Website:
www.cblueasia.com
Tel: +86-755-23059481
Email:
marketing@cblueasia.com

Test Report

Applicant	:	Felion Technologies Company Limited
Address	:	Room 304 3F Fuxing Building No.6 Binglang Road Fubao Community Futian District Shenzhen
Product Name	:	ColorFlux Light Strip
Brand Mark	:	ISOOCO, VOCOLINC
Model no.	:	LS3
FCC ID	:	2AXT8-LS2201
Report Number	:	BLA-EMC-202411-A3601
Date of Receipt	:	2024.11.13
Date of Test	:	2024.11.13 to 2024.12.03
Test Standard	:	47 CFR Part 15, Subpart C 15.247
Test Result	:	Pass

Compiled by: Mark Chen **Review by:** Sweely **Approved by:** Blue Zheng

Issued Date: 2024.12.06

BlueAsia of Technical Services(Shenzhen) Co.,Ltd.

Address: Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China

Table of Contents

Revise Record

Version No.	Date	Description
01	2024.12.06	Original

1 General information

1.1 General information

Applicant	Felion Technologies Company Limited
Address	Room 304 3F Fuxing Building No.6 Binglang Road Fubao Community Futian District Shenzhen
Manufacturer	Felion Technologies Company Limited
Address	Room 304 3F Fuxing Building No.6 Binglang Road Fubao Community Futian District Shenzhen
Factory	N/A
Address	N/A

1.2 General description of EUT

Product name	ColorFlux Light Strip	
Model no.	LS3	
Series model	LS2201, LS2202	
Desc of series model	The above models are identical in PCB layout, internal structure and components, only model no, and appearance is different.	
Operation Frequency:	2402MHz-2480MHz	
Modulation Type:	GFSK	
Rate data:	1Mbps	
Channel Spacing:	2MHz	
Number of Channels:	40	
Antenna Type:	PCB antenna	
Antenna Gain:	0dBi (Provided by customer)	
Power supply:	Adapter	MODEL NO:CW2401000USG INPUT:100-240V,50/60Hz,0.8A MAX OUTPUT:24V/1000mA
Test Voltage:	AC 120V	
Hardware Version	N/A	
Software Version	N/A	

Note: For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

2 Test summary

No.	Test item	Result	Remark
1	Antenna Requirement	Pass	
2	Conducted Emissions at AC Power Line (150kHz-30MHz)	Pass	
3	Conducted Peak Output Power	Pass	
4	Minimum 6dB Bandwidth	Pass	
5	Power Spectrum Density	Pass	
6	Conducted Band Edges Measurement	Pass	
7	Conducted Spurious Emissions	Pass	
8	Radiated Spurious Emissions	Pass	
9	Radiated Emissions which fall in the restricted bands	Pass	

N/A: Not Applicable

3 Test Configuration

3.1 Test mode

Test Mode Note 1	Description
TX	Keep the EUT in continuously transmitting with modulation mode.
RX	Keep the EUT in receiving mode
TX Low channel	Keep the EUT in continuously transmitting mode in low channel
TX middle channel	Keep the EUT in continuously transmitting mode in middle channel
TX high channel	Keep the EUT in continuously transmitting mode in high channel

Note 1: The EUT was configured to measure its highest possible emission and/or immunity level. The test modes were adapted according to the operation manual for use.

3.2 Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	10	2422MHz	20	2442MHz	30	2462MHz
1	2404MHz	11	2424MHz	21	2444MHz	31	2464MHz
…	…	…	…	…	…	…	…
8	2418MHz	18	2438MHz	28	2458MHz	38	2478MHz
9	2420MHz	19	2440MHz	29	2460MHz	39	2480MHz

3.3 Test channel

Channel	Frequency
The lowest channel	2402MHz
The middle channel	2442MHz
The Highest channel	2480MHz

3.4 Auxiliary equipment

Device Type	Manufacturer	Model Name	Serial No.	Remark
PC	Lenovo	E460C	N/A	From lab (No.BLA-ZC-BS-2022005)
Note: “--” mean no any auxiliary device during testing.				

3.5 Test environment

Environment	Temperature	Voltage
Normal	25°C	AC 120V

4 Laboratory information

4.1 Laboratory and accreditations

The test facility is recognized, certified, or accredited by the following organizations:

Company name:	BlueAsia of Technical Services(Shenzhen) Co., Ltd.
Address:	Building C, No. 107, Shihuan Road, Shiyan Sub-District, Baoan District, Shenzhen, Guangdong Province, China
CNAS accredited No.:	L9788
A2LA Cert. No.:	5071.01
FCC Designation No.:	CN1252
ISED CAB identifier No.:	CN0028
Telephone:	+86-755-28682673
FAX:	+86-755-28682673

4.2 Measurement uncertainty

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

Parameter	Expanded Uncertainty
Radiated Emission(9kHz-30MHz)	±4.34dB
Radiated Emission(30Mz-1000MHz)	±4.24dB
Radiated Emission(1GHz-18GHz)	±4.68dB
AC Power Line Conducted Emission(150kHz-30MHz)	±3.45dB
Occupied Channel Bandwidth	±5 %
RF output power, conducted	±1.5 dB
Power Spectral Density, conducted	±3.0 dB
Unwanted Emissions, conducted	±3.0 dB
Temperature	±3 °C
Supply voltages	±3 %
Time	±5 %

5 Test equipment

Radiated Spurious Emissions (Below 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-002-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-002-02	Control room	966 control room	SKET	N/A	2024/3/27	2027/3/26
BLA-EMC-009	EMI receiver	ESR7	R&S	101199	2024/08/08	2025/08/07
BLA-EMC-043	Loop antenna	FMZB1519B	Schwarzbeck	00102	2024/06/29	2026/06/28
BLA-EMC-065	Broadband antenna	VULB9168	Schwarzbeck	01065P	2024/06/29	2026/06/27
BLA-XC-01	Coaxial Cable	N/A	BlueAsia	V01	N/A	N/A
BLA-XC-02	Coaxial Cable	N/A	BlueAsia	V02	N/A	N/A

Radiated Spurious Emissions (Above 1GHz)

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-001-01	Anechoic chamber	9*6*6 chamber	SKET	N/A	2023/11/16	2026/11/15
BLA-EMC-001-02	Control Room	966 control room	SKET	N/A	2023/11/16	2025/11/15
BLA-EMC-008	Spectrum	FSP40	R&S	100817	2024/08/08	2025/08/07
BLA-EMC-012	Broadband antenna	VULB9168	Schwarzbeck	00836 P:00227	2022/10/12	2025/10/11
BLA-EMC-013	Horn Antenna	BBHA9120D	Schwarzbeck	01892	2024/06/29	2026/06/28
BLA-EMC-014	Amplifier	PA_000318G-45	SKET	PA2018043003	2024/08/08	2025/08/07
BLA-EMC-046	Filter bank	2.4G/5G Filter bank	SKET	N/A	2024/06/28	2025/06/27
BLA-EMC-061	Receiver	ESPI7	R&S	101477	2024/06/28	2025/06/27
BLA-EMC-066	Amplifier	LNPA_30M01G-30	SKET	SK2021060801	2024/06/28	2025/06/27
BLA-EMC-086	Amplifier	LNPA_18G40G-50dB	SKET	SK2022071301	2024/06/28	2025/06/27
BLA-EMC-087	Horn Antenna	BBHA 9170	Schwarzbeck	1106	2024/06/29	2026/06/28

BLA-XC-03	Coaxial Cable	N/A	BlueAsia	V03	N/A	N/A
BLA-XC-04	Coaxial Cable	N/A	BlueAsia	V04	N/A	N/A

RF conducted

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-003-003	Shield room	5*3*3	SKET	N/A	2023/11/16	2025/11/15
BLA-EMC-016	Signal Generator	N5182A	Agilent	MY52420567	2024/06/28	2025/06/27
BLA-EMC-038	Spectrum	N9020A	Agilent	MY49100060	2024/08/08	2025/08/07
BLA-EMC-042	Power sensor	RPR3006W	DARE	14I00889SN042	2024/08/08	2025/08/07
BLA-EMC-044	Radio communication tester	CMW500	R&S	132429	2024/08/08	2025/08/07
BLA-EMC-064	Signal Generator	N5182B	KEYSIGHT	MY58108892	2024/06/28	2025/06/27
BLA-EMC-079	Spectrum	N9020A	Agilent	MY54420161	2024/08/08	2025/08/07
BLA-EMC-088	Audio Analyzer	ATS-1	Audio Precision	ATS141094	2024/06/28	2025/06/27

Conducted Emissions

Equipment	Name	Model	Manufacture	S/N	Cal. Date	Due. Date
BLA-EMC-003-001	Shield room	8*3*3	SKET	N/A	2023/11/16	2025/11/15
BLA-EMC-009	EMI receiver	ESR7	R&S	101199	2024/08/08	2025/08/07
BLA-EMC-011	LISN	ENV216	R&S	101372	2024/08/08	2025/08/07
BLA-EMC-033	Impedance transformer	DC-2GHz	DFXP	N/A	2024/06/28	2025/06/27
BLA-EMC-041	LISN	AT166-2	ATTEN	AKK1806000003	2024/08/08	2025/08/07
BLA-EMC-045	Impedance stable network	ISNT8-cat6	TESEQ	53580	2024/08/08	2025/08/07
BLA-EMC-095	Single-channel	NNBM	Schwarzbe	01045	2024/06/28	2025/06/27

	vehicle artificial power network	8124	ck			
BLA-EMC-096 BLA-XC-05	Single-channel vehicle artificial power network Coaxial Cable	NNBM 8124 N/A	Schwarzbeck BlueAsia	01075 V05	2024/06/28 N/A	2025/06/27 N/A

Test Software Record：

Software No.	Software Name	Manufacture	Software version	Test site
BLA-EMC-S001	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S002	EZ-EMC	EZ	EEMC-3A1+	RE
BLA-EMC-S003	EZ-EMC	EZ	EEMC-3A1+	CE
BLA-EMC-S010	MTS 8310	MW	2.0.0.0	RF

6 Test result

6.1 Antenna requirement

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	N/A

6.1.1 Requirement

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. The use of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of a so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

EUT antenna:
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0dBi.

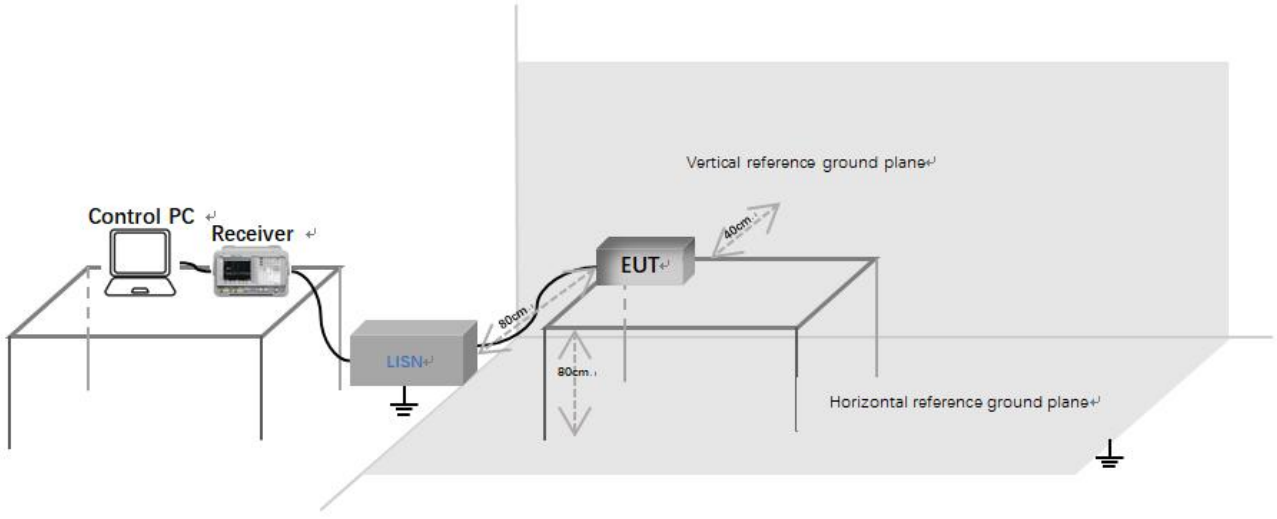
6.2 Conducted emissions at AC power line (150 kHz-30 MHz)

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.2.1 Limit

Frequency of emission(MHz)	**Conducted limit(dBμV)**	
	Quasi-peak	**Average**
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50
*Decreases with the logarithm of the frequency.		

6.2.2 Test setup



Description of test setup connection:

a) Connect the control PC to the receiver through a USB to GPIB cable;

b) The receiver is connected to the LISN through a coaxial line;

c) Connect the power port of LISN to the EUT.

6.2.3 Procedure

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50H + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane,

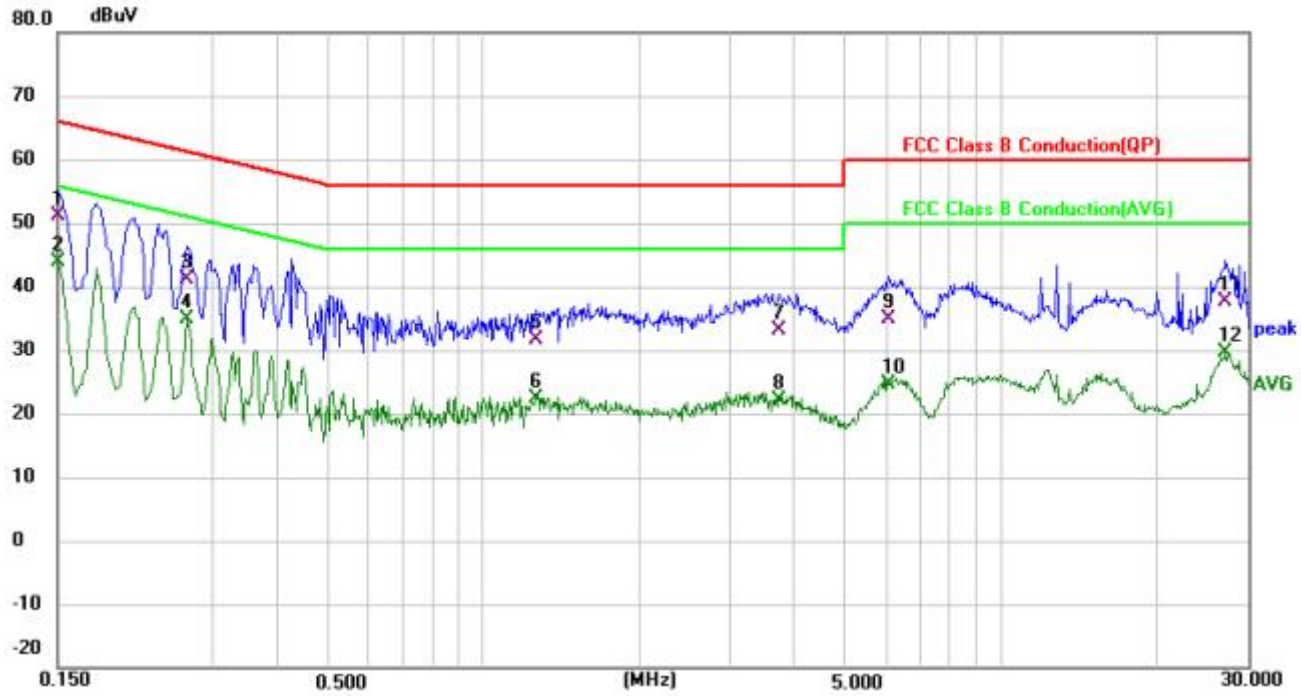
4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) 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 on conducted measurement.

