RF MEASUREMENT REPORT

FCC ID:	2APLN-SSB
Applicant:	Seura Inc
Application Type:	Certification
Product:	Soundbar
Model No.:	SSB-1, SSB-2
Brand Name:	Seura
FCC Classification:	Digital Transmission System (DTS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Test Date:	November 08 ~ 14, 2021

Reviewed By: Kevin Guo

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

The test results relate only to the samples tested.

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2109RSU056-U2	Rev. 01	Initial Report	12-15-2021	Valid

CONTENTS

Description Page

1. General Information 5

1.1. Applicant 5
1.2. Manufacturer 5
1.3. Testing Facility 5
1.4. Product Information 6
1.5. Radio Specification 6
1.6. Working Frequencies 7

2. Test Configuration 8

2.1. Test System Connection Diagram 8
2.2. Test System Details 8
2.3. Test Software 8
2.4. Applied Standards 8
2.5. Duty Cycle 9
2.6. Test Environment Condition 9

3. Antenna Requirements 10

4. Measuring Instrument 11

5. Measurement Uncertainty 12

6. Test Result 13

6.1. Summary 13
6.2. 6dB Bandwidth 14
6.2.1. Test Limit 14
6.2.2. Test Procedure used 14
6.2.3. Test Setting 14
6.2.4. Test Setup 14
6.2.5. Test Result 14
6.3. Output Power 15
6.3.1. Test Limit 15
6.3.2. Test Procedure Used 15
6.3.3. Test Setting 15
6.3.4. Test Setup 15
6.3.5. Test Result 15
6.4. Power Spectral Density 16
6.4.1. Test Limit 16
6.4.2. Test Procedure Used 16
6.4.3. Test Setting 16

6.4.4. Test Setup 17
6.4.5. Test Result 17
6.5. Conducted Band Edge and Out-of-Band Emissions 18
6.5.1. Test Limit 18
6.5.2. Test Procedure Used 18
6.5.3. Test Settitng 18
6.5.4. Test Setup 19
6.5.5. Test Result 19
6.6. Radiated Spurious Emission 20
6.6.1. Test Limit 20
6.6.2. Test Procedure Used 20
6.6.3. Test Setting 20
6.6.4. Test Setup 22
6.6.5. Test Result 22
6.7. Radiated Restricted Band Edge 23
6.7.1. Test Limit 23
6.7.2. Test Procedure Used 24
6.7.3. Test Setting 24
6.7.4. Test Setup 25
6.7.5. Test Result 25
6.8. AC Conducted Emissions 26
6.8.1. Test Limit 26
6.8.2. Test Setup 26
6.8.3. Test Result 26

7. Conclusion 27

Appendix A - Test Result 28

A.1 6dB Bandwidth Test Result 28
A.2 Output Power Test Result 29
A.3 Power Spectral Density Test Result 30
A.4 Conducted Band Edge and Out-of-Band Emissions Test Result 31
A.5 Radiated Spurious Emission Test Result 33
A.6 Radiated Restricted Band Edge Test Result 36
A.7 AC Conducted Emissions Test Result 44

Appendix B - Test Setup Photograph 46

Appendix C - EUT Photograph 47

1. General Information

1.1. Applicant

Seura, Inc

1230 Ontario Road, Green Bay, Wisconsin 54311

1.2. Manufacturer

Hansong (Nanjing) Technology Ltd.

8th Kangping Road, Jiangning Economy and Technology Development Zone, Nanjing, 211106, China.

1.3. Testing Facility

☒	**Test Site – MRT Suzhou Laboratory**				
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China **Laboratory Location (Suzhou - SIP)** 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China				
	Laboratory Accreditations				
	A2LA: 3628.01		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**Test Site – MRT Shenzhen Laboratory**				
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China				
	Laboratory Accreditations				
	A2LA: 3628.02		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**Test Site – MRT Taiwan Laboratory**				
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)				
	Laboratory Accreditations				
	TAF: L3261-190725				
	FCC: 291082, TW3261		ISED: TW3261		

1.4. Product Information

Product Name	Soundbar
Model No.	SSB-1, SSB-2
Brand Name	Seura
Bluetooth Specification	V4.2 Dual mode
Antenna Information	Refer to section 1.5
EUT Identification No.	20210926Sample#20
Power Supply	AC 120V/60Hz

Remark:

1. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.
2. Differences between models is only the size, the size of SSB-1 is 960mm, SSB-2 is 1450mm, all the PCBA are the same, so only SSB-2 was selected for all tests.

1.5. Radio Specification

Bluetooth Frequency	2402 ~ 2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	1Mbps
Antenna Type	PCB Antenna
Antenna Gain	1.14dBi

Note: For other features of this EUT, test report will be issued separately.

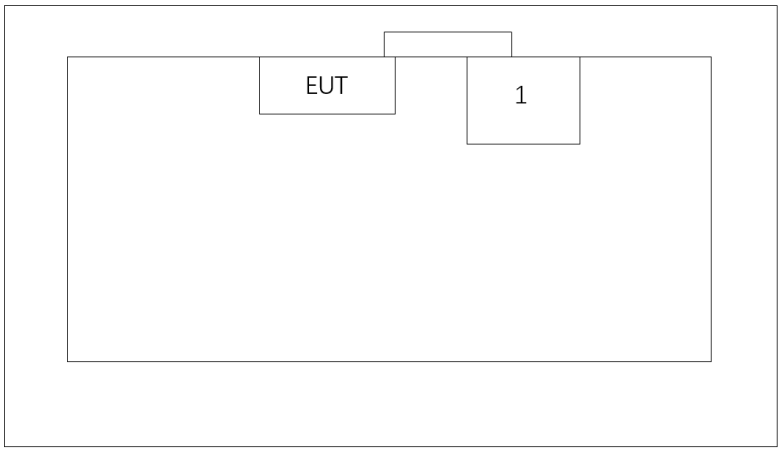
1.6. Working Frequencies

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

2. Test Configuration

2.1. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.

Connection Diagram – Radiated Emission testing & AC Conducted Emissions


2.2. Test System Details

Product		Manufacturer	Model No.
1	Notebook	DELL	P62G

2.3. Test Software

The test utility software used during testing was “BT FCC TOOL”, and the version was 2.00.

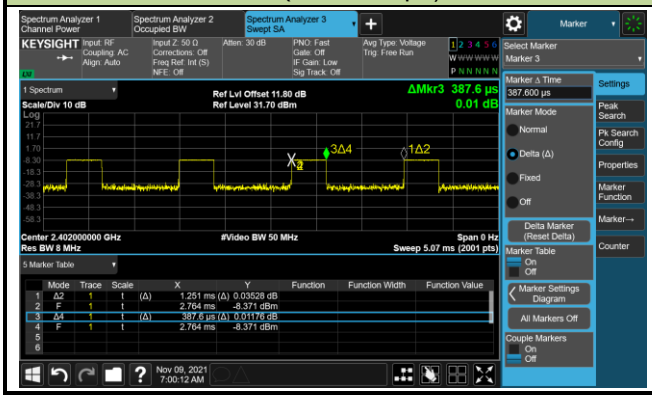
2.4. Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15.247
- KDB 558074 D01v05r02
- ANSI C63.10-2013

2.5. Duty Cycle

2.4GHz WLAN (DTS) operation is possible in 20MHz & 40MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
BLE	30.98%
Duty Cycle (T = Transmission Duration)	
BLE (T = 387.6μs)	
	

2.6. Test Environment Condition

Ambient Temperature	15°C~35°C
Relative Humidity	20%RH ~75%RH

3. Antenna Requirements

Excerpt from §15.203 of the FCC Rules/Regulations:

"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antenna of the device is **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

No.	Instrument	Manufacturer	Model No.	Asset No.	Last Cali. Date	Cali. Due Date	Test Site
1	Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2022/4/13	WZ-SR5
2	Bluetooth Test Set	Anritsu	MT8852B	MRTSUE06389	1 year	2022/6/8	WZ-SR5
3	Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2022/6/28	WZ-SR5
4	Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	/	/	WZ-SR5
5	Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2022/6/24	WZ-SR5
6	TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2022/5/24	WZ-AC2
7	EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2022/6/24	WZ-AC2
8	Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2021/11/30	WZ-AC2
					1 year	2022/12/1	WZ-AC2
9	Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2022/10/21	WZ-AC2
10	Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2021/11/13	WZ-AC2
					1 year	2022/11/12	
11	Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2022/4/29	WZ-AC2
12	Thermohygrometer	testo	Testo 608-H1	MRTSUE11038	1 year	2021/11/12	WZ-AC2
					1 year	2022/11/11	
13	Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28	WZ-AC1/WZ-AC2
14	Horn Antenna	ETS	3117	MRTSUE06257	1 year	2022/9/25	WZ-AC1/WZ-AC2
15	Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2021/12/2	WZ-AC1/WZ-AC2
					1 year	2022/12/1	
16	Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2022/1/14	WZ-AC1/WZ-AC2
17	Preamplifier	EMCI	EMC051845SE	MRTSUE06987	1 year	2022/9/9	WZ-AC1/WZ-AC2

Software	Version	Function
EMI Software	V3	EMI Test Software

5. Measurement Uncertainty

Where relevant, the following test uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k = 2.

