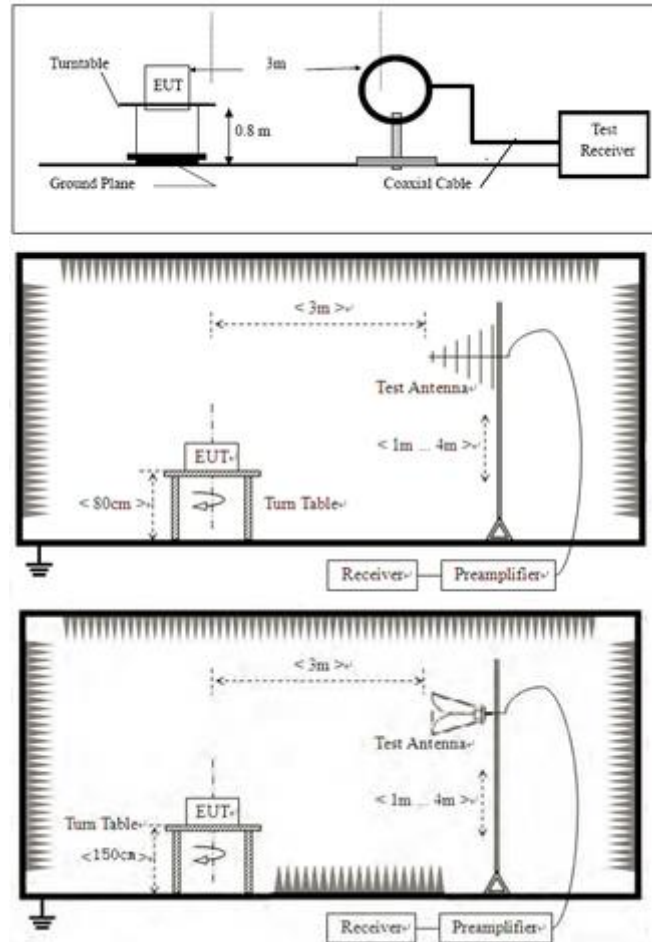### 13.2 BLOCK DIAGRAM OF TEST SETUP

13.3 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.
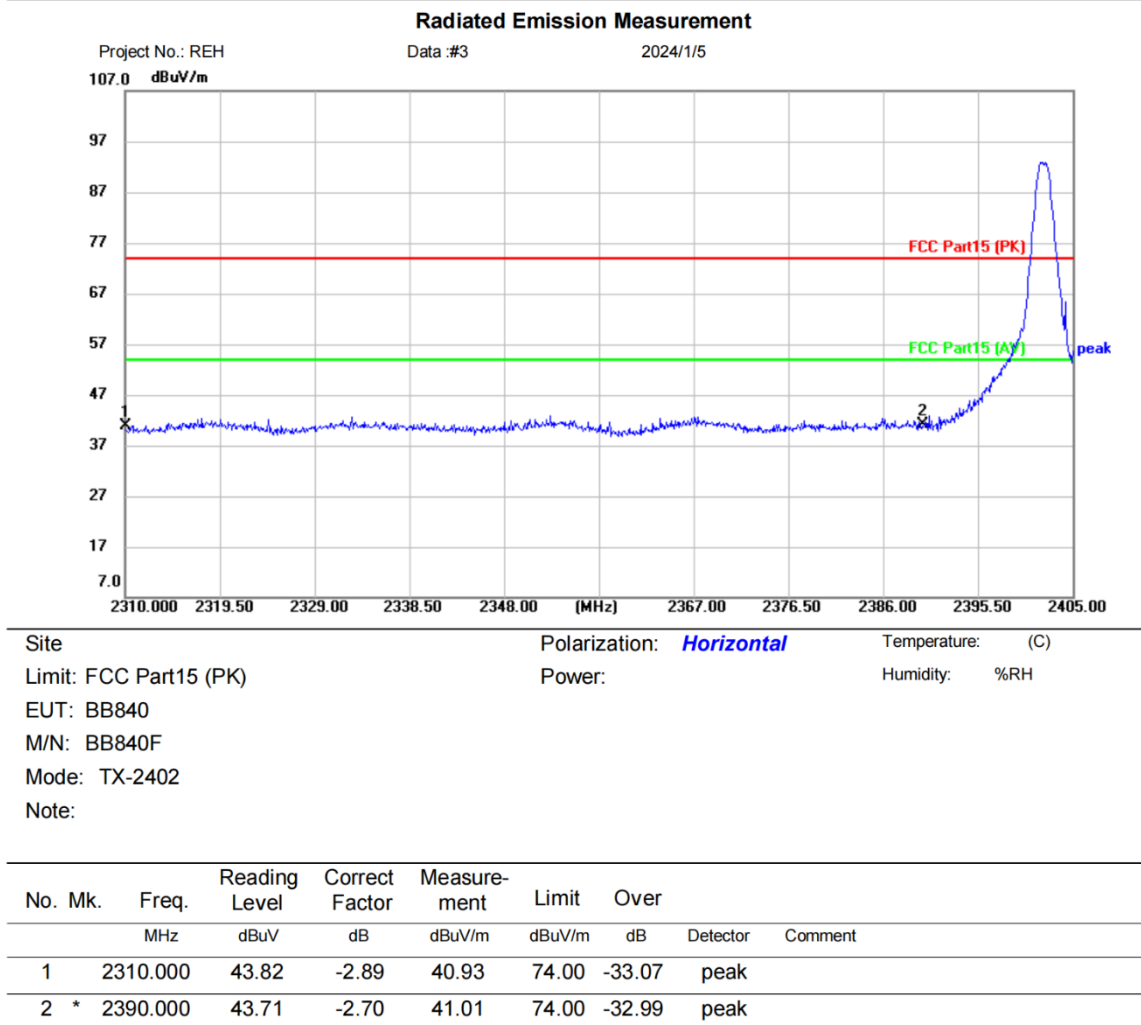
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

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.

Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 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.

13.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Horizontal]

Radiated Emission Measurement

Project No.: REH Data :#3 2024/1/5

Site

Limit: FCC Part15 (PK)

EUT: BB840

M/N: BB840F

Mode: TX-2402

Note:

Polarization: *Horizontal* Temperature: (C)

Power: Humidity: %RH

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1		2310.000	43.82	-2.89	40.93	74.00	-33.07	peak	
2	*	2390.000	43.71	-2.70	41.01	74.00	-32.99	peak	

*:Maximum data   x:Over limit   !:over margin   〈Reference Only

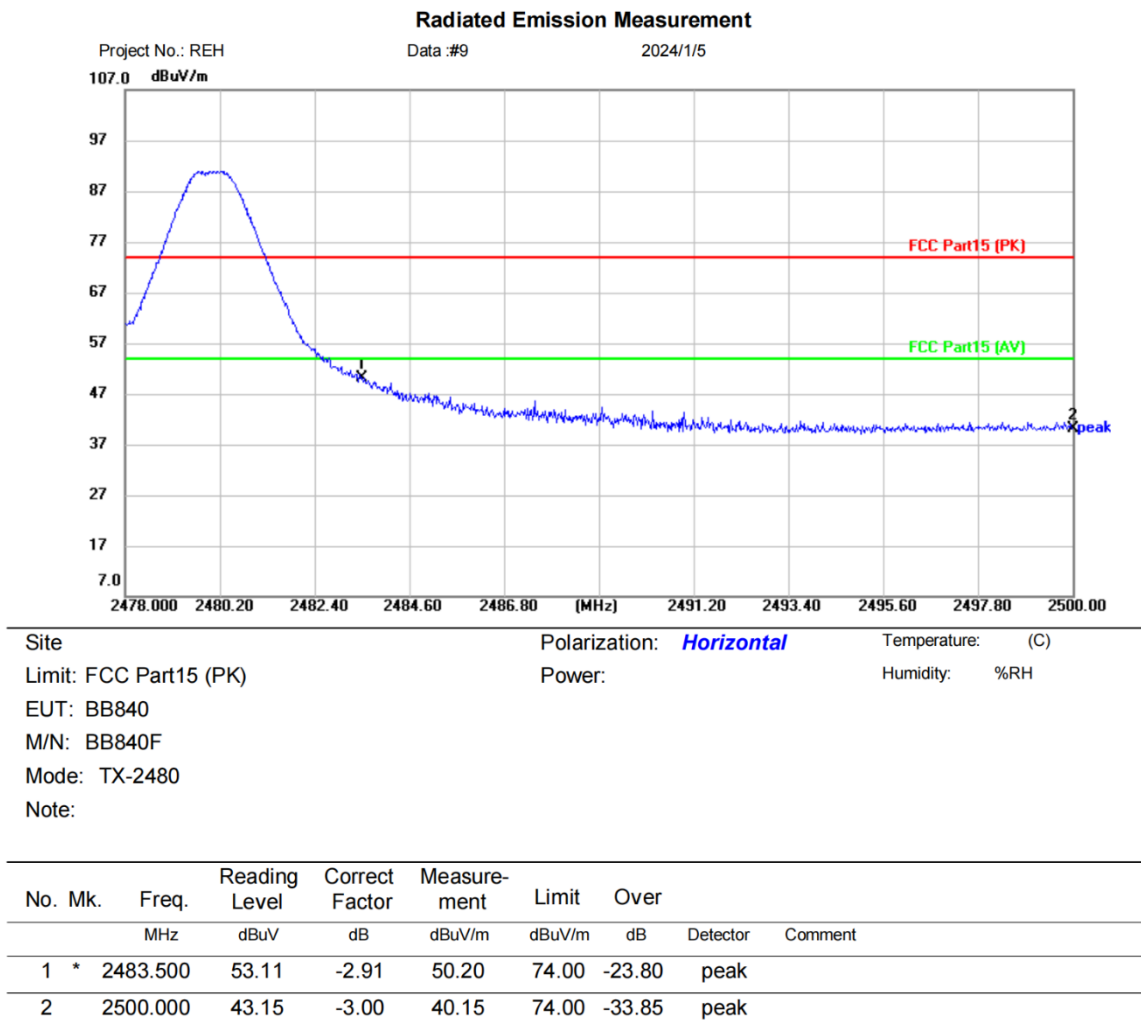Receiver: ESR_1 Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G Engineer Signature:

Test Result: Pass

![Blue Asia logo] 蓝亚 BLUE ASIA

[TestMode: TX low channel]; [Polarity: Vertical]

Radiated Emission Measurement

Project No.: REH   Data :#4   2024/1/5

| Site | Polarization: | **Vertical** | Temperature: | (C) |
| Limit: FCC Part15 (PK) | Power: | | Humidity: | %RH |

