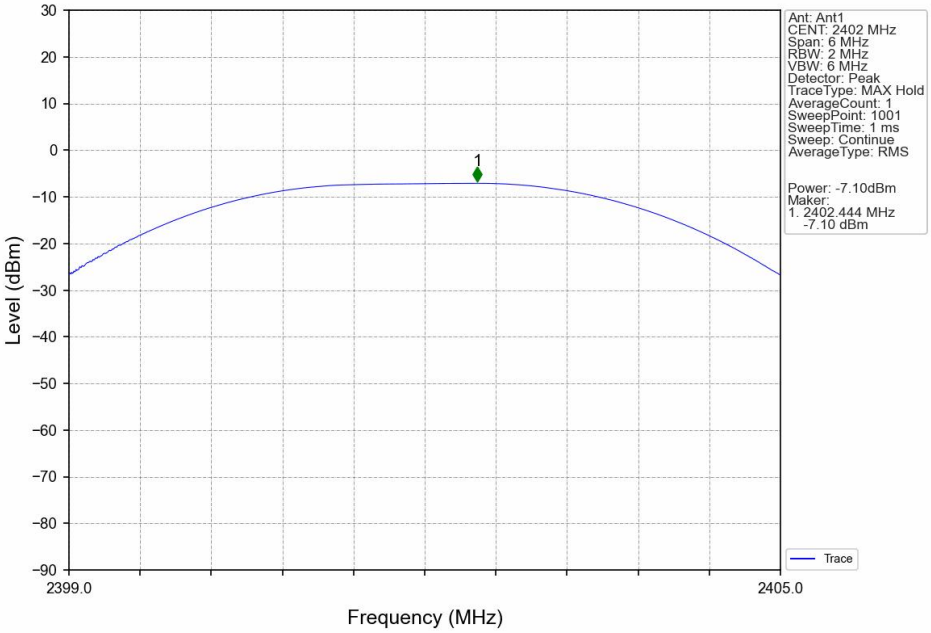
Peak Power NVNT BLE 1M 2402MHz Ant1



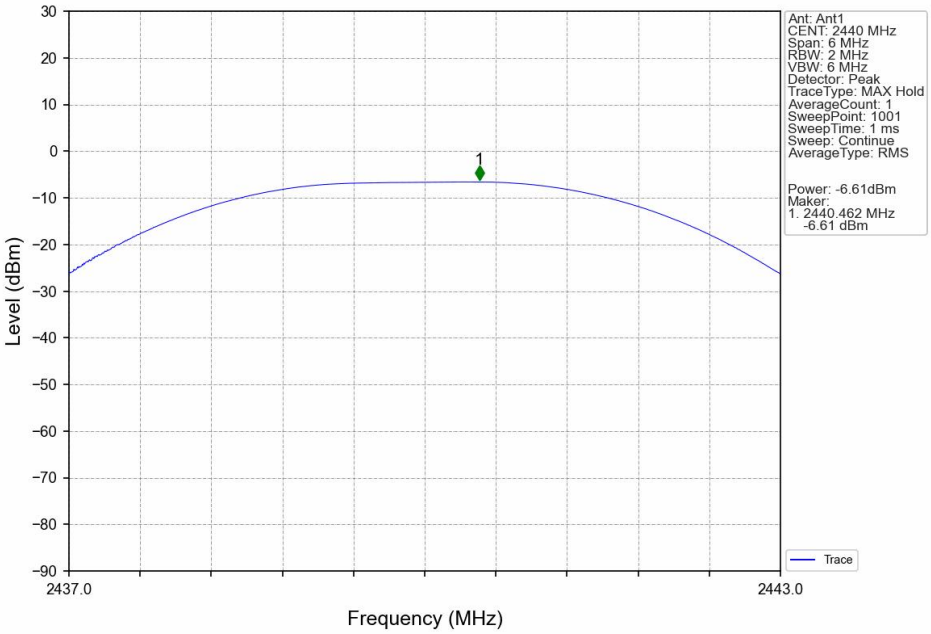
Peak Power NVNT BLE 1M 2440MHz Ant1



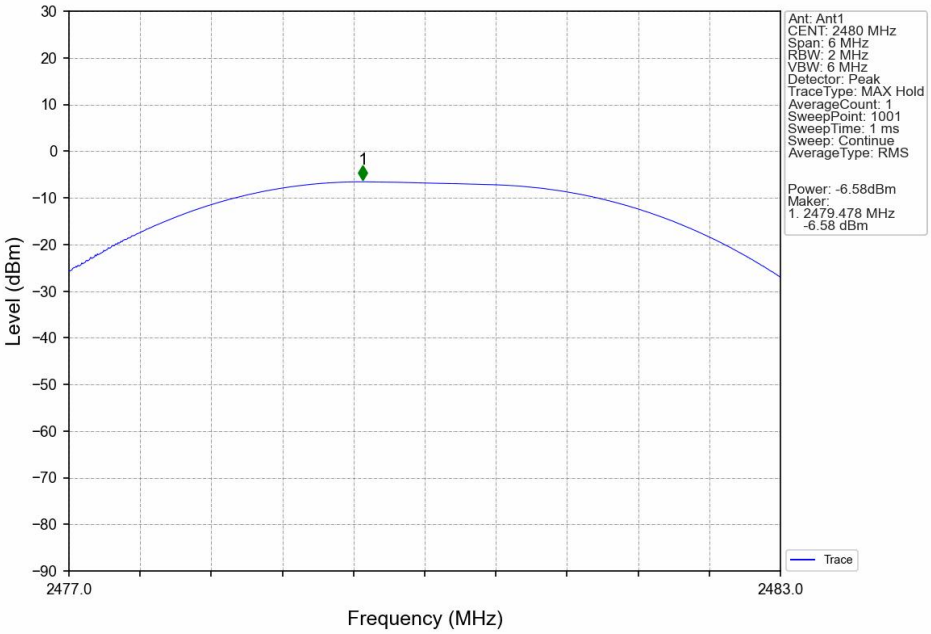
Peak Power NVNT BLE 1M 2480MHz Ant1



Peak Power NVNT BLE 2M 2402MHz Ant1



Peak Power NVNT BLE 2M 2440MHz Ant1



Peak Power NVNT BLE 2M 2480MHz Ant1

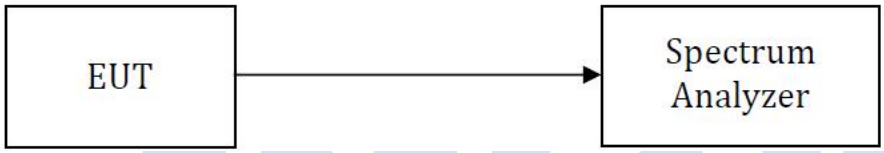
8. Power Spectral Density

8.1.Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019; ANSI C63.10:2020+Cor1:2023

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247	Power Spectral Density	8dBm/3kHz	2400-2483.5	PASS

