



RF MEASUREMENT REPORT

FCC ID: 2ALZG-320

Applicant: Qingdao Magene Intelligence Technology Co., Ltd.

Product: Radar Tail Light

Model No.: P0108001, SEEMEE 508

Brand Name: Magene, MAGICSHINE

FCC Classification: Part 15 Low Power Communication Device Transmitter (DXX)

FCC Rule Part(s): Part 15.249

Test Procedure(s): ANSI C63.10 - 2013

Result: Complies

Test Date: 2022-07-30 ~ 2022-08-03

Reviewed By:

Jame Yuan

Approved By:

Robin Wu



The test results relate only to the samples tested.

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

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

Revision History

Report No.	Version	Description	Issue Date	Note
2207RSU011-U1	Rev. 01	Initial Report	2022-08-05	Valid

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1. General Information

1.1. Applicant

Qingdao Magene Intelligence Technology Co., Ltd.

Room 302, Building 3, No.328A Chengkang Road, Xiazhuang Subdistrict, Chengyang District, Qingdao, Shandong, China.

1.2. Manufacturer

Qingdao Magene Intelligence Technology Co., Ltd.

Room 302, Building 3, No.328A Chengkang Road, Xiazhuang Subdistrict, Chengyang District, Qingdao, Shandong, China.

1.3. Testing Facility

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

1.4. Product Information

Product Name	Radar Tail Light
Model No.	P0108001, SEEMEE 508
EUT Identification No.	20220711Sample#03
Temperature	-10°C ~ 50°C
Power Supply	DC 5V, 750mA
Accessories	
Battery	Model No.: YJ802656
	Capacitance: 1500mAh/5.55Wh
	Rated Voltage: 3.7V
Remark:	
1.The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	
2. The only difference between P0108001 and SEEMEE 508 is the brand name, others are the same.	

1.5. Radio Specification under Test

Frequency Range	24.00 ~ 24.25GHz
Type of Modulation	FMCW
Antenna Type	Integrated Antenna

2. Test Configuration

2.1. Test Mode

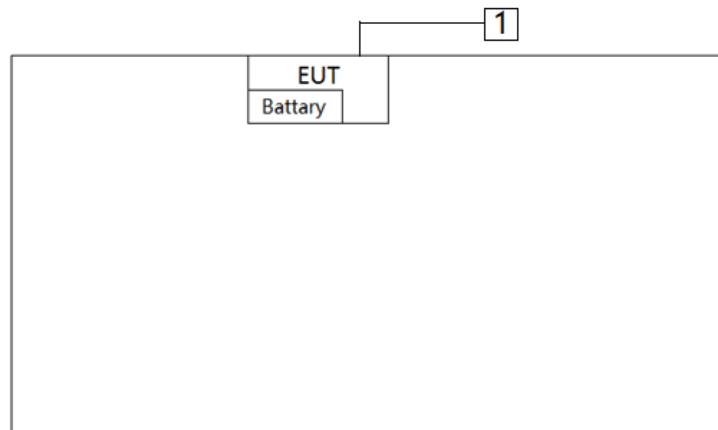
Mode 1: Collocated TX/RX mode

Note: The test sample was provided by the manufacturer, which was configured into Collocated Tx/Rx mode after power on.

2.2. Test Configuration

This device was tested per the guidance ANSI C63.10:2013 was used to reference the appropriate EUT setup for radiated emissions testing.

Connection Diagram



2.3. Test System Details

Product		Manufacturer	Model No.
1	Adapter	HUAWEI	HW-059200CHQ

2.4. 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:

This unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR3	MRTSUE06185	1 year	2022-12-29	SIP-AC1
Anechoic Chamber	RIKEN	SIP-AC1	MRTSUE06554	1 year	2022-12-23	SIP-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06559	1 year	2023-06-01	SIP-AC1
Preamplifier	EMCI	EMC051845SE	MRTSUE06600	1 year	2022-11-08	SIP-AC1
Horn Antenna	R&S	HF907	MRTSUE06610	1 year	2023-07-13	SIP-AC1
Thermohygrometer	testo	608-H1	MRTSUE06616	1 year	2022-11-02	SIP-AC1
Thermohygrometer	testo	608-H1	MRTSUE06620	1 year	2022-11-28	SIP-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06645	1 year	2022-08-26	SIP-AC1
Loop Antenna	Schwarzbeck	FMZB 1519 B	MRTSUE06937	1 year	2023-03-14	SIP-AC1
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2023-06-01	SIP-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06612	1 year	2023-06-01	SIP-SR2
Thermohygrometer	testo	608-H1	MRTSUE06621	1 year	2022-11-28	SIP-SR2
Shielding Room	MIX-BEP	SIP-SR2	MRTSUE06949	5 years	2024-10-23	SIP-SR2
Waveguide Harmonic Mixer	Keysight	M1970V	MRTSUE06271	N/A	N/A	SIP-TR2
Waveguide Harmonic Mixer	Keysight	M1970W	MRTSUE06272	N/A	N/A	SIP-TR2
mmWave Antenna	MI-WWAVE	261U-25/383	MRTSUE06273	N/A	N/A	SIP-TR2
mmWave Antenna	A-INFO	LB-15-25-A	MRTSUE06409	N/A	N/A	SIP-TR2
mmWave Antenna	A-INFO	LB-10-25-A	MRTSUE06410	N/A	N/A	SIP-TR2
Thermohygrometer	testo	622	MRTSUE06628	1 year	2023-01-06	SIP-TR2
Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2022-08-08	SIP-TR2

Software	Version	Function
EMI V3	V 3.0.0	EMI Test Software
Controller_MF 7802BS	1.02	RE Antenna & turntable
MotorContor	V 2	mmw

5. Measurement Uncertainty

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

AC Conducted Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 9kHz~150kHz: 3.74dB 150kHz~30MHz: 3.44dB
Radiated Emission Measurement
Measurement Uncertainty for a Level of Confidence of 95% ($U=2U_c(y)$): 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

6. Test Result

6.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Verdict
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	Pass
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Radiated	Pass
15.215(c)	20dB Spectrum Bandwidth	Radiated	Pass

Notes:

1. The radiation measurements are performed in X, Y, Z axis positioning. 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.
3. "N/A" means that this item is not applicable, and the detail information refer to relevant section.

