RF MEASUREMENT REPORT

FCC ID:	Z9G-EDF158
Applicant:	Edifier International Limited
Product:	Portable Bluetooth Speaker
Model No.:	EDF100018
Brand Name:	EDIFIER
FCC Classification:	FCC Part 15 Spread Spectrum Transmitter (DSS)
FCC Rule Part(s):	Part 15 Subpart C (Section 15.247)
Test Procedure(s):	ANSI C63.10-2013
Test Date:	January 14 ~ 24, 2022

Reviewed By: Sunny Sun

Approved By: Robin Wu

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.02

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.

Revision History

Report No.	Version	Description	Issue Date	Note
2110RSU015-U2	Rev. 01	Initial Report	02-24-2022	Valid

CONTENTS

1. GENERAL INFORMATION

1.1. Applicant

Edifier International Limited

P.O. Box 6264 General Post Office Hong Kong

1.2. Manufacturer

Beijing Edifier Technology Co., Ltd.

8th floor, ZuoAn Building, NO.68 BeiSiHuanXiLu, Haidian District, Beijing 100080, CHINA

1.3. Test 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	
☒	**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	Portable Bluetooth Speaker
Model No.	EDF100018
Test Device	20220121Sample#01 & 20211011Sample#01 (Conducted Sample) 20220114Sample#02 (Radiated Sample)
Operating Temp.	0 ~ 45°C
Bluetooth Version	v5.3 Single mode, BR/EDR only
Remark: 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

Operating Frequency	2402 ~ 2480MHz
Channel Number	79
Type of modulation	GFSK, π/4 DQPSK, 8DPSK
Data Rate	1Mbps (GFSK), 2Mbps (π/4 DQPSK), 3Mbps (8DPSK)
Antenna Type	PCB Antenna
Antenna Gain	5.93dBi

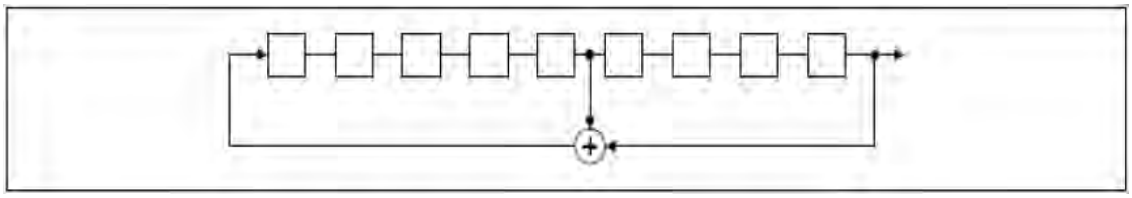
1.6. Working Frequencies

Channel	Frequency	Channel	Frequency	Channel	Frequency
00	2402 MHz	01	2403 MHz	02	2404 MHz
03	2405 MHz	04	2406 MHz	05	2407 MHz
06	2408 MHz	07	2409 MHz	08	2410 MHz
09	2411 MHz	10	2412 MHz	11	2413 MHz
12	2414 MHz	13	2415 MHz	14	2416 MHz
15	2417 MHz	16	2418 MHz	17	2419 MHz
18	2420 MHz	19	2421 MHz	20	2422 MHz
21	2423 MHz	22	2424 MHz	23	2425 MHz
24	2426 MHz	25	2427 MHz	26	2428 MHz
27	2429 MHz	28	2430 MHz	29	2431 MHz
30	2432 MHz	31	2433 MHz	32	2434 MHz
33	2435 MHz	34	2436 MHz	35	2437 MHz
36	2438 MHz	37	2439 MHz	38	2440 MHz
39	2441 MHz	40	2442 MHz	41	2443 MHz
42	2444 MHz	43	2445 MHz	44	2446 MHz
45	2447 MHz	46	2448 MHz	47	2449 MHz
48	2450 MHz	49	2451 MHz	50	2452 MHz
51	2453 MHz	52	2454 MHz	53	2455 MHz
54	2456 MHz	55	2457 MHz	56	2458 MHz
57	2459 MHz	58	2460 MHz	59	2461 MHz
60	2462 MHz	61	2463 MHz	62	2464 MHz
63	2465 MHz	64	2466 MHz	65	2467 MHz
66	2468 MHz	67	2469 MHz	68	2470 MHz
69	2471 MHz	70	2472 MHz	71	2473 MHz
72	2474 MHz	73	2475 MHz	74	2476 MHz
75	2477 MHz	76	2478 MHz	77	2479 MHz
78	2480 MHz	--	--	--	--

1.7. Pseudorandom Frequency Hopping Sequence

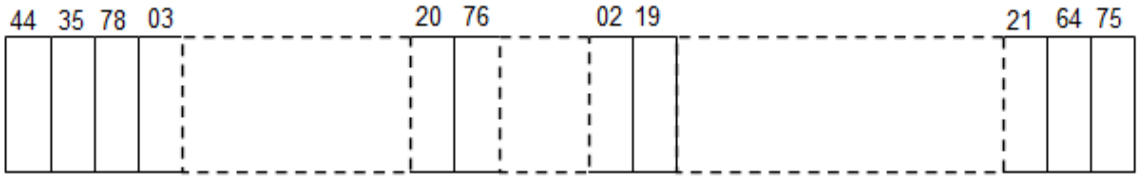
The pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONES, i.e. the shift register is initialized with nine ones.

- Number of shift register stages: 9
- Length of pseudo-random sequence: 2^9 - 1 = 511 bits
- Longest sequence of zeros: 8 (non-inverted signal)



Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:



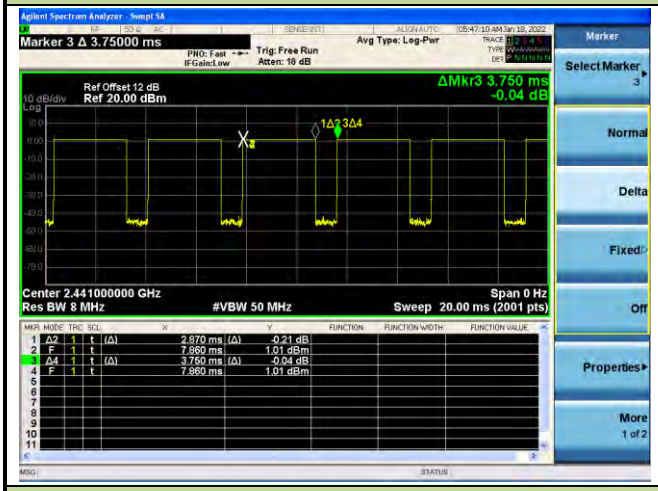
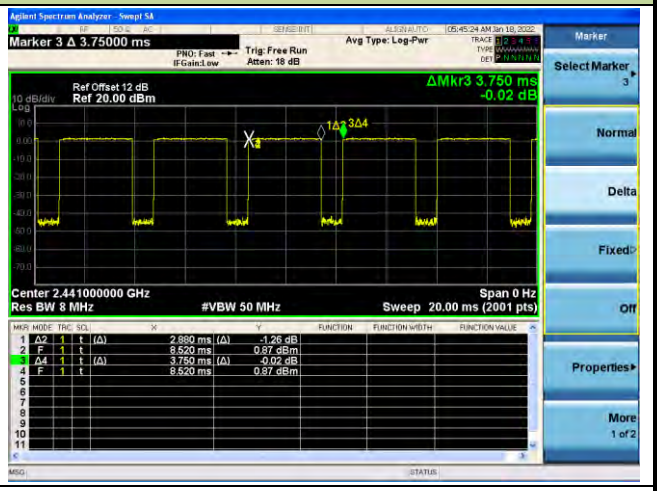
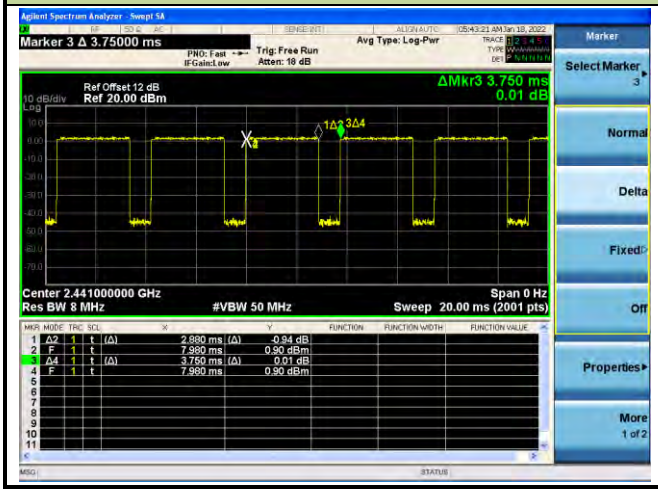
Each frequency used equally on the average by each transmitter.

The system receivers have input bandwidths that match the hopping channel bandwidths of their Corresponding transmitters and shift frequencies in synchronization with the transmitted signals.

1.8. Duty Cycle

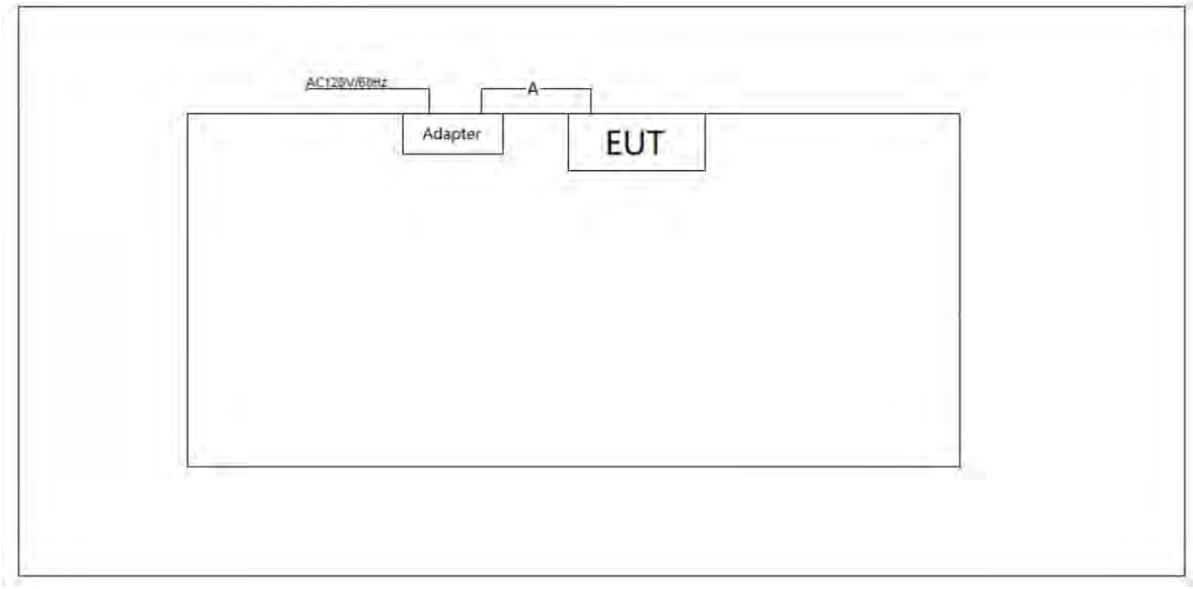
The maximum achievable duty cycle was determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Test Mode	Duty Cycle
DH5	76.53%
2DH5	76.80%
3DH5	76.80%

Duty Cycle (T = Transmission Duration)	
DH5 (T = 2.870ms)	2DH5 (T = 2.880ms)
	
3DH5 (T = 2.880ms)	
	

1.9. Description of Test Configuration

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



Cable Type		Cable Description
A	USB Cable	Non-Shielding, 0.8m

Note 1: The test utility software used during testing was “BT FCC Tool”, and the version was V2.24.

1.10. EMI Suppression Device(s) / Modifications

No EMI suppression device(s) were added and/or no modifications were made during testing.

1.11. Test Environment Condition

Ambient Temperature	15 ~ 35 ℃
Relative Humidity	20 ~ 75 %RH

2. 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.

3. TEST EQUIPMENT CALIBRATION DATE

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESL3	MRTSUE06576	1 year	2022/06/27	NS-SR2
ENV216-LV-NETZNACHB	R&S	ENV216	MRTSUE06577	1 year	2022/07/04	NS-SR2
ENV216-LV-NETZNACHB	R&S	ENV216	MRTSUE06578	1 year	2022/07/04	NS-SR2
Temperature/Humidity Meter	deli	NO.8813	MRTSUE06587	1 year	2022/06/30	NS-SR2
Shielding Anechoic Chamber	BOOMWAVE	SR2	MRTSUE06551	5 years	2024/06/04	NS-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06575	1 year	2022/06/27	NS-AC1
EXA Signal Analyzer	Keysight	N9010A	MRTSUE06195	1 year	2022/03/17	NS-AC1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06292	1 year	2022/10/20	NS-AC1
Broad-Band Horn Antenna	Schwarzbeck	9120D	MRTSUE06572	1 year	2022/10/20	NS-AC1
Bilog Period Antenna	Schwarzbeck	VULB 9162	MRTSUE06573	1 year	2022/03/14	NS-AC1
Preamplifier	Schwarzbeck	BBV 9721	MRTSUE06121	1 year	2022/06/29	NS-AC1
Broadband Coaxial Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06574	1 year	2022/06/09	NS-AC1
Anechoic Chamber	BOOMWAVE	AC1	MRTSUE06496	1 year	2022/07/12	NS-AC1
Temperature/Humidity Meter	deli	NO.8813	MRTSUE06588	1 year	2022/07/24	NS-AC1
electronic hygrothermograph	DELI	No.8813	MRTSUE06783	1 year	2022/05/09	NS-TR2
USB wideband power sensor	Keysight	U2021XA	MRTSUE06581	1 year	2022/08/15	NS-TR2
EXA Signal Analyzer	Keysight	N9010A	MRTSUE06195	1 year	2022/08/19	NS-TR2

Software	Version	Function
EMI Software	V3	EMI Test Software

4. 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 Emission Measurement
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
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 0.28%

5. TEST RESULT

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result
15.247(a)(1)	20dB Bandwidth	No Limit	Conducted	Pass
15.247(b)(1)	Peak Transmitter Output Power	<1 Watt if > 75 non- overlapping channels used		Pass
15.24207(a)(1)	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW		Pass
15.247(a)(1)(iii)	Number of Channels	> 15 Channels		Pass
15.247(a)(1)(iii)	Time of Occupancy	< 0.4 sec in 31.6 sec period		Pass
15.247(d)	Band Edge / Out-of-Band Emissions	Conducted ≥ 20dBc		Pass
15.205, 15.209	General Field Strength (Restricted Bands and Radiated Emission)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits >	Line Conducted	Pass

Notes:

1) For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
2) 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.

5.2. 20dB Bandwidth Measurement

5.2.1.Test Limit

N/A

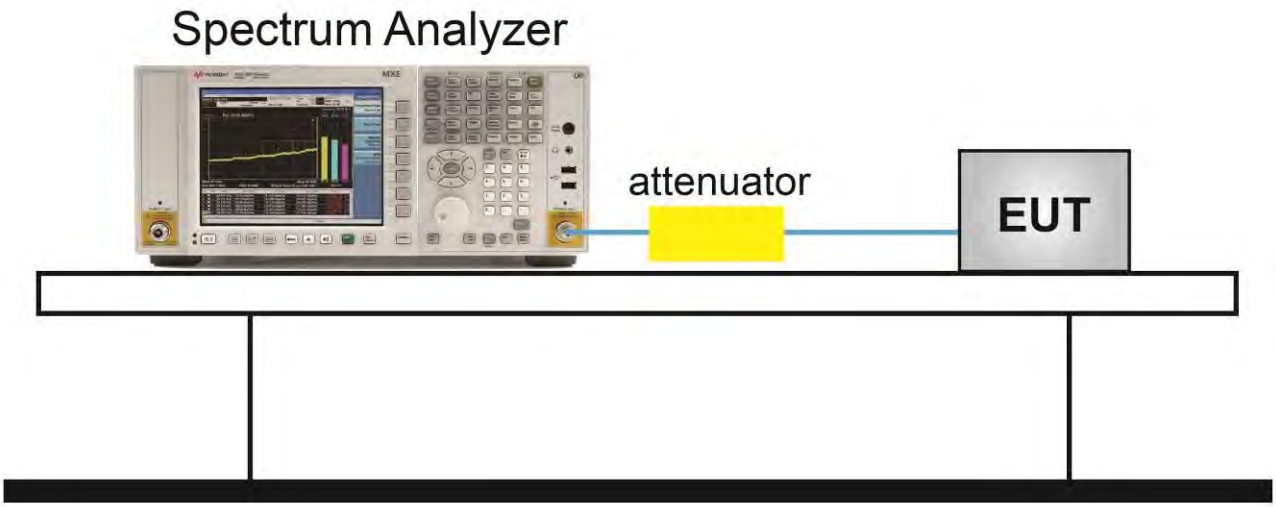
5.2.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.9.2

5.2.3.Test Setting

1. Set RBW ≥ 1% to 5% of the OBW
2. VBW = Approximately three times RBW
3. Span = Approximately 2 to 5 times the OBW, centered on a hopping channel
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize
8. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 20 dB relative to the maximum level measured in the fundamental emission.

5.2.4.Test Setup

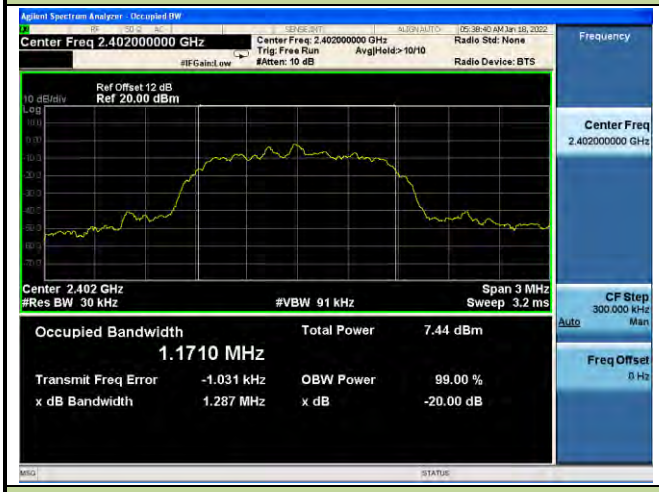


5.2.5.Test Result

Test Site	NS-TR2	Test Engineer	Flag Yang
Test Date	2022/01/18		

Test Mode	Channel No.	Frequency (MHz)	20dB Bandwidth (kHz)	Result
DH5	00	2402	950.0	Pass
	39	2441	950.4	Pass
	78	2480	949.3	Pass
2DH5	00	2402	1287.0	Pass
	39	2441	1280.0	Pass
	78	2480	1279.0	Pass
3DH5	00	2402	1254.0	Pass
	39	2441	1254.0	Pass
	78	2480	1257.0	Pass

DH5 20dB Bandwidth	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

2DH5 20dB Bandwidth	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

3DH5 20dB Bandwidth	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

5.3. Output Power Measurement

5.3.1.Test Limit

The maximum out power permissible output power is 1 Watt for all frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels.

For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

5.3.2.Test Procedure Used

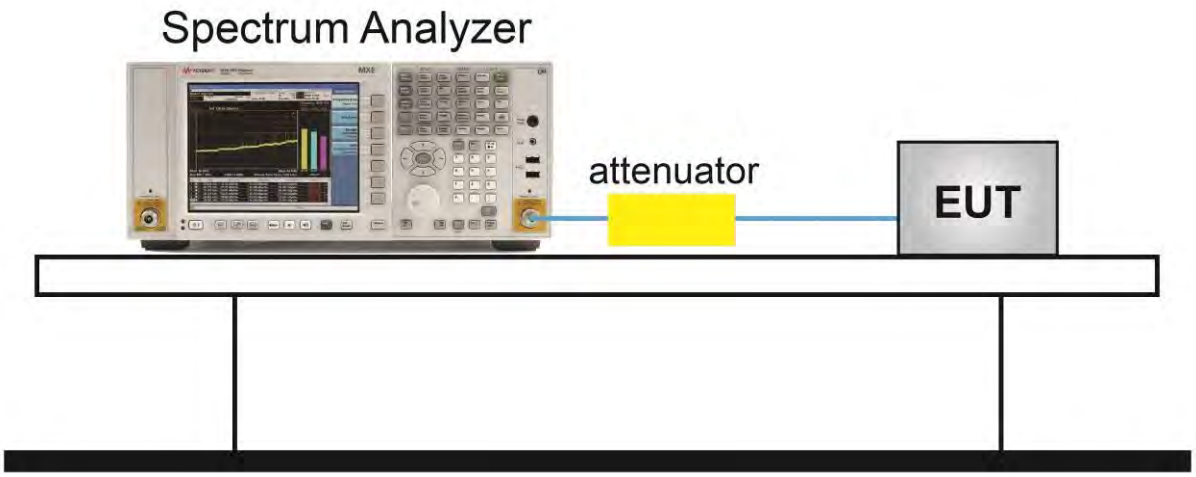
ANSI C63.10-2013 - Section 7.8.5

5.3.3.Test Setting

1. Set RBW ≥ the 20 dB bandwidth of the emission being measured.
2. VBW ≥ RBW
3. Span = approximately five times the 20dB bandwidth, centered on a hopping channel
4. Detector = Peak
5. Trace mode = Max hold
6. Sweep = Auto couple
7. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.