8.2.Test Setup

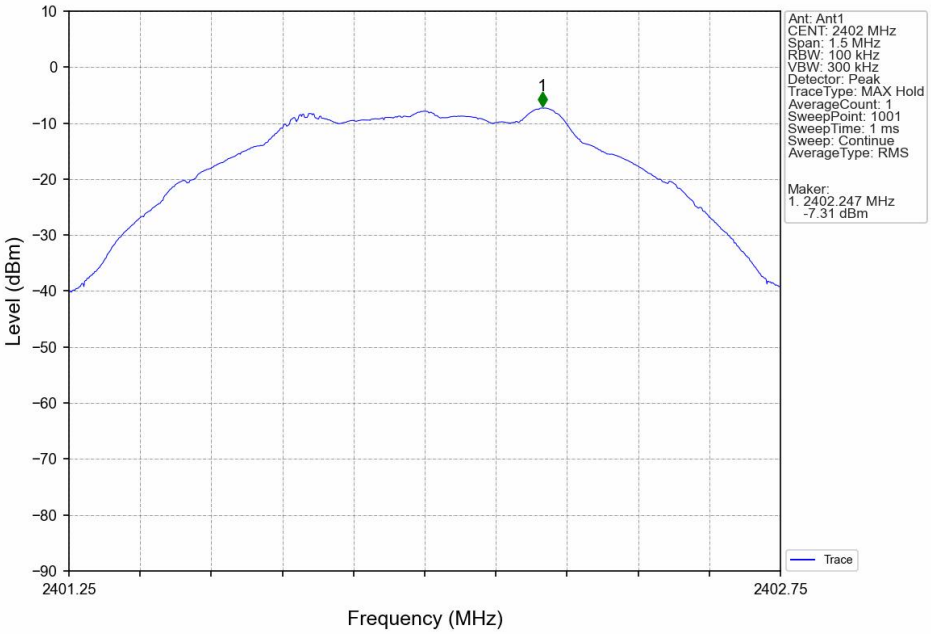


8.3.Test Procedure

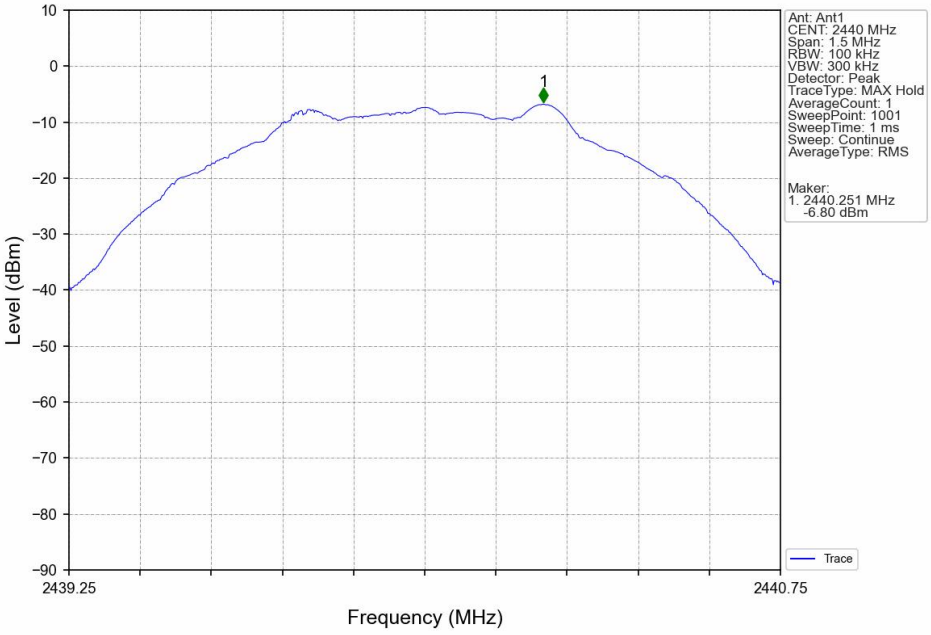
KDB 558074 D01 15.247 Meas Guidance v05r02 April 2, 2019 section 10.2
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100kHz. VBW = 300kHz , Span = 1.5 times the DTS channel bandwidth(6 dB bandwidth). Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

8.4.Test Result

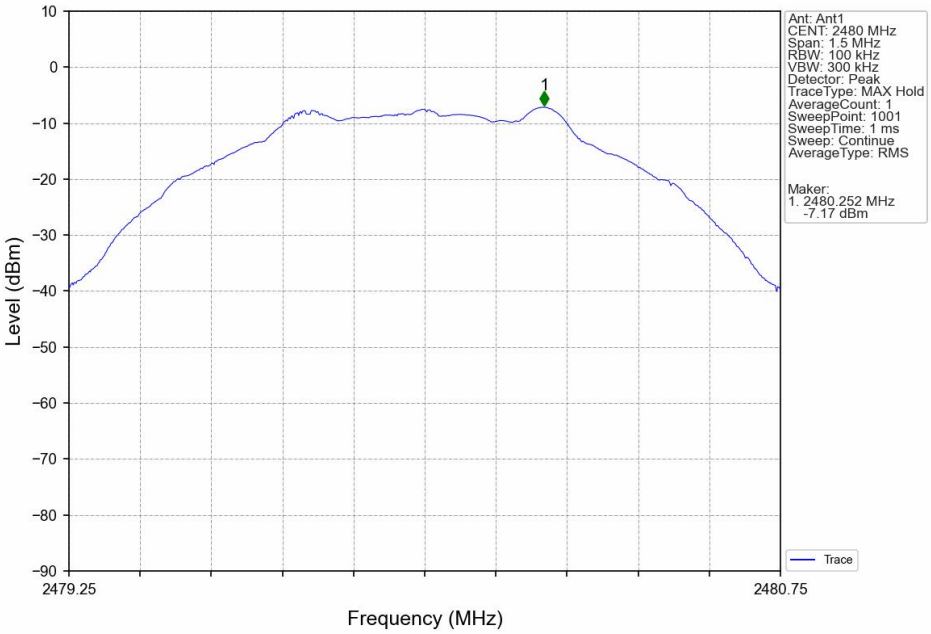
Mode	Frequency (MHz)	Total PSD (dBm/100KHz)	Limit (dBm/3KHz)	Verdict
BLE 1M	2402	-7.31	8	Pass
BLE 1M	2440	-6.80	8	Pass
BLE 1M	2480	-7.17	8	Pass
BLE 2M	2402	-7.85	8	Pass
BLE 2M	2440	-7.35	8	Pass
BLE 2M	2480	-7.48	8	Pass



