

RF MEASUREMENT REPORT

FCC ID: 2BAXN-MR0001
Applicant: Willand (Beijing) Technology Co., LTD.
Product: Navimow
Model No.: H800N-VF, H1500N-VF, H3000N-VF
Brand Name: Segway
FCC Classification: Digital Transmission System (DTS)
FCC Rule Part(s): Part 15 Subpart C (Section 15.247)
Result: Complies
Received Date: 2023-04-20
Test Date: 2023-05-03 ~ 2023-06-01

Reviewed By:

Vincent Yu

Approved By:

Robin Wu



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
2304RSU043-U2	V01	Initial Report	2023-06-12	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 under Test	6
1.6. Working Frequencies	7
2. Test Configuration	8
2.1. Test Mode.....	8
2.2. Test System Connection Diagram.....	8
2.3. Test Software	9
2.4. Applied Standards.....	9
2.5. Test Environment Condition	9
3. Antenna Requirements	10
4. Measuring Instrument	11
5. Decision Rules and Measurement Uncertainty	13
5.1. Decision Rules	13
5.2. Measurement Uncertainty	13
6. Test Result.....	14
6.1. Summary.....	14
6.2. 6dB Bandwidth Measurement.....	15
6.2.1. Test Limit	15
6.2.2. Test Procedure	15
6.2.3. Test Setting	15
6.2.4. Test Setup	15
6.2.5. Test Result	15
6.3. Output Power Measurement	16
6.3.1. Test Limit	16
6.3.2. Test Procedure	16
6.3.3. Test Setting	16
6.3.4. Test Setup	16
6.3.5. Test Result	16
6.4. Power Spectral Density Measurement	17
6.4.1. Test Limit	17
6.4.2. Test Procedure	17

6.4.3.	Test Setting	17
6.4.4.	Test Setup	17
6.4.5.	Test Result	17
6.5.	Conducted Band Edge and Out-of-Band Emissions Measurement	18
6.5.1.	Test Limit	18
6.5.2.	Test Procedure	18
6.5.3.	Test Settintg	18
6.5.4.	Test Setup	19
6.5.5.	Test Result	19
6.6.	Radiated Spurious Emission Measurement.....	20
6.6.1.	Test Limit	20
6.6.2.	Test Procedure	20
6.6.3.	Test Setting	20
6.6.4.	Test Setup	22
6.6.5.	Test Result	23
6.7.	Radiated Restricted Band Edge Measurement	24
6.7.1.	Test Limit	24
6.7.2.	Test Procedure	25
6.7.3.	Test Setting	25
6.7.4.	Test Setup	26
6.7.5.	Test Result	26
6.8.	AC Conducted Emissions Measurement	27
6.8.1.	Test Limit	27
6.8.2.	Test Setup	27
6.8.3.	Test Result	27
Appendix A - Test Result.....		28
A.1	Duty Cycle Test Result	28
A.2	6dB Bandwidth Test Result	29
A.3	Output Power Test Result	30
A.4	Power Spectral Density Test Result.....	31
A.5	Conducted Band Edge and Out-of-Band Emissions Test Result.....	32
A.6	Radiated Spurious Emission Test Result	34
A.7	Radiated Restricted Band Edge Test Result.....	37
A.8	AC Conducted Emissions Test Result	45
Appendix B - Test Setup Photograph		47
Appendix C - EUT Photograph		48

1. General Information

1.1. Applicant

Willand (Beijing) Technology Co., LTD.

Room 203, A1 Bldg. Zhongguancun Dongsheng Technology Park, Haidian Dist., Beijing, China.

1.2. Manufacturer

Willand (Beijing) Technology Co., LTD.

Room 203, A1 Bldg. Zhongguancun Dongsheng Technology Park, Haidian Dist., Beijing, China.

1.3. Testing Facility

<input checked="" type="checkbox"/>	<p>Test Site – MRT Suzhou Laboratory</p> <hr/> <p>Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China</p> <p>Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China</p> <hr/> <p>Laboratory Accreditations</p> <p>A2LA: 3628.01 CNAS: L10551</p> <p>FCC: CN1166 ISED: CN0001</p> <p>VCCI: <input type="checkbox"/>R-20025 <input type="checkbox"/>G-20034 <input type="checkbox"/>C-20020 <input type="checkbox"/>T-20020</p> <p style="padding-left: 100px;"><input type="checkbox"/>R-20141 <input type="checkbox"/>G-20134 <input type="checkbox"/>C-20103 <input type="checkbox"/>T-20104</p>
<input type="checkbox"/>	<p>Test Site – MRT Shenzhen Laboratory</p> <hr/> <p>Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China</p> <hr/> <p>Laboratory Accreditations</p> <p>A2LA: 3628.02 CNAS: L10551</p> <p>FCC: CN1284 ISED: CN0105</p>
<input type="checkbox"/>	<p>Test Site – MRT Taiwan Laboratory</p> <hr/> <p>Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)</p> <hr/> <p>Laboratory Accreditations</p> <p>TAF: L3261-190725</p> <p>FCC: 291082, TW3261 ISED: TW3261</p>

1.4. Product Information

Product Name	Navimow
Model No.	H800N-VF, H1500N-VF, H3000N-VF
EUT Identification No.	20230426Sample#02 for Conducted measurement 20230426Sample#01 for Radiated measurement
Wi-Fi Specification	802.11b/g/n
Bluetooth Specification	V4.1
SRD Specification	915.05 ~ 917.90 MHz
Antenna Information	Refer to 1.5.
Power Supply	By Battery Pack
Note: <ol style="list-style-type: none">1. Only the rated capacity of the internal battery is different, others are all identical. H3000N-VF was selected for all of test in this report.2. This device contains a certified WWAN module (FCC ID: XMR201909EC25AFX).3. The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

Bluetooth Frequency	2402 ~ 2480MHz
Channel Number	40
Type of modulation	GFSK
Data Rate	1Mbps
Antenna Type	PCB Antenna
Number of Antenna	1
Antenna Gain	-1.26dBi

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

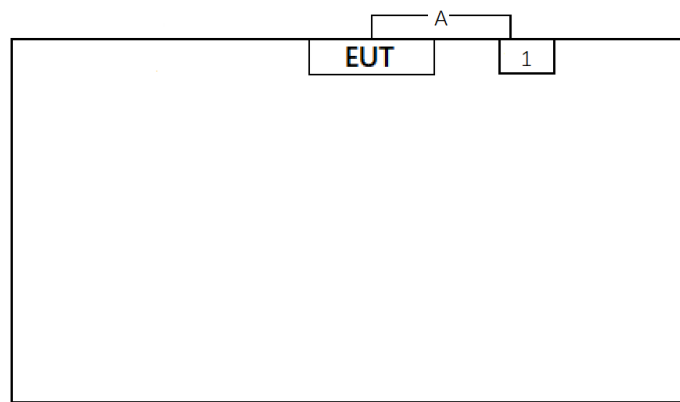
2.1. Test Mode

Mode 1: Transmit by BLE-1Mbps

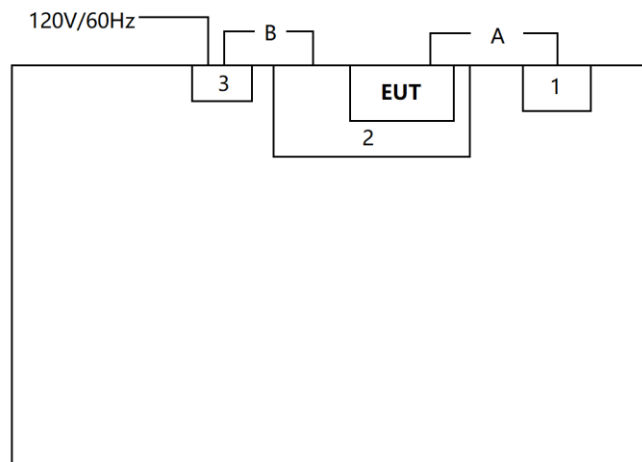
2.2. Test System Connection Diagram

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



Connection Diagram – Radiated AC line conducted testing



Cable Type		Cable Spec.	Length
A	USB Cable	Unshielding	< 0.5m
B	Power Cable	Shielding	0.5m
Product		Manufacturer	Model No.
1	Notebook	DELL	DELL Inspiron 5359
2	Navimow Charging Station	Segway	H25D2E
3	AC/DC Adapter	Segway	NBW32D002D5N-US

2.3. Test Software

The test utility software used during testing was “nRFgo Studio”, and the version was 1.12.1.1992.

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. Test Environment Condition

Ambient Temperature	15 ~ 35°C
Relative Humidity	20 ~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

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2023-12-28	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2023-05-08	WZ-AC1
				1 year	2024-05-07	
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2024-04-20	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2023-12-28	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2023-11-01	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2023-09-29	WZ-AC1/WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2023-11-05	WZ-AC1/WZ-AC2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2023-05-20	WZ-AC2
				1 year	2024-05-15	
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2023-06-04	WZ-AC2
Thermohygrometer	Mingle	ETH529	MRTSUE06170	1 year	2023-11-27	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2023-10-13	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2023-05-08	WZ-AC2
				1 year	2024-05-15	
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2024-04-20	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11038	1 year	2023-11-01	WZ-AC2
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2023-06-04	WZ-SR2
Symmetrical Attenuator	Schwarzbeck	SYMAT 40	MRTSUE06117	1 year	2024-04-09	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2023-06-06	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2023-10-27	WZ-SR2
USB Power Sensor	Keysight	U2021XA	MRTSUE06446	1 year	2023-06-04	WZ-SR5
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2023-06-06	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2023-06-04	WZ-SR5
Signal Analyzer	Agilent	N9020A	MRTSUE06106	1 year	2024-02-29	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11071	1 year	2023-06-09	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11074	1 year	2023-06-09	WZ-SR5

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable
Controller_MF 7802	1.02	RE Antenna & Turntable
Agilent Power Analyzer/Agilent Power Panel	V R03.09.00	Power

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. 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: 3.58dB 150kHz~30MHz: 3.20dB
Radiated Disturbance
Measurement Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): Coaxial: 9kHz~30MHz: 2.59dB Coplanar: 9kHz~30MHz: 2.60dB Horizontal: 30MHz~200MHz: 3.85dB 200MHz~1GHz: 4.36dB 1GHz~10GHz: 4.98dB Vertical: 30MHz~200MHz: 4.06dB 200MHz~1GHz: 5.28dB 1GHz~10GHz: 4.91dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.30dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.30dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 2.30dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2Uc(y)$): 3.20%

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

Notes:

- 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.
- The test results shown in the following sections represent the worst-case emissions.