LISN=Read Level+ Cable Loss+ LISN Factor

6.2.4 Test data

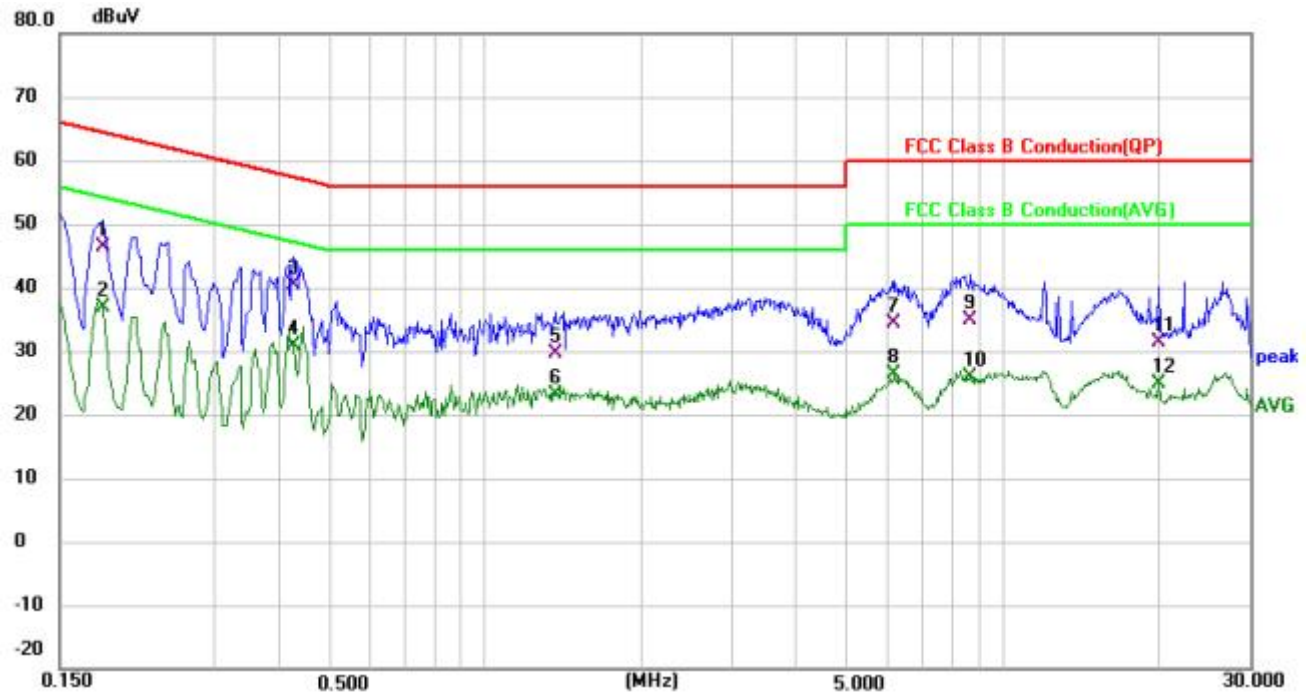
[Test Mode: TX]; [Line: Line];[Voltage:120V/60Hz]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.1508	40.95	10.17	51.12	65.96	-14.84	QP			
2	*	0.1508	33.82	10.17	43.99	55.96	-11.97	AVG			
3		0.2660	30.80	10.42	41.22	61.24	-20.02	QP			
4		0.2660	24.39	10.42	34.81	51.24	-16.43	AVG			
5		1.2660	21.79	9.81	31.60	56.00	-24.40	QP			
6		1.2660	12.52	9.81	22.33	46.00	-23.67	AVG			
7		3.7260	23.00	10.09	33.09	56.00	-22.91	QP			
8		3.7260	12.13	10.09	22.22	46.00	-23.78	AVG			
9		6.0739	24.58	10.21	34.79	60.00	-25.21	QP			
10		6.0739	14.52	10.21	24.73	50.00	-25.27	AVG			
11		27.1860	24.59	13.16	37.75	60.00	-22.25	QP			
12		27.1860	16.40	13.16	29.56	50.00	-20.44	AVG			

Test Result: Pass

[Test Mode: TX]; [Line: Neutral] ;[Voltage:120V/60Hz]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	cm	degree	Comment
1		0.1819	36.15	10.22	46.37	64.40	-18.03	QP			
2		0.1819	26.57	10.22	36.79	54.40	-17.61	AVG			
3		0.4260	30.64	9.79	40.43	57.33	-16.90	QP			
4	*	0.4260	21.13	9.79	30.92	47.33	-16.41	AVG			
5		1.3660	19.98	9.75	29.73	56.00	-26.27	QP			
6		1.3660	13.42	9.75	23.17	46.00	-22.83	AVG			
7		6.1740	24.25	10.21	34.46	60.00	-25.54	QP			
8		6.1740	16.22	10.21	26.43	50.00	-23.57	AVG			
9		8.6459	24.33	10.49	34.82	60.00	-25.18	QP			
10		8.6459	15.30	10.49	25.79	50.00	-24.21	AVG			
11		19.9940	18.42	13.00	31.42	60.00	-28.58	QP			
12		19.9940	11.80	13.00	24.80	50.00	-25.20	AVG			

Test Result: Pass

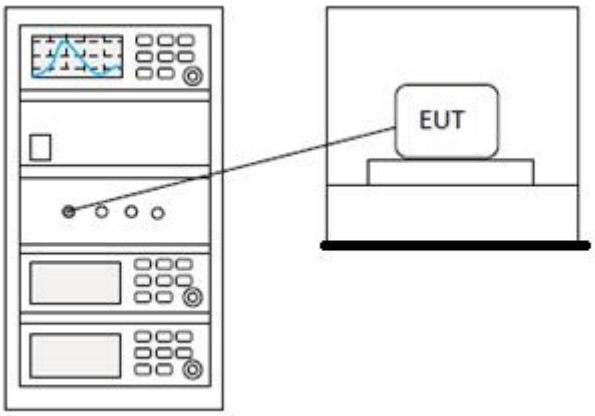
6.3 Conducted peak output Power

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.3.1 Limit

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

6.3.2 Test setup



6.3.3 Test data

Pass: Please refer to appendix A for details

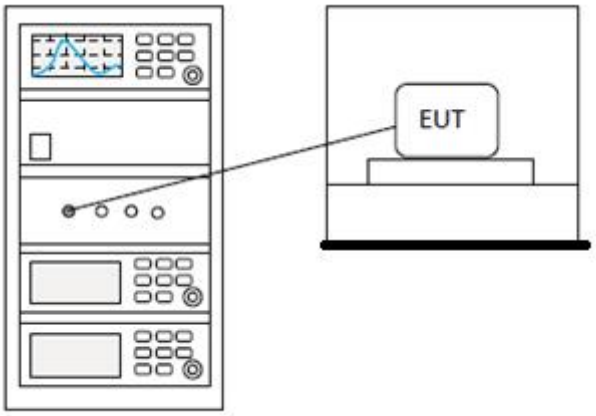
6.4 Minimum 6dB bandwidth

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.8.1
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.4.1 Limit

≥500 kHz

6.4.2 Test setup



6.4.3 Test data

Pass: Please refer to appendix A for details

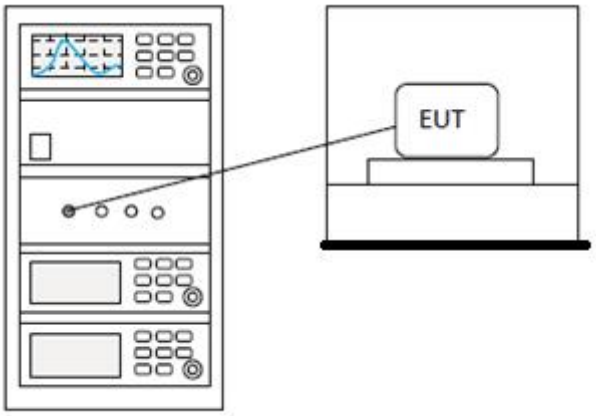
6.5 Power spectrum density

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 11.10.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.5.1 Limit

≤8dBm in any 3 kHz band during any time interval of continuous transmission

6.5.2 Test setup



6.5.3 Test data

Pass: Please refer to appendix A for details

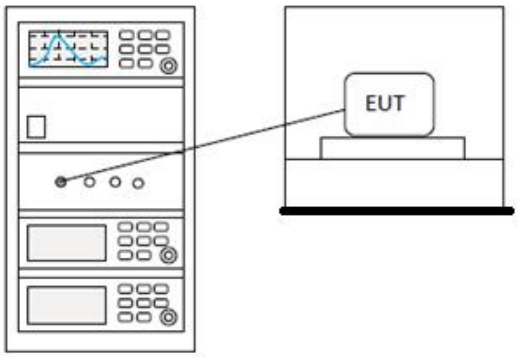
6.6 Conducted Band Edges Measurement

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.8 & Section 11.13.3.2
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.6.1 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 20dB.
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)).

6.6.2 Test setup



6.6.3 Test data

Pass: Please refer to appendix A for details

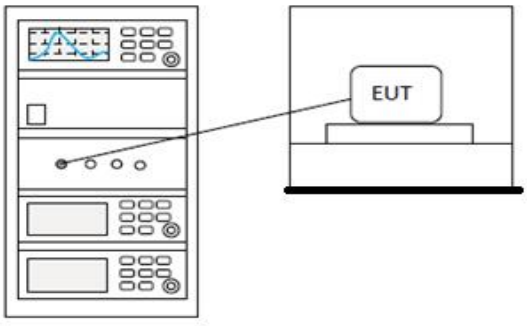
6.7 Conducted spurious emissions

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 7.8.6 & Section 11.11
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

6.7.1 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 20dB.
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)).

6.7.2 Test setup



6.7.3 Test data

Pass: Please refer to appendix A for details

6.8 Radiated spurious emissions

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.4,6.5,6.6
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

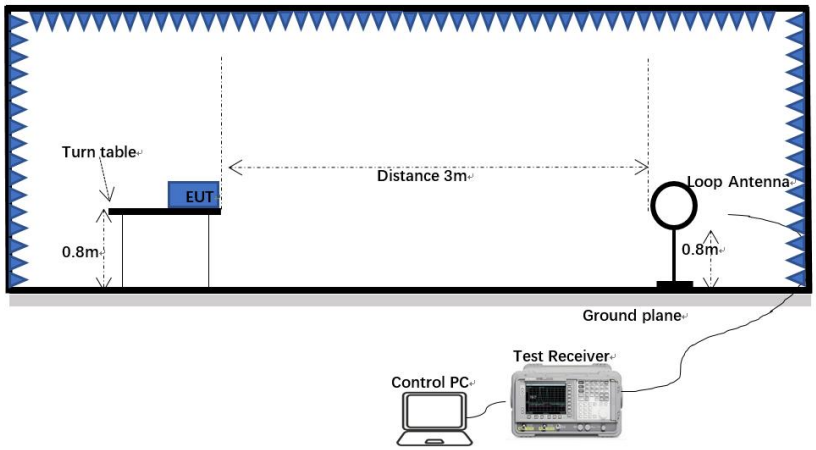
6.8.1 Limit

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

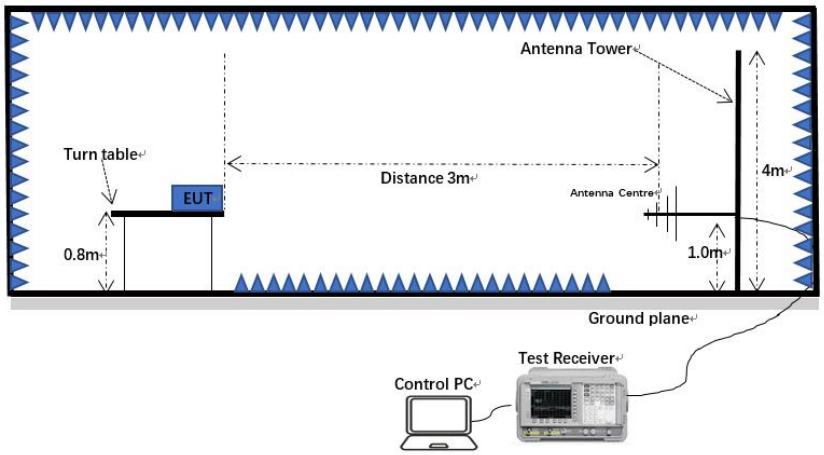
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

6.8.2 Test setup

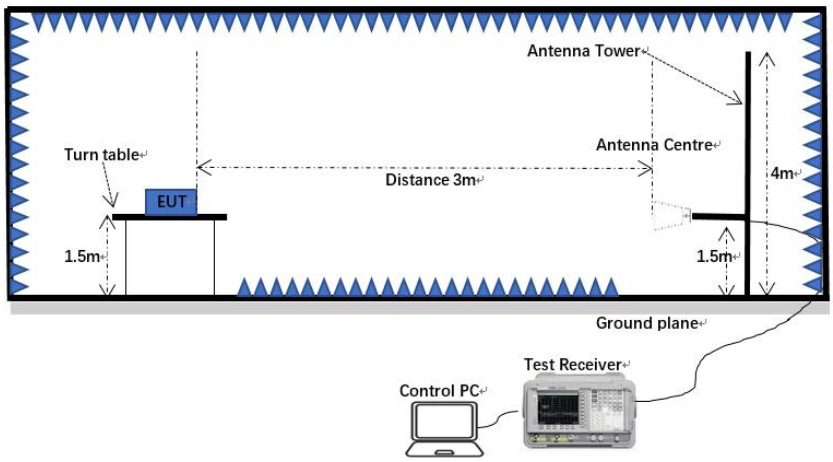
Below 1GHz：



30MHz-1GHz：



Above 1GHz：



6.8.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j) Repeat above procedures until all frequencies measured was complete.