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): Horizontal: 30MHz~300MHz: 5.04dB 300MHz~1GHz: 4.95dB 1GHz~40GHz: 6.40dB Vertical: 30MHz~300MHz: 5.24dB 300MHz~1GHz: 6.03dB 1GHz~40GHz: 6.40dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.78dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.13dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.15dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.247(a)(2)	6dB Bandwidth	Conducted	Pass
15.247(b)(3)	Output Power		Pass
15.247(e)	Power Spectral Density		Pass
15.247(d)	Band Edge / Out-of-Band Emissions		Pass
15.205 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Remark:

The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.

6.2. 6dB Bandwidth

6.2.1. Test Limit

The minimum 6dB bandwidth shall be at least 500 kHz.

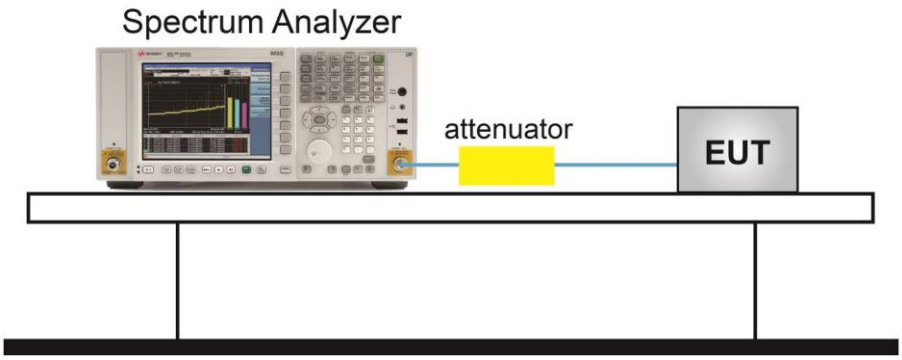
6.2.2. Test Procedure used

ANSI C63.10 - 2013 - Section 11.8

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. Set RBW = 100 kHz
3. VBW ≥ 3 × RBW
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.1.

6.3. Output Power

6.3.1. Test Limit

The maximum output power shall be less 1 Watt (30dBm).

The conducted output power limit specified in paragraph FCC Part 15.247(b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs FCC Part 15.247(b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.3.2. Test Procedure Used

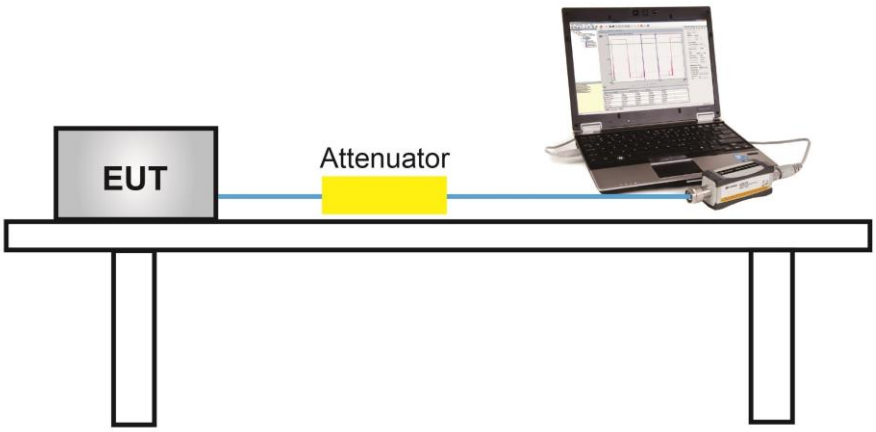
ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

Average Power Measurement

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.2.

6.4. Power Spectral Density

6.4.1. Test Limit

The maximum permissible power spectral density is 8dBm in any 3 kHz band.

The same method of determining the conducted output power shall be used to determine the power spectral density.

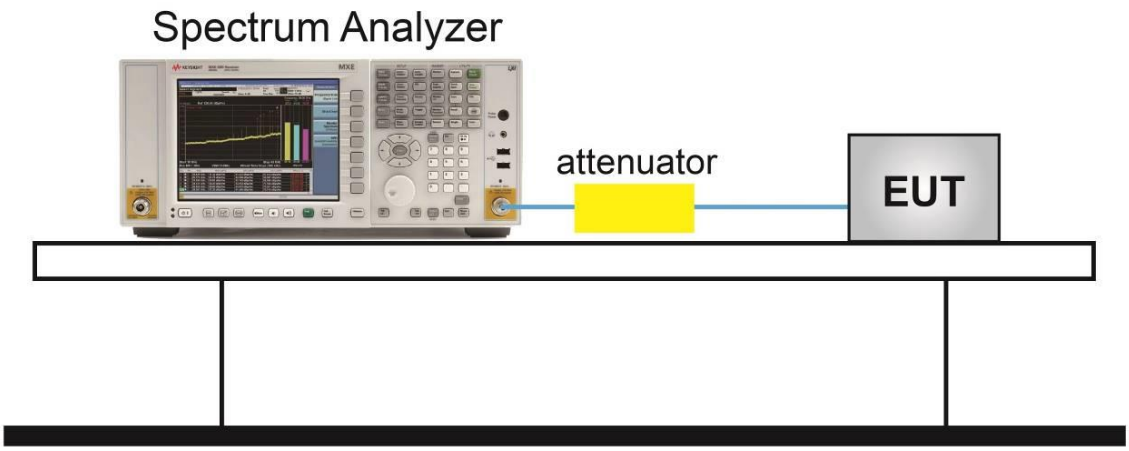
6.4.2. Test Procedure Used

ANSI C63.10 - 2013 - Section 11.10.5

6.4.3. Test Setting

1. Measure the duty cycle (x) of the transmitter output signal.
2. Set instrument center frequency to DTS channel center frequency.
3. Set span to at least 1.5 times the OBW.
4. RBW = 10 kHz.
5. VBW = 30 kHz.
6. Detector = RMS.
7. Ensure that the number of measurement points in the sweep ≥ 2 x span/RBW.
8. Sweep time = auto couple.
9. Don’t use sweep triggering. Allow sweep to “free run”.
10. Employ trace averaging (RMS) mode over a minimum of 100 traces.
11. Use the peak marker function to determine the maximum amplitude level.
12. Add 10 log (1/x), where x is the duty cycle measured in step (a, to the measured PSD to compute the average PSD during the actual transmission time. If measured value exceeds requirement specified by regulatory agency, then reduce RBW (but no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span to meet the minimum measurement point requirement as the RBW is reduced).

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.3.

6.5. Conducted Band Edge and Out-of-Band Emissions

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 30dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100 kHz bandwidth per the PSD procedure.

6.5.2. Test Procedure Used

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Settitng

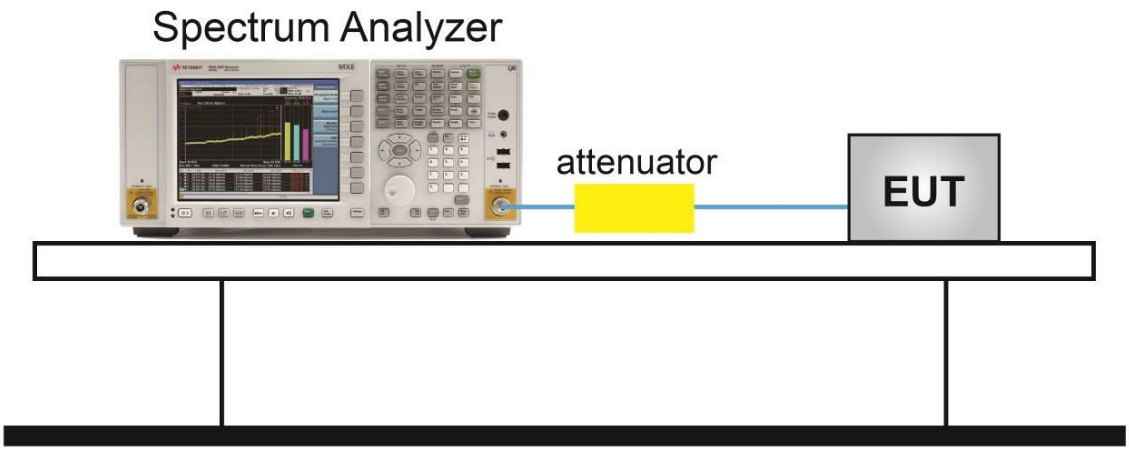
Reference level measurement

1. Set instrument center frequency to DTS channel center frequency
2. Set the span to ≥ 1.5 times the DTS bandwidth
3. Set the RBW = 100 kHz
4. Set the VBW ≥ 3 x RBW
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Allow trace to fully stabilize

Emission level measurement

1. Set the center frequency and span to encompass frequency range to be measured
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

6.5.4. Test Setup



6.5.5. Test Result

Refer to Appendix A.4.

6.6. Radiated Spurious Emission

6.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.6.2. Test Procedure Used

ANSI C63.10 - 2013 - Section 11.11 & 11.12

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

ANSI C63.10 - 2013 - Section 6.6 (Standard test method above 1GHz)

6.6.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000MHz	1MHz

Quasi-Peak Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. Span was set greater than 1MHz

3. RBW = as specified in Table 1

4. Detector = CISPR quasi-peak

5. Sweep time = auto couple

6. Trace was allowed to stabilize

Peak Measurements above 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW = 3MHz

4. Detector = peak

5. Sweep time = auto couple

6. Trace mode = max hold

7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest

2. RBW = 1MHz

3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10 Hz.

If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration.