EUT: BB840

M/N: BB840F

Mode: TX-2402

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1		2310.000	43.43	-2.89	40.54	74.00	-33.46	peak	
2	*	2390.000	43.55	-2.70	40.85	74.00	-33.15	peak	

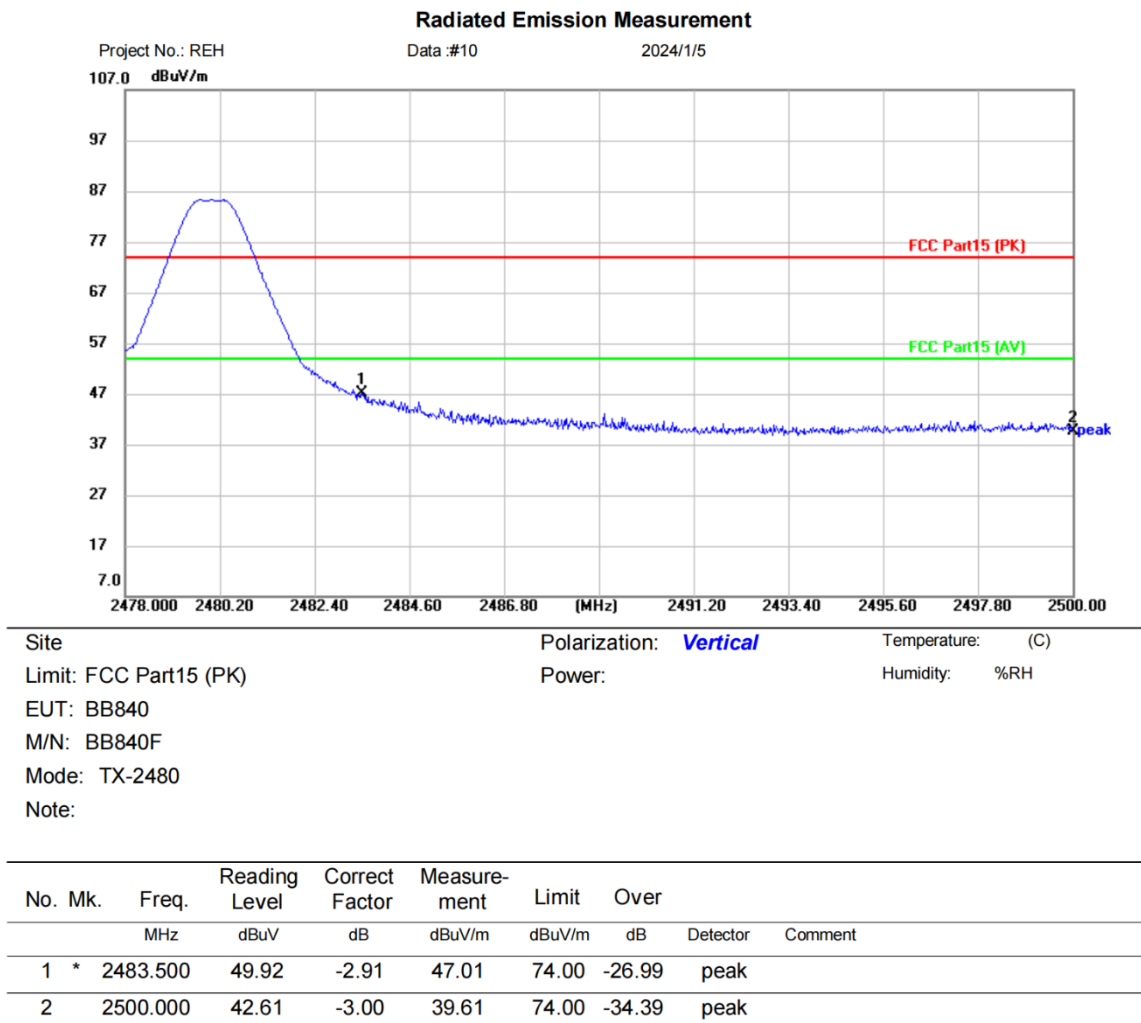*:Maximum data   x:Over limit   !:over margin   〈Reference Only〉

Receiver: ESR_1   Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G   Engineer Signature:

Test Result: Pass

BLUE ASIA
蓝亚

[TestMode: TX high channel]; [Polarity: Horizontal]

Radiated Emission Measurement

Project No.: REH   Data :#9   2024/1/5

| Site | | | | Polarization: | *Horizontal* | | Temperature: | (C) |
| Limit: FCC Part15 (PK) | | | | Power: | | | Humidity: | %RH |

Site
Limit: FCC Part15 (PK)
EUT: BB840
M/N: BB840F
Mode: TX-2480
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	Detector	Comment
1	*	2483.500	53.11	-2.91	50.20	74.00	-23.80	peak	
2		2500.000	43.15	-3.00	40.15	74.00	-33.85	peak	

*:Maximum data   x:Over limit   !:over margin   〈Reference Only

Receiver: ESR_1   Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G   Engineer Signature:

Test Result: Pass

[TestMode: TX high channel]; [Polarity: Vertical]

Radiated Emission Measurement

Project No.: REH   Data :#10   2024/1/5

Site		Polarization:	**Vertical**	Temperature:	(C)
Limit: FCC Part15 (PK)		Power:		Humidity:	%RH

EUT: BB840

M/N: BB840F

Mode: TX-2480

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB		
1	*	2483.500	49.92	-2.91	47.01	74.00	-26.99	peak	
2		2500.000	42.61	-3.00	39.61	74.00	-34.39	peak	

*:Maximum data   x:Over limit   !:over margin   〈Reference Only

Receiver: ESR_1   Spectrum Analyzer: FSP40

Antenna: EZ 9120D 1G-18G   Engineer Signature:

Test Result: Pass

Remark:

1. Final Level =Receiver Read level + Correct factor

2. Correct factor = Antenna Factor + Cable Loss – Preamplifier Factor

3. The emission levels of other frequencies are very lower than the limit and not show in test report.

14 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
Tester	Jozu
Temperature	25℃
Humidity	60%

14.1 LIMITS

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 §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)).

14.2 BLOCK DIAGRAM OF TEST SETUP

14.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

15 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
Tester	Jozu
Temperature	25℃
Humidity	60%

15.1 LIMITS

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

15.2 BLOCK DIAGRAM OF TEST SETUP
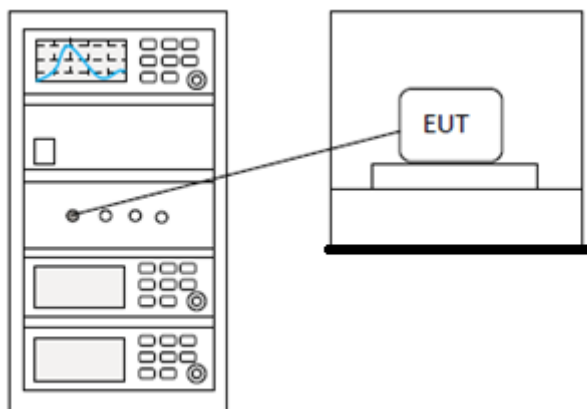
15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

16 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
Tester	Jozu
Temperature	25℃
Humidity	60%

16.1 LIMITS

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

16.2 BLOCK DIAGRAM OF TEST SETUP
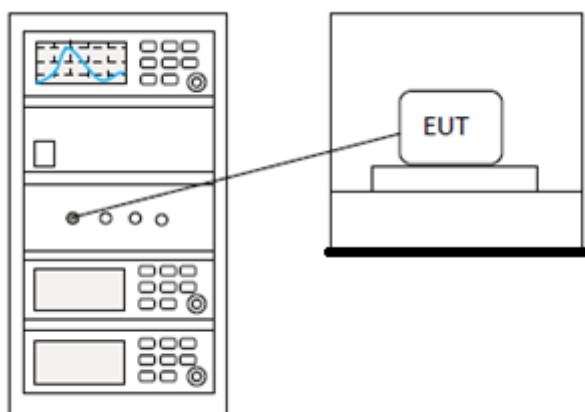
16.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

17 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
Tester	Jozu
Temperature	25℃
Humidity	60%

17.1 LIMITS

Limit:	≥500 kHz

17.2 BLOCK DIAGRAM OF TEST SETUP
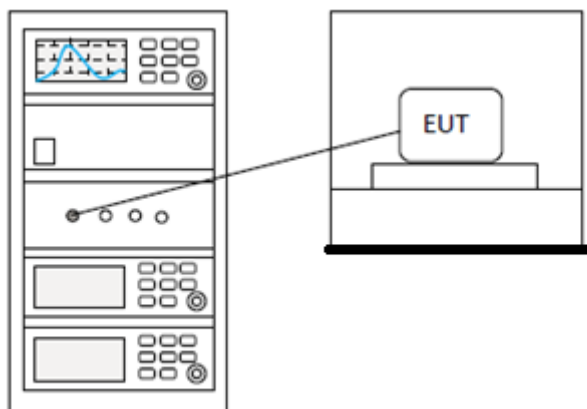
17.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

18 ANTENNA REQUIREMENT

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

18.1 CONCLUSION

Standard 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 a   antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit permanently attached antenna or of an 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 best case gain of the antenna is -0.03dBi.