Note 1: Scan from 9 kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Note 3: The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic

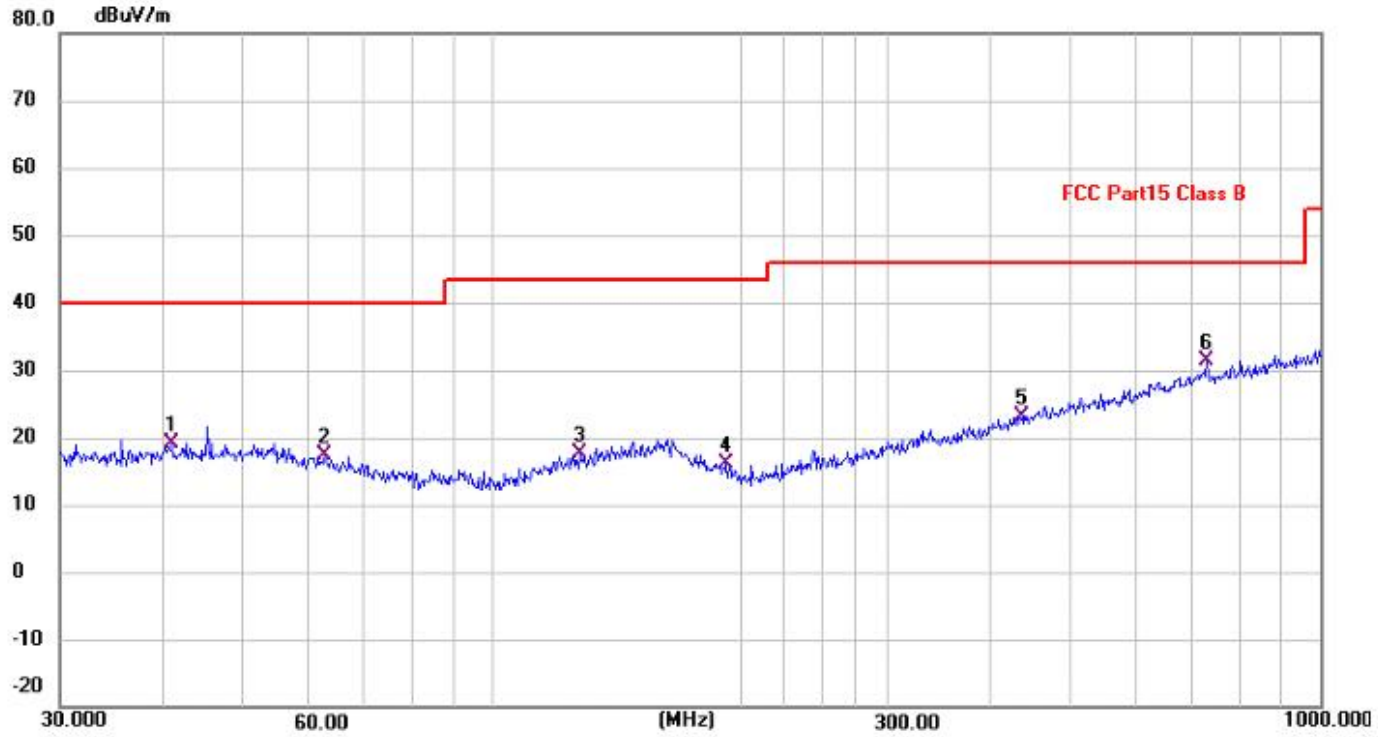
equation with a sample calculation is as follows:

Level (dBuV) = Reading (dBuV) + Factor (dB/m)

6.8.4 Test data

Below 1GHz

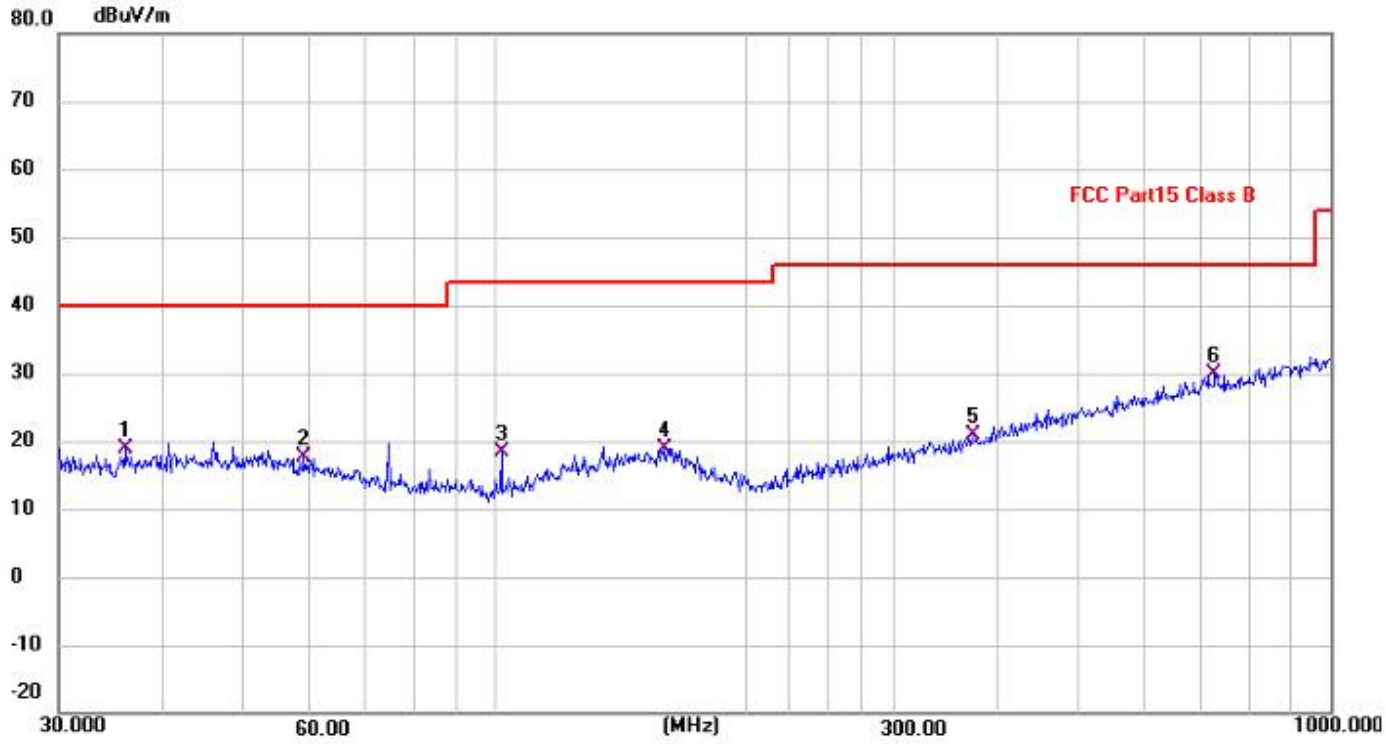
[Test mode: TX]; [Polarity: Horizontal]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	40.9881	-0.52	19.65	19.13	40.00	-20.87	QP
2	62.6507	-0.79	18.11	17.32	40.00	-22.68	QP
3	127.2176	-1.34	19.07	17.73	43.50	-25.77	QP
4	191.0738	-0.73	16.97	16.24	43.50	-27.26	QP
5	437.1199	-0.53	23.65	23.12	46.00	-22.88	QP
6 *	729.3583	2.50	29.00	31.50	46.00	-14.50	QP

Test Result: Pass

[Test mode: TX]; [Polarity: Vertical]



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	36.0007	-0.16	18.93	18.77	40.00	-21.23	QP
2	59.0251	-0.82	18.48	17.66	40.00	-22.34	QP
3	101.6443	2.32	16.06	18.38	43.50	-25.12	QP
4	159.2251	-1.45	20.41	18.96	43.50	-24.54	QP
5	373.3112	-1.37	22.25	20.88	46.00	-25.12	QP
6 *	726.8052	0.78	29.08	29.86	46.00	-16.14	QP

Test Result: Pass

Above 1GHz:

[Test mode: TX low channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4804.000	37.26	6.31	43.57	74.00	-30.43	peak
2		5864.500	38.36	8.93	47.29	74.00	-26.71	peak
3		7206.000	37.28	10.39	47.67	74.00	-26.33	peak
4		8437.750	38.56	11.39	49.95	74.00	-24.05	peak
5		9608.000	36.21	13.01	49.22	74.00	-24.78	peak
6	*	11422.25	38.87	13.37	52.24	74.00	-21.76	peak

Test Result: Pass

[Test mode: TX low channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4804.000	38.32	6.31	44.63	74.00	-29.37	peak
2		5970.250	37.61	8.99	46.60	74.00	-27.40	peak
3		7206.000	37.10	10.39	47.49	74.00	-26.51	peak
4	*	8226.250	39.63	11.34	50.97	74.00	-23.03	peak
5		9608.000	36.24	13.01	49.25	74.00	-24.75	peak
6		11445.75	37.53	13.41	50.94	74.00	-23.06	peak

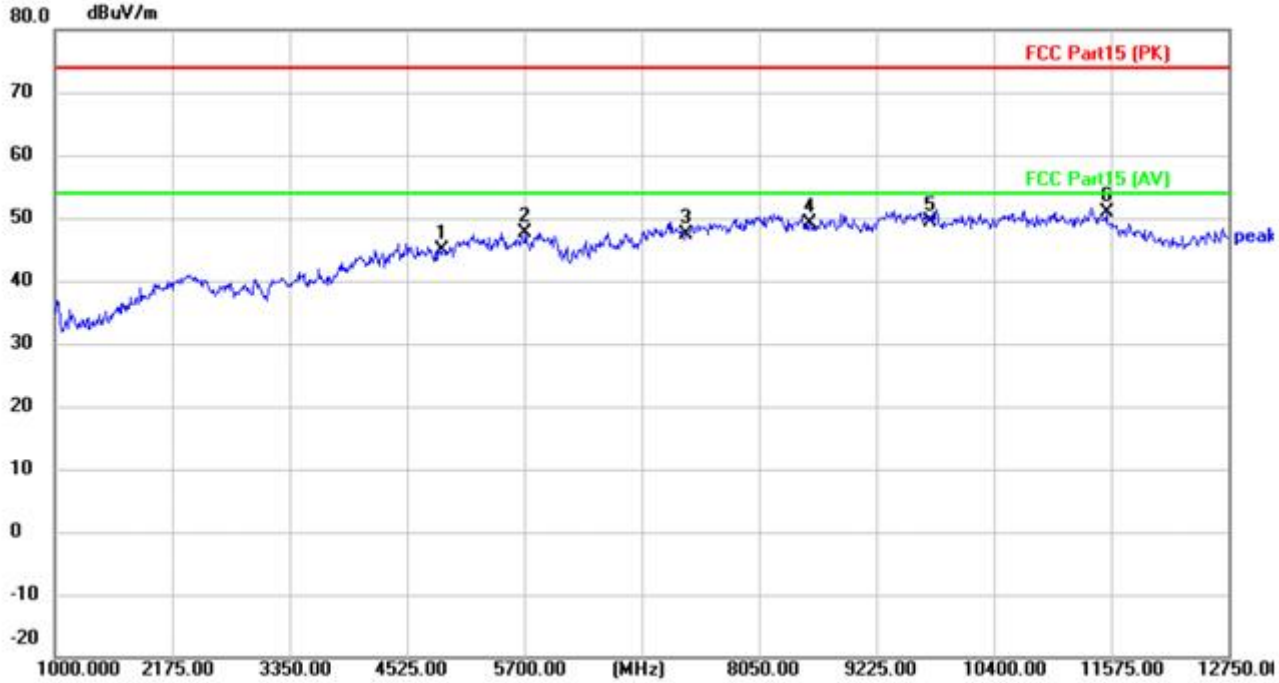
Test Result: Pass

[Test mode: TX middle channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4884.000	38.28	6.45	44.73	74.00	-29.27	peak
2		5864.500	37.82	8.93	46.75	74.00	-27.25	peak
3		7326.000	37.31	10.21	47.52	74.00	-26.48	peak
4	*	8273.250	39.01	11.11	50.12	74.00	-23.88	peak
5		9768.000	35.77	13.75	49.52	74.00	-24.48	peak
6		11128.50	36.32	13.47	49.79	74.00	-24.21	peak

Test Result: Pass

[Test mode: TX middle channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4884.000	38.55	6.45	45.00	74.00	-29.00	peak
2		5711.750	38.98	8.74	47.72	74.00	-26.28	peak
3		7326.000	37.26	10.21	47.47	74.00	-26.53	peak
4		8555.250	37.62	11.48	49.10	74.00	-24.90	peak
5		9768.000	35.54	13.75	49.29	74.00	-24.71	peak
6	*	11528.00	37.41	13.35	50.76	74.00	-23.24	peak

Test Result: Pass

[Test mode: TX High channel]; [Polarity: Horizontal]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4960.000	37.43	7.41	44.84	74.00	-29.16	peak
2		5993.750	38.10	8.96	47.06	74.00	-26.94	peak
3		7440.000	38.70	11.03	49.73	74.00	-24.27	peak
4		8802.000	37.93	12.27	50.20	74.00	-23.80	peak
5		9920.000	35.59	13.16	48.75	74.00	-25.25	peak
6	*	11410.50	37.19	13.34	50.53	74.00	-23.47	peak

Test Result: Pass

[Test mode: TX High channel]; [Polarity: Vertical]

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		4960.000	37.79	7.41	45.20	74.00	-28.80	peak
2		5993.750	36.65	8.96	45.61	74.00	-28.39	peak
3		7440.000	37.11	11.03	48.14	74.00	-25.86	peak
4		8849.000	36.58	11.80	48.38	74.00	-25.62	peak
5		9920.000	34.78	13.16	47.94	74.00	-26.06	peak
6	*	11316.50	36.61	12.76	49.37	74.00	-24.63	peak

Test Result: Pass

6.9 Radiated emissions which fall in the restricted bands

Test Standard	47 CFR Part 15, Subpart C 15.247
Test Method	ANSI C63.10 (2013) Section 6.10.5
Test Mode (Pre-Scan)	TX
Test Mode (Final Test)	TX

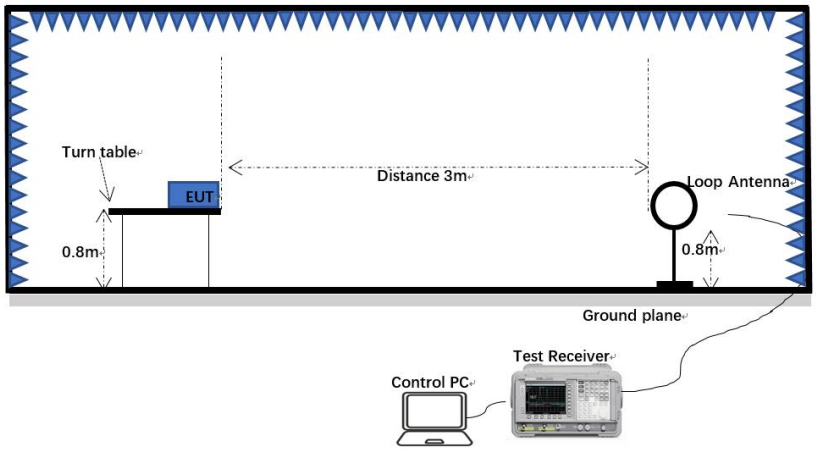
6.9.1 Limit

Frequency(MHz)	Field strength(microvolts/meter)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

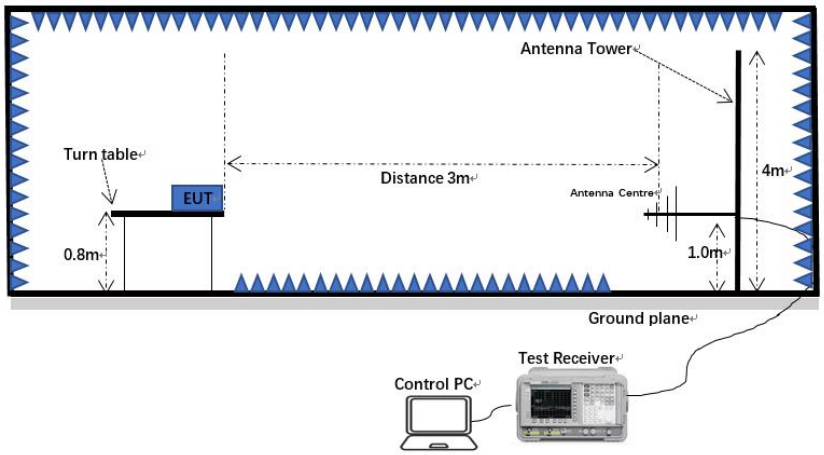
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.