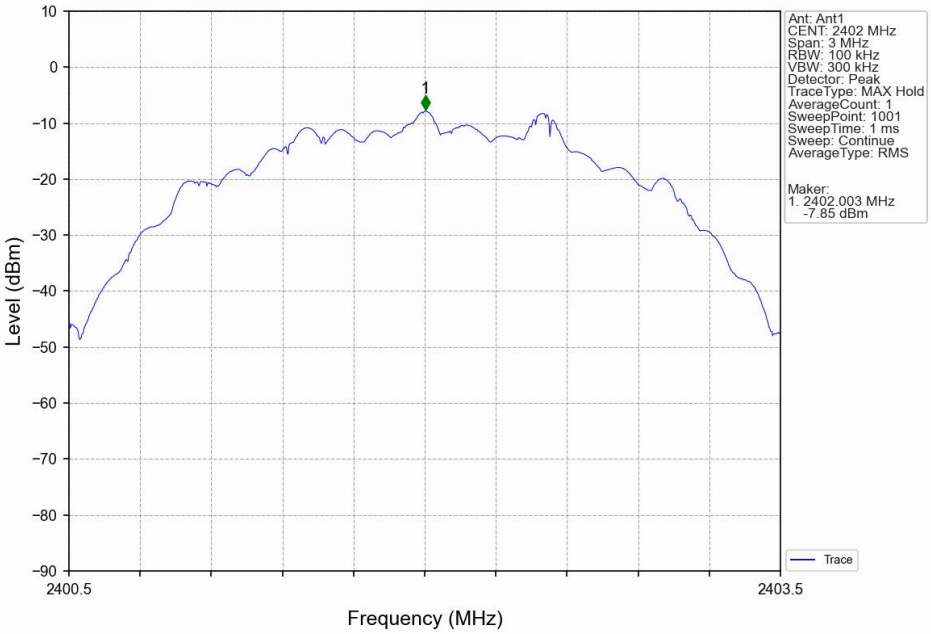
PSD NVNT BLE 1M 2402MHz Ant1



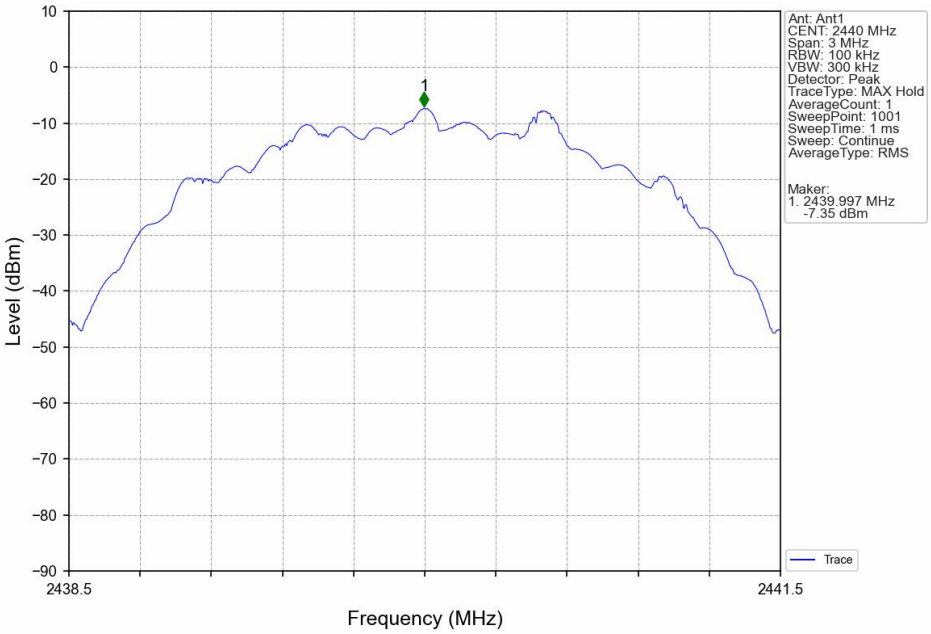
PSD NVNT BLE 1M 2440MHz Ant1



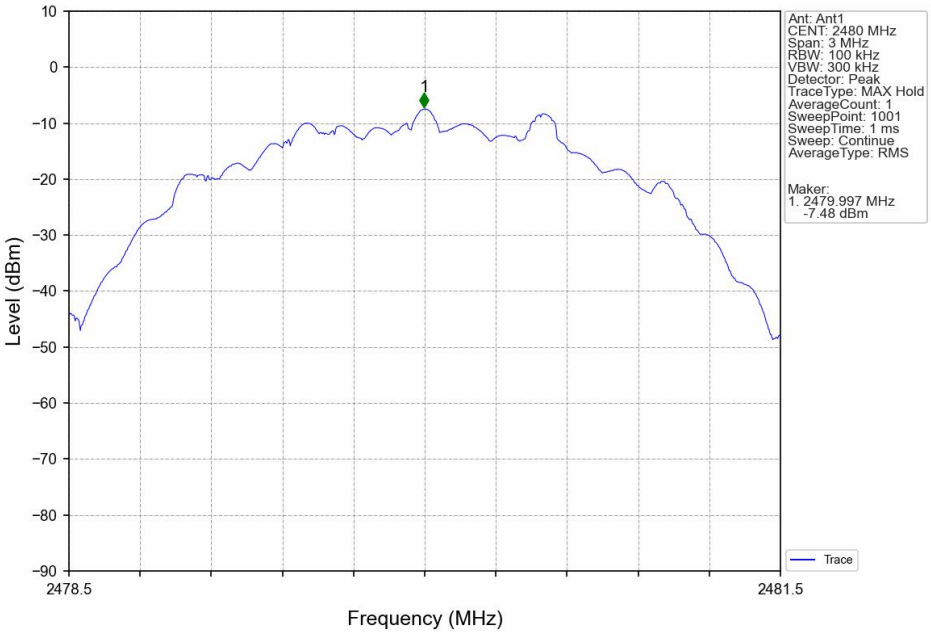
PSD NVNT BLE 1M 2480MHz Ant1



PSD NVNT BLE 2M 2402MHz Ant1



PSD NVNT BLE 2M 2440MHz Ant1



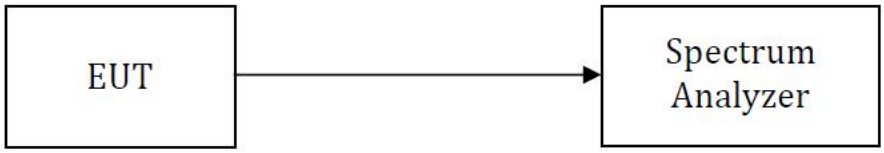
PSD NVNT BLE 2M 2480MHz Ant1

9. Duty Cycle Correction Factor (DCCF)

9.1.Limit

-

9.2.Test Setup



9.3.Test Procedure

1.The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2.Set to the maximum power setting and enable the EUT transmit continuously
3.Use the following spectrum analyzer settings:
Span = zero span, centered on a hopping channel, RBW= 8 MHz,
VBW ≥ RBW, Sweep = as necessary to capture the entire dwell time channel
Detector function = RMS, Trigger mode
Measure and record the duty cycle data