6.2. AC Conducted Emissions Measurement

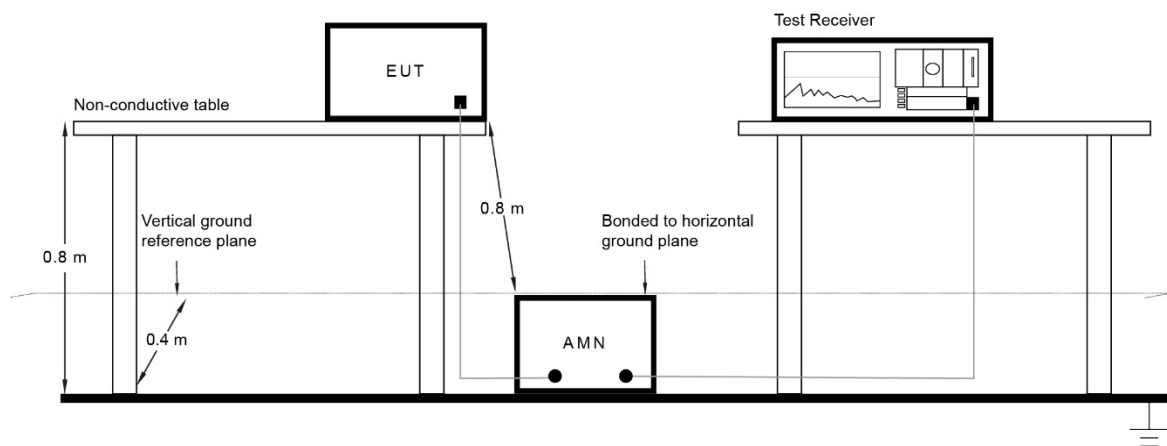
6.2.1. Test Limit

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.

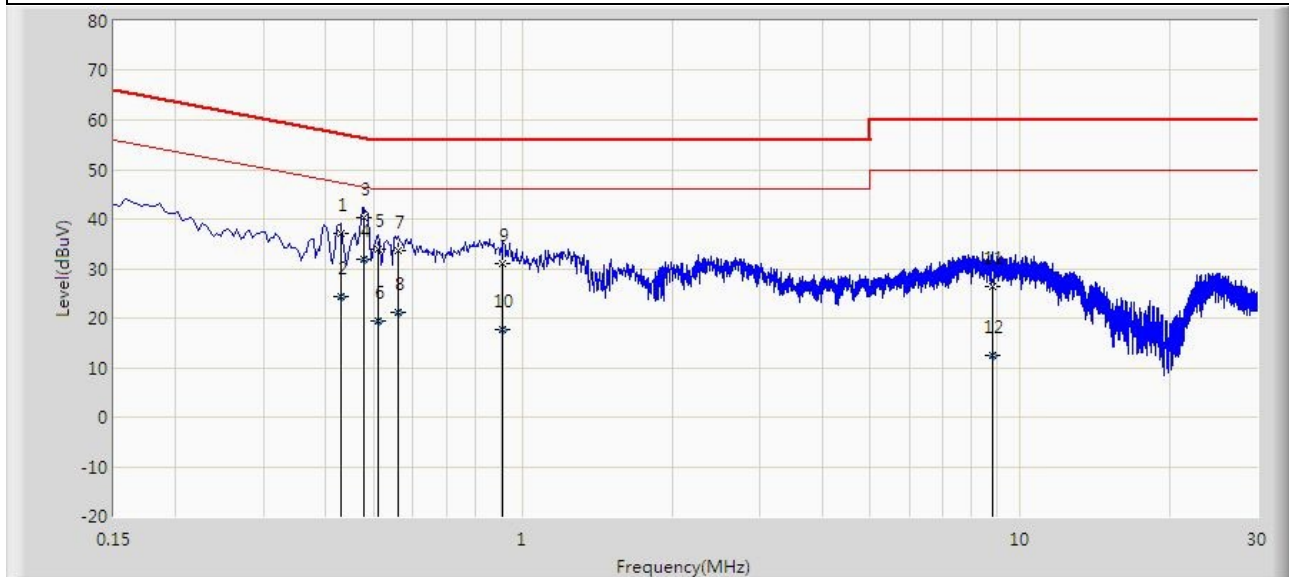
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

6.2.2. Test Setup



6.2.3.Test Result

Site: SIP-SR2	Time: 2022/08/03 - 11:09
Temperature: 28.6°C	Humidity: 52.8%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Miron Ding
Probe: SIP-SR2-ENV216_101684_E	Polarity: Line
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



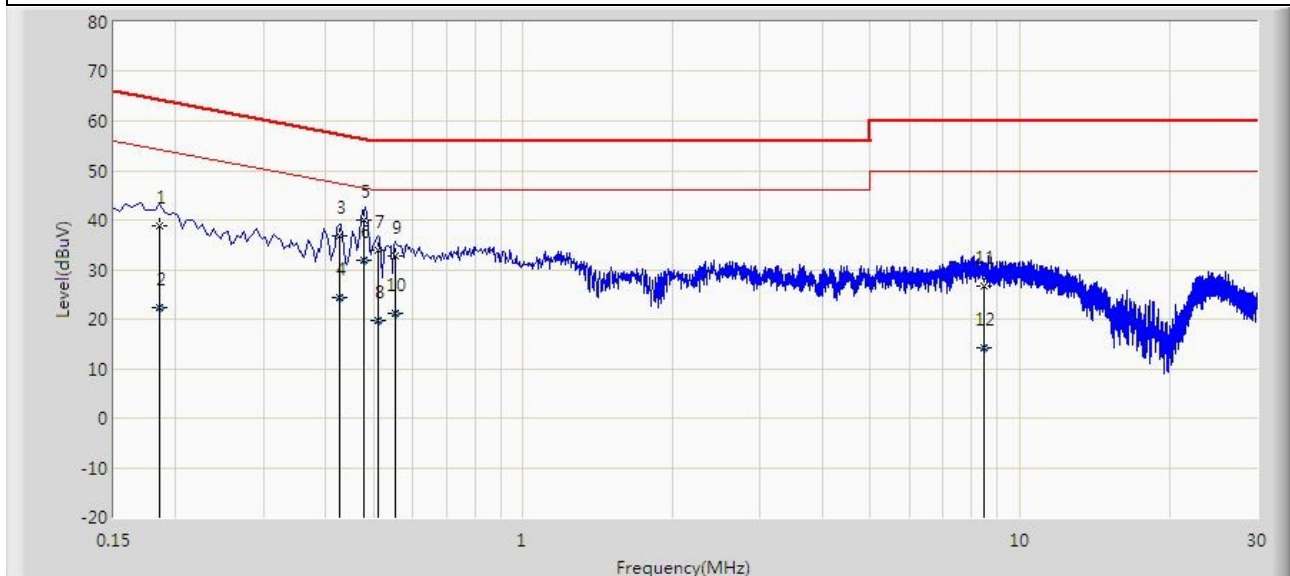
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.430	36.983	27.160	-20.270	57.253	9.823	QP
2		0.430	24.305	14.482	-22.948	47.253	9.823	AV
3		0.477	40.325	30.500	-16.066	56.391	9.825	QP
4	*	0.477	31.925	22.100	-14.466	46.391	9.825	AV
5		0.510	33.838	24.012	-22.162	56.000	9.827	QP
6		0.510	19.402	9.575	-26.598	46.000	9.827	AV
7		0.562	33.541	23.711	-22.459	56.000	9.830	QP
8		0.562	21.155	11.325	-24.845	46.000	9.830	AV
9		0.910	31.003	21.159	-24.997	56.000	9.844	QP
10		0.910	17.818	7.974	-28.182	46.000	9.844	AV
11		8.790	26.492	15.793	-33.508	60.000	10.699	QP
12		8.790	12.554	1.855	-37.446	50.000	10.699	AV