6.9.2 Test setup

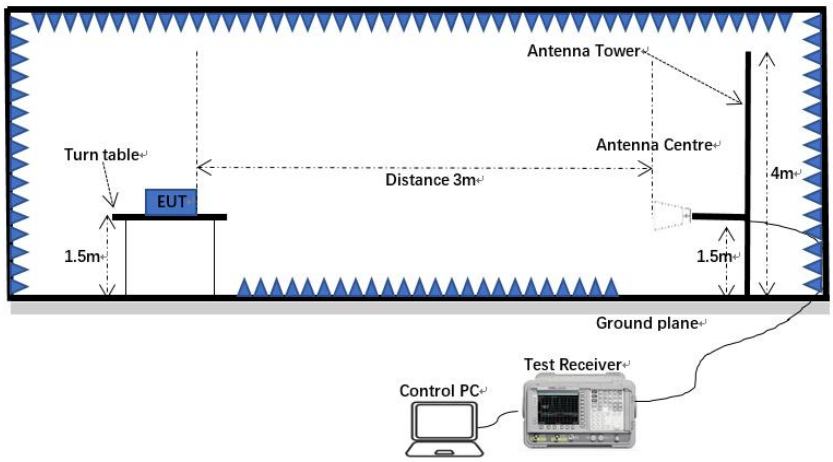
Below 1GHz：



30MHz-1GHz：



Above 1GHz：



6.9.3 Procedure

a) For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b) For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c) The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d) The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f) The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g) If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h) Test the EUT in the lowest channel, the middle channel, the highest channel.

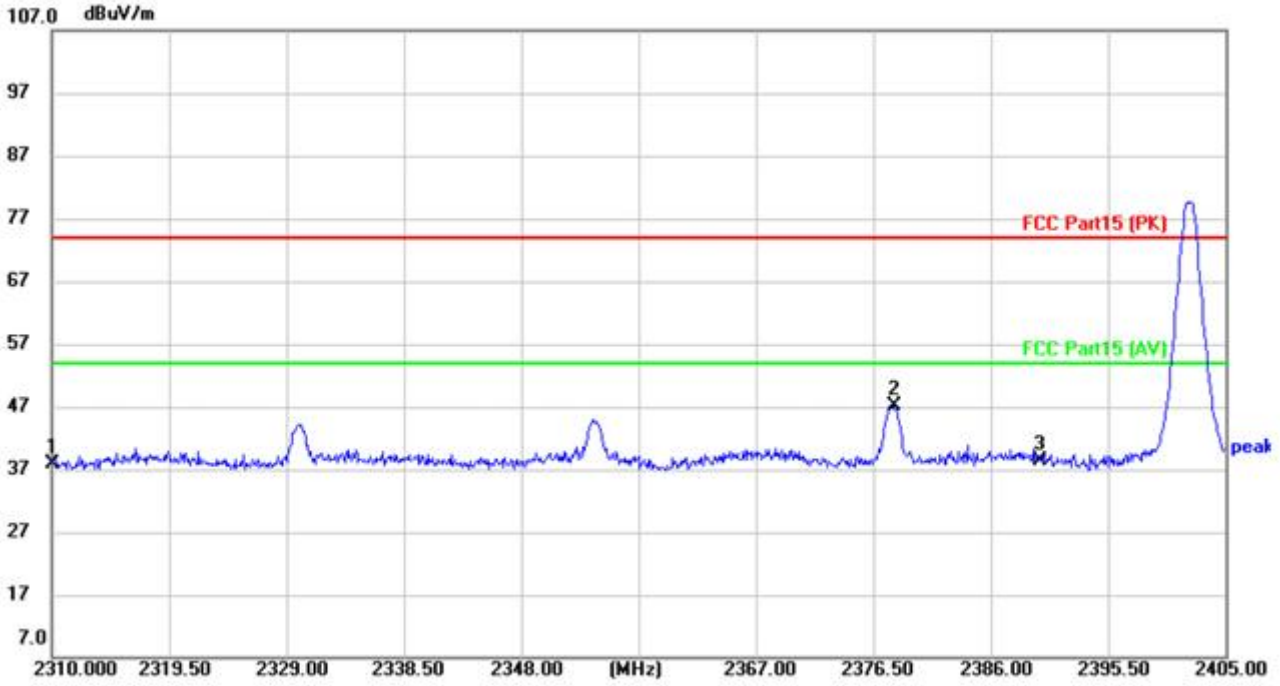
i) The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j) Repeat above procedures until all frequencies measured was complete.

Note 1: Level (dBuV) = Reading (dBuV) + Factor (dB/m)
Note 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

6.9.4 Test data

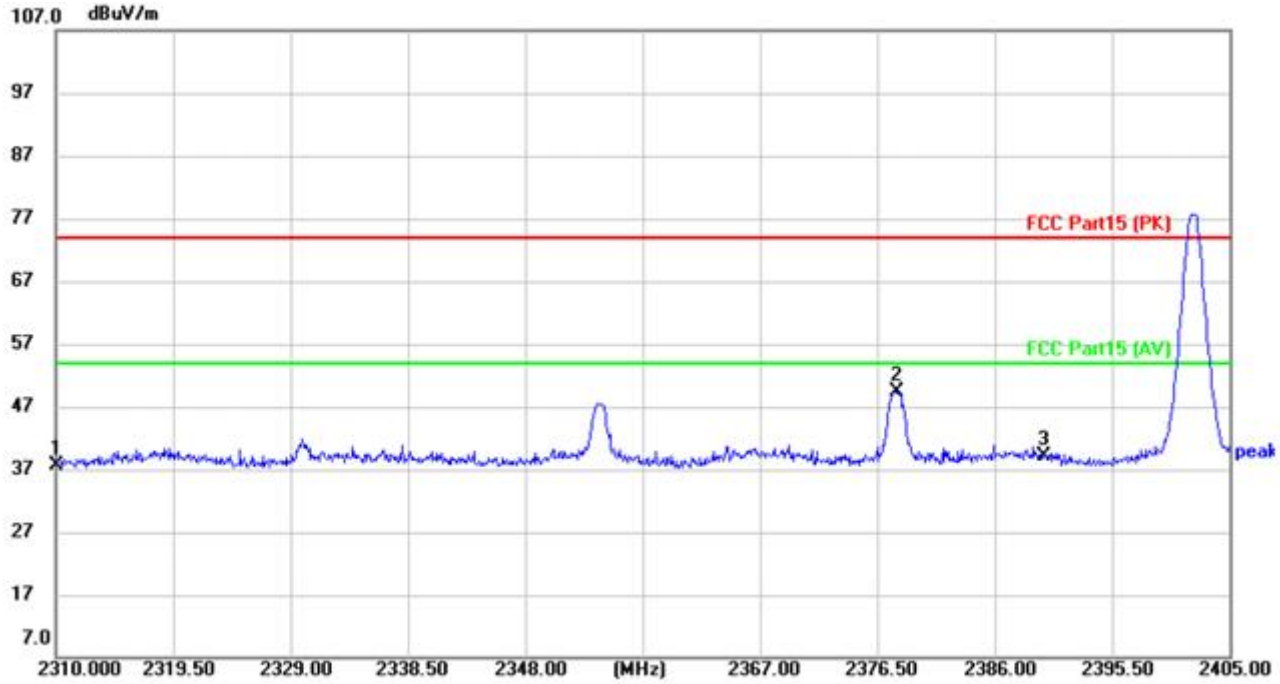
[Test mode: TX low channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2310.000	40.73	-2.87	37.86	74.00	-36.14	peak
2	*	2378.210	49.73	-2.51	47.22	74.00	-26.78	peak
3		2390.000	40.75	-2.44	38.31	74.00	-35.69	peak

Test Result: Pass

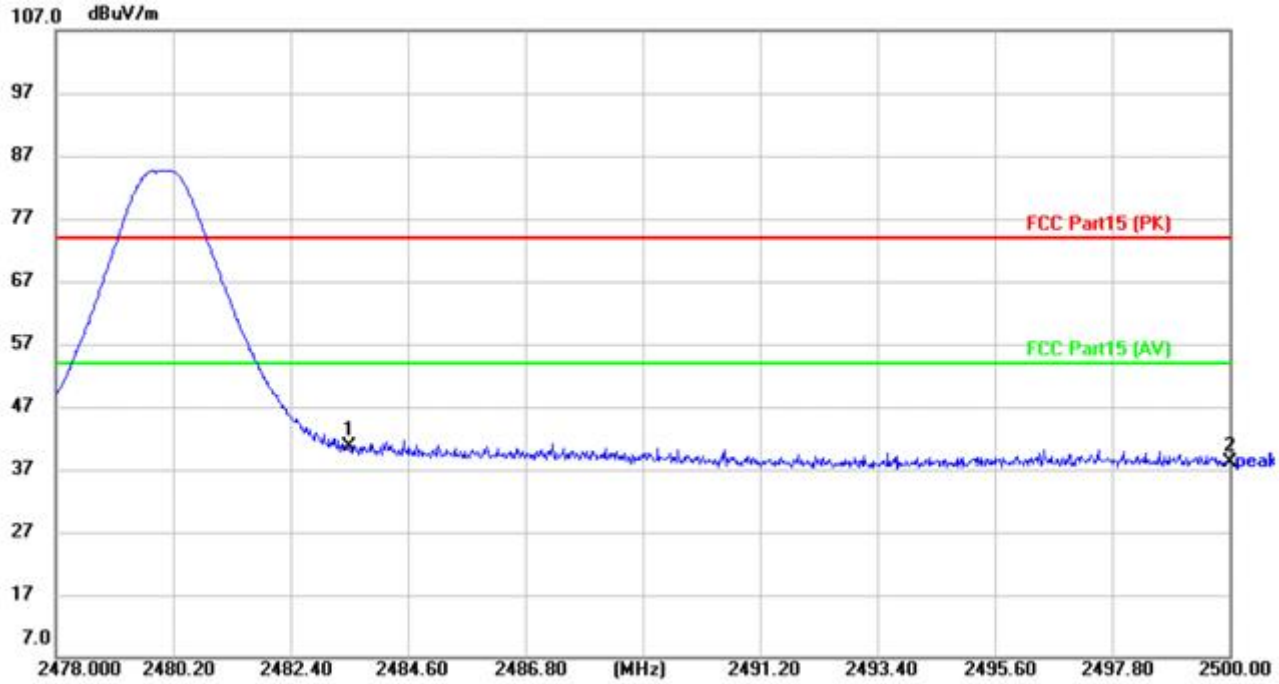
[Test mode:TX low channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1		2310.000	40.61	-2.87	37.74	74.00	-36.26	peak
2	*	2378.115	52.01	-2.51	49.50	74.00	-24.50	peak
3		2390.000	41.52	-2.44	39.08	74.00	-34.92	peak

Test Result: Pass

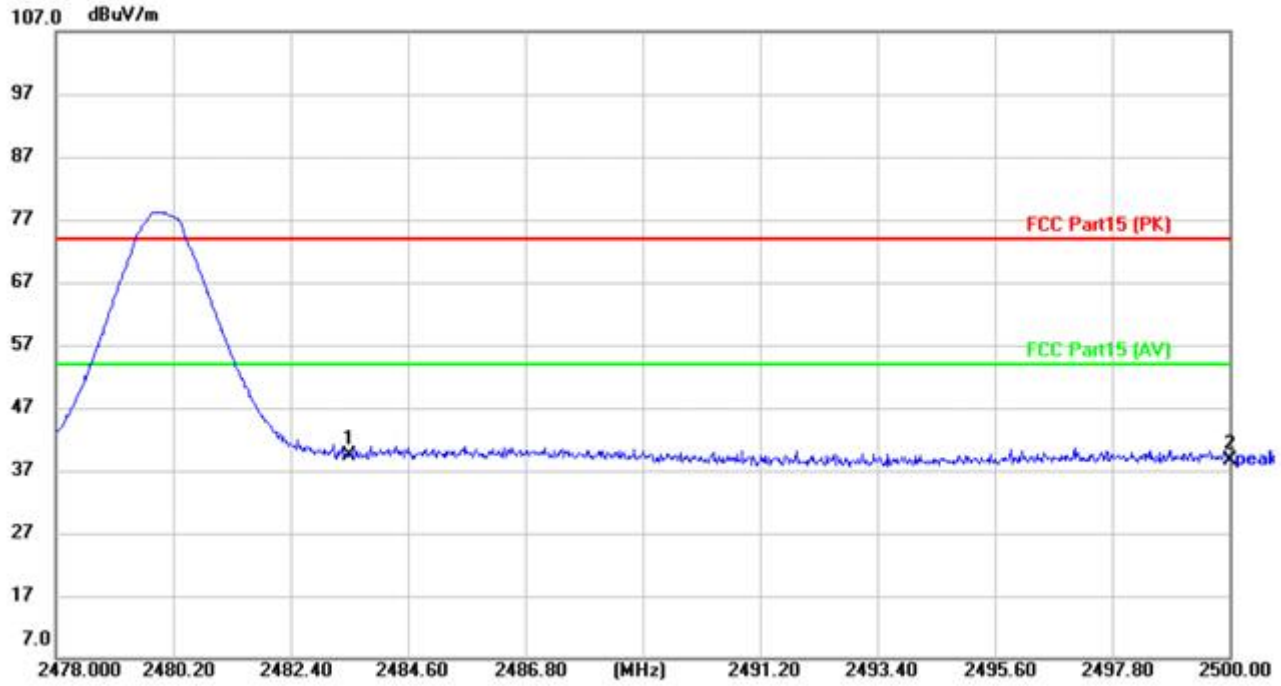
[Test mode: TX High channel]; [Polarity: Horizontal]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	2483.500	43.58	-2.91	40.67	74.00	-33.33	peak
2		2500.000	41.19	-3.00	38.19	74.00	-35.81	peak

Test Result: Pass

[Test mode:TX High channel]; [Polarity: Vertical]



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector
1	*	2483.500	42.29	-2.91	39.38	74.00	-34.62	peak
2		2500.000	41.52	-3.00	38.52	74.00	-35.48	peak