4. Detector = Peak

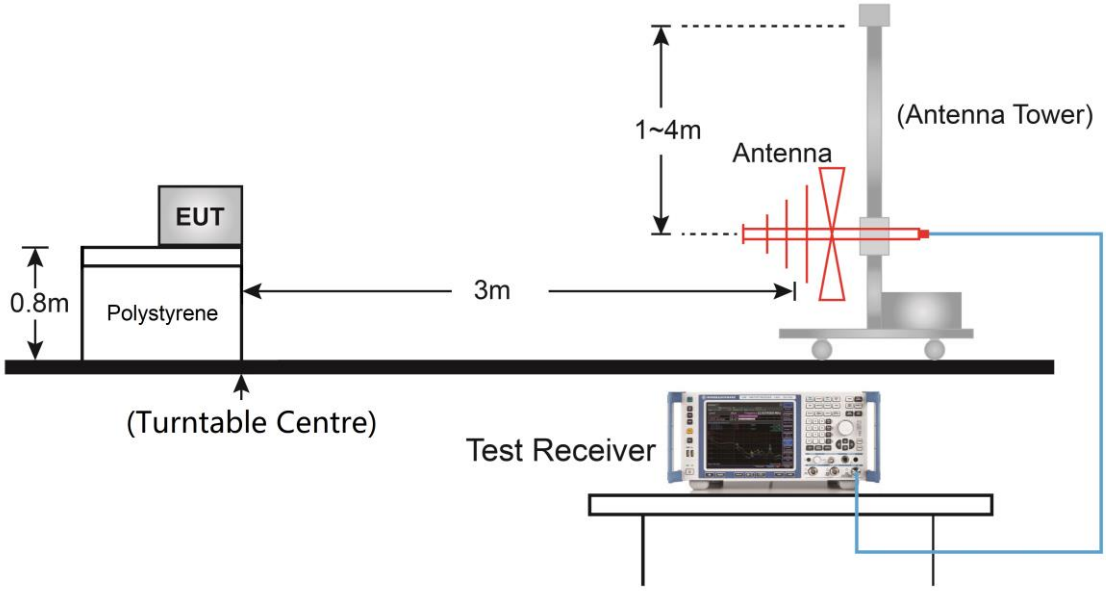
5. Sweep time = auto

6. Trace mode = max hold

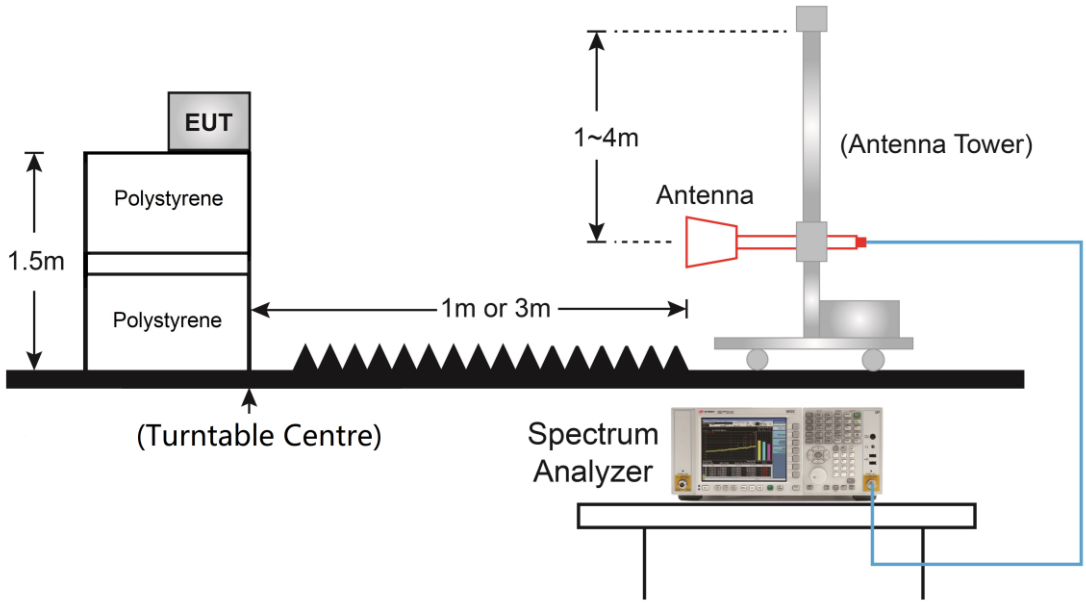
7. Trace was allowed to stabilize

6.6.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.5.

6.7. Radiated Restricted Band Edge

6.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (GHz)
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1] 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.7.2. Test Procedure Used

ANSI C63.10-2013 Section 6.3

ANSI C63.10-2013 Section 6.6

ANSI C63.10-2013 Section 11.13

6.7.3. Test Setting

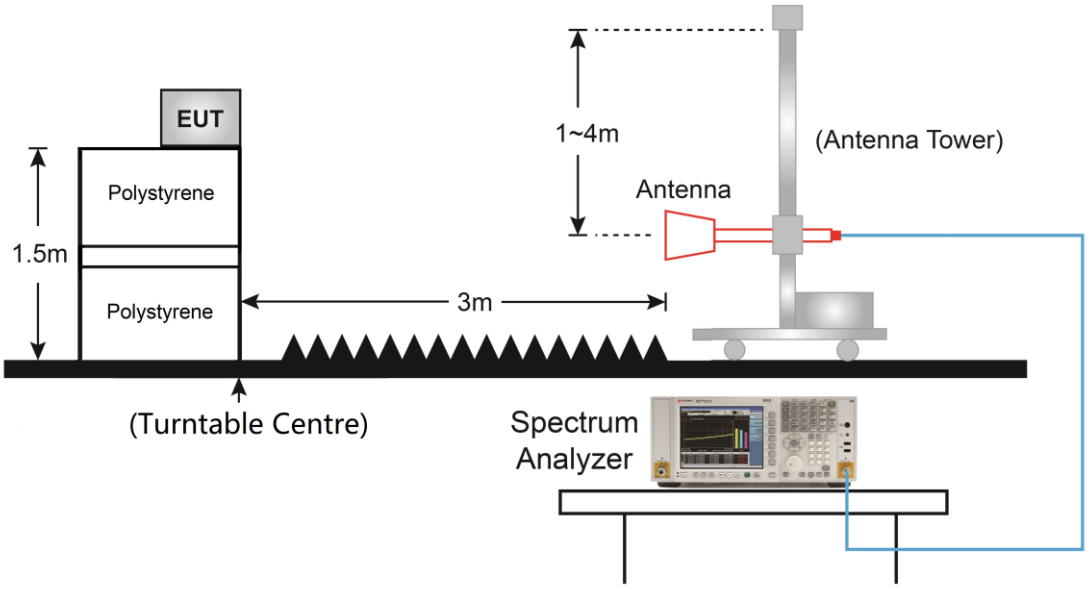
Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW ≥ 1/T
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to "Voltage" regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

6.7.4. Test Setup



6.7.5. Test Result

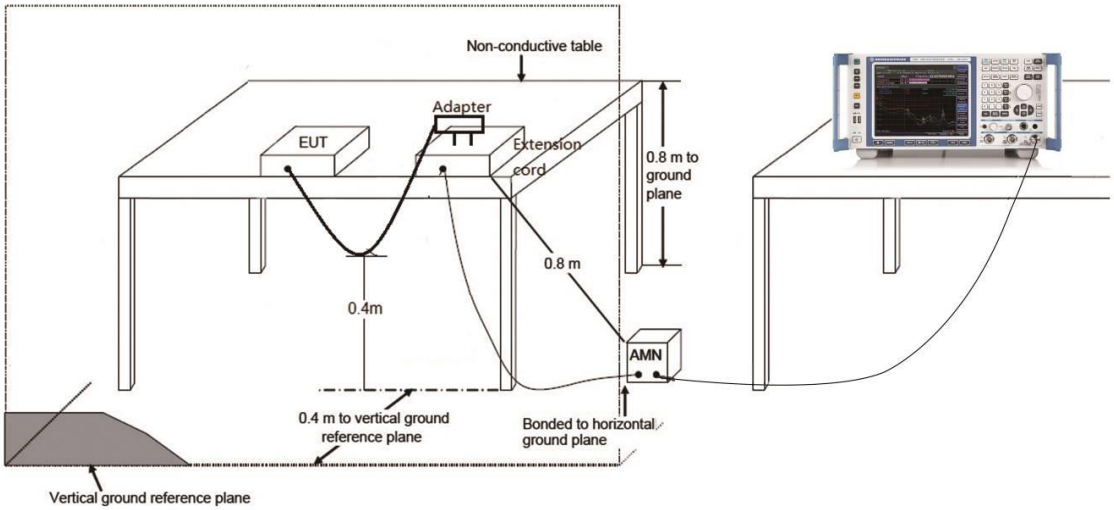
Refer to Appendix A.6.

6.8. AC Conducted Emissions

6.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.		

6.8.2. Test Setup



6.8.3. Test Result

Refer to Appendix A.7.

7. Conclusion

The data collected relate only the item(s) tested and show that the device is in compliance with Part 15C of the FCC rules.

