



RF MEASUREMENT REPORT

FCC ID: 2AU47-00005
Applicant: Tonies US, Inc.
Product: Toniebox 2
Model No.: 10005
Brand Name: Tonies
FCC Classification: Unlicensed National Information Infrastructure (NII)
FCC Rule Part(s): Part 15 Subpart E (Section 15.407)
Result: Complies
Received Date: 2024-10-31
Test Date: 2024-12-18 ~ 2025-01-17

Reviewed By:

Denise Zhou

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 KDB789033. 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
2410RSU073-U6	V01	Initial Report	2025-03-31	Invalid
2410RSU073-U6	V01	Update product brand name	2025-05-09	Valid

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1. General Information

1.1. Applicant

Tonies US, Inc.

3000 El Camino Real Building 4, Suite 200, Palo Alto CA 94306

1.2. Manufacturer

Tonies US, Inc.

3000 El Camino Real Building 4, Suite 200, Palo Alto CA 94306

1.3. Testing Facility

☒	Test Site – MRT Suzhou Laboratory
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	Laboratory Location (Suzhou - Wujiang) Building 1, No.1 Xingdong Road, Wujiang, Suzhou, Jiangsu, People's Republic of China
	Laboratory Accreditations
	A2LA: 3628.01 CNAS: L10551 FCC: CN1166 ISED: CN0001
	VCCI: ☐ R-20025 ☐ G-20034 ☐ C-20020 ☐ T-20020 ☐ R-20141 ☐ G-20134 ☐ C-20103 ☐ T-20104
☐	Test Site – MRT Shenzhen Laboratory
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 CNAS: L10551 FCC: CN1284 ISED: CN0105
☐	Test Site – MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: 3261 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	Toniebox 2
Model No.	10005
EUT Identification No.	20241113Sample#03 (Radiated) 20241217Sample#99 (Conducted)
HW Version	Main board for CE test: V2.0.O.1 UX-Board for CE test: 1.0.H.6
SW Version	For Conducted Emission test: hw-verify-cert-v0.28.0 Except for Conducted Emission test: hw-verify-cert-v0.26.0
Wi-Fi Specification	802.11a/b/g/n
NFC Specification	13.56MHz
Bluetooth Specification	Bluetooth 5.2 (Dual Mode)
Antenna Information	Refer to Section 1.7
Power Type	By Battery
Accessory	
Rechargeable Li-ion Battery	Model No.: ITR26700 Nominal Voltage: 3.2V Rated Capacity: 4000mAh 12.8Wh Limited Charge Voltage: 3.65V
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 under Test

Frequency Range	For 802.11a/n-HT20: 5180~5240MHz For 802.11n-HT40: 5190~5230MHz
Type of Modulation	802.11a/n: OFDM
Data Rate	802.11a: 6/9/12/18/24/36/48/54Mbps 802.11n: up to 150Mbps

1.6. Working Frequencies

802.11a/n-HT20

Channel	Frequency	Channel	Frequency	Channel	Frequency
36	5180 MHz	40	5200 MHz	44	5220 MHz
48	5240 MHz	--	--	--	--

802.11n-HT40

Channel	Frequency	Channel	Frequency	Channel	Frequency
38	5190 MHz	46	5230 MHz	--	--

1.7. Antenna Details

Antenna Type	Frequency (MHz)	Antenna Gain (dBi)
PCB Antenna	2400 ~ 2483.5	3.4
	5150 ~ 5250	6.6

2. Test Configuration

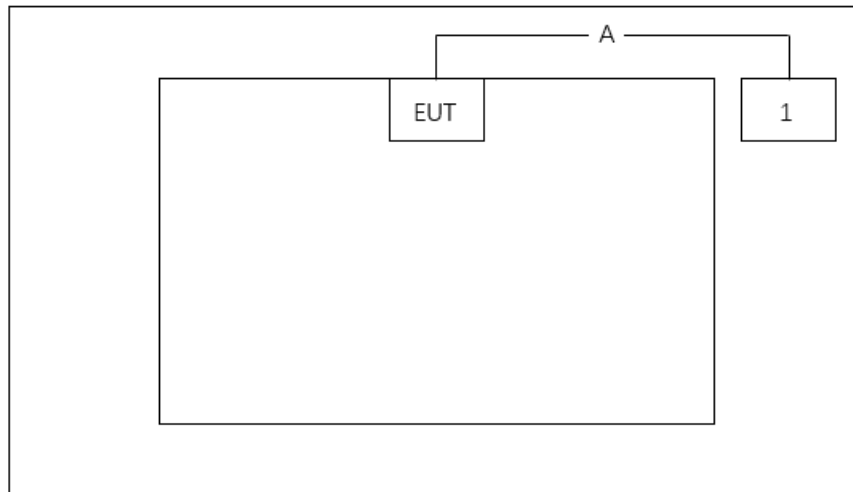
2.1. Test Mode

Mode 1: Transmit by 802.11a (6Mbps)
Mode 2: Transmit by 802.11n-HT20 (MCS0)
Mode 3: Transmit by 802.11n-HT40 (MCS0)
Note: The modulation and the data rate picked for testing are determined by the Max. RF conducted power.

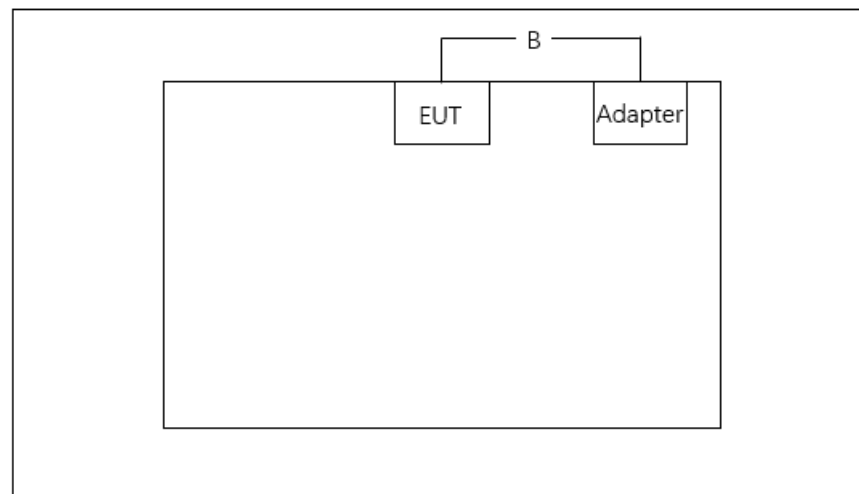
2.2. Test System Connection Diagram

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 emissions testing



Connection Diagram - AC line conducted testing



Cable Type		Cable Description	Length
A	USB Cable	Shielded	>10m
B	USB Cable	Shielded	0.13m
Product		Manufacturer	Model No.
1	Notebook	Lenovo	E430C

2.3. Test Software

The test utility software used during testing was “DutApiSisoBtUart.exe”, and the version was 1.0.0.17.

Final power setting please refer to operational description.

2.4. Applied Standards

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

- FCC Part 15.407
- KDB 789033 D02v02r01
- 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
Thermohygrometer	testo	608-H1	MRTSUE06402	1 year	2025-05-12	WZ-SR5
Shielding Room	HUAMING	WZ-SR5	MRTSUE06442	N/A	N/A	WZ-SR5
Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2025-05-08	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11079	1 year	2025-06-05	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11085	1 year	2025-06-05	WZ-SR5
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2025-05-08	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2025-05-12	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2025-09-05	WZ-SR2
TRILOG Antenna	Schwarzbeck	VULB 9162	MRTSUE06022	1 year	2025-04-17	WZ-AC2
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2025-05-08	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06171	1 year	2025-09-23	WZ-AC2
Preamplifier	Schwarzbeck	BBV 9718	MRTSUE06176	1 year	2025-05-06	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2025-04-18	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11263	1 year	2025-10-16	WZ-AC2
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06597	1 year	2025-11-03	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2025-01-11	WZ-AC1
Preamplifier	EMCI	EMC184045SE	MRTSUE06640	1 year	2026-01-09	WZ-AC1
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2025-12-05	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2025-07-26	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9170	MRTSUE06024	1 year	2025-09-23	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2025-11-08	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2025-05-15	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2025-04-19	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2025-10-13	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2025-01-27	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2025-10-16	WZ-AC1

Software	Version	Function
e3	230711	RE & CE
BenchVue Power Meter	2018.1	Power
Controller_MF 7802	1.02	RE Antenna & Turntable
Controller_MF 7802	2.03C	RE Antenna & Turntable

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
The maximum measurement uncertainty is evaluated as: 9kHz~150kHz: 3.02dB 150kHz~30MHz: 2.56dB
Radiated Emission Measurement
The maximum measurement uncertainty is evaluated as: Coaxial: 9kHz~30MHz: 2.35dB Coplanar: 9kHz~30MHz: 2.37dB Horizontal: 30MHz~200MHz: 3.46dB 200MHz~1GHz: 3.78dB 1GHz~40GHz: 4.97dB Vertical: 30MHz~200MHz: 4.07dB 200MHz~1GHz: 5.28dB 1GHz~40GHz: 4.78dB
Spurious Emissions, Conducted
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.5dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 1.3dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.5dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 2.6%

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.407(a)	26dB & 99% Bandwidth	Conducted	Pass
15.407(a)(1)(iv)	Maximum Conducted Output Power		Pass
15.407(g)	Frequency Stability		Pass
15.407(a)(1)(iv)	Peak Power Spectral Density		Pass
15.407(b)(1)	Undesirable Emissions	Radiated	Pass
15.205, 15.209 15.407(b)(8), (9), (10)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass

Remark:

1. The analyzer plots shown in this section were captured using a correction table to account for cable and attenuator losses in the system connecting the EUT to the analyzer across relevant frequencies.
2. For radiated emission test, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.

6.2. 26dB & 99% Bandwidth Measurement

6.2.1. Test Limit

N/A

6.2.2. Test Procedure

KDB 789033 D02v02r01- Section II)C)1) (26dB Bandwidth)

KDB 789033 D02v02r01- Section II)D) (99% Bandwidth)

6.2.3. Test Setting

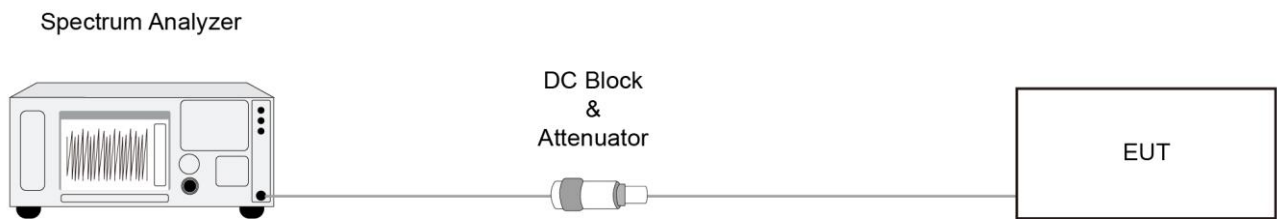
26dB Bandwidth

1. The analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth
2. RBW = approximately 1% of the emission bandwidth.
3. VBW > RBW
4. Detector = Peak.
5. Trace mode = max hold.
6. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

99% Bandwidth

1. Set center frequency to the nominal EUT channel center frequency.
2. RBW = 1% to 5% of the OBW
3. $VBW \geq 3 \times RBW$
4. Span = 1.5 times to 5 times the OBW
5. Detector = peak
6. Trace mode = max hold
7. Allow the trace to stabilize
8. Use the 99% power bandwidth function of the instrument.

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

For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

6.3.2. Test Procedure

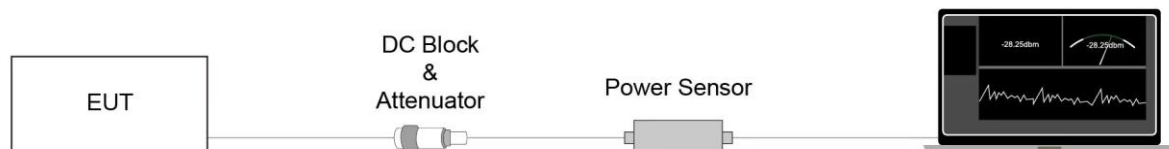
KDB 789033D02v02r01- Section II)E)3)b) Method PM-G

6.3.3. Test Setting

Average Power Measurement

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

6.3.4. Test Setup



6.3.5. Test Result

Refer to Appendix A.3.

6.4. Power Spectral Density Measurement

6.4.1. Test Limit

For the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

If transmitting antennas of directional gain greater than 6dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

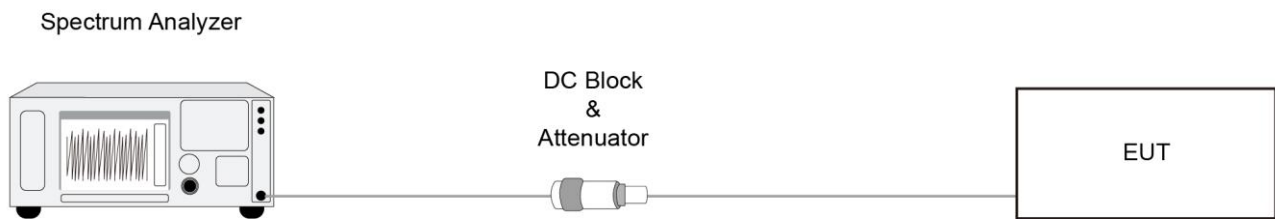
6.4.2. Test Procedure

KDB 789033 D02v02r01-Section II)F)

6.4.3. Test Setting

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire 26dB EBW of the signal.
3. RBW = 1MHz
4. VBW = $3 \times \text{RBW}$
5. Number of sweep points $\geq 2 \times (\text{span} / \text{RBW})$
6. Detector = power averaging (Average)
7. Sweep time = auto
8. Trigger = free run
9. Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.
10. Use the peak search function on the instrument to find the peak of the spectrum and record its value.
11. Add $10 \cdot \log(1/x)$, where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times (because the measurement represents an average over both the on and off times of the transmission). For example, add $10 \cdot \log(1/0.25) = 6 \text{ dB}$ if the duty cycle is 25 percent.

6.4.4. Test Setup



6.4.5. Test Result

Refer to Appendix A.4.