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

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

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

Site: SIP-SR2	Time: 2022/08/03 - 11:15
Temperature: 28.6°C	Humidity: 52.8%
Limit: FCC_Part15.207_CE_AC Power	Engineer: Miron Ding
Probe: SIP-SR2-ENV216_101684_E	Polarity: Neutral
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.186	38.969	29.228	-25.244	64.213	9.741	QP
2		0.186	22.270	12.529	-31.943	54.213	9.741	AV
3		0.426	36.767	26.949	-20.564	57.330	9.818	QP
4		0.426	24.429	14.611	-22.901	47.330	9.818	AV
5		0.477	40.020	30.200	-16.372	56.391	9.820	QP
6	*	0.477	31.820	22.000	-14.572	46.391	9.820	AV
7		0.510	33.933	24.112	-22.067	56.000	9.821	QP
8		0.510	19.707	9.886	-26.293	46.000	9.821	AV
9		0.554	32.684	22.862	-23.316	56.000	9.822	QP
10		0.554	21.214	11.392	-24.786	46.000	9.822	AV
11		8.457	26.738	16.100	-33.262	60.000	10.638	QP
12		8.457	14.138	3.500	-35.862	50.000	10.638	AV

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

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

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

6.3. Radiated Emission

6.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.249		
Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (μ V/m)
902 ~ 928	50	500
2400 ~ 2483.5	50	500
5725 ~ 5875	50	500
24000 ~ 24250	250	2500
Note: FCC Part 15.249 (d), Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.		

FCC Part 15 Subpart C Paragraph 15.209		
Frequency (MHz)	Field Strength (μ V/m)	Measurement Distance (m)
0.009 ~ 0.490	$2400/F(\text{kHz})$	300
0.490 ~ 1.705	$24000/F(\text{kHz})$	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3
Note 1: The lower limit shall apply at the transition frequency.		
Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.		
Note 3: E field strength (dB μ V/m) = 20 log E field strength (μ V/m).		

6.3.2. Test Procedure

ANSI C63.10-2013 Section 6.3

ANSI C63.10-2013 Section 6.4

ANSI C63.10-2013 Section 6.5

ANSI C63.10-2013 Section 6.6

6.3.3. Test Setting

Measurement of harmonic and spurious emissions above 40 GHz

1. Connect the test antenna covering the appropriate frequency range to a spectrum analyzer via an external mixer.
2. Set spectrum analyzer RBW = 1MHz, VBW = 3MHz, peak & average detector.
3. Maximize all observed emissions. Note the maximum power indicated on the spectrum analyzer. Adjust this reading, if necessary, by the conversion loss of the external mixer used at the frequency under investigation and the external mixer IF cable loss.
4. Calculate the maximum field strength of the emission at the measurement distance.
5. Calculate the power density at the distance specified by the limit from the field strength at the distance specified by the limit.
6. Repeat the preceding sequence for every emission observed in the frequency band under investigation.

Measurement of harmonic and spurious emissions below 40 GHz

Peak Field Strength Measurements

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

Table 1 - RBW as a function of frequency

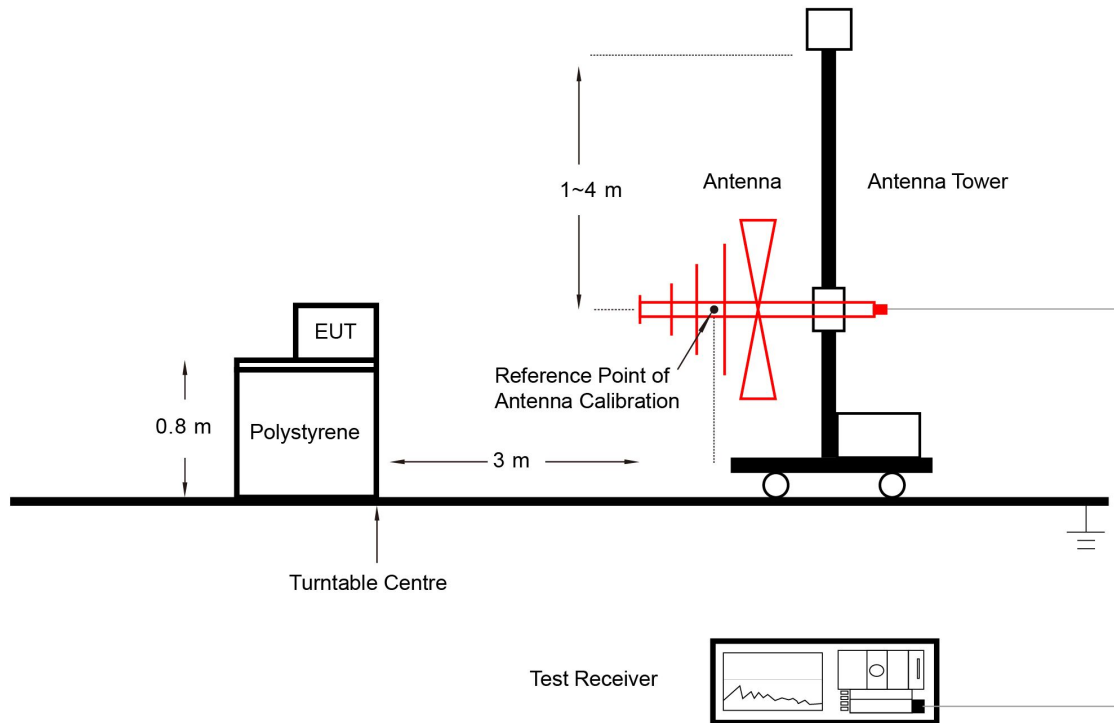
Frequency	RBW
9 ~ 150 kHz	200 Hz
0.15 ~ 30 MHz	9 kHz
30 ~ 1000 MHz	120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements

