14.2 BLOCK DIAGRAM OF TEST SETUP

14.3 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.

14.4 TEST DATA

[TestMode: TX low channel]; [Polarity: Horizontal]
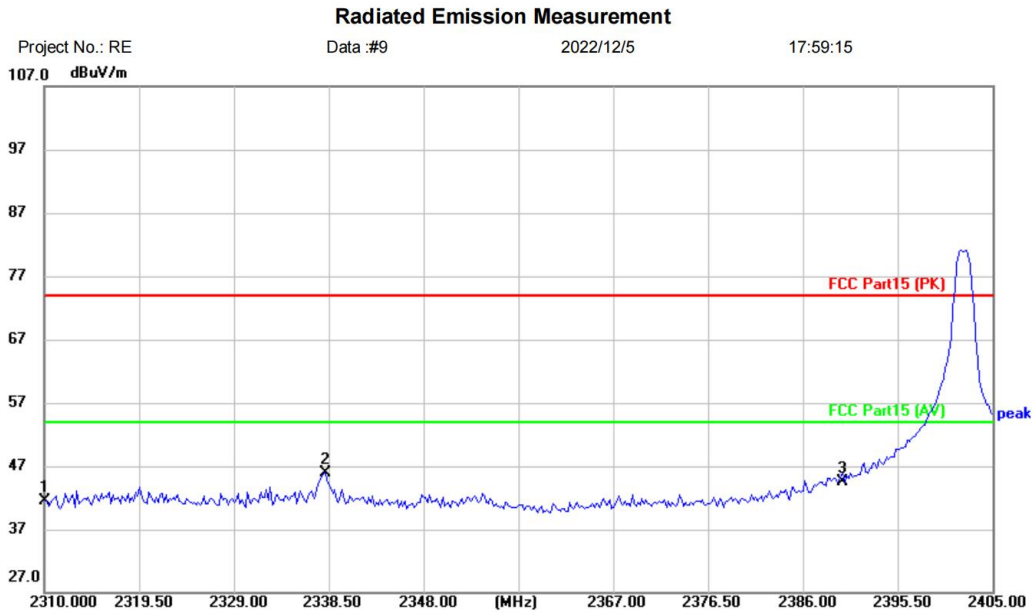
Radiated Emission Measurement

| Project No.: RE | Data :#9 | 2022/12/5 | 17:59:15 |

Site	Polarization: *Horizontal* Temperature: (C)
Limit: FCC Part15 (PK)	Power: Humidity: %RH
EUT: LED	
M/N: 16000370	
Mode: TX-L	
Note:	

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		2310.000	45.79	-4.27	41.52	74.00	-32.48	peak	
2	*	2338.120	50.02	-4.11	45.91	74.00	-28.09	peak	
3		2390.000	48.40	-3.82	44.58	74.00	-29.42	peak	

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

Test Result: Pass

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

Radiated Emission Measurement

Project No.: RE	Data :#10	2022/12/5	17:28:25
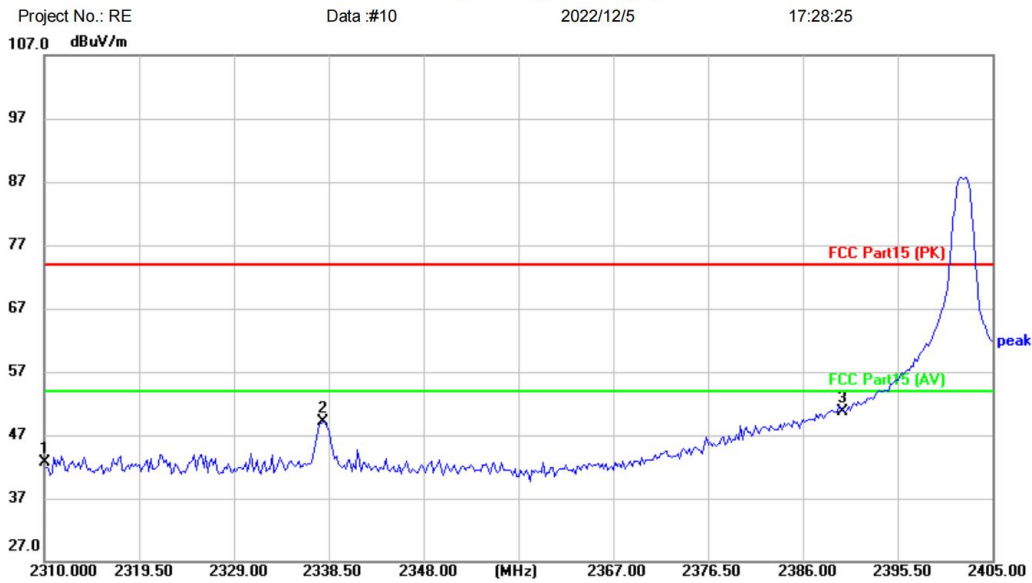
Site	Polarization:	Vertical	Temperature:	(C)
Limit: FCC Part15 (PK)	Power:		Humidity:	%RH

EUT: LED

M/N: 16000370

Mode: TX-L

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1		2310.000	46.98	-4.27	42.71	74.00	-31.29	peak	
2		2337.930	53.20	-4.11	49.09	74.00	-24.91	peak	
3	*	2390.000	54.62	-3.82	50.80	74.00	-23.20	peak	

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

Test Result: Pass

![Blue Asia logo] 蓝亚 BLUE ASIA

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

Radiated Emission Measurement

Project No.: RE   Data :#1   2022/12/5   17:37:00
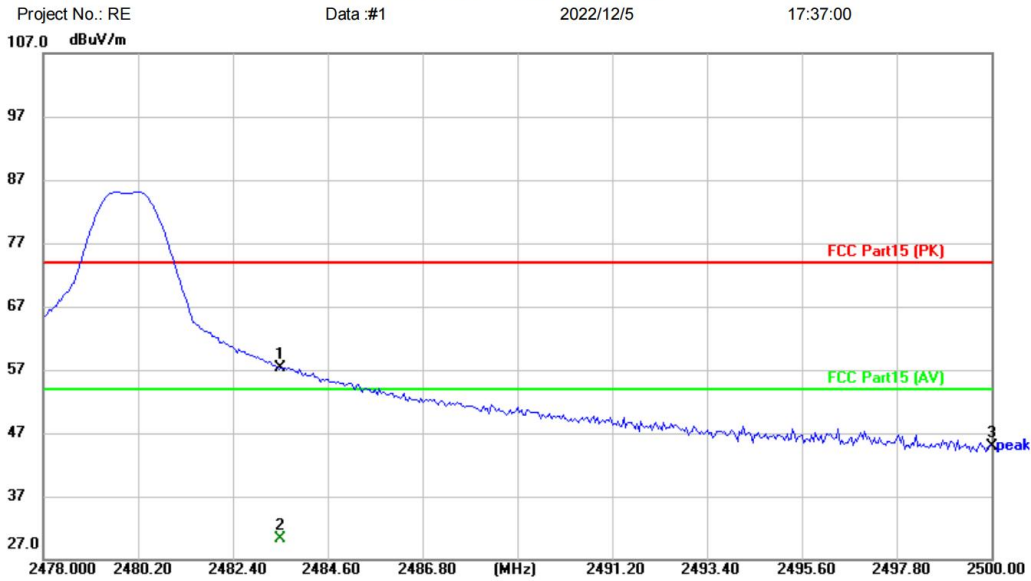
Site	Polarization:	*Horizontal*	Temperature:	(C)
Limit: FCC Part15 (PK)	Power:		Humidity:	%RH