6.2. 6dB Bandwidth Measurement

6.2.1. Test Limit

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

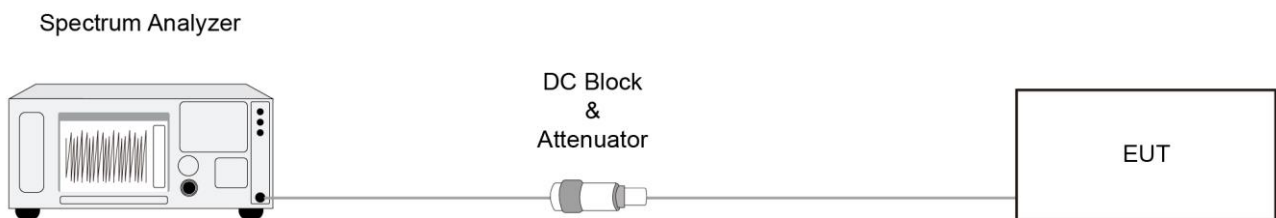
6.2.2. Test Procedure

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. $VBW \geq 3 \times RBW$
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.2.

6.3. Output Power Measurement

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

ANSI C63.10 - 2013 - Section 11.9.1.3

ANSI C63.10 - 2013 - Section 11.9.2.3.2

6.3.3. Test Setting

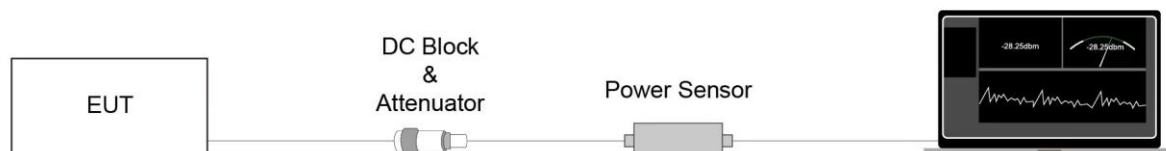
Method PKPM1 (Peak Power Measurement of Signals with DTS BW \leq 50MHz)

Peak 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 pulse sensor employs a VBW = 50MHz so this method was only used for signals whose DTS bandwidth was less than or equal to 50MHz.

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.3.

6.4. Power Spectral Density Measurement

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.

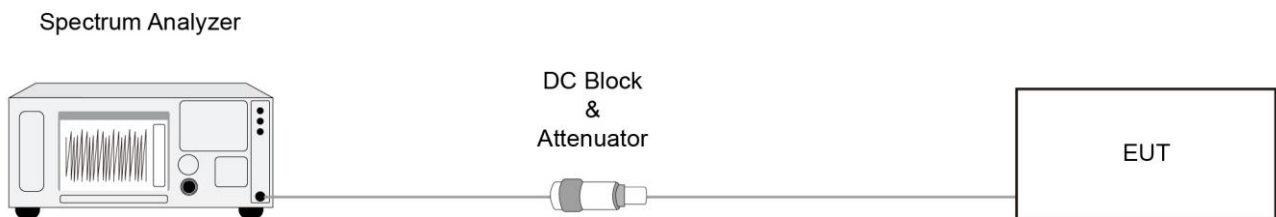
6.4.2. Test Procedure

ANSI C63.10-2013 Section 11.10.2

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the DTS channel under investigation
2. Span = 1.5 times the DTS channel bandwidth
3. RBW = 3kHz
4. VBW = 10kHz
5. Detector = peak
6. Sweep time = auto couple
7. Trace mode = max hold
8. Trace was allowed to stabilize

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

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

6.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB 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

ANSI C63.10-2013 - Section 11.11

6.5.3. Test Setting

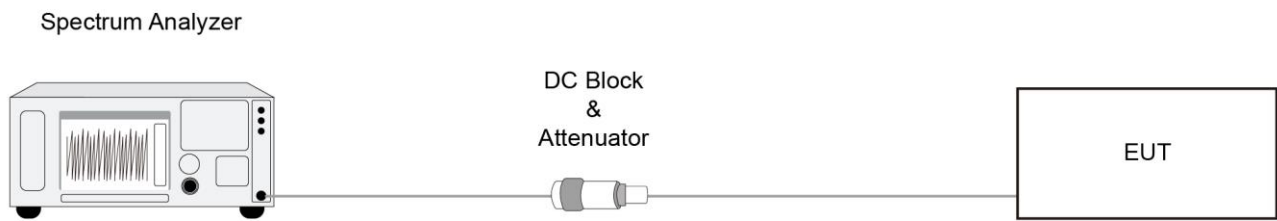
Reference level measurement

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 $\geq 3 \times$ 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.5.

6.6. Radiated Spurious Emission Measurement

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

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

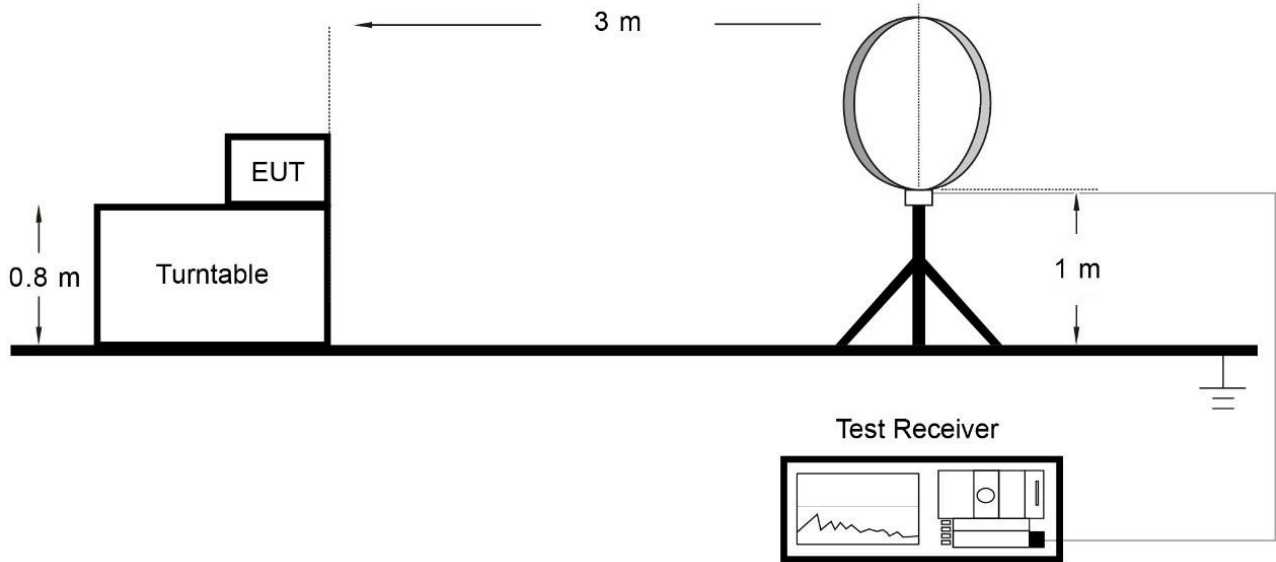
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

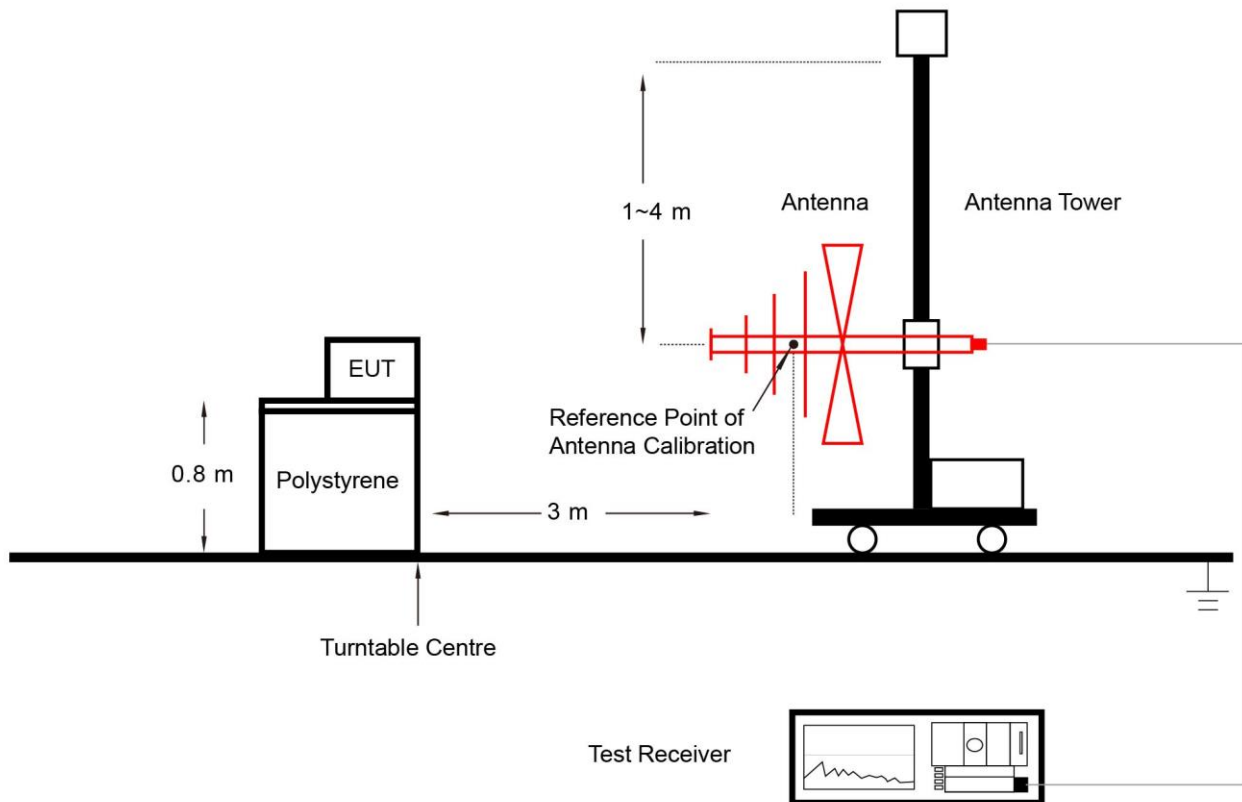
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set VBW $\geq 1/T$. T is the minimum transmission duration.
4. Detector = Peak
5. Sweep time = auto
6. Trace mode = max hold
7. Trace was allowed to stabilize