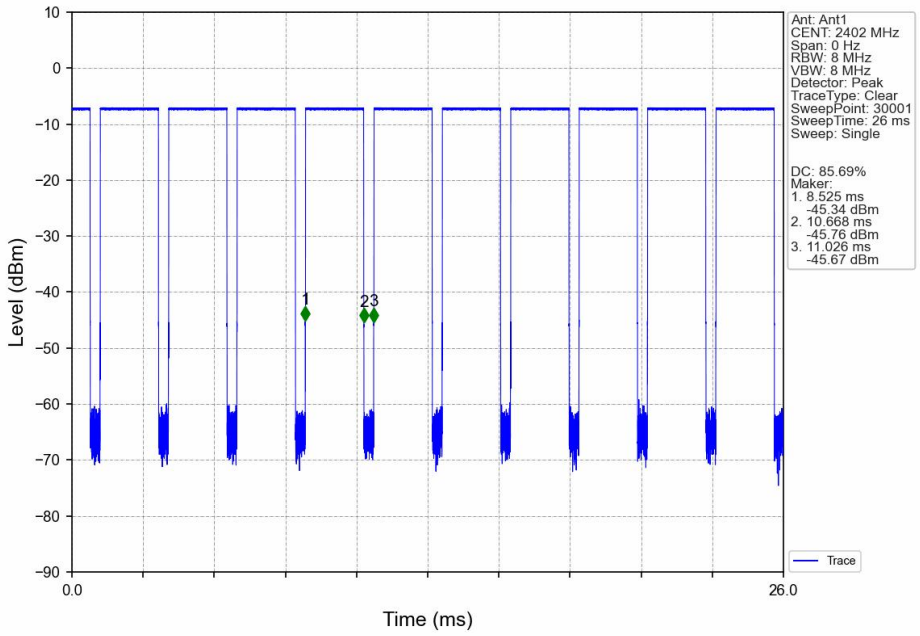
9.4.Test Result

Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	2.143	2.501	85.69	0.67	0.03
		2440	2.143	2.501	85.69	0.67	0.03
		2480	2.142	2.500	85.68	0.67	0.03
2M	SISO	2402	1.089	1.874	58.11	2.36	0.03
		2440	1.072	1.875	57.17	2.43	0.03
		2480	1.072	1.875	57.17	2.43	0.03