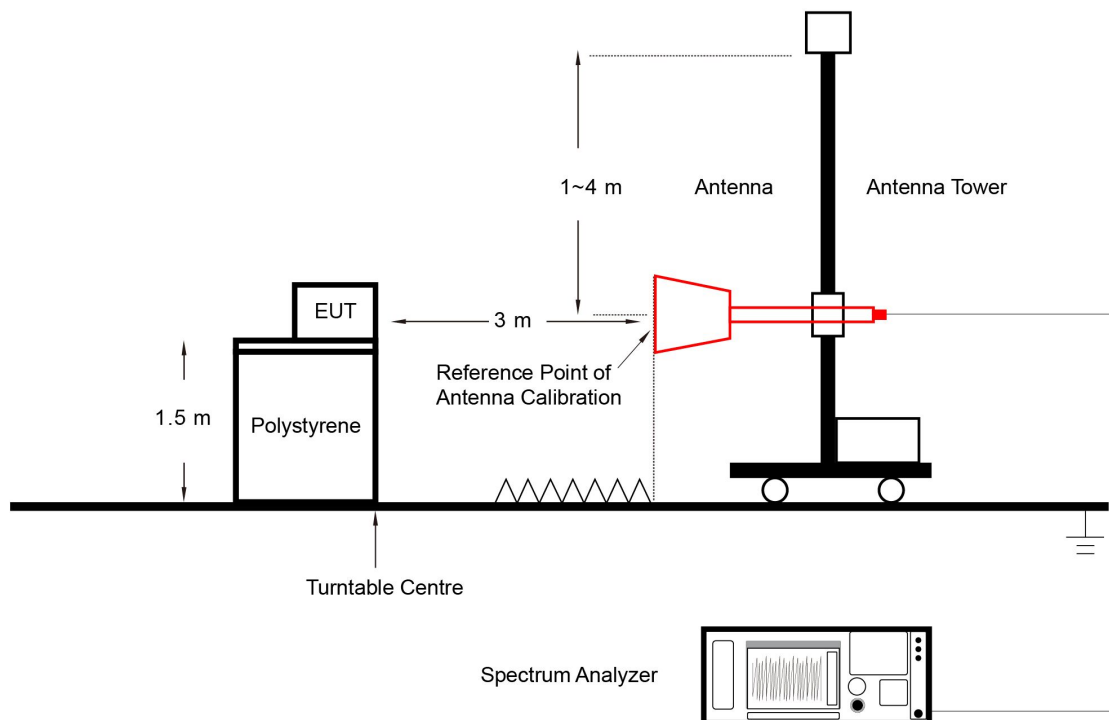
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain).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

6.3.4. Test Setup

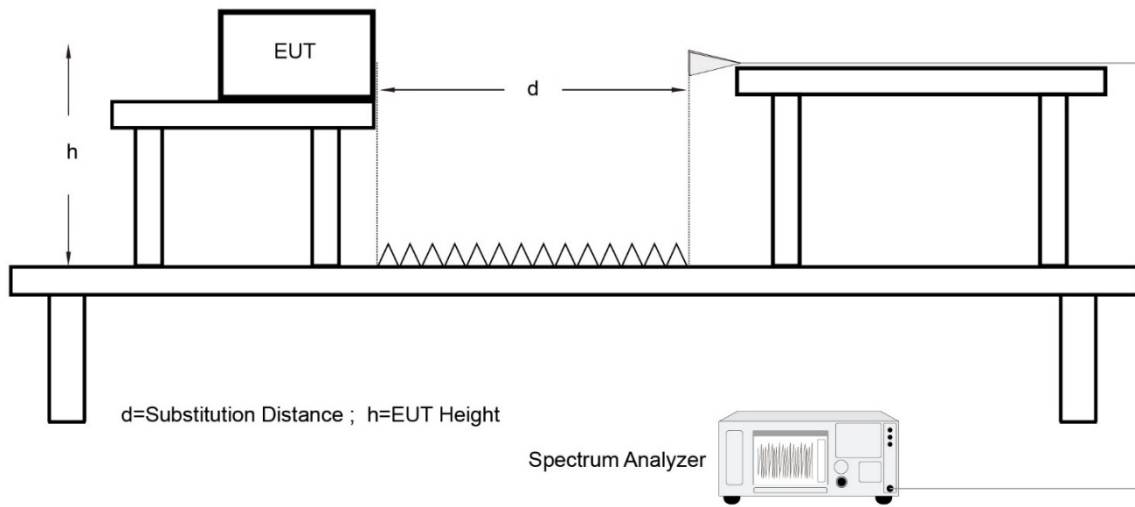
Below 1GHz Test Setup:



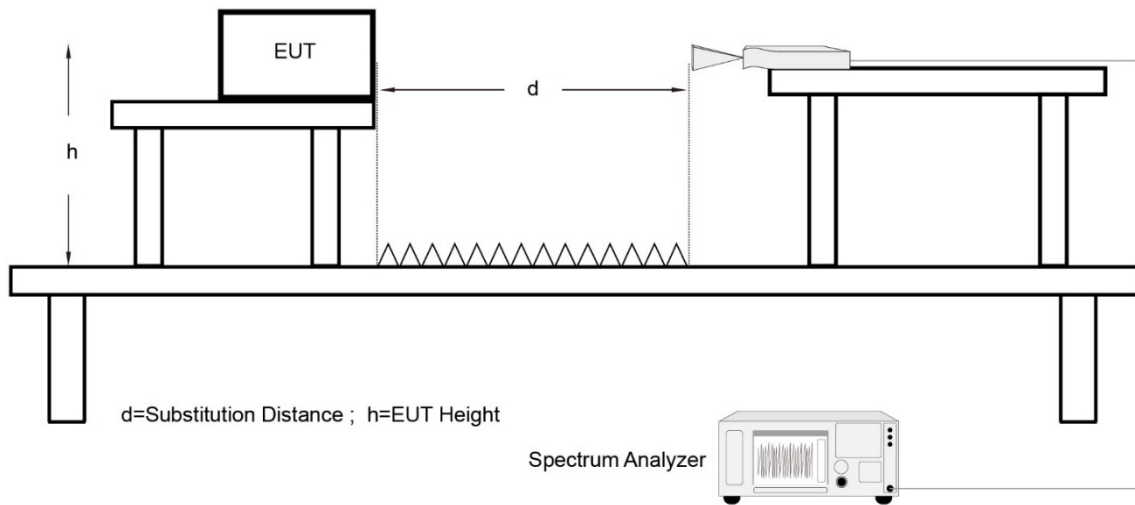
1GHz ~ 40GHz Test Setup:



40GHz ~ 50GHz Test Setup:



Above 50GHz Test Setup:



6.3.5. Test Result

Test Site	SIP-AC1	Test Date	2022/07/30
Test Engineer	Arvin Ding	Test Mode	Mode 1

Frequency Band (GHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level @3m (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Result
Fundamental Radiated Emission							
24.00 ~ 24.25	113.017	-8.599	104.418	128	-23.582	Peak	Pass
	95.735	-8.584	87.151	108	-20.849	Average	Pass

Notes:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
- The Vertical and Horizontal polarization were evaluated, only the worst-case test results are shown in the table.

Test Site	SIP-AC1	Test Date	2022/07/30
Test Engineer	Arvin Ding	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Below 1GHz							
46.0	0.9	18.3	19.2	40.0	-20.8	Peak	Horizontal
65.9	0.3	17.4	17.7	40.0	-22.3	Peak	Horizontal
163.4	1.4	18.1	19.5	43.5	-24.0	Peak	Horizontal
463.1	2.4	22.8	25.2	46.0	-20.8	Peak	Horizontal
594.1	2.7	25.8	28.5	46.0	-17.5	Peak	Horizontal
791.9	2.8	28.6	31.4	46.0	-14.6	Peak	Horizontal
37.8	1.5	17.5	19.0	40.0	-21.0	Peak	Vertical
68.8	5.0	17.0	22.0	40.0	-18.0	Peak	Vertical
259.9	4.4	17.0	21.4	46.0	-24.6	Peak	Vertical
324.9	4.8	19.4	24.2	46.0	-21.8	Peak	Vertical
729.4	3.3	28.0	31.3	46.0	-14.7	Peak	Vertical
933.1	2.7	30.4	33.1	46.0	-12.9	Peak	Vertical

Note:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
- The amplitude of radiated emissions (frequency range from 9kHz to 30MHz) 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.
- QP measurement was not performed when peak measure level was lower than the QP limit.