   The indicated level is the peak output power (don't forget added the external attenuation and cable loss)

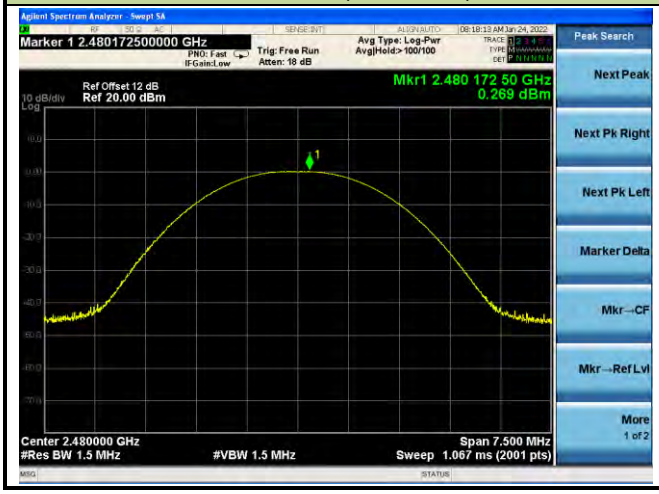
5.3.4.Test Setup



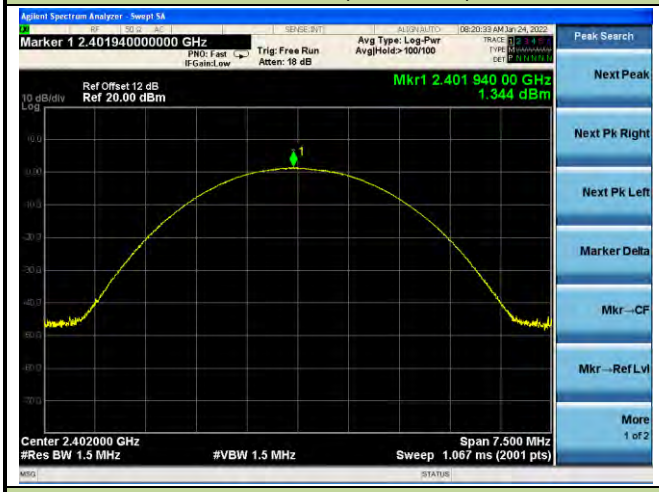
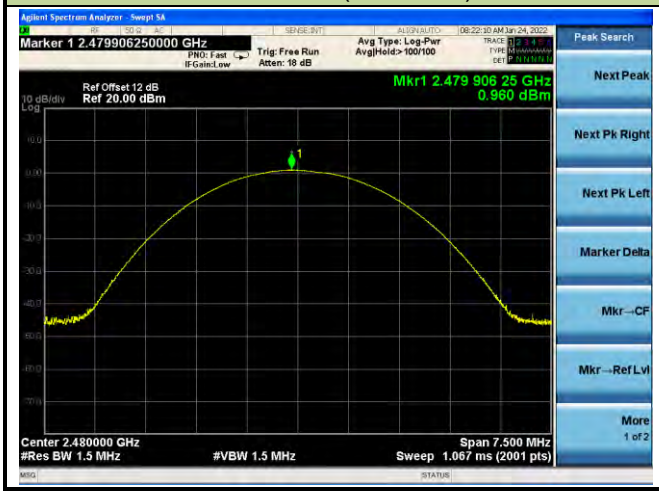
5.3.5.Test Result

Test Site	NS-TR2	Test Engineer	Flag Yang
Test Date	2022/01/24		

Test Mode	Channel No.	Frequency (MHz)	Peak Power (dBm)	Power Limit (dBm)
DH5	00	2402	0.639	≤ 30.00
	39	2441	0.479	≤ 30.00
	78	2480	0.269	≤ 30.00
2DH5	00	2402	1.062	≤ 30.00
	39	2441	0.949	≤ 30.00
	78	2480	0.779	≤ 30.00
3DH5	00	2402	1.344	≤ 30.00
	39	2441	1.291	≤ 30.00
	78	2480	0.960	≤ 30.00

DH5 Output Power	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

2DH5 Output Power	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

3DH5 Output Power	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

5.4. Carrier Frequency Separation Measurement

5.4.1.Test Limit

The minimum permissible channel separation for this system is 25kHz or 2/3 the value of the 20dB BW, whichever is greater.

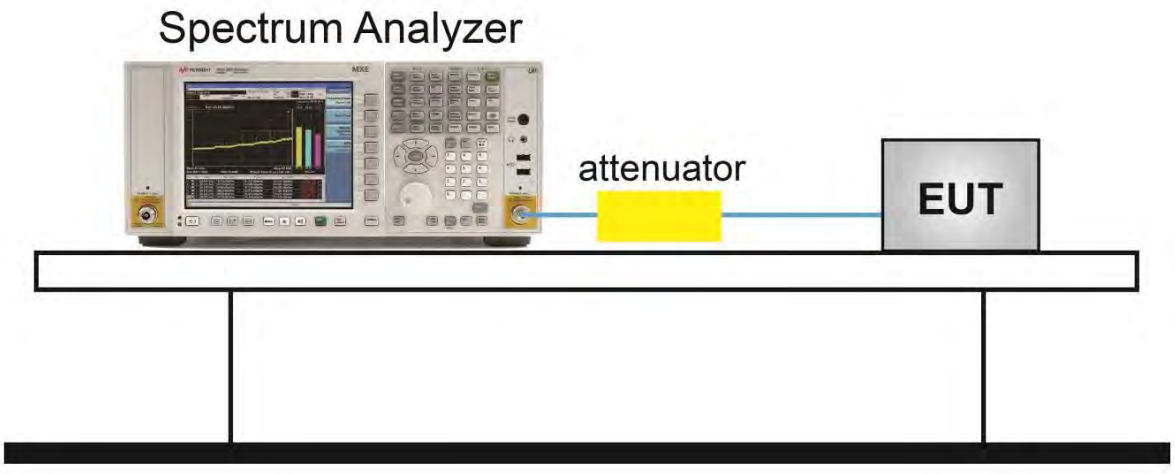
5.4.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.2

5.4.3.Test Setting

1. Span = Wide enough to capture the peaks of two adjacent channels.
2. Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel.
3. VBW ≥ RBW
4. Sweep time = Auto couple
5. Detector = Peak
6. Trace mode = Max hold
7. Allowed the trace to stabilize
8. Use the marker-delta function to determine the separation between the peaks of the adjacent channels.

5.4.4.Test Setup



5.4.5.Test Result

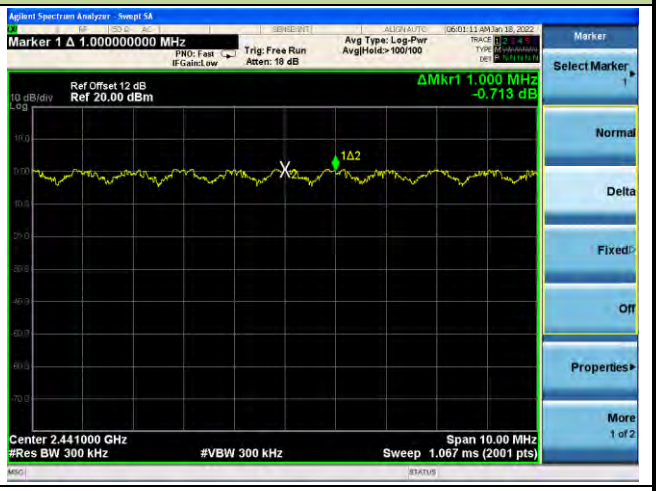
Test Site	NS-TR2	Test Engineer	Flag Yang
Test Date	2022/01/18		

Test Mode	Channel No.	Frequency (MHz)	Carrier Frequency Separation (kHz)	Limit (kHz)	Result
DH5	00	2402	1000	≥ 633.3	Pass
	39	2441	1000	≥ 633.6	Pass
	78	2480	1000	≥ 632.9	Pass
2DH5	00	2402	1000	≥ 858.0	Pass
	39	2441	1000	≥ 853.3	Pass
	78	2480	1000	≥ 852.7	Pass
3DH5	00	2402	1000	≥ 836.0	Pass
	39	2441	1000	≥ 836.0	Pass
	78	2480	1000	≥ 838.0	Pass

Note: The Limit is 2/3 the value of the 20dB BW.

DH5 Carrier Frequency Separation	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

2DH5 Carrier Frequency Separation	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

3DH5 Carrier Frequency Separation	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

5.5. Number of Hopping Channels Measurement

5.5.1.Test Limit

This frequency hopping system must employ a minimum of 15 hopping channels.

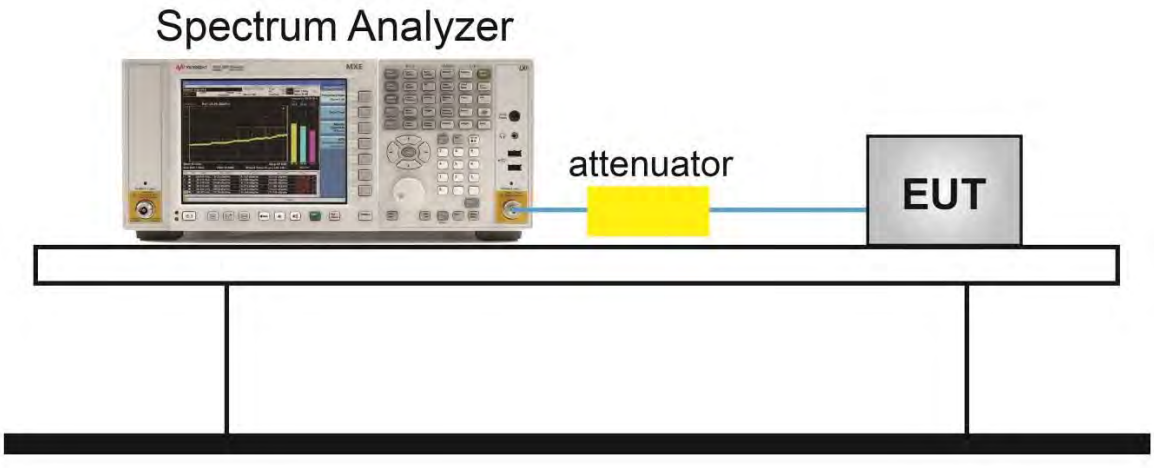
5.5.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.3

5.5.3.Test Setting

1. Span = The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen.
2. RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep time = Auto couple
5. Detector = Peak
6. Trace mode = Max hold
7. Allow the trace to stabilize

5.5.4.Test Setup



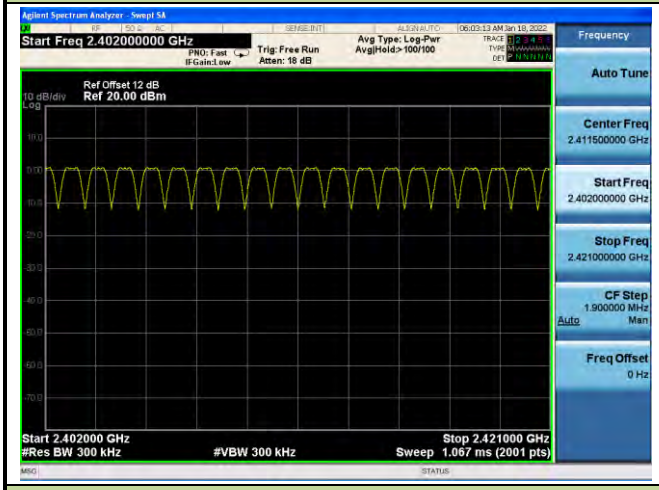
5.5.5.Test Result

Test Site	NS-TR2	Test Engineer	Flag Yang
Test Date	2022/01/18		

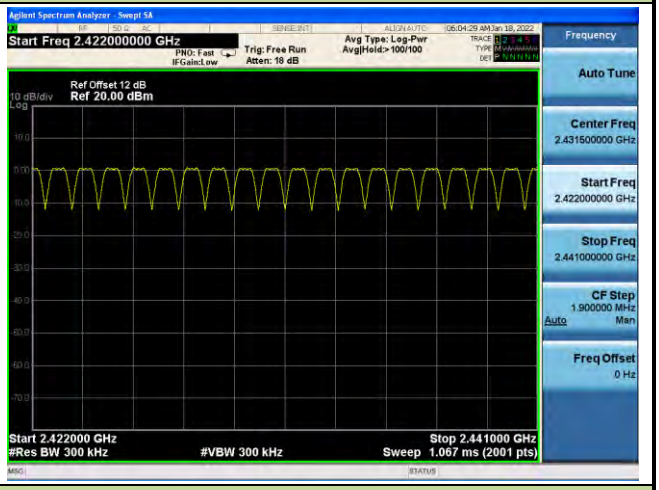
Test Mode (Hopping)	Channel Numbers	Frequency (MHz)	Limit (Hopping Channels)	Result
DH5	79	2402 ~ 2480	≥ 15	Pass
2DH5	79	2402 ~ 2480	≥ 15	Pass
3DH5	79	2402 ~ 2480	≥ 15	Pass

DH5 Number of Hopping Channels

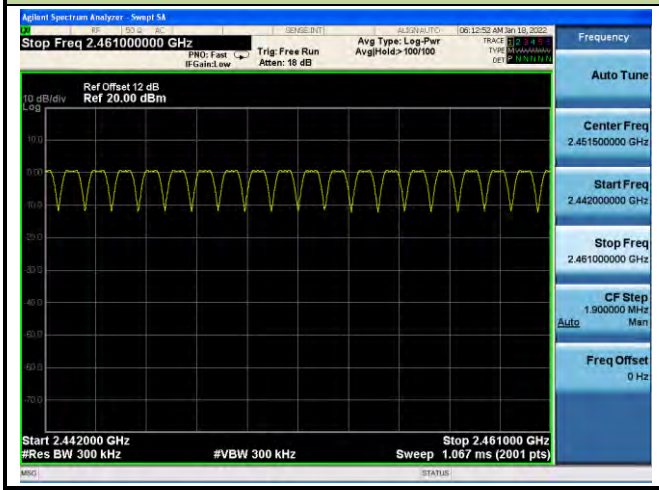
2402 ~ 2421MHz



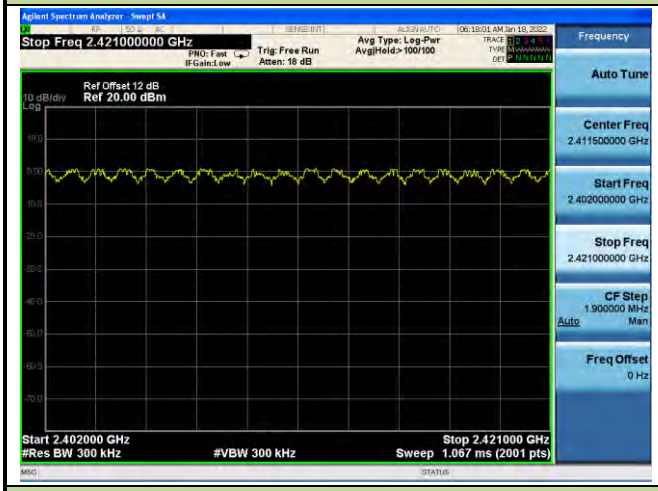
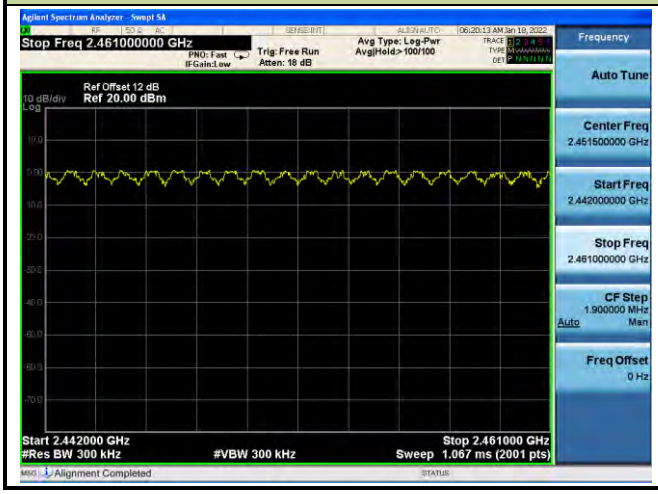
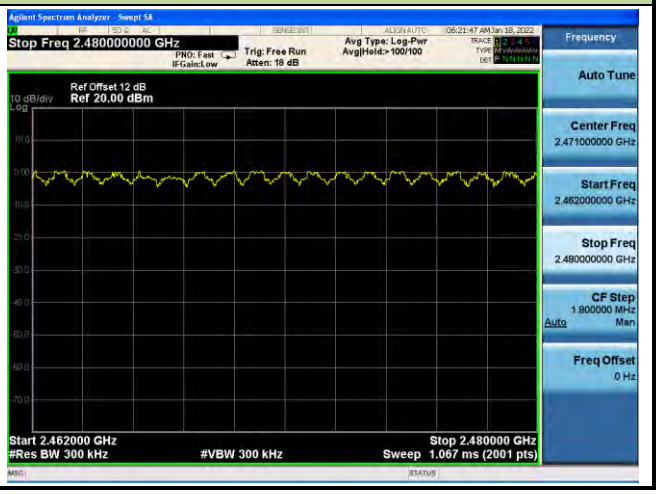
2422 ~ 2441MHz

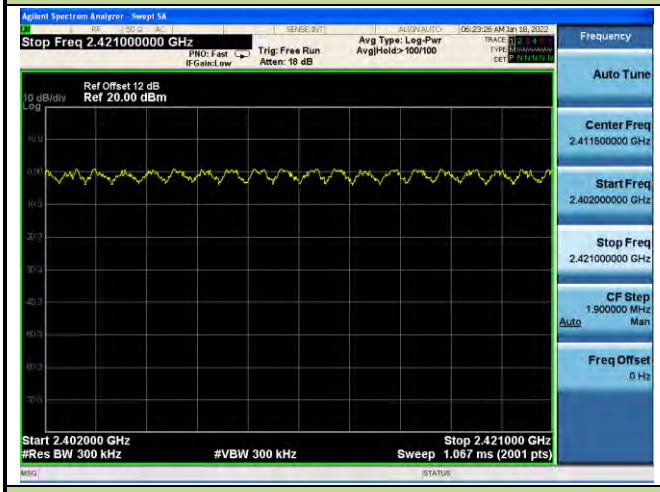
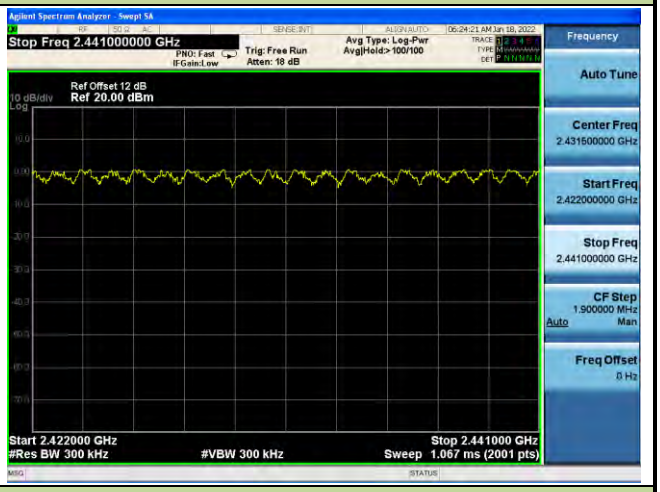
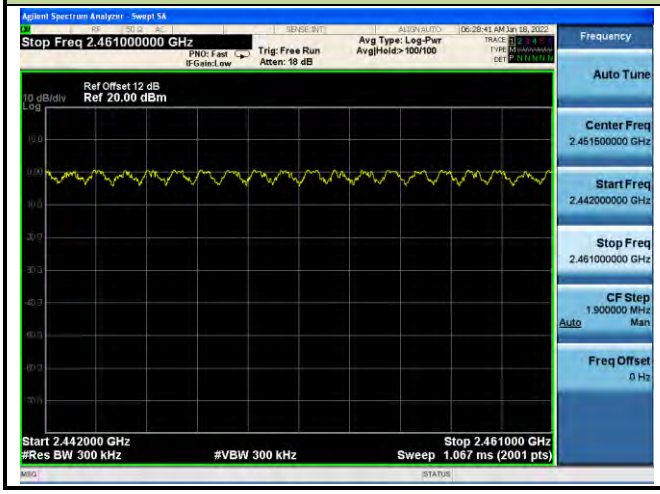
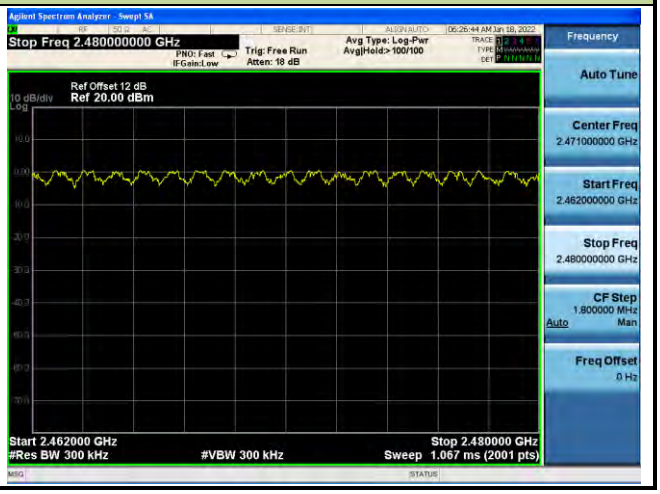


2442 ~ 2461MHz



2462 ~ 2480MHz

2DH5 Number of Hopping Channels	
2402 ~ 2421MHz	2422 ~ 2441MHz
	
2442 ~ 2461MHz	2462 ~ 2480MHz
	

3DH5 Number of Hopping Channels	
2402 ~ 2421MHz	2422 ~ 2441MHz
	
2442 ~ 2461MHz	2462 ~ 2480MHz
	

5.6. Time of Occupancy Measurement

5.6.1.Test Limit

The maximum permissible time of occupancy is 400ms within a period of 400ms multiplied by the number of hopping channels employed.