6.5. Frequency Stability Measurement

6.5.1. Test Limit

Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

6.5.2. Test Procedure

Frequency Stability Under Temperature Variations:

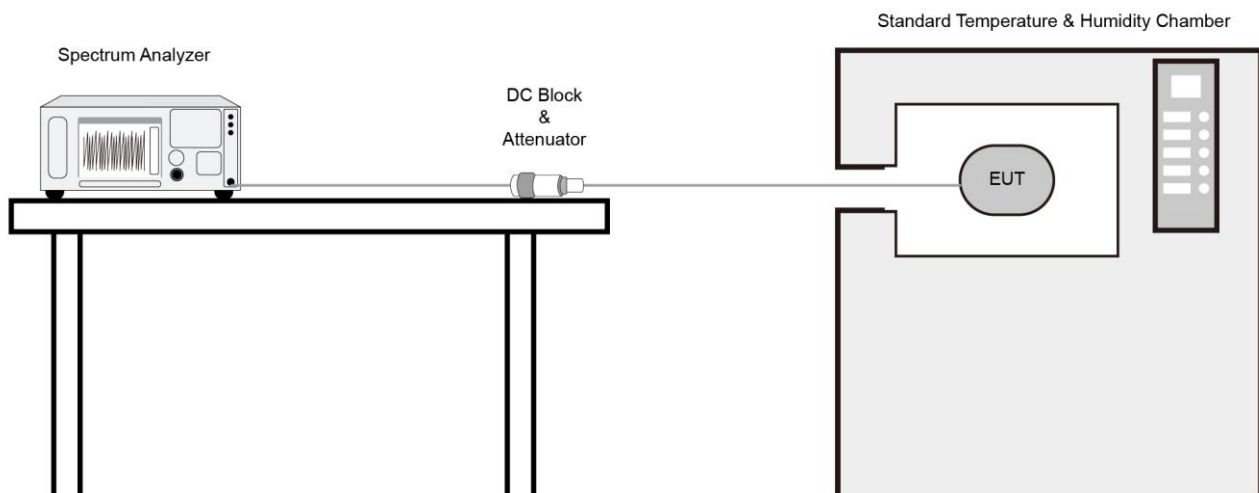
The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum analyzer via feed through attenuators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and measure EUT 20°C operating frequency as reference frequency. Turn EUT off and set the chamber temperature to highest. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure with 10°C decreased per stage until the lowest temperature reached.

Frequency Stability Under Voltage Variations:

Set chamber temperature to 20°C. Use a variable AC power supply / DC power source to power the EUT and set the voltage to rated voltage. Set the spectrum analyzer RBW low enough to obtain the desired frequency resolution and recorded the frequency.

Reduce the input voltage to specify extreme voltage variation ($\pm 15\%$) and endpoint, record the maximum frequency change.

6.5.3. Test Setup



6.5.4. 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 [μV/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

KDB 789033 D02v02r01- Section II)G)

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

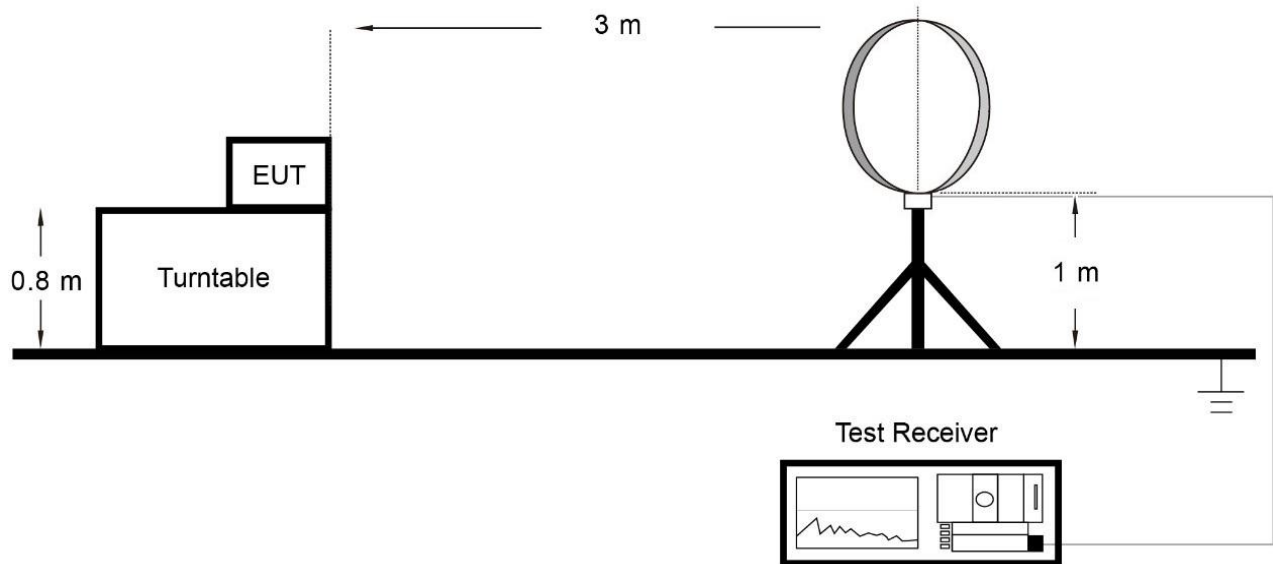
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Peak
5. Sweep time = Auto couple
6. Trace mode = Max hold
7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

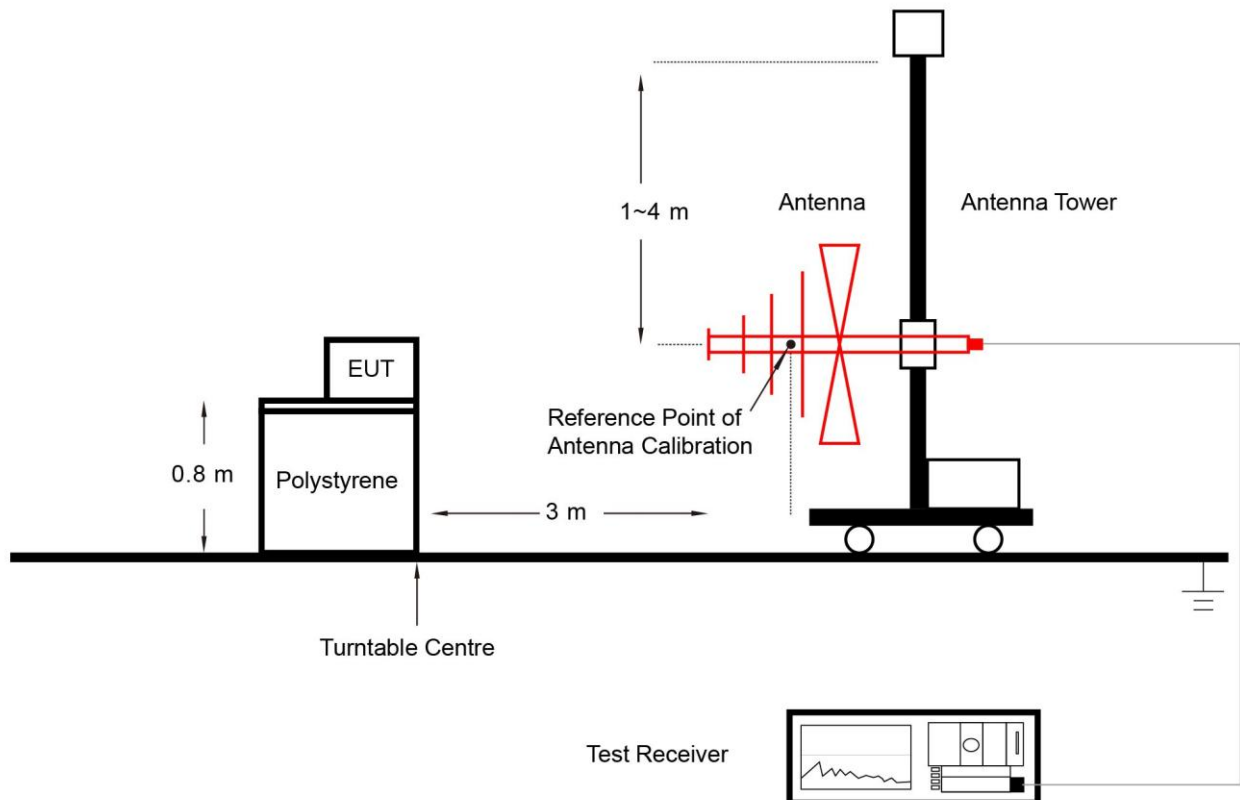
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW; if the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10Hz
If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.
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. Trace was allowed to stabilize

6.6.4. Test Setup

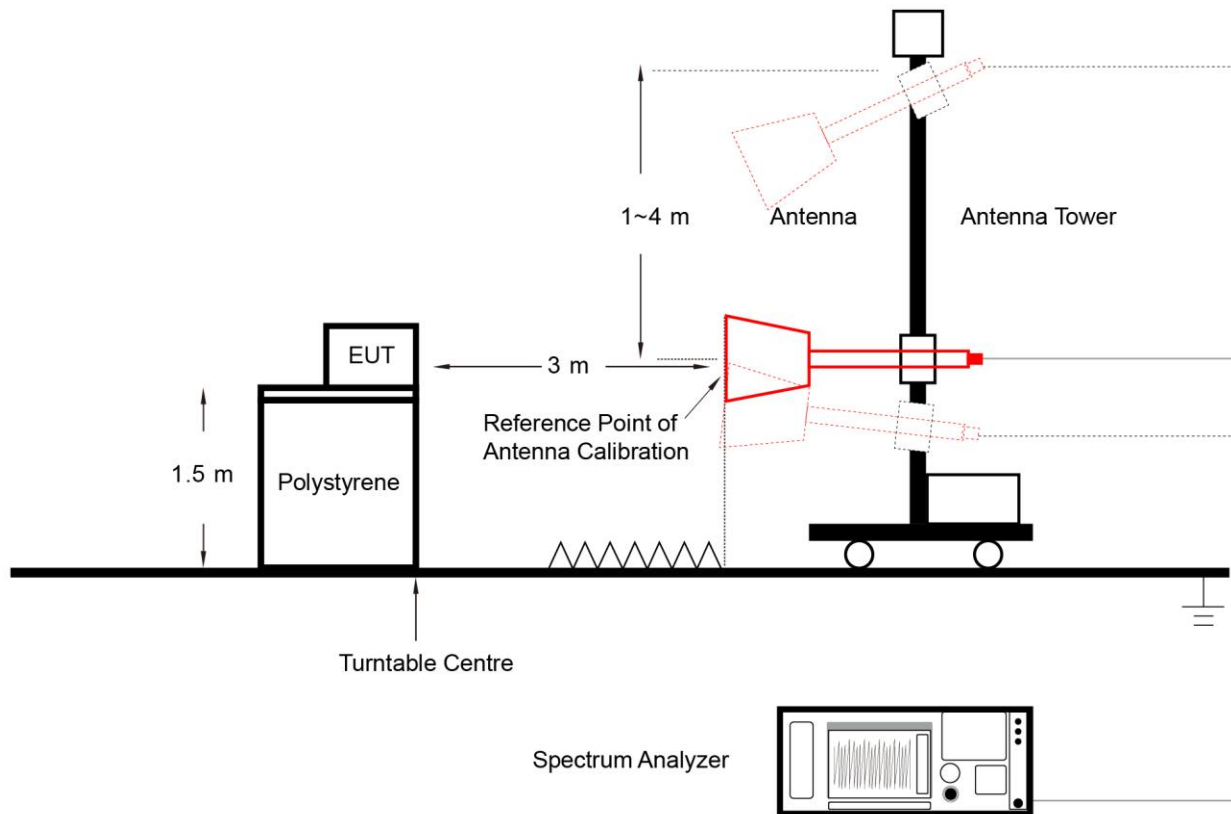
Below 30MHz Test Setup:



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	--	--	--

For 15.407(b) requirement:

For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band: All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Refer to KDB 789033 D02v02r01 G)2)c), as specified in § 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a maximum emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in § 15.407(b)(4)). However, an out-of-band emission that complies with both the peak and average limits of § 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

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 [μV/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

KDB 789033 D02v02r01- Section II)G)

6.7.3. Test Setting

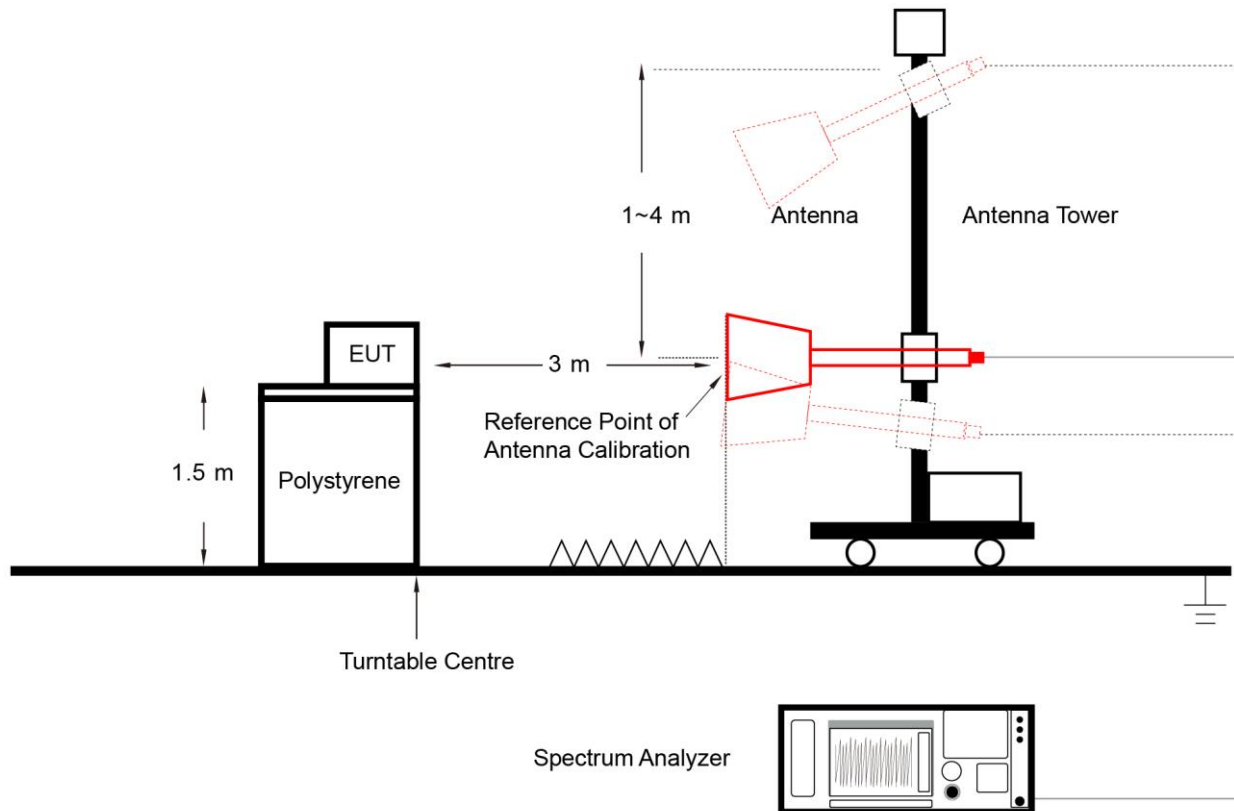
Peak Field Strength Measurements

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; If the EUT is configured to transmit with duty cycle $\geq 98\%$, set VBW = 10 Hz.
If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.
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