6.6.4. Test Setup

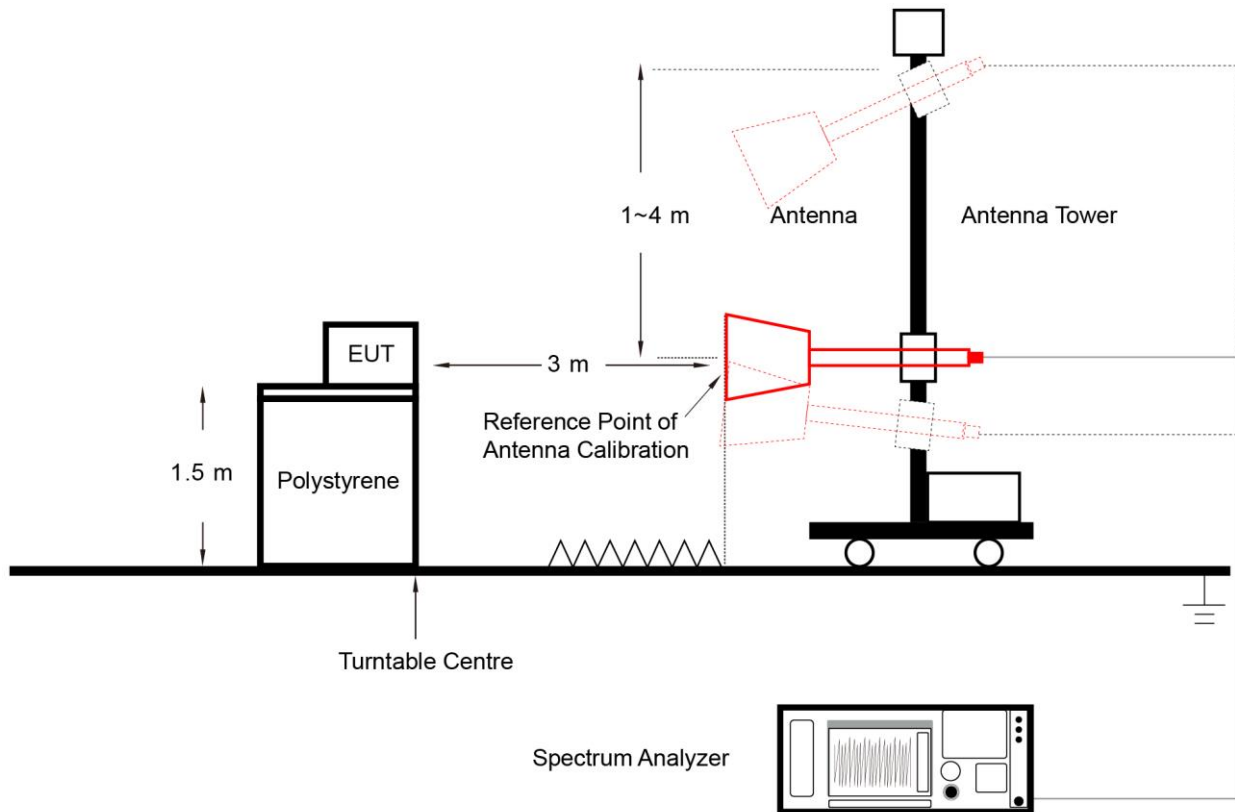
Below 30MHz Test Setup:



Below 1GHz Test Setup:



Above 1GHz Test Setup:



6.6.5. Test Result

Refer to Appendix A.6.

6.7. Radiated Restricted Band Edge Measurement

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

ANSI C63.10-2013 Section 6.3 & 6.6 & 11.13

6.7.3. Test Setting

Peak Field Strength Measurements

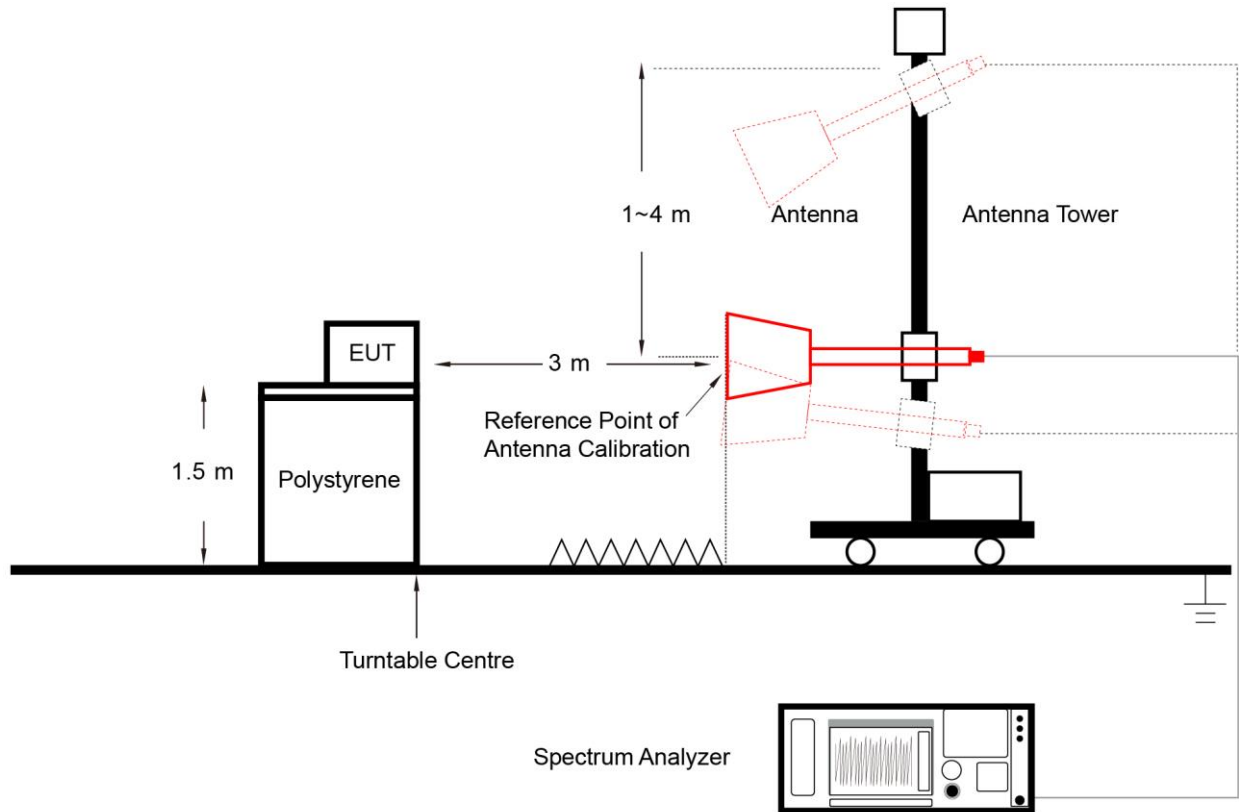
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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 \geq 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.7.

6.8. AC Conducted Emissions Measurement

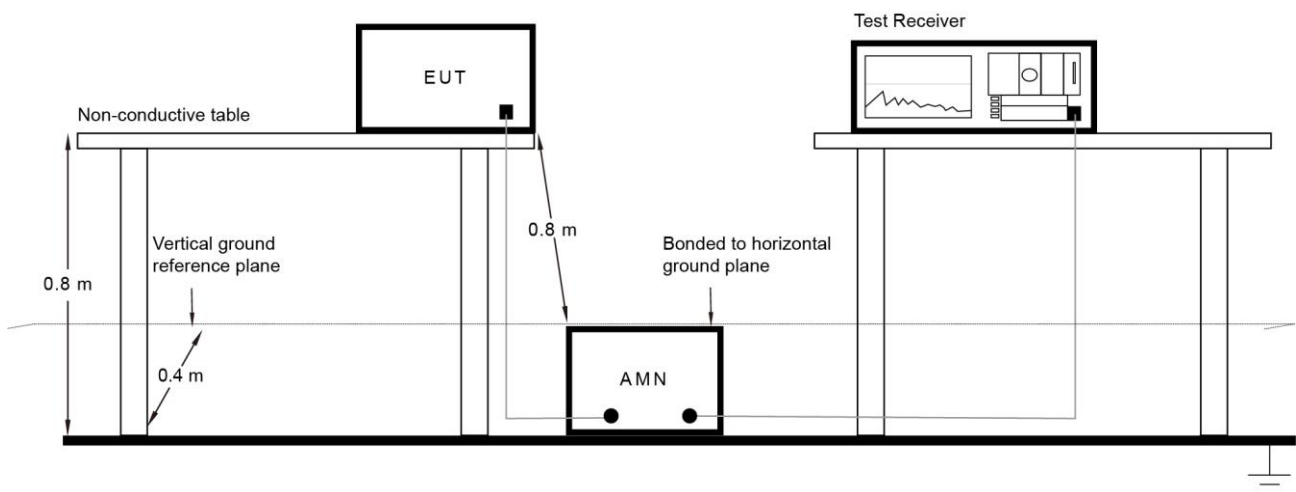
6.8.1. Test Limit

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.8.