Appendix A - Test Result

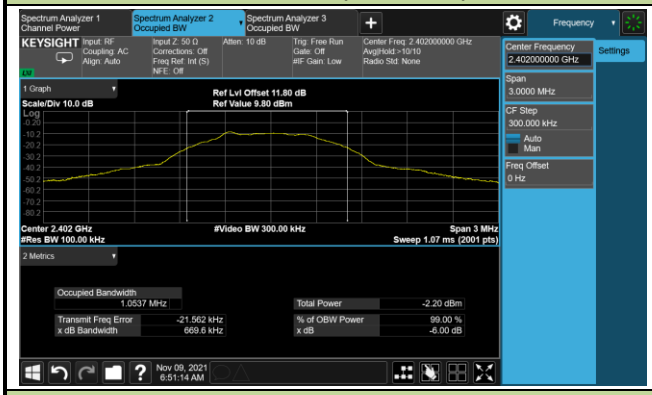
A.1 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2021/11/09		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
BLE	1Mbps	00	2402	0.670	≥ 0.5
BLE	1Mbps	19	2440	0.666	≥ 0.5
BLE	1Mbps	39	2480	0.669	≥ 0.5

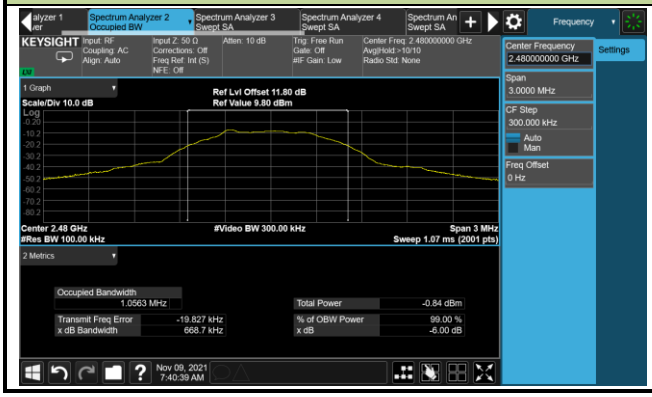
BLE-1Mbps 6dB Bandwidth

Channel 00 (2402MHz)



Channel 19 (2440MHz)

Channel 39 (2480MHz)



A.2 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2021/11/09		

Test Result of Peak Output Power

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	-2.89	≤ 30.00	Pass
BLE	1Mbps	19	2440	-2.66	≤ 30.00	Pass
BLE	1Mbps	39	2480	-2.46	≤ 30.00	Pass

Note: Max EIRP (dBm) = Peak Power (dBm) + Antenna Gain (dBi).

Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	-4.09	≤ 30.00	Pass
BLE	1Mbps	19	2440	-4.02	≤ 30.00	Pass
BLE	1Mbps	39	2480	-3.90	≤ 30.00	Pass

Note: Max EIRP (dBm) = Average Power (dBm) + Antenna Gain (dBi).

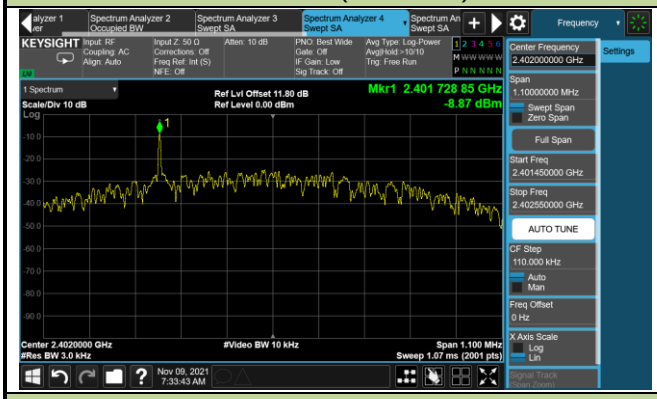
A.3 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2021/11/09		

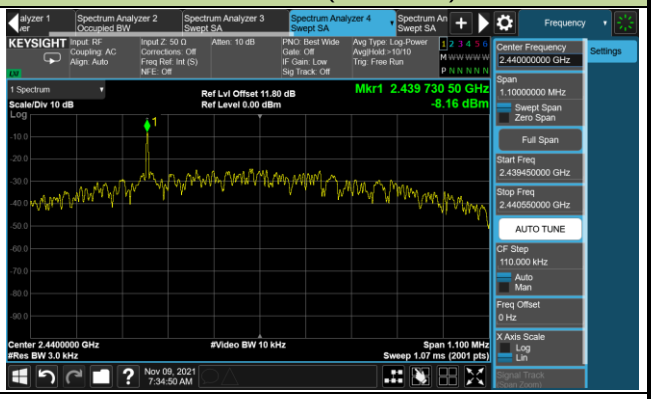
Test Mode	Data Rate	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1Mbps	00	2402	-8.87	≤ 8.00	Pass
BLE	1Mbps	19	2440	-8.16	≤ 8.00	Pass
BLE	1Mbps	39	2480	-7.29	≤ 8.00	Pass

BLE-1Mbps PSD

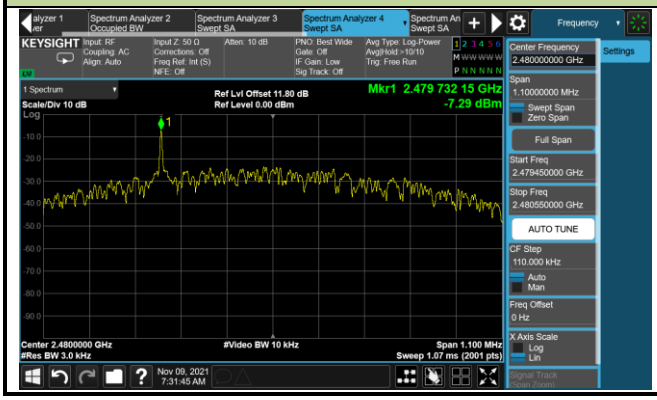
Channel 00 (2402MHz)



Channel 19 (2440MHz)



Channel 39 (2480MHz)



A.4 Conducted Band Edge and Out-of-Band Emissions Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2021/11/09		

Test Mode	Data Rate / Mbps	Channel No.	Frequency (MHz)	Limit (dBc)	Result
BLE	1	00	2402	20	Pass
BLE	1	19	2440	20	Pass
BLE	1	39	2480	20	Pass

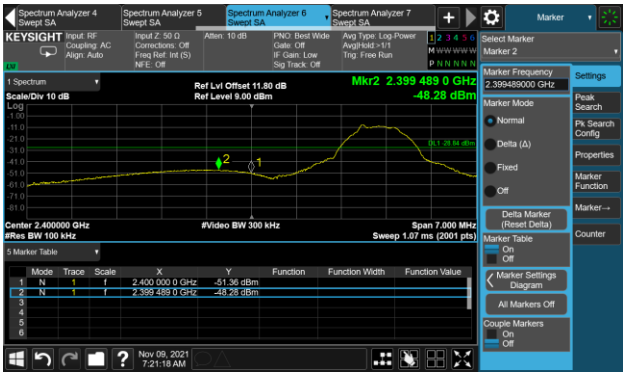
BLE-1Mbps Out-of-Band Emissions

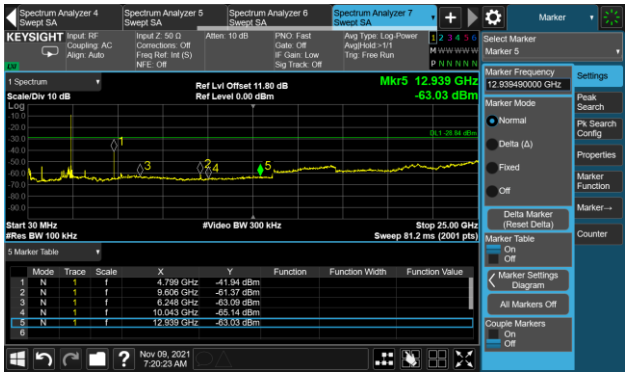
100kHz PSD Reference Level

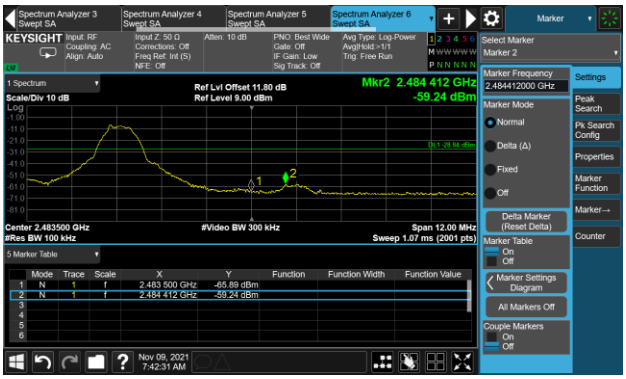
BLE-1Mbps Out-of-Band Emissions

Channel 00 (2402MHz)

Low Band Edge	Spurious Emission 30MHz ~ 25GHz





Channel 19 (2440MHz)	
Spurious Emission 30MHz ~ 25GHz	
Channel 39 (2480MHz)	
High Band Edge	Spurious Emission 30MHz ~ 25GHz
	

A.5 Radiated Spurious Emission Test Result

Test Site	WZ-AC2	Test Engineer	Kin Xia
Test Date	2021/11/14	Test Mode:	BLE
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