Test Site	SIP-AC1	Test Date	2022/07/30
Test Engineer	Arvin Ding	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Between 1GHz ~ 40GHz							
4918.5	56.7	-9.4	47.3	74.0	-26.7	Peak	Horizontal
9474.5	48.1	-4.1	44.0	74.0	-30.0	Peak	Horizontal
17337.0	42.8	7.9	50.7	74.0	-23.3	Peak	Horizontal
5581.5	49.8	-8.9	40.9	74.0	-33.1	Peak	Vertical
10749.5	47.4	-3.5	43.9	74.0	-30.1	Peak	Vertical
16895.0	44.2	6.1	50.3	74.0	-23.7	Peak	Vertical
23544.0	75.3	-9.5	65.8	74.0	-8.2	Peak	Horizontal
23544.0	55.4	-8.4	47.0	54.0	-7.0	Average	Horizontal
34544.0	68.0	-7.0	61.0	74.0	-7.0	Peak	Horizontal
34544.0	58.2	-7.0	51.2	54.0	-2.8	Average	Horizontal
39285.0	63.0	-0.2	62.8	74.0	-11.2	Peak	Horizontal
39285.0	53.1	-0.2	52.9	54.0	-1.1	Average	Horizontal
28659.0	66.9	-9.2	57.7	74.0	-16.3	Peak	Vertical
28659.0	56.4	-9.2	47.2	54.0	-6.8	Average	Vertical
34379.0	69.2	-7.5	61.7	74.0	-12.3	Peak	Vertical
34379.0	58.1	-7.5	50.6	54.0	-3.4	Average	Vertical
39417.0	62.1	-0.1	62.0	74.0	-12.0	Peak	Vertical
39417.0	51.9	-0.1	51.8	54.0	-2.2	Average	Vertical

Notes:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre-Amplifier Gain (dB)
- Average measurement was not performed when the peak level lower than average limit.

Test Site	SIP-TR2	Test Date	2022/08/01
Test Engineer	Chase Zhu	Test Mode	Mode 1

Frequency (GHz)	Reading Level @1m (dBμV)	Factor (dB/m)	Measure Level @1m (dBμV/m)	Measure Level @3m (dBμV/m)	Limit @3m (dBμV/m)	Margin (dB)	Detector	Result
Between 40 ~ 50GHz								
48.4	25.7	46.6	72.3	62.8	88.0	-25.2	Peak	Pass
48.4	13.4	46.6	60.0	50.5	68.0	-17.5	Average	Pass

Notes:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Between 40 ~ 50GHz:
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m)
- Between 40 ~ 50GHz:
Measure Level @3m = Measure Level @1.0m + 20 * log(1.0m / 3m)
- The Vertical and Horizontal polarization were evaluated, only the worst-case test results are shown in the table.
- The distance of testing is 1m and the height of testing is 1.25m.

Test Site	SIP-TR2	Test Date	2022/08/01
Test Engineer	Chase Zhu	Test Mode	Mode 1

Frequency (GHz)	Reading Level @0.75m (dBμV)	Factor (dB/m)	Measure Level @0.75m (dBμV/m)	Measure Level @3m (dBμV/m)	Limit @3m (dBμV/m)	Margin (dB)	Detector	Result
Above 50G								
72.5	31.1	42.7	73.8	61.8	88.0	-26.2	Peak	Pass
72.5	22.2	42.7	64.9	52.9	68.0	-15.1	Average	Pass
96.6	36.7	44.7	81.4	69.4	88.0	-18.6	Peak	Pass
96.6	26.6	44.7	71.3	59.3	68.0	-8.7	Average	Pass

Notes:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)
Above 50GHz:
Factor (dB/m) = Cable Loss (dB) + Antenna Factor (dB/m) + Mixer Conversion Loss (dB)
- Above 50GHz:
Measure Level @3m = Measure Level @0.75m + 20 * log(0.75m / 3m)
- The Vertical and Horizontal polarization were evaluated, only the worst-case test results are shown in the table.
- The distance of testing is 0.75m and the height of testing is 1.25m.

6.4. Radiated Restricted Band Edge Measurement

6.4.1. 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 [$\mu\text{V}/\text{m}$]	Measured Distance [Meter]
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