Appendix A - Test Result

A.1 Duty Cycle Test Result

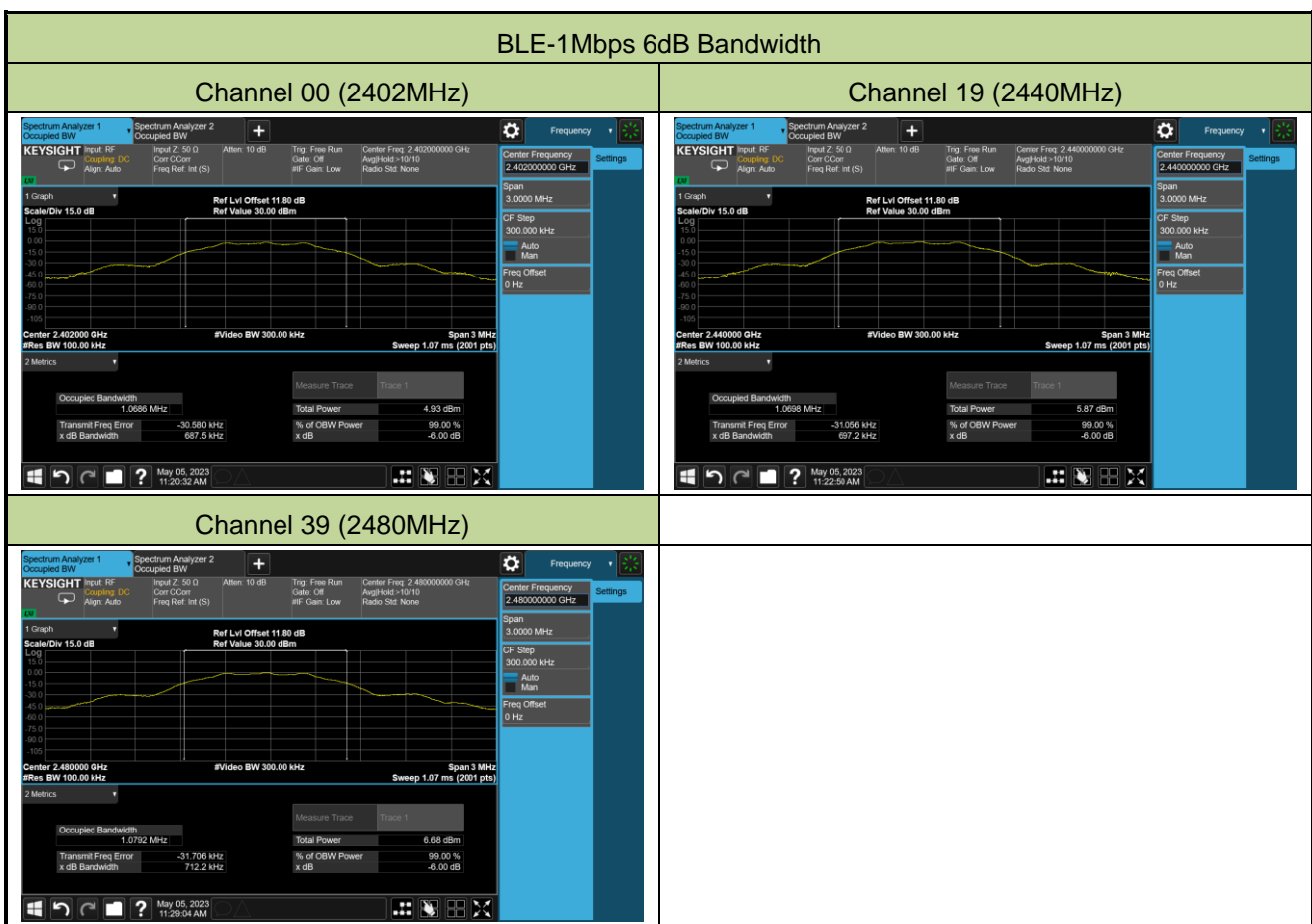
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-05-05		

Test Mode	Duty Cycle
BLE-1Mbps	62.5%
Duty Cycle (T = Transmission Duration)	
BLE-1Mbps (T = 391.0µs)	

A.2 6dB Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-05-05		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	6dB Bandwidth (MHz)	Limit (MHz)
BLE	1Mbps	00	2402	0.6875	≥ 0.5
BLE	1Mbps	19	2440	0.6972	≥ 0.5
BLE	1Mbps	39	2480	0.7122	≥ 0.5



A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-05-05		

Test Result of Peak Output Power

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Peak Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	-1.26	≤ 30.00	Pass
BLE	1Mbps	19	2440	-0.42	≤ 30.00	Pass
BLE	1Mbps	39	2480	0.20	≤ 30.00	Pass

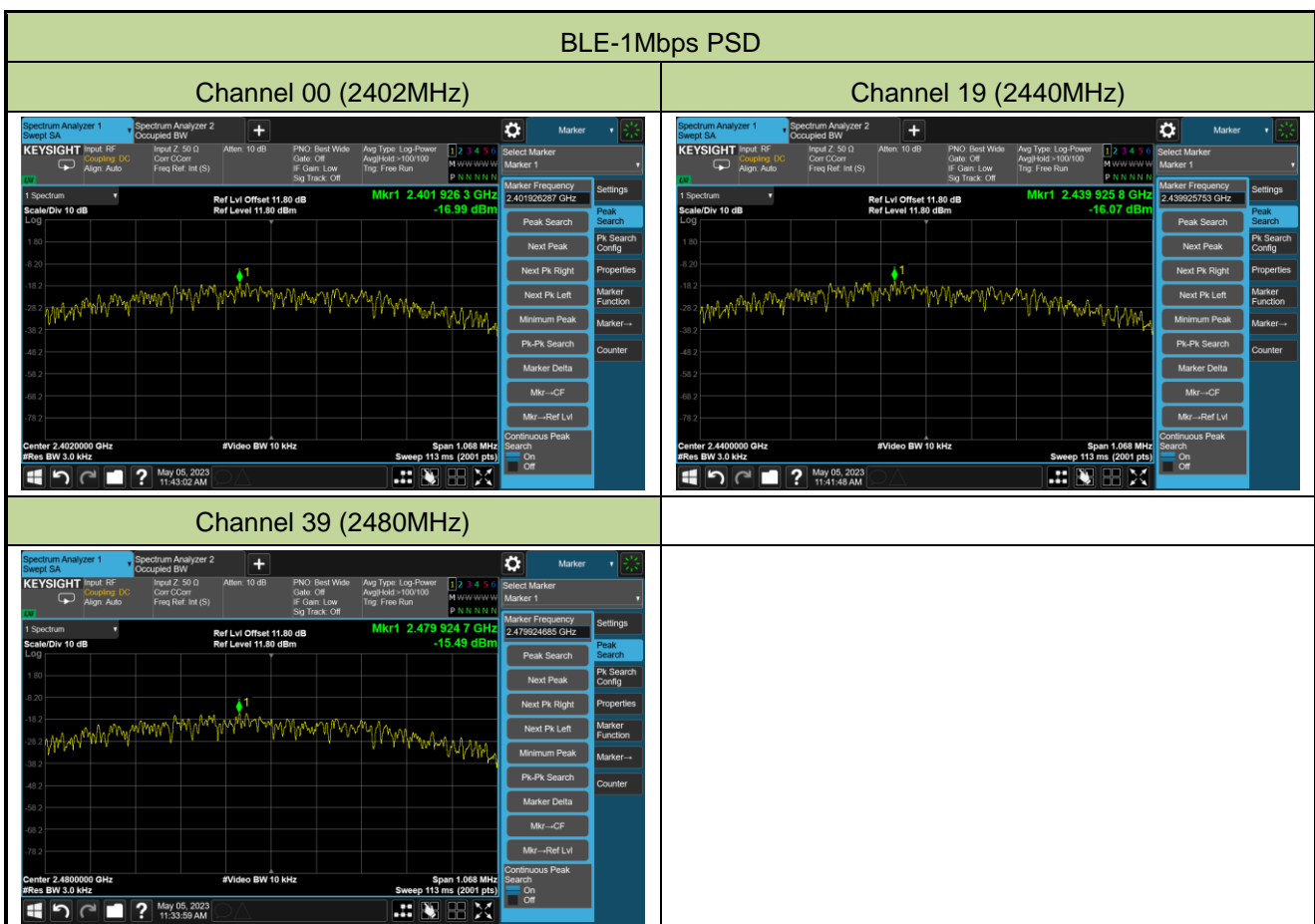
Test Result of Average Output Power (Reporting Only)

Test Mode	Data Rate	Channel No.	Frequency (MHz)	Average Power (dBm)	Limit (dBm)	Result
BLE	1Mbps	00	2402	-1.69	≤ 30.00	Pass
BLE	1Mbps	19	2440	-0.78	≤ 30.00	Pass
BLE	1Mbps	39	2480	-0.27	≤ 30.00	Pass

A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-05-05		

Test Mode	Data Rate	Channel No.	Frequency (MHz)	PSD Result (dBm / 3kHz)	Limit (dBm / 3kHz)	Result
BLE	1Mbps	00	2402	-16.99	≤ 8.00	Pass
BLE	1Mbps	19	2440	-16.07	≤ 8.00	Pass
BLE	1Mbps	39	2480	-15.49	≤ 8.00	Pass



A.5 Conducted Band Edge and Out-of-Band Emissions Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2023-05-10		

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

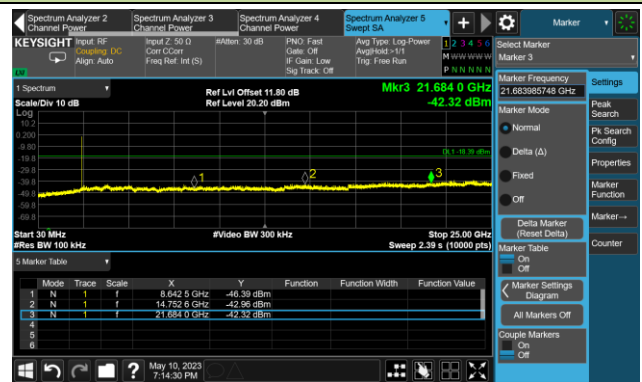


Channel 19 (2440MHz)

100kHz PSD Reference Level



Spurious Emission 30MHz ~ 25GHz



Channel 39 (2480MHz)

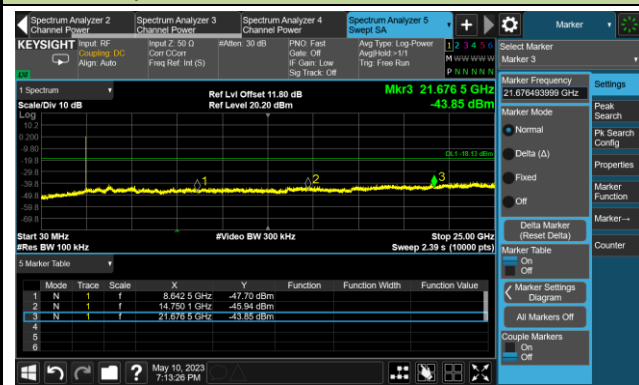
100kHz PSD Reference Level



High Band Edge



Spurious Emission 30MHz ~ 25GHz



A.6 Radiated Spurious Emission Test Result

Test Site	WZ-AC1/WZ-AC2	Test Engineer	Charles Zhang/ Dick Shen
Test Date	2023-05-03~2023-05-15	Test Mode:	BLE-1Mbps
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.		