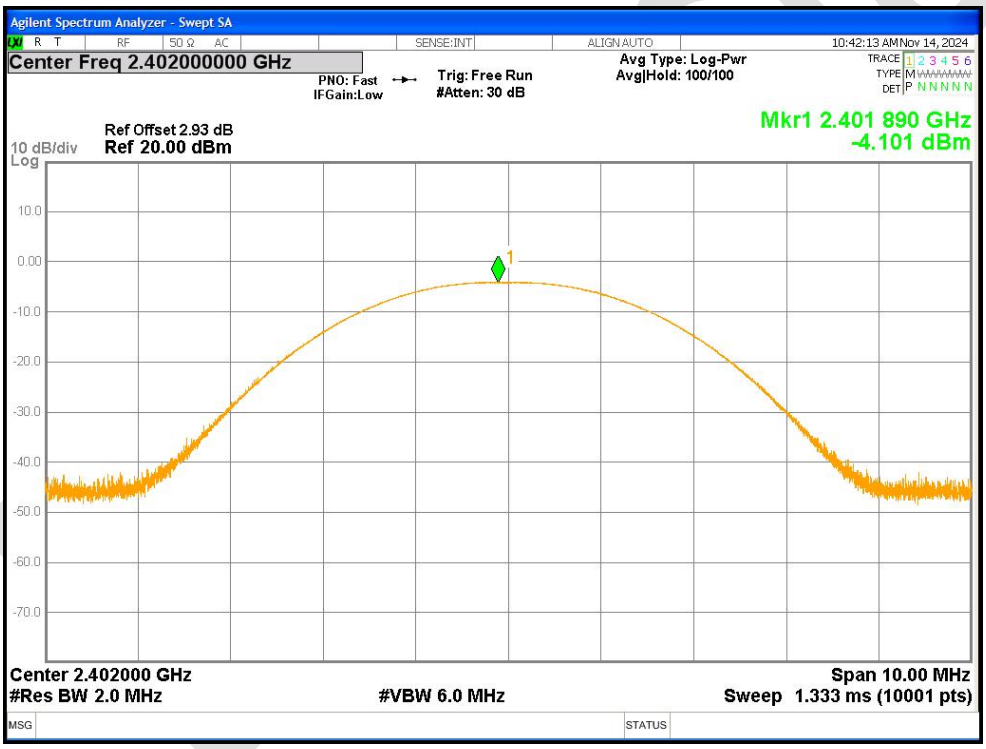
Test Result: Pass

7 Appendix A

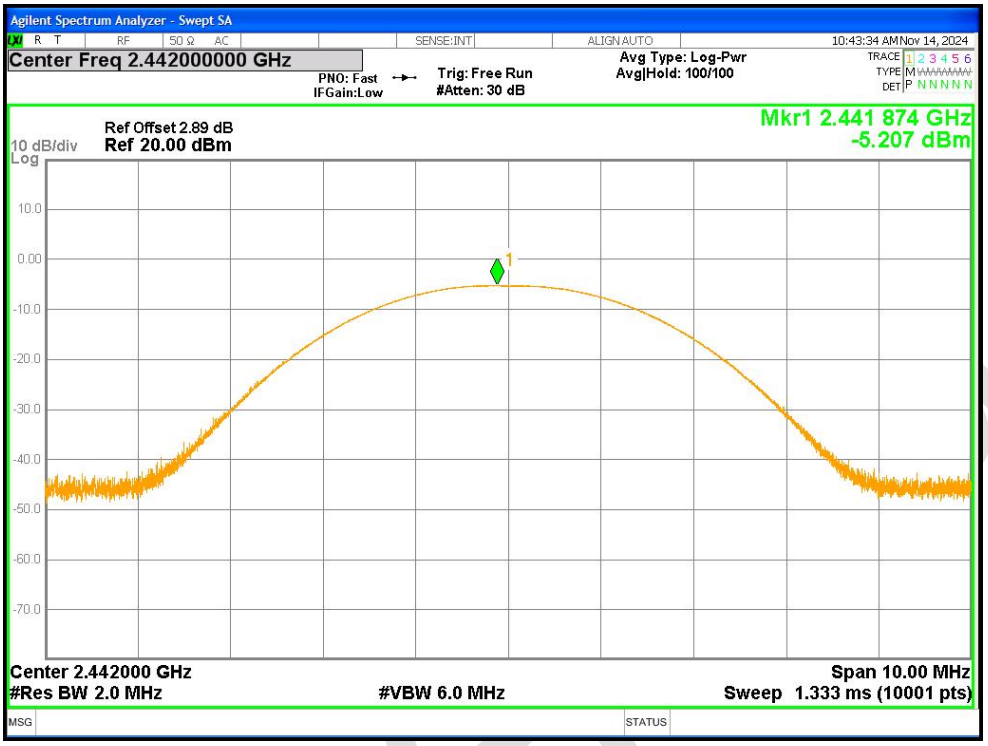
7.1 Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-4.101	30	Pass
NVNT	BLE 1M	2442	Ant1	-5.207	30	Pass
NVNT	BLE 1M	2480	Ant1	-7.59	30	Pass

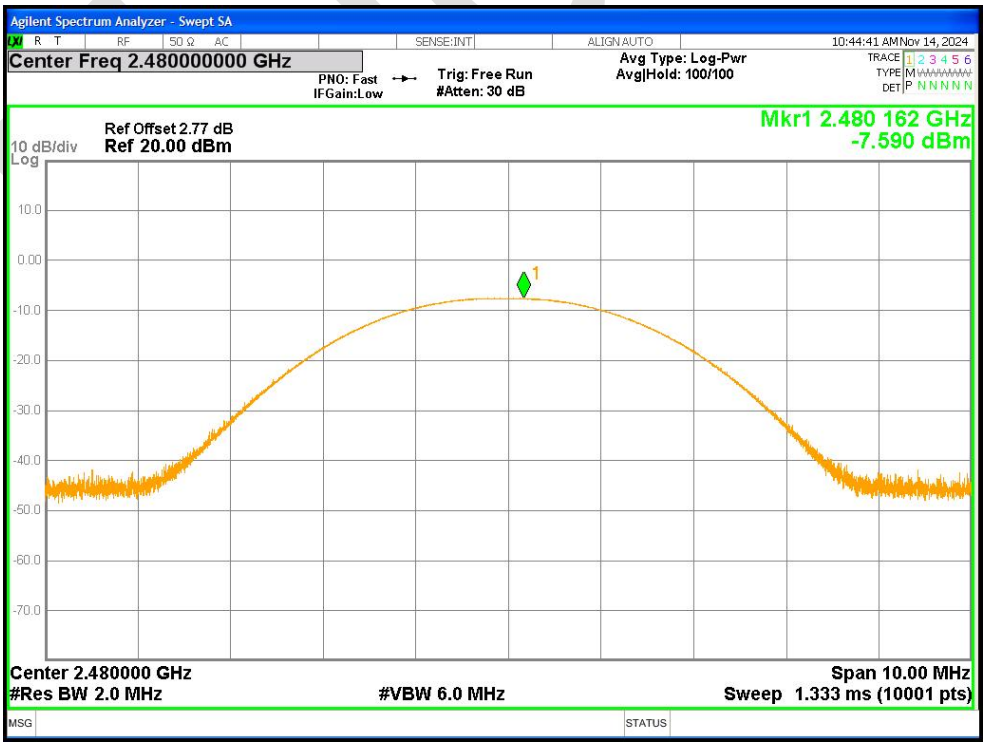
Power NVNT BLE 1M 2402MHz Ant1



Power NVNT BLE 1M 2442MHz Ant1



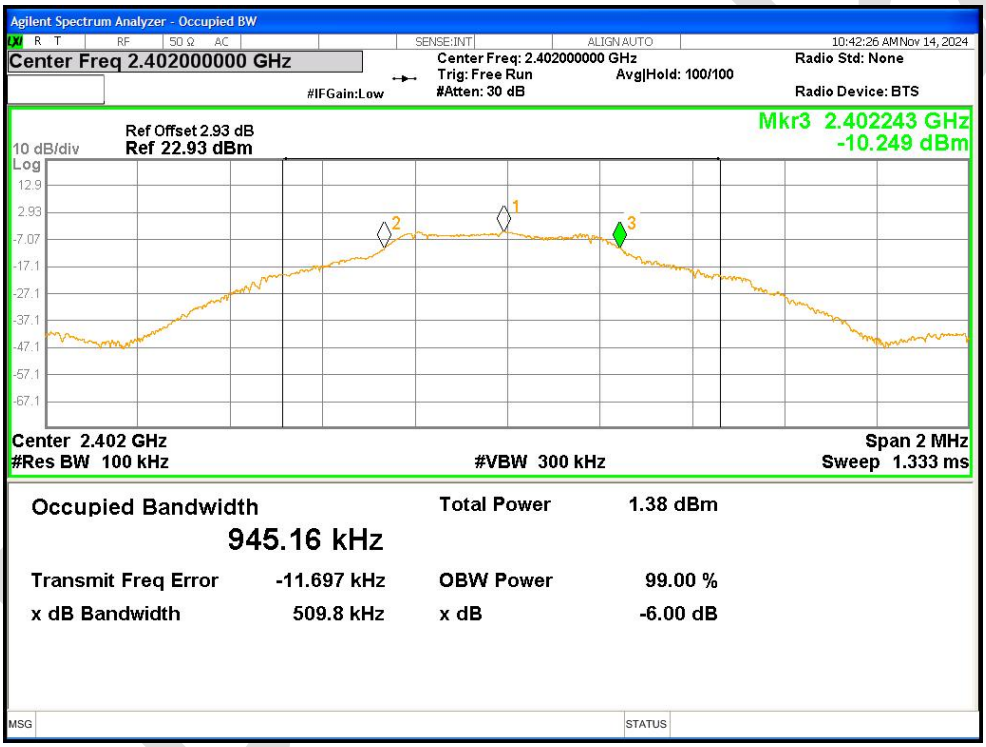
Power NVNT BLE 1M 2480MHz Ant1



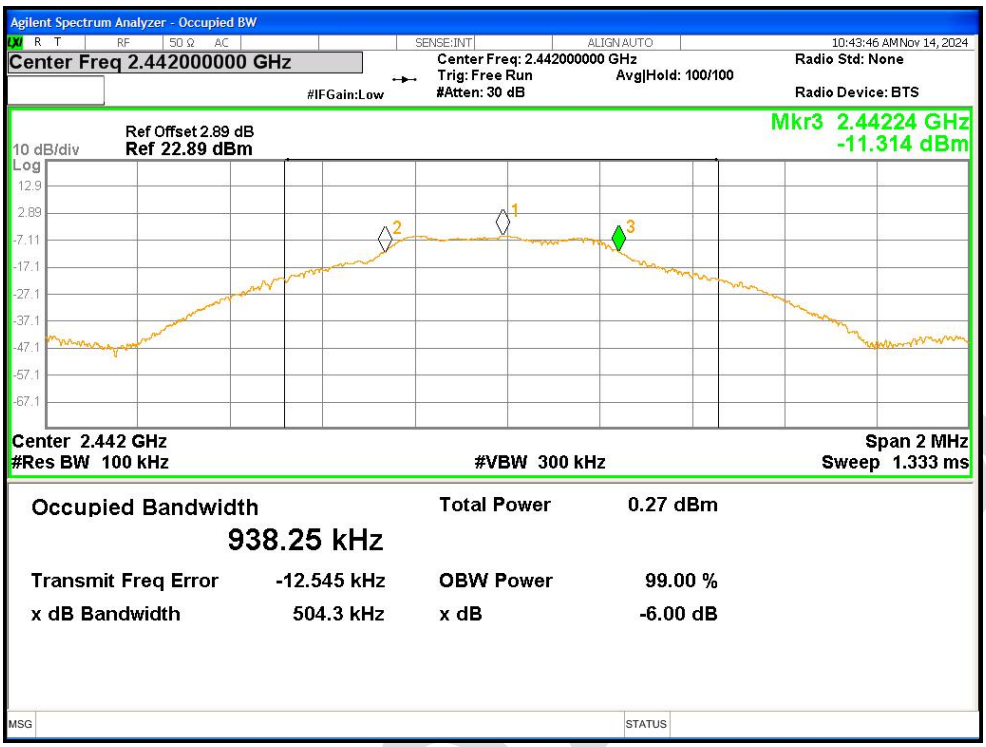
7.2 -6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE 1M	2402	Ant1	0.51	0.5	Pass
NVNT	BLE 1M	2442	Ant1	0.504	0.5	Pass
NVNT	BLE 1M	2480	Ant1	0.509	0.5	Pass