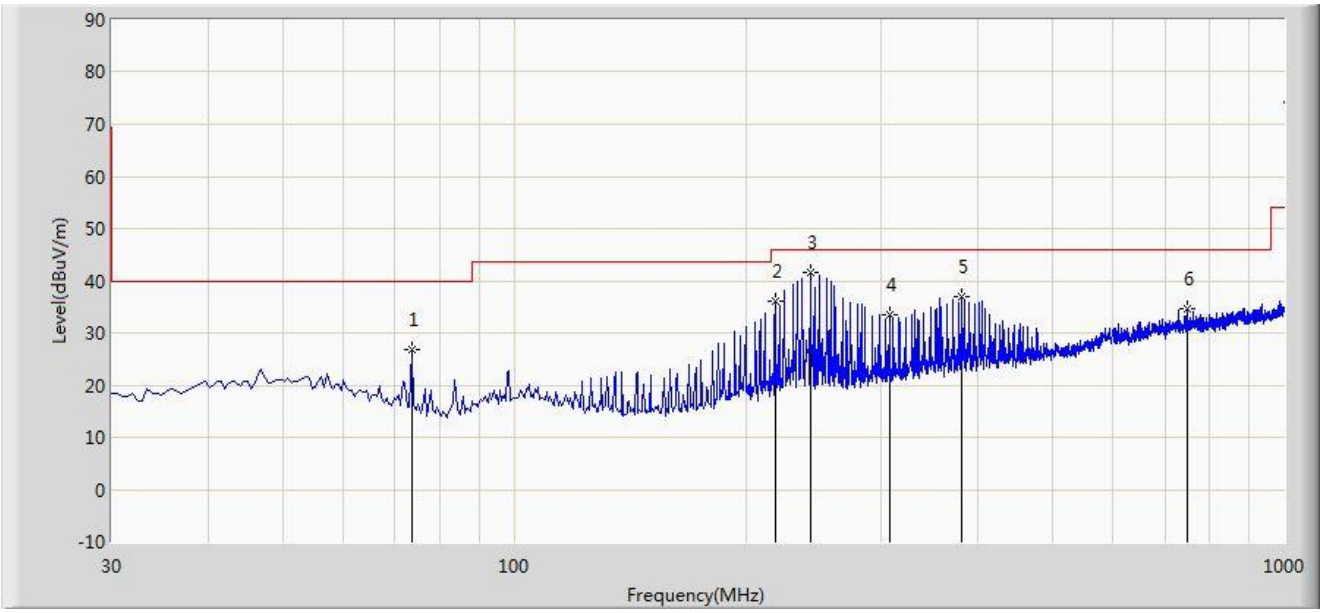
Test Channel	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
00	5989.5	34.0	6.2	40.2	74.0	-33.8	Peak	Horizontal
	7859.5	32.8	11.5	44.3	74.0	-29.7	Peak	Horizontal
	9313.0	32.0	14.4	46.4	74.0	-27.6	Peak	Horizontal
	4782.5	35.4	4.0	39.4	74.0	-34.6	Peak	Vertical
	5445.5	34.0	4.4	38.4	74.0	-35.6	Peak	Vertical
	8233.5	34.5	11.7	46.3	74.0	-27.7	Peak	Vertical
19	3796.5	36.5	0.1	36.7	74.0	-37.3	Peak	Horizontal
	4876.0	37.5	3.8	41.2	74.0	-32.8	Peak	Horizontal
	7324.0	32.0	11.4	43.3	74.0	-30.7	Peak	Horizontal
	3796.5	36.5	0.1	36.7	74.0	-37.3	Peak	Vertical
	4876.0	37.5	3.8	41.2	74.0	-32.8	Peak	Vertical
	7324.0	32.0	11.4	43.3	74.0	-30.7	Peak	Vertical
39	3737.0	36.0	0.1	36.2	74.0	-37.8	Peak	Horizontal
	4961.0	43.7	3.6	47.3	74.0	-26.7	Peak	Horizontal
	7451.5	31.3	11.6	43.0	74.0	-31.0	Peak	Horizontal
	4264.0	35.2	1.8	37.0	74.0	-37.0	Peak	Vertical
	4961.0	37.6	3.6	41.2	74.0	-32.8	Peak	Vertical
	7451.5	31.6	11.6	43.3	74.0	-30.7	Peak	Vertical

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)

The Result of Radiated Emission below 1GHz:

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_VULB9162_0.03-7GHz	Polarity: Horizontal
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			73.650	26.835	11.402	-13.165	40.000	15.434	PK
2			218.180	36.187	17.456	-9.813	46.000	18.731	PK
3		*	242.430	41.625	21.778	-4.375	46.000	19.847	PK
4			306.935	33.531	12.490	-12.469	46.000	21.041	PK
5			381.140	37.093	14.130	-8.907	46.000	22.963	PK
6			749.740	34.778	4.950	-11.222	46.000	29.828	PK

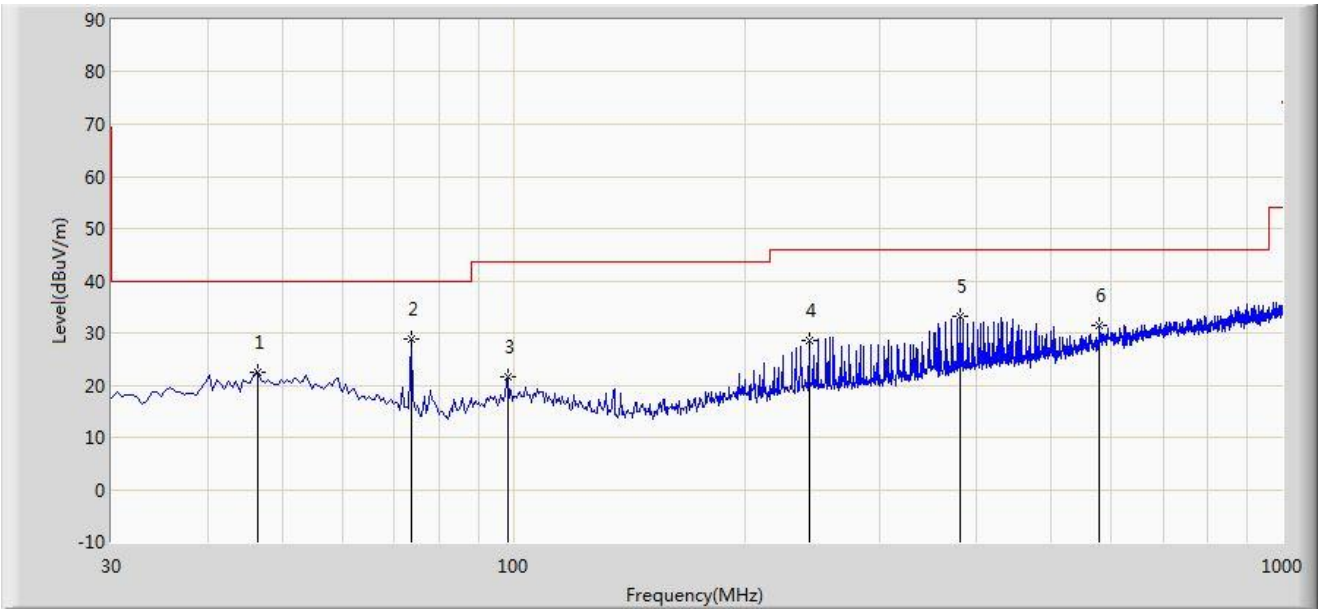
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: QP measurement was not performed when peak measure level was lower than the QP limit.

Note 3: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_VULB9162_0.03-7GHz	Polarity: Vertical
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			35.335	32.450	15.507	-7.550	40.000	16.943	PK
2		*	79.070	39.153	25.380	-0.847	40.000	13.774	QP
3			236.610	35.525	19.376	-10.475	46.000	16.149	PK
4			315.180	31.594	12.795	-14.406	46.000	18.799	PK
5			579.990	38.559	13.628	-7.441	46.000	24.931	PK
6			809.880	32.948	4.543	-13.052	46.000	28.405	PK

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)

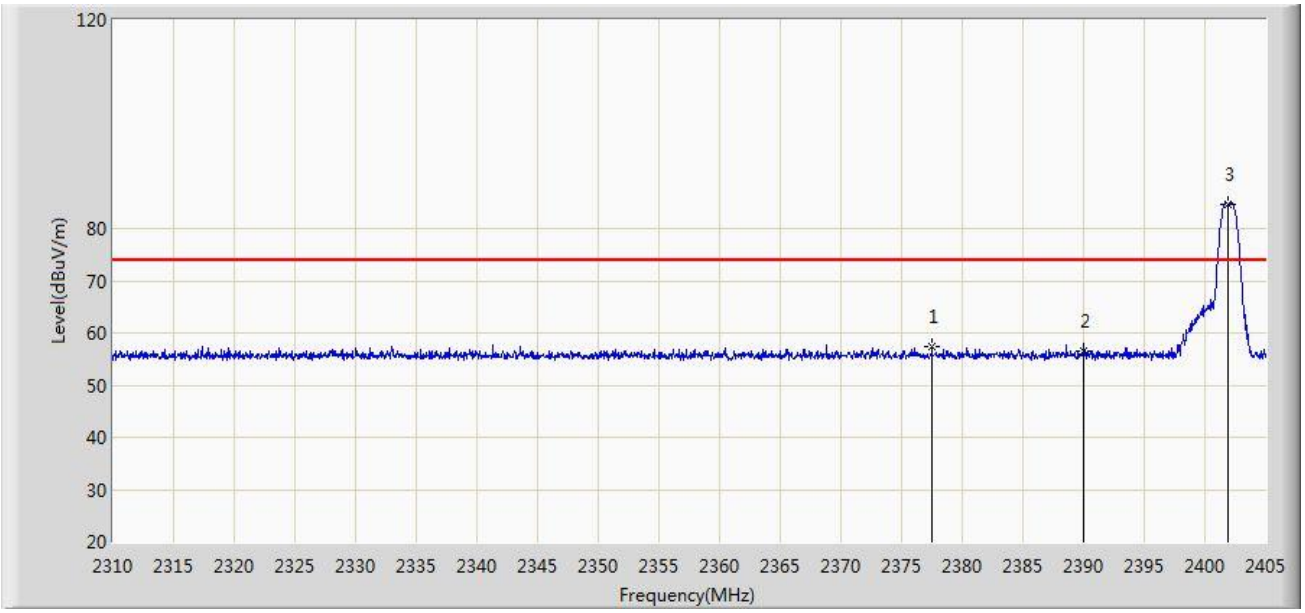
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Note 2: QP measurement was not performed when peak measure level was lower than the QP limit.