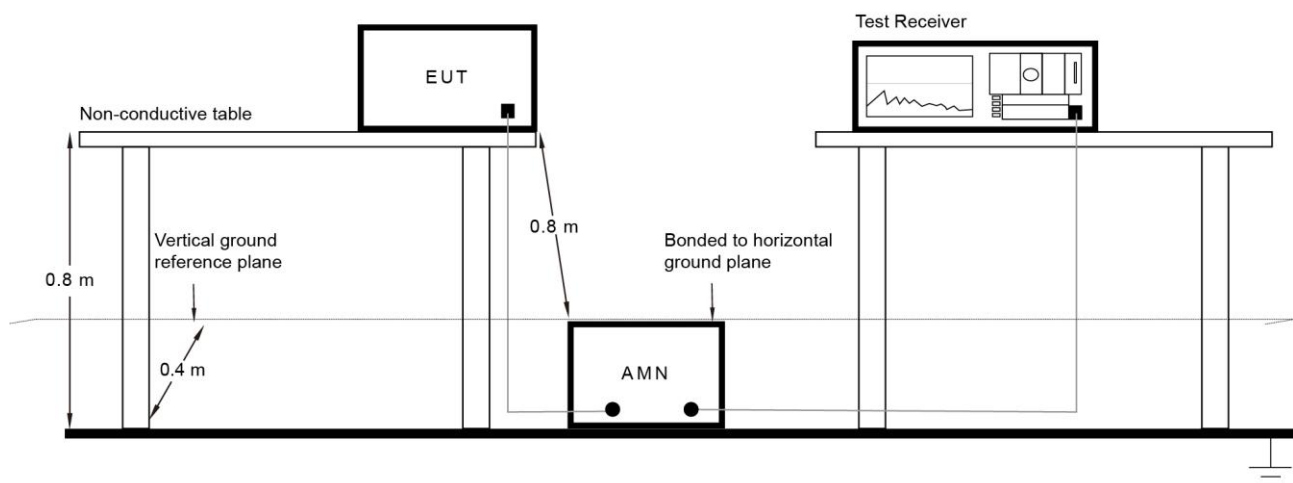
6.8.1. Test Limit

FCC Part 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
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

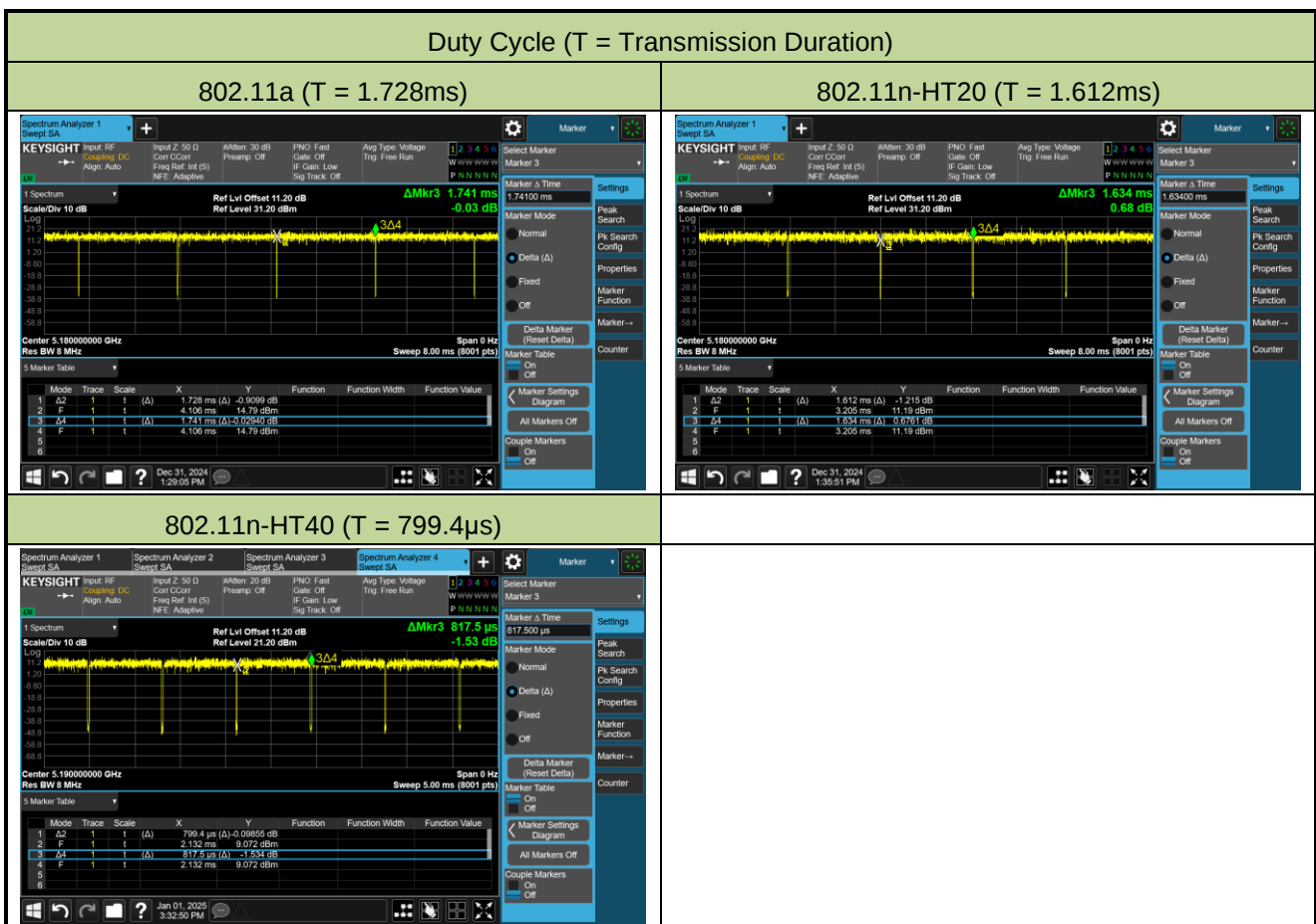
Refer to Appendix A.8.

Appendix A - Test Result

A.1 Duty Cycle Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-31 ~ 2025-01-01		

Test Mode	Duty Cycle
802.11a	99.25%
802.11n-HT20	98.65%
802.11n-HT40	97.79%



A.2 26dB & 99% Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2025-01-01		

Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
11a	6Mbps	36	5180	19.73	16.641
11a	6Mbps	44	5220	19.55	16.635
11a	6Mbps	48	5240	19.46	16.601
11n-HT20	MCS0	36	5180	20.05	17.661
11n-HT20	MCS0	44	5220	19.65	17.628
11n-HT20	MCS0	48	5240	20.00	17.653
11n-HT40	MCS0	38	5190	40.23	36.236
11n-HT40	MCS0	46	5230	40.76	36.286

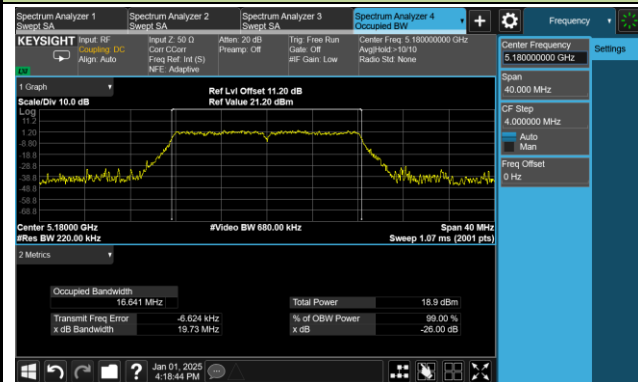
Test Mode	Data Rate/ MCS	Channel No.	Frequency (MHz)	F _H (MHz)	Limit (MHz)
802.11a	6Mbps	48	5240	5248.30	< 5250
802.11n-HT20	MCS0	48	5240	5248.83	< 5250
802.11n-HT40	MCS0	46	5230	5248.14	< 5250

Note: $F_H = \text{Centre frequency} + 99\% \text{ OBW} / 2$.

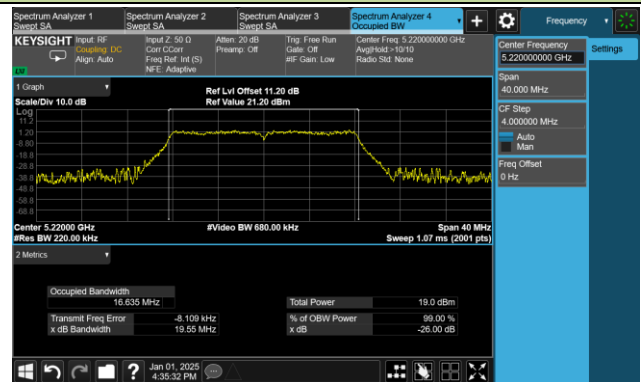
For example, 802.11a 5240MHz, $F_H = 5240\text{MHz} + 16.601\text{MHz} / 2 = 5248.30\text{MHz}$.

802.11a 26dB Bandwidth & 99% Bandwidth

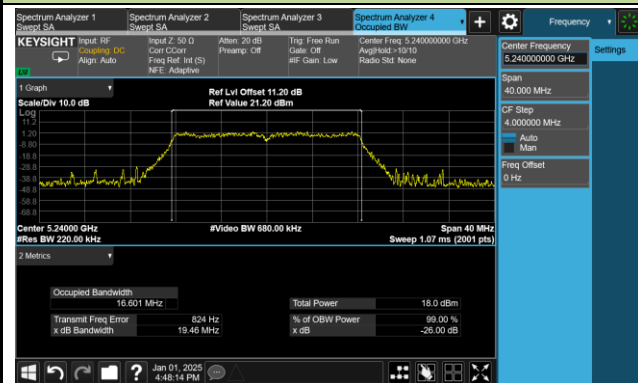
Channel 36 (5180MHz)



Channel 44 (5220MHz)

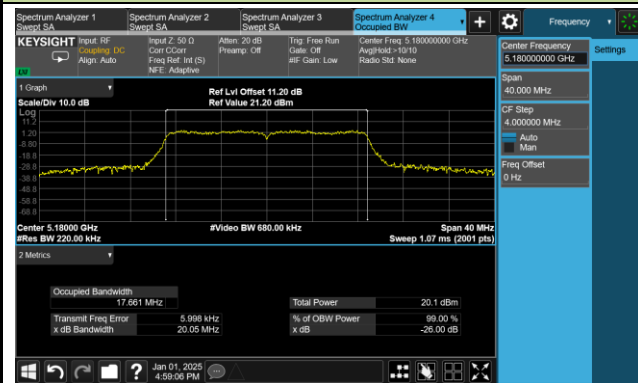


Channel 48 (5240MHz)

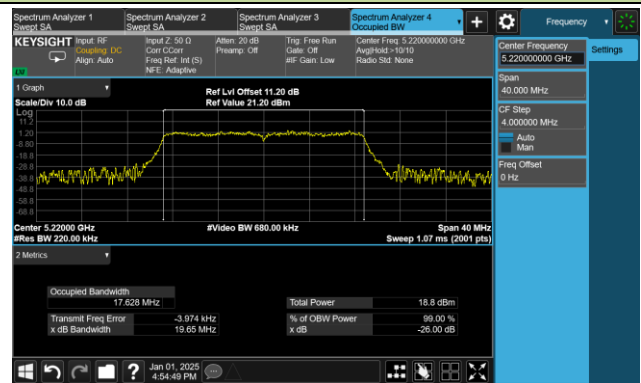


802.11n-HT20 26dB Bandwidth & 99% Bandwidth

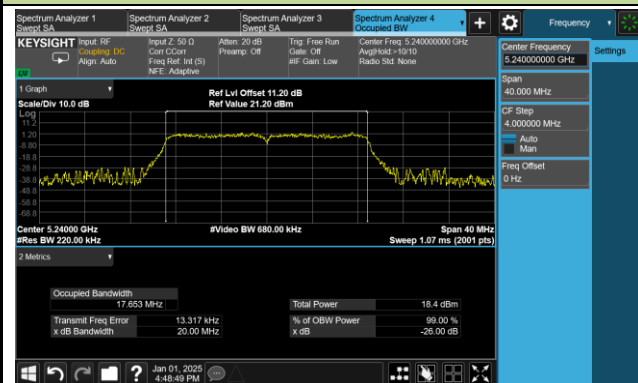
Channel 36 (5180MHz)

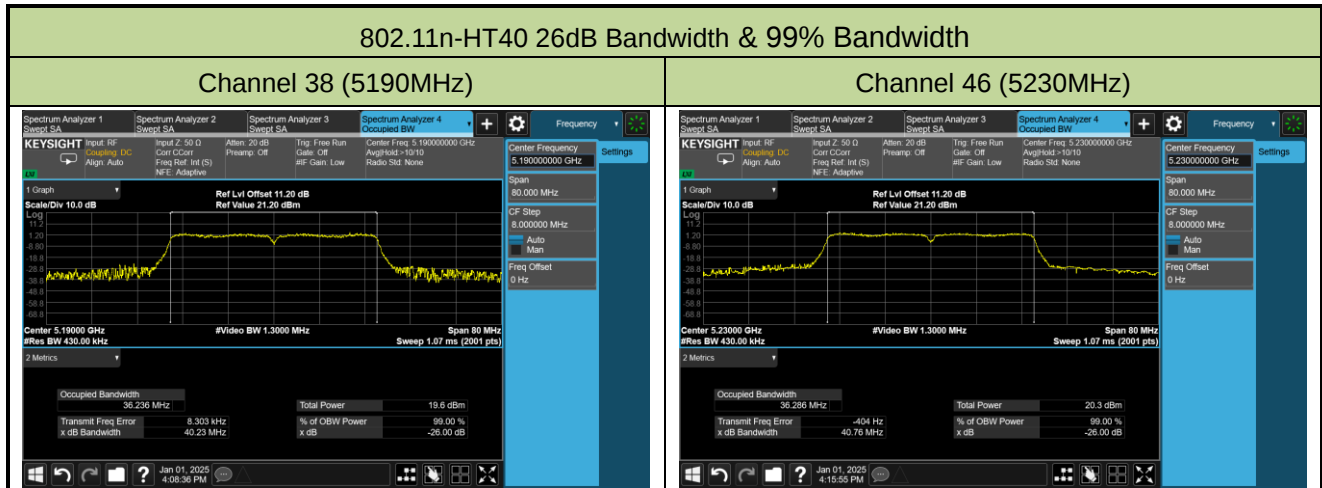


Channel 44 (5220MHz)



Channel 48 (5240MHz)