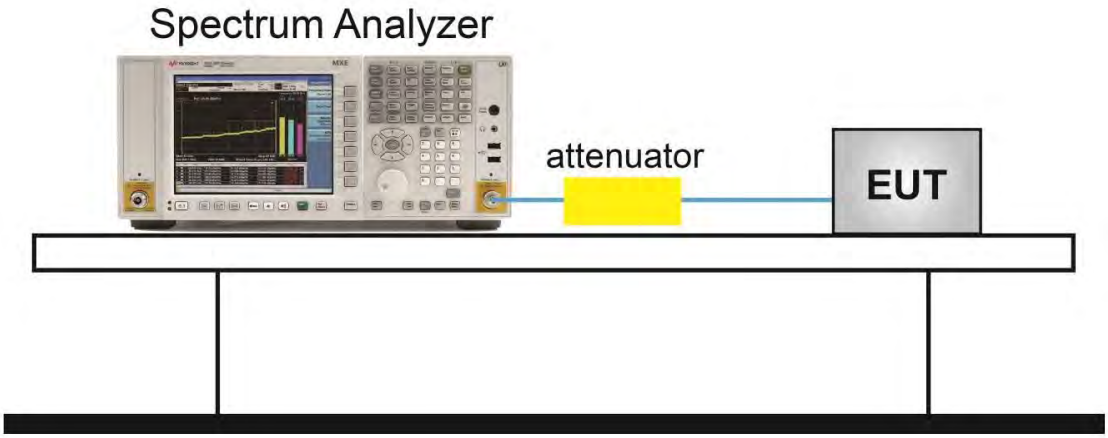
5.6.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.4

5.6.3.Test Setting

1. Span = Zero span, centered on a hopping channel.
2. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
3. VBW ≥ RBW
4. Sweep time = As necessary to capture the entire dwell time per hopping channel
5. Detector = Peak
6. Trace mode = Free run
7. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. An oscilloscope may be used instead of a spectrum analyzer. The EUT shall show compliance with the appropriate regulatory limit for the number of hopping channels. A plot of the data shall be included in the test report.

5.6.4.Test Setup



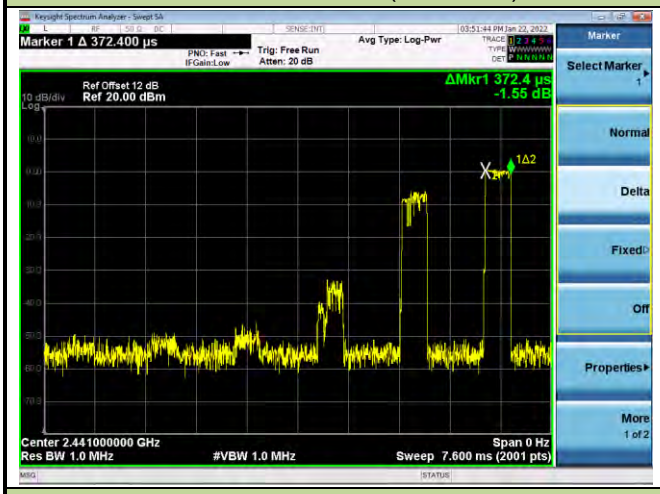
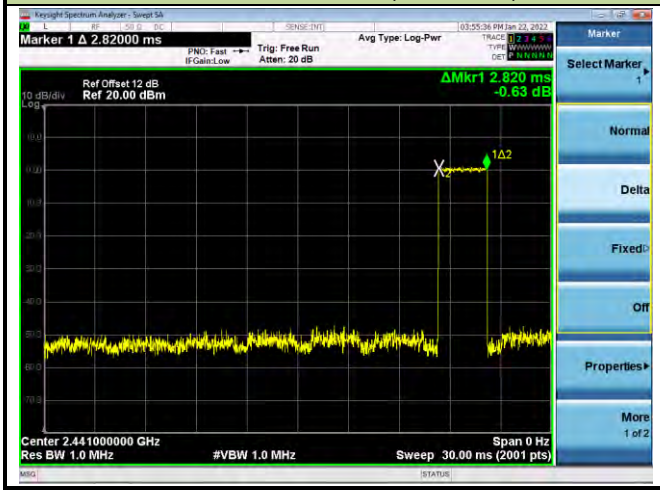
5.6.5.Test Result

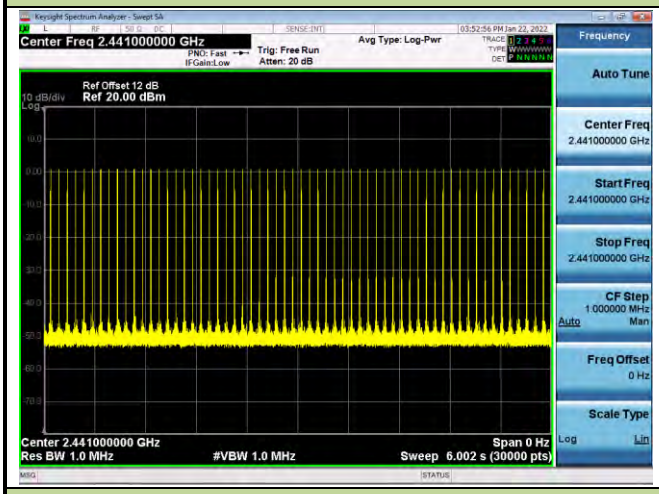
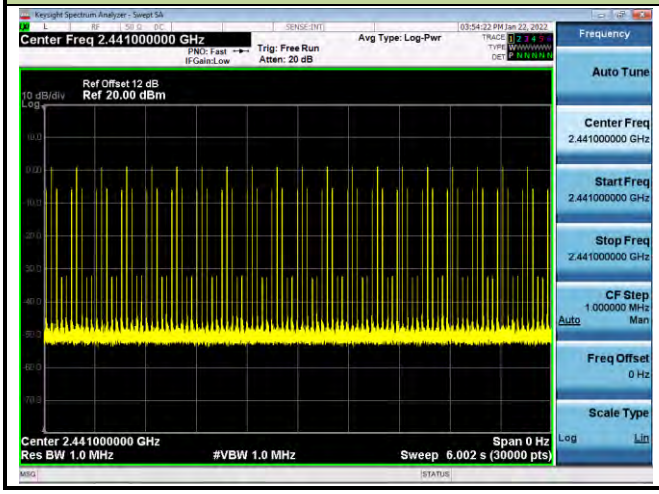
Test Site	NS-TR2	Test Engineer	Summer Tang
Test Date	2022/01/22		

Test Mode	Channel No.	Frequency (MHz)	Transmit Time Per Hop (ms)	Observation Period (s)	Number of Hops in Sweep Time	Time of Occupancy (ms)	Limit (ms)	Result
3DH1	00~78	2402~2480	0.372	31.6	60	117.552	≤ 400	Pass
3DH3	00~78	2402~2480	1.590	31.6	31	259.594	≤ 400	Pass
3DH5	00~78	2402~2480	2.820	31.6	20	297.040	≤ 400	Pass

Note 1: Number of Hops in Observation Period = Number of Hops in Sweep Time * (Observation Period / Sweep Time), Sweep Time = 6s.

Note 2: Time of Occupancy (ms) = Transmit Time Per Hop (ms) * Number of Hops in Observation Period.

Transmit Time Per Hop	
3DH1 - Channel 39 (2441MHz)	3DH3 - Channel 39 (2441MHz)
	
3DH5 - Channel 39 (2441MHz)	
	

Number of Hops in Sweep Time	
3DH1	3DH3
	
3DH5	
	

5.7. Band-edge Compliance Measurement

5.7.1.Test Limit

The maximum permissible emission level is 20dBc. Any emissions were lying outside of the emission bandwidth and in authorized band edges to a field strength limit specified in Section 15.209 of the Title 47 CFR.

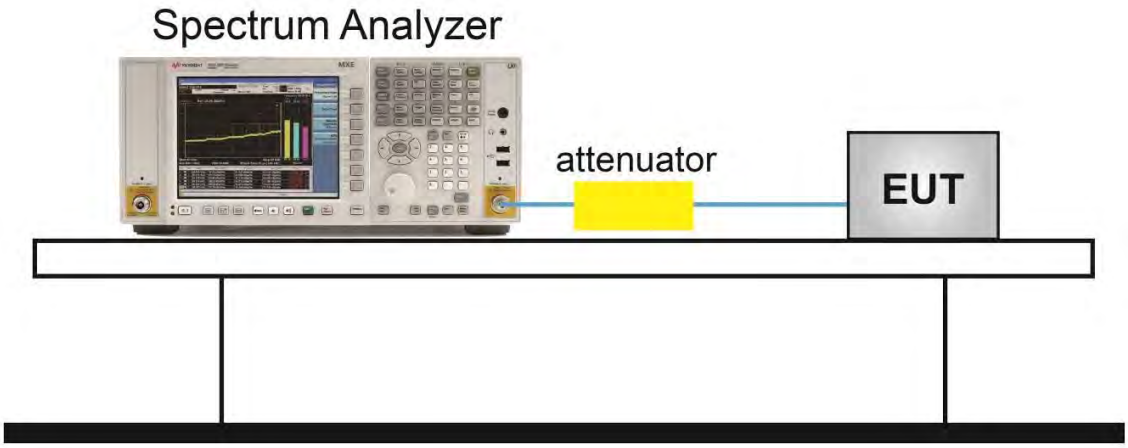
5.7.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.10.4

5.7.3.Test Setting

1. Span = Wide enough to capture the peak level of the emission operating on the channel closest to the band edge, as well as any modulation products which fall outside of the authorized band of operation.
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Allow the trace to stabilize. Set the marker on the emission at the band edge, or on the highest modulation product outside of the band, if this level is greater than that at the band edge. Enable the marker-delta function, than use the marker-to-peak function to move the marker to the peak of the in-band emission.

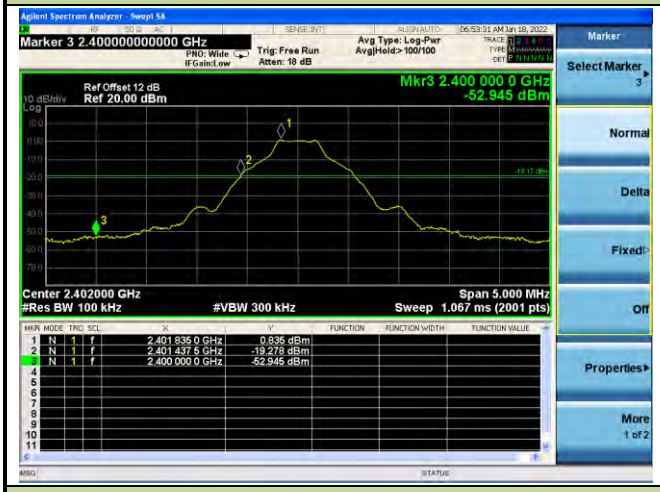
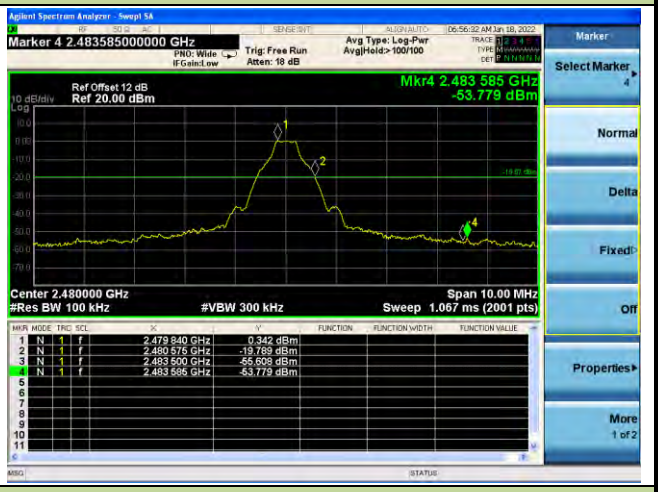
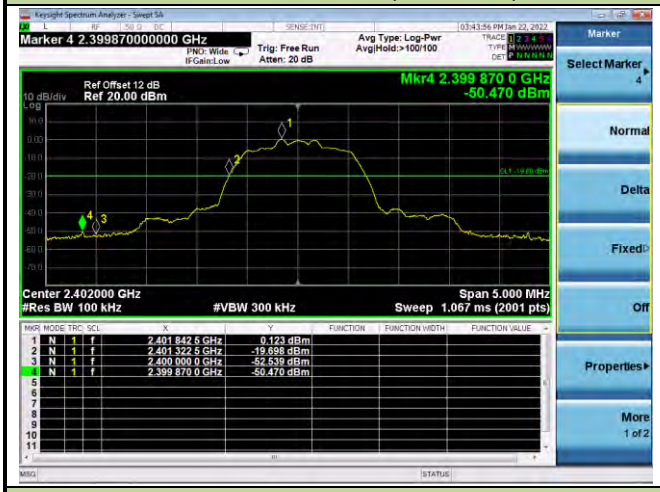
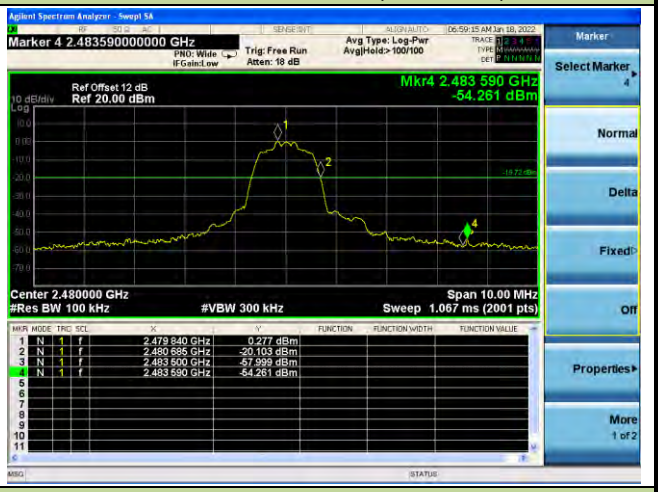
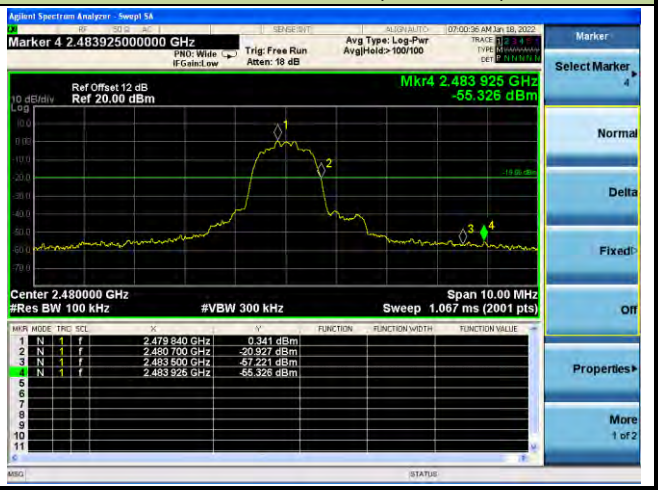
5.7.4.Test Setup

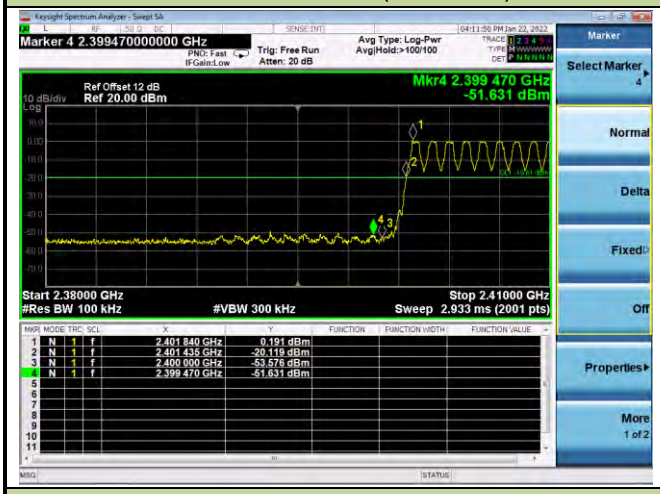
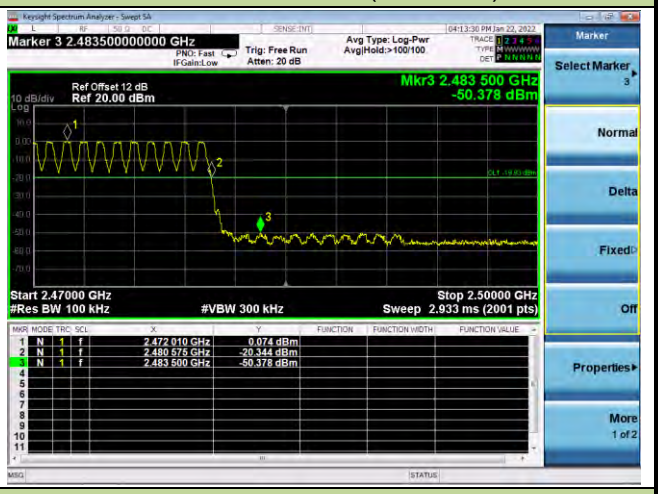
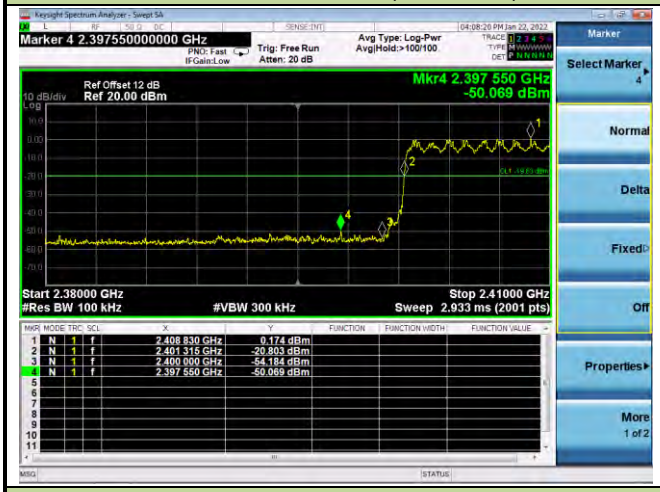
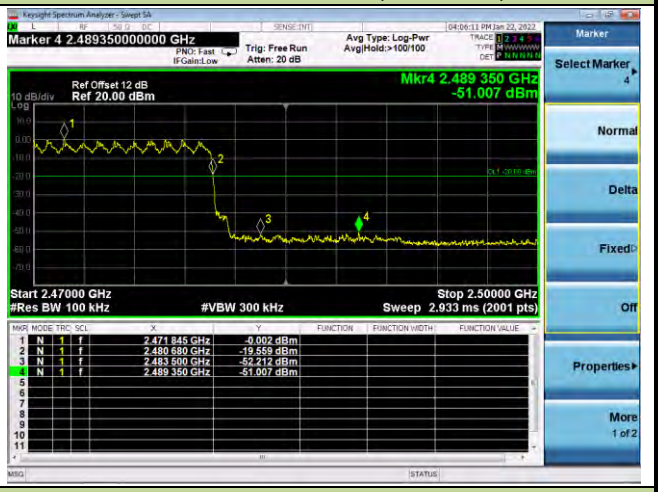
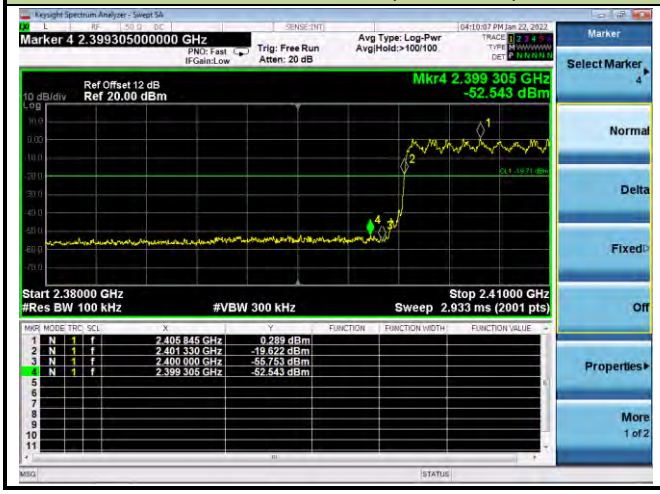
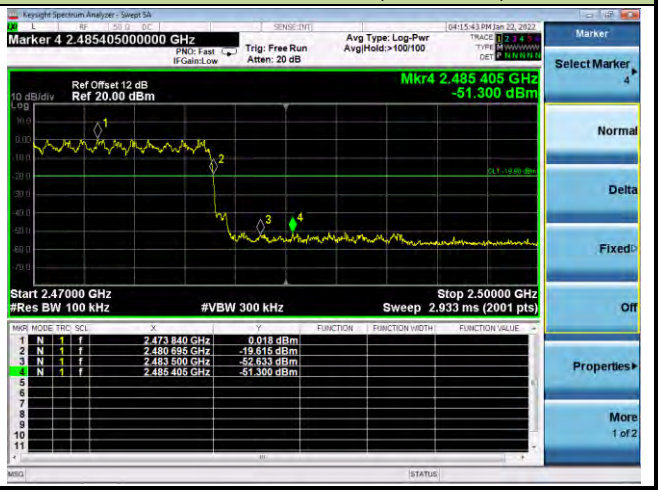


5.7.5.Test Result

Test Site	NS-TR2	Test Engineer	Summer Tang
Test Date	2022/01/22		

Test Mode	Channel No.	Frequency (MHz)	Limit	Result
DH5	00	2402	20dBc	Pass
	78	2480	20dBc	Pass
2DH5	00	2402	20dBc	Pass
	78	2480	20dBc	Pass
3DH5	00	2402	20dBc	Pass
	78	2480	20dBc	Pass

Band-edge Compliance	
DH5 - Channel 00 (2402MHz)	DH5 - Channel 78 (2480MHz)
	
2DH5 - Channel 00 (2402MHz)	2DH5 - Channel 78 (2480MHz)
	
3DH5 - Channel 00 (2402MHz)	3DH5 - Channel 78 (2480MHz)
	

Operation Frequency Range of 20dB Bandwidth with Hopping Mode	
DH5 - Channel 00 (2402MHz)	DH5 - Channel 78 (2480MHz)
	
2DH5 - Channel 00 (2402MHz)	2DH5 - Channel 78 (2480MHz)
	
3DH5 - Channel 00 (2402MHz)	3DH5 - Channel 78 (2480MHz)
	

5.8. Conducted Spurious Emissions Measurement

5.8.1.Test 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 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, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

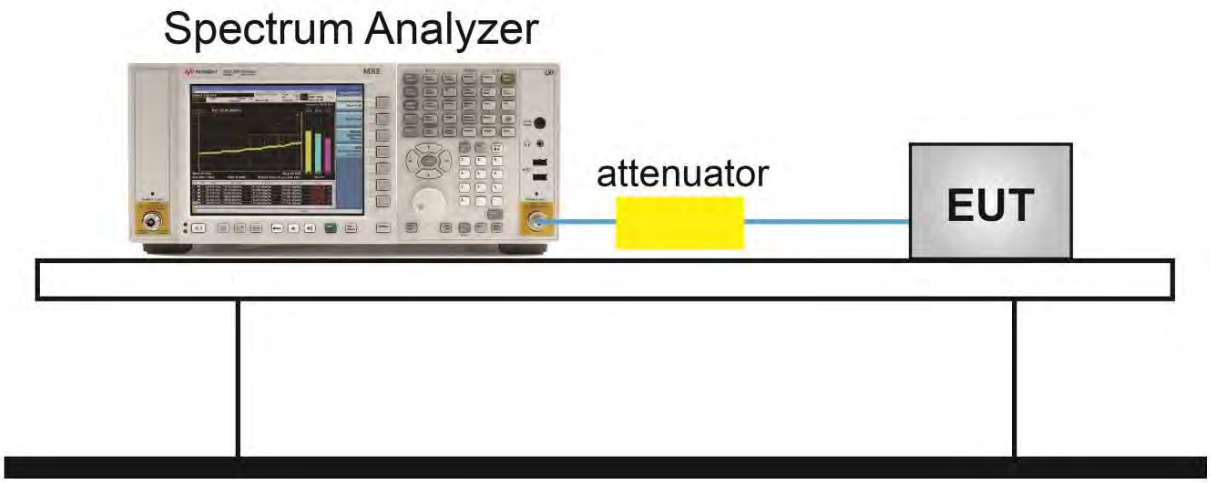
5.8.2.Test Procedure Used

ANSI C63.10-2013 - Section 7.8.8

5.8.3.Test Setting

1. Span = Wide enough to capture the peak level of the in-band emission and all spurious emissions (e.g., harmonics) from the lowest frequency generated in the EUT up through the 10th harmonic. Typically, several plots are required to cover this entire span.
2. RBW = 100kHz
3. VBW = 300kHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize
8. Set the marker on the peak of any spurious emission recorded. The level displayed must comply with the limit specified in this section.