Note 3: The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 25GHz) is that proximity to ambient noise, which also are attenuated more than 20 dB below the permissible value. Therefore, the data is not presented in the report.

A.6 Radiated Restricted Band Edge Test Result

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

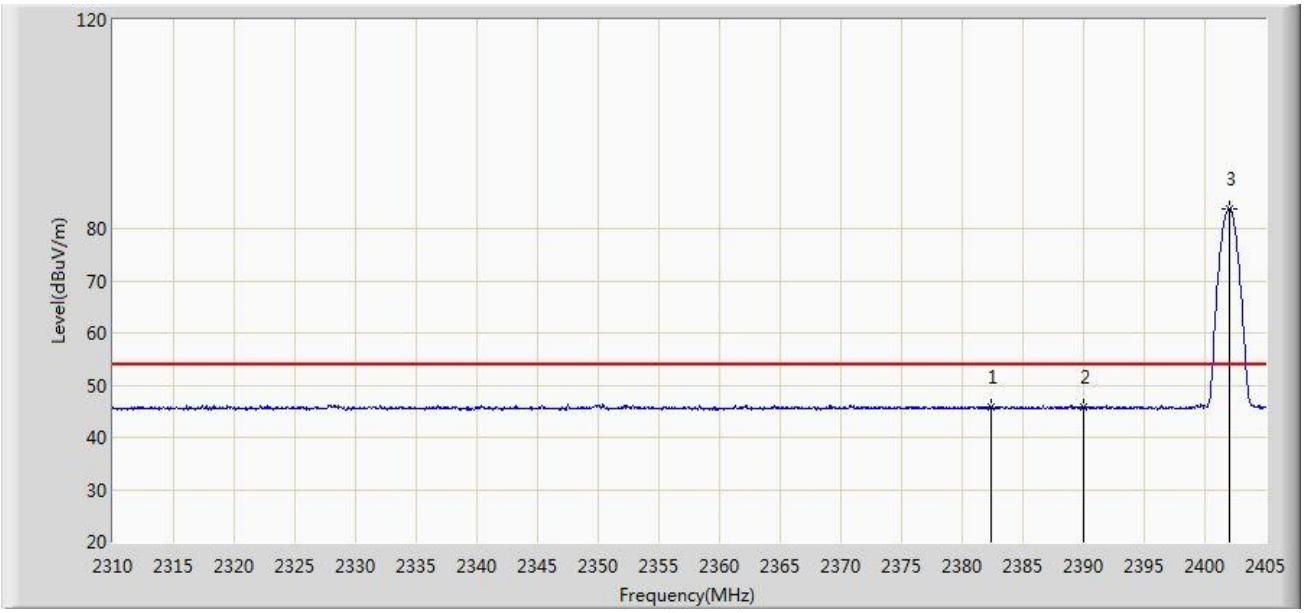


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			2377.498	57.405	25.392	-16.595	74.000	32.013	PK
2			2390.000	56.472	24.469	-17.528	74.000	32.003	PK
3		*	2401.960	84.756	52.770	N/A	N/A	31.986	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

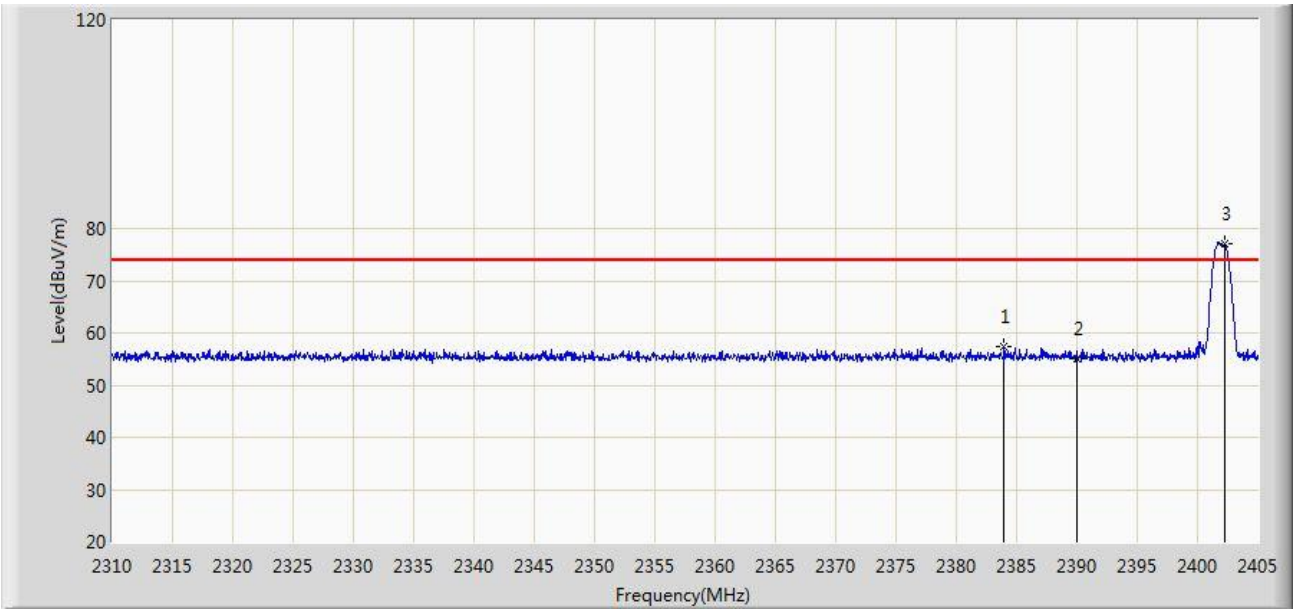


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			2382.343	45.902	13.885	-8.098	54.000	32.016	AV
2			2390.000	45.696	13.693	-8.304	54.000	32.003	AV
3		*	2402.008	83.827	51.841	N/A	N/A	31.986	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

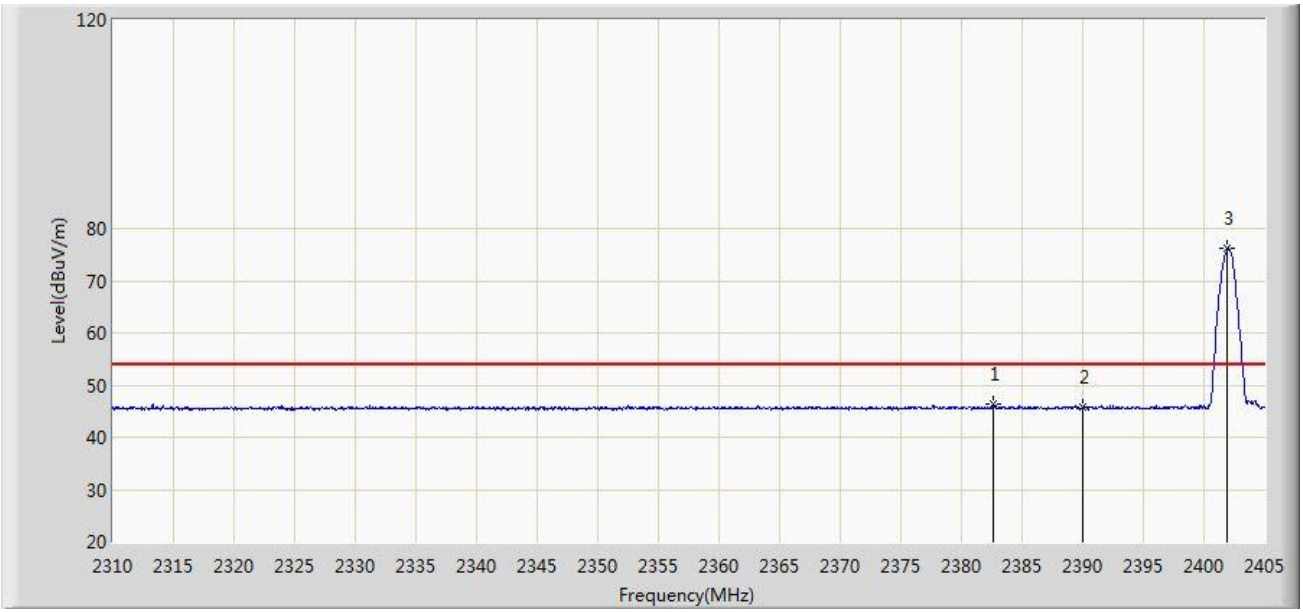


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			2383.958	57.492	25.474	-16.508	74.000	32.018	PK
2			2390.000	55.019	23.016	-18.981	74.000	32.003	PK
3		*	2402.245	77.181	45.195	N/A	N/A	31.986	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2402MHz	