A.3 Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-23		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	Average Power (dBm)	Power Limit (dBm)
11a	6Mbps	36	5180	12.54	≤ 23.38
11a	6Mbps	44	5220	12.56	≤ 23.38
11a	6Mbps	48	5240	12.60	≤ 23.38
11n-HT20	MCS0	36	5180	12.60	≤ 23.38
11n-HT20	MCS0	44	5220	12.68	≤ 23.38
11n-HT20	MCS0	48	5240	13.63	≤ 23.38
11n-HT40	MCS0	38	5190	12.59	≤ 23.38
11n-HT40	MCS0	46	5230	13.59	≤ 23.38

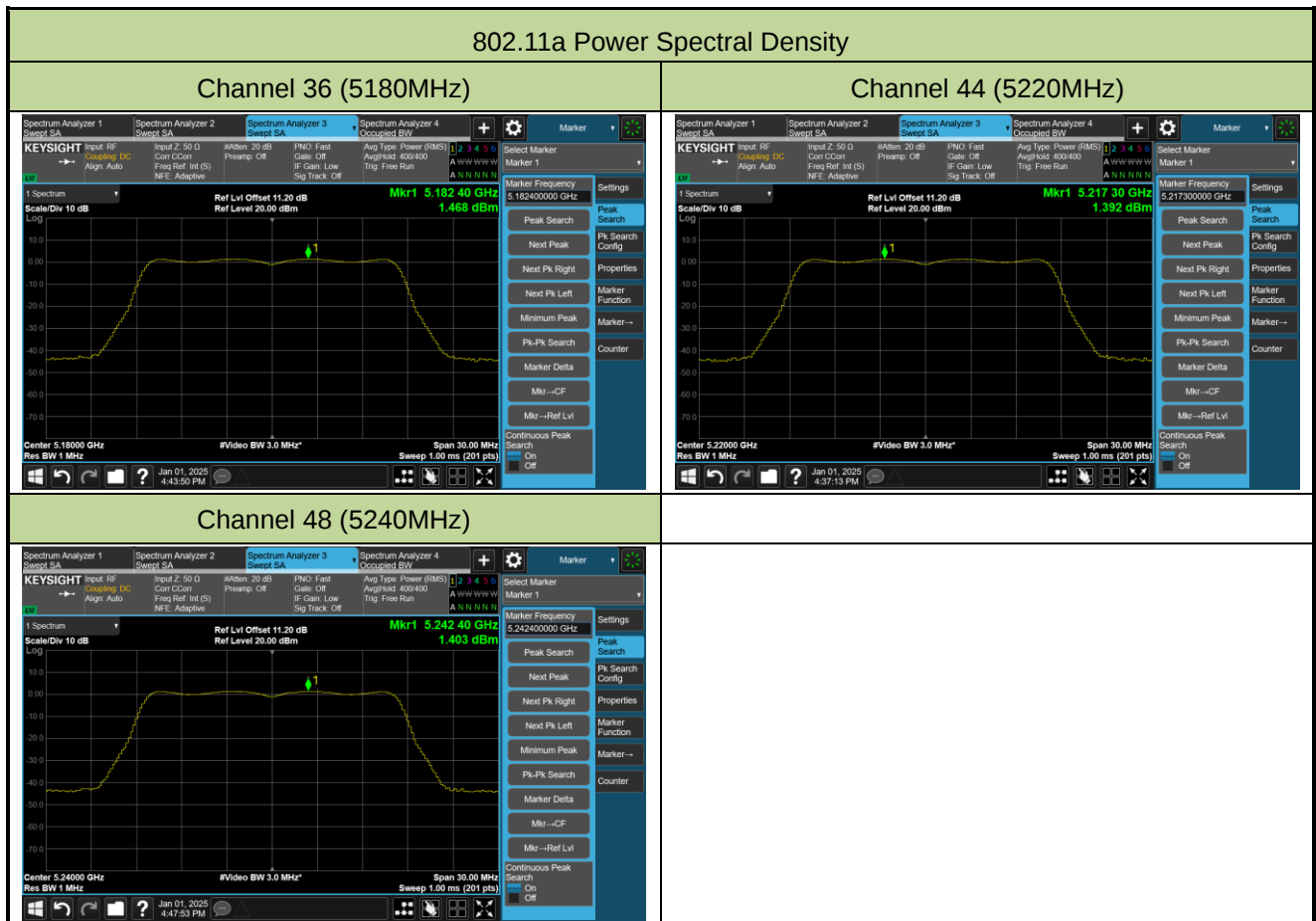
A.4 Power Spectral Density Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2025-01-01		

Test Mode	Data Rate/ MCS	Channel No.	Freq. (MHz)	PSD (dBm/MHz)	Duty Cycle (%)	10*log (1 / duty cycle)	Final PSD (dBm/MHz)	PSD Limit (dBm/MHz)
11a	6Mbps	36	5180	1.468	99.25	0.03	1.468	≤ 10.40
11a	6Mbps	44	5220	1.392	99.25	0.03	1.392	≤ 10.40
11a	6Mbps	48	5240	1.403	99.25	0.03	1.403	≤ 10.40
11n-HT20	MCS0	36	5180	1.368	98.65	0.06	1.368	≤ 10.40
11n-HT20	MCS0	44	5220	1.267	98.65	0.06	1.267	≤ 10.40
11n-HT20	MCS0	48	5240	1.262	98.65	0.06	1.262	≤ 10.40
11n-HT40	MCS0	38	5190	-1.090	97.79	0.10	-0.990	≤ 10.40
11n-HT40	MCS0	46	5230	-1.383	97.79	0.10	-1.283	≤ 10.40

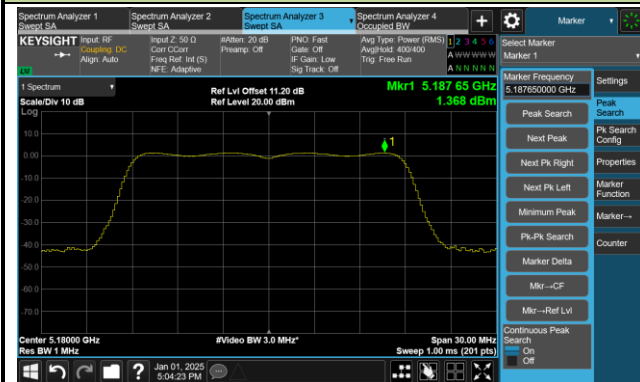
Note: When duty cycle≥98%, Final PSD (dBm/MHz) = PSD (dBm/MHz).

When duty cycle<98%, Final PSD (dBm/MHz) = PSD (dBm/MHz) + 10*log(1 / duty cycle).



802.11n-HT20 Power Spectral Density

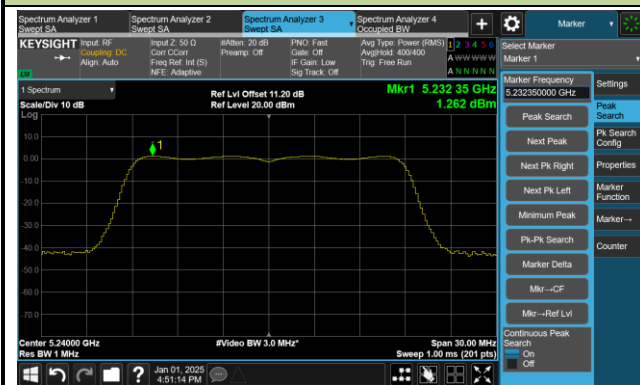
Channel 36 (5180MHz)



Channel 44 (5220MHz)



Channel 48 (5240MHz)



802.11n-HT40 Power Spectral Density

Channel 38 (5190MHz)



Channel 46 (5230MHz)



A.5 Frequency Stability Test Result

Test Site	WZ-TR3	Test Engineer	Dandy Li
Test Date	2025-01-06	Test Mode	5180MHz (Carrier Mode)

Voltage (%)	Power (VAC)	Temp (°C)	Frequency Tolerance (ppm)			
			0 minutes	2 minutes	5 minutes	10 minutes
100%	120	- 30	-10.41	-10.44	-10.47	-10.47
		- 20	6.65	6.60	6.53	6.37
		- 10	7.40	7.40	7.39	7.39
		0	6.90	6.94	6.96	6.96
		+ 10	5.07	5.23	5.37	5.39
		+ 20	3.37	3.38	3.40	3.40
		+ 30	1.29	1.30	1.30	1.29
		+ 40	-0.41	-0.40	-0.40	-0.39
		+ 50	-1.02	-0.98	-0.98	-0.98
115%	138	+ 20	3.44	3.44	3.42	3.44
85%	102	+ 20	3.44	3.43	3.42	3.42

Note: Frequency Tolerance (ppm) = {[Measured Frequency (Hz) - Declared Frequency (Hz)] / Declared Frequency (Hz)} *10⁶.

A.6 Radiated Spurious Emission Test Result

Test Site	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11a – Channel 36
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
*	8726.500	32.7	12.3	45.0	68.2	-23.2	Peak	Horizontal
*	10358.500	35.4	14.5	49.9	68.2	-18.3	Peak	Horizontal
	11106.500	31.9	16.4	48.3	74.0	-25.7	Peak	Horizontal
	15528.200	31.8	17.5	49.3	54.0	-4.7	Average	Horizontal
	15528.200	38.4	17.5	55.9	74.0	-18.1	Peak	Horizontal
*	8729.900	32.3	12.2	44.5	68.2	-23.7	Peak	Vertical
*	10360.200	36.0	14.5	50.5	68.2	-17.7	Peak	Vertical
	11106.500	32.6	16.4	49.0	74.0	-25.0	Peak	Vertical
	15546.900	34.0	17.3	51.3	54.0	-2.7	Average	Vertical
	15546.900	42.3	17.3	59.6	74.0	-14.4	Peak	Vertical

Note 1: "*" is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11a – Channel 44
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8967.900	31.7	12.8	44.5	68.2	-23.7	Peak	Horizontal
*	10254.800	32.5	14.0	46.5	68.2	-21.7	Peak	Horizontal
	11653.900	31.2	17.4	48.6	74.0	-25.4	Peak	Horizontal
	15650.600	33.6	16.7	50.3	54.0	-3.7	Average	Horizontal
	15650.600	42.0	16.7	58.7	74.0	-15.3	Peak	Horizontal
*	8721.400	32.5	12.3	44.8	68.2	-23.4	Peak	Vertical
*	10436.700	33.9	14.8	48.7	68.2	-19.5	Peak	Vertical
	11475.400	31.1	17.1	48.2	74.0	-25.8	Peak	Vertical
	15669.300	34.0	16.8	50.8	54.0	-3.2	Average	Vertical
	15669.300	41.7	16.8	58.5	74.0	-15.5	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11a – Channel 48
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8663.600	32.4	12.0	44.4	68.2	-23.8	Peak	Horizontal
*	9823.000	33.1	13.2	46.3	68.2	-21.9	Peak	Horizontal
	11710.000	30.8	17.3	48.1	74.0	-25.9	Peak	Horizontal
	15733.900	34.3	16.5	50.8	54.0	-3.2	Average	Horizontal
	15733.900	43.4	16.5	59.9	74.0	-14.1	Peak	Horizontal
*	8830.200	32.5	12.3	44.8	68.2	-23.4	Peak	Vertical
*	10477.500	34.4	14.8	49.2	68.2	-19.0	Peak	Vertical
	11529.800	30.8	17.0	47.8	74.0	-26.2	Peak	Vertical
	15722.000	35.6	16.3	51.9	54.0	-2.1	Average	Vertical
	15722.000	43.3	16.3	59.6	74.0	-14.4	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11n-HT20 – Channel 36
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8536.100	32.9	11.7	44.6	68.2	-23.6	Peak	Horizontal
*	10361.900	36.4	14.5	50.9	68.2	-17.3	Peak	Horizontal
	12073.800	31.1	16.6	47.7	74.0	-26.3	Peak	Horizontal
	15533.300	32.0	17.4	49.4	54.0	-4.6	Average	Horizontal
	15533.300	42.2	17.4	59.6	74.0	-14.4	Peak	Horizontal
*	8765.600	32.1	12.1	44.2	68.2	-24.0	Peak	Vertical
*	10363.600	35.4	14.5	49.9	68.2	-18.3	Peak	Vertical
	11466.900	30.4	17.1	47.5	74.0	-26.5	Peak	Vertical
	15540.100	33.8	17.4	51.2	54.0	-2.8	Average	Vertical
	15540.100	42.6	17.4	60.0	74.0	-14.0	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11n-HT20 – Channel 44
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8576.900	32.4	11.9	44.3	68.2	-23.9	Peak	Horizontal
*	10100.100	33.8	13.3	47.1	68.2	-21.1	Peak	Horizontal
	11478.800	30.3	17.2	47.5	74.0	-26.5	Peak	Horizontal
	15652.300	32.7	16.6	49.3	54.0	-4.7	Average	Horizontal
	15652.300	42.9	16.6	59.5	74.0	-14.5	Peak	Horizontal
*	8724.800	32.7	12.3	45.0	68.2	-23.2	Peak	Vertical
*	10443.500	34.2	14.8	49.0	68.2	-19.2	Peak	Vertical
	11475.400	30.6	17.1	47.7	74.0	-26.3	Peak	Vertical
	15665.900	34.4	16.7	51.1	54.0	-2.9	Average	Vertical
	15665.900	42.4	16.7	59.1	74.0	-14.9	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-18	Test Mode	802.11n-HT20 – Channel 48
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8716.300	32.8	12.3	45.1	68.2	-23.1	Peak	Horizontal
*	10479.200	34.2	14.8	49.0	68.2	-19.2	Peak	Horizontal
	11570.600	31.5	17.1	48.6	74.0	-25.4	Peak	Horizontal
	15716.900	34.8	16.3	51.1	54.0	-2.9	Average	Horizontal
	15716.900	43.7	16.3	60.0	74.0	-14.0	Peak	Horizontal
*	8704.400	32.6	12.3	44.9	68.2	-23.3	Peak	Vertical
*	10480.900	35.8	14.8	50.6	68.2	-17.6	Peak	Vertical
	11470.300	31.3	17.1	48.4	74.0	-25.6	Peak	Vertical
	15723.700	36.0	16.3	52.3	54.0	-1.7	Average	Vertical
	15723.700	45.7	16.3	62.0	74.0	-12.0	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-19	Test Mode	802.11n-HT40 – Channel 38
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8920.300	32.1	12.8	44.9	68.2	-23.3	Peak	Horizontal
*	10202.100	33.6	13.9	47.5	68.2	-20.7	Peak	Horizontal
	11487.300	30.6	17.3	47.9	74.0	-26.1	Peak	Horizontal
	15582.600	28.6	17.3	45.9	54.0	-8.1	Average	Horizontal
	15582.600	37.1	17.3	54.4	74.0	-19.6	Peak	Horizontal
*	8961.100	32.3	12.9	45.2	68.2	-23.0	Peak	Vertical
*	10062.700	33.5	13.3	46.8	68.2	-21.4	Peak	Vertical
	11614.800	31.2	16.8	48.0	74.0	-26.0	Peak	Vertical
	15584.300	29.7	17.3	47.0	54.0	-7.0	Average	Vertical
	15584.300	37.4	17.3	54.7	74.0	-19.3	Peak	Vertical

Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC2	Test Engineer	Dick Shen
Test Date	2024-12-19	Test Mode	802.11n-HT40 – Channel 46
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.		