19 APPENDIX1

Maximum Conducted Output Power

Condition	Mode	Frequency (MHz)	Antenna	Conducted Power (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant1	-0.696	30	Pass
NVNT	BLE	2442	Ant1	-1.066	30	Pass
NVNT	BLE	2480	Ant1	-0.712	30	Pass

Power NVNT BLE 2402MHz Ant1
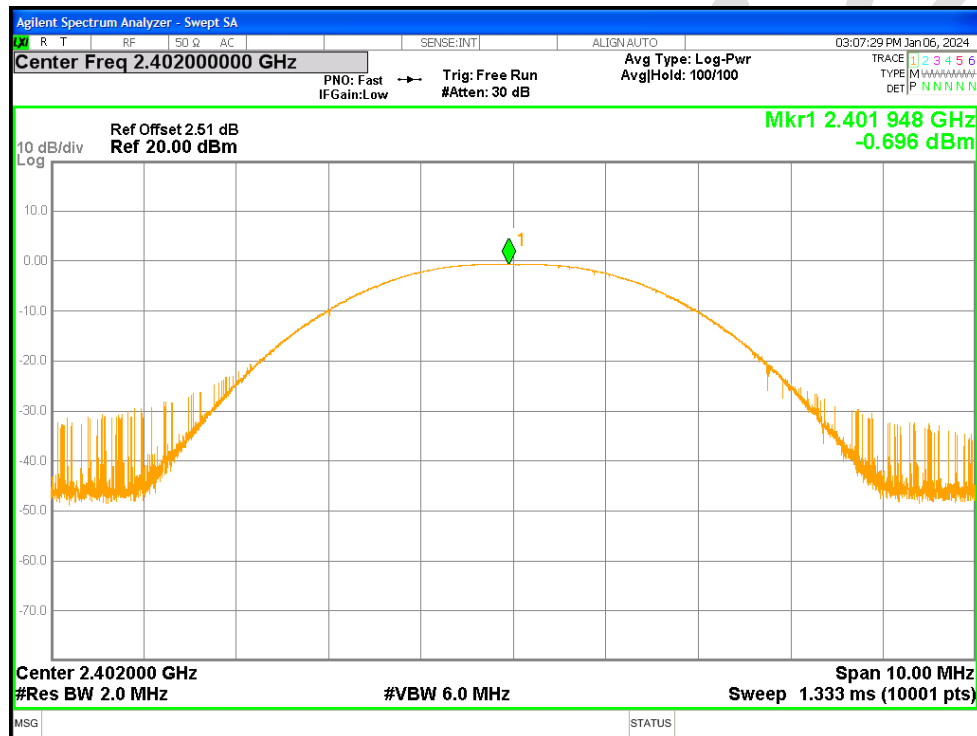
Power NVNT BLE 2442MHz Ant1

![Spectrum analyzer screenshot showing Center Freq 2.442000000 GHz, Mkr1 2.441 683 GHz -1.066 dBm]

Power NVNT BLE 2480MHz Ant1

![Spectrum analyzer screenshot showing Center Freq 2.480000000 GHz, Mkr1 2.479 684 GHz -0.712 dBm]
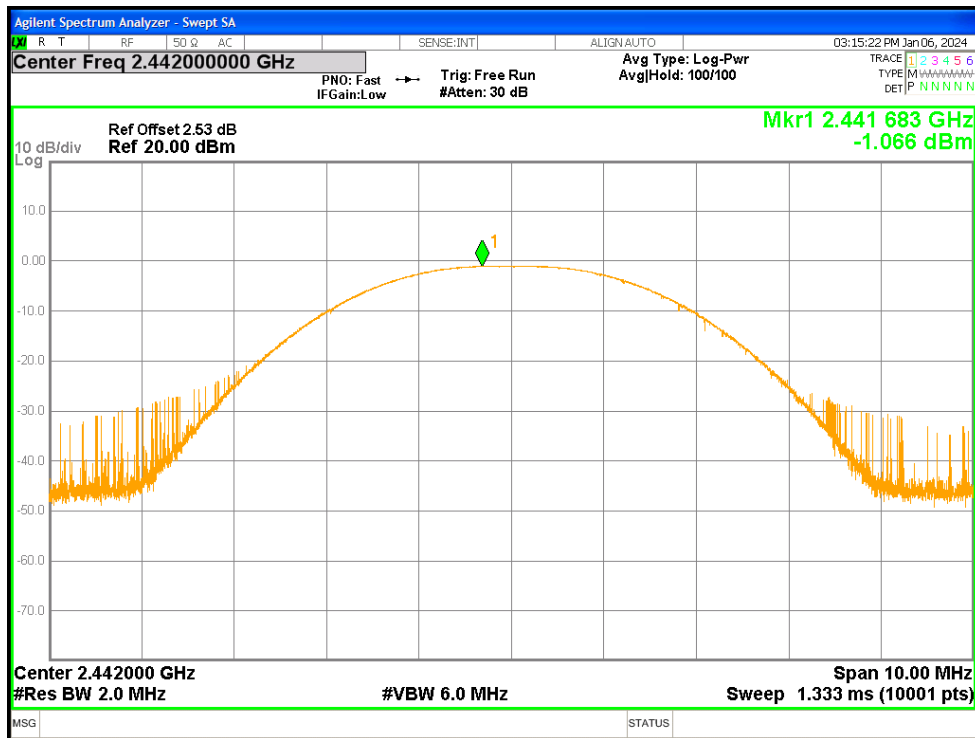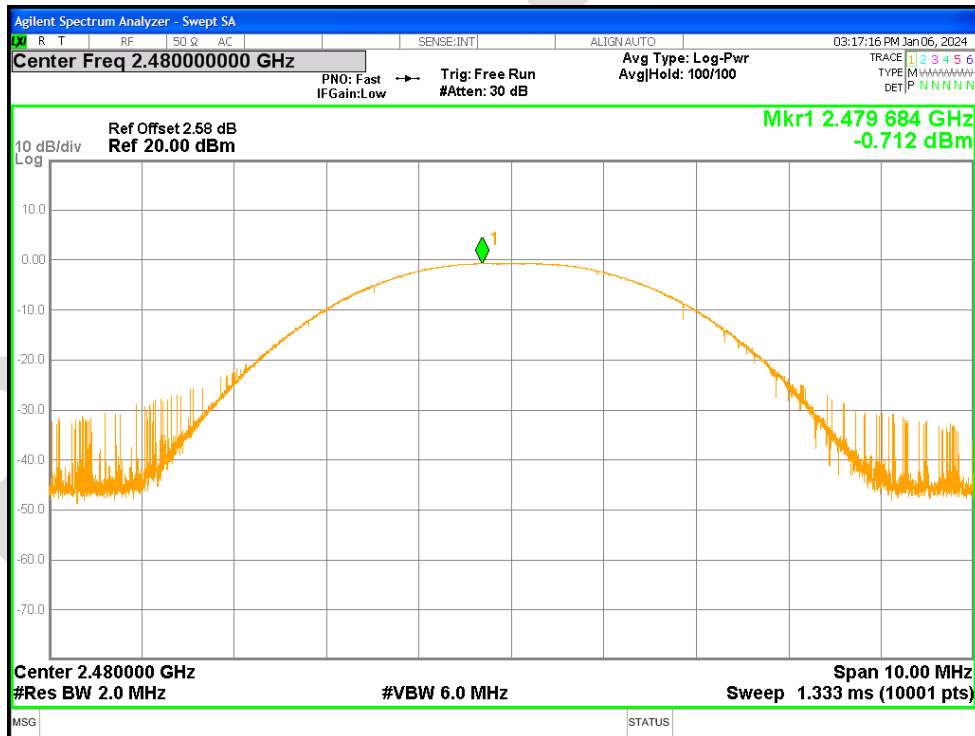
-6dB Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	-6 dB Bandwidth (MHz)	Limit -6 dB Bandwidth (MHz)	Verdict
NVNT	BLE	2402	Ant1	0.708	0.5	Pass
NVNT	BLE	2442	Ant1	0.671	0.5	Pass
NVNT	BLE	2480	Ant1	0.673	0.5	Pass

-6dB Bandwidth NVNT BLE 2402MHz Ant1
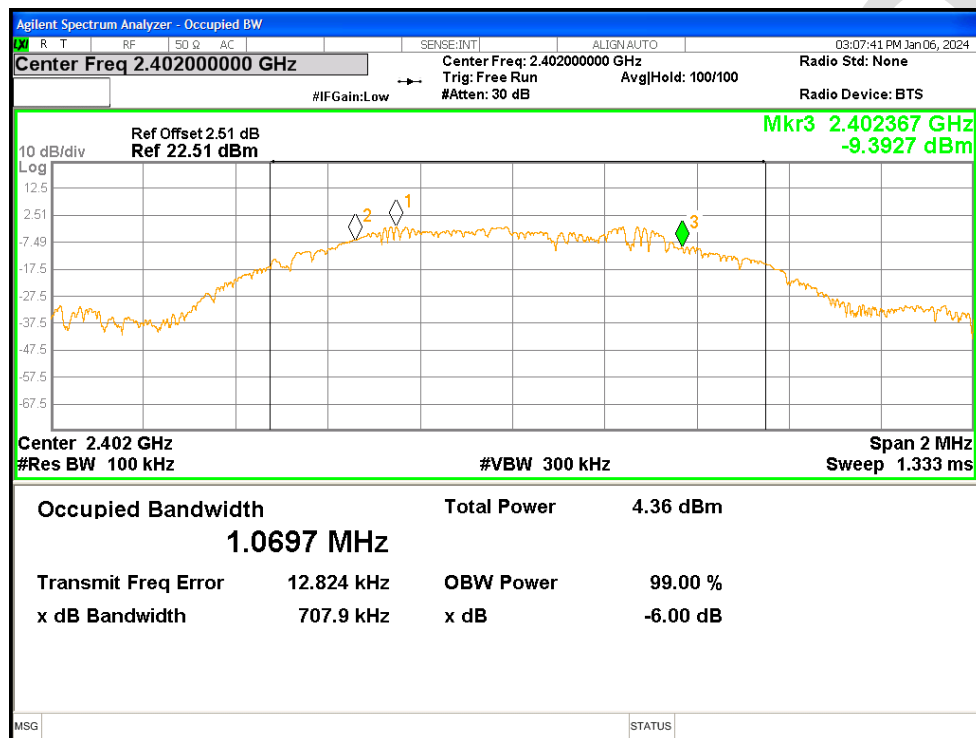
-6dB Bandwidth NVNT BLE 2442MHz Ant1

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.442000000 GHz

Center Freq: 2.442000000 GHz	Radio Std: None
Trig: Free Run Avg|Hold: 100/100	Radio Device: BTS
#IFGain:Low #Atten: 30 dB	

Ref Offset 2.53 dB
Ref 22.53 dBm

Center 2.442 GHz   Span 2 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 1.333 ms

Occupied Bandwidth		Total Power	4.31 dBm
1.0638 MHz			
Transmit Freq Error	15.819 kHz	OBW Power	99.00 %
x dB Bandwidth	670.6 kHz	x dB	-6.00 dB

-6dB Bandwidth NVNT BLE 2480MHz Ant1

Agilent Spectrum Analyzer - Occupied BW

Center Freq 2.480000000 GHz

Center Freq: 2.480000000 GHz	Radio Std: None
Trig: Free Run Avg|Hold: 100/100	Radio Device: BTS
#IFGain:Low #Atten: 30 dB	

Mkr3 2.480343 GHz
-7.5375 dBm

Ref Offset 2.58 dB
Ref 22.58 dBm

Center 2.48 GHz   Span 2 MHz
#Res BW 100 kHz   #VBW 300 kHz   Sweep 1.333 ms

Occupied Bandwidth		Total Power	4.59 dBm
1.0725 MHz			
Transmit Freq Error	6.230 kHz	OBW Power	99.00 %
x dB Bandwidth	672.9 kHz	x dB	-6.00 dB