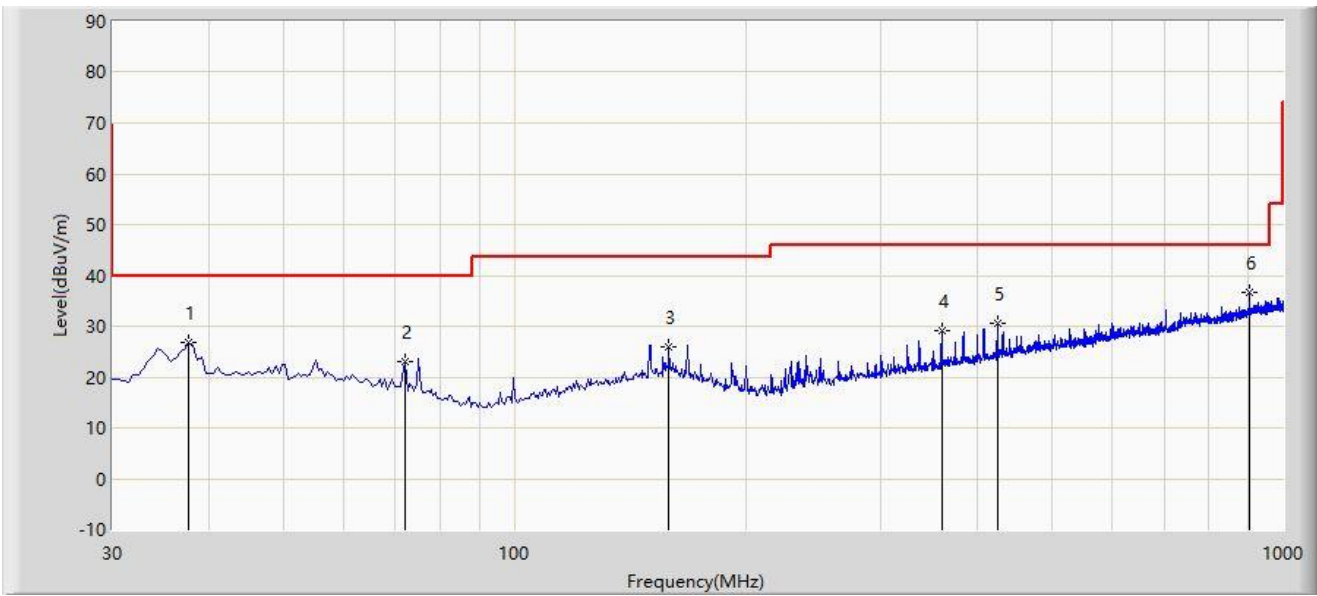
Test Channel	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB/m)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
00	4808.0	42.2	2.8	45.0	74.0	-29.0	Peak	Horizontal
	8420.5	37.3	8.6	45.9	74.0	-28.1	Peak	Horizontal
	12007.5	38.8	12.3	51.1	74.0	-22.9	Peak	Horizontal
	12007.5	35.8	12.3	48.1	54.0	-5.9	Average	Horizontal
	4808.0	42.3	2.8	45.1	74.0	-28.9	Peak	Vertical
	9194.0	36.4	11.1	47.5	74.0	-26.5	Peak	Vertical
	10800.5	36.0	13.4	49.4	74.0	-24.6	Peak	Vertical
19	4876.0	42.9	2.8	45.7	74.0	-28.3	Peak	Horizontal
	7315.5	45.3	7.9	53.2	74.0	-20.8	Peak	Horizontal
	7315.5	42.1	7.9	50.0	54.0	-4.0	Average	Horizontal
	11081.0	36.4	13.2	49.6	74.0	-24.4	Peak	Horizontal
	4884.5	45.2	2.9	48.1	74.0	-25.9	Peak	Vertical
	7324.0	44.0	7.9	51.9	74.0	-22.1	Peak	Vertical
	7324.0	42.5	7.9	50.4	54.0	-3.6	Average	Vertical
	10664.5	36.0	13.2	49.2	74.0	-24.8	Peak	Vertical
39	4961.0	42.3	3.1	45.4	74.0	-28.6	Peak	Horizontal
	7443.0	45.3	8.2	53.5	74.0	-20.5	Peak	Horizontal
	7443.0	43.2	8.2	51.4	54.0	-2.6	Average	Horizontal
	10953.5	35.3	13.5	48.8	74.0	-25.2	Peak	Horizontal
	4961.0	46.1	3.1	49.2	74.0	-24.8	Peak	Vertical
	7443.0	47.3	8.2	55.5	74.0	-18.5	Peak	Vertical
	7443.0	43.9	8.2	52.1	54.0	-1.9	Average	Vertical
	10877.0	35.8	13.4	49.2	74.0	-24.8	Peak	Vertical

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

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

The Result of Radiated Emission below 1GHz:

Site: WZ-AC2	Test Date: 2023-05-15
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB 9168_25-2000MHz	Polarity: Horizontal
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE-1M at channel 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		37.760	26.733	8.568	-13.267	40.000	18.165	PK
2		72.195	23.087	7.098	-16.913	40.000	15.989	PK
3		159.010	25.910	7.478	-17.590	43.500	18.432	PK
4		360.285	29.045	8.857	-16.955	46.000	20.187	PK
5		424.790	30.654	8.662	-15.346	46.000	21.992	PK
6	*	903.000	36.568	6.703	-9.432	46.000	29.865	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

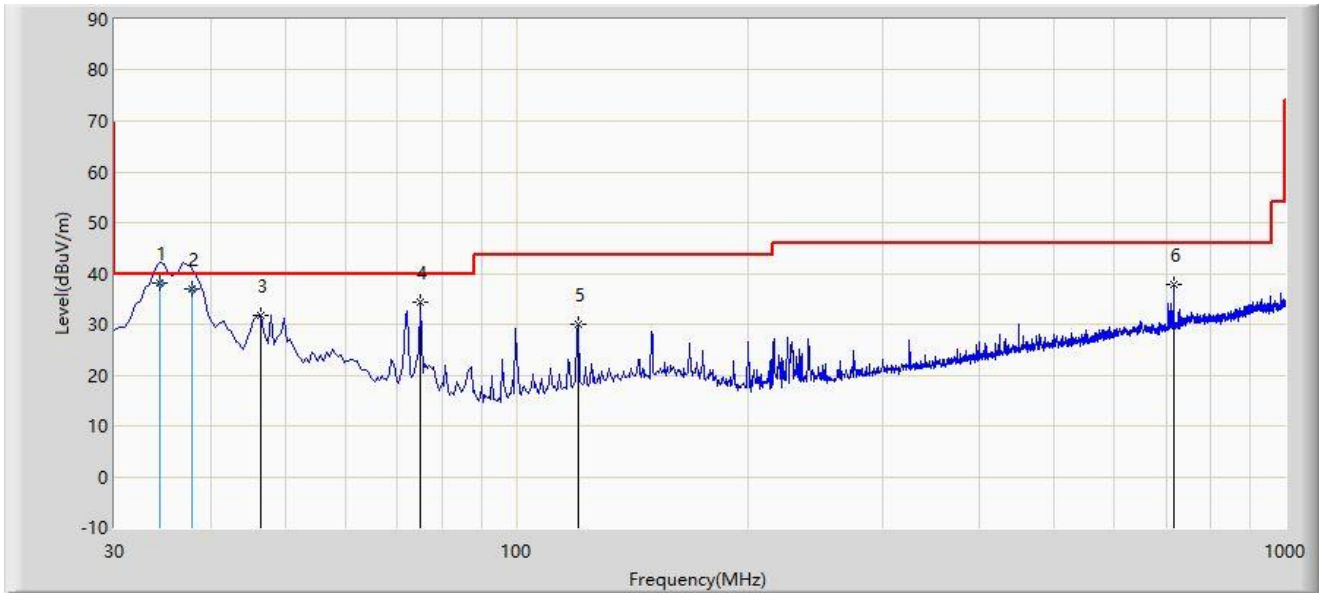
Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: 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	Test Date: 2023-05-15
Limit: FCC_Part15.209_RSE(3m)	Engineer: Dick Shen
Probe: VULB 9168_25-2000MHz	Polarity: Vertical
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE-1M at channel 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1	*	34.390	38.132	20.390	-1.868	40.000	17.742	QP
2		37.770	36.956	18.790	-3.044	40.000	18.166	QP
3		46.490	31.884	13.399	-8.116	40.000	18.485	PK
4		75.105	34.490	19.053	-5.510	40.000	15.437	PK
5		120.210	29.937	13.912	-13.563	43.500	16.025	PK
6		715.790	37.935	10.625	-8.065	46.000	27.310	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