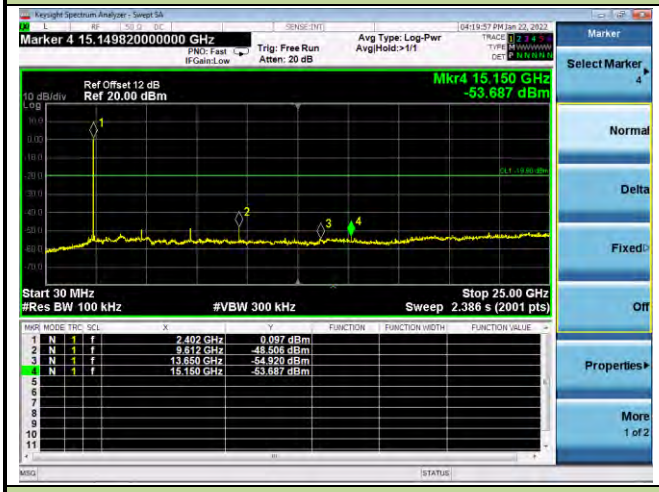
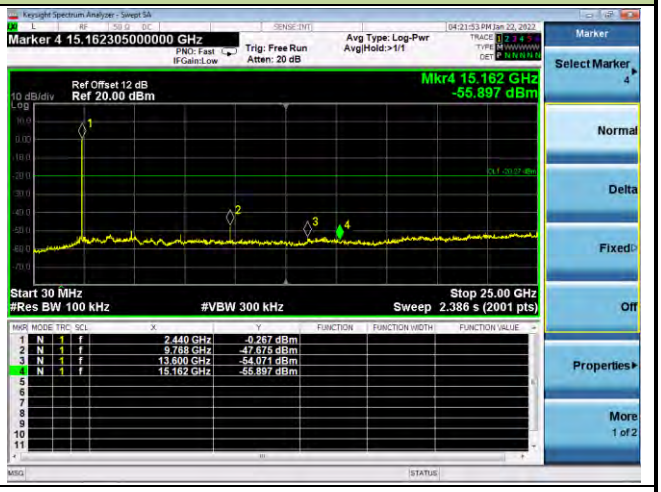
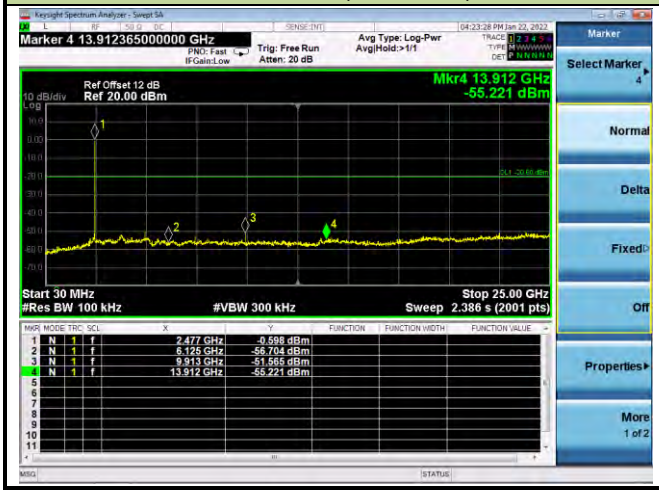
5.8.4.Test Setup

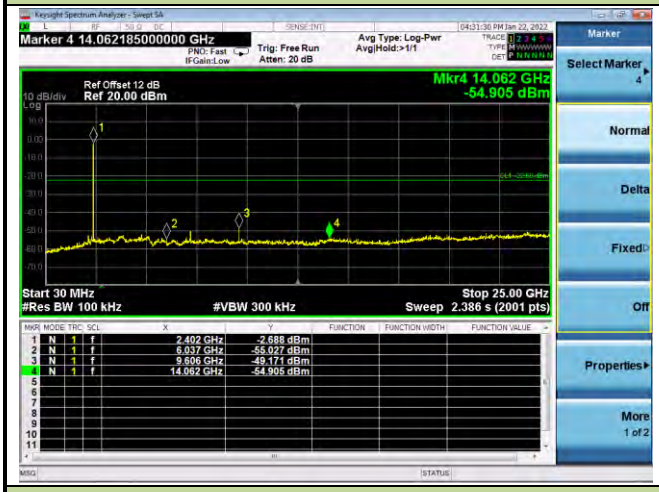
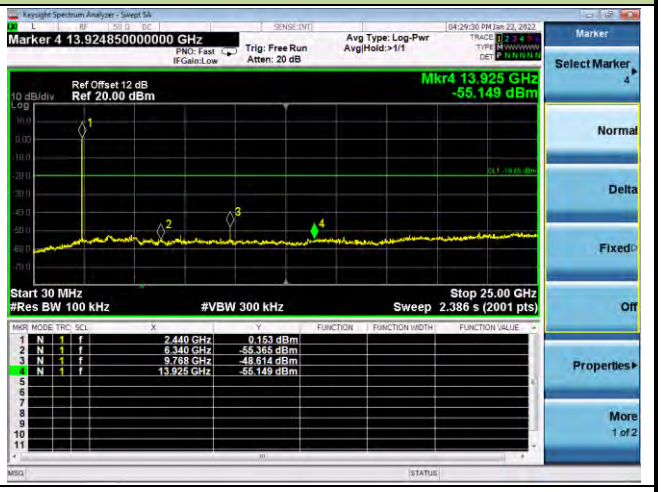
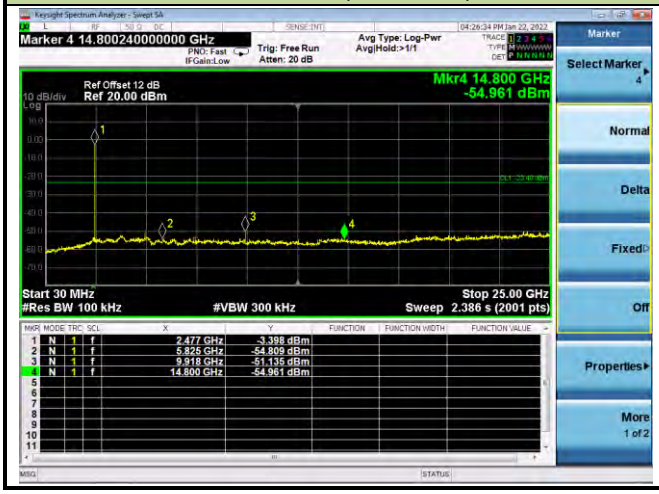


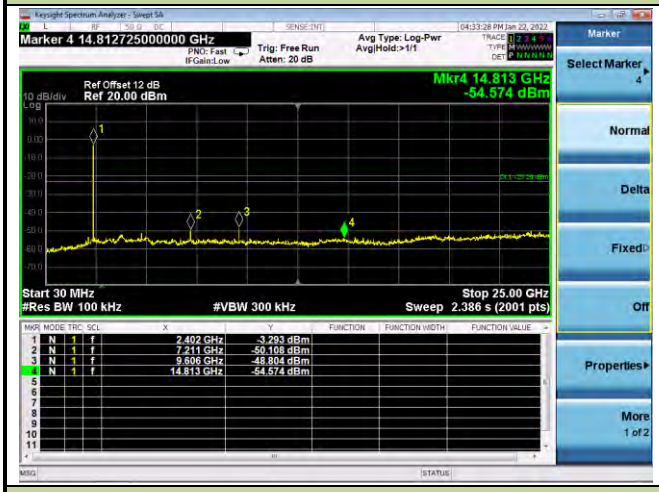
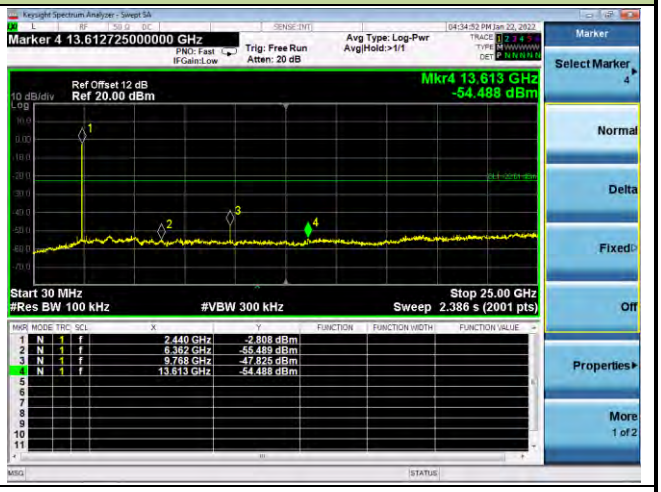
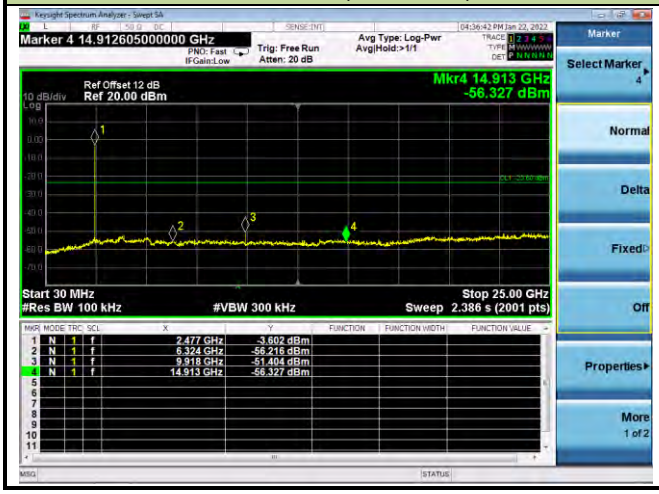
5.8.5.Test Result

Test Site	NS-TR2	Test Engineer	Summer Tang
Test Date	2022/01/22		

Test Mode	Channel No.	Frequency (MHz)	Limit	Result
DH5	00	2402	20dBc	Pass
	39	2441	20dBc	Pass
	78	2480	20dBc	Pass
2DH5	00	2402	20dBc	Pass
	39	2441	20dBc	Pass
	78	2480	20dBc	Pass
3DH5	00	2402	20dBc	Pass
	39	2441	20dBc	Pass
	78	2480	20dBc	Pass

DH5 Conducted Spurious Emissions	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

2DH5 Conducted Spurious Emissions	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

3DH5 Conducted Spurious Emissions	
Channel 00 (2402MHz)	Channel 39 (2441MHz)
	
Channel 78 (2480MHz)	
	

5.9. Radiated Spurious Emission Measurement

5.9.1.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 (μV/m)	Measured Distance (m)
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

5.9.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.4 & 6.5 & 6.6

5.9.3.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
> 1000 MHz	1 MHz

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

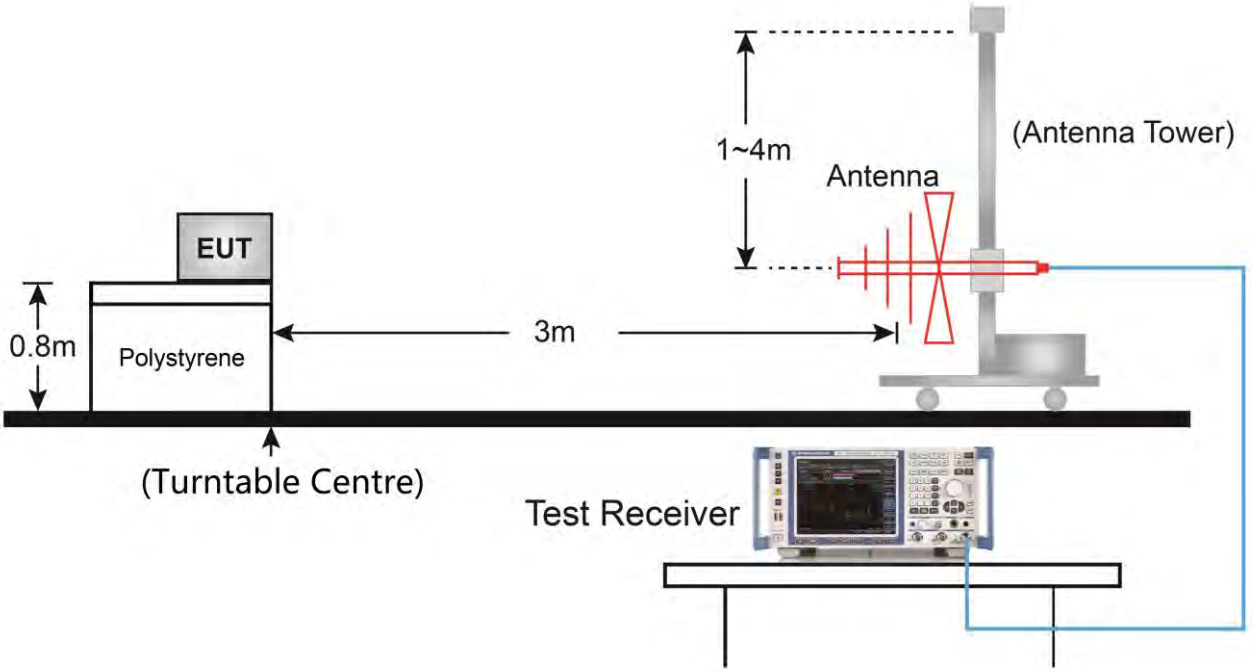
Average Measurements above 1GHz (Method VB)

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 = 10Hz

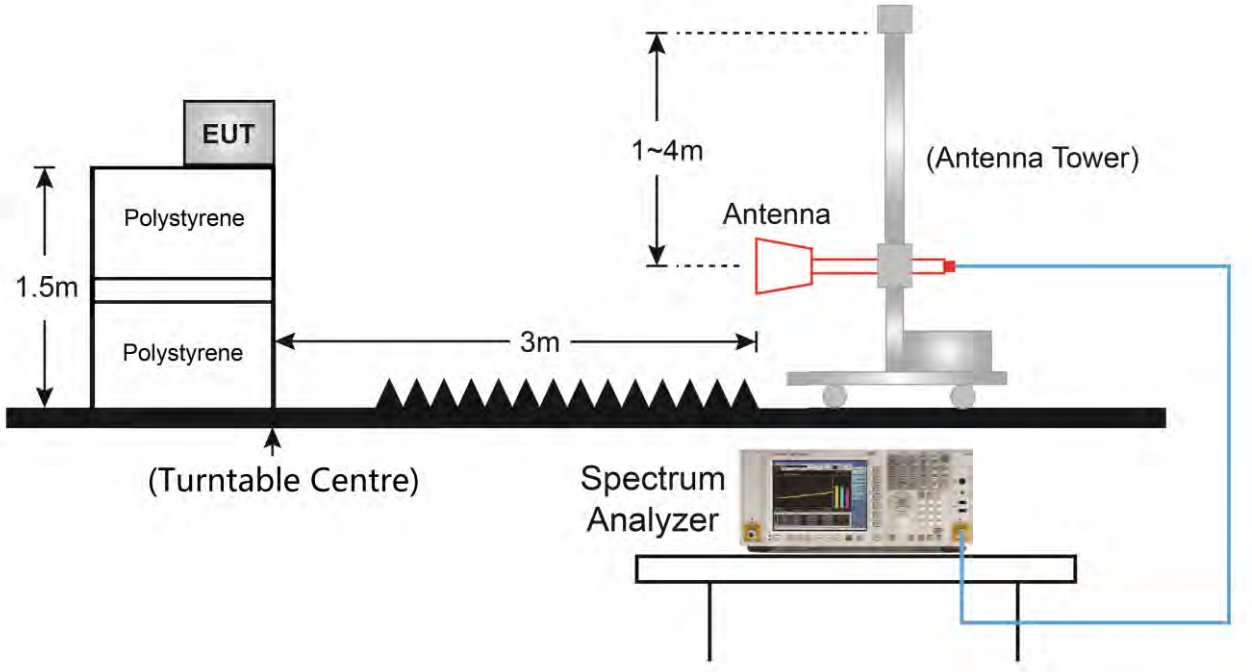
   If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration
4. Detector = Peak
5. Sweep time = Auto
6. Trace mode = Max hold
7. Trace was allowed to stabilize

5.9.4.Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.9.5.Test Result

Test Site	NS-AC1	Test Engineer	Dillon Diao
Test Mode	DH5	Test Date	2022/01/14
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 shown in the report.		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Channel 00							
4808.0	46.5	1.4	47.9	74.0	-26.1	Peak	Horizontal
7205.0	36.0	8.5	44.5	74.0	-29.5	Peak	Horizontal
9610.5	39.4	11.8	51.2	74.0	-22.8	Peak	Horizontal
4808.0	41.1	1.4	42.5	74.0	-31.5	Peak	Vertical
7205.0	37.6	8.5	46.1	74.0	-27.9	Peak	Vertical
9610.5	39.3	11.8	51.1	74.0	-22.9	Peak	Vertical
Channel 39							
4884.5	46.0	1.4	47.4	74.0	-26.6	Peak	Horizontal
7324.0	34.3	9.1	43.4	74.0	-30.6	Peak	Horizontal
9763.5	39.3	12.1	51.4	74.0	-22.6	Peak	Horizontal
4884.5	44.7	1.4	46.1	74.0	-27.9	Peak	Vertical
7324.0	36.4	9.1	45.5	74.0	-28.5	Peak	Vertical
9763.5	38.2	12.1	50.3	74.0	-23.7	Peak	Vertical
Channel 78							
4961.0	44.9	1.7	46.6	74.0	-27.4	Peak	Horizontal
7443.0	34.0	9.4	43.4	74.0	-30.6	Peak	Horizontal
9916.5	39.6	12.2	51.8	74.0	-22.2	Peak	Horizontal
4961.0	39.7	1.7	41.4	74.0	-32.6	Peak	Vertical
7443.0	34.5	9.4	43.9	74.0	-30.1	Peak	Vertical
9916.5	38.8	12.2	51.0	74.0	-23.0	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m) Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)							

Test Site	NS-AC1	Test Engineer	Dillon Diao
Test Mode	2DH5	Test Date	2022/01/14
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 shown in the report.		