EUT: LED
M/N: 16000370
Mode: TX-H
Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	2483.500	61.31	-3.96	57.35	74.00	-16.65	peak	
2		2483.500	34.26	-3.96	30.30	54.00	-23.70	AVG	
3		2500.000	48.96	-4.00	44.96	74.00	-29.04	peak	

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

Test Result: Pass

![Blue Asia logo] 蓝亚 BLUE ASIA

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

Radiated Emission Measurement

Project No.: RE   Data :#2   2022/12/5   17:41:14
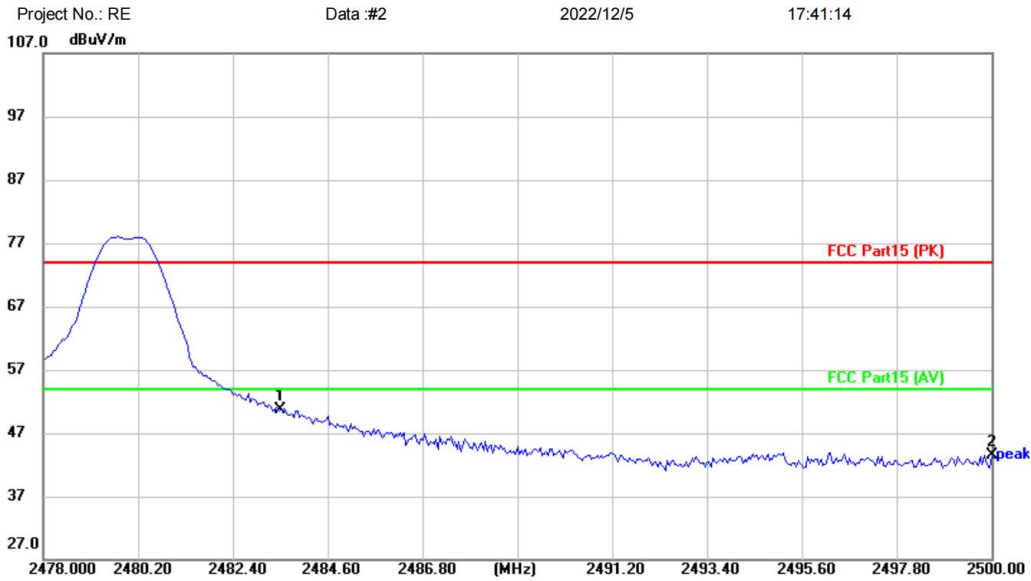
Site	Polarization:	**Vertical**	Temperature:	(C)
Limit: FCC Part15 (PK)	Power:		Humidity:	%RH

EUT: LED

M/N: 16000370

Mode: TX-H

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Detector	Comment
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB		
1	*	2483.500	54.71	-3.96	50.75	74.00	-23.25	peak	
2		2500.000	47.43	-4.00	43.43	74.00	-30.57	peak	

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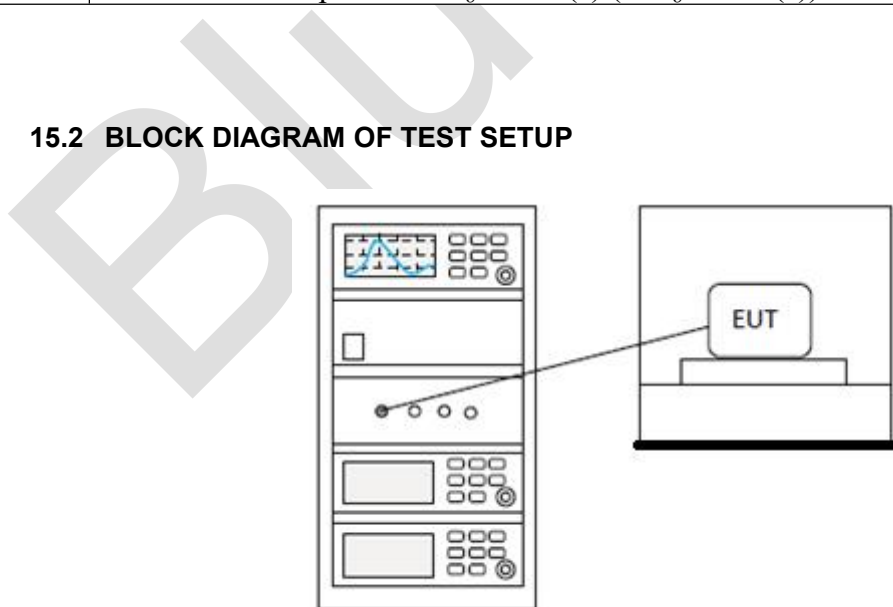
Test Result: Pass

15 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%

15.1 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)).

15.2 BLOCK DIAGRAM OF TEST SETUP

15.3 TEST DATA

Pass: Please Refer To Appendix: Appendix1 For Details

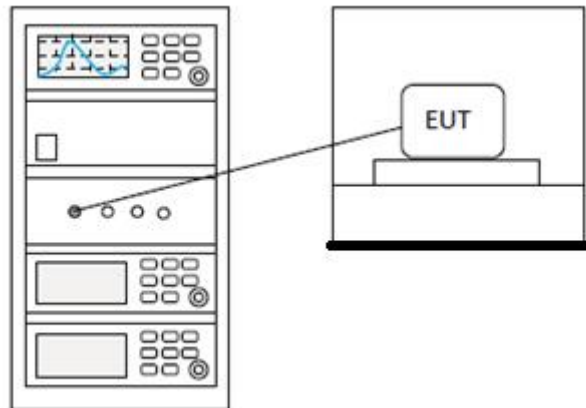## 16 POWER SPECTRUM DENSITY

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%

16.1 LIMITS

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

16.2 BLOCK DIAGRAM OF TEST SETUP

16.3 TEST DATA

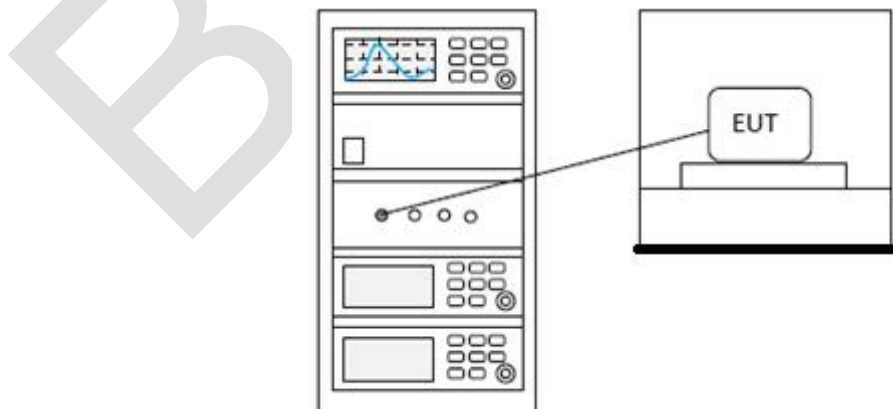**Pass: Please Refer To Appendix: Appendix1 For Details**