6.4.2. Test Procedure

ANSI C63.10-2013 Section 6.3

ANSI C63.10-2013 Section 6.6

ANSI C63.10-2013 Section 6.10

6.4.3. Test Setting

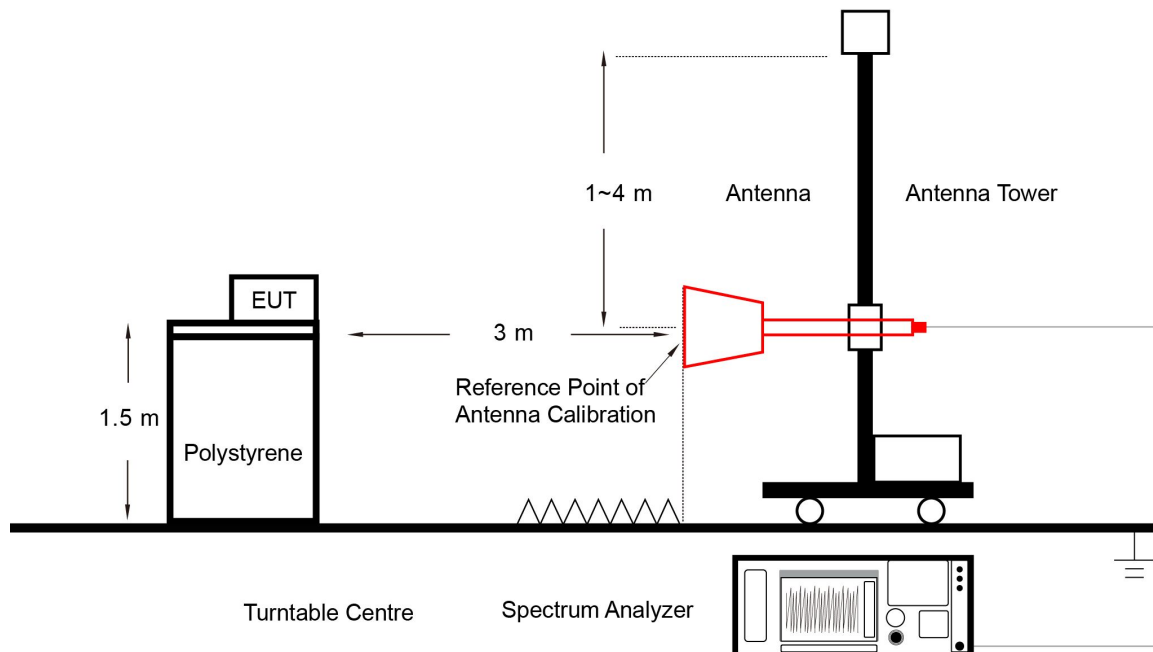
Peak Field Strength Measurements

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

Average Field Strength Measurements

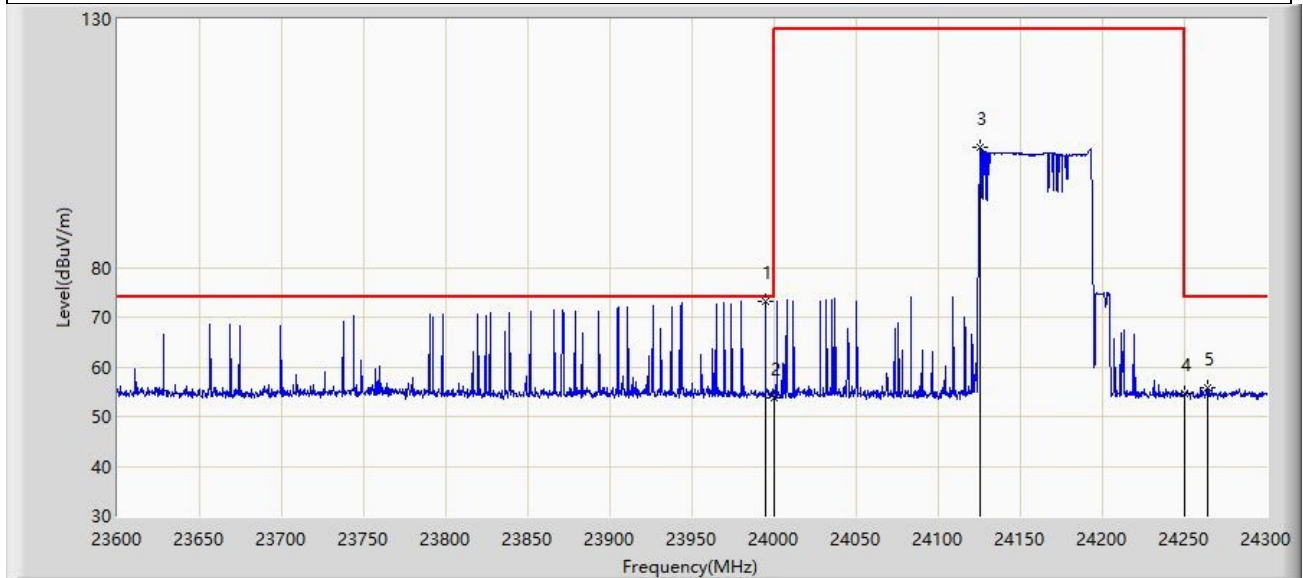
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain).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

6.4.4. Test Setup



6.4.5. Test Result

Site: SIP-AC1	Test Date: 2022/08/01
Limit: FCC_Part 15.209_RE(3m)	Engineer: Yien Qian
Probe: BBHA 9170_00935_18-40GHz	Polarity: Horizontal
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



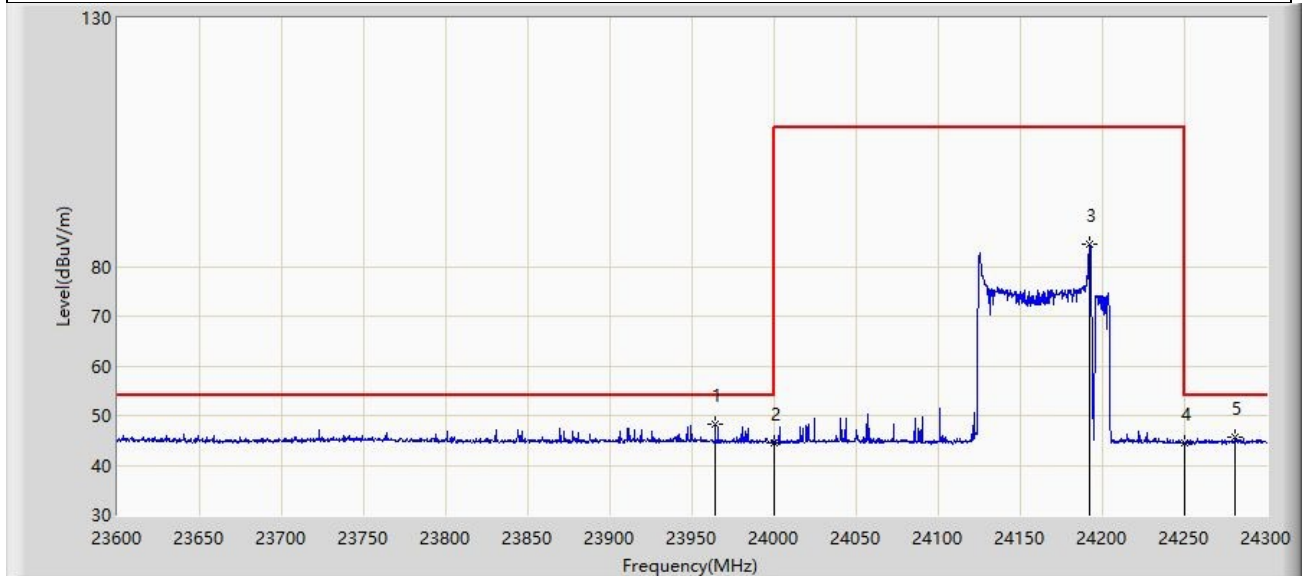
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	23994.801	73.176	82.042	-0.824	74.000	-8.865	PK
2		24000.000	53.832	62.732	-20.168	74.000	-8.900	PK
3		24125.350	104.160	113.017	-23.84	128.000	-8.858	PK
4		24250.000	54.622	63.335	-19.378	74.000	-8.713	PK
5		24263.600	55.798	64.475	-18.202	74.000	-8.677	PK

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

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

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

Site: SIP-AC1	Test Date: 2022/08/01
Limit: FCC_Part 15.209_RE(3m)	Engineer: Yien Qian
Probe: BBHA 9170_00935_18-40GHz	Polarity: Horizontal
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