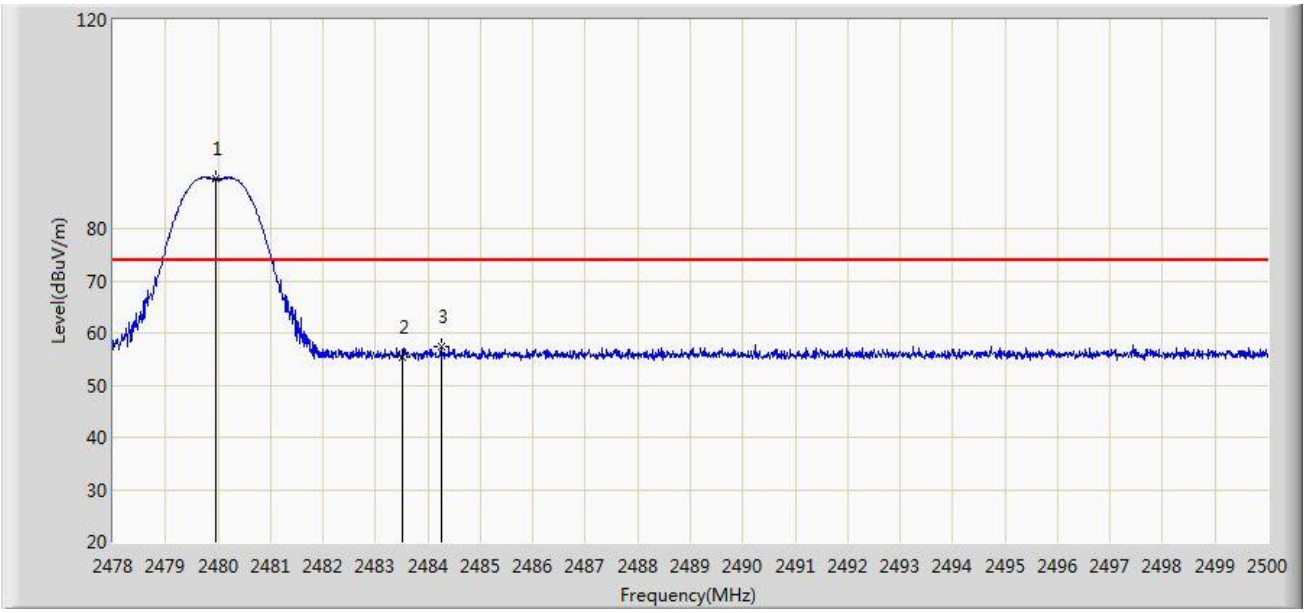


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1			2382.675	46.290	14.273	-7.710	54.000	32.016	AV
2			2390.000	45.670	13.667	-8.330	54.000	32.003	AV
3		*	2401.960	76.109	44.123	N/A	N/A	31.986	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

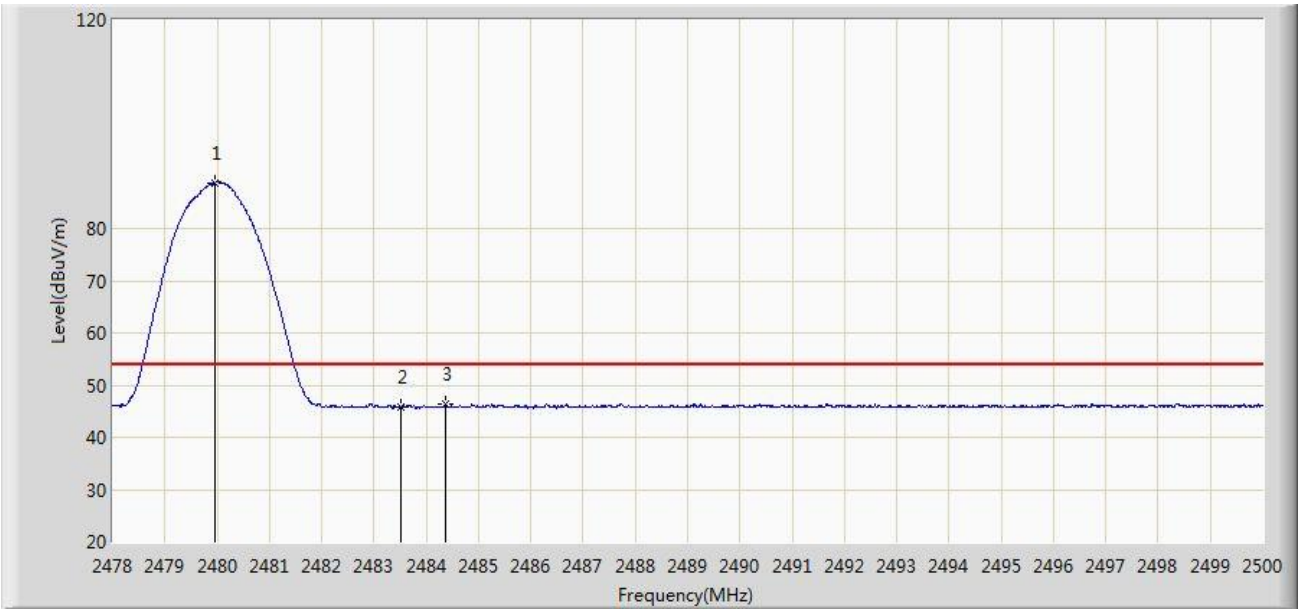


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2479.947	89.452	57.533	N/A	N/A	31.919	PK
2			2483.500	55.444	23.532	-18.556	74.000	31.912	PK
3			2484.259	57.431	25.521	-16.569	74.000	31.910	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

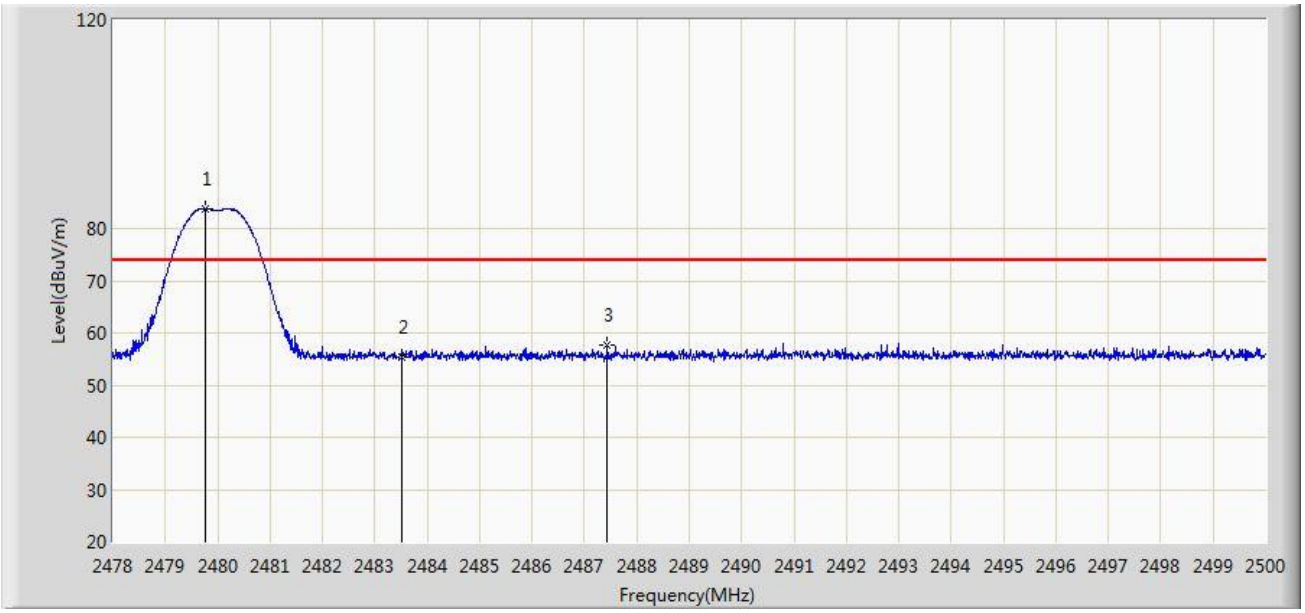


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2479.947	88.814	56.895	N/A	N/A	31.919	AV
2			2483.500	45.837	13.925	-8.163	54.000	31.912	AV
3			2484.369	46.347	14.437	-7.653	54.000	31.910	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	

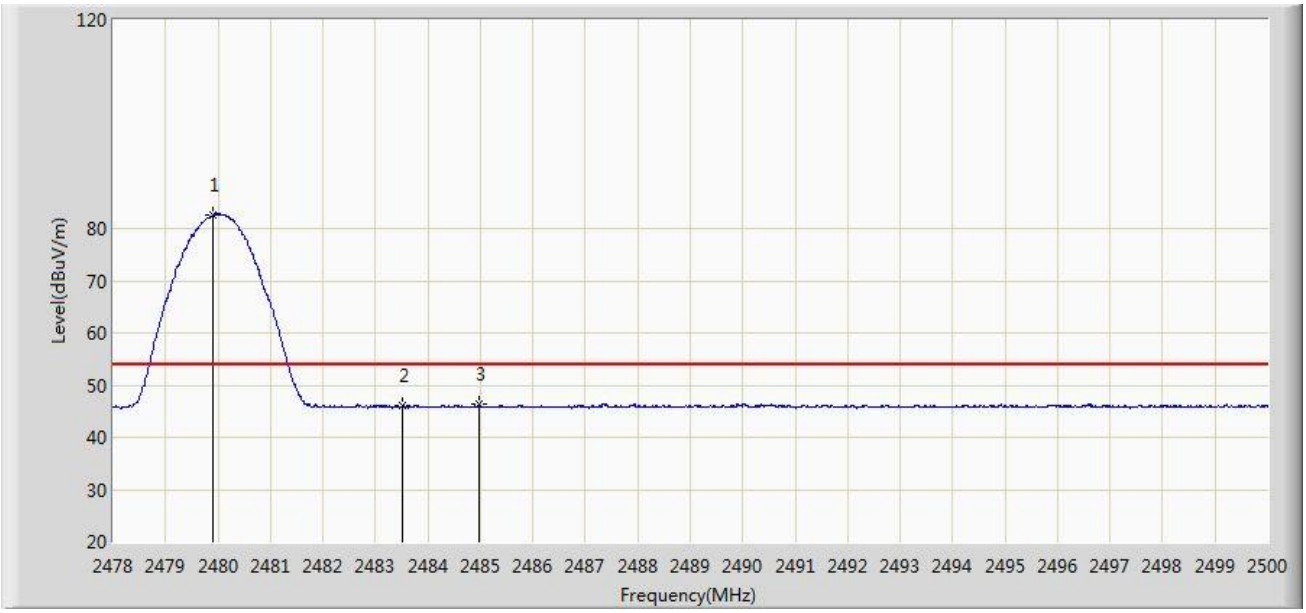


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2479.771	83.913	51.993	N/A	N/A	31.919	PK
2			2483.500	55.318	23.406	-18.682	74.000	31.912	PK
3			2487.438	57.583	25.679	-16.417	74.000	31.904	PK