17 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%

17.1 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

17.2 BLOCK DIAGRAM OF TEST SETUP

17.3 TEST DATA

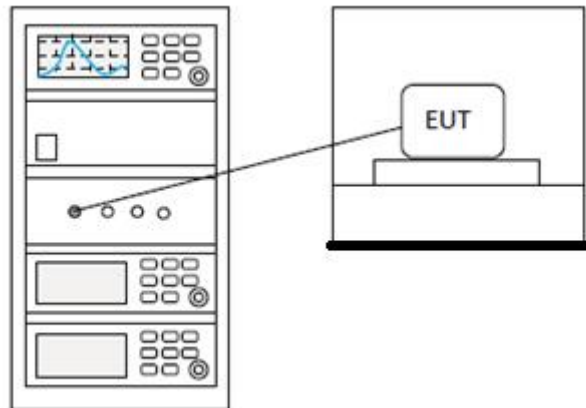**Pass: Please Refer To Appendix: Appendix1 For Details**

18 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%

18.1 LIMITS

Limit:	≥500 kHz

18.2 BLOCK DIAGRAM OF TEST SETUP

18.3 TEST DATA

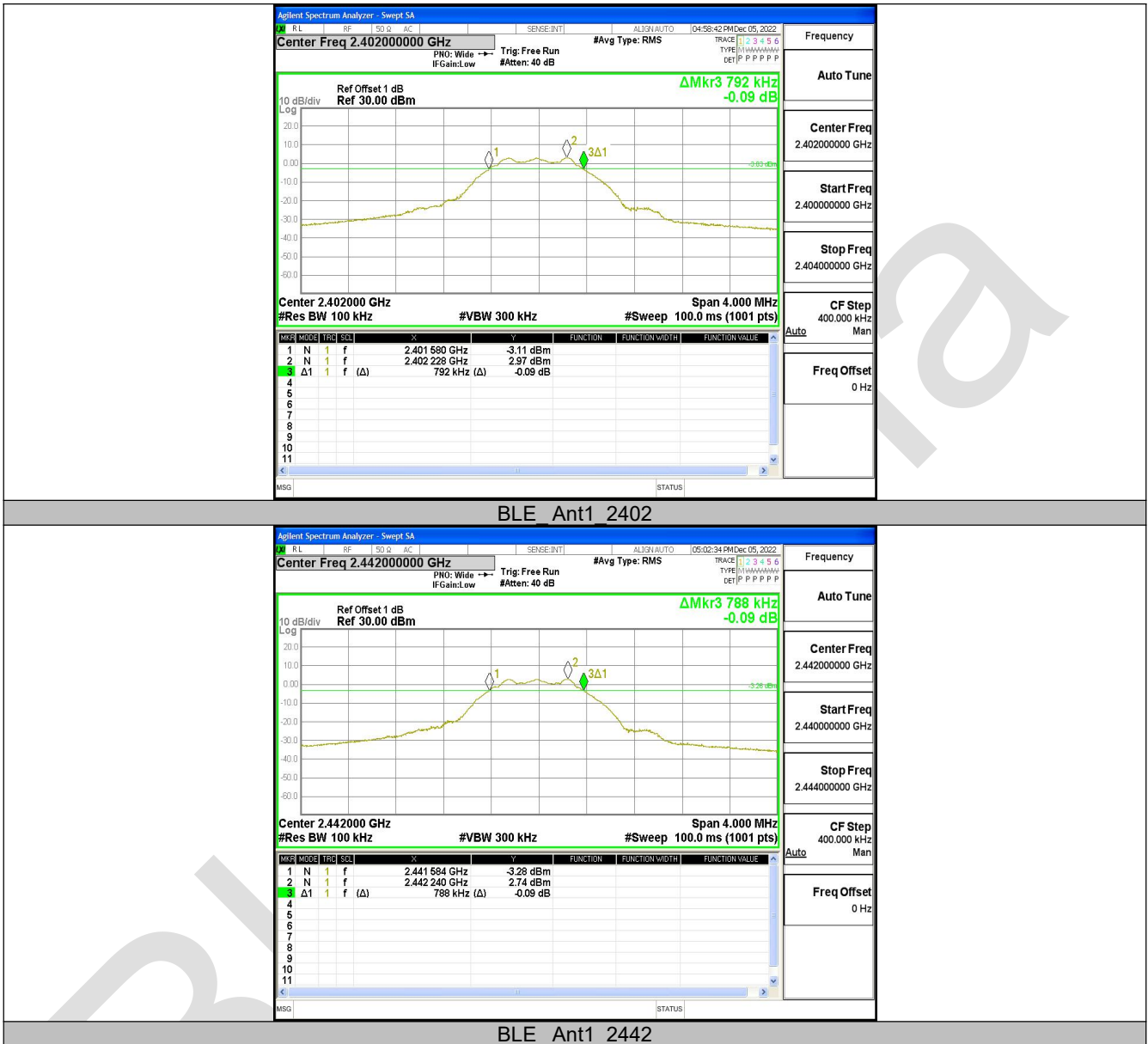**Pass: Please Refer To Appendix: Appendix1 For Details**
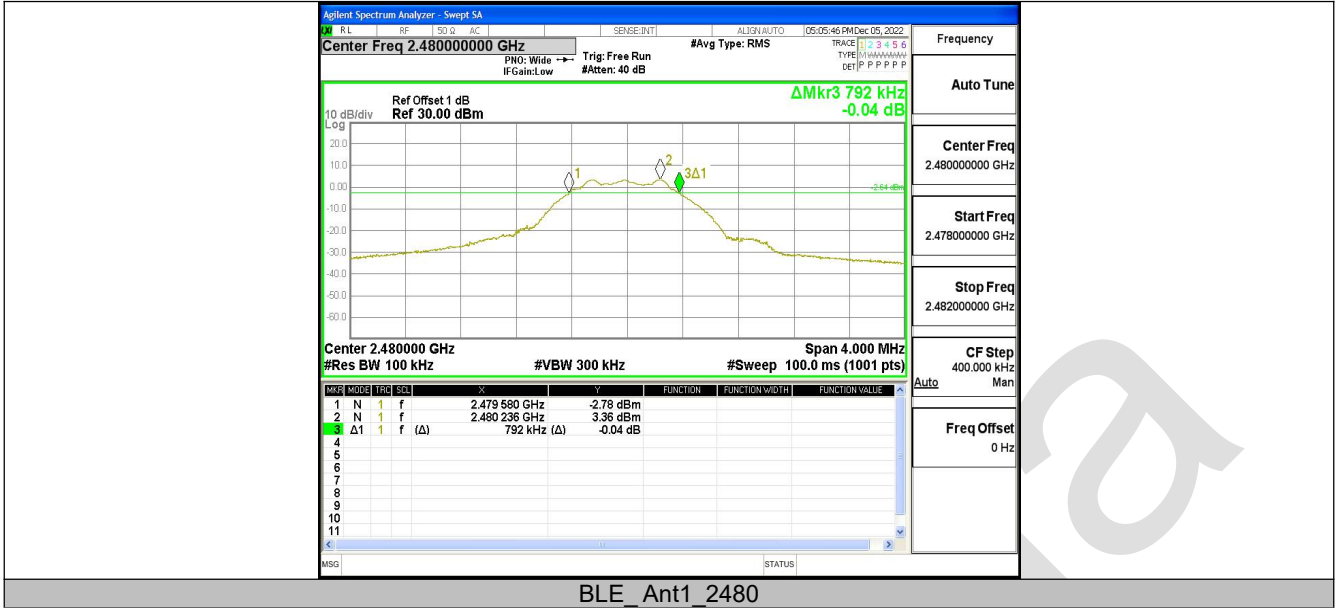
19 APPENDIX