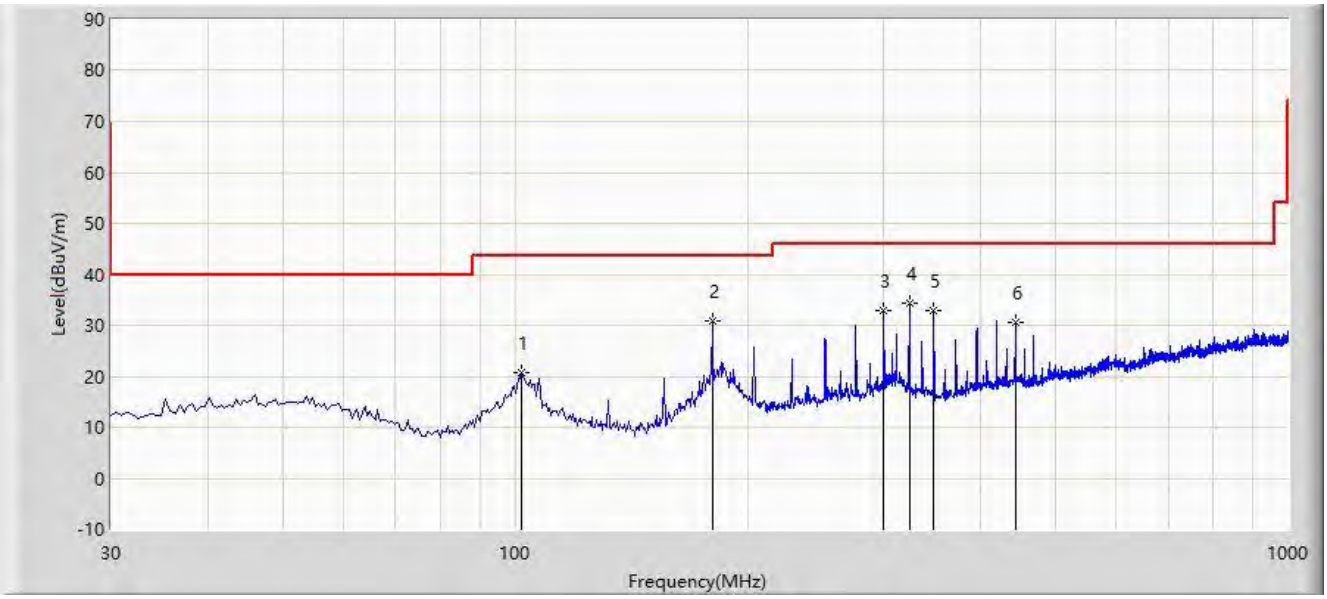
Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Channel 00							
4808.0	44.8	1.4	46.2	74.0	-27.8	Peak	Horizontal
7681.0	34.3	8.8	43.1	74.0	-30.9	Peak	Horizontal
9610.5	39.5	11.8	51.3	74.0	-22.7	Peak	Horizontal
4808.0	39.5	1.4	40.9	74.0	-33.1	Peak	Vertical
7205.0	36.3	8.5	44.8	74.0	-29.2	Peak	Vertical
9610.5	38.3	11.8	50.1	74.0	-23.9	Peak	Vertical
Channel 39							
4884.5	45.4	1.4	46.8	74.0	-27.2	Peak	Horizontal
7324.0	35.7	9.1	44.8	74.0	-29.2	Peak	Horizontal
9763.5	40.1	12.1	52.2	74.0	-21.8	Peak	Horizontal
4884.5	39.2	1.4	40.6	74.0	-33.4	Peak	Vertical
7324.0	36.0	9.1	45.1	74.0	-28.9	Peak	Vertical
9763.5	40.5	12.1	52.6	74.0	-21.4	Peak	Vertical
Channel 78							
4884.5	45.4	1.4	46.8	74.0	-27.2	Peak	Horizontal
7324.0	35.7	9.1	44.8	74.0	-29.2	Peak	Horizontal
9763.5	40.1	12.1	52.2	74.0	-21.8	Peak	Horizontal
4884.5	39.2	1.4	40.6	74.0	-33.4	Peak	Vertical
7324.0	36.0	9.1	45.1	74.0	-28.9	Peak	Vertical
9763.5	40.5	12.1	52.6	74.0	-21.4	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m) Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre_Amplifier Gain (dB)							

Test Site	NS-AC1	Test Engineer	Dillon Diao
Test Mode	3DH5	Test Date	2022/01/14
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 shown in the report.		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Channel 00							
4808.0	46.3	1.4	47.7	74.0	-26.3	Peak	Horizontal
7205.0	35.8	8.5	44.3	74.0	-29.7	Peak	Horizontal
9610.5	39.5	11.8	51.3	74.0	-22.7	Peak	Horizontal
4799.5	39.5	1.4	40.9	74.0	-33.1	Peak	Vertical
7205.0	36.7	8.5	45.2	74.0	-28.8	Peak	Vertical
9610.5	38.7	11.8	50.5	74.0	-23.5	Peak	Vertical
Channel 39							
4884.5	46.1	1.4	47.5	74.0	-26.5	Peak	Horizontal
7324.0	36.6	9.1	45.7	74.0	-28.3	Peak	Horizontal
9763.5	39.5	12.1	51.6	74.0	-22.4	Peak	Horizontal
4884.5	38.7	1.4	40.1	74.0	-33.9	Peak	Vertical
7324.0	36.6	9.1	45.7	74.0	-28.3	Peak	Vertical
9763.5	39.7	12.1	51.8	74.0	-22.2	Peak	Vertical
Channel 78							
4961.0	44.4	1.7	46.1	74.0	-27.9	Peak	Horizontal
7443.0	33.1	9.4	42.5	74.0	-31.5	Peak	Horizontal
9916.5	39.7	12.2	51.9	74.0	-22.1	Peak	Horizontal
4961.0	39.9	1.7	41.6	74.0	-32.4	Peak	Vertical
7443.0	34.4	9.4	43.8	74.0	-30.2	Peak	Vertical
9916.5	38.6	12.2	50.8	74.0	-23.2	Peak	Vertical
Note: Measure Level (dBμV/m) = Reading Level (dBμV) + 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: NS-AC1	Time: 2021/10/18
Temperature: 23.2°C	Humidity: 66%
Limit: FCC_Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_VULB9162	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			101.780	20.822	5.516	-22.678	43.500	15.307	PK
2			179.865	30.943	17.812	-12.557	43.500	13.132	PK
3			299.660	32.783	15.822	-13.217	46.000	16.961	PK
4		*	323.910	34.310	16.795	-11.690	46.000	17.515	PK
5			348.160	32.990	14.612	-13.010	46.000	18.377	PK
6			444.190	30.477	10.177	-15.523	46.000	20.300	PK

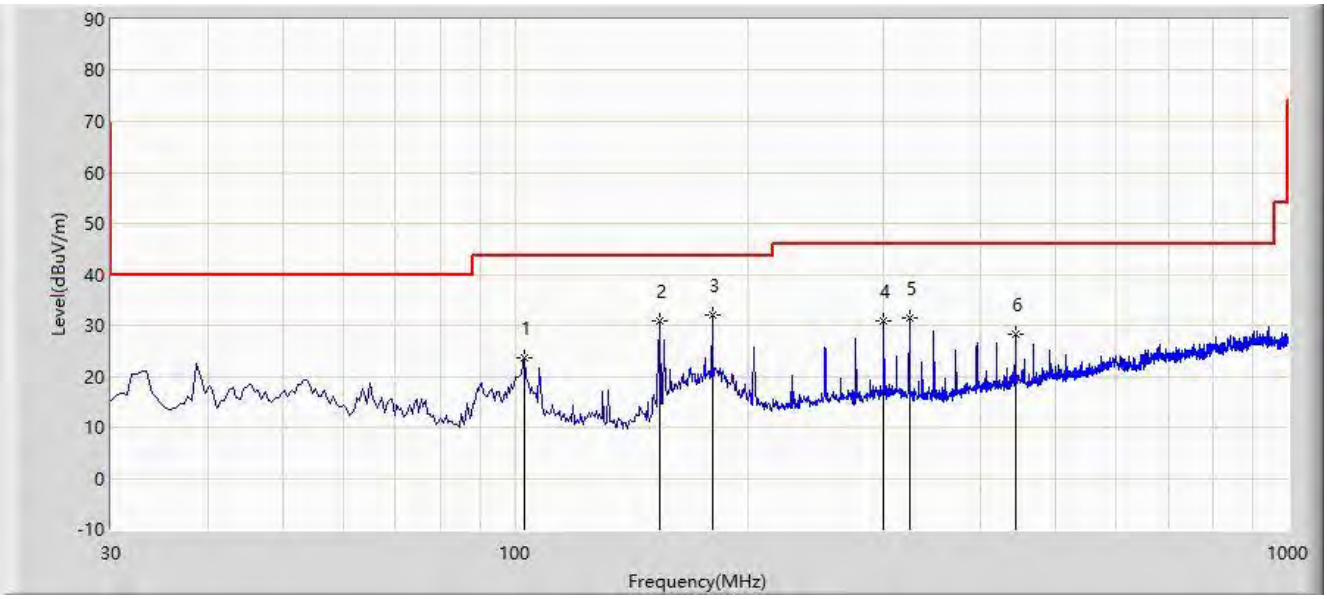
Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

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

Note 2: 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.

Note 3: QP measurement was not performed when peak measure level was lower than the QP limit.

Site: NS-AC1	Time: 2021/10/18
Temperature: 23.2°C	Humidity: 66%
Limit: FCC_Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_VULB9162	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			102.750	23.486	8.150	-20.014	43.500	15.336	PK
2			154.160	30.959	19.089	-12.541	43.500	11.870	PK
3		*	179.865	32.008	18.877	-11.492	43.500	13.132	PK
4			299.660	30.996	14.035	-15.004	46.000	16.961	PK
5			323.910	31.306	13.791	-14.694	46.000	17.515	PK
6			444.190	28.201	7.901	-17.799	46.000	20.300	PK

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

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

Note 2: 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.

Note 3: QP measurement was not performed when peak measure level was lower than the QP limit.

5.10. Radiated Restricted Band Edge Measurement

5.10.1.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 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 (μV/m)	Measured Distance (m)
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

5.10.2.Test Procedure Used

ANSI C63.10-2013 - Section 6.3 & 6.6 & 6.10

5.10.3.Test Setting

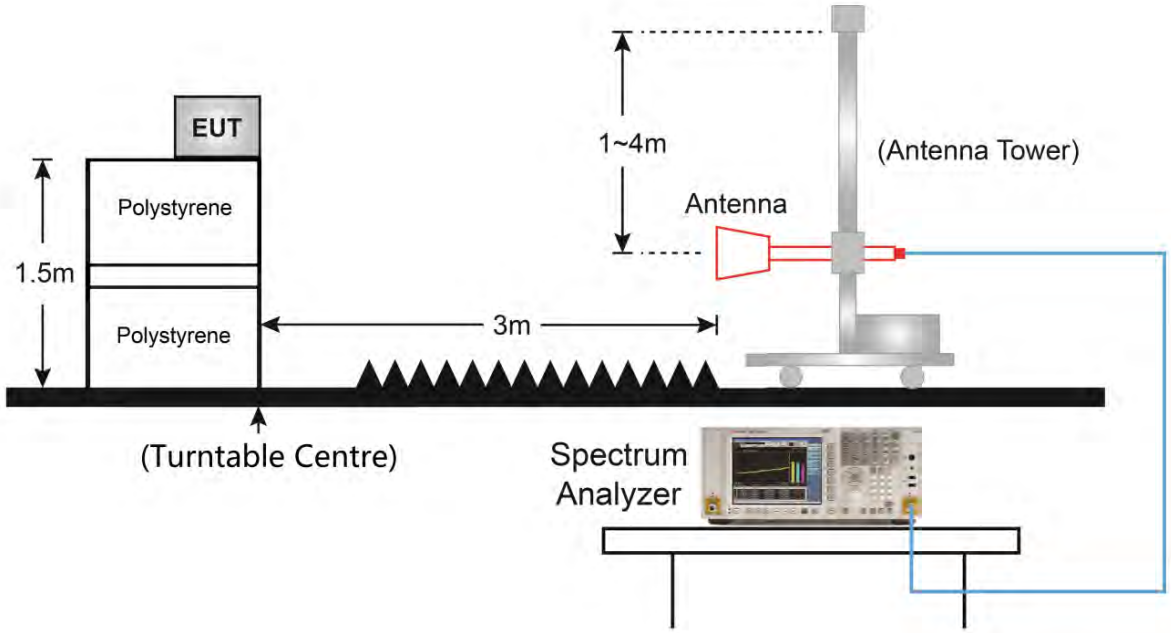
Peak Field Strength Measurements

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 Measurements above 1GHz (Method VB)

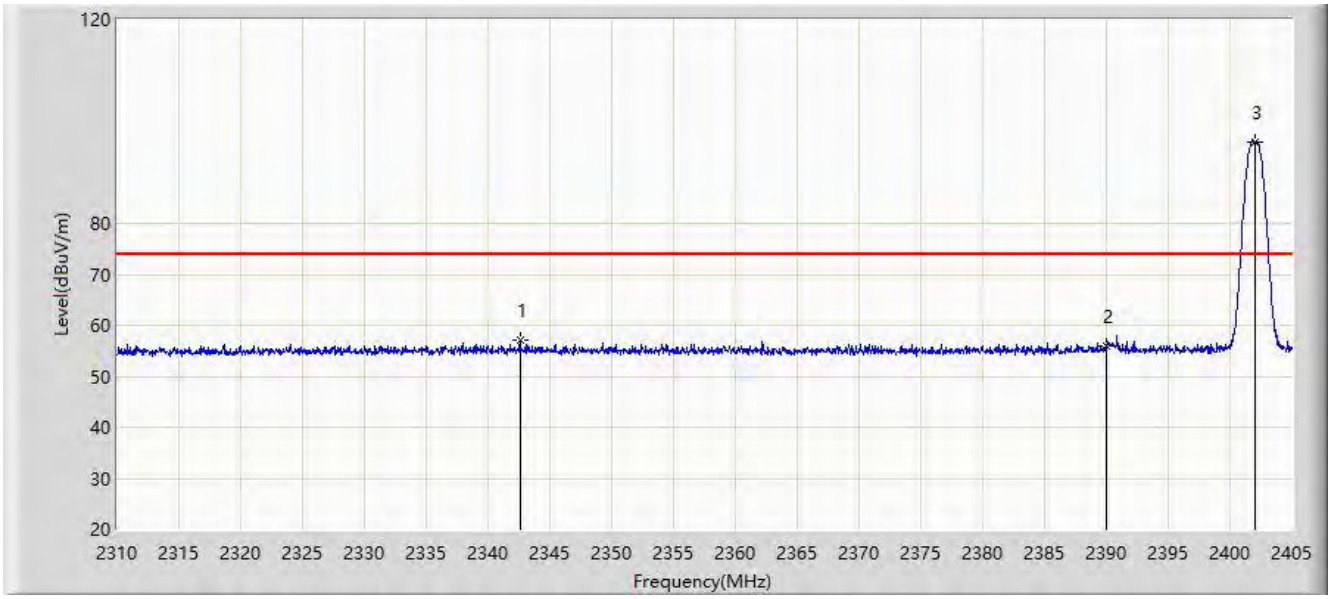
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; If the EUT is configured to transmit with duty cycle ≥ 98%, set VBW = 10Hz
4. If the EUT duty cycle is < 98%, set VBW ≥ 1/T. T is the minimum transmission duration
5. Detector = Peak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

5.10.4.Test Setup



5.10.5.Test Result

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2402MHz	

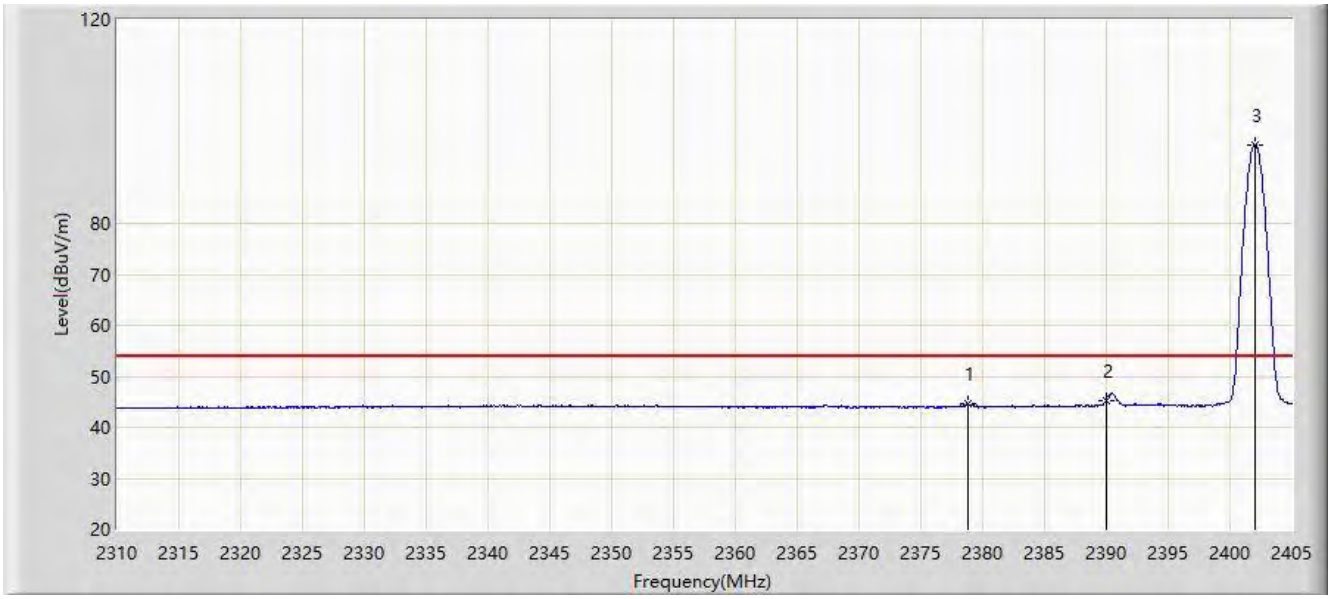


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1			2342.585	57.029	25.842	-16.971	74.000	31.187	PK
2			2390.000	56.071	25.168	-17.929	74.000	30.903	PK
3		*	2402.008	95.970	65.035	N/A	N/A	30.935	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2402MHz	

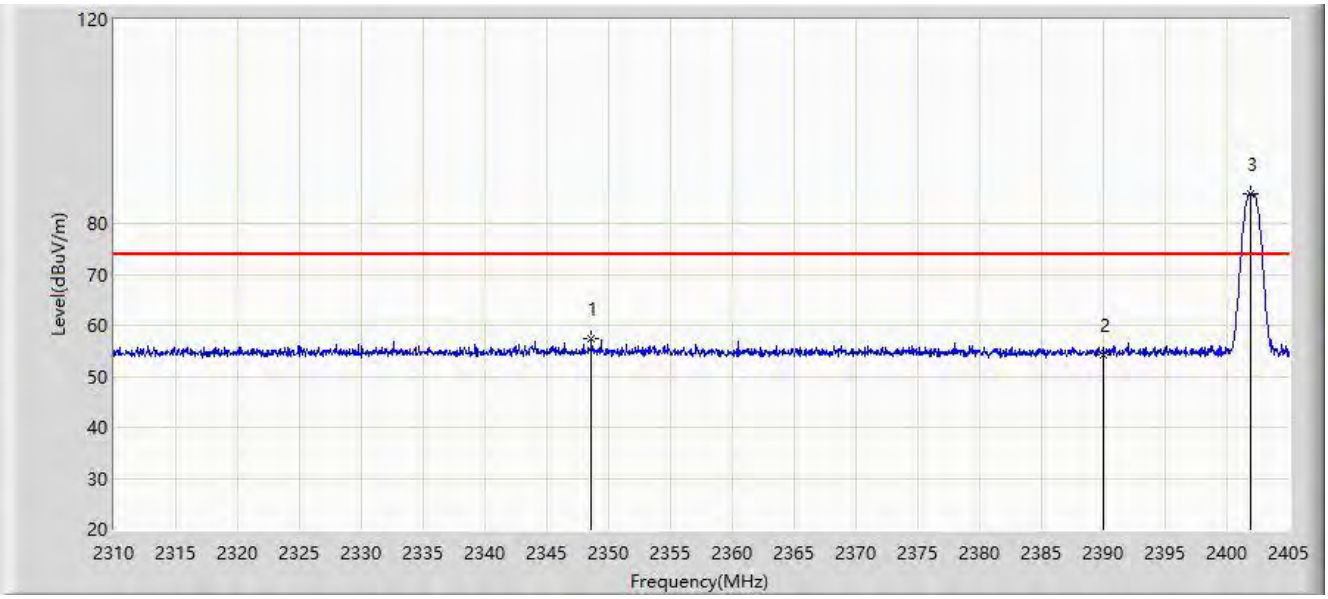


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2378.780	44.511	13.599	-9.489	54.000	30.913	AV
2			2390.000	45.361	14.458	-8.639	54.000	30.903	AV
3		*	2402.008	95.435	64.500	N/A	N/A	30.935	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2402MHz	

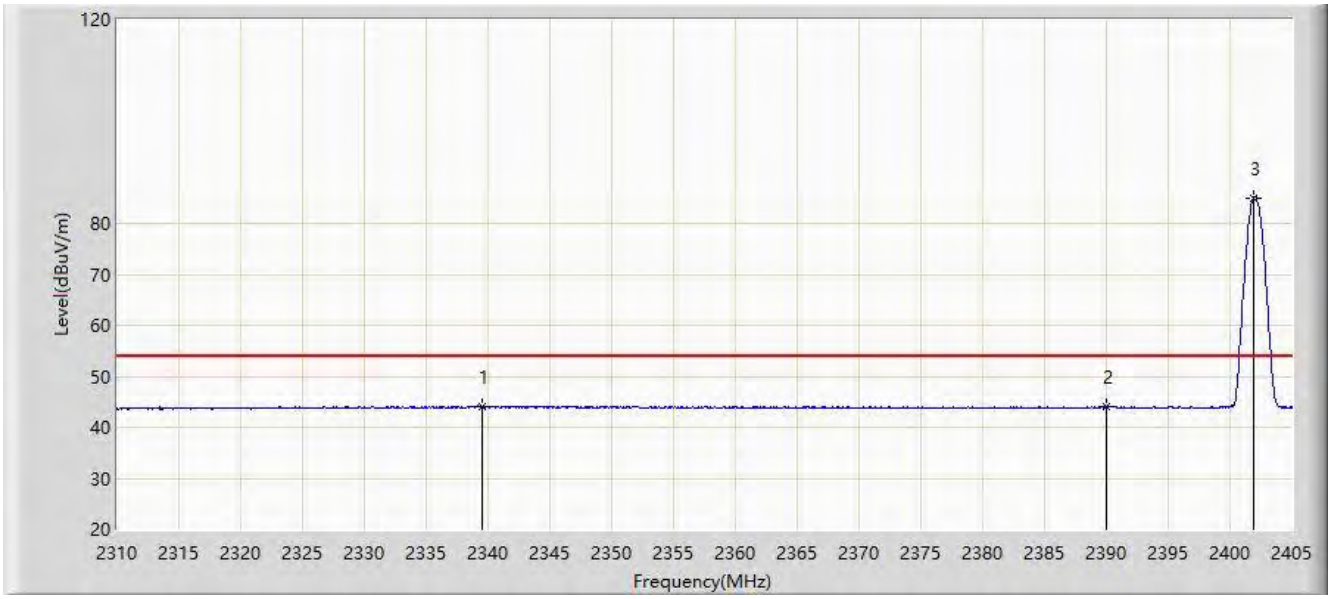


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2348.617	57.413	26.291	-16.587	74.000	31.122	PK
2			2390.000	54.268	23.365	-19.732	74.000	30.903	PK
3		*	2401.913	85.736	54.801	N/A	N/A	30.935	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2402MHz	