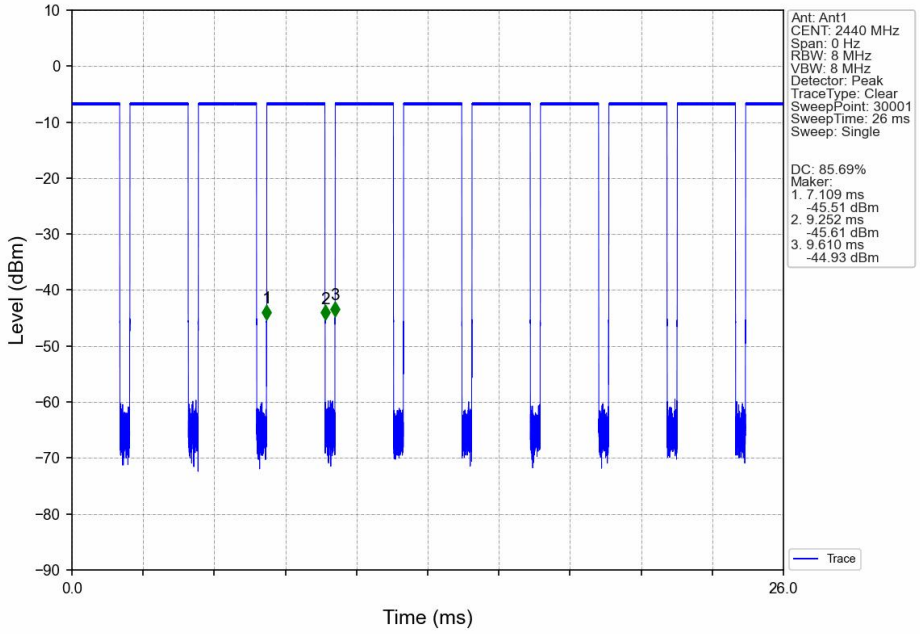
9.2 Test Graph

9.2.1 Ant1

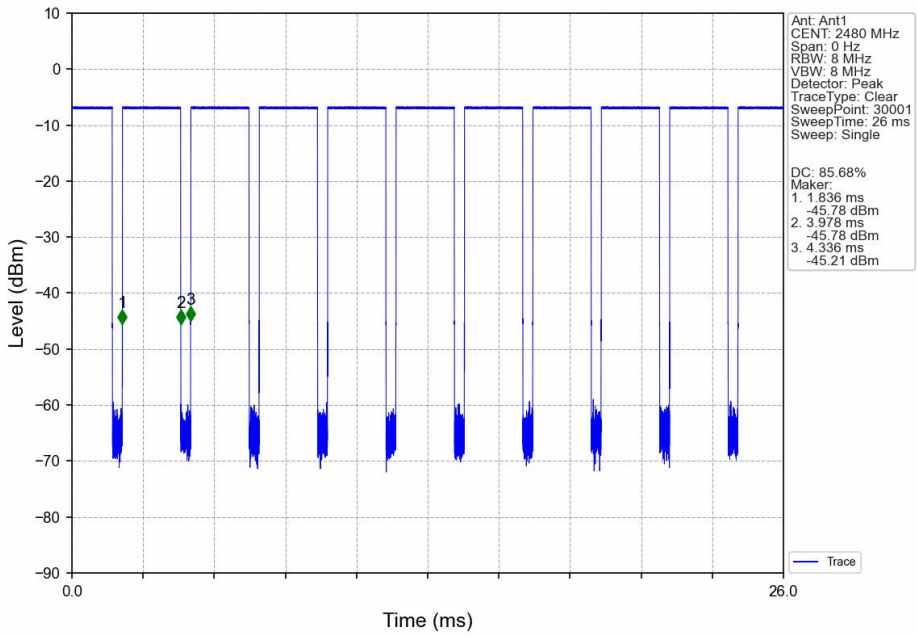
1M_LCH_2402MHz_Ant1_NTNV



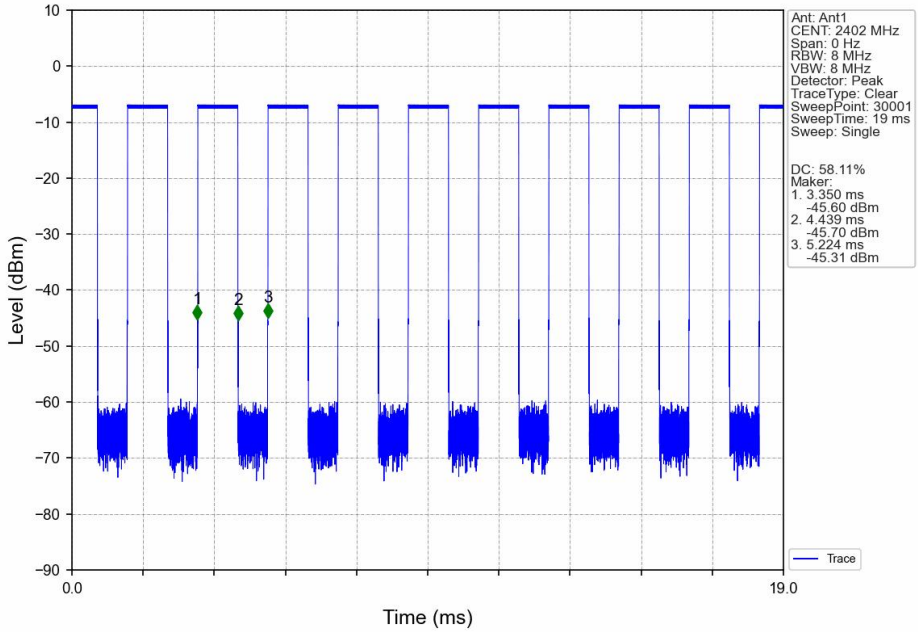
1M_MCH_2440MHz_Ant1_NTNV



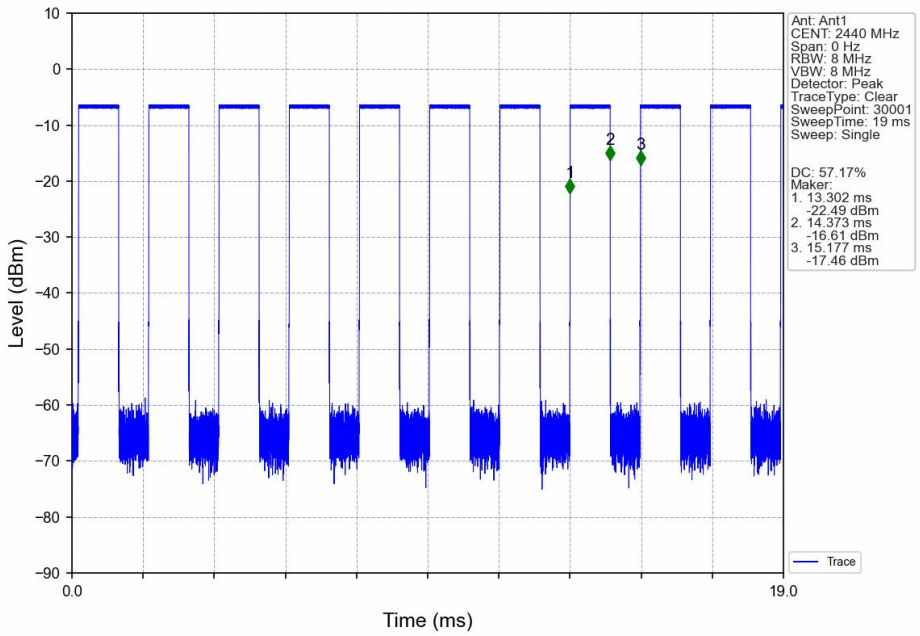
1M_HCH_2480MHz_Ant1_NTNV



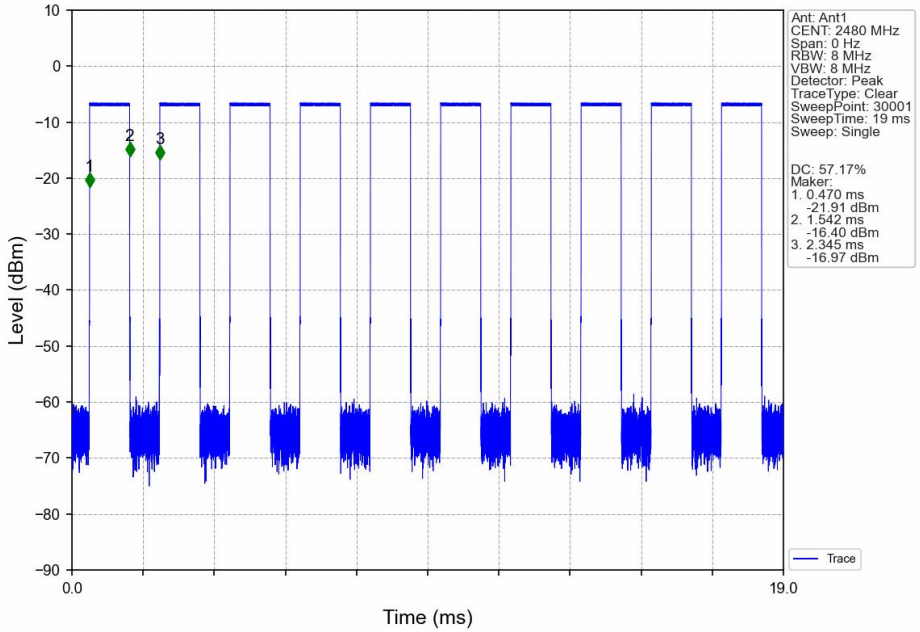
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



10. Antenna Requirement

According to the FCC Part 15 Paragraph 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. This product has an integrated antenna fulfills the requirement of this section.

This product has an PCB antenna, and the maximum antenna gain is 2.34dBi, fulfills the requirement of this section.

11. Test Photographs

Please see the attachment for Test Photographs.

Appendix I: Photos of the EUT

Please see the attachment for External Photographs and Internal Photographs.

※※※※※ **END OF REPORT** ※※※※※