Appendix1

19.1 APPENDIX A: DTS BANDWIDTH

Test Result

TestMode	Antenna	Channel	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	0.792	2401.580	2402.372	>=0.5	PASS
		2442	0.788	2441.584	2442.372	>=0.5	PASS
		2480	0.792	2479.580	2480.372	>=0.5	PASS

Test Graphs

BLE_ Ant1_2402

BLE_ Ant1_2442

![Blue Asia Logo] 蓝亚 BLUE ASIA

BLE_ Ant1_2480

19.2APPENDIX B: OCCUPIED CHANNEL BANDWIDTH

Test Result

TestMode	Antenna	Channel	OCB [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
BLE	Ant1	2402	1.1212	2401.429	2402.550	---	PASS
		2442	1.1146	2441.431	2442.546	---	PASS
		2480	1.1166	2479.429	2480.546	---	PASS

Test Graphs

Agilent Spectrum Analyzer - Occupied BW	

Center Freq 2.402000000 GHz

Center Freq: 2.402000000 GHz	Radio Std: None
Trig: Free Run Avg|Hold: 100/100	
#IFGain:Low #Atten: 40 dB	Radio Device: BTS

Mkr1 2.40196 GHz
0.57124 dBm

Ref Offset 1 dB
Ref 30.00 dBm

10 dB/div
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0

Center 2.402 GHz   Span 4 MHz
#Res BW 43 kHz   #VBW 150 kHz   #Sweep 100 ms

Occupied Bandwidth	Total Power	10.4 dBm
1.1212 MHz		
Transmit Freq Error -10.515 kHz	OBW Power	99.00 %
x dB Bandwidth 1.525 MHz	x dB	-26.00 dB

BLE_ Ant1_2402

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	
#IFGain:Low #Atten: 40 dB	Radio Device: BTS

Mkr1 2.441964 GHz
0.42155 dBm

Ref Offset 1 dB
Ref 30.00 dBm

10 dB/div
Log
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0

Center 2.442 GHz   Span 4 MHz
#Res BW 43 kHz   #VBW 150 kHz   #Sweep 100 ms

Occupied Bandwidth	Total Power	10.2 dBm
1.1146 MHz		
Transmit Freq Error -11.742 kHz	OBW Power	99.00 %
x dB Bandwidth 1.522 MHz	x dB	-26.00 dB

BLE_ Ant1_2442

BLE_ Ant1_2480

19.3 APPENDIX C: MAXIMUM CONDUCTED OUTPUT POWER

Test Result

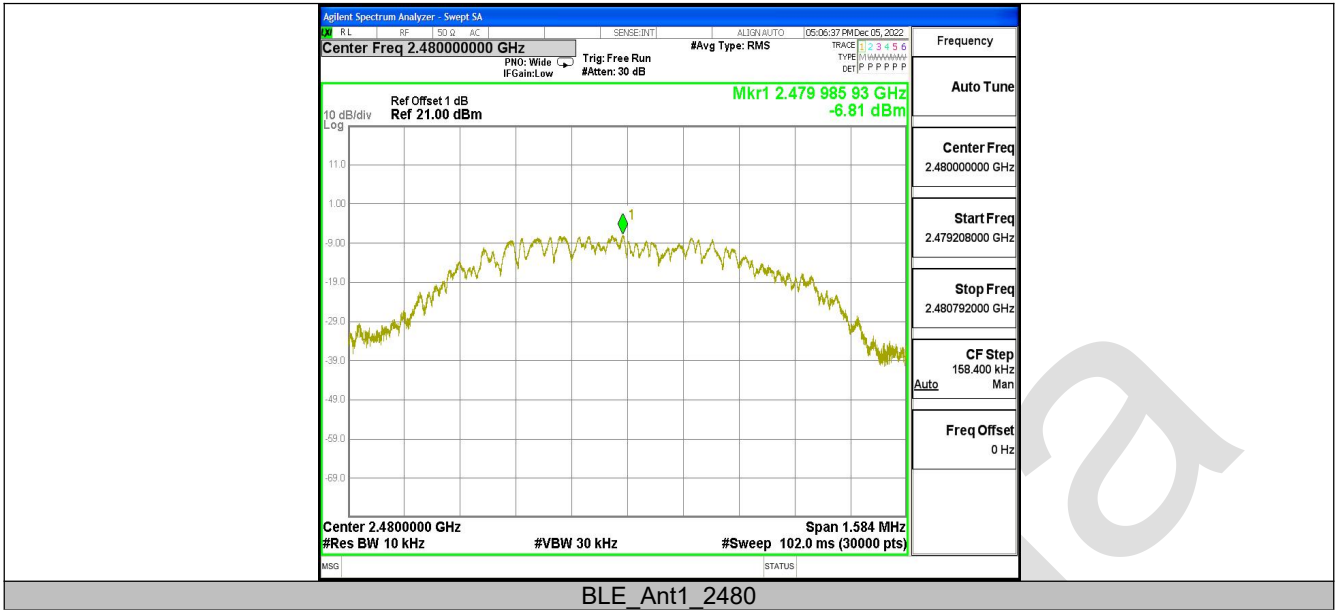| TestMode	Antenna	Channel	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	3.78	<=30	PASS
		2442	3.61	<=30	PASS
		2480	4.23	<=30	PASS