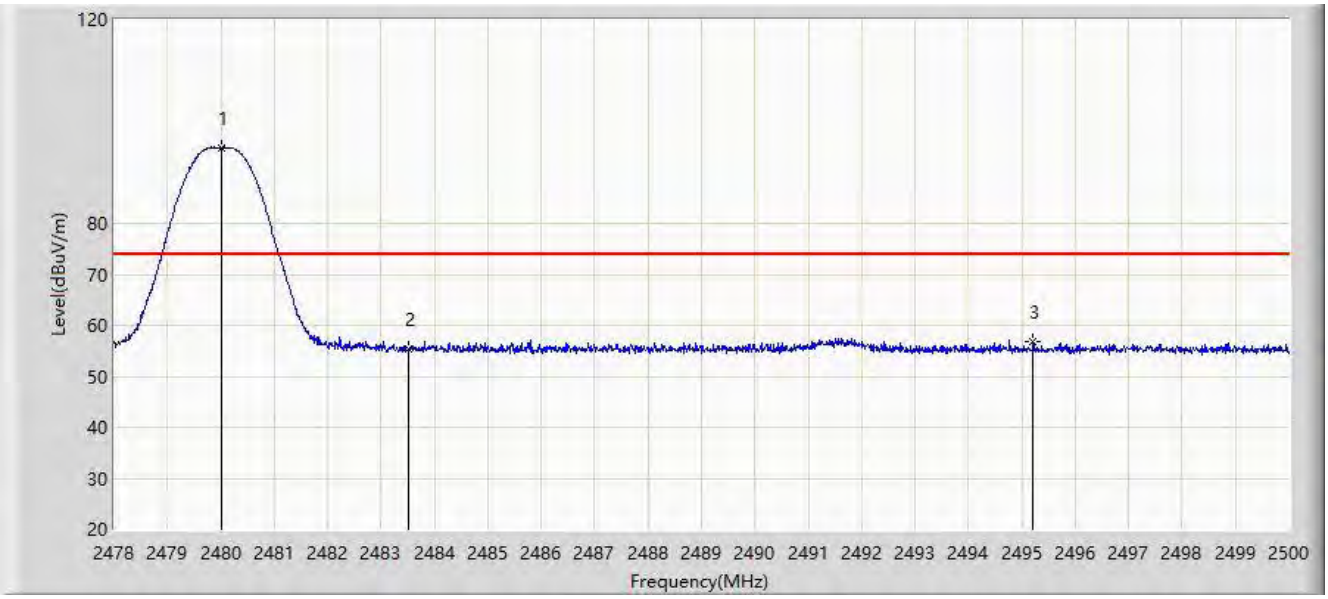


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2339.498	44.197	13.020	-9.803	54.000	31.176	AV
2			2390.000	43.945	13.042	-10.055	54.000	30.903	AV
3		*	2401.913	85.068	54.133	N/A	N/A	30.935	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2480MHz	

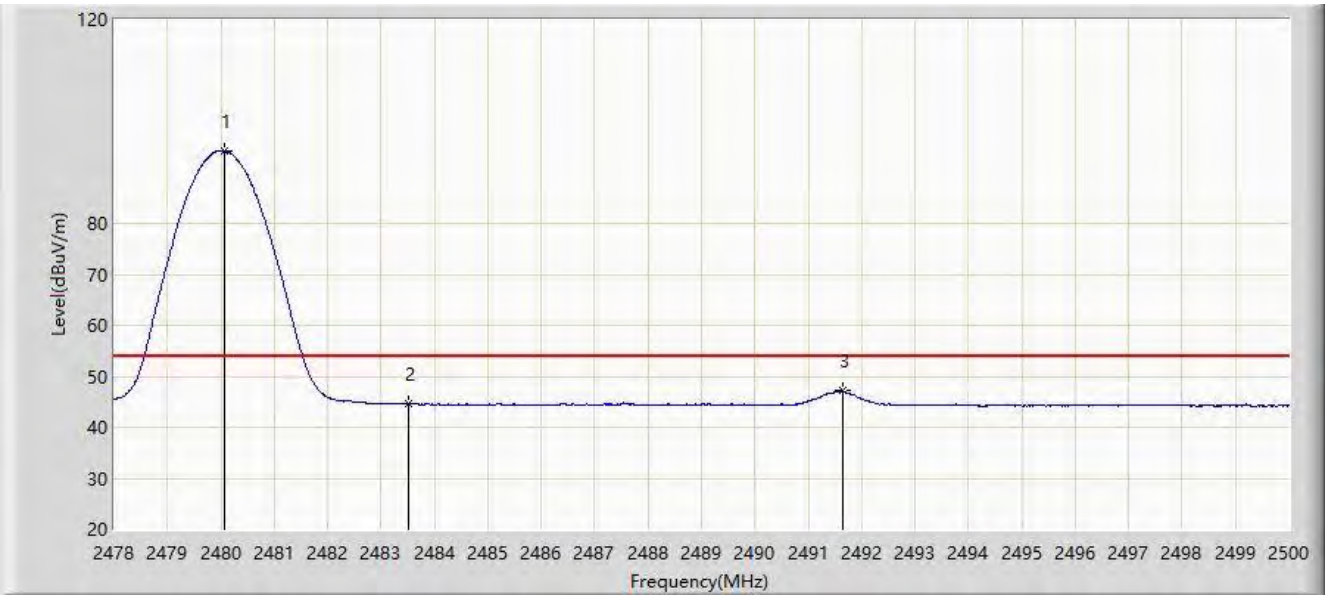


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.002	94.784	63.913	N/A	N/A	30.871	PK
2			2483.500	55.244	24.355	-18.756	74.000	30.889	PK
3			2495.204	56.927	25.980	-17.073	74.000	30.947	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2480MHz	

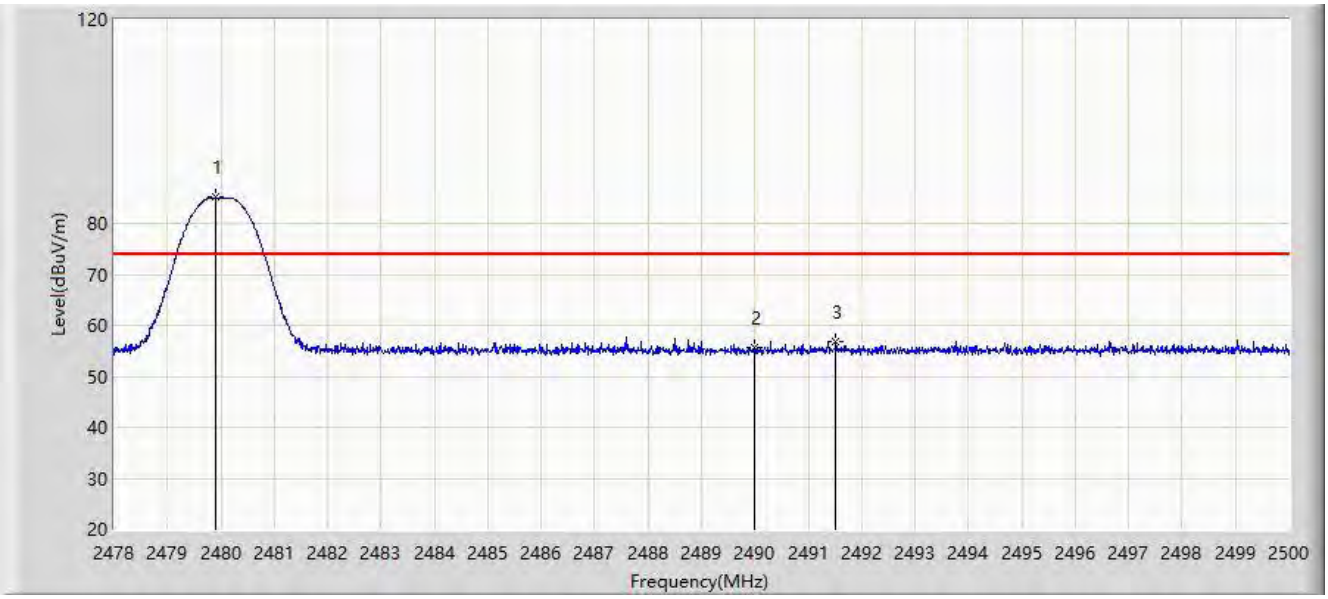


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.079	94.184	63.312	N/A	N/A	30.872	AV
2			2483.500	44.556	13.667	-9.444	54.000	30.889	AV
3			2491.640	47.189	16.260	-6.811	54.000	30.929	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2480MHz	

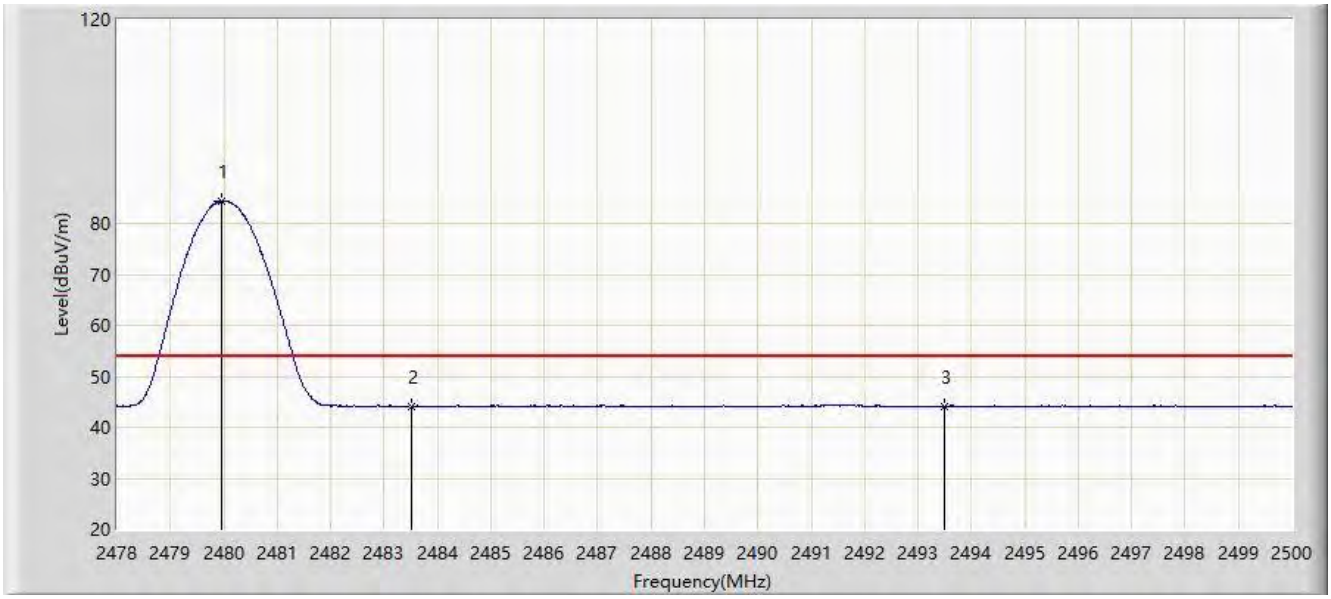


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2479.892	85.169	54.298	N/A	N/A	30.871	PK
2			2490.000	55.621	24.700	-18.379	74.000	30.921	PK
3			2491.519	56.874	25.945	-17.126	74.000	30.929	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by DH5 at channel 2480MHz	

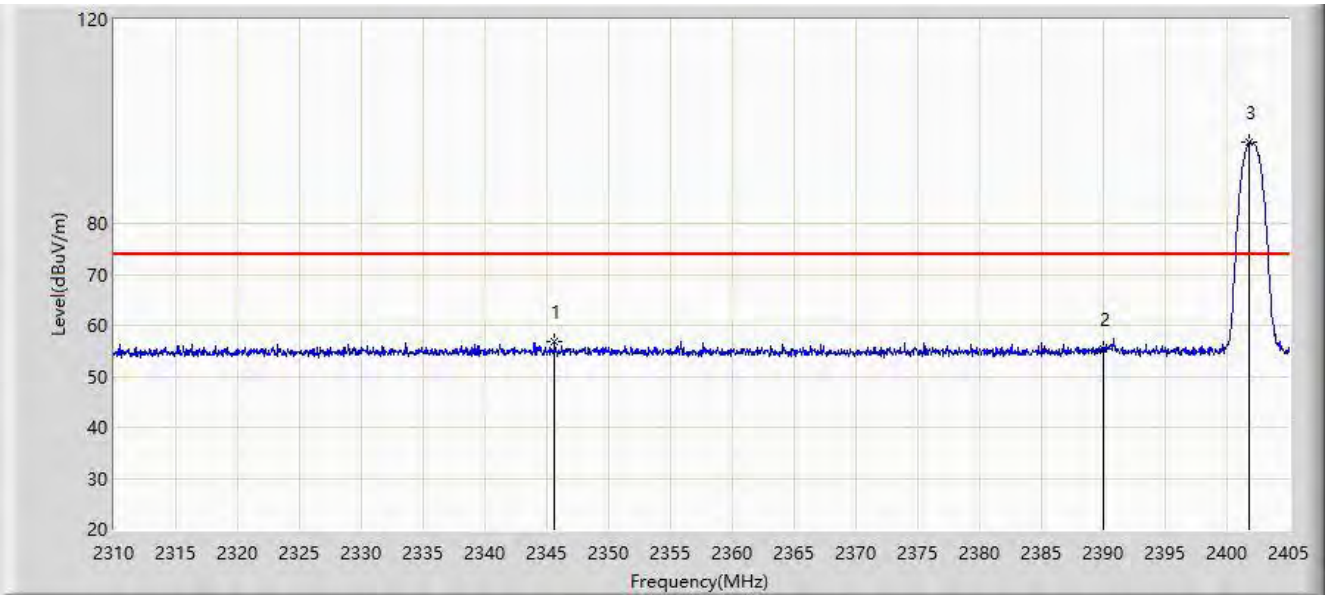


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2479.969	84.346	53.475	N/A	N/A	30.871	AV
2			2483.500	44.150	13.261	-9.850	54.000	30.889	AV
3			2493.488	44.102	13.163	-9.898	54.000	30.939	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2402MHz	

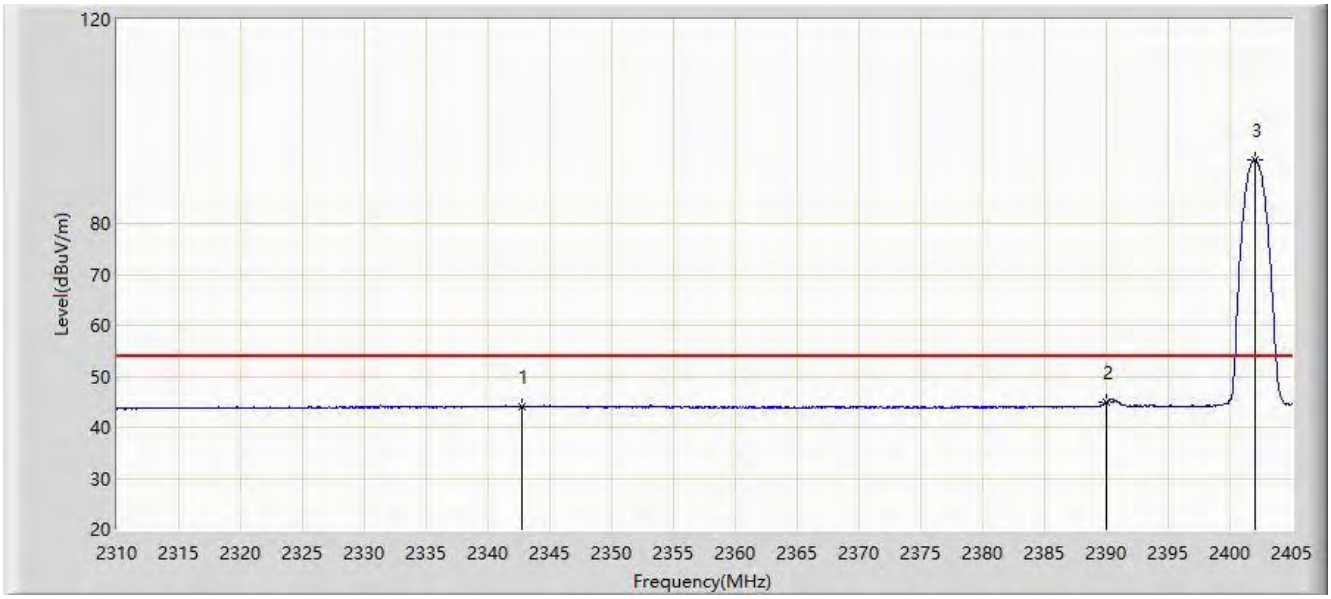


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2345.625	56.843	25.686	-17.157	74.000	31.157	PK
2			2390.000	55.428	24.525	-18.572	74.000	30.903	PK
3		*	2401.817	96.002	65.067	N/A	N/A	30.934	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2402MHz	

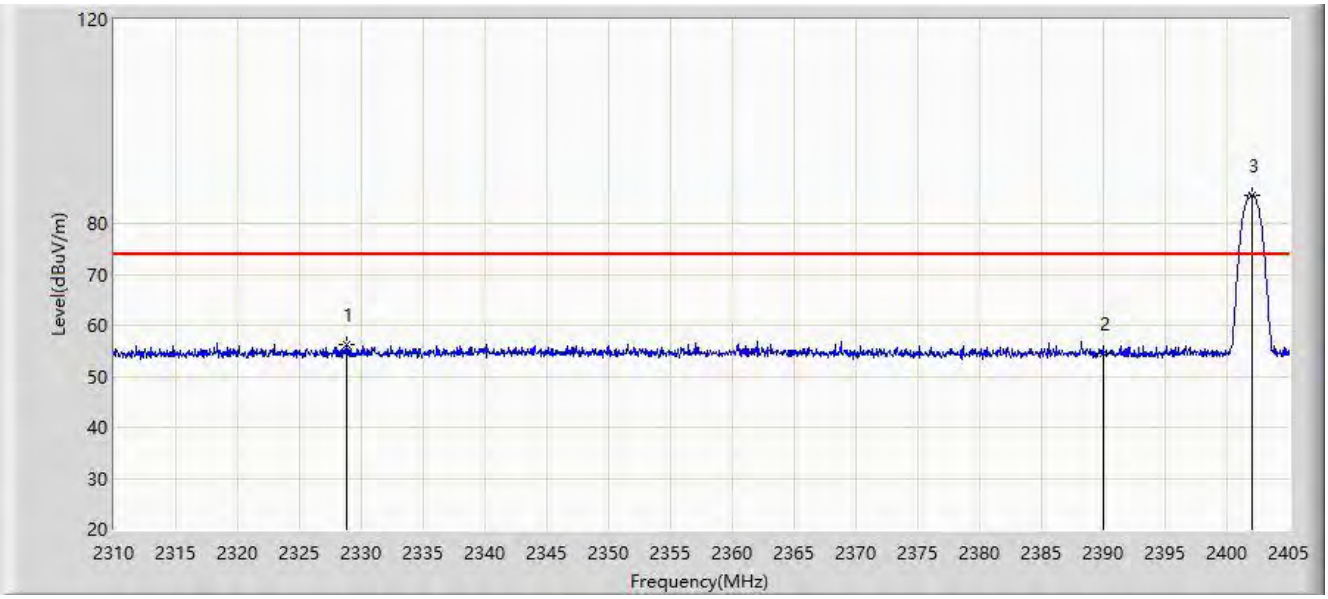


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2342.775	44.123	12.935	-9.877	54.000	31.188	AV
2			2390.000	44.951	14.048	-9.049	54.000	30.903	AV
3		*	2402.008	92.523	61.588	N/A	N/A	30.935	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2402MHz	

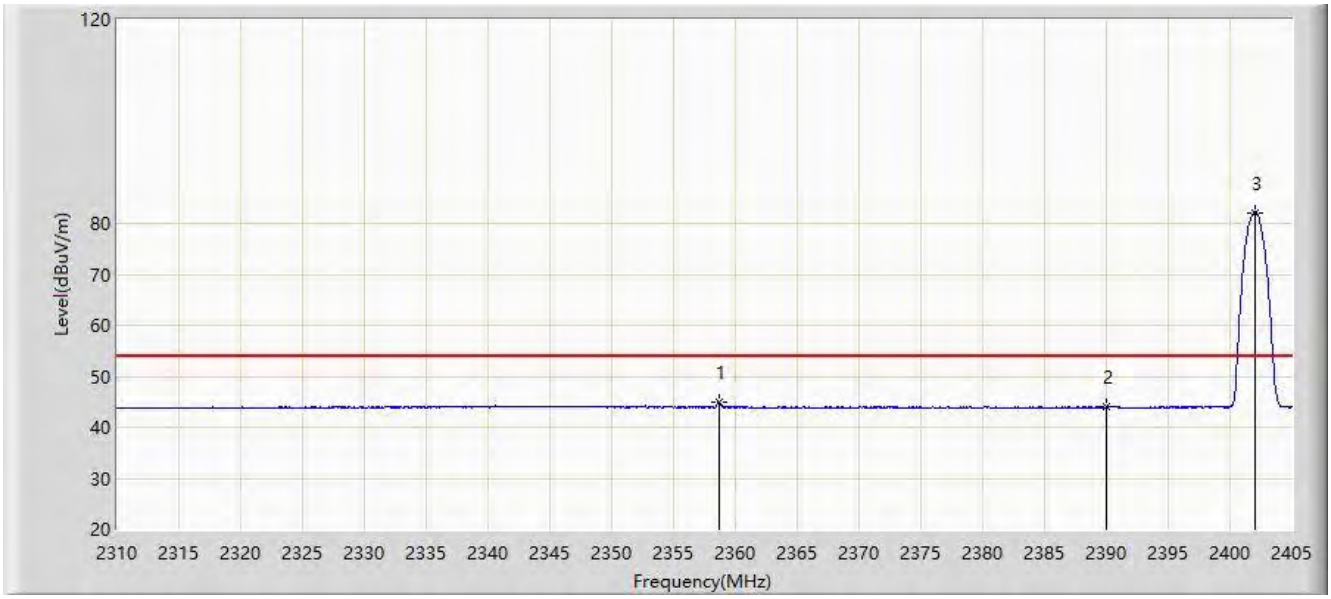


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2328.762	56.263	25.122	-17.737	74.000	31.140	PK
2			2390.000	54.538	23.635	-19.462	74.000	30.903	PK
3		*	2402.055	85.555	54.619	N/A	N/A	30.936	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2402MHz	