Occupied Channel Bandwidth

Condition	Mode	Frequency (MHz)	Antenna	99% OBW (MHz)
NVNT	BLE	2402	Ant1	1.0365
NVNT	BLE	2442	Ant1	1.0412
NVNT	BLE	2480	Ant1	1.0397

OBW NVNT BLE 2402MHz Ant1
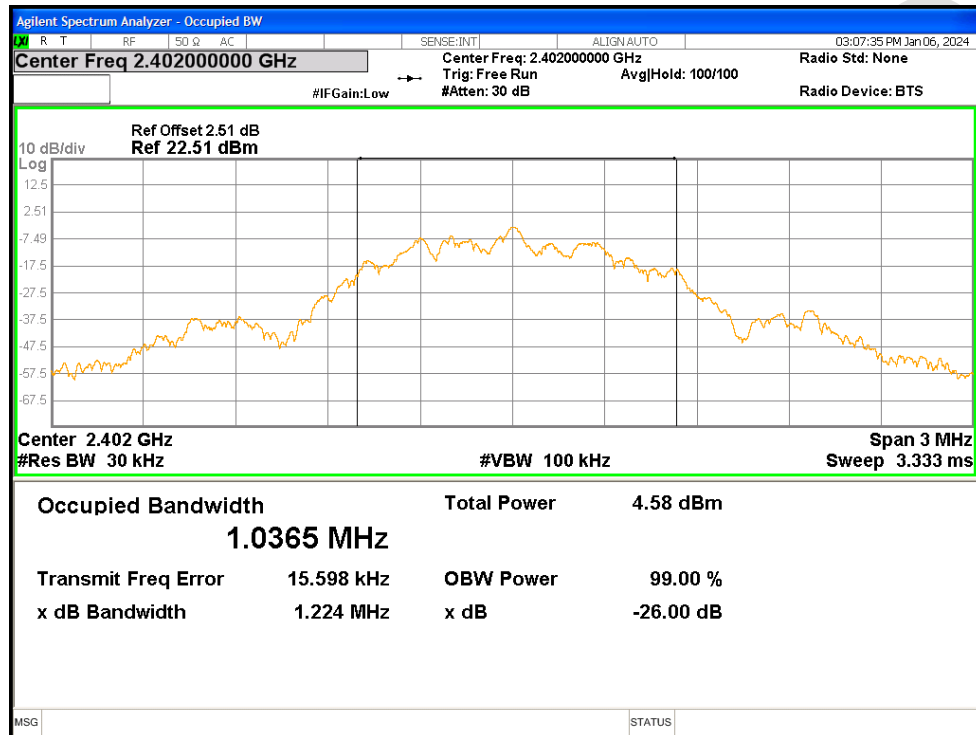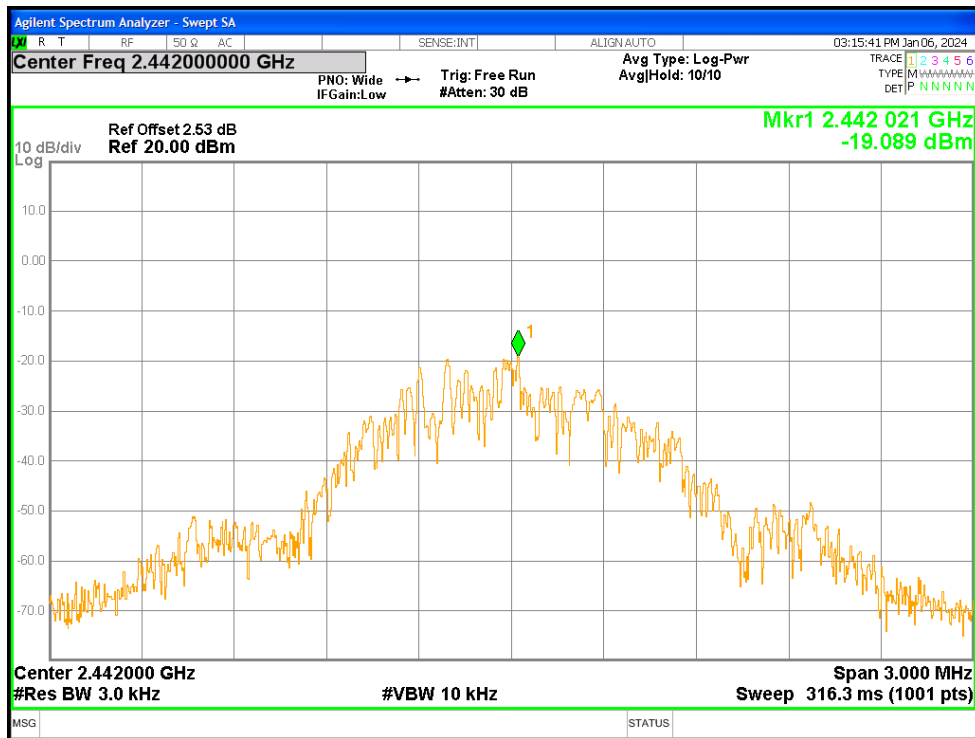

OBW NVNT BLE 2442MHz Ant1
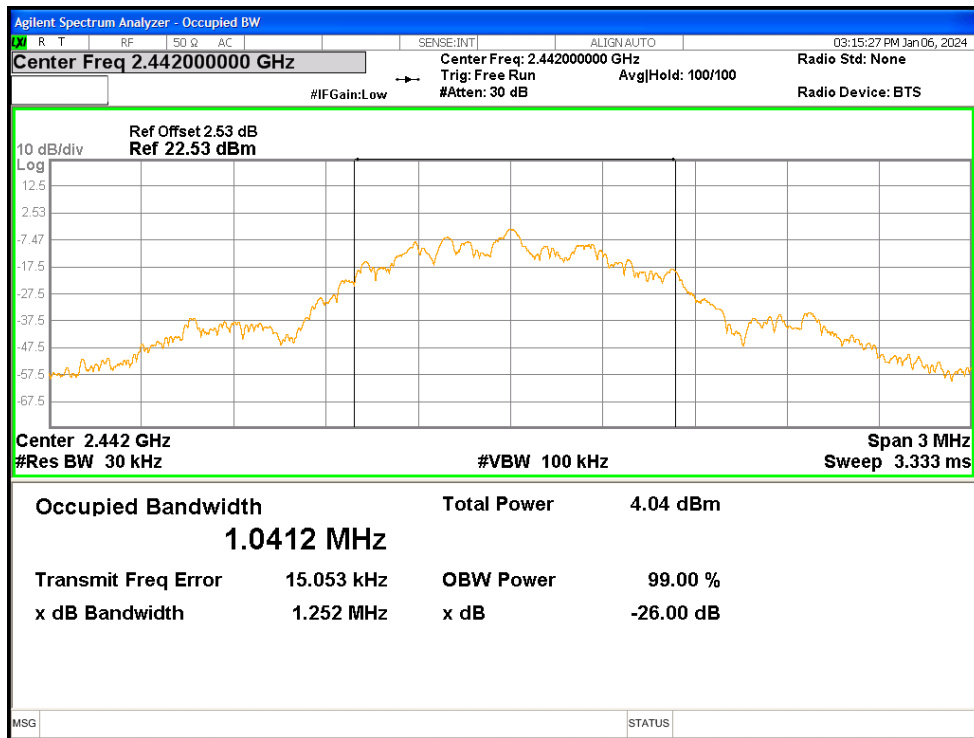
OBW NVNT BLE 2480MHz Ant1
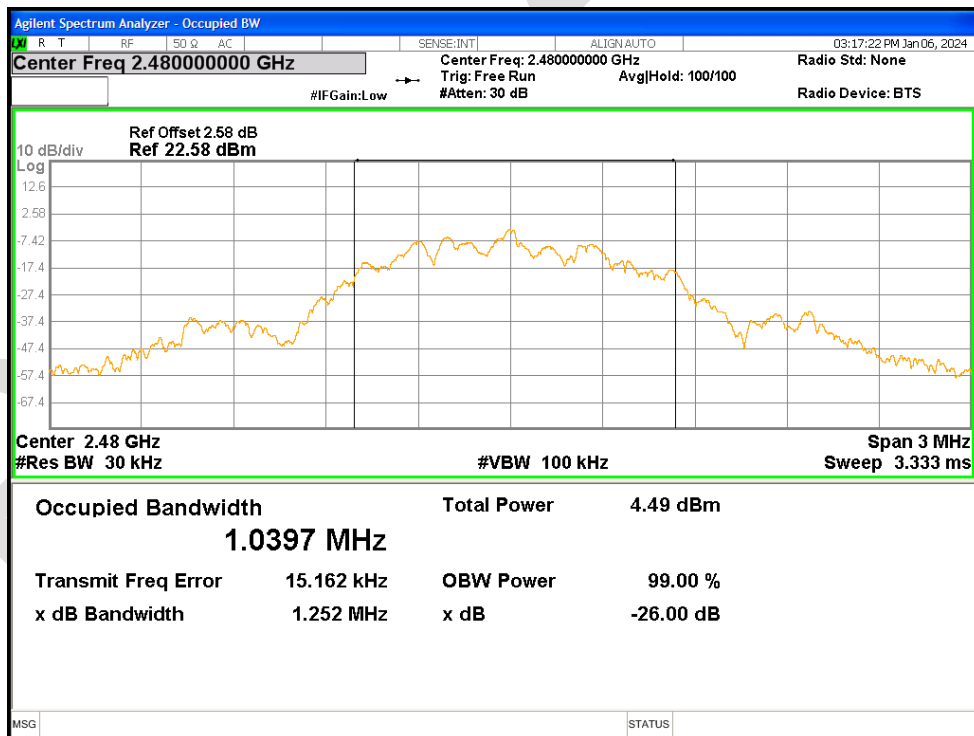
Maximum Power Spectral Density Level

Condition	Mode	Frequency (MHz)	Antenna	Max PSD (dBm)	Limit (dBm)	Verdict
NVNT	BLE	2402	Ant1	-18.504	8	Pass
NVNT	BLE	2442	Ant1	-19.089	8	Pass
NVNT	BLE	2480	Ant1	-18.738	8	Pass