Test Graphs
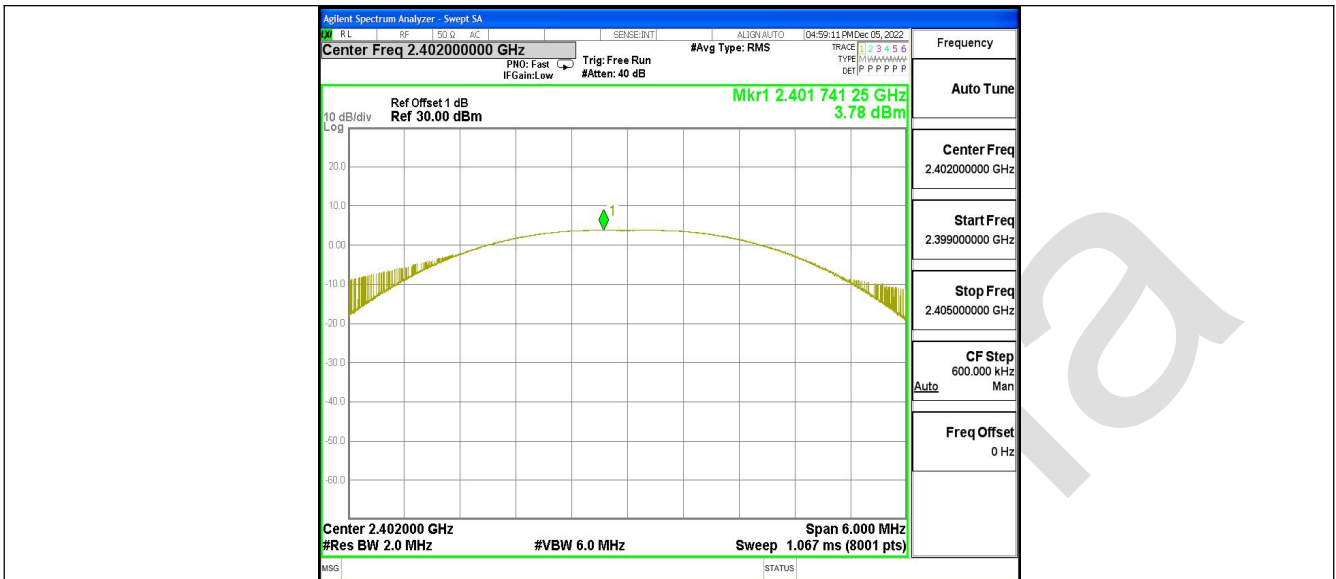
BLE_ Ant1_2402
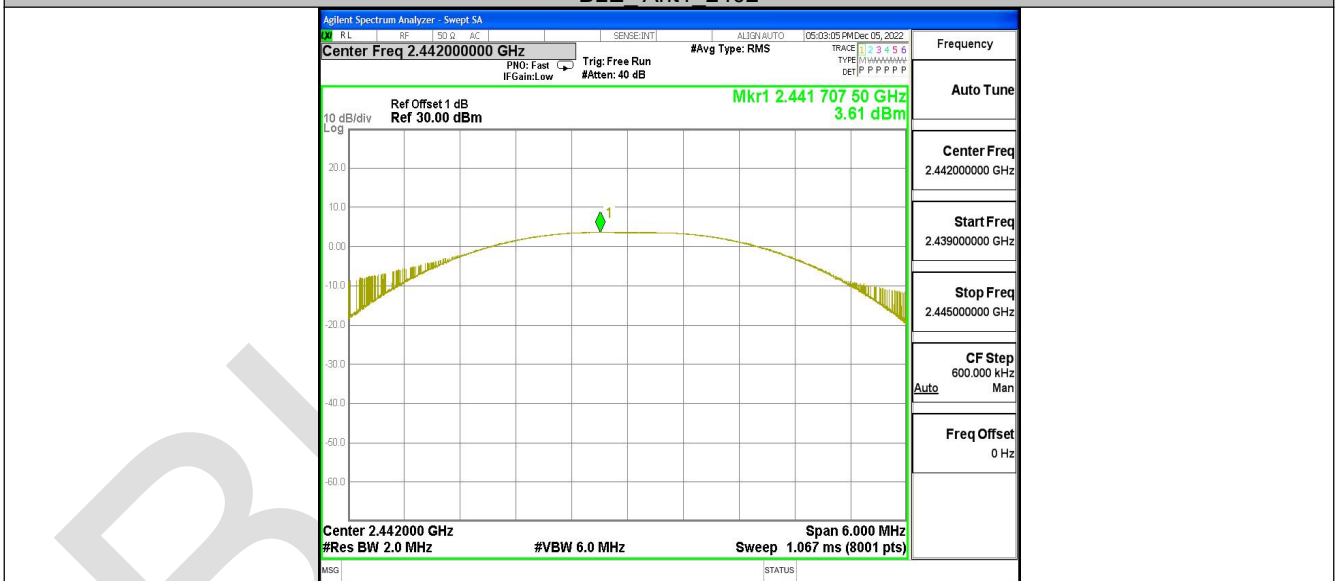
BLE_ Ant1_2442
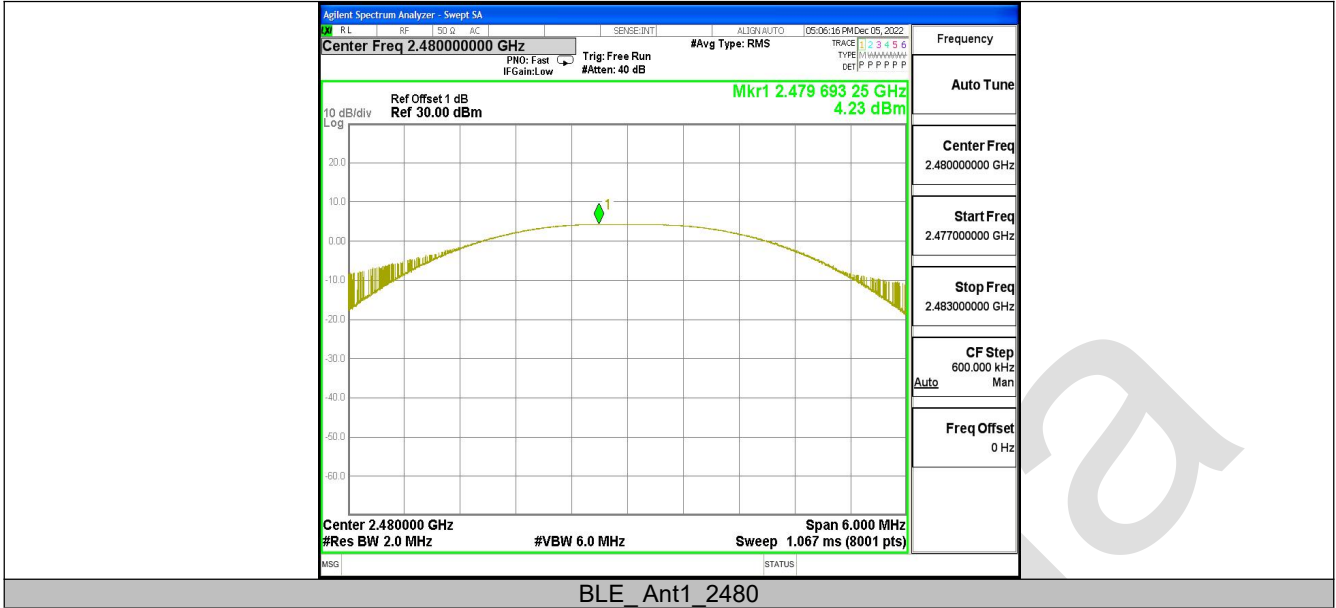
BLE_Ant1_2480