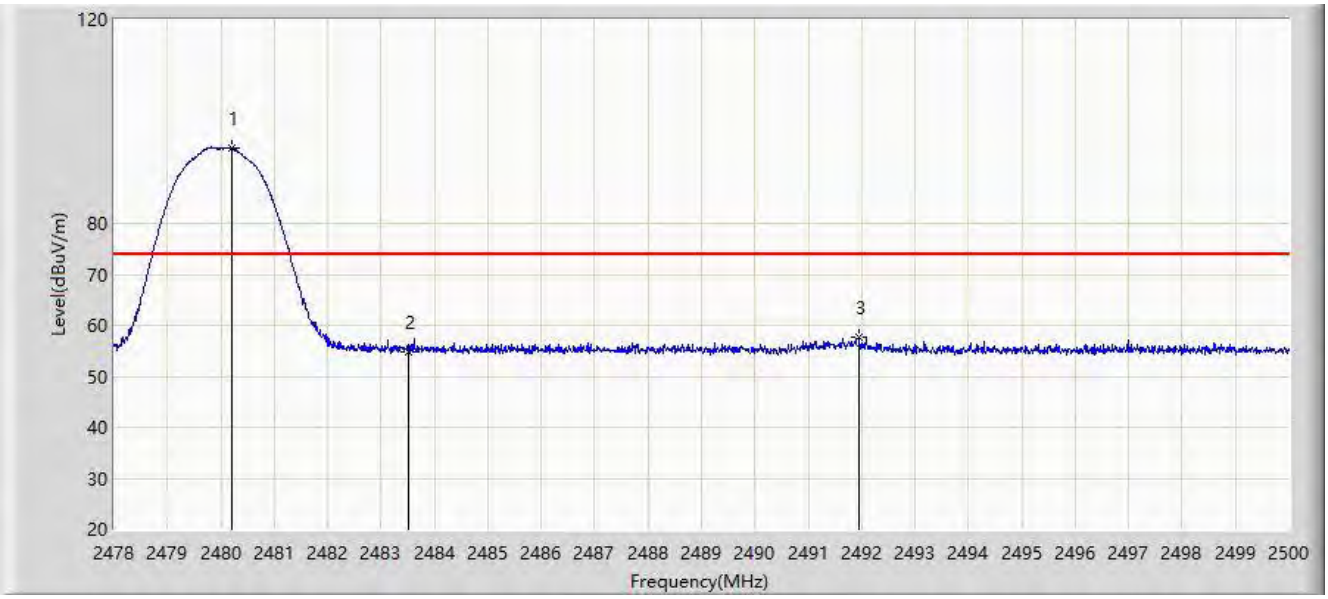


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2358.687	44.932	13.928	-9.068	54.000	31.004	AV
2			2390.000	43.939	13.036	-10.061	54.000	30.903	AV
3		*	2402.008	82.156	51.221	N/A	N/A	30.935	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2480MHz	

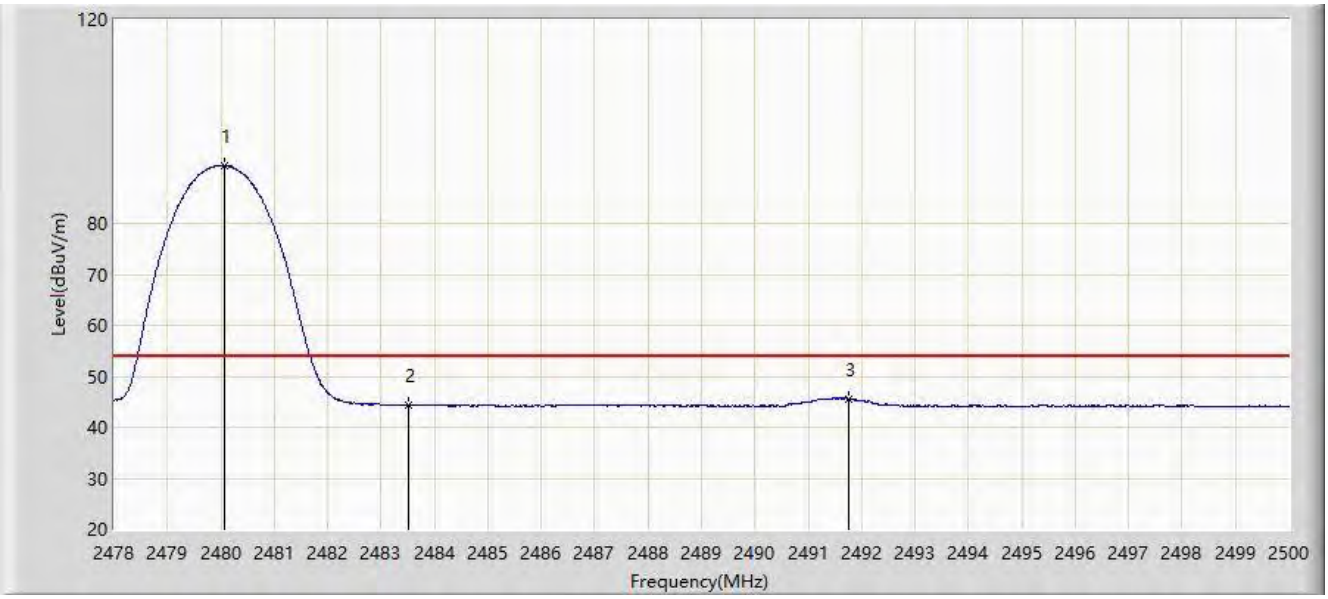


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.211	94.725	63.853	N/A	N/A	30.872	PK
2			2483.500	54.785	23.896	-19.215	74.000	30.889	PK
3			2491.959	57.641	26.710	-16.359	74.000	30.931	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2480MHz	

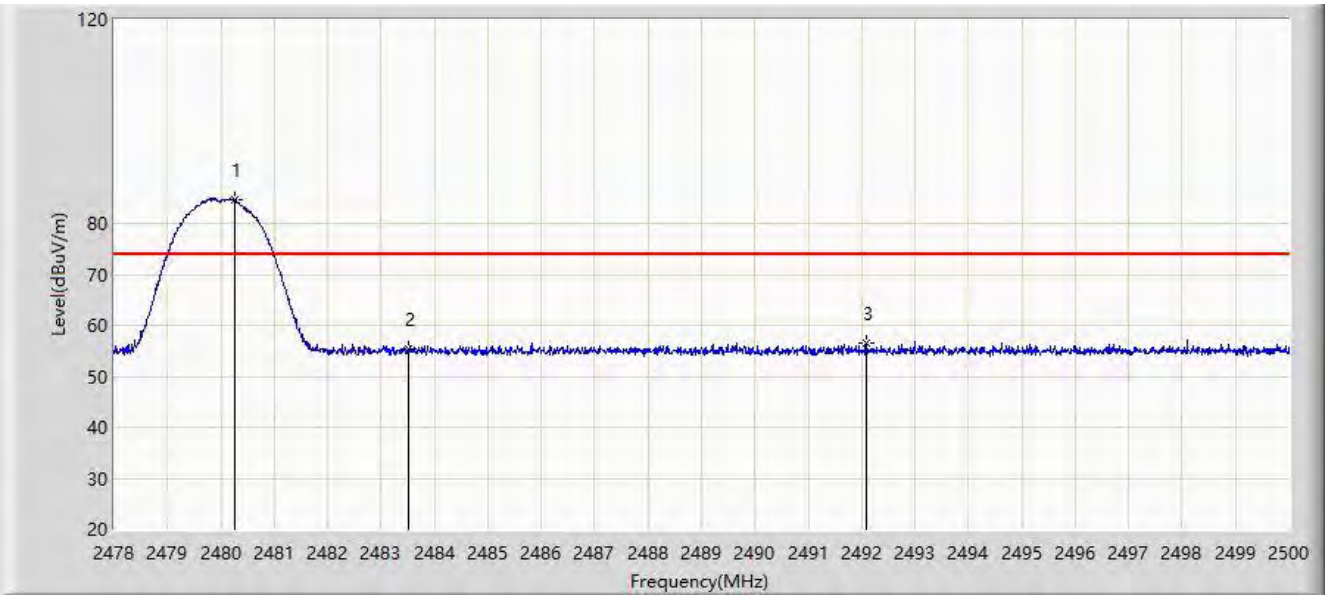


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		*	2480.079	91.296	60.424	N/A	N/A	30.872	AV
2			2483.500	44.364	13.475	-9.636	54.000	30.889	AV
3			2491.761	45.641	14.711	-8.359	54.000	30.930	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2480MHz	

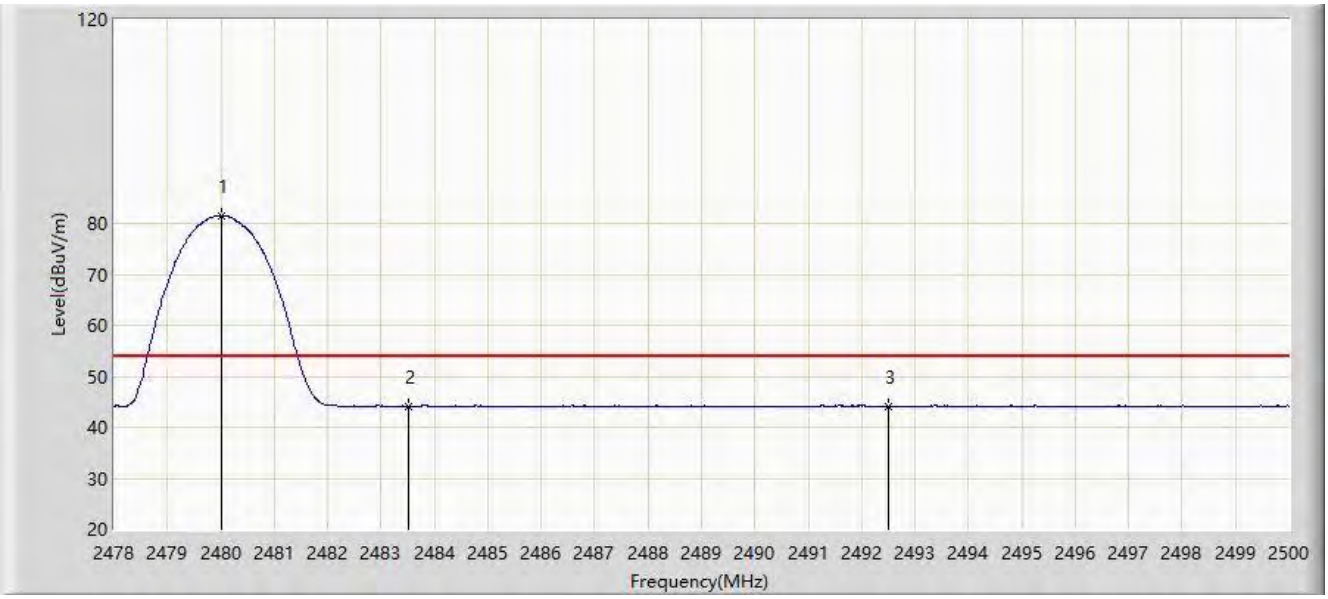


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.255	84.764	53.891	N/A	N/A	30.873	PK
2			2483.500	55.491	24.602	-18.509	74.000	30.889	PK
3			2492.080	56.666	25.734	-17.334	74.000	30.932	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 2DH5 at channel 2480MHz	

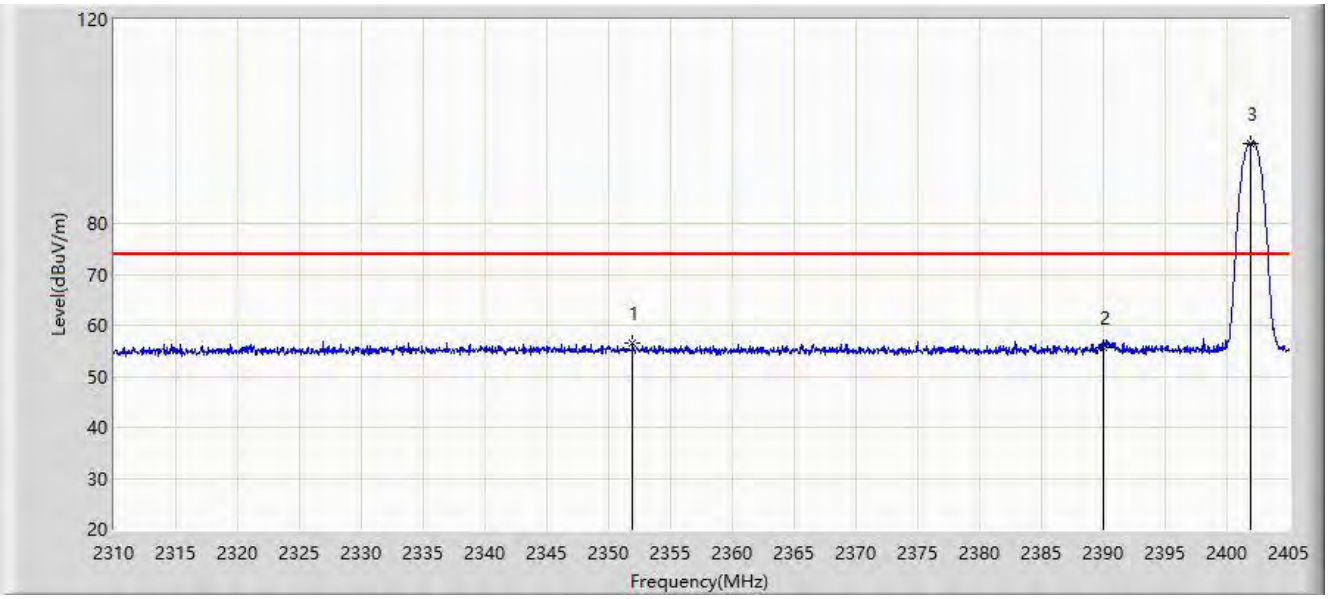


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.002	81.517	50.646	N/A	N/A	30.871	AV
2			2483.500	44.008	13.119	-9.992	54.000	30.889	AV
3			2492.509	44.080	13.146	-9.920	54.000	30.934	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	

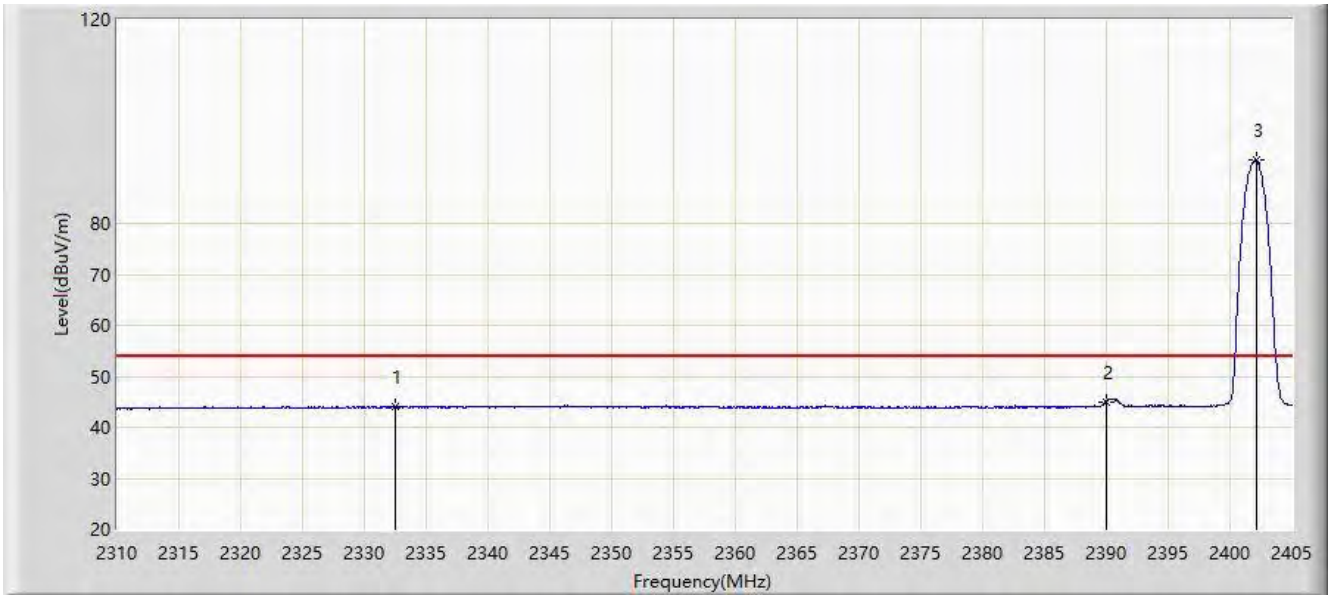


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2351.942	56.580	25.497	-17.420	74.000	31.083	PK
2			2390.000	55.708	24.805	-18.292	74.000	30.903	PK
3		*	2401.865	95.771	64.836	N/A	N/A	30.935	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	

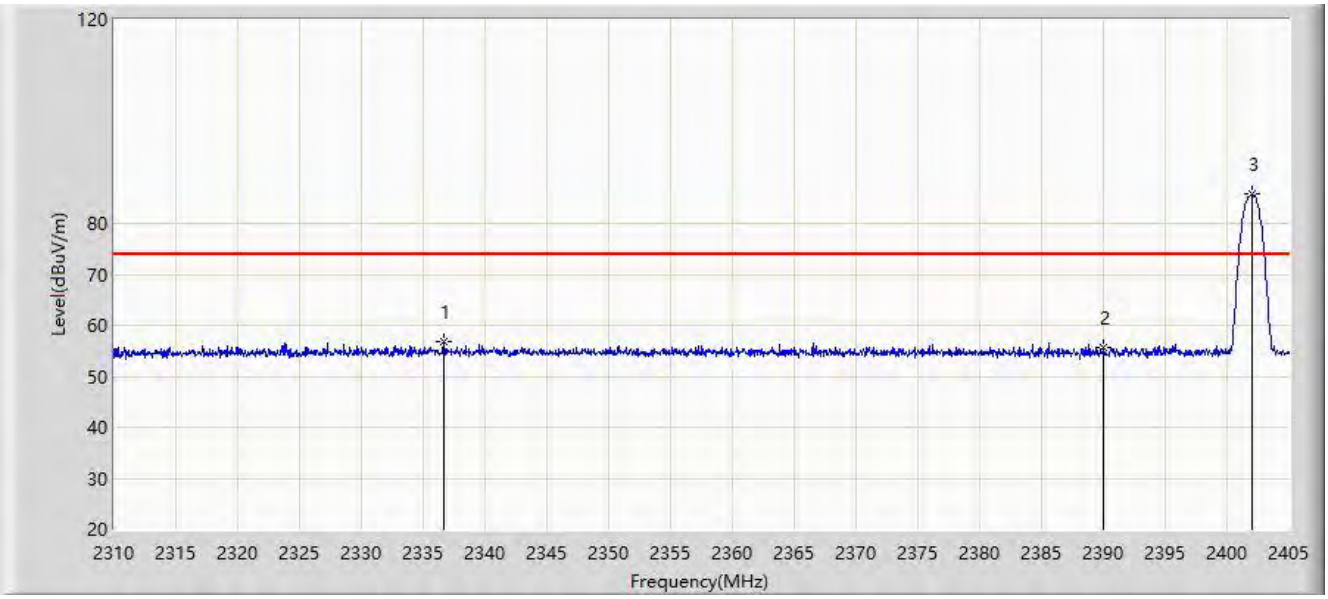


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2332.468	44.084	12.931	-9.916	54.000	31.153	AV
2			2390.000	44.975	14.072	-9.025	54.000	30.903	AV
3		*	2402.150	92.321	61.385	N/A	N/A	30.936	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	

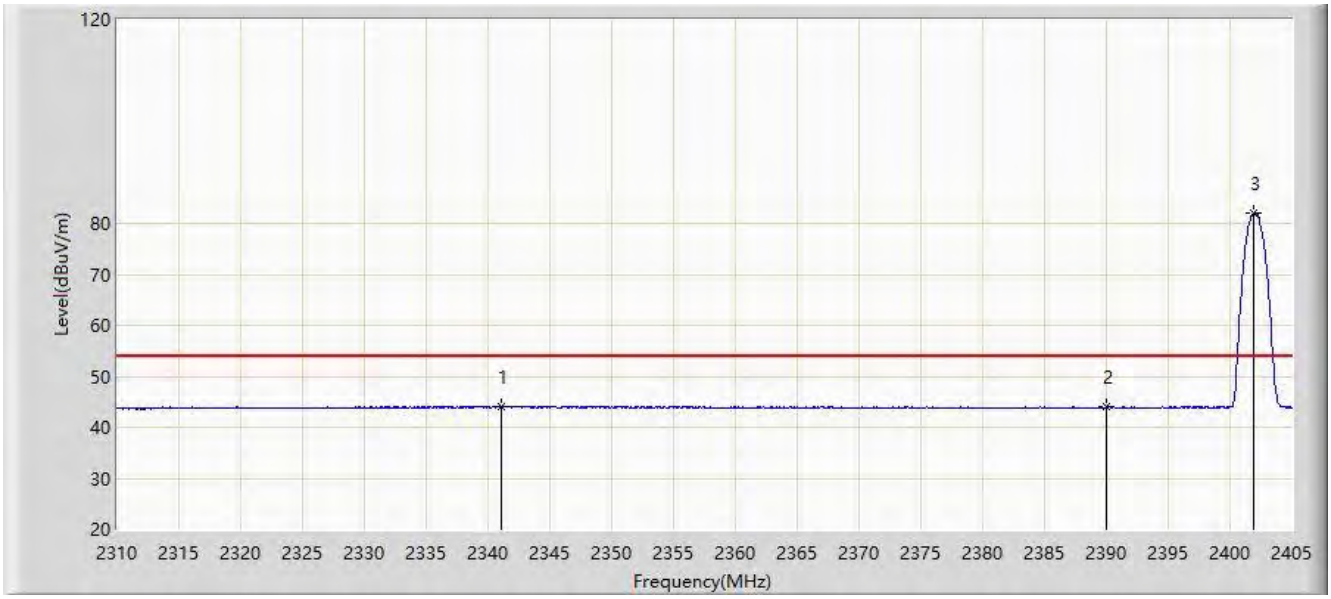


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2336.695	56.819	25.652	-17.181	74.000	31.167	PK
2			2390.000	55.652	24.749	-18.348	74.000	30.903	PK
3		*	2402.008	85.766	54.831	N/A	N/A	30.935	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	