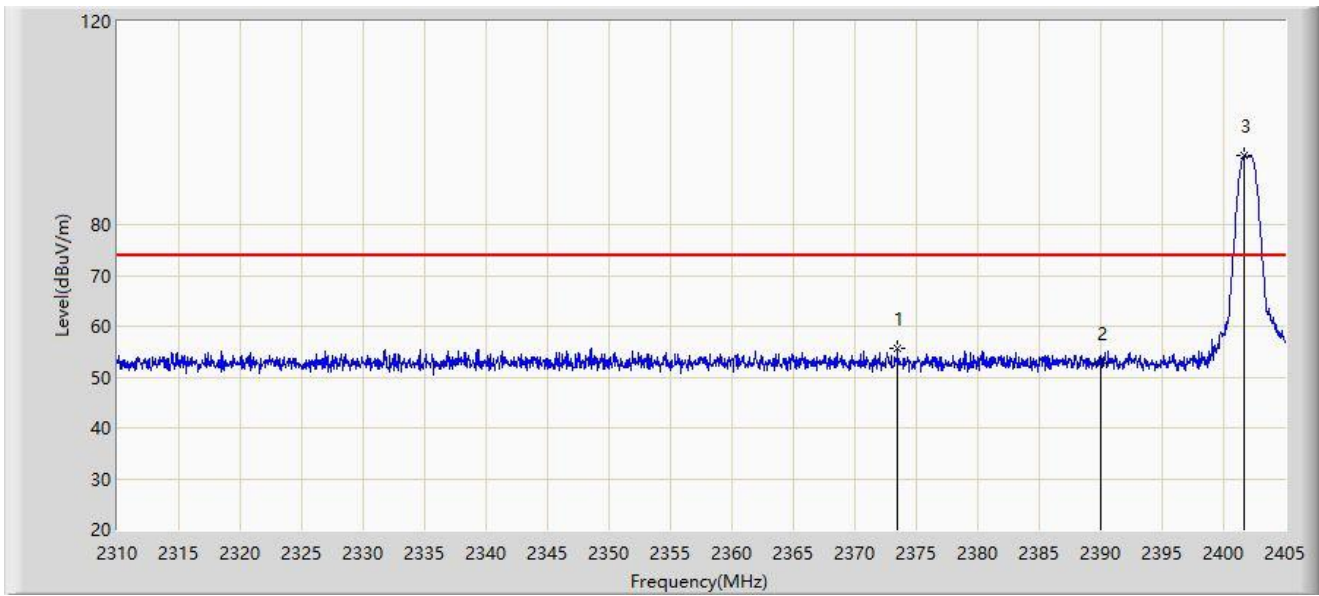
Note 4: Quasi-Peak measurement was not performed when peak measure level was lower than the quasi-peak limit.

Note 5: 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.7 Radiated Restricted Band Edge Test Result

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2402MHz	



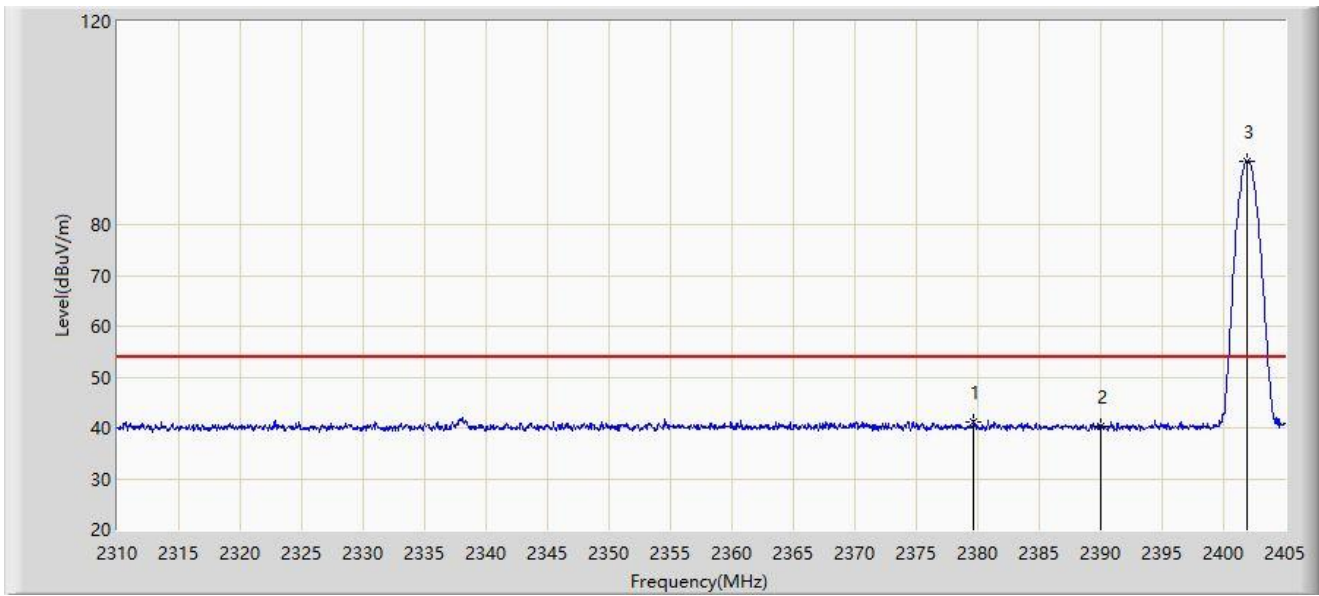
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2373.460	55.624	24.581	-18.376	74.000	31.043	PK
2		2390.000	52.779	21.787	-21.221	74.000	30.992	PK
3		2401.675	93.493	62.504	N/A	N/A	30.989	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2402MHz	



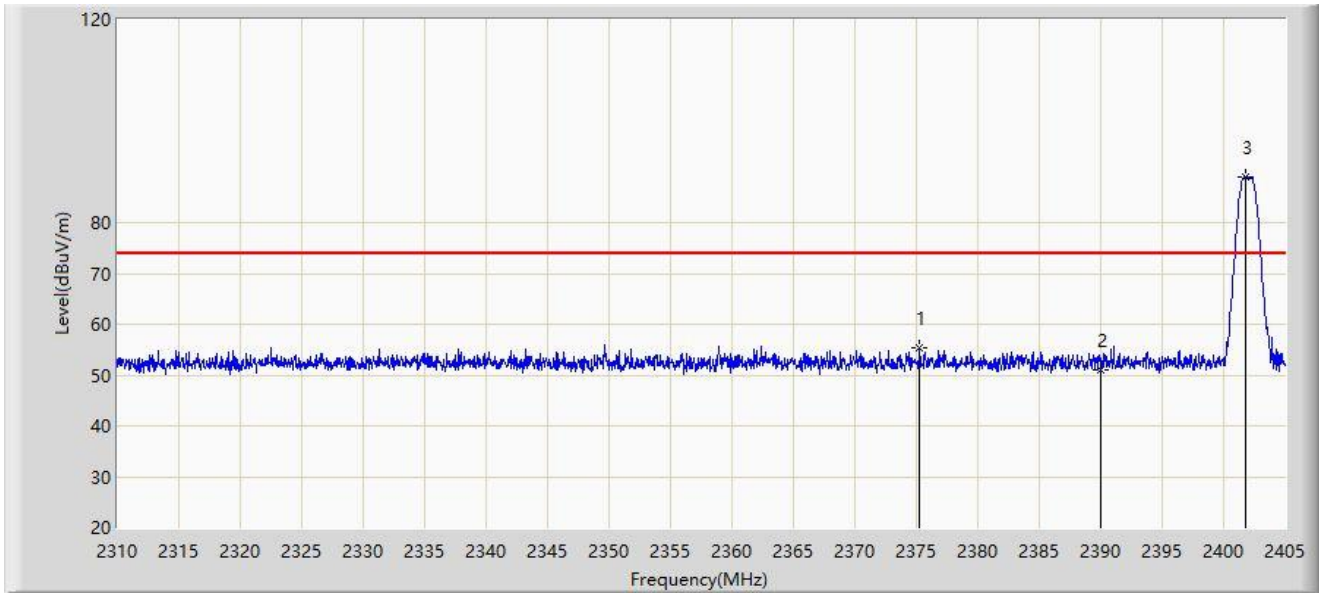
No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1	*	2379.683	41.275	10.261	-12.725	54.000	31.014	AV
2		2390.000	40.417	9.425	-13.583	54.000	30.992	AV
3		2401.913	92.605	61.616	N/A	N/A	30.989	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2402MHz	



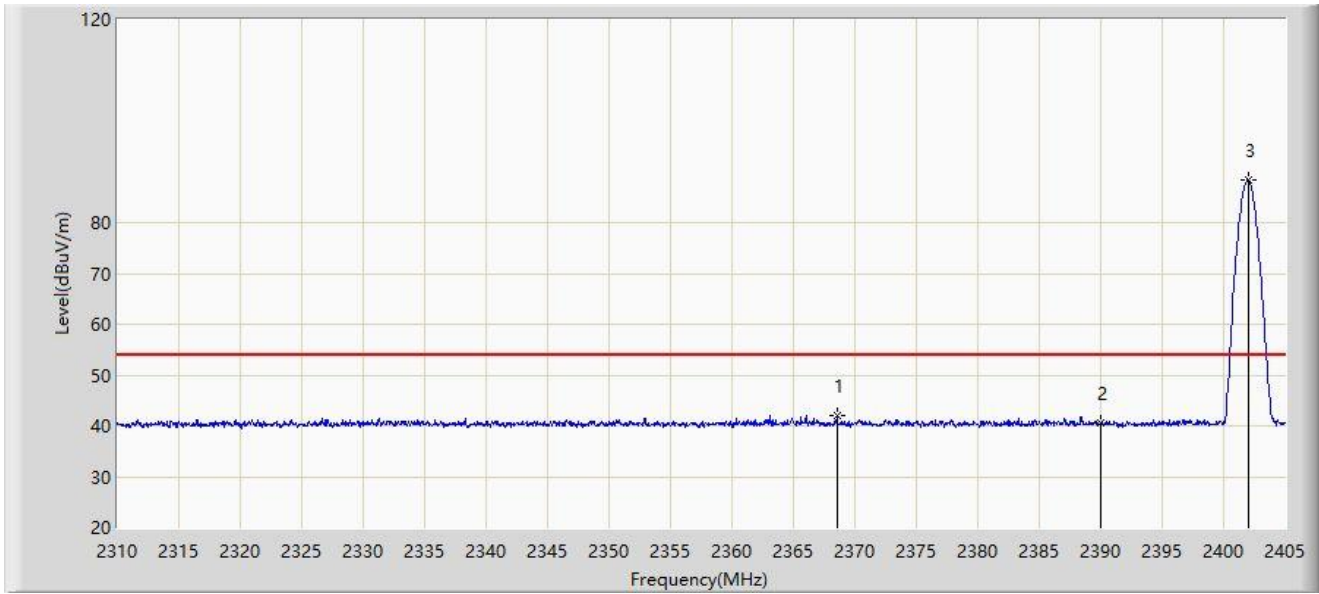
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	2375.265	55.435	24.401	-18.565	74.000	31.034	PK
2		2390.000	50.997	20.005	-23.003	74.000	30.992	PK
3		2401.770	88.906	57.917	N/A	N/A	30.989	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2402MHz	