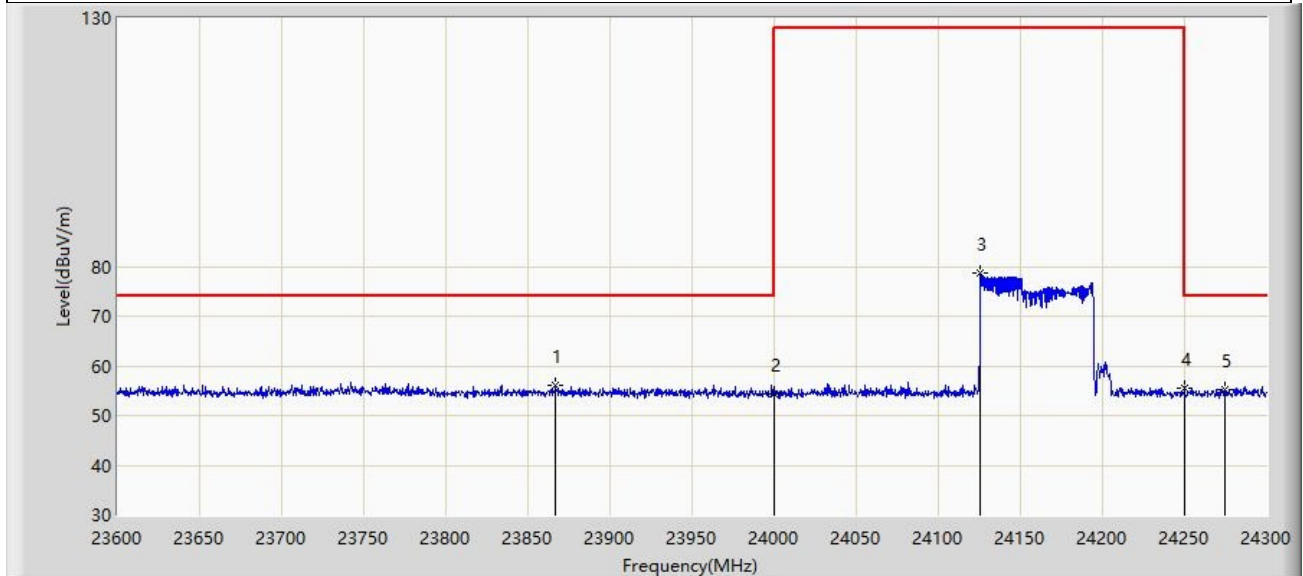
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	23964.000	48.264	56.959	-5.736	54.000	-8.695	AV
2		24000.000	44.529	53.429	-9.471	54.000	-8.900	AV
3		24191.850	84.350	92.948	-23.65	108.000	-8.598	AV
4		24250.000	44.483	53.196	-9.517	54.000	-8.713	AV
5		24281.100	45.598	54.200	-8.402	54.000	-8.603	AV

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

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

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

Site: SIP-AC1	Test Date: 2022/08/01
Limit: FCC_Part 15.209_RE(3m)	Engineer: Yien Qian
Probe: BBHA 9170_00935_18-40GHz	Polarity: Vertical
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



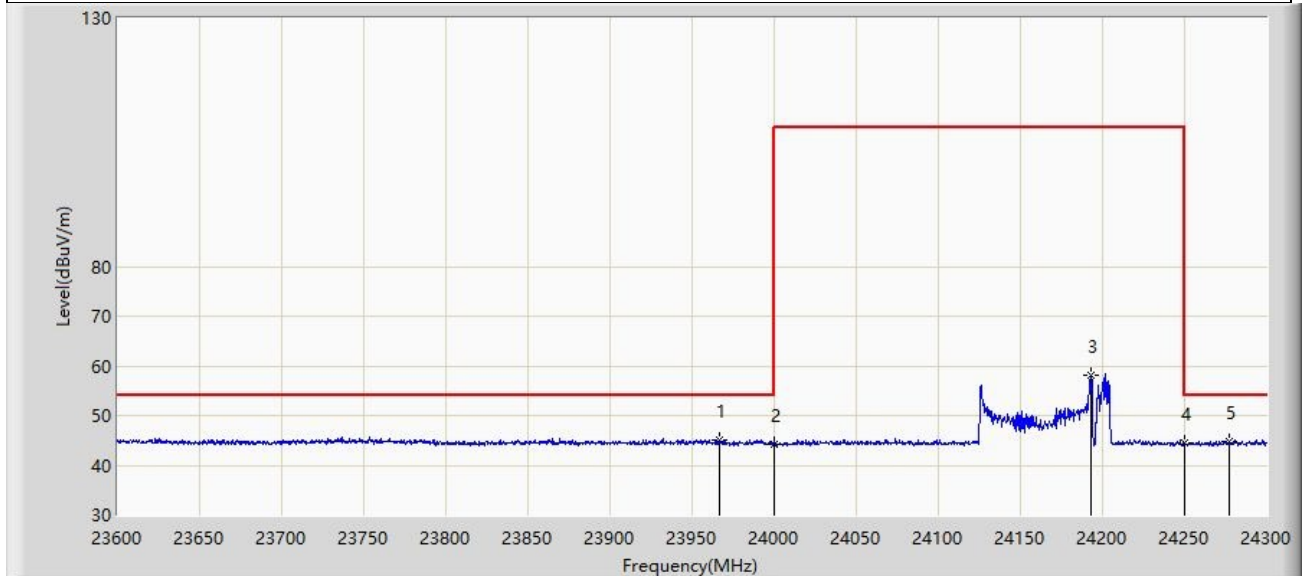
No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	23867.051	56.024	64.647	-17.976	74.000	-8.623	PK
2		24000.000	54.469	63.369	-19.531	74.000	-8.900	PK
3		24125.699	78.705	87.561	-49.295	128.000	-8.857	PK
4		24250.000	55.574	64.287	-18.426	74.000	-8.713	PK
5		24274.449	55.347	63.984	-18.653	74.000	-8.637	PK

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

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

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

Site: SIP-AC1	Test Date: 2022/08/01
Limit: FCC_Part 15.209_RE(3m)	Engineer: Yien Qian
Probe: BBHA 9170_00935_18-40GHz	Polarity: Vertical
EUT: Radar Tail Light	Power: By Battery
Test Mode: Transmit at 24GHz	



No	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB/m)	Type
1	*	23966.449	45.177	53.884	-8.823	54.000	-8.707	AV
2		24000.000	44.246	53.146	-9.754	54.000	-8.900	AV
3		24192.900	58.254	66.854	-49.746	108.000	-8.601	AV
4		24250.000	44.359	53.072	-9.641	54.000	-8.713	AV
5		24276.900	44.867	53.491	-9.133	54.000	-8.625	AV

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

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

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

6.5. 20dB Spectrum Bandwidth Measurement

6.5.1. Test Limit

Intentional radiators must be designed to ensure that the 20 dB bandwidth of the emission in the specific band.