19.4 APPENDIX D: MAXIMUM POWER SPECTRAL DENSITY

Test Result

TestMode	Antenna	Channel	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
BLE	Ant1	2402	-7.38	<=8	PASS
		2442	-7.69	<=8	PASS
		2480	-6.81	<=8	PASS

Test Graphs

BLE_Ant1_2402

BLE_Ant1_2442
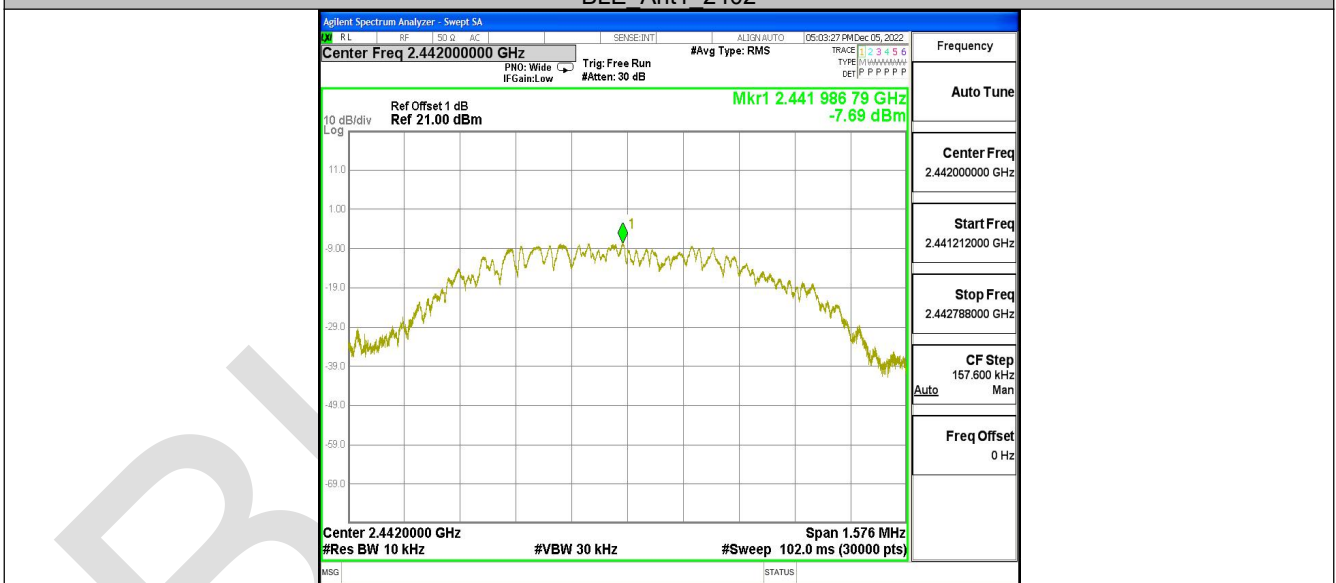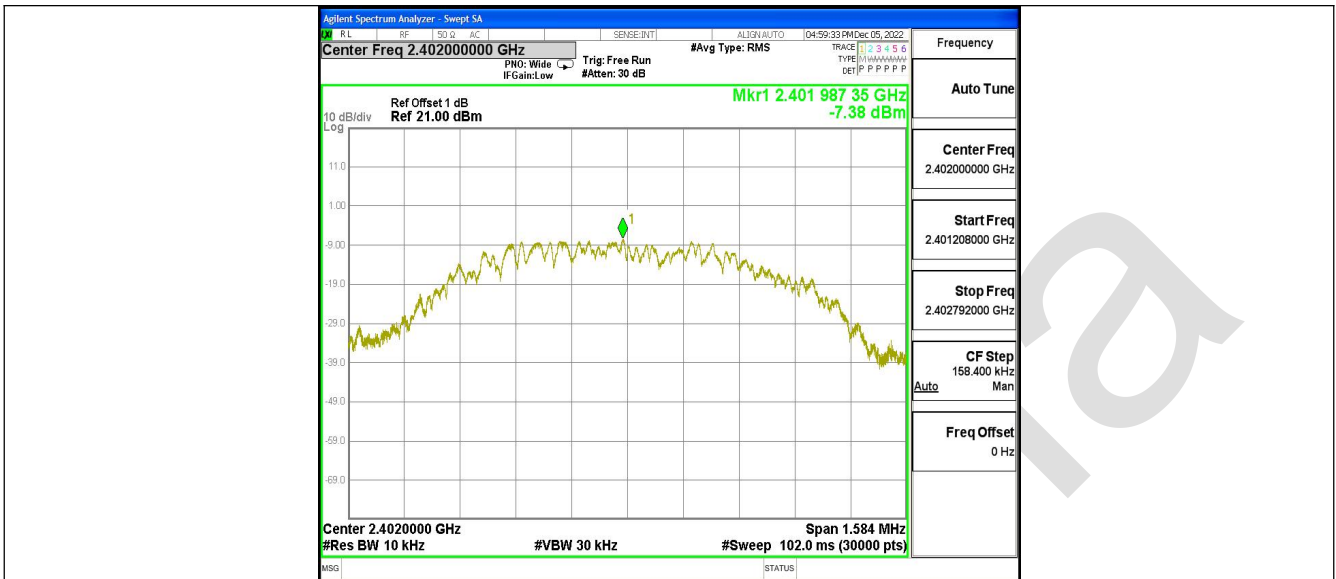
BLE_Ant1_2480

19.5 APPENDIX E: BAND EDGE MEASUREMENTS

Test Result

TestMode	Antenna	ChName	Channel	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	Low	2402	2.88	-33.24	<=-17.12	PASS
		High	2480	3.34	-38.86	<=-16.67	PASS

Test Graphs

BLE_Ant1_Low_2402

BLE_Ant1_High_2480

19.6 APPENDIX F: CONDUCTED SPURIOUS EMISSION

Test Result

TestMode	Antenna	Channel	FreqRange [MHz]	RefLevel [dBm]	Result[dBm]	Limit[dBm]	Verdict
BLE	Ant1	2402	Reference	2.86	2.86	---	PASS
			30~1000	2.86	-44.79	<=-27.14	PASS
			1000~26500	2.86	-34.19	<=-27.14	PASS
		2442	Reference	2.63	2.63	---	PASS
			30~1000	2.63	-44.7	<=-27.37	PASS
			1000~26500	2.63	-29.05	<=-27.37	PASS
		2480	Reference	3.34	3.34	---	PASS
			30~1000	3.34	-44.48	<=-26.66	PASS
			1000~26500	3.34	-34.47	<=-26.66	PASS