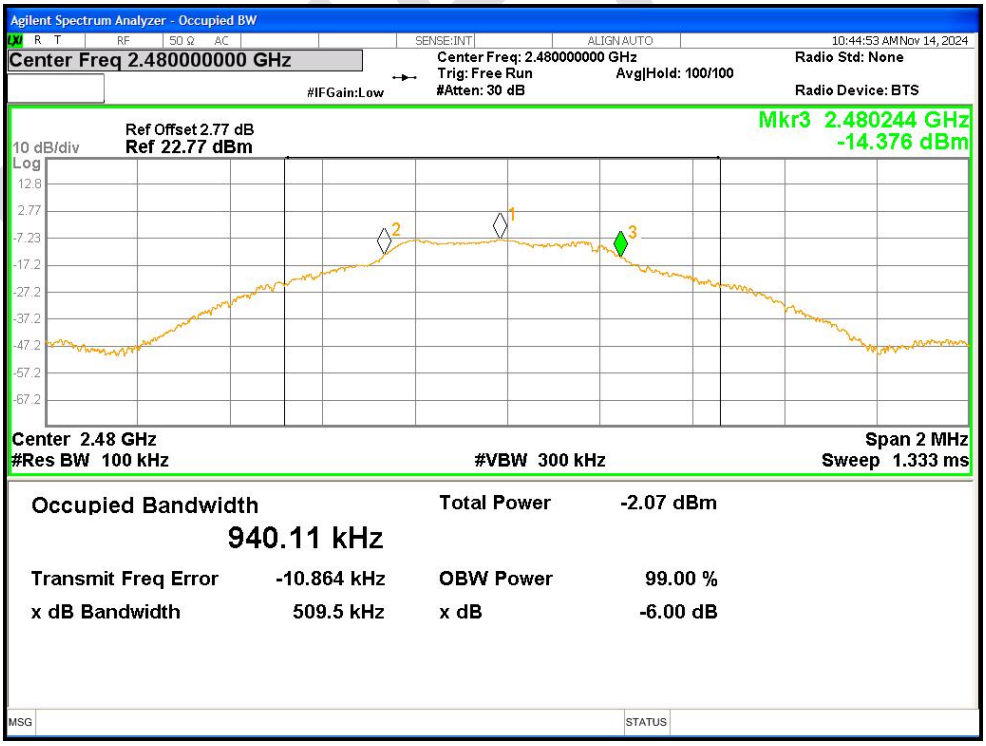
-6dB Bandwidth NVNT BLE 1M 2402MHz Ant1



-6dB Bandwidth NVNT BLE 1M 2442MHz Ant1



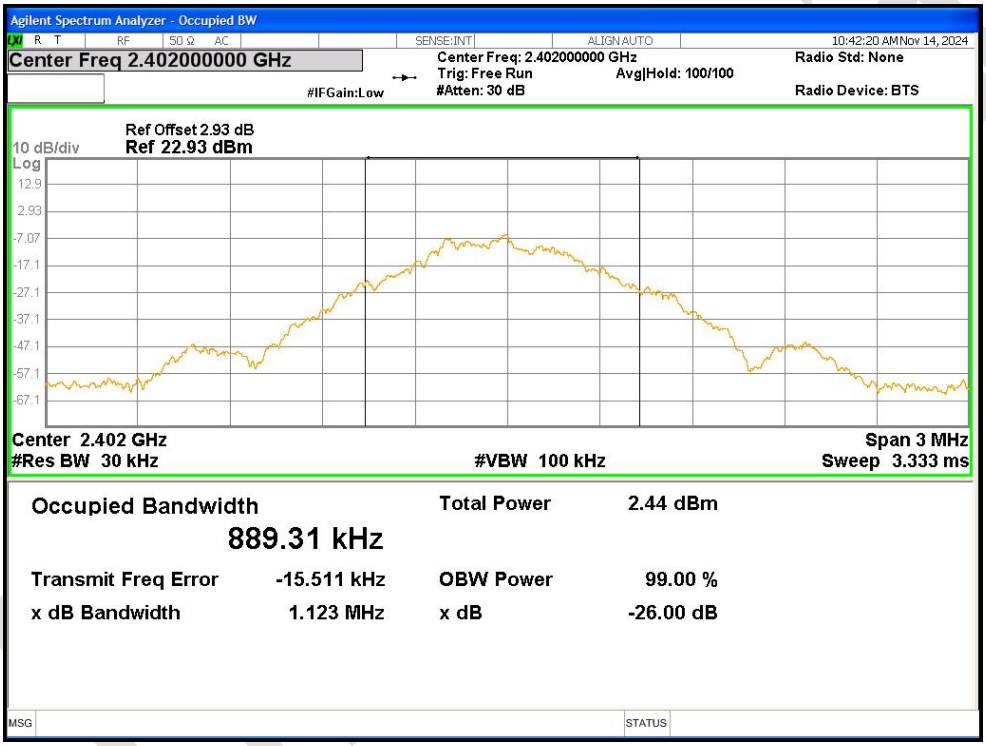
-6dB Bandwidth NVNT BLE 1M 2480MHz Ant1



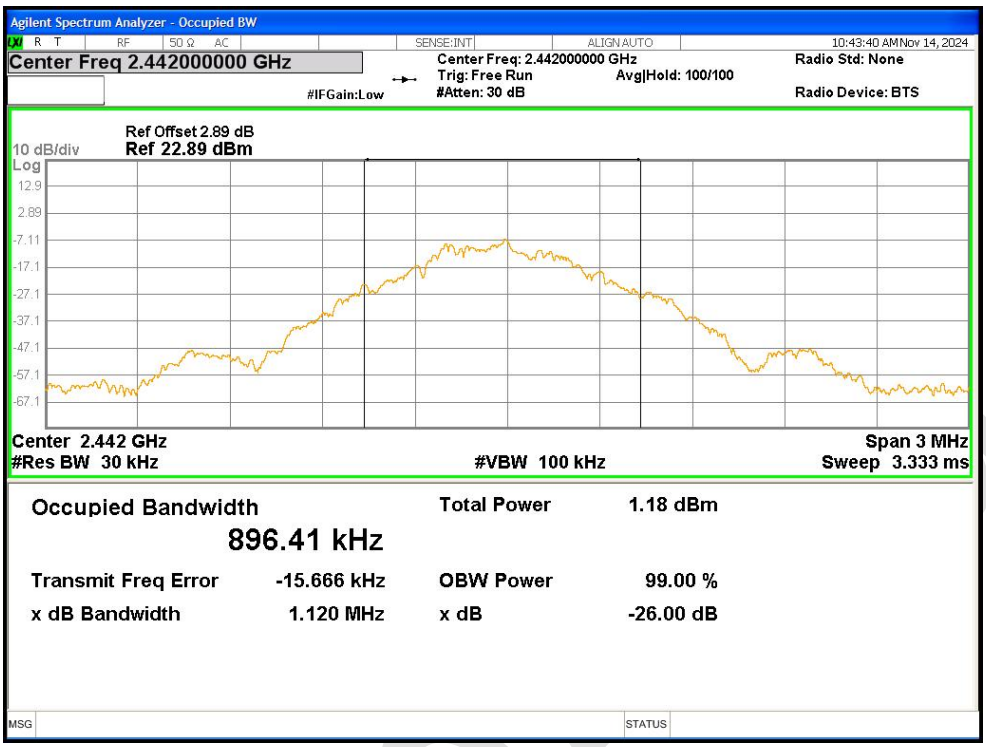
7.3 Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE 1M	2402	Ant1	0.88931
NVNT	BLE 1M	2442	Ant1	0.89641
NVNT	BLE 1M	2480	Ant1	0.89811

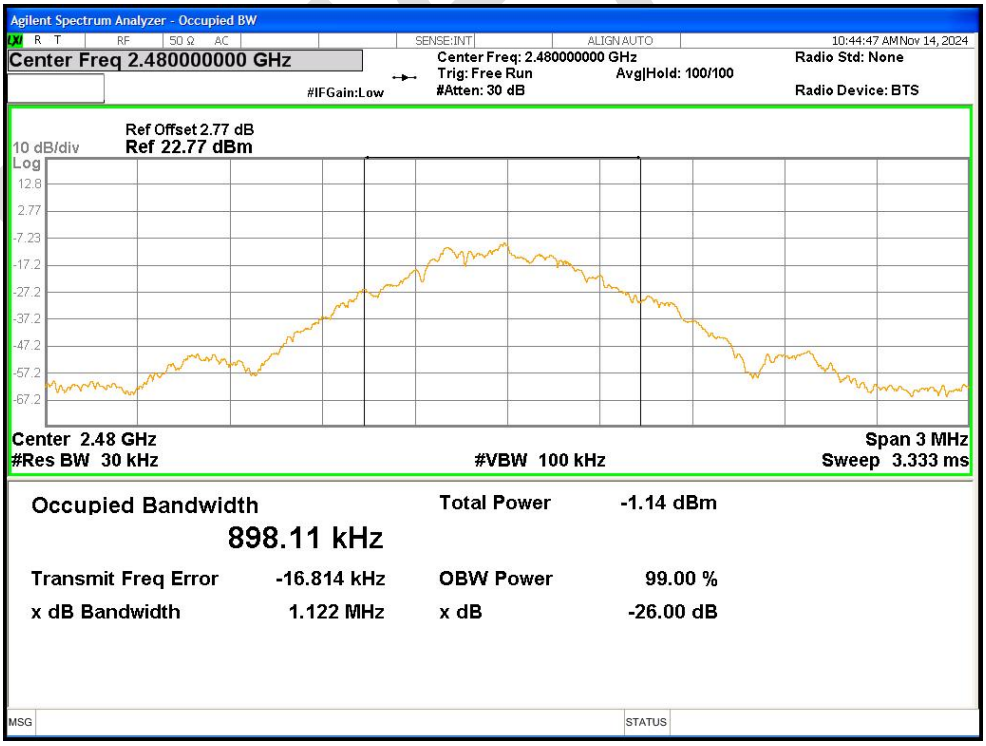
OBW NVNT BLE 1M 2402MHz Ant1



OBW NVNT BLE 1M 2442MHz Ant1



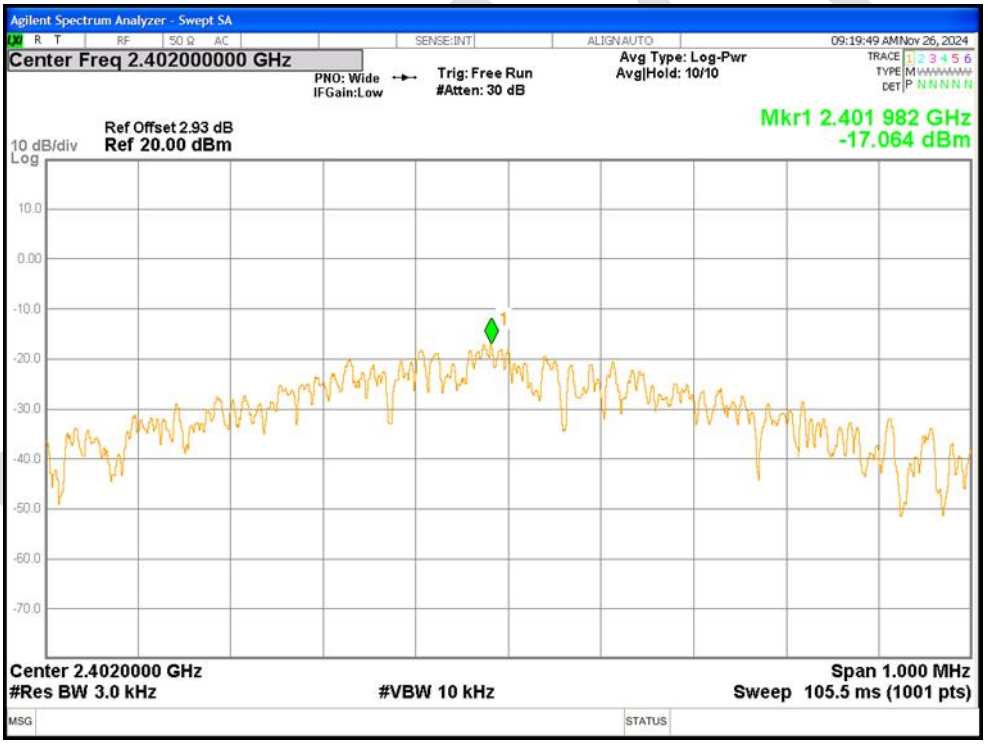
OBW NVNT BLE 1M 2480MHz Ant1



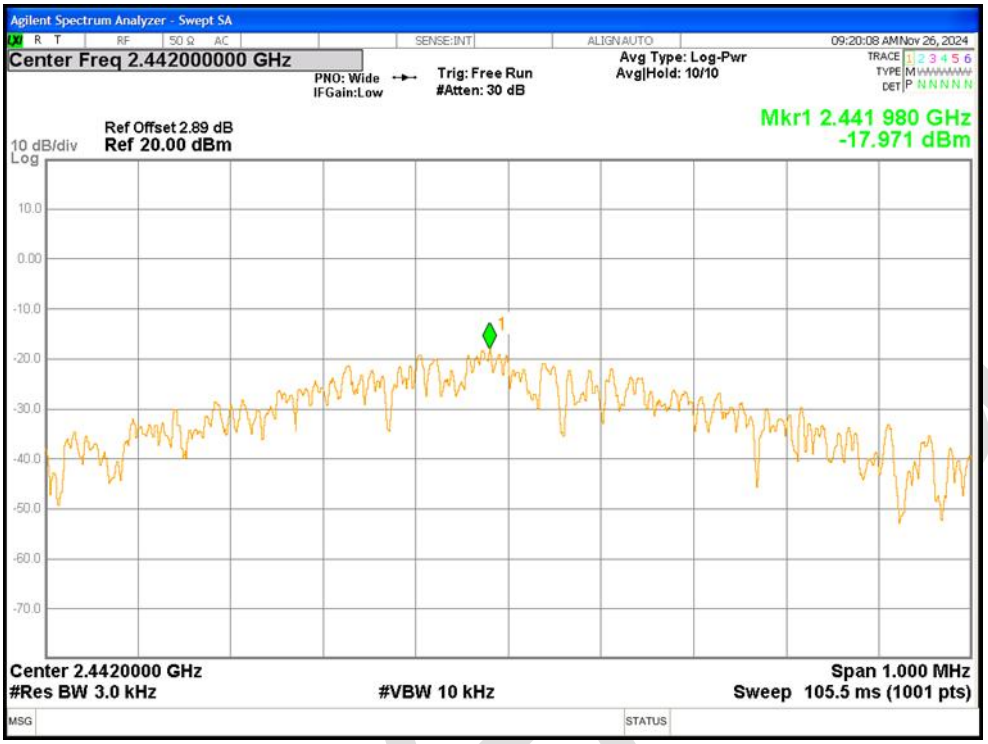
7.4 Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE 1M	2402	Ant1	-17.064	8	Pass
NVNT	BLE 1M	2442	Ant1	-17.971	8	Pass
NVNT	BLE 1M	2480	Ant1	-20.201	8	Pass