PSD NVNT BLE 2402MHz Ant1
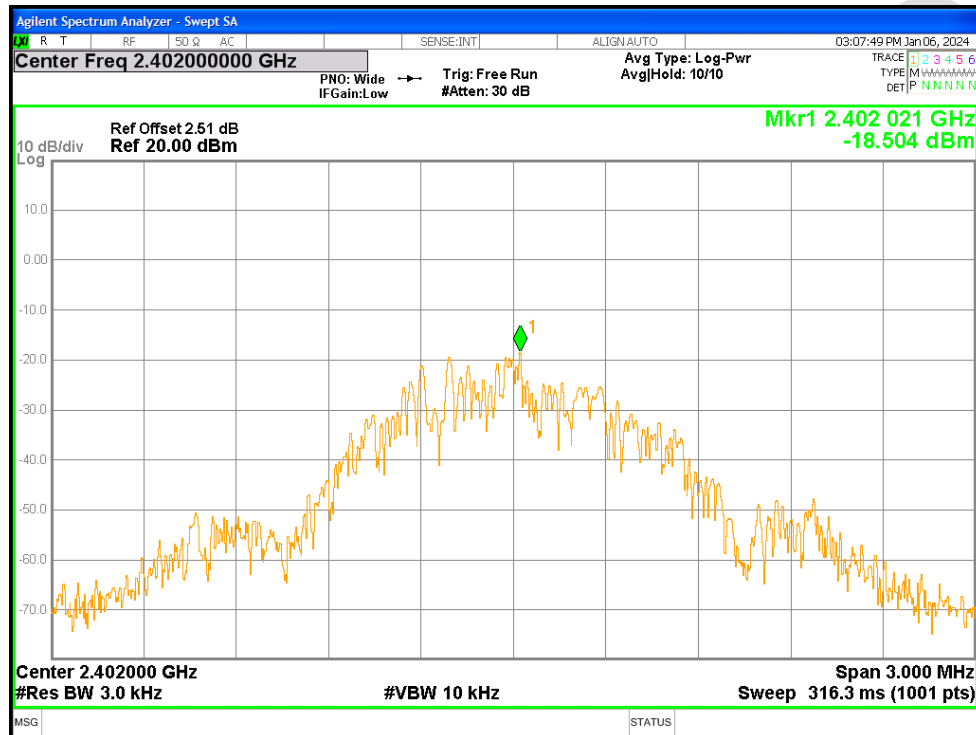
PSD NVNT BLE 2442MHz Ant1

PSD NVNT BLE 2480MHz Ant1
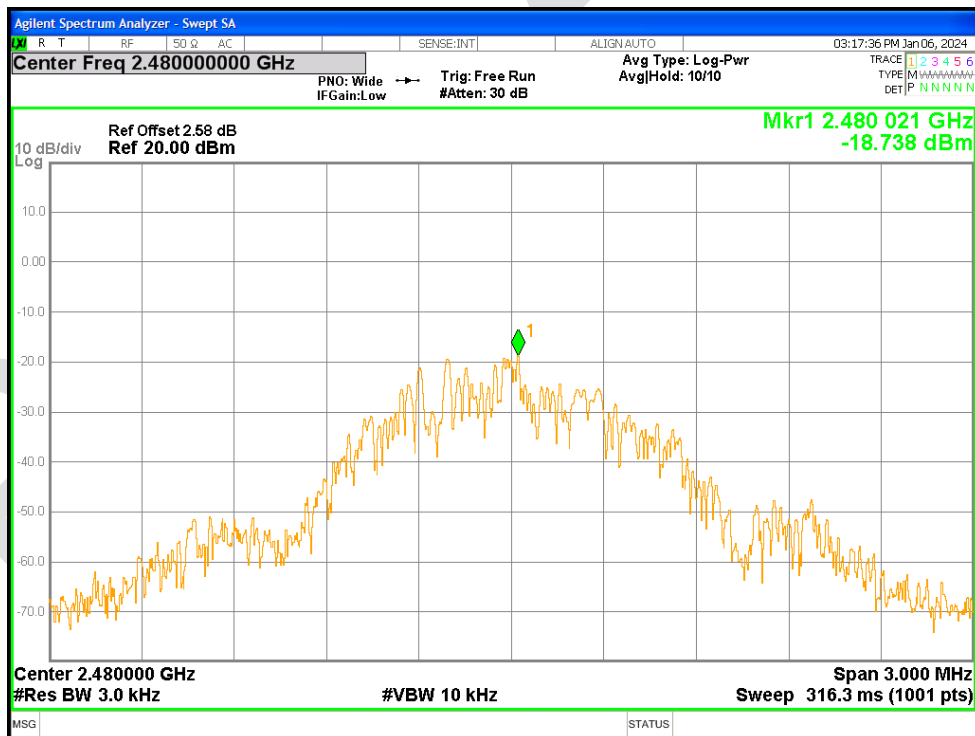
Band Edge

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-54.95	-20	Pass
NVNT	BLE	2480	Ant1	-53.68	-20	Pass

Band Edge NVNT BLE 2402MHz Ant1 Ref

Band Edge NVNT BLE 2402MHz Ant1 Emission

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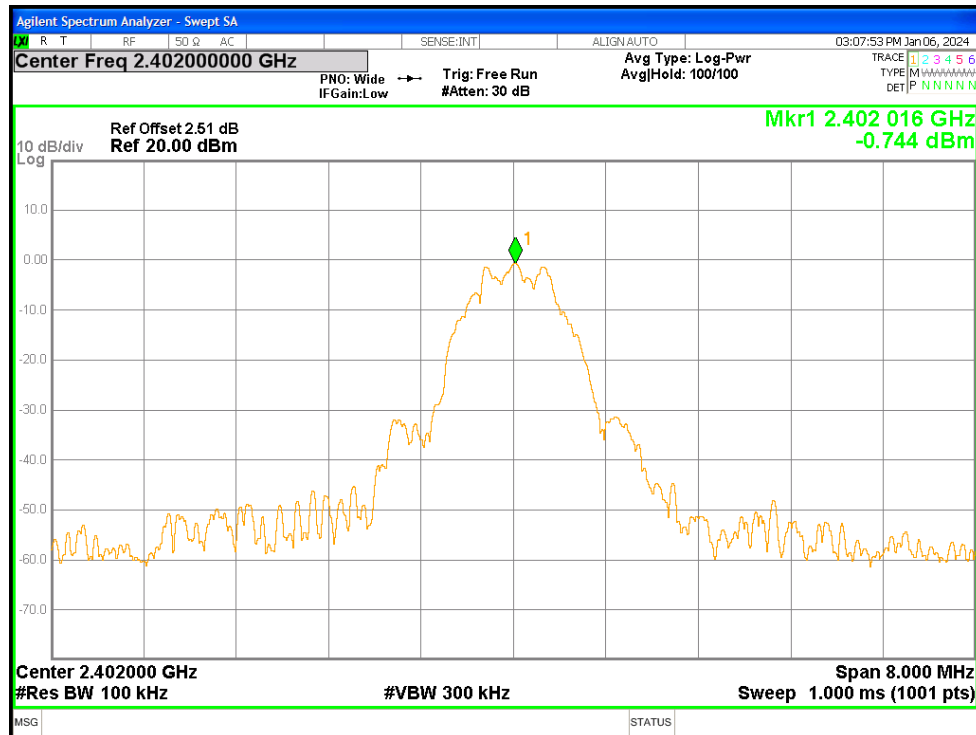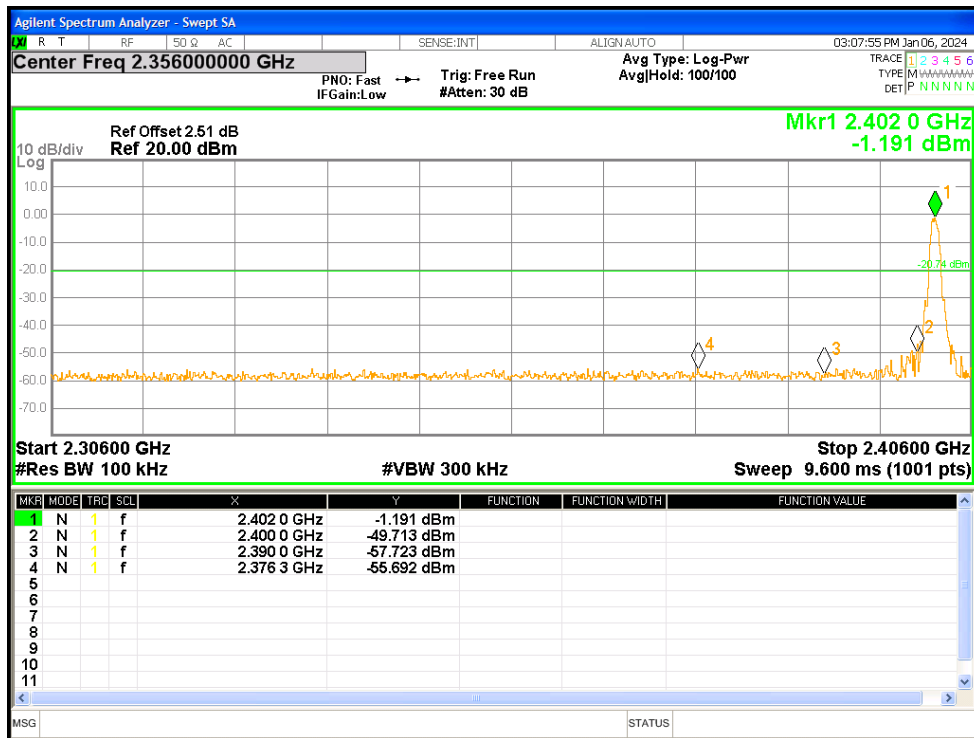
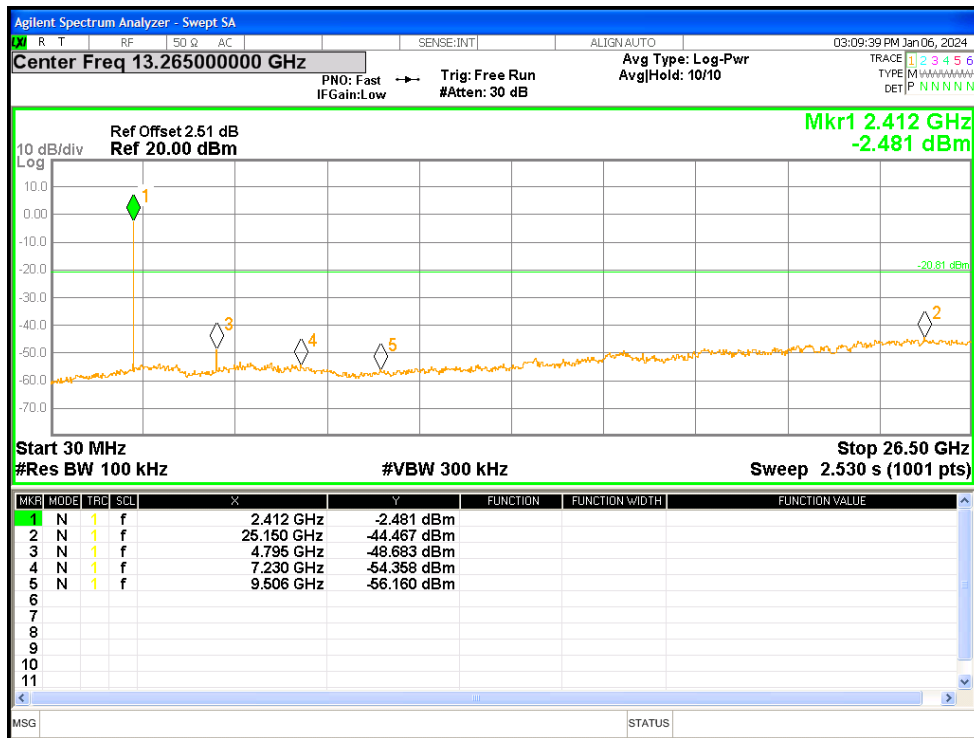