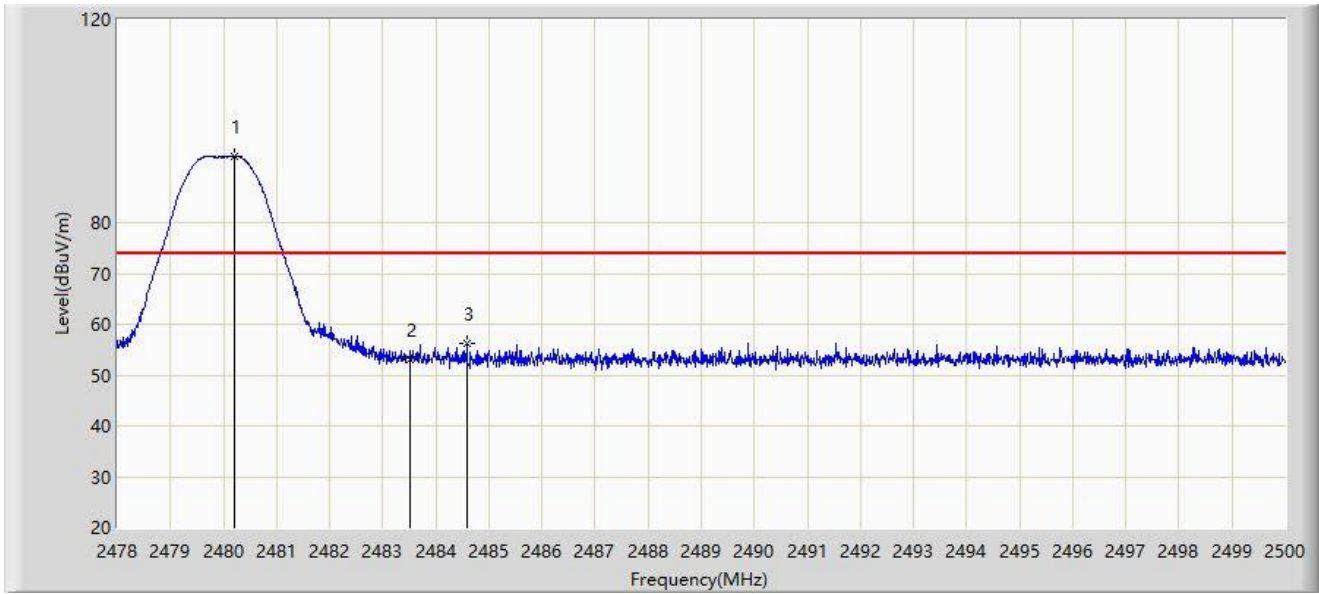
No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1	*	2368.520	41.975	10.907	-12.025	54.000	31.068	AV
2		2390.000	40.496	9.504	-13.504	54.000	30.992	AV
3		2402.008	88.352	57.363	N/A	N/A	30.989	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2480MHz	



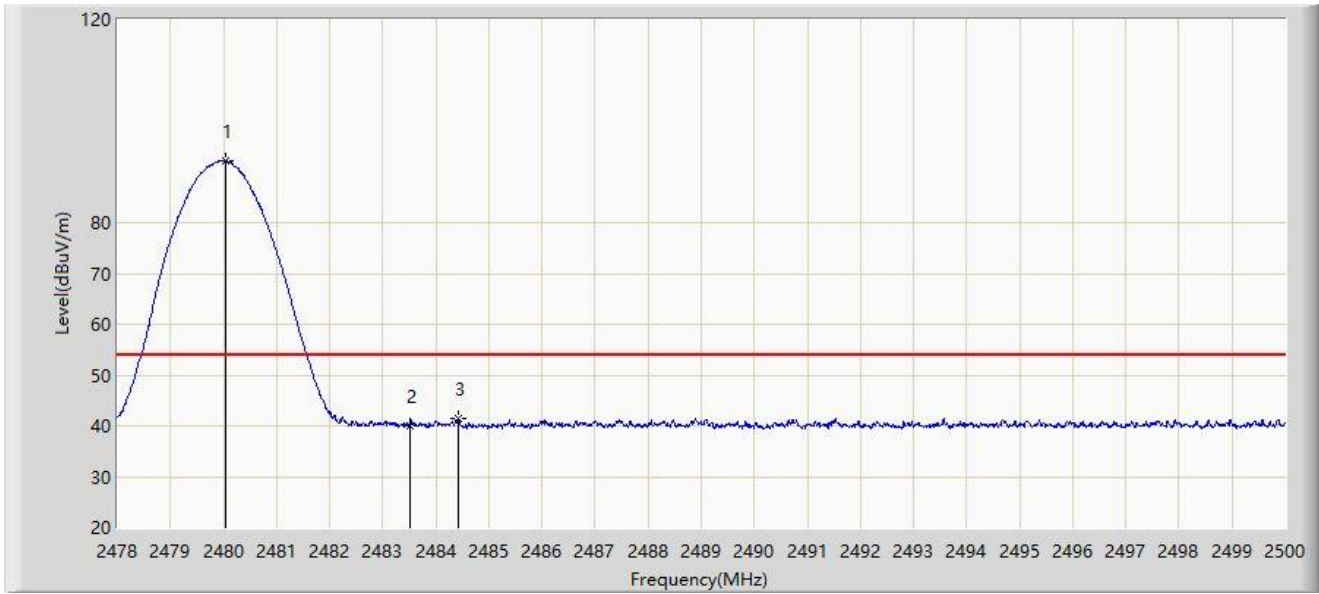
No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1		2480.200	93.102	62.205	N/A	N/A	30.897	PK
2		2483.500	53.062	22.171	-20.938	74.000	30.892	PK
3	*	2484.589	56.190	25.300	-17.810	74.000	30.890	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Horizontal
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2480MHz	



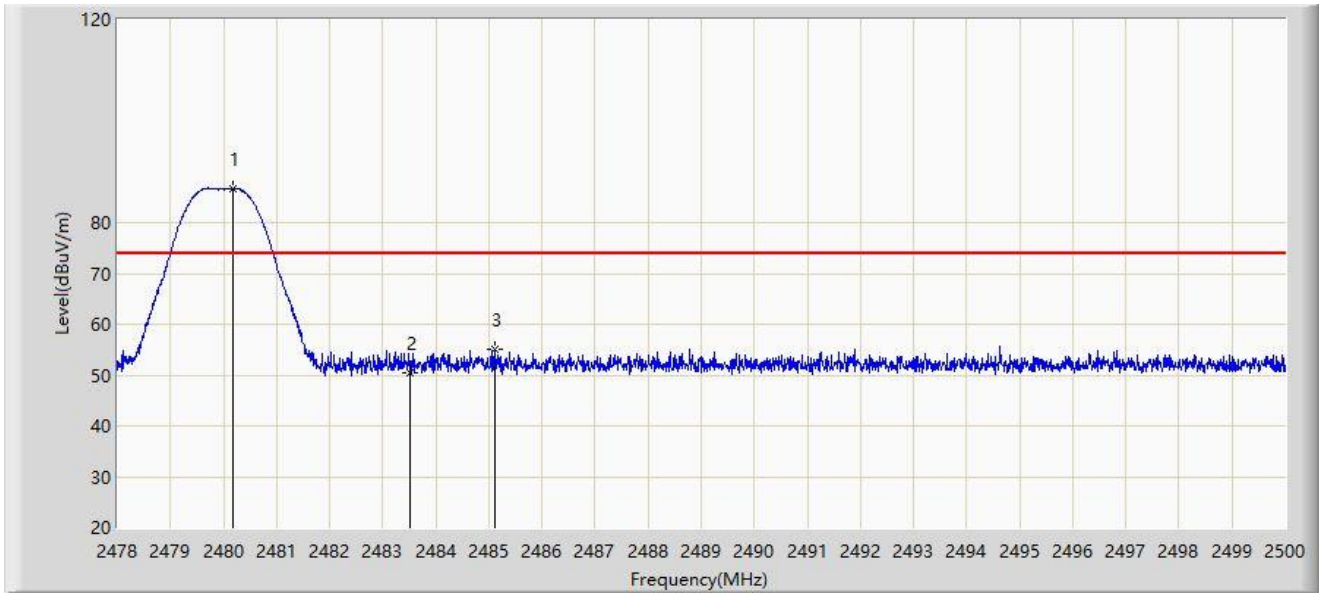
No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1		2480.035	92.156	61.259	N/A	N/A	30.897	AV
2		2483.500	40.017	9.126	-13.983	54.000	30.892	AV
3	*	2484.424	41.374	10.484	-12.626	54.000	30.890	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03 - 16:58
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2480MHz	