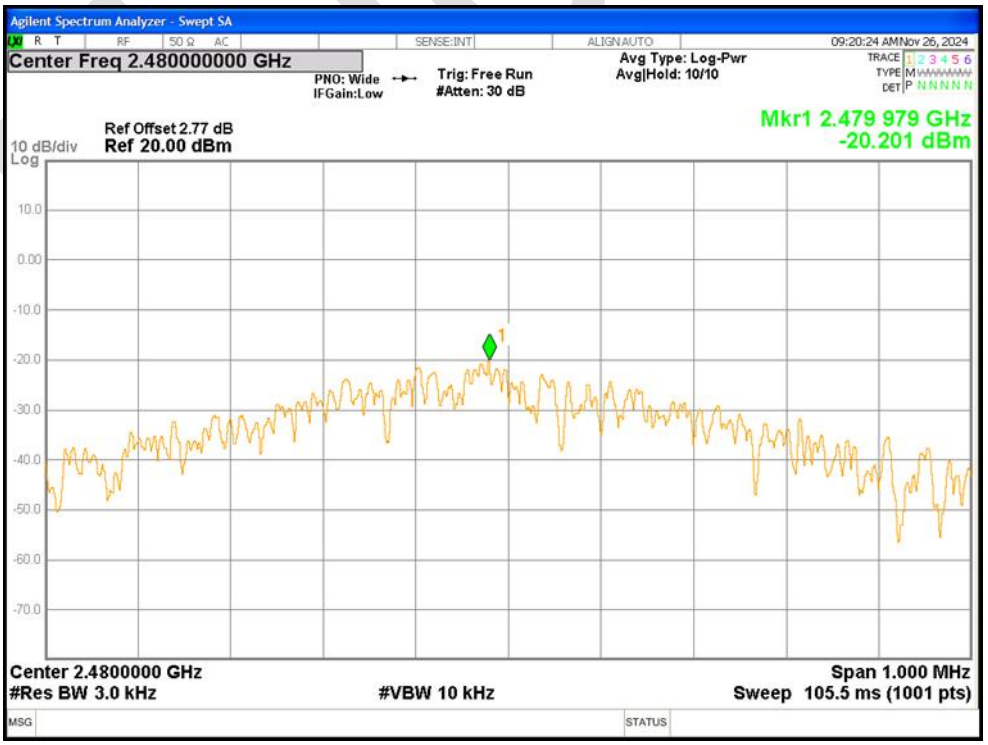
PSD NVNT BLE 1M 2402MHz Ant1



PSD NVNT BLE 1M 2442MHz Ant1



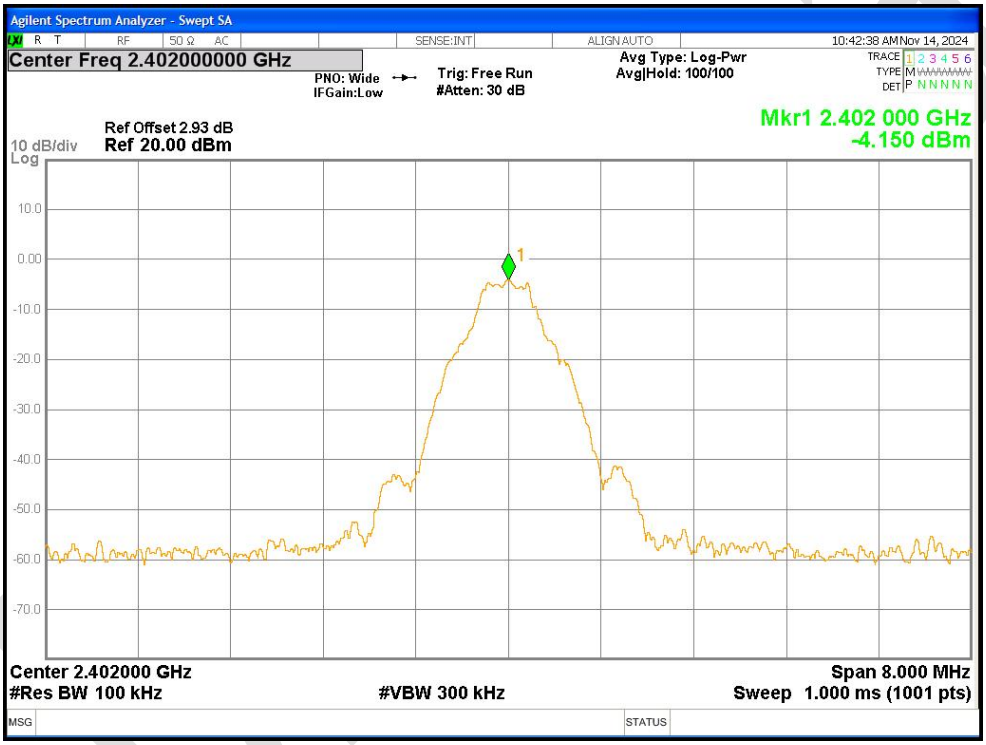
PSD NVNT BLE 1M 2480MHz Ant1



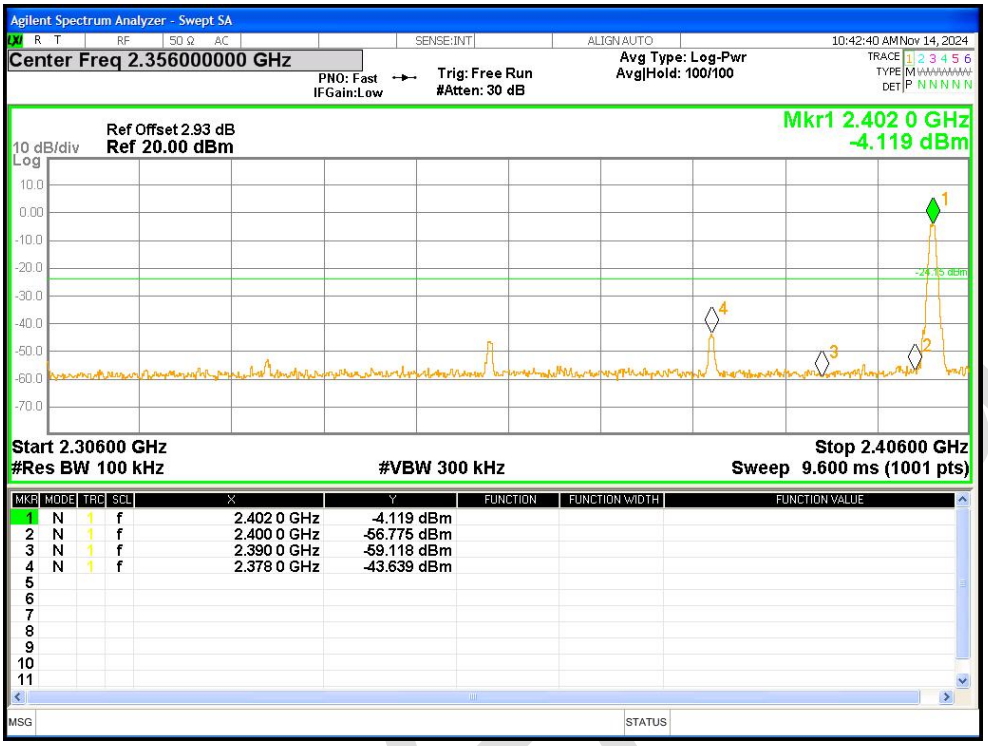
7.5 Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-39.48	-20	Pass
NVNT	BLE 1M	2480	Ant1	-34.51	-20	Pass

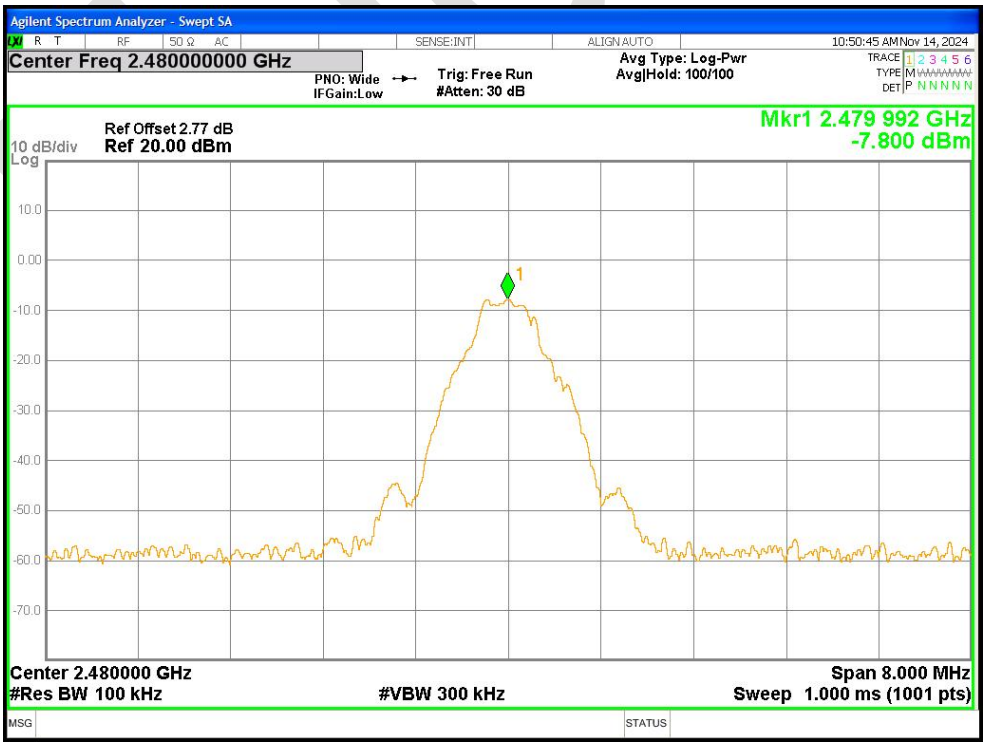
Band Edge NVNT BLE 1M 2402MHz Ant1 Ref



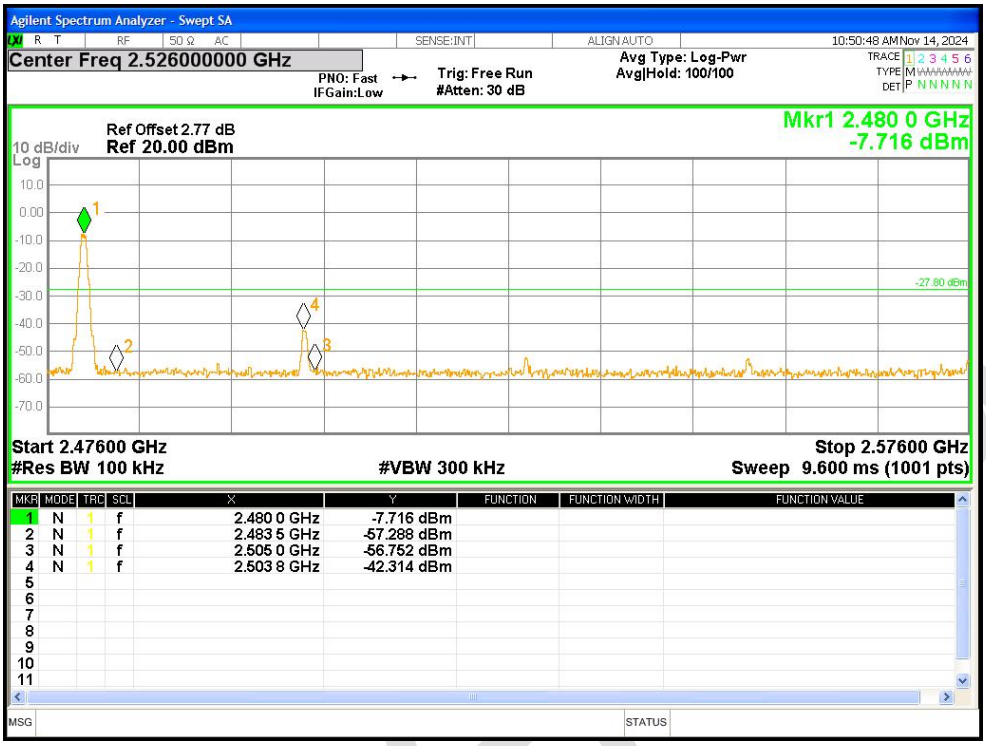
Band Edge NVNT BLE 1M 2402MHz Ant1 Emission



Band Edge NVNT BLE 1M 2480MHz Ant1 Ref



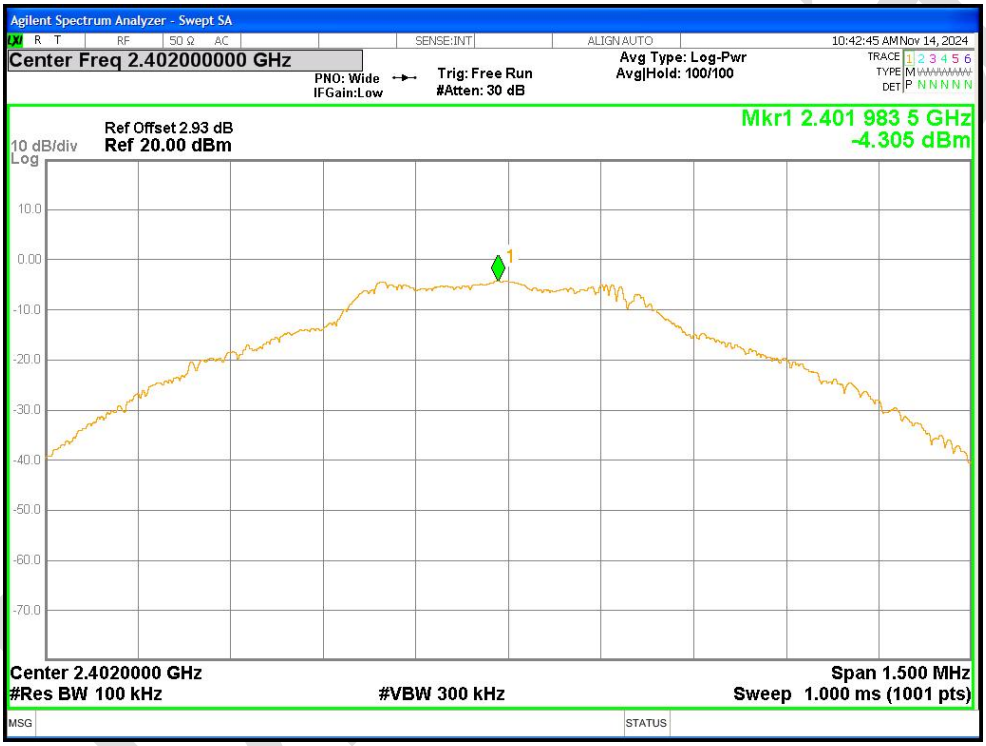
Band Edge NVNT BLE 1M 2480MHz Ant1 Emission



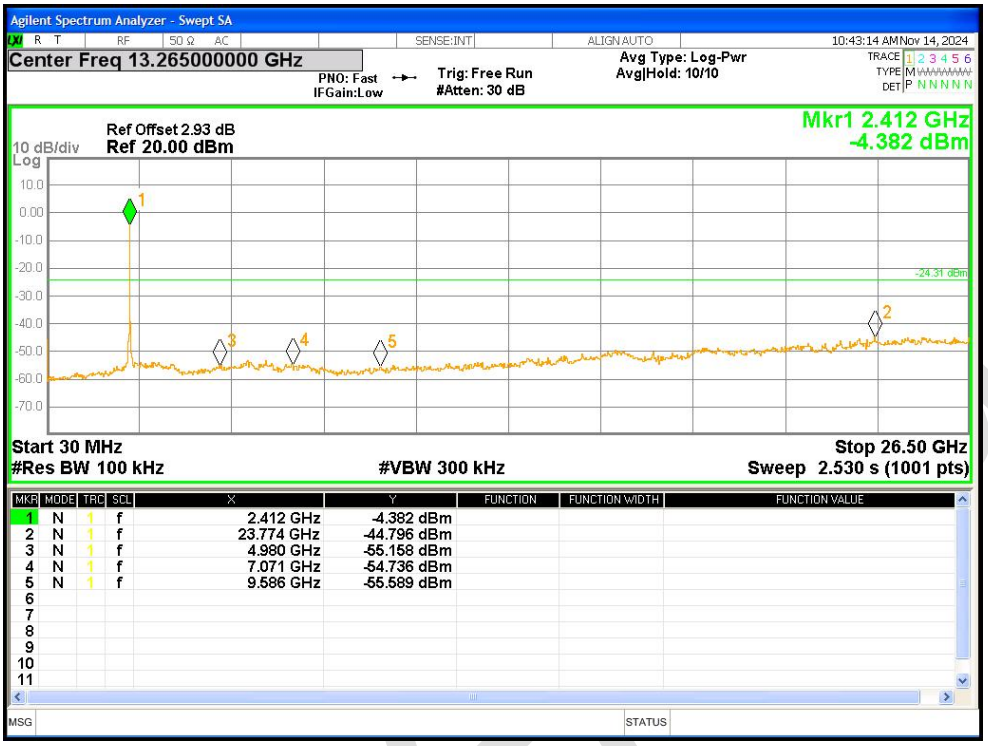
7.6 Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE 1M	2402	Ant1	-40.49	-20	Pass
NVNT	BLE 1M	2442	Ant1	-39.16	-20	Pass
NVNT	BLE 1M	2480	Ant1	-37	-20	Pass

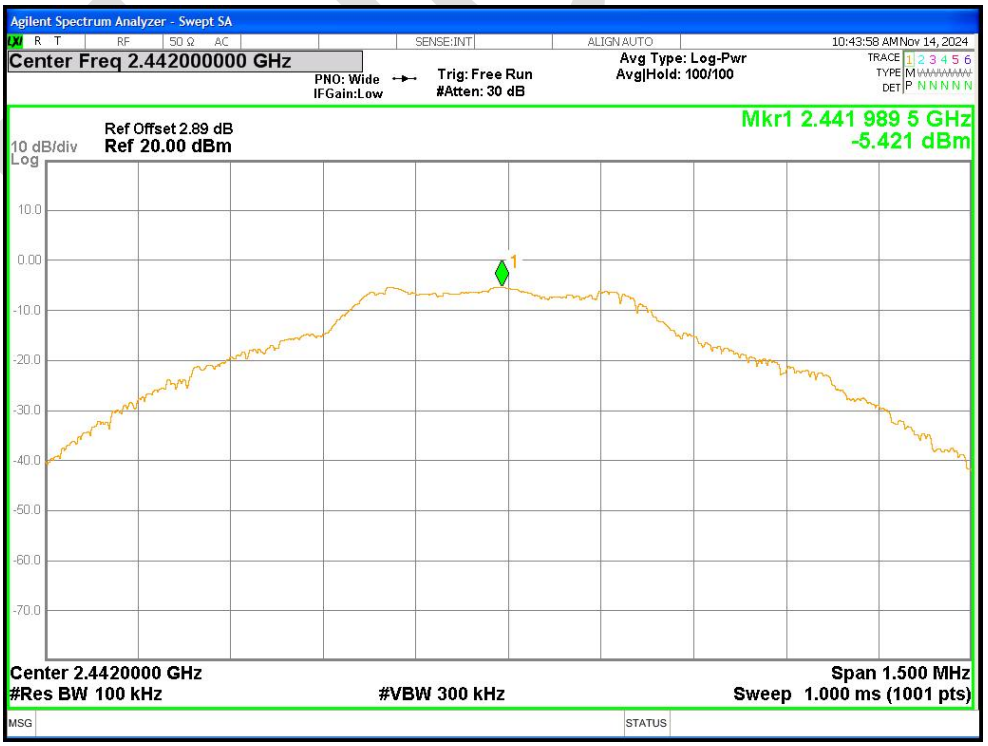
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Ref