Band Edge NVNT BLE 2480MHz Ant1 Ref
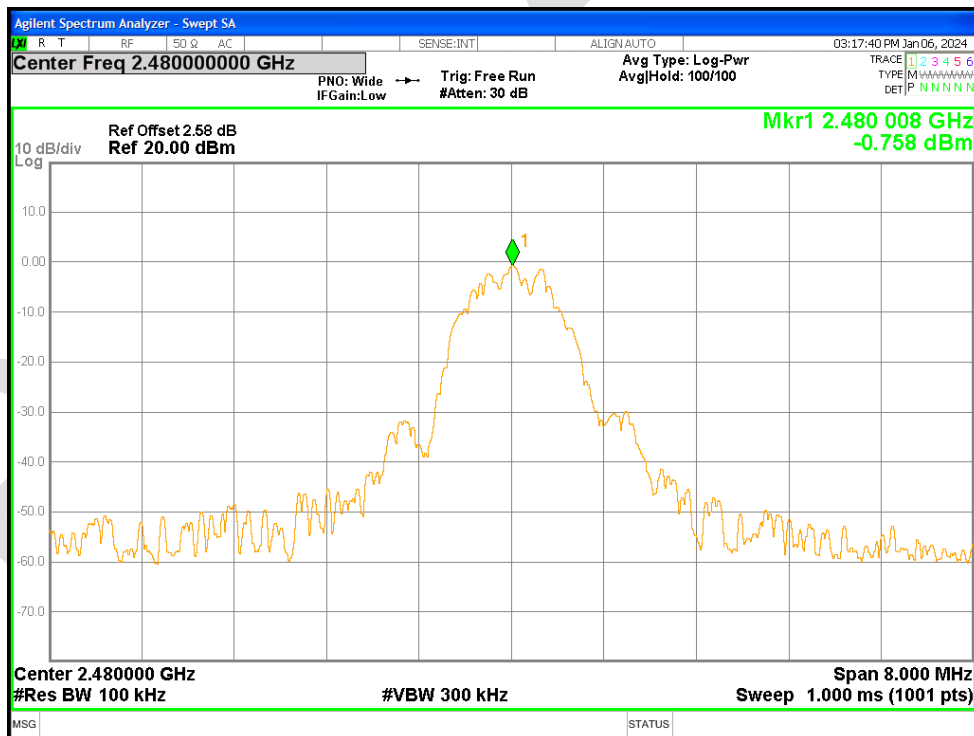
Band Edge NVNT BLE 2480MHz Ant1 Emission
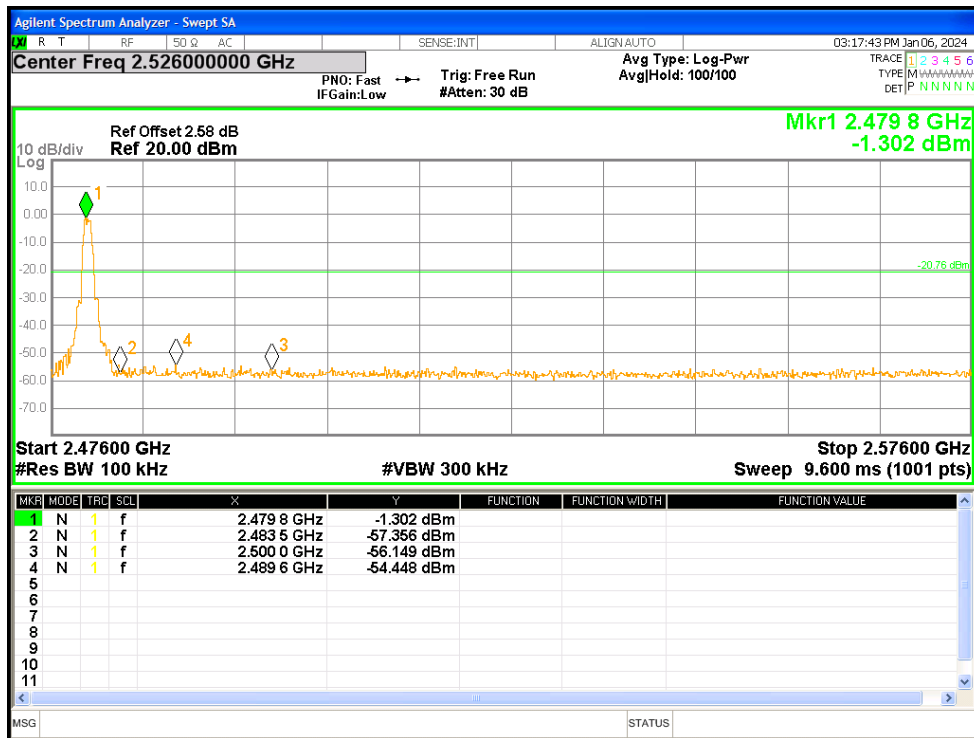
Conducted RF Spurious Emission

Condition	Mode	Frequency (MHz)	Antenna	Max Value (dBc)	Limit (dBc)	Verdict
NVNT	BLE	2402	Ant1	-43.65	-20	Pass
NVNT	BLE	2442	Ant1	-42.11	-20	Pass
NVNT	BLE	2480	Ant1	-43.06	-20	Pass

Tx. Spurious NVNT BLE 2402MHz Ant1 Ref
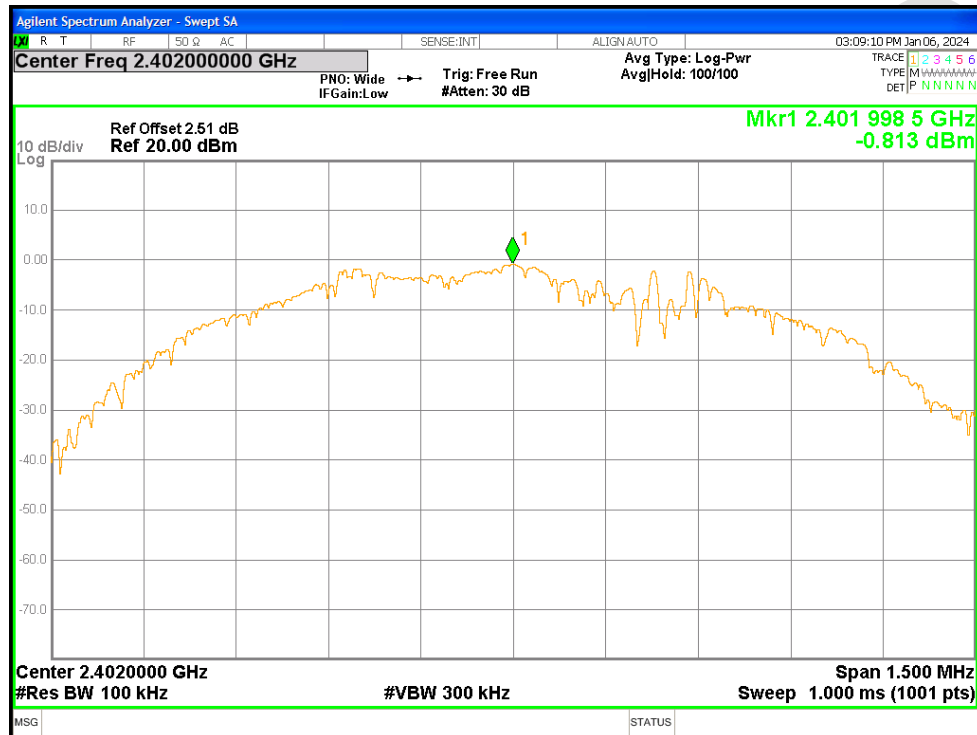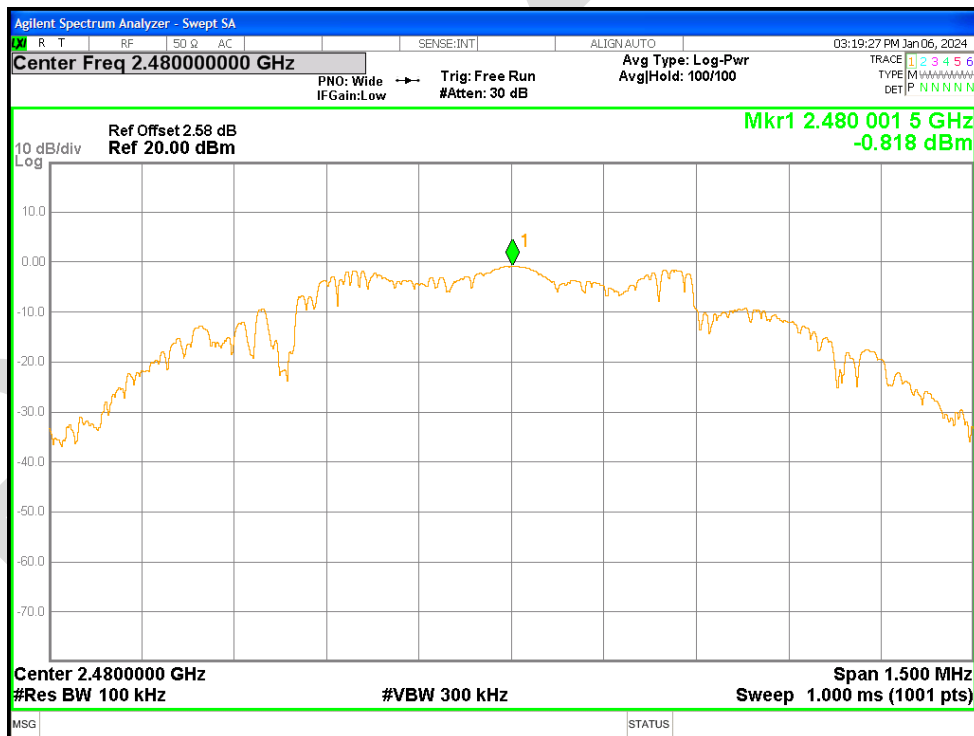