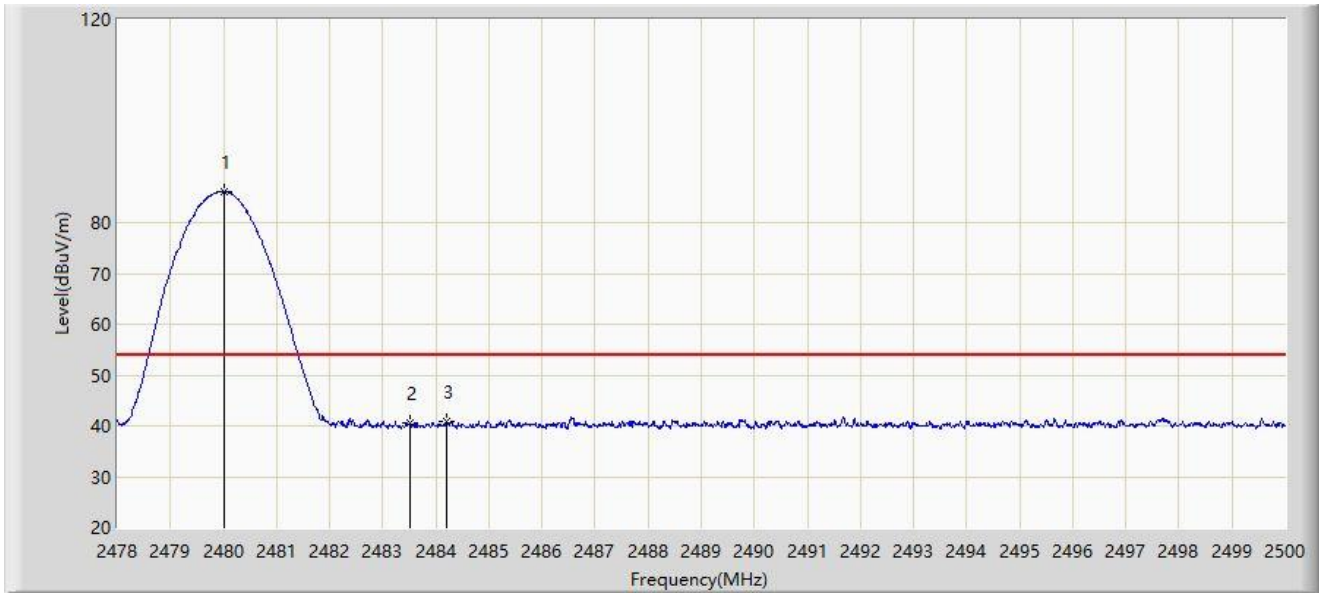
No	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Margin (dB)	Limit (dB μ V/m)	Factor (dB/m)	Type
1		2480.178	86.753	55.856	N/A	N/A	30.897	PK
2		2483.500	50.377	19.486	-23.623	74.000	30.892	PK
3	*	2485.106	55.135	24.246	-18.865	74.000	30.889	PK

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

Site: WZ-AC1	Test Date: 2023-05-03 - 17:03
Limit: FCC_Part15.209_RSE(3m)	Engineer: Charles Zhang
Probe: BBHA9120D_1167_1-18GHz	Polarity: Vertical
EUT: Navimow	Power: By Battery
Test Mode: Transmit by BLE 1M at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		2480.002	86.171	55.274	N/A	N/A	30.897	AV
2		2483.500	40.563	9.672	-13.437	54.000	30.892	AV
3	*	2484.215	40.963	10.073	-13.037	54.000	30.891	AV

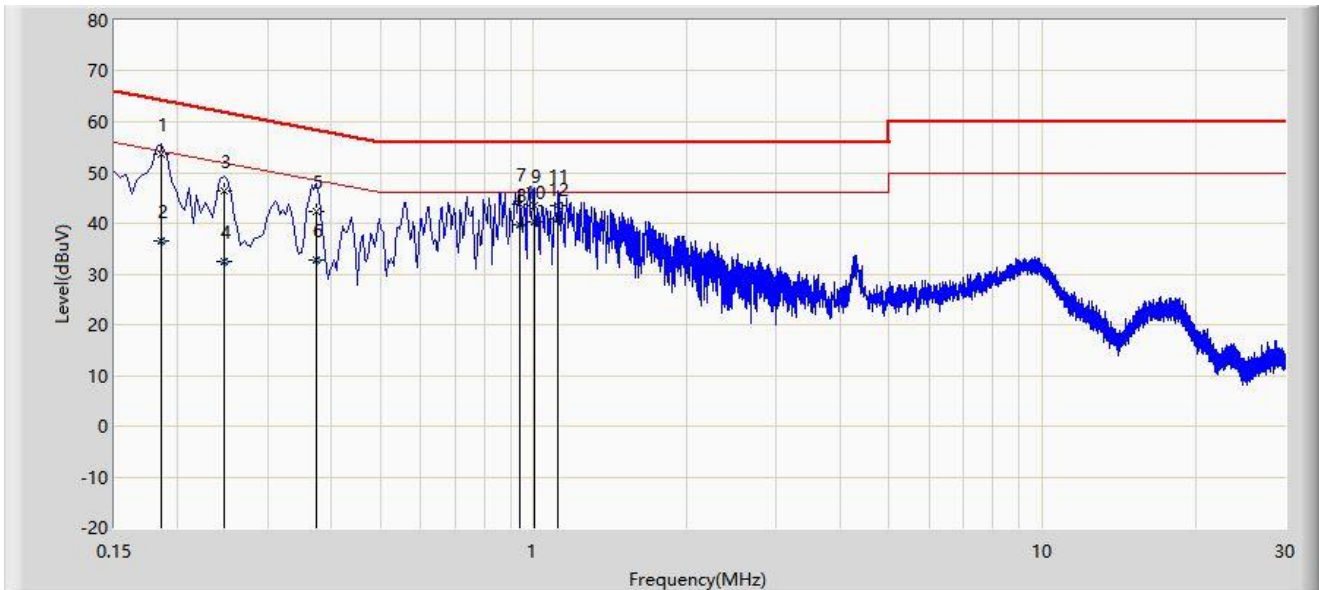
Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m).

Note 3: Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

A.8 AC Conducted Emissions Test Result

Site: WZ-SR2	Test Date: 2023-06-01
Temperature: 23.1°C	Humidity: 52.1%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Alin Zhou
Probe: ENV216_101683_Filter Off	Polarity: Line
EUT: Navimow	Power: AC 120V/60Hz
Test Mode: Transmit by BLE-1M at 2480MHz	



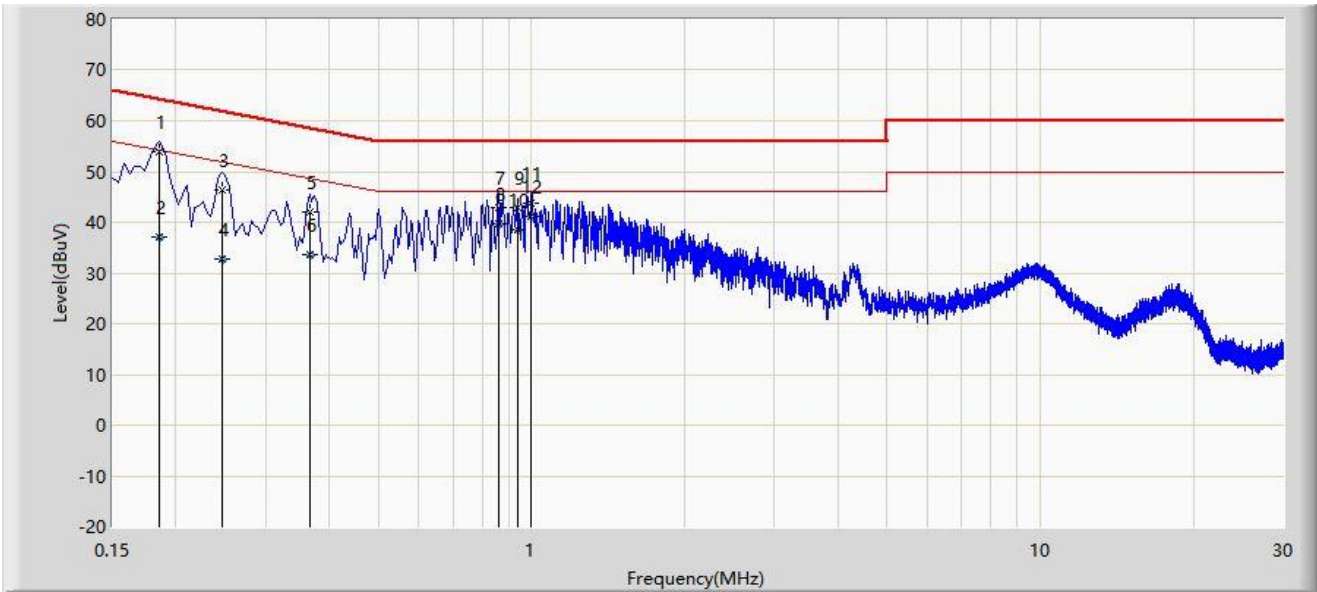
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.186	53.600	43.987	-10.614	64.213	9.612	QP
2		0.186	36.613	27.001	-17.600	54.213	9.612	AV
3		0.246	46.380	36.750	-15.511	61.891	9.630	QP
4		0.246	32.556	22.925	-19.336	51.891	9.630	AV
5		0.374	42.437	32.752	-15.975	58.412	9.684	QP
6		0.374	32.853	23.169	-15.558	48.412	9.684	AV
7		0.938	43.830	33.868	-12.170	56.000	9.962	QP
8		0.938	39.642	29.680	-6.358	46.000	9.962	AV
9		1.002	43.410	33.421	-12.590	56.000	9.989	QP
10		1.002	40.216	30.226	-5.784	46.000	9.989	AV
11		1.118	43.337	33.346	-12.663	56.000	9.991	QP
12	*	1.118	40.779	30.788	-5.221	46.000	9.991	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Test Date: 2023-06-01
Temperature: 23.1°C	Humidity: 52.1%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Alin Zhou
Probe: ENV216_101683_Filter Off	Polarity: Neutral
EUT: Navimow	Power: AC 120V/60Hz
Test Mode: Transmit by BLE-1M at 2480MHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.186	54.032	44.439	-10.181	64.213	9.593	QP
2		0.186	37.243	27.649	-16.971	54.213	9.593	AV
3		0.246	46.440	36.818	-15.451	61.891	9.622	QP
4		0.246	32.719	23.097	-19.172	51.891	9.622	AV
5		0.366	42.141	32.464	-16.451	58.591	9.677	QP
6		0.366	33.481	23.804	-15.111	48.591	9.677	AV
7		0.862	42.937	33.009	-13.063	56.000	9.928	QP
8		0.862	39.651	29.723	-6.349	46.000	9.928	AV
9		0.938	42.801	32.833	-13.199	56.000	9.968	QP
10		0.938	38.641	28.673	-7.359	46.000	9.968	AV
11		0.998	43.653	33.654	-12.347	56.000	9.999	QP
12	*	0.998	41.225	31.227	-4.775	46.000	9.999	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Appendix B - Test Setup Photograph

Refer to "2304RSU043-UT" file.

Appendix C - EUT Photograph

Refer to "2304RSU043-UE" file.

_____ The End _____