Mark	Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB/m)	Detector	Polarization
*	8741.800	32.6	12.1	44.7	68.2	-23.5	Peak	Horizontal
*	10521.700	33.8	14.9	48.7	68.2	-19.5	Peak	Horizontal
	11101.400	32.1	16.5	48.6	74.0	-25.4	Peak	Horizontal
	15682.900	30.4	16.5	46.9	54.0	-7.1	Average	Horizontal
	15682.900	38.7	16.5	55.2	74.0	-18.8	Peak	Horizontal
*	8731.600	33.0	12.2	45.2	68.2	-23.0	Peak	Vertical
*	10453.700	33.7	14.9	48.6	68.2	-19.6	Peak	Vertical
	10826.000	33.3	15.9	49.2	74.0	-24.8	Peak	Vertical
	15693.100	32.4	16.3	48.7	54.0	-5.3	Average	Vertical
	15693.100	40.0	16.3	56.3	74.0	-17.7	Peak	Vertical

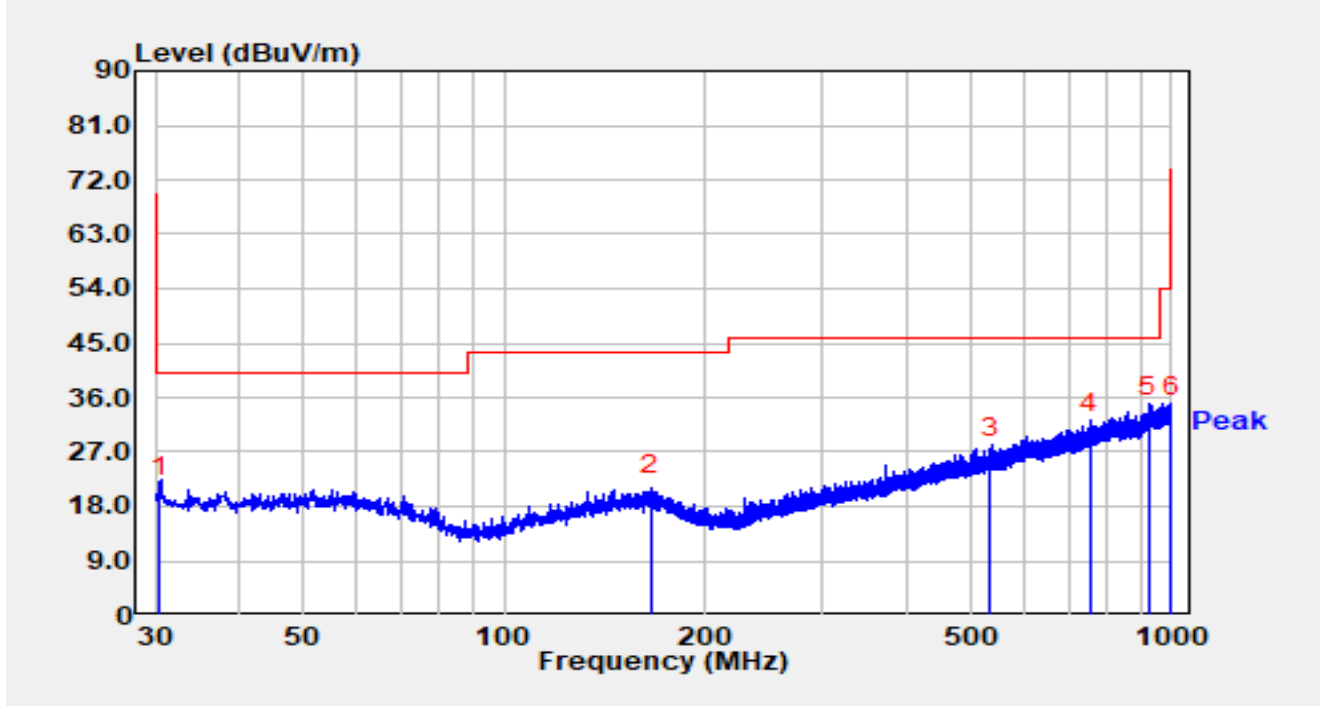
Note 1: “*” is not in restricted band, its limit is -27dBm/MHz. At a distance of 3 meters, the field strength limit in dBμV/m can be determined by adding a “conversion” factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions.

Note 2: 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	WZ-AC1	Test Date	2025-01-13
Temperature	24.6°C	Humidity	58.1%
Limit	FCC_Part 15.209_RSE(3m)	Test Engineer	Ajin Fan
Factor	VULB 9168_00662	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5240MHz		

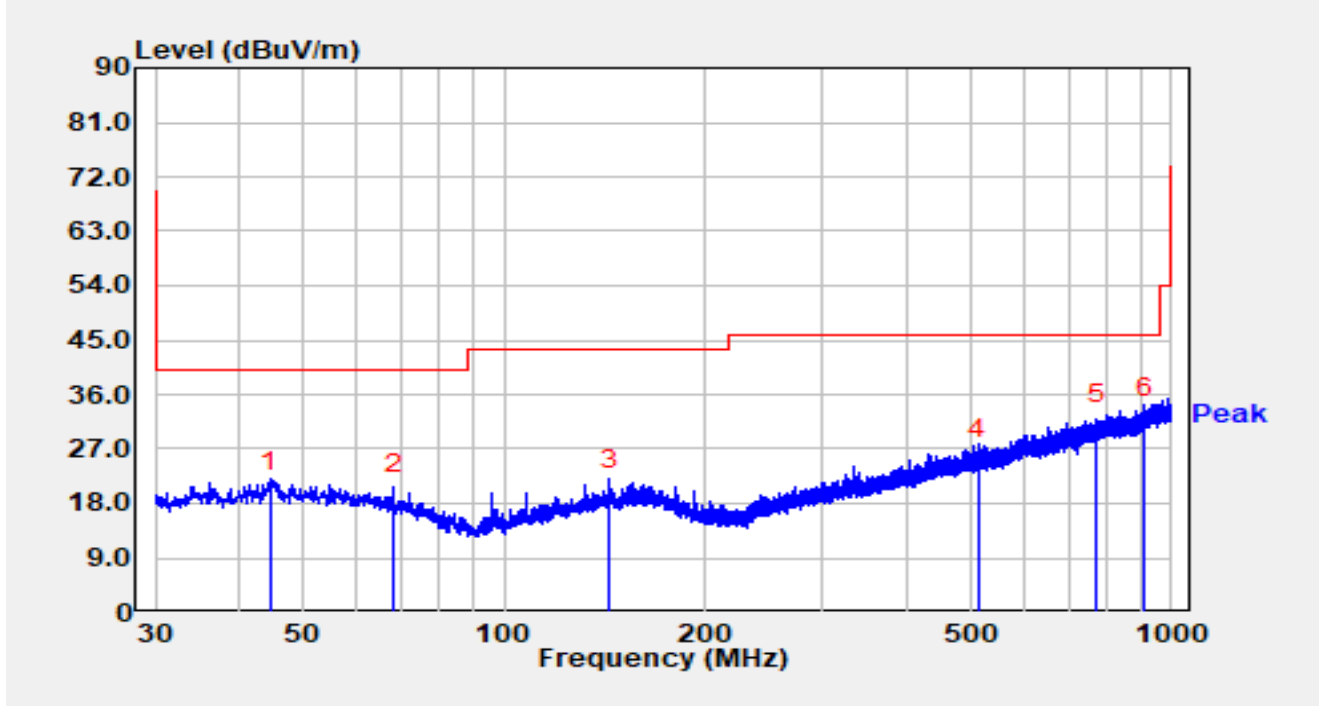


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		30.500	2.14	17.43	19.57	-20.43	40.00	QP
2		165.600	1.65	18.36	20.01	-23.49	43.50	QP
3		534.000	1.61	24.35	25.96	-20.04	46.00	QP
4		755.140	1.64	28.37	30.01	-15.99	46.00	QP
5	*	922.109	2.10	30.55	32.65	-13.35	46.00	QP
6		999.020	1.64	31.24	32.88	-21.12	54.00	QP

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).
4. The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 40GHz) 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-AC1	Test Date	2025-01-13
Temperature	24.6°C	Humidity	58.1%
Limit	FCC_Part 15.209_RSE(3m)	Test Engineer	Ajin Fan
Factor	VULB 9168_00662	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5240MHz		



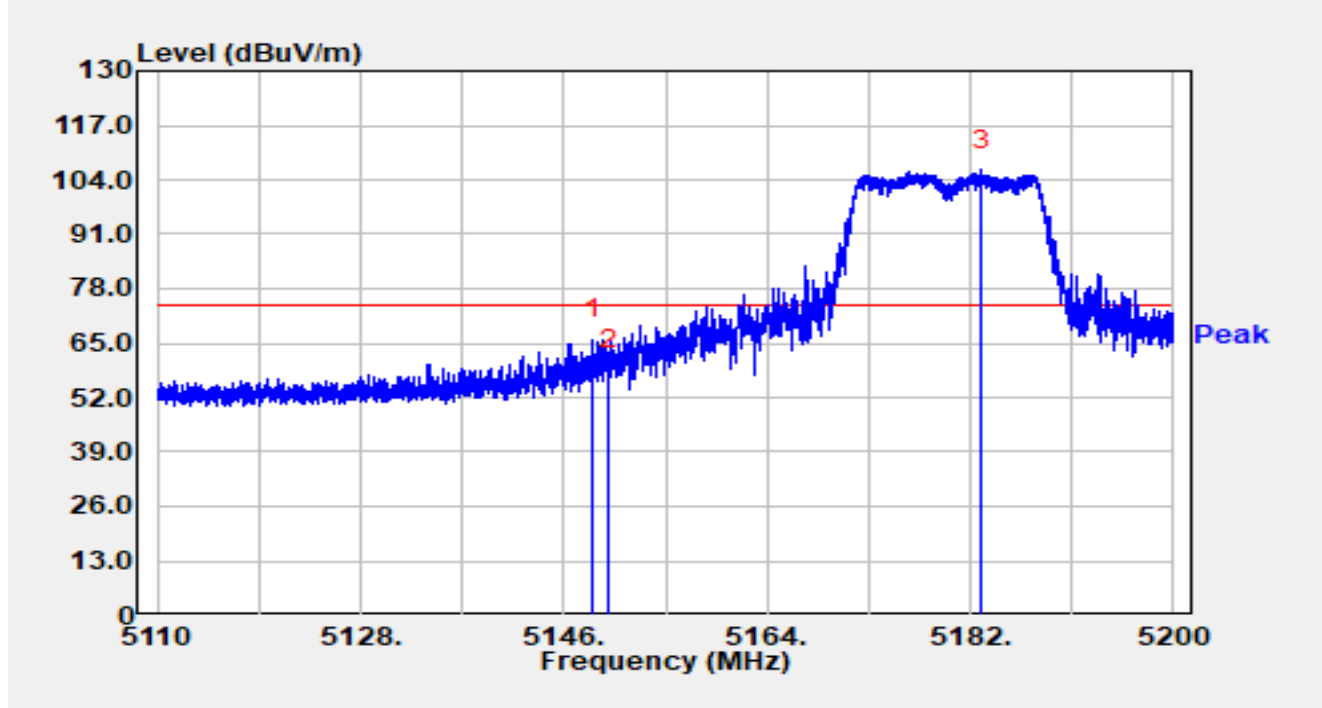
No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		44.647	1.45	18.29	19.74	-20.26	40.00	QP
2		68.315	2.45	17.02	19.47	-20.53	40.00	QP
3		143.975	2.15	17.97	20.12	-23.38	43.50	QP
4		513.448	1.45	24.01	25.46	-20.54	46.00	QP
5		773.990	2.40	28.77	31.17	-14.83	46.00	QP
6	*	910.000	1.93	30.08	32.01	-13.99	46.00	QP

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).
4. The amplitude of radiated emissions (frequency range from 9kHz to 30MHz and 18GHz to 40GHz) 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-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11a at 5180MHz		

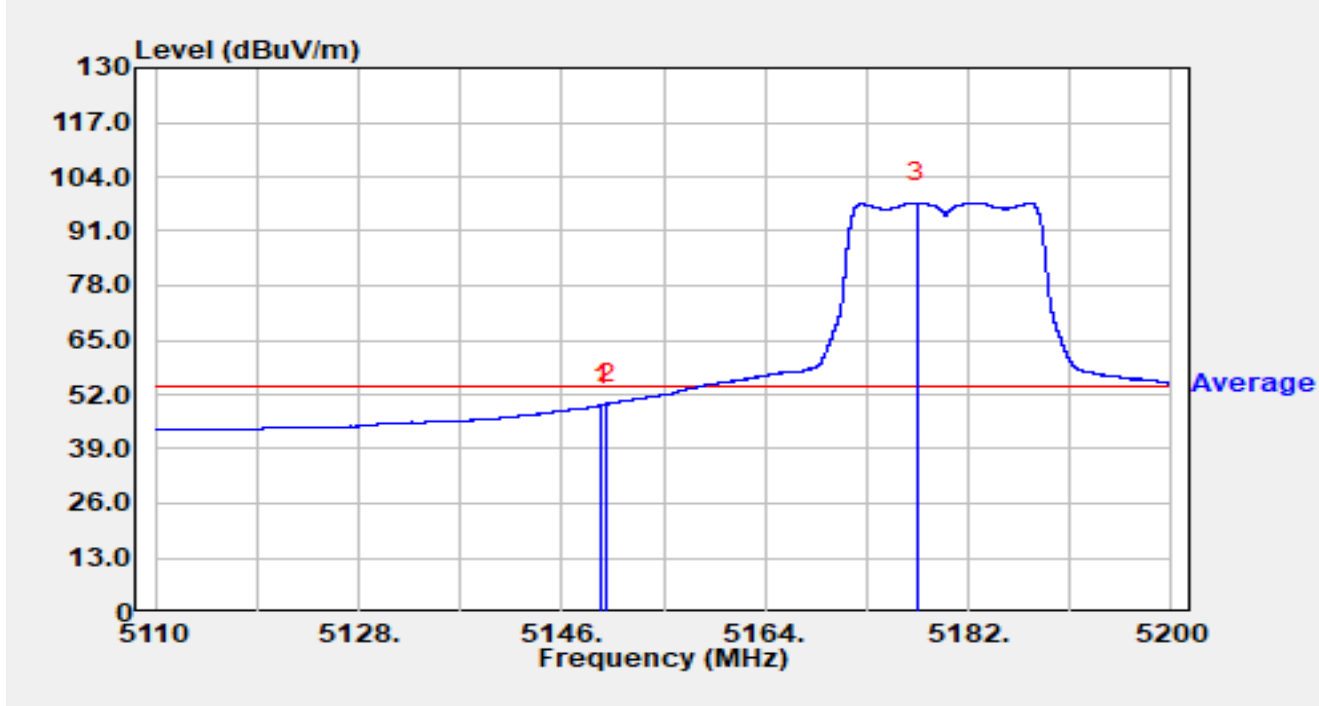


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5148.574	46.17	19.77	65.94	-8.06	74.00	Peak
2		5150.000	38.71	19.78	58.49	-15.51	74.00	Peak
3		5183.035	86.67	19.60	106.27	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11a at 5180MHz		