Tx. Spurious NVNT BLE 2402MHz Ant1 Emission

Tx. Spurious NVNT BLE 2442MHz Ant1 Ref
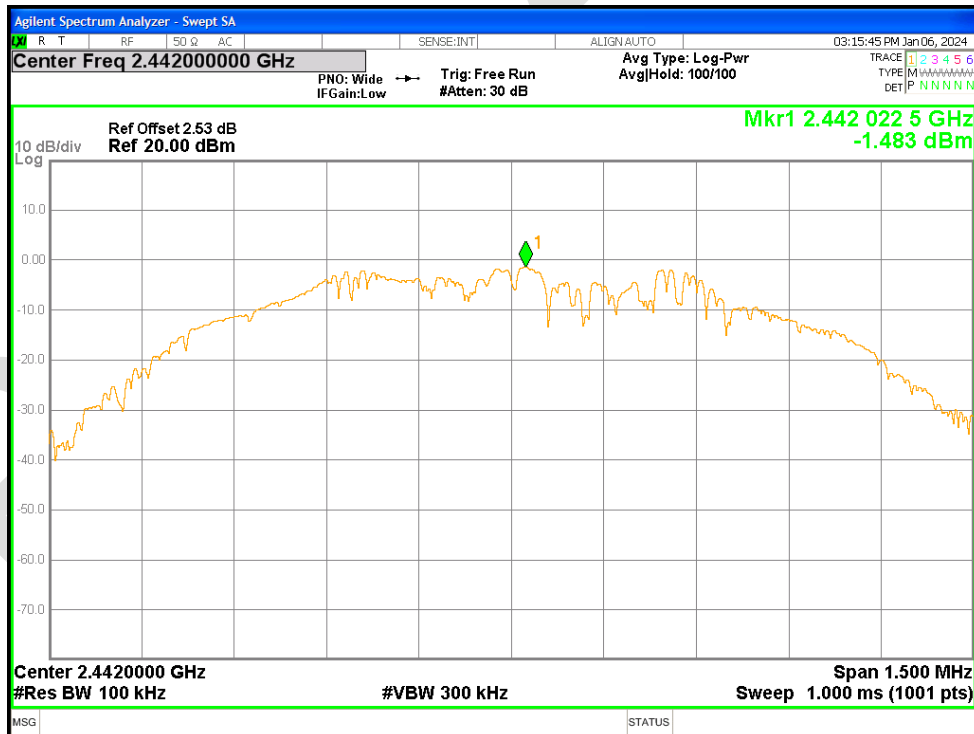
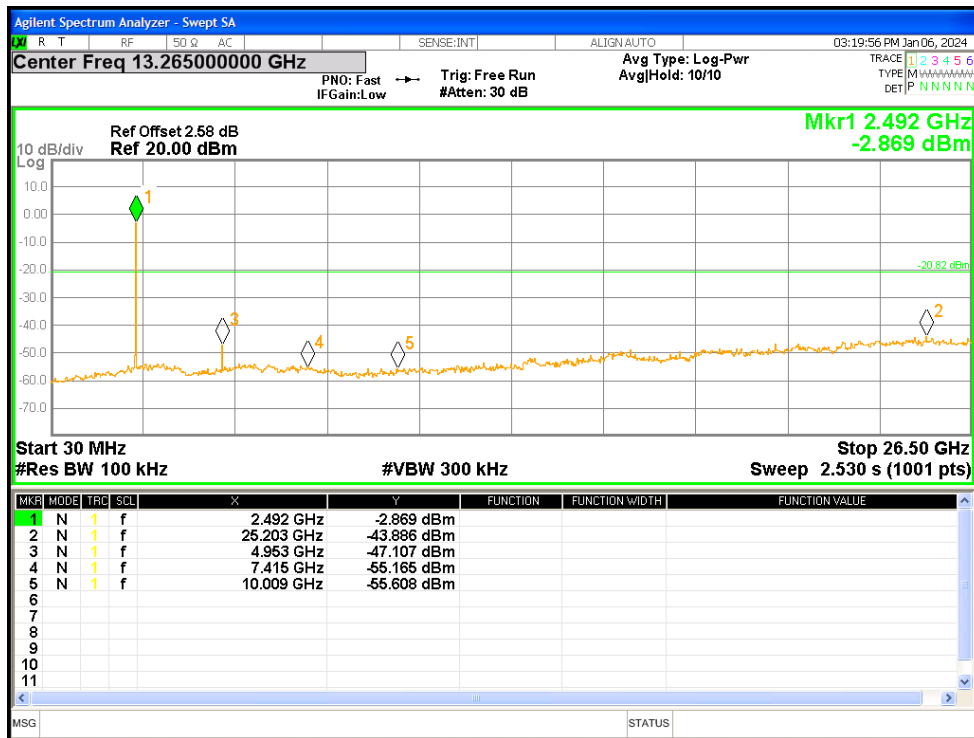Tx. Spurious NVNT BLE 2442MHz Ant1 Emission
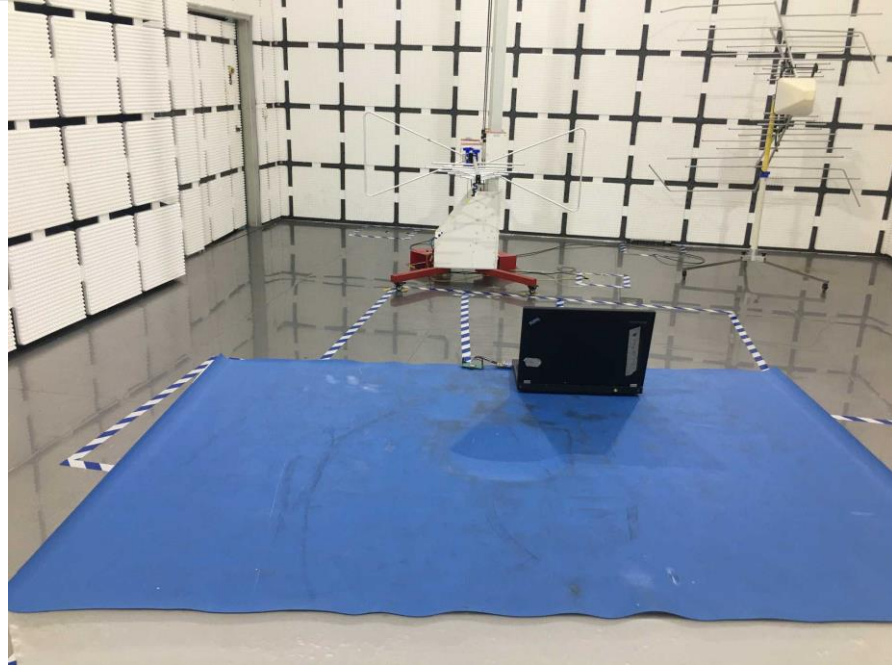
Tx. Spurious NVNT BLE 2480MHz Ant1 Ref

Tx. Spurious NVNT BLE 2480MHz Ant1 Emission

蓝亚 BLUE ASIA

Agilent Spectrum Analyzer - Swept SA

R T	RF	50 Ω	AC		SENSE:INT		ALIGN AUTO		03:19:56 PM Jan 06, 2024	

Center Freq 13.265000000 GHz

PNO: Fast → Trig: Free Run
IFGain:Low #Atten: 30 dB

Avg Type: Log-Pwr
Avg|Hold: 10/10

TRACE 1 2 3 4 5 6
TYPE M W W W W W
DET P N N N N N

Ref Offset 2.58 dB
10 dB/div **Ref 20.00 dBm**
Log

Mkr1 2.492 GHz
-2.869 dBm

10.0
0.00
-10.0
-20.0 ————————————————————————————————————— -20.82 dBm
-30.0
-40.0
-50.0
-60.0
-70.0

Start 30 MHz
#Res BW 100 kHz   #VBW 300 kHz

Stop 26.50 GHz
Sweep 2.530 s (1001 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.492 GHz	-2.869 dBm			
2	N	1	f	25.203 GHz	-43.886 dBm			
3	N	1	f	4.953 GHz	-47.107 dBm			
4	N	1	f	7.415 GHz	-55.165 dBm			
5	N	1	f	10.009 GHz	-55.608 dBm			
6								
7								
8								
9								
10								
11								