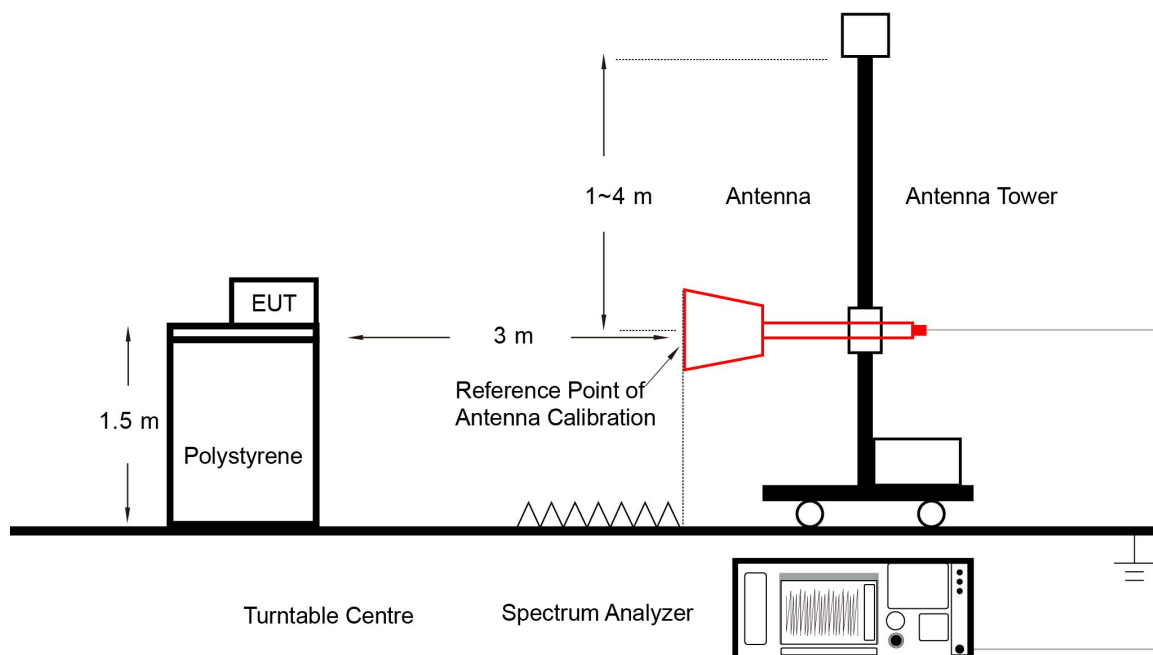
6.5.2. Test Procedure

ANSI C63.10-2013 Clause 6.9.2

6.5.3. Test Setting

1. Set the spectrum span range to overlap the nominal center frequency
2. Set RBW = 1% ~ 5% of the OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize and marker the highest level
8. Use Occupied BW function to determine two frequencies, one at the lowest frequency and the other at the highest frequency

6.5.4. Test Setup



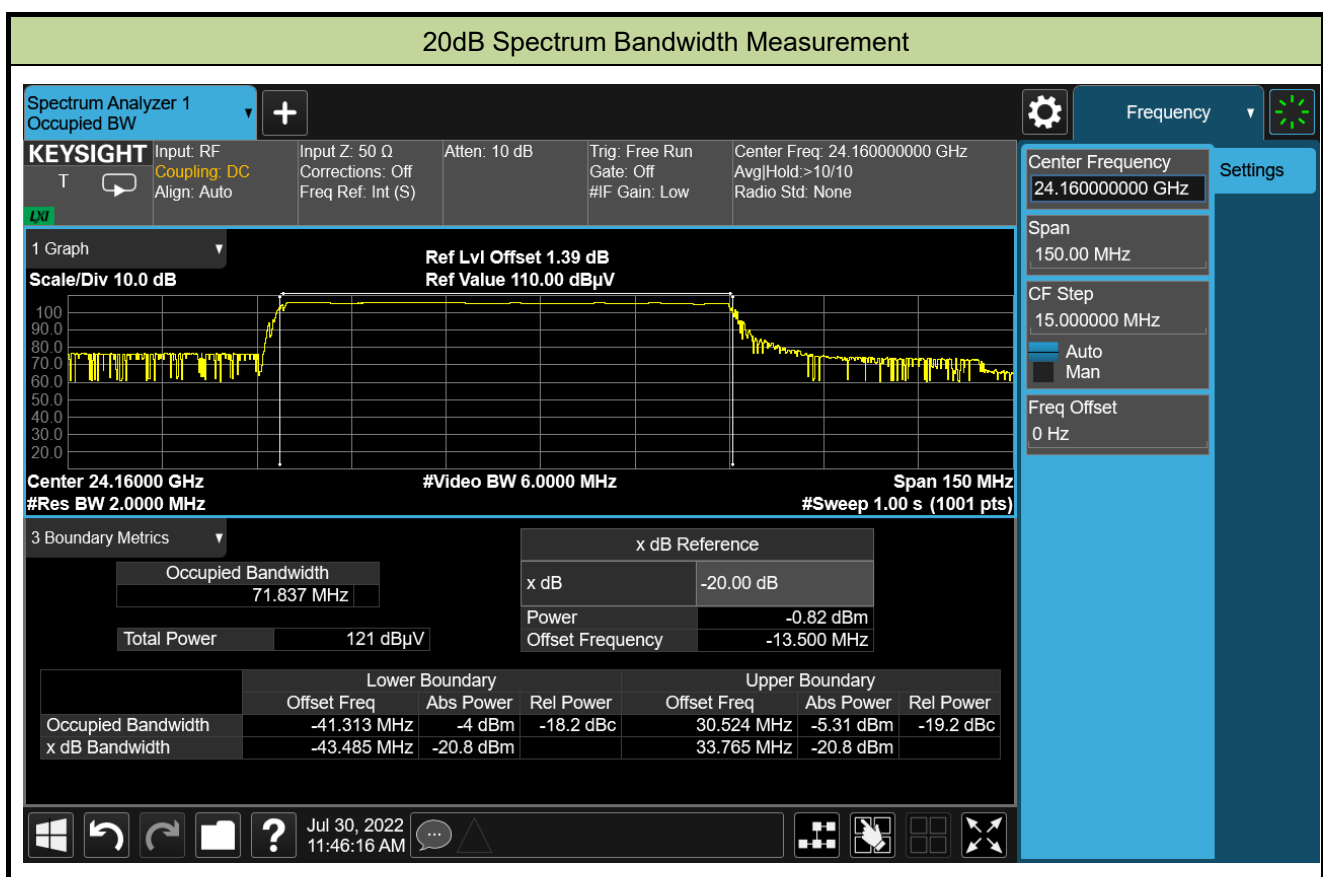
6.5.5. Test Result

Test Site	SIP-AC1	Test Date	2022/07/30
Test Engineer	Arvin Ding		

20dB Bandwidth (MHz)	f_L (MHz)	f_L Limit (MHz)	f_H (MHz)	f_H Limit (MHz)	Result
77.25	24116.515	≥ 24000	24193.765	≤ 24250	Pass

Note: Low Frequency (F_L) F_L = Center Frequency + Lower Boundary;

High Frequency (F_H) F_H = Center Frequency + Upper Boundary



Appendix A - Test Setup Photograph

Refer to “2207RSU011-UT” file.

Appendix B - EUT Photograph

Refer to “2207RSU011-UE” file.