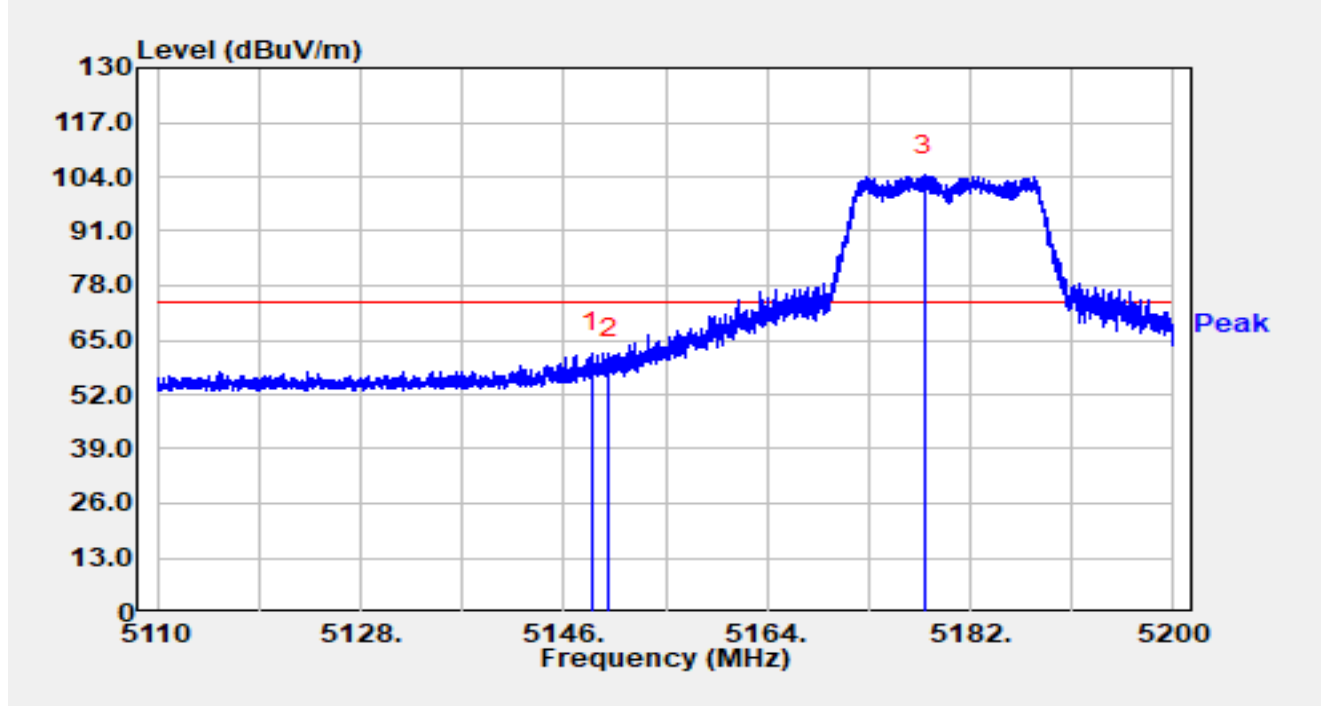


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		5149.492	29.64	19.78	49.42	-4.58	54.00	Average
2	*	5150.000	29.98	19.78	49.76	-4.24	54.00	Average
3		5177.491	78.14	19.69	97.83	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11a at 5180MHz		

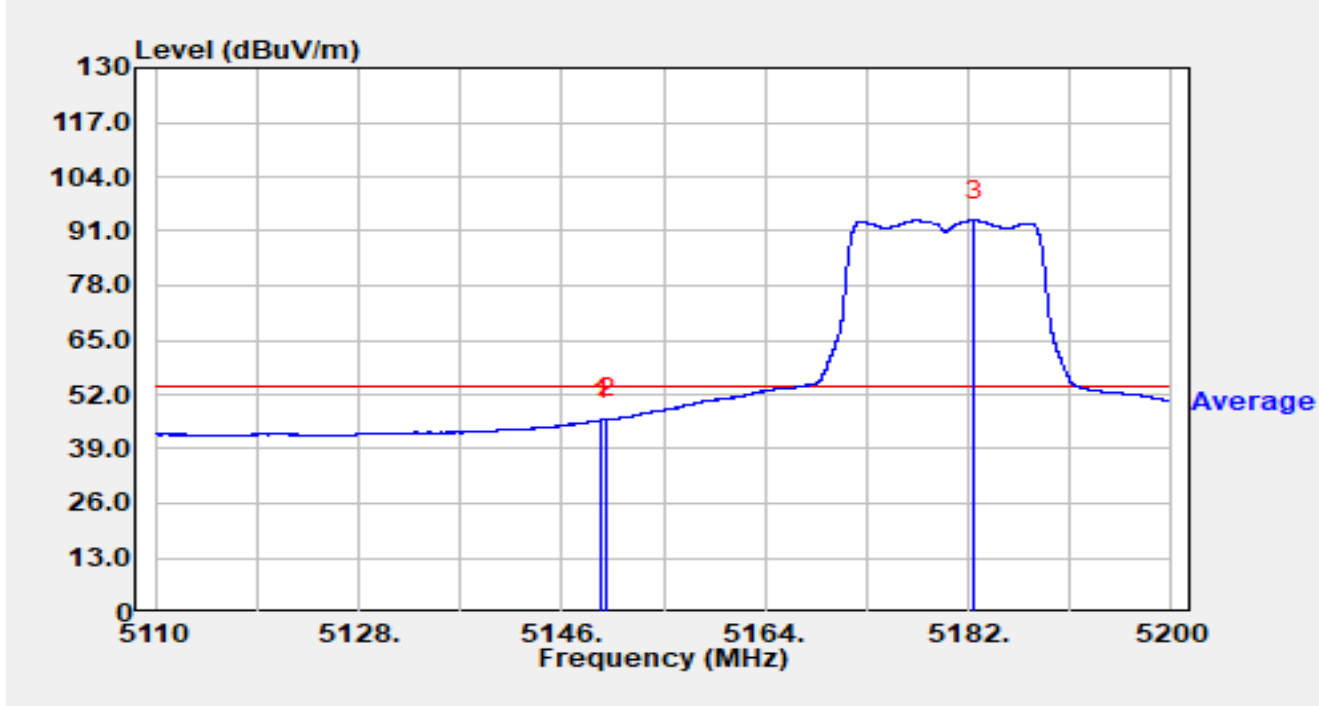


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5148.439	42.12	19.77	61.89	-12.11	74.00	Peak
2		5150.000	40.69	19.78	60.47	-13.53	74.00	Peak
3		5177.932	84.68	19.68	104.36	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11a at 5180MHz		

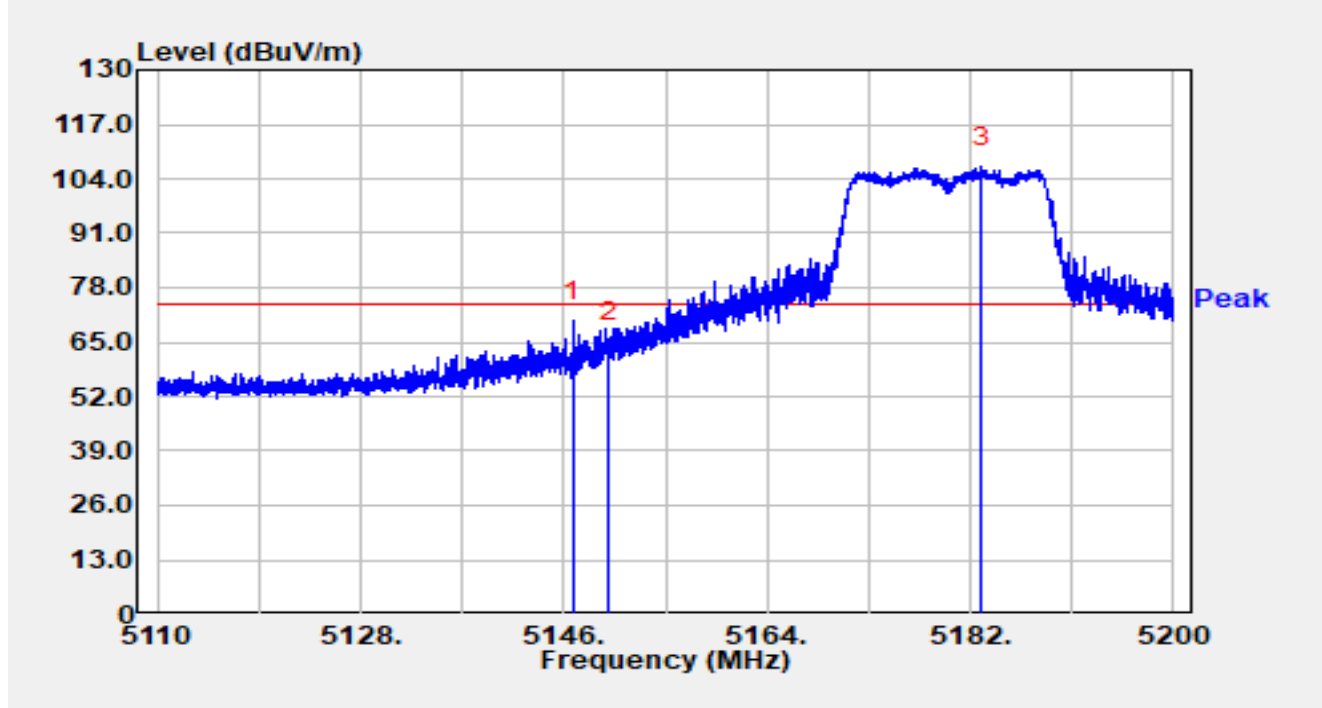


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		5149.474	26.07	19.78	45.85	-8.15	54.00	Average
2	*	5150.000	26.37	19.78	46.15	-7.85	54.00	Average
3		5182.531	73.96	19.60	93.57	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5180MHz		

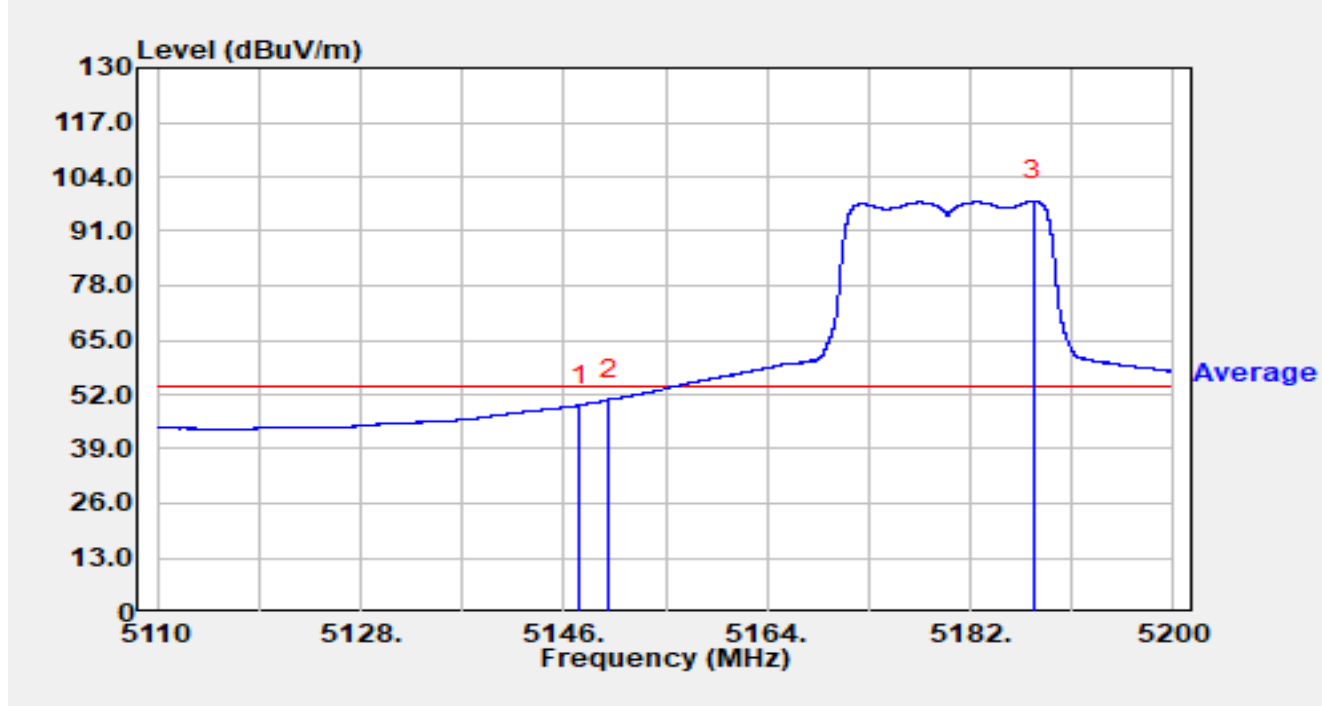


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5146.846	50.36	19.76	70.11	-3.89	74.00	Peak
2		5150.000	45.11	19.78	64.89	-9.11	74.00	Peak
3		5182.990	87.27	19.60	106.86	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5180MHz		