Test Graphs

BLE_Ant1_2402_0~Reference
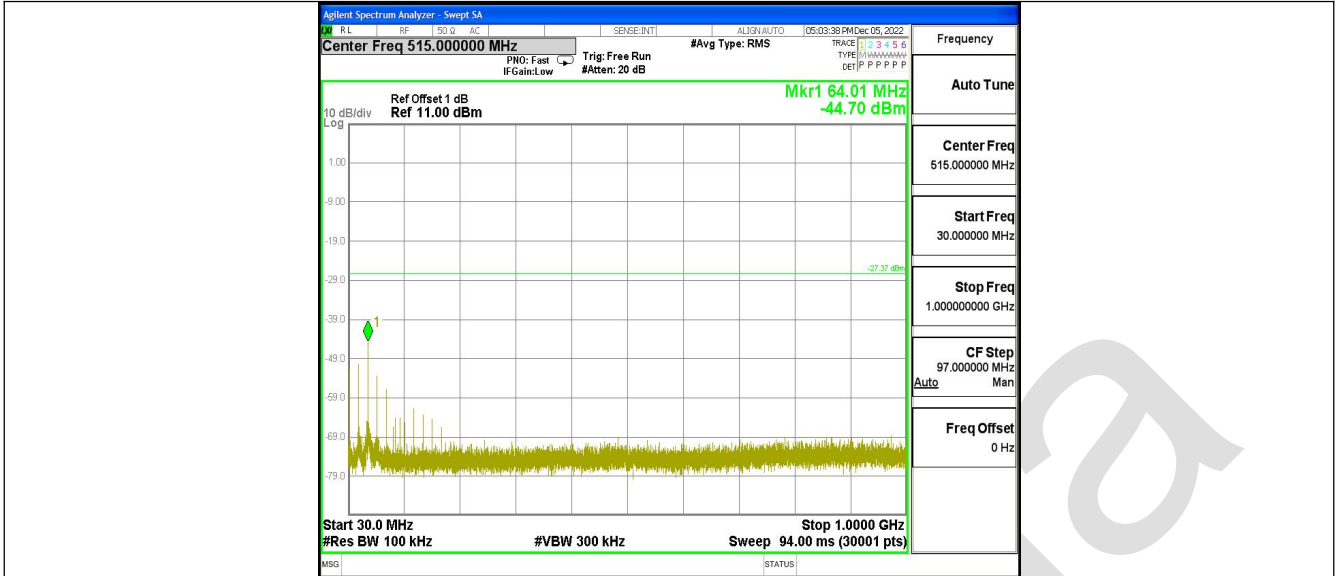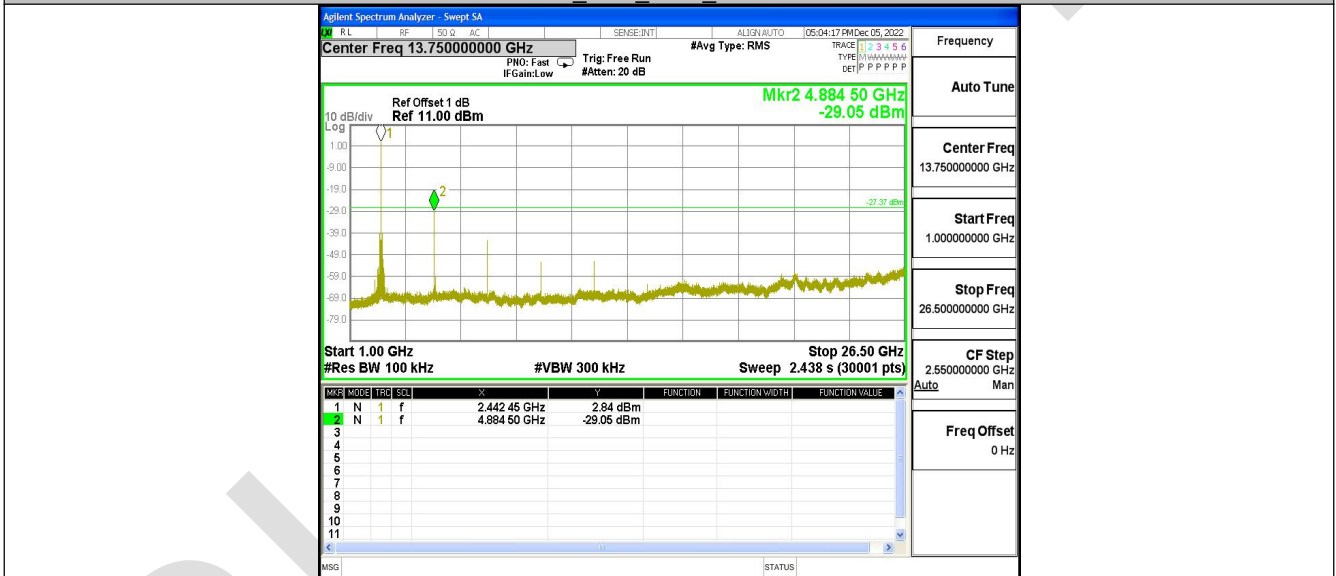