MSG   STATUS
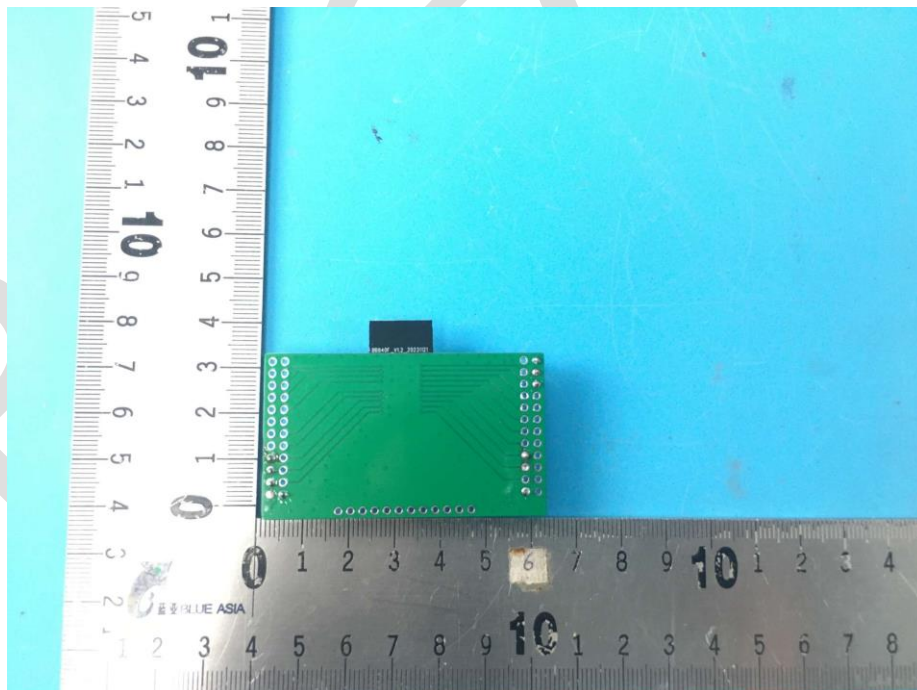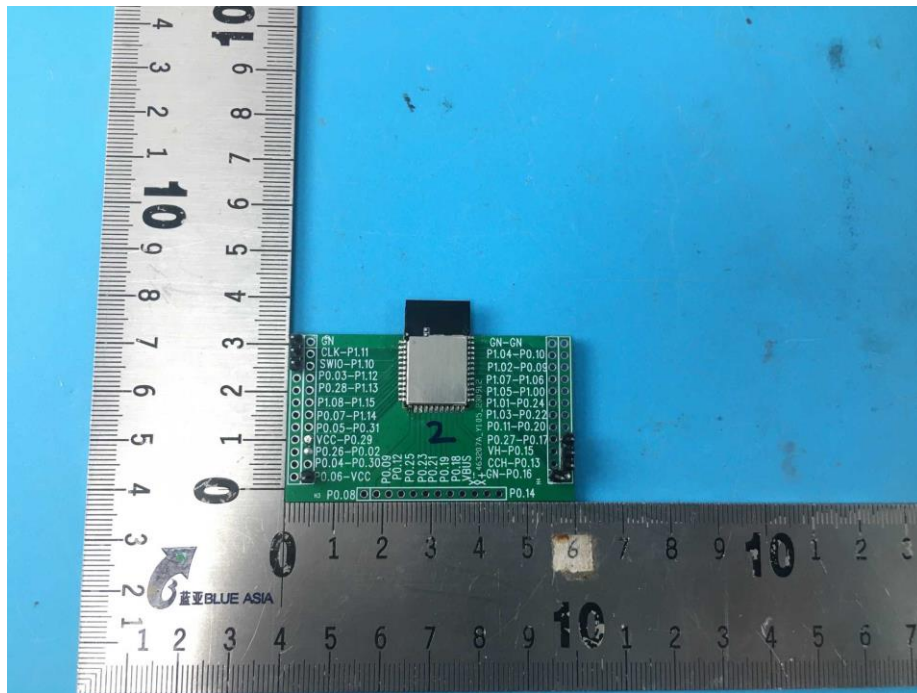
APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Radiated Spurious Emissions

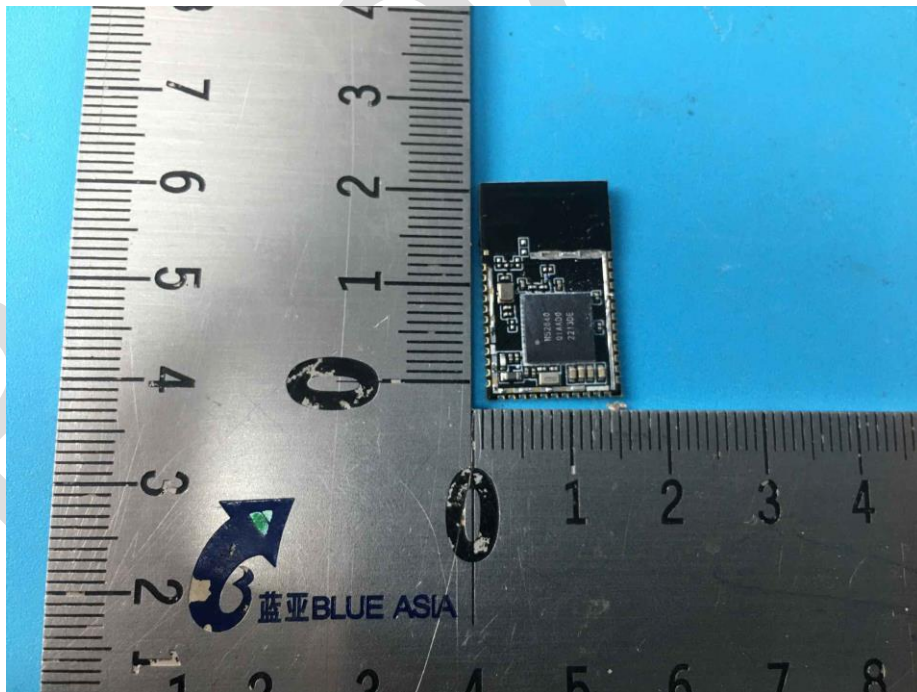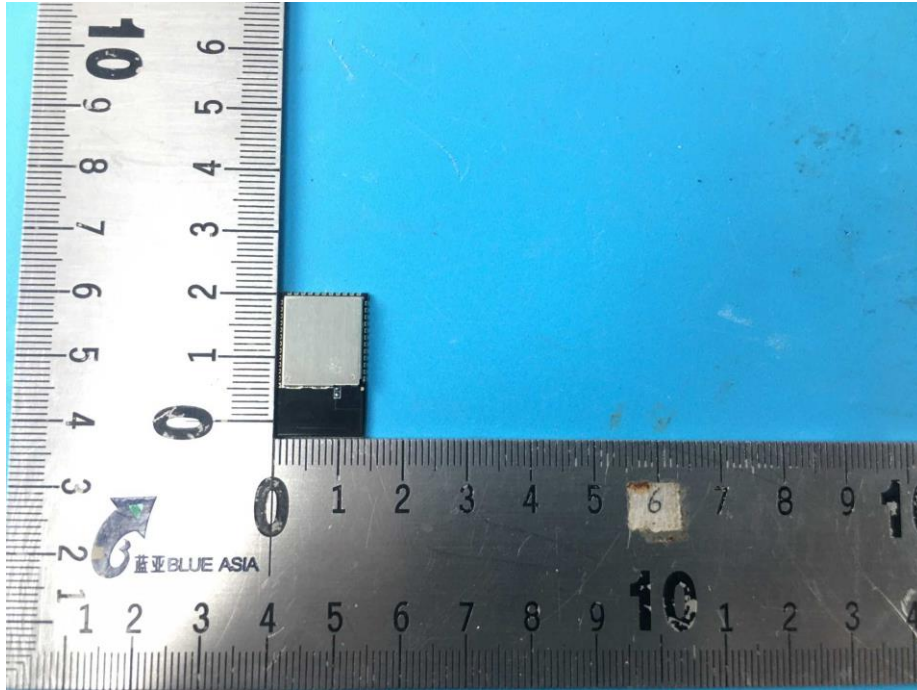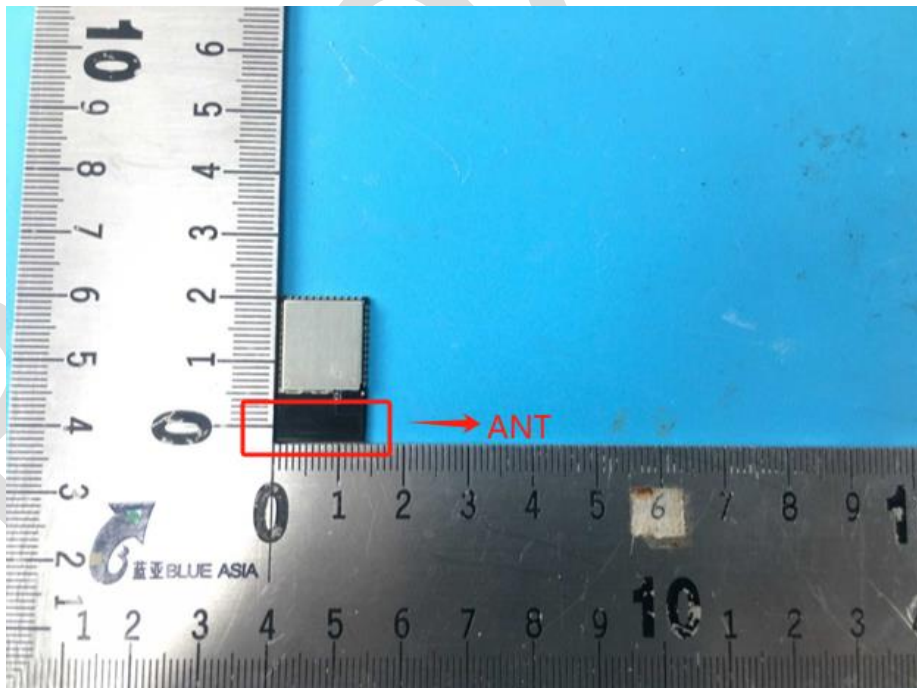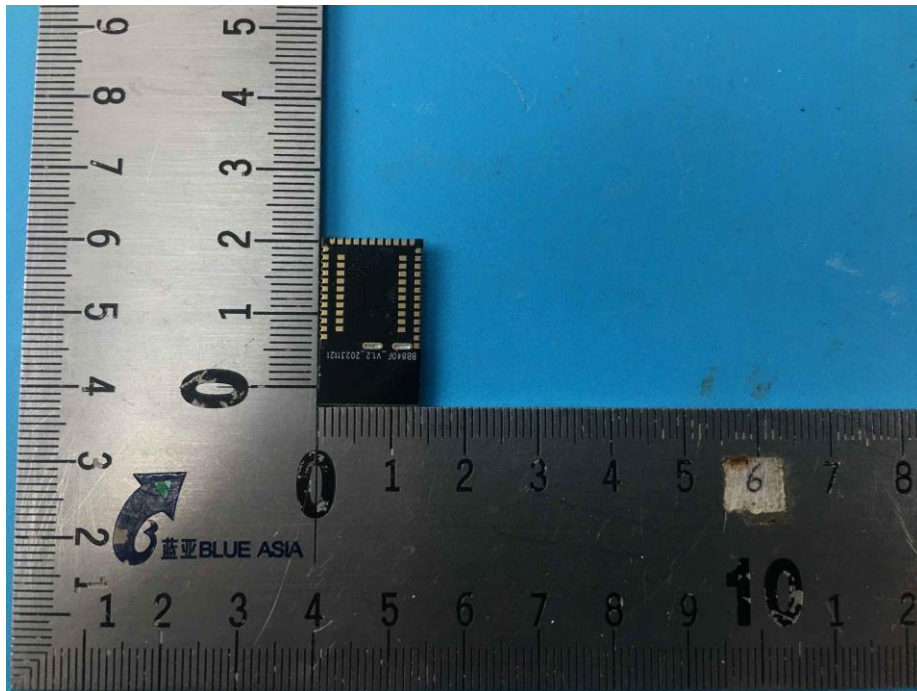**Conducted Emissions at AC Power Line (150kHz-30MHz)**

APPENDIX B: PHOTOGRAPHS OF EUT

Development Board

EUT

----END OF REPORT----

The test report is effective only with both signature and specialized stamp, The result(s) shown in this report refer only to the sample(s) tested. Without written approval of BlueAsia, this report can't be reproduced except in full.