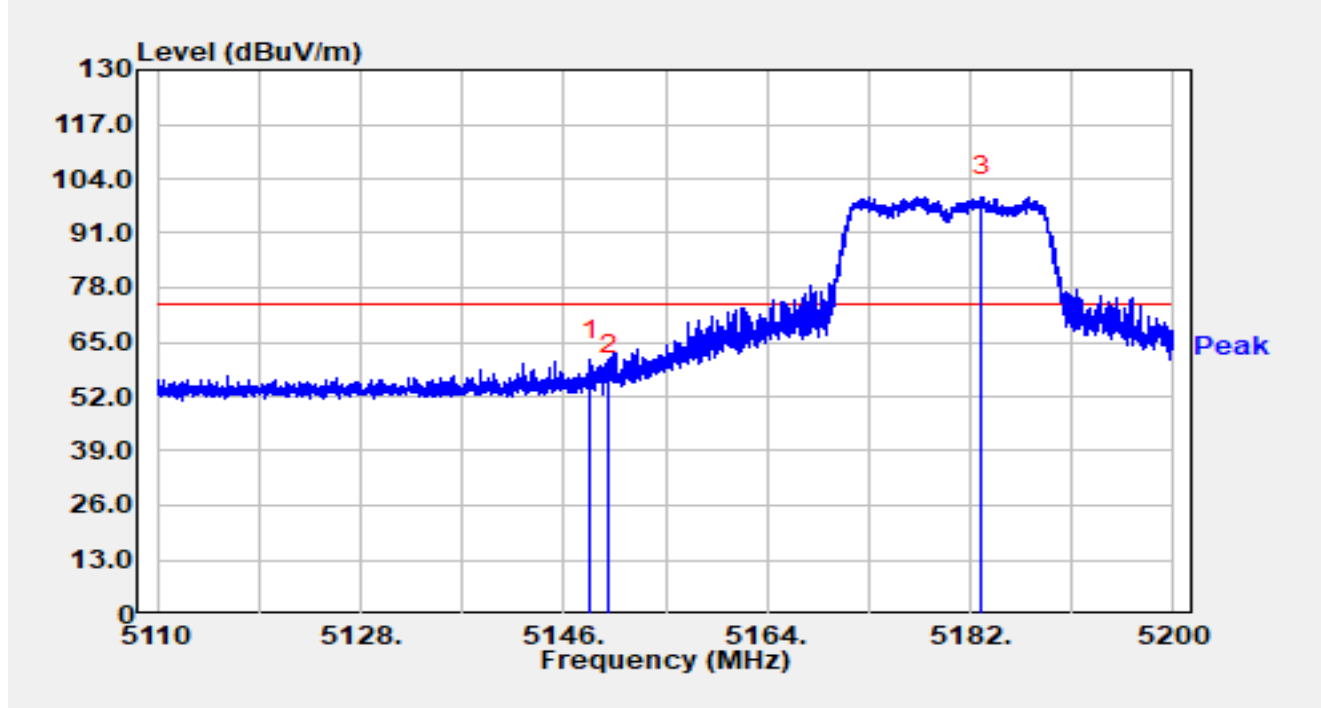


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		5147.341	29.70	19.76	49.46	-4.54	54.00	Average
2	*	5150.000	31.02	19.78	50.80	-3.20	54.00	Average
3		5187.571	78.69	19.51	98.20	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5180MHz		

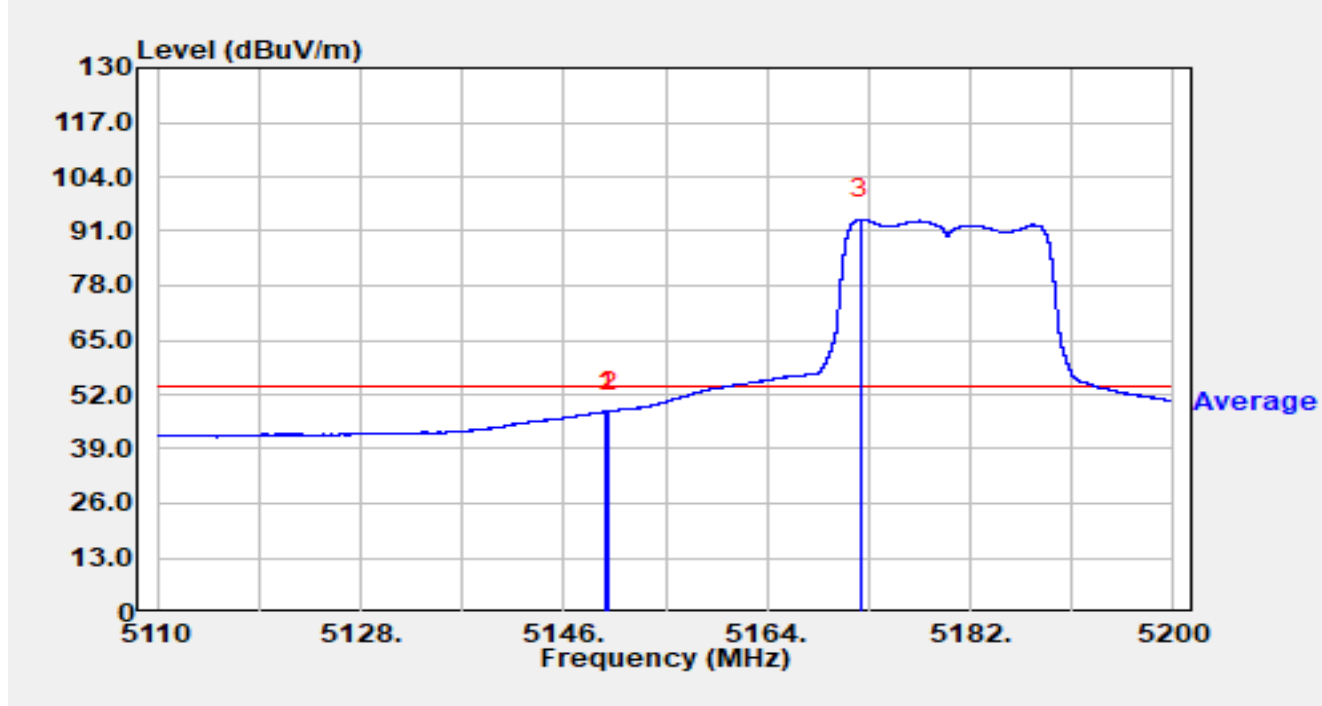


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5148.367	40.86	19.77	60.63	-13.37	74.00	Peak
2		5150.000	37.42	19.78	57.20	-16.80	74.00	Peak
3		5183.026	80.11	19.60	99.71	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-18
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT20 at 5180MHz		

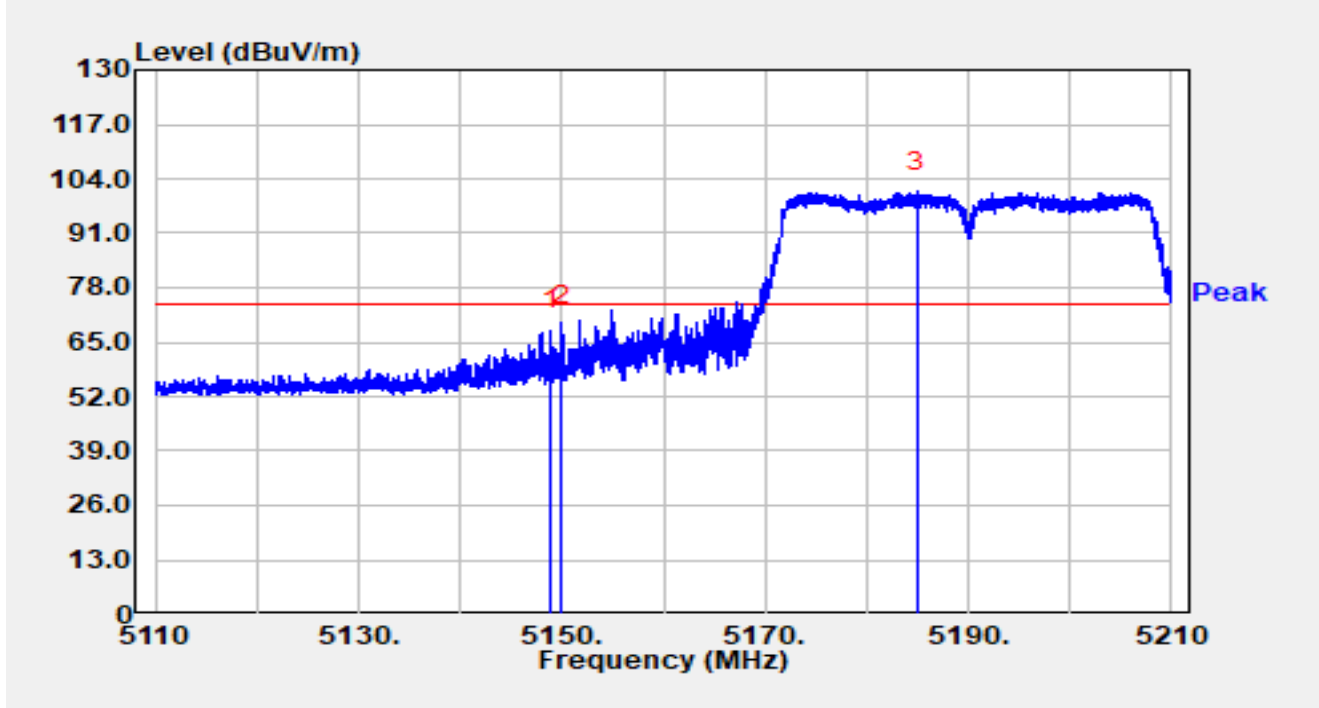


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		5149.708	28.19	19.78	47.97	-6.03	54.00	Average
2	*	5150.000	28.26	19.78	48.04	-5.96	54.00	Average
3		5172.316	73.97	19.77	93.74	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-19
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT40 at 5190MHz		

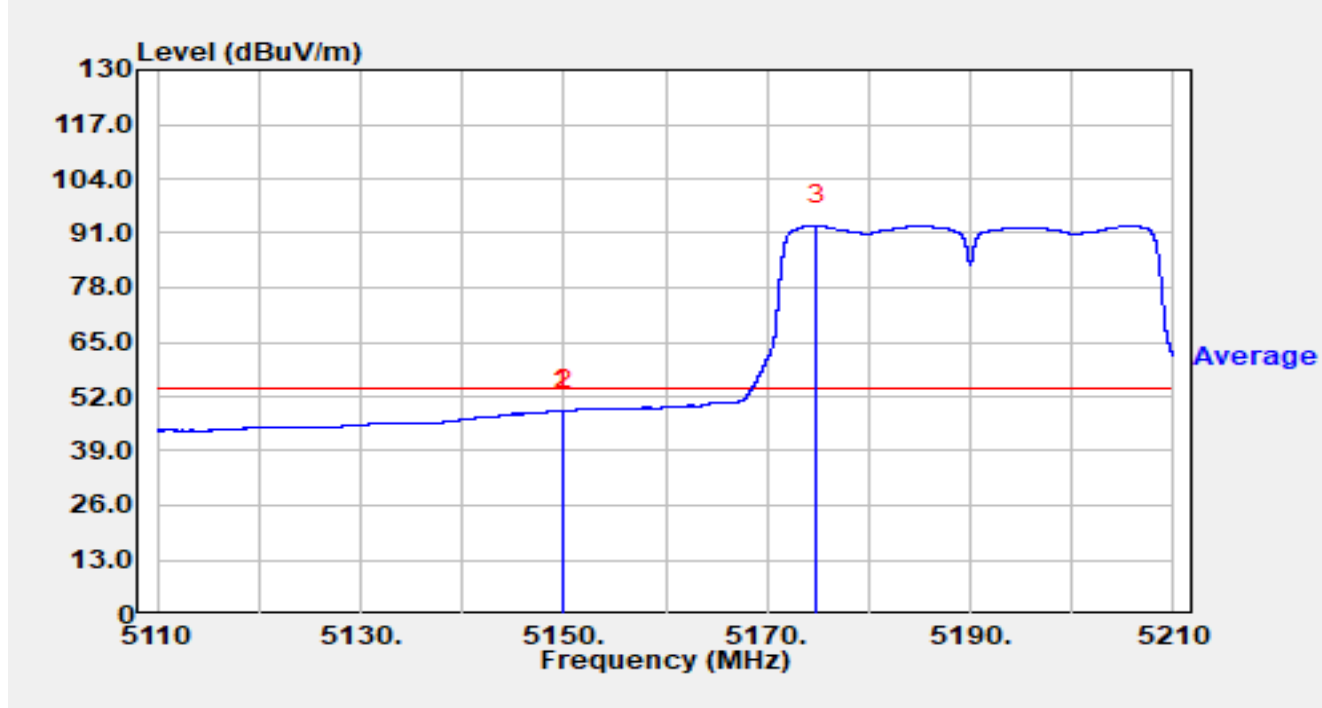


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1		5148.950	48.17	19.78	67.94	-6.06	74.00	Peak
2	*	5150.000	48.91	19.78	68.69	-5.31	74.00	Peak
3		5184.990	81.47	19.56	101.03	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-19
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Horizontal
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT40 at 5190MHz		

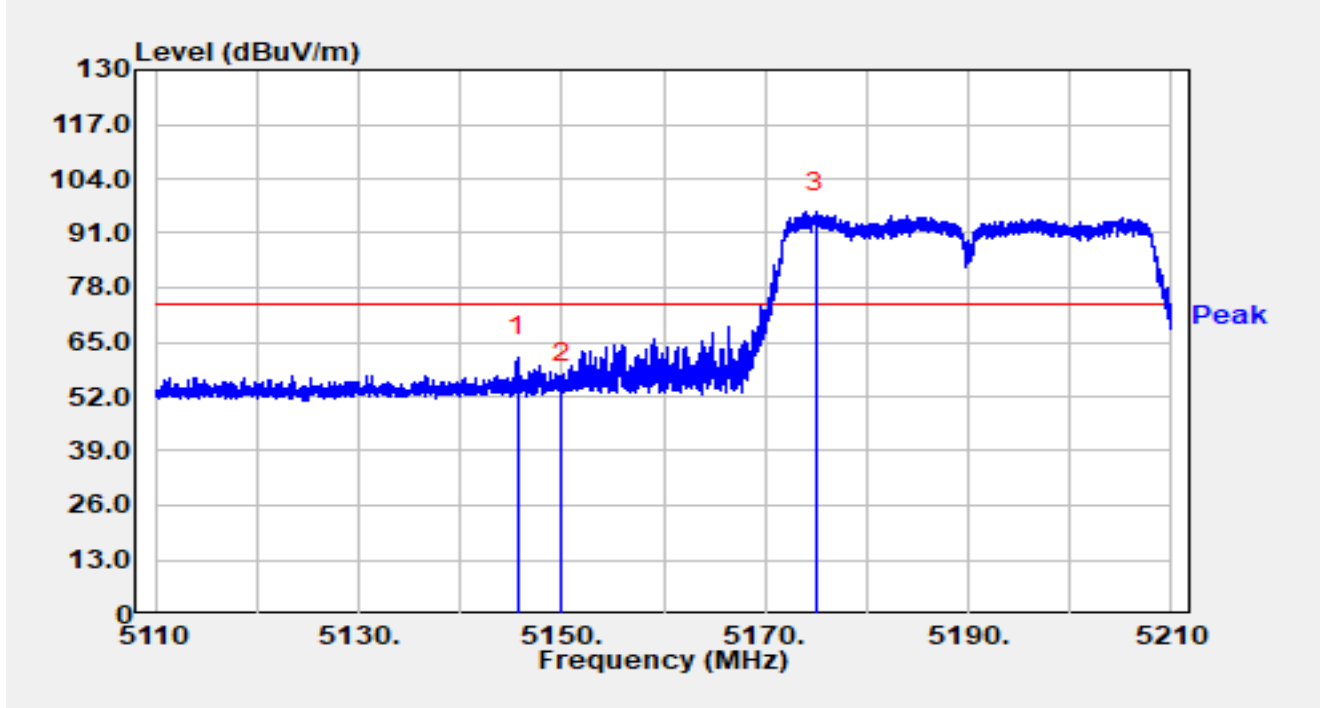


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5149.840	28.85	19.78	48.63	-5.37	54.00	Average
2		5150.000	28.79	19.78	48.57	-5.43	54.00	Average
3		5174.870	73.09	19.73	92.82	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-19
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_PK	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT40 at 5190MHz		