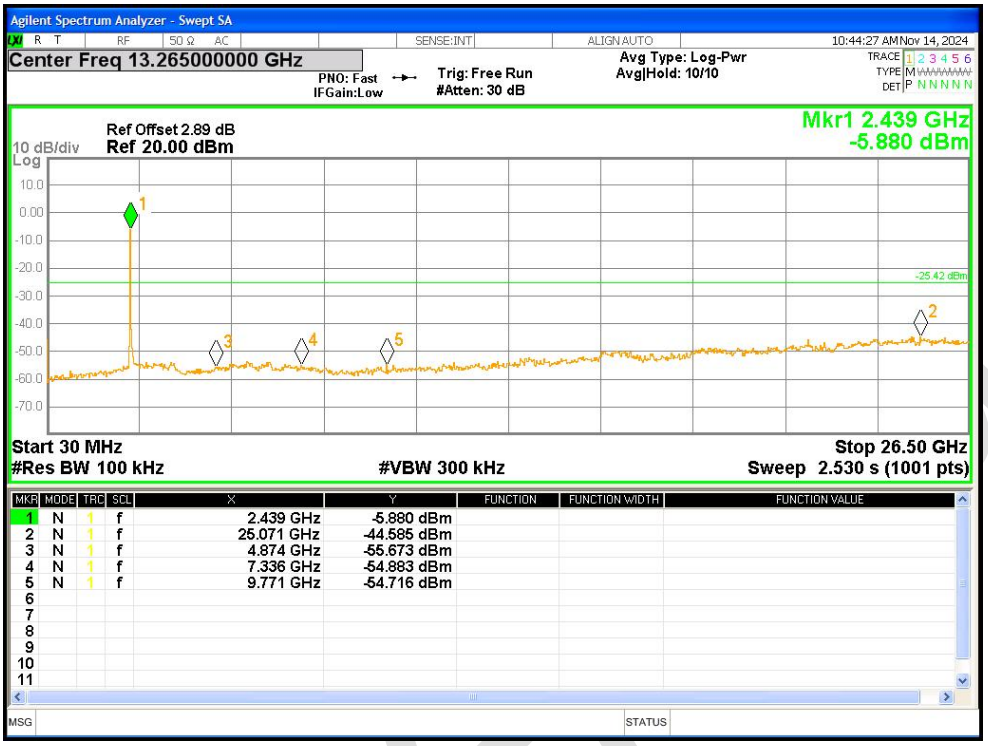
Tx. Spurious NVNT BLE 1M 2402MHz Ant1 Emission



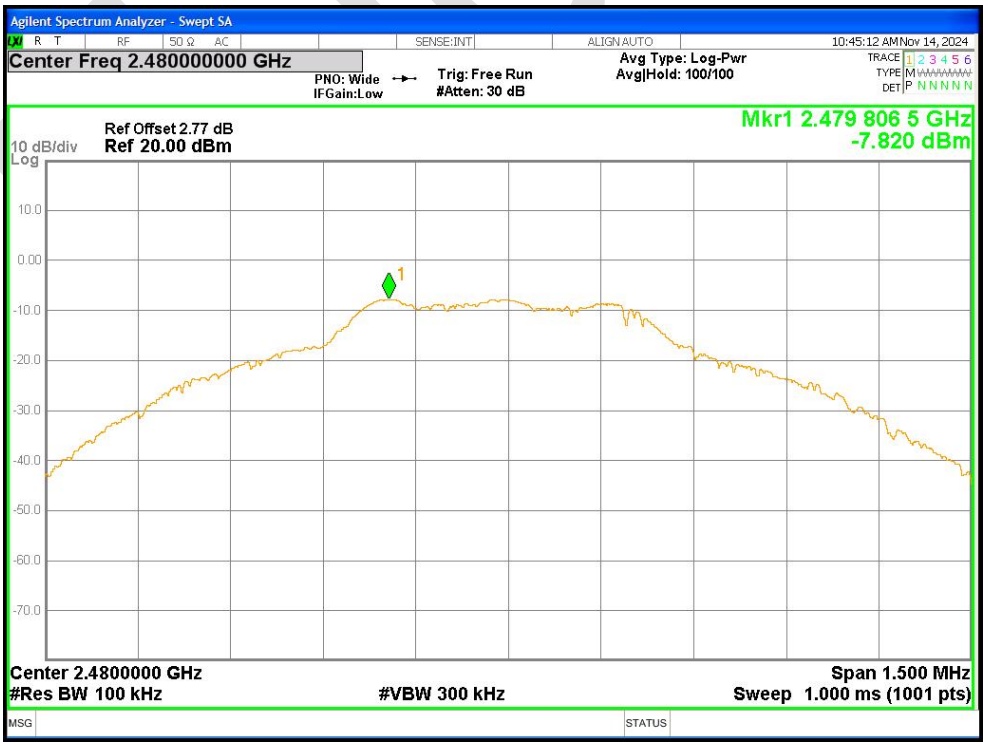
Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Ref



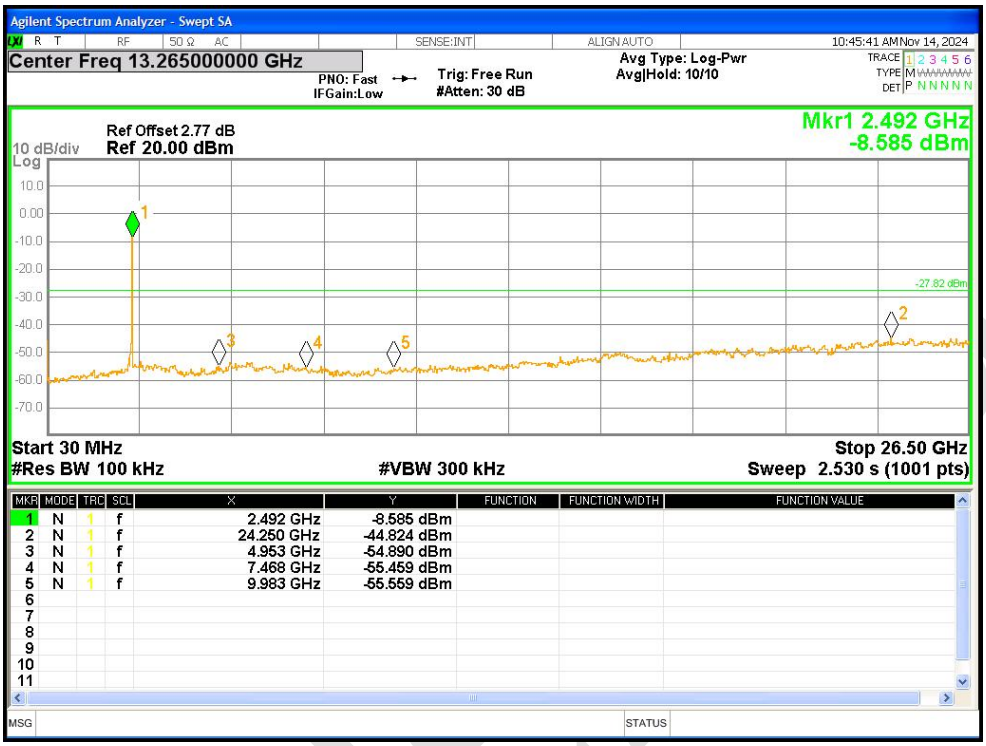
Tx. Spurious NVNT BLE 1M 2442MHz Ant1 Emission



Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Ref



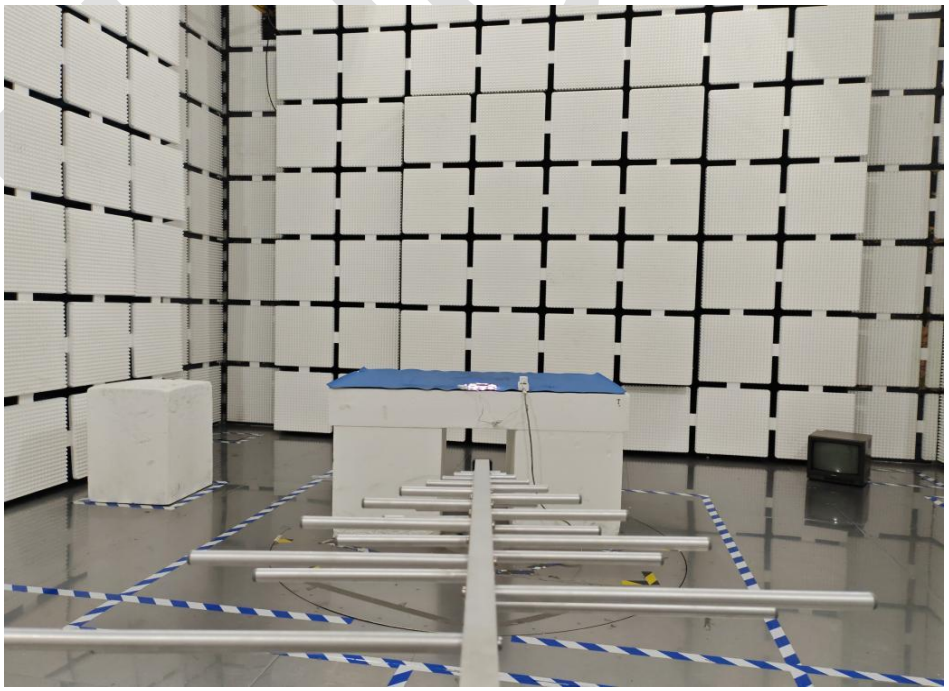
Tx. Spurious NVNT BLE 1M 2480MHz Ant1 Emission



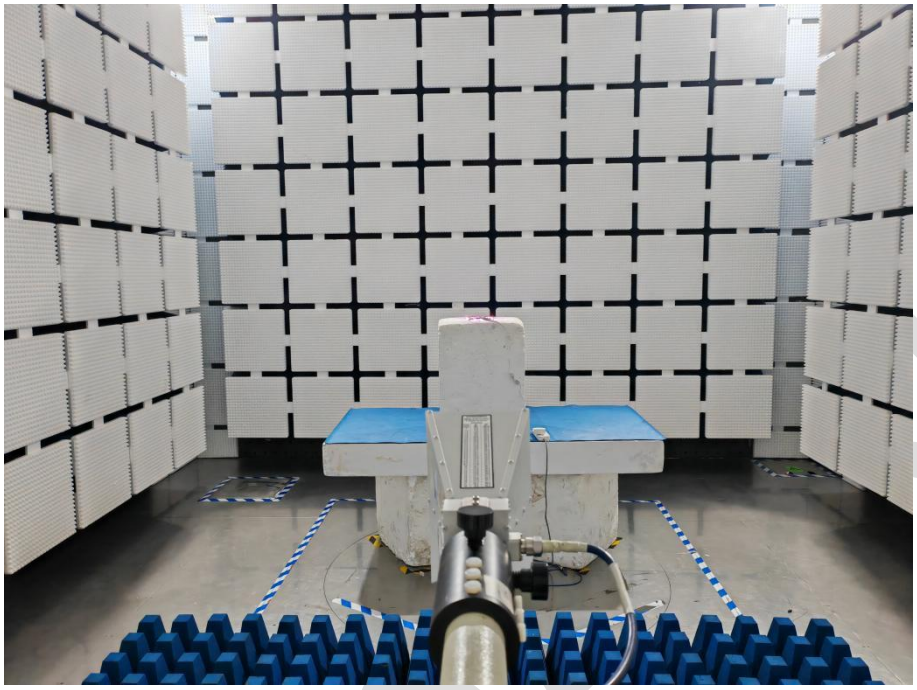
Appendix B: photographs of test setup

Conducted Emissions at Mains Terminals (150 kHz-30MHz)

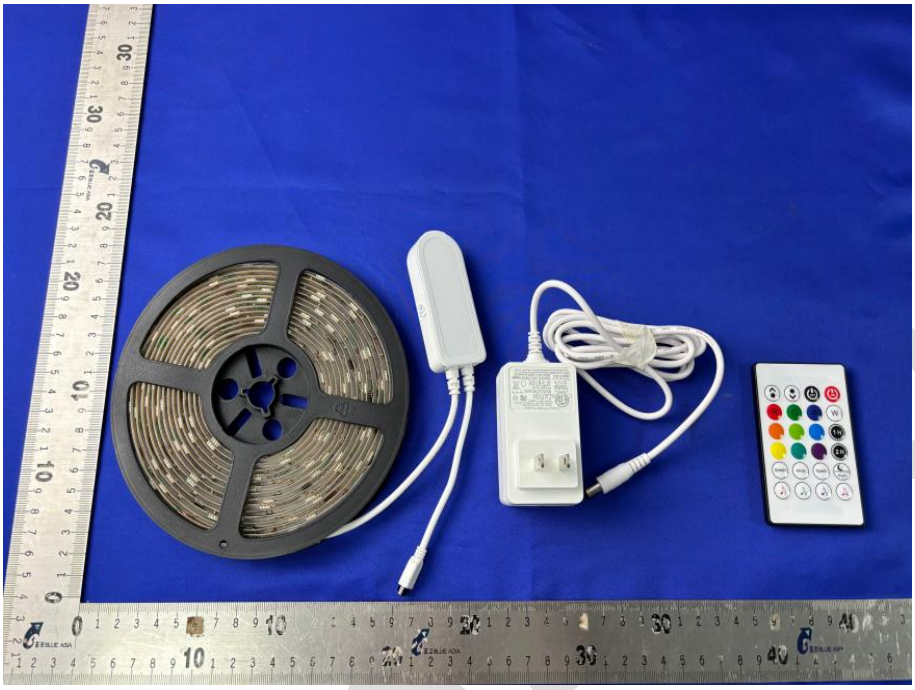
Radiated Emissions (30MHz-1GHz)



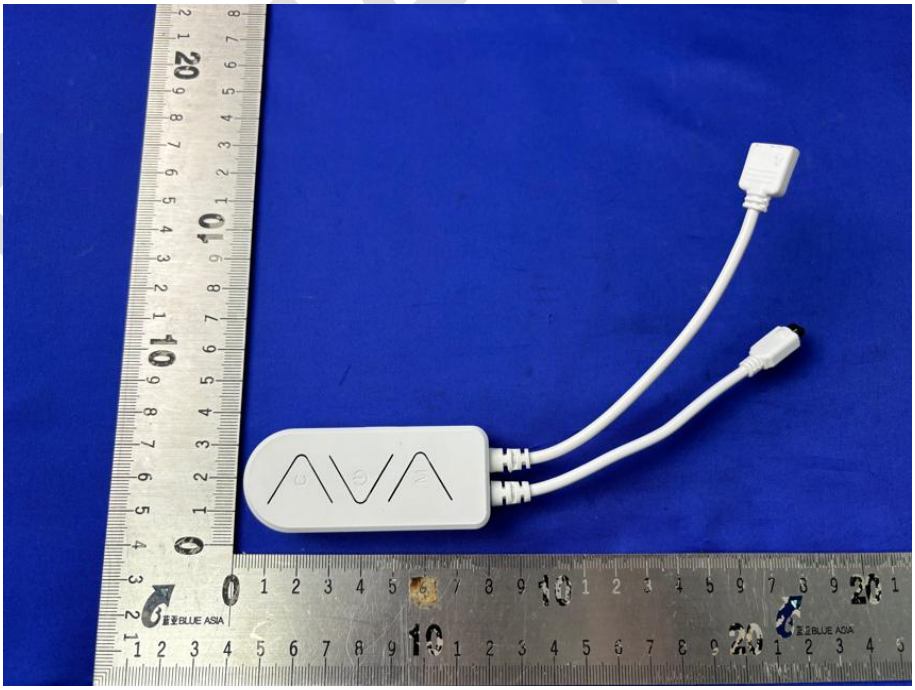
Radiated Emissions (above 1GHz)



Appendix C: photographs of EUT



View of Product-1



View of Product-2