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

Site: WZ-AC2	Time: 2021/11/14
Limit: FCC_Part15.209_RE(3m)	Engineer: Kin Xia
Probe: WZ-AC2_BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at Channel 2480MHz	



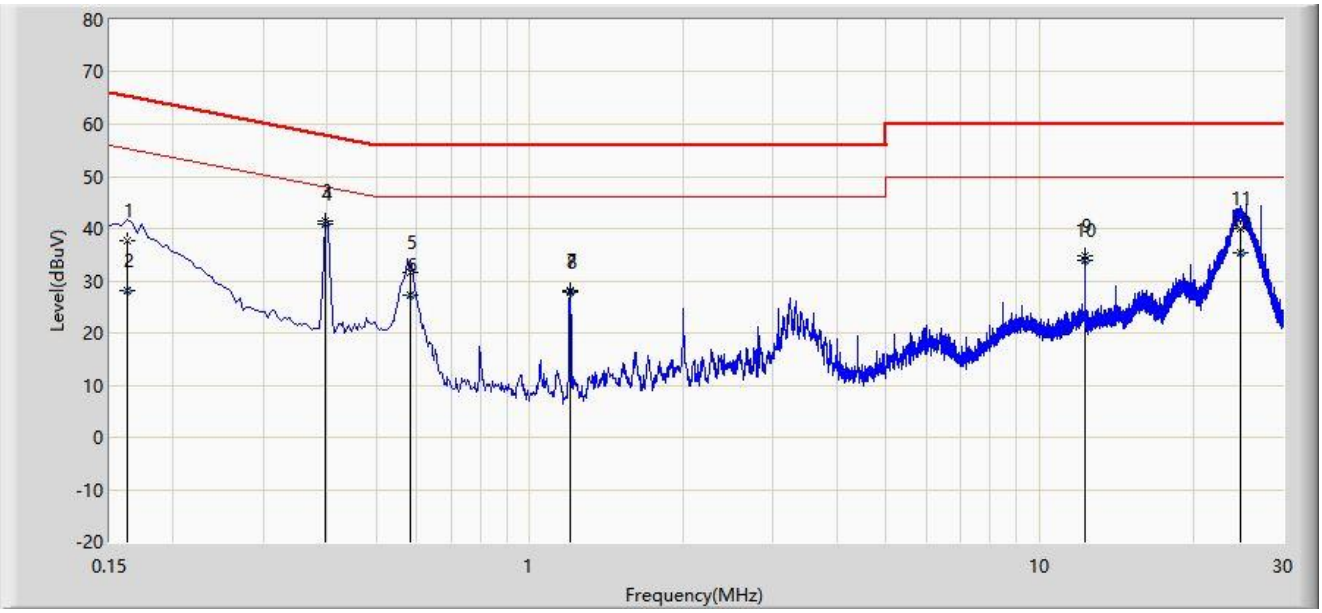
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB/m)	Type
1		*	2479.892	82.489	50.570	N/A	N/A	31.919	AV
2			2483.500	46.009	14.097	-7.991	54.000	31.912	AV
3			2484.985	46.238	14.329	-7.762	54.000	31.909	AV

Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)

A.7 AC Conducted Emissions Test Result

Site: WZ-SR2	Time: 2021/11/17
Limit: FCC_Part15.207_CE_AC Power	Engineer: Helen Han
Probe: ENV216_101683_Filter Off_C	Polarity: Line
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at channel 2402MHz	

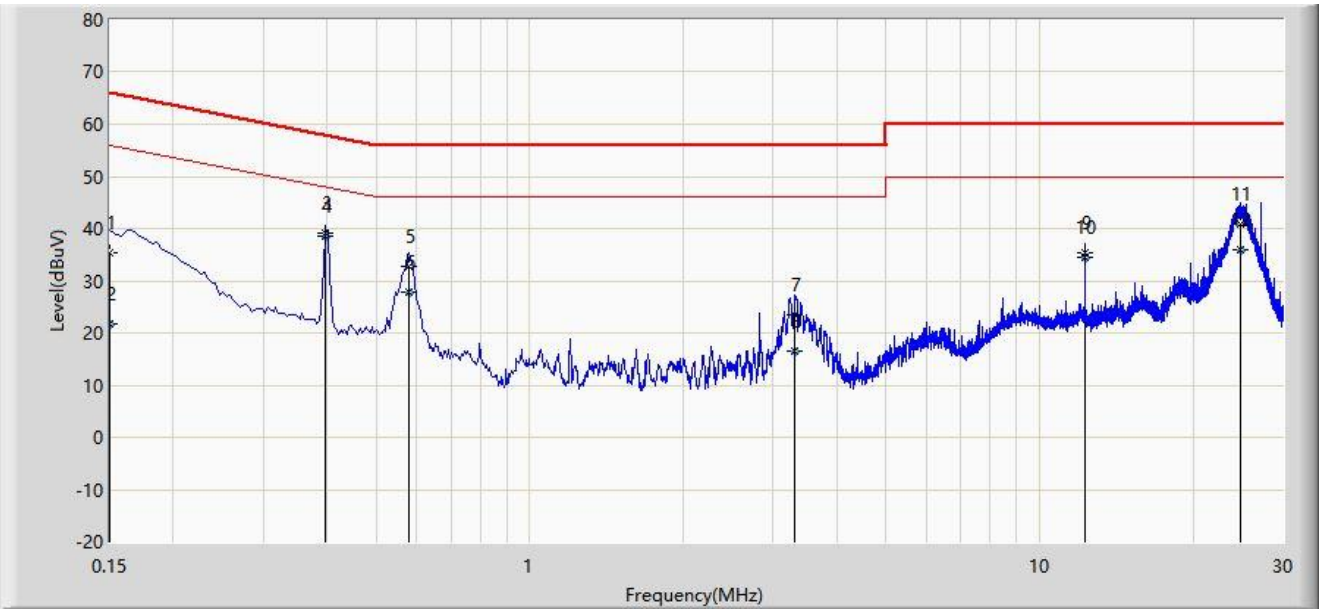


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1			0.162	37.594	27.546	-27.767	65.361	10.047	QP
2			0.162	27.975	17.928	-27.386	55.361	10.047	AV
3			0.398	41.415	31.322	-16.480	57.895	10.093	QP
4		*	0.398	40.767	30.674	-7.128	47.895	10.093	AV
5			0.582	31.598	21.458	-24.402	56.000	10.140	QP
6			0.582	27.355	17.215	-18.645	46.000	10.140	AV
7			1.198	28.230	17.998	-27.770	56.000	10.232	QP
8			1.198	27.840	17.608	-18.160	46.000	10.232	AV
9			12.290	34.711	23.845	-25.289	60.000	10.866	QP
10			12.290	33.926	23.060	-16.074	50.000	10.866	AV
11			24.722	40.021	28.698	-19.979	60.000	11.323	QP
12			24.722	35.341	24.018	-14.659	50.000	11.323	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Site: WZ-SR2	Time: 2021/11/17
Limit: FCC_Part15.207_CE_AC Power	Engineer: Messiah Li
Probe: ENV216_101683_Filter Off_C	Polarity: Neutral
EUT: Soundbar	Power: AC 120V/60Hz
Test Mode: Transmit by BLE at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1			0.150	35.376	24.999	-30.624	66.000	10.377	QP
2			0.150	21.790	11.413	-34.210	56.000	10.377	AV
3			0.398	39.181	28.818	-18.714	57.895	10.363	QP
4		*	0.398	38.604	28.241	-9.291	47.895	10.363	AV
5			0.578	32.619	22.224	-23.381	56.000	10.395	QP
6			0.578	27.877	17.482	-18.123	46.000	10.395	AV
7			3.314	23.397	12.684	-32.603	56.000	10.713	QP
8			3.314	16.601	5.888	-29.399	46.000	10.713	AV
9			12.286	35.395	24.265	-24.605	60.000	11.130	QP
10			12.286	34.588	23.458	-15.412	50.000	11.130	AV
11			24.774	40.837	29.248	-19.163	60.000	11.589	QP
12			24.774	35.964	24.376	-14.036	50.000	11.589	AV

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Appendix B - Test Setup Photograph

Refer to “2109RSU056-UT” file.

Appendix C - EUT Photograph

Refer to “2109RSU056-UE” file.

The End