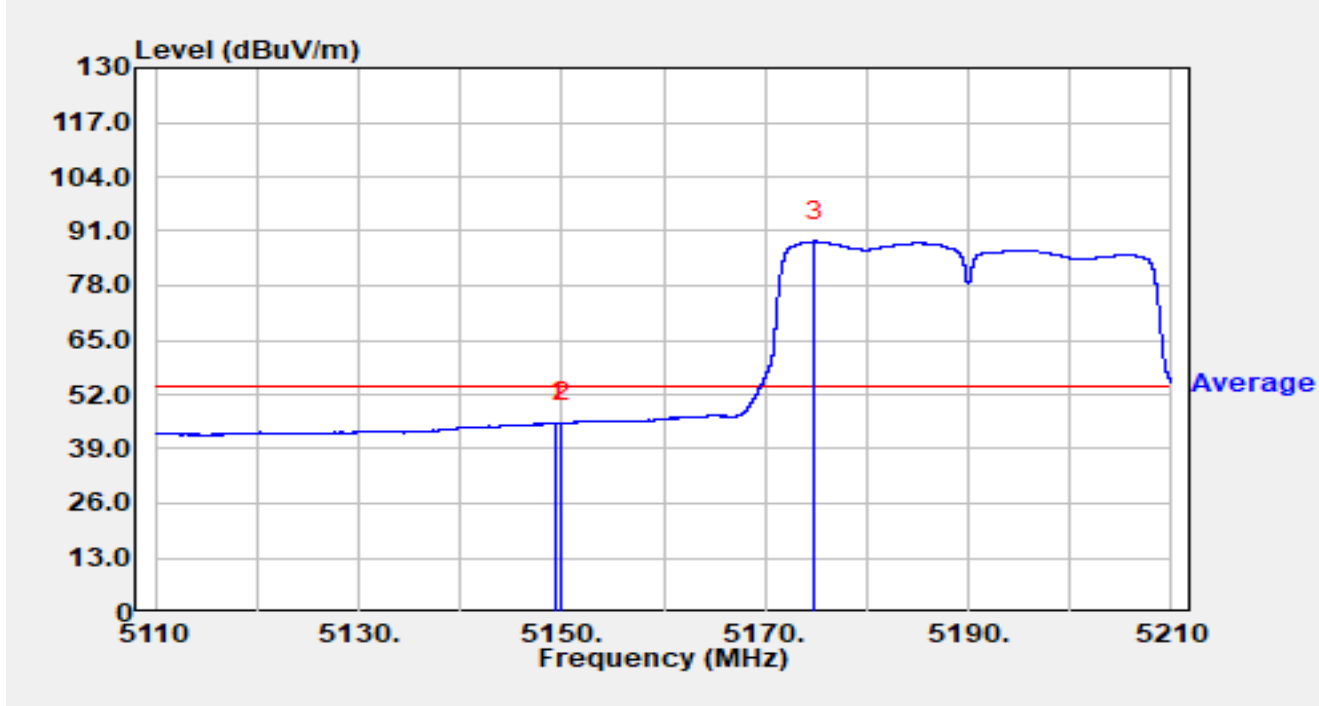


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5145.690	41.64	19.74	61.38	-12.62	74.00	Peak
2		5150.000	35.31	19.78	55.09	-18.91	74.00	Peak
3		5175.060	76.40	19.73	96.12	N/A	N/A	Peak

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

Site	WZ-AC2	Test Date	2024-12-19
Temperature	20.7°C	Humidity	40.3%
Limit	FCC_Part 15_Band Edge(3m)_AV	Test Engineer	Dick Shen
Factor	BBHA 9120D_1457_1-18GHz	Polarity	Vertical
EUT	Toniebox 2	Test Voltage	By Battery
Test Mode	Transmit by 802.11n-HT40 at 5190MHz		



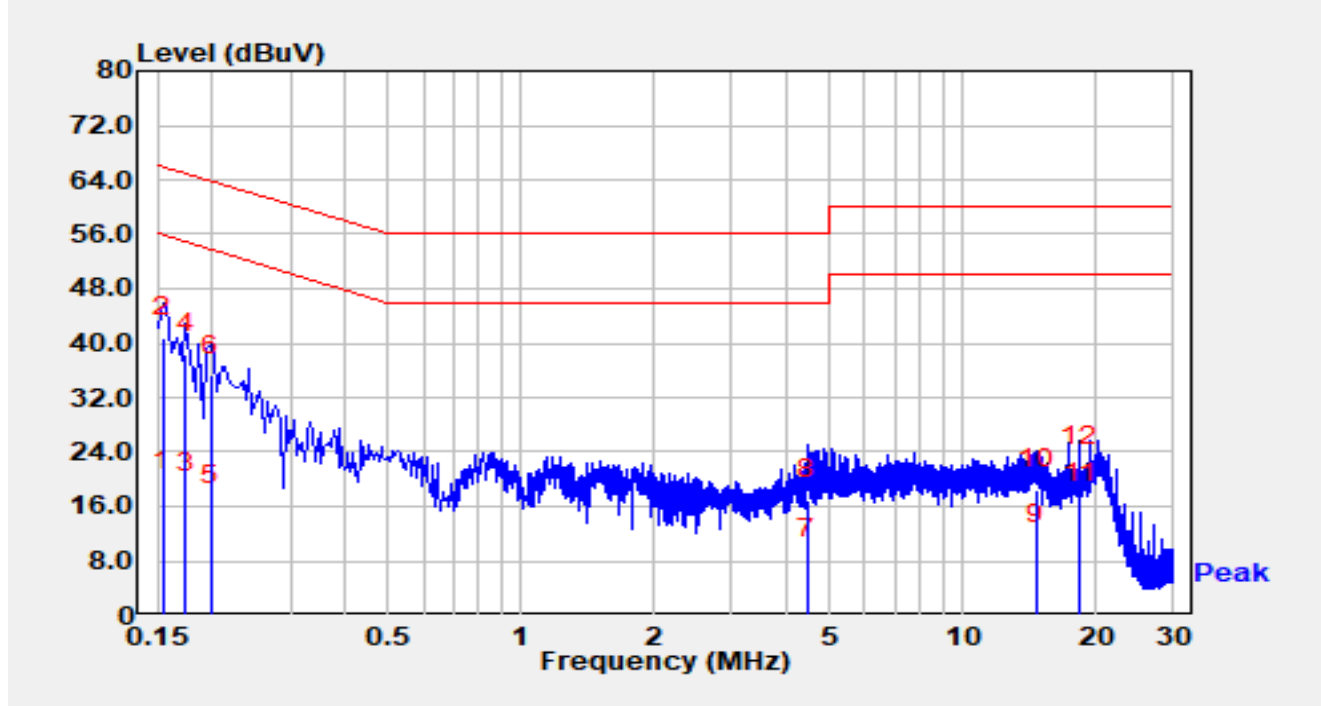
No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB/m)	Measurement (dBμV/m)	Margin (dB)	Limit (dBμV/m)	Detector
1	*	5149.510	25.50	19.78	45.28	-8.72	54.00	Average
2		5150.000	25.37	19.78	45.15	-8.85	54.00	Average
3		5174.820	68.83	19.73	88.56	N/A	N/A	Average

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB/m) = Antenna Factor (dB/m) + Cable Loss (dB) + 16dB Attenuation (dB) - AMP (dB).
3. Measurement (dBμV/m) = Reading (dBμV) + C.F (dB/m).

A.8 AC Conducted Emissions Test Result

Site	WZ-SR2	Test Date	2025-01-17
Temperature	17.0°C	Humidity	28.2%
Limit	FCC Part 15.207_CE_Mains	Test Engineer	Linda Wei
Factor	ENV216_101683_L1_Filter Off_E	Polarity	Line
EUT	Toniebox 2	Test Voltage	AC 120V/60Hz
Test Mode	Transmit by 802.11n-HT20 at 5240MHz		

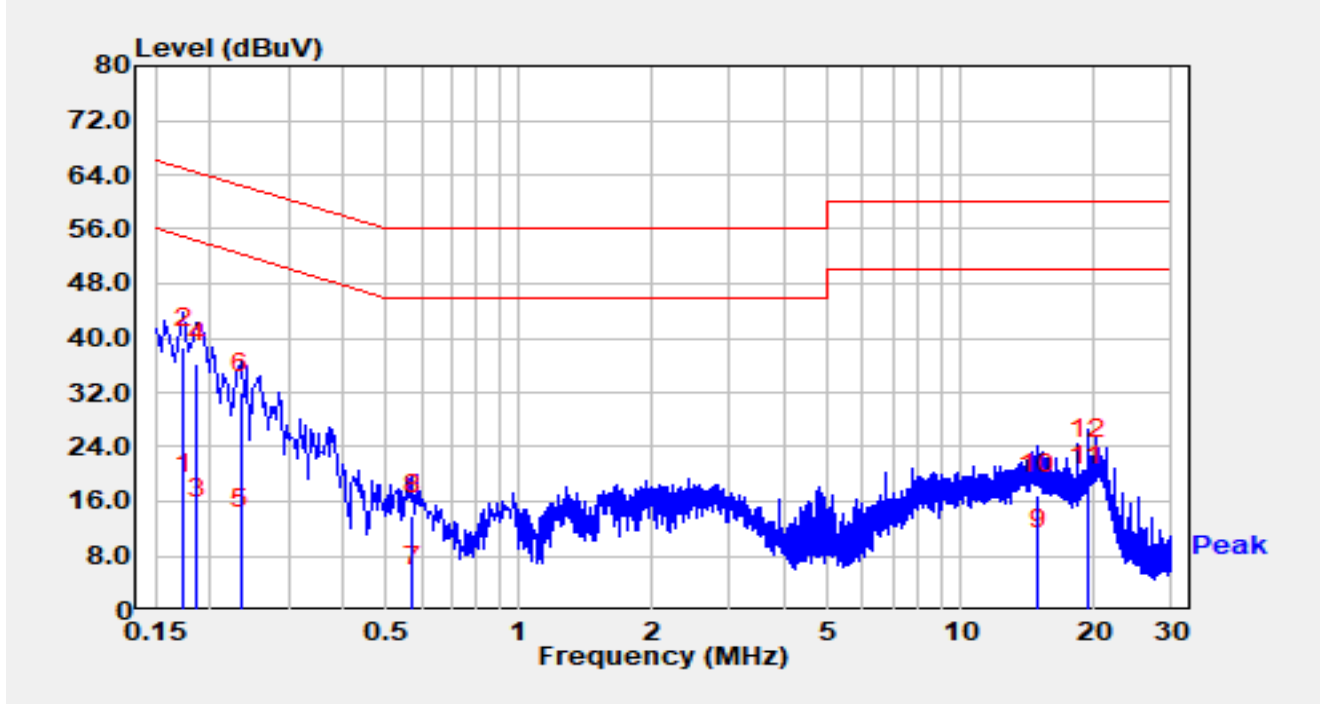


No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB)	Measurement (dBμV)	Margin (dB)	Limit (dBμV)	Detector
1		0.154	8.50	9.78	18.28	-37.50	55.78	Average
2	*	0.154	31.10	9.78	40.88	-24.90	65.78	QP
3		0.174	8.20	9.78	17.98	-36.79	54.77	Average
4		0.174	28.70	9.78	38.48	-26.29	64.77	QP
5		0.198	6.30	9.79	16.09	-37.60	53.69	Average
6		0.198	25.40	9.79	35.19	-28.50	63.69	QP
7		4.440	-2.30	10.52	8.22	-37.78	46.00	Average
8		4.440	6.50	10.52	17.02	-38.98	56.00	QP
9		14.620	-0.80	11.23	10.43	-39.57	50.00	Average
10		14.620	7.20	11.23	18.43	-41.57	60.00	QP
11		18.430	5.10	11.35	16.45	-33.55	50.00	Average
12		18.430	10.50	11.35	21.85	-38.15	60.00	QP

Notes:

1. "*", means this data is the worst emission level.
2. C.F (dB) = LISN Factor (dB) + Cable Loss (dB).
3. Measurement (dB μ V) = Reading (dB μ V) + C.F (dB).

Site	WZ-SR2	Test Date	2025-01-17
Temperature	17.0°C	Humidity	28.2%
Limit	FCC Part 15.207_CE_Mains	Test Engineer	Linda Wei
Factor	ENV216_101683_N_Filter Off_E	Polarity	Neutral
EUT	Toniebox 2	Test Voltage	AC 120V/60Hz
Test Mode	Transmit by 802.11n-HT20 at 5240MHz		



No	Mark	Frequency (MHz)	Reading (dBμV)	C.F (dB)	Measurement (dBμV)	Margin (dB)	Limit (dBμV)	Detector
1		0.174	7.40	9.76	17.16	-37.60	54.77	Average
2	*	0.174	28.80	9.76	38.56	-26.20	64.77	QP
3		0.186	3.70	9.77	13.47	-40.74	54.21	Average
4		0.186	26.50	9.77	36.27	-27.94	64.21	QP
5		0.234	2.00	9.79	11.79	-40.52	52.31	Average
6		0.234	22.20	9.79	31.99	-30.32	62.31	QP
7		0.574	-6.50	9.95	3.45	-42.55	46.00	Average
8		0.574	4.00	9.95	13.95	-42.05	56.00	QP
9		15.010	-2.30	11.30	9.00	-41.00	50.00	Average
10		15.010	5.70	11.30	17.00	-43.00	60.00	QP
11		19.400	6.80	11.48	18.28	-31.72	50.00	Average
12		19.400	10.60	11.48	22.08	-37.92	60.00	QP

Notes:

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

2. $C.F (dB) = LISN \text{ Factor } (dB) + \text{Cable Loss } (dB)$.
3. $\text{Measurement } (dB\mu V) = \text{Reading } (dB\mu V) + C.F (dB)$.

Appendix B - Test Setup Photograph

Refer to “2410RSU073-UT” file.

Appendix C - EUT Photograph

Refer to “2410RSU073-UE” file.

The End