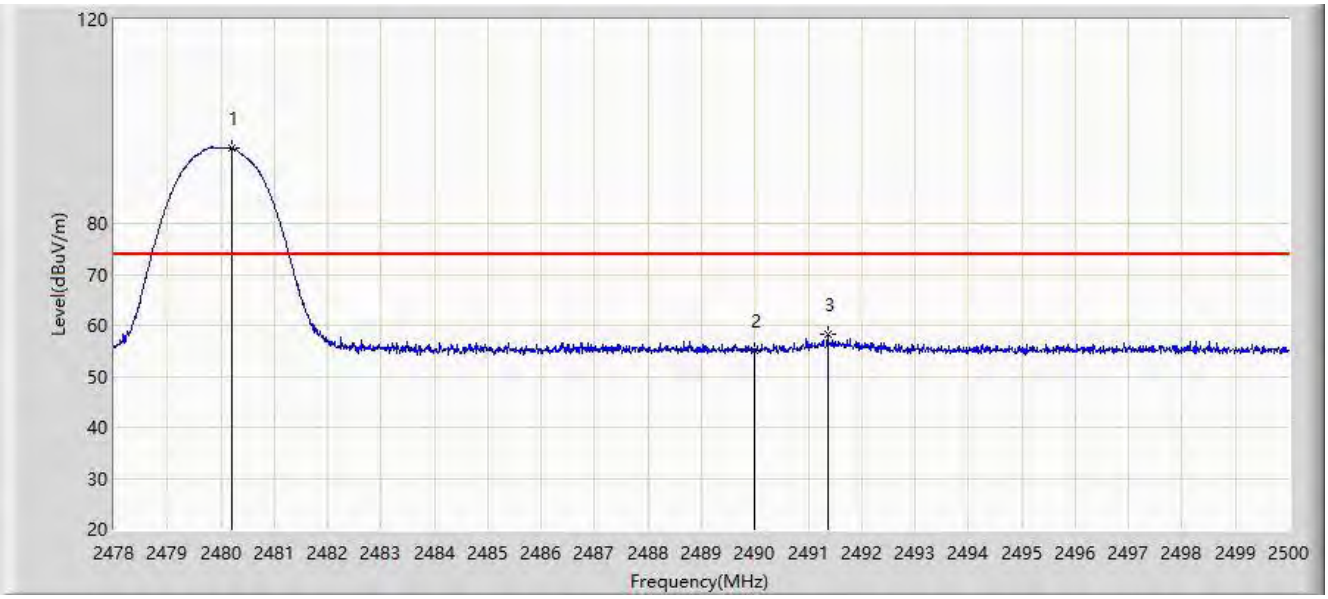


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1			2341.065	44.075	12.893	-9.925	54.000	31.181	AV
2			2390.000	43.952	13.049	-10.048	54.000	30.903	AV
3		*	2401.913	82.030	51.095	N/A	N/A	30.935	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2480MHz	

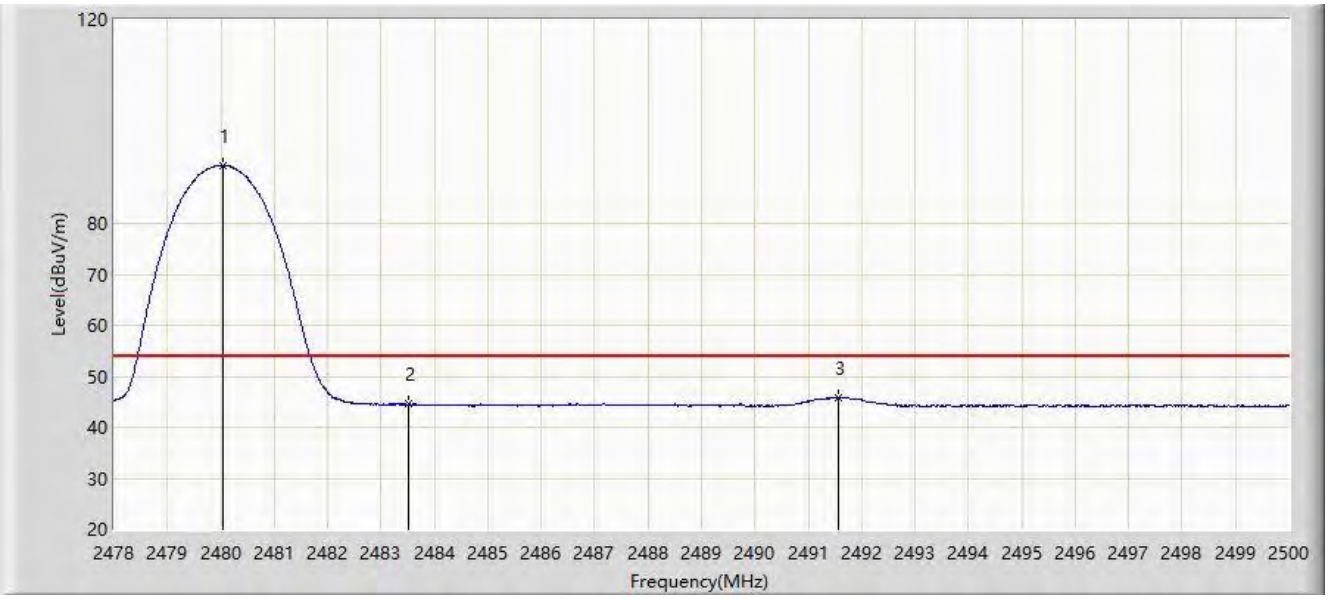


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		*	2480.211	94.709	63.837	N/A	N/A	30.872	PK
2			2490.000	55.031	24.110	-18.969	74.000	30.921	PK
3			2491.365	58.147	27.219	-15.853	74.000	30.928	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Horizontal
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2480MHz	

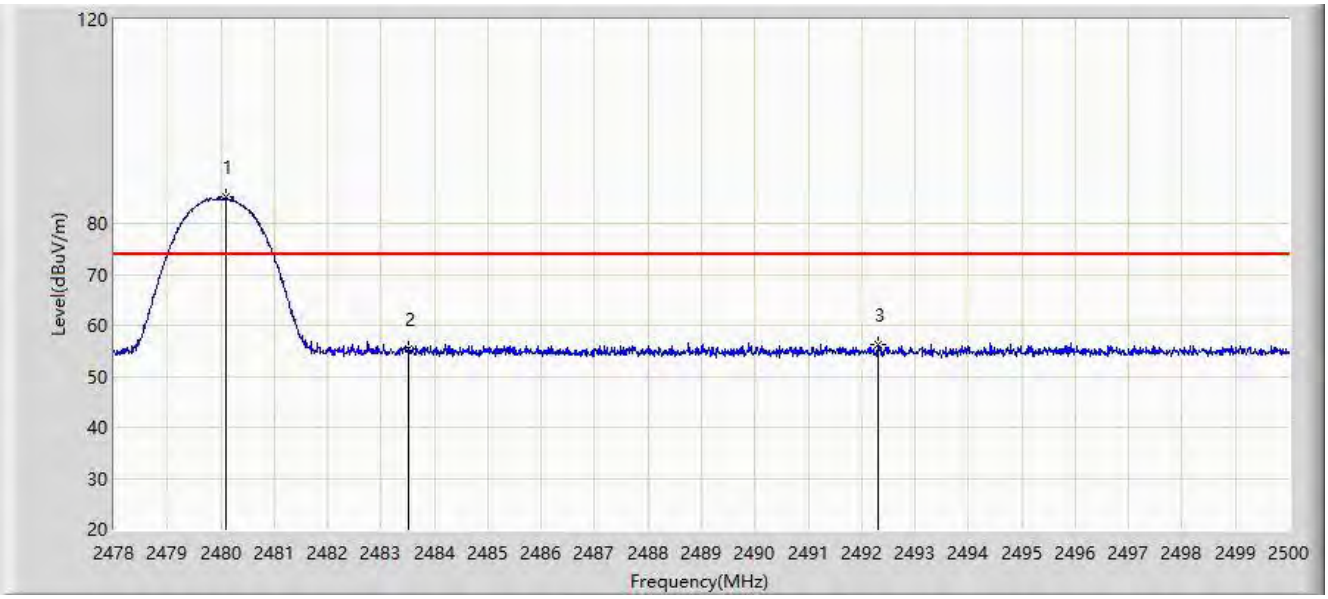


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		*	2480.046	91.362	60.490	N/A	N/A	30.872	AV
2			2483.500	44.494	13.605	-9.506	54.000	30.889	AV
3			2491.574	45.933	15.004	-8.067	54.000	30.929	AV

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2480MHz	

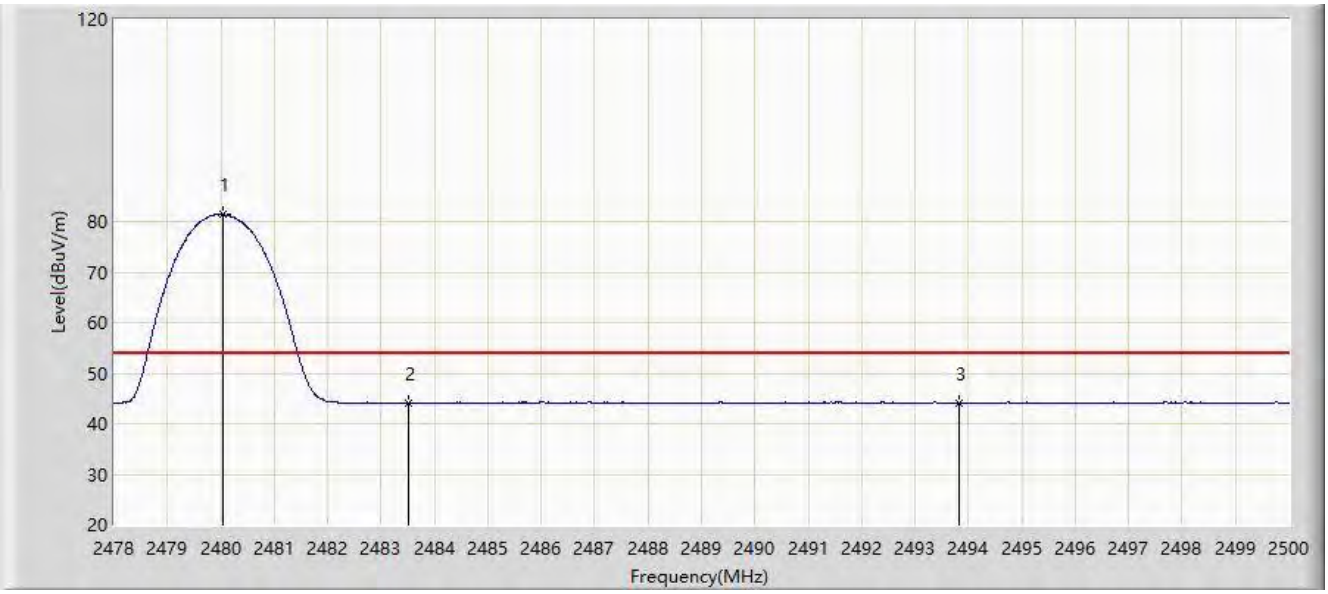


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV/m)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV/m)	Factor (dB/m)	Type
1		*	2480.090	85.086	54.214	N/A	N/A	30.872	PK
2			2483.500	55.299	24.410	-18.701	74.000	30.889	PK
3			2492.322	56.091	25.158	-17.909	74.000	30.933	PK

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

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

Site: NS-AC1	Time: 2022/01/15
Limit: FCC Part 15.209_RE(3m)	Engineer: Dillon Diao
Probe: NS-AC1_BBHA9120D	Polarity: Vertical
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2480MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1		*	2480.046	81.357	50.485	N/A	N/A	30.872	AV
2			2483.500	44.150	13.261	-9.850	54.000	30.889	AV
3			2493.829	44.070	13.130	-9.930	54.000	30.940	AV

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

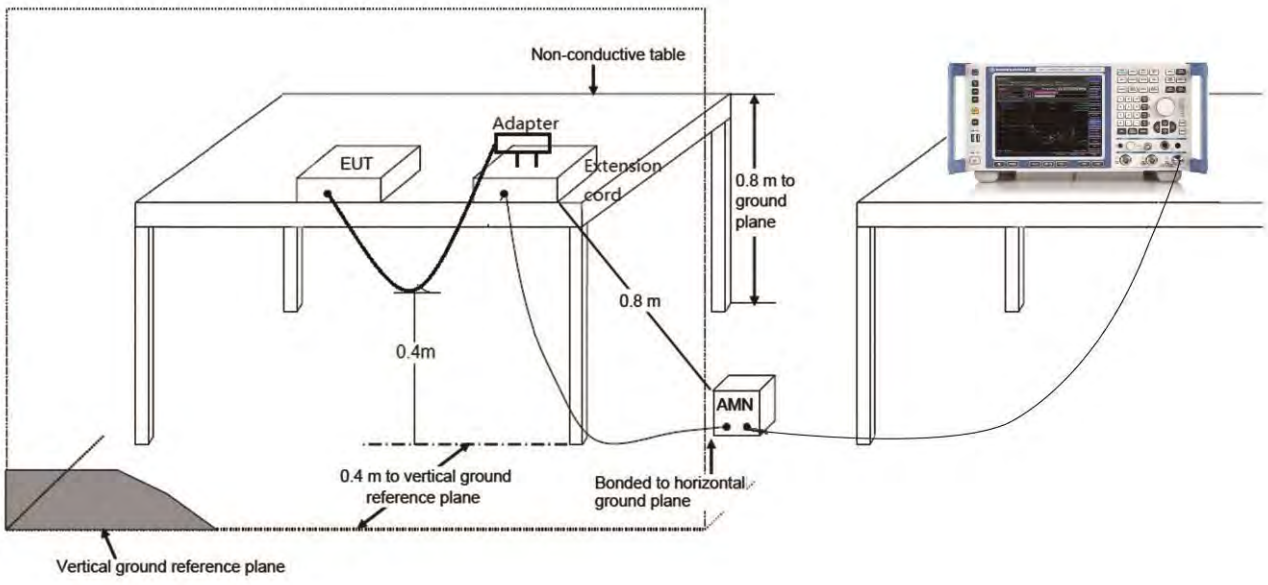
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m).

5.11. AC Conducted Emissions Measurement

5.11.1.Test Limit

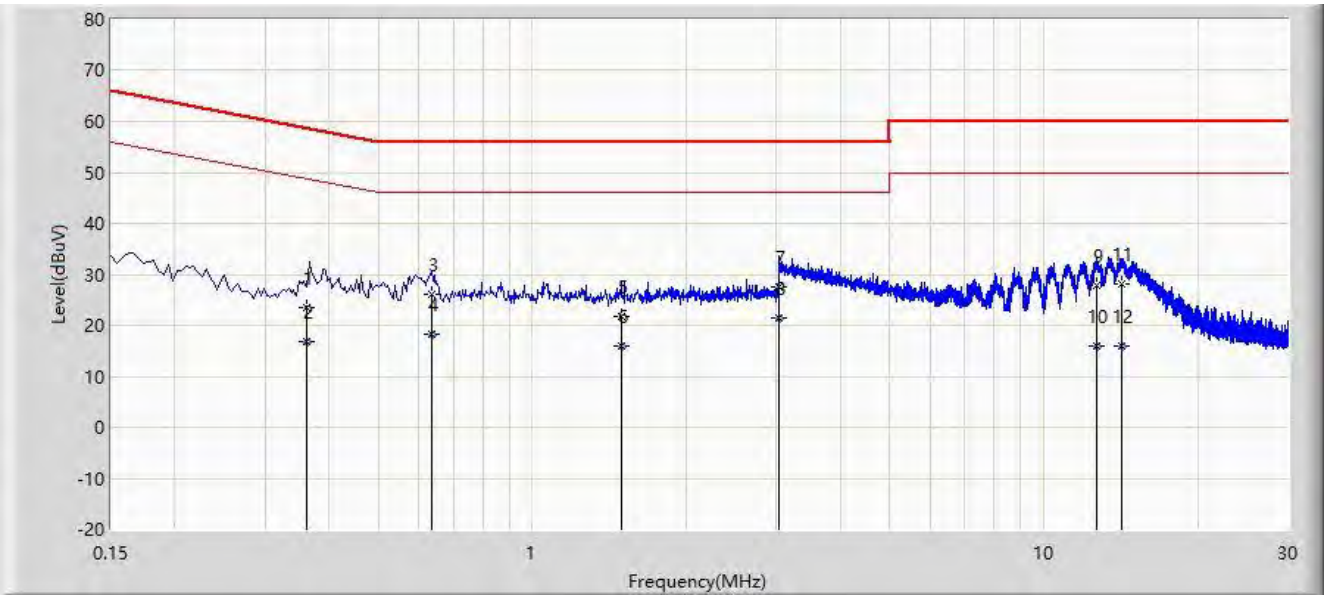
FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBμV)	Average (dBμV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50
Note 1: The lower limit shall apply at the transition frequencies. Note 2: The limit decreases linearly with the logarithm of the frequency in the range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

5.11.2.Test Setup



5.11.3.Test Result

Site: NS-SR2	Time: 2022/01/21
Temperature: 22.6°C	Humidity: 56%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Flag Yang
Probe: ENV216_102493_150kHz~30MHz	Polarity: Line
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	

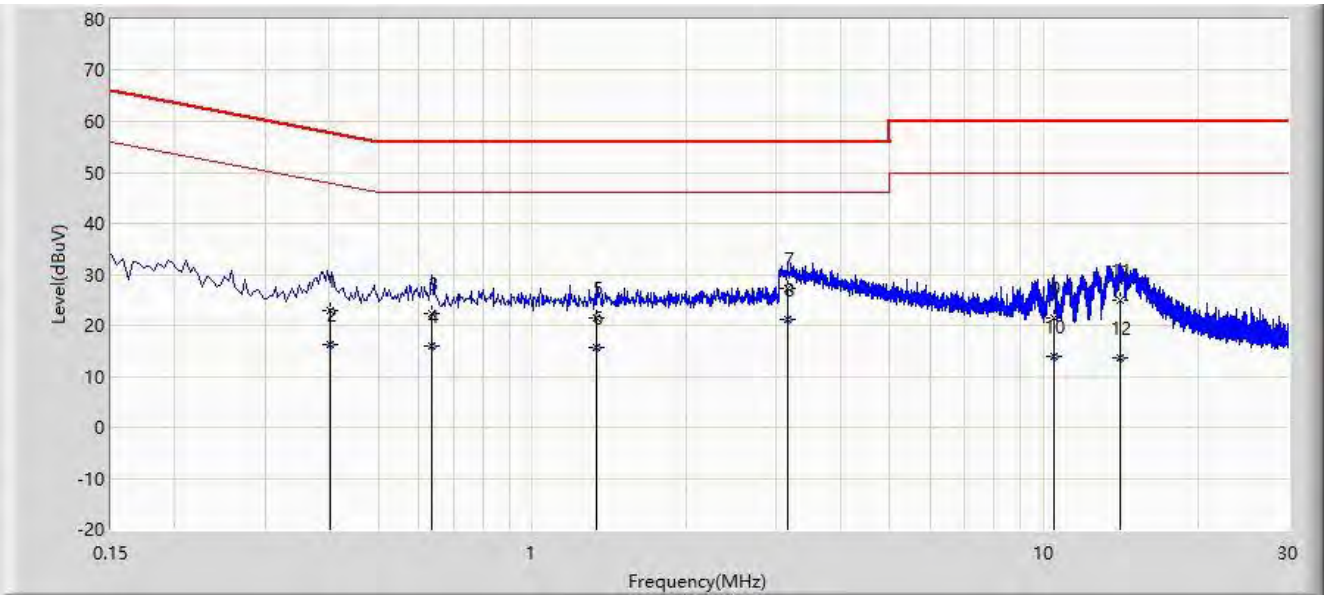


No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1			0.361	23.341	13.418	-35.359	58.700	9.922	QP
2			0.361	16.906	6.983	-31.794	48.700	9.922	AV
3			0.634	26.067	16.364	-29.933	56.000	9.703	QP
4			0.634	18.147	8.445	-27.853	46.000	9.703	AV
5			1.494	21.841	12.099	-34.159	56.000	9.742	QP
6			1.494	15.823	6.081	-30.177	46.000	9.742	AV
7			3.042	27.502	17.699	-28.498	56.000	9.803	QP
8		*	3.042	21.574	11.772	-24.426	46.000	9.803	AV
9			12.722	27.821	17.791	-32.179	60.000	10.030	QP
10			12.722	15.863	5.833	-34.137	50.000	10.030	AV
11			14.150	28.238	18.190	-31.762	60.000	10.048	QP
12			14.150	15.823	5.775	-34.177	50.000	10.048	AV

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

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

Site: NS-SR2	Time: 2022/01/21
Temperature: 22.6°C	Humidity: 56%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Flag Yang
Probe: ENV216_102493_150kHz~30MHz	Polarity: Neutral
EUT: Portable Bluetooth Speaker	Power: AC 120V/60Hz
Test Mode: Transmit by 3DH5 at channel 2402MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1			0.402	22.784	13.113	-35.029	57.813	9.671	QP
2			0.402	16.179	6.509	-31.633	47.813	9.671	AV
3			0.634	22.220	12.578	-33.780	56.000	9.643	QP
4			0.634	16.061	6.419	-29.939	46.000	9.643	AV
5			1.330	21.501	11.823	-34.499	56.000	9.678	QP
6			1.330	15.747	6.070	-30.253	46.000	9.678	AV
7			3.150	27.158	17.412	-28.842	56.000	9.747	QP
8		*	3.150	21.196	11.450	-24.804	46.000	9.747	AV
9			10.498	21.349	11.308	-38.651	60.000	10.041	QP
10			10.498	13.913	3.872	-36.087	50.000	10.041	AV
11			14.122	24.819	14.696	-35.181	60.000	10.123	QP
12			14.122	13.705	3.582	-36.295	50.000	10.123	AV

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

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

Appendix A - Test Setup Photograph

Refer to “2110RSU015-UT” file.

Appendix B - EUT Photograph

Refer to “2110RSU015-UE” file.