BLE_Ant1_2402_30~1000
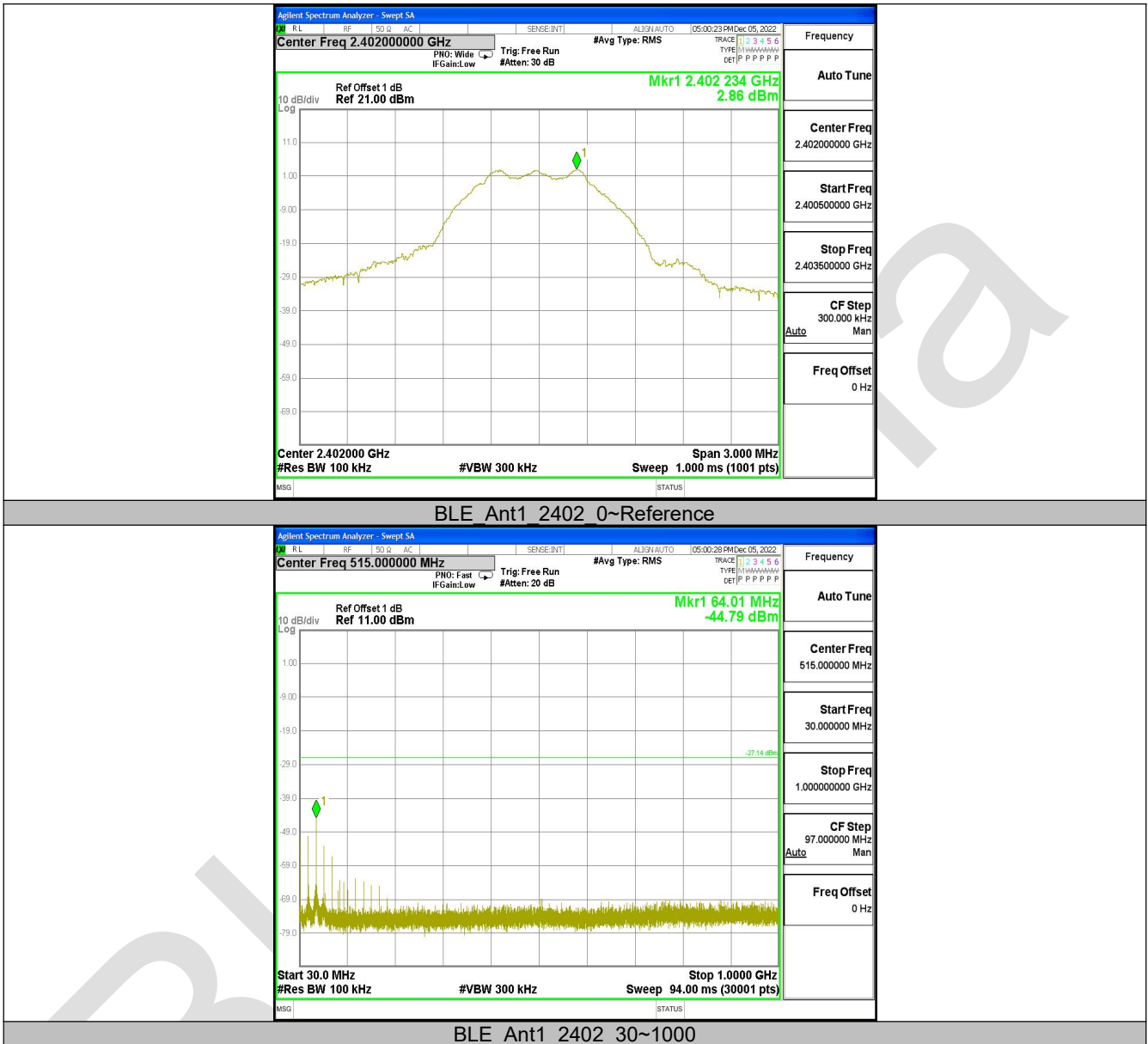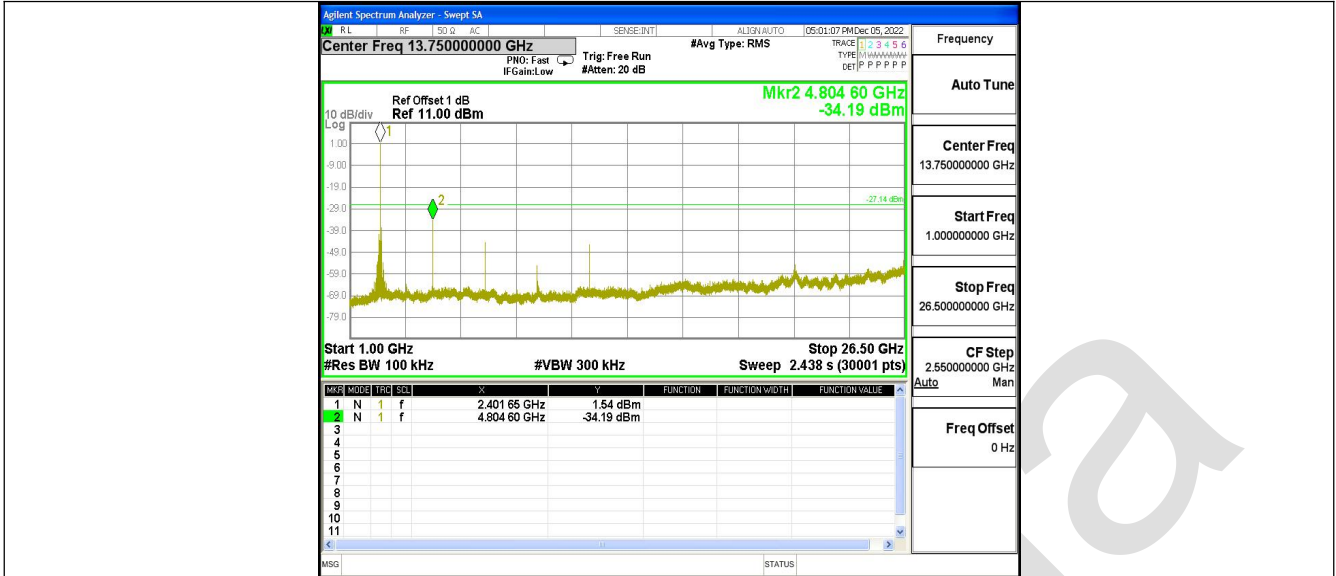
BLE_Ant1_2402_1000~26500
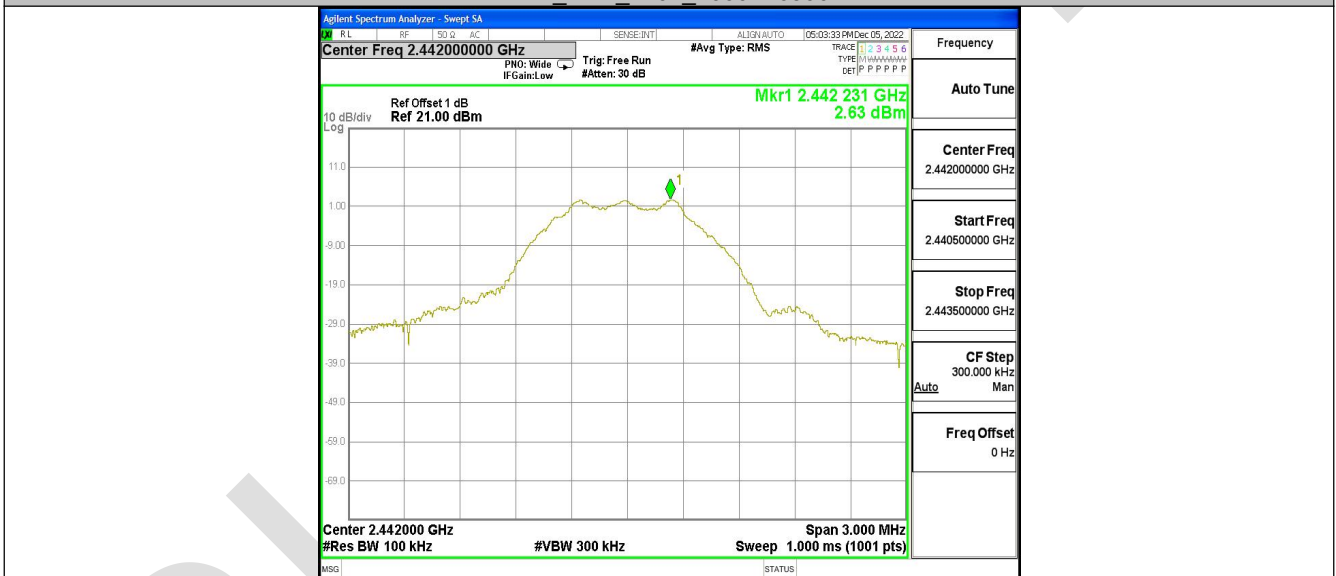
BLE_Ant1_2442_0~Reference

BLE_Ant1_2442_30~1000

BLE_Ant1_2442_1000~26500