



MEASUREMENT REPORT

FCC PART 15.249

FCC ID: 2A2IC-24GBSD

Applicant: Xiamen Autostar Electronics Co., Ltd

Application Type: Certification

Product: 24GHz BSD

Model No.: 24GHz BSD

Brand Name: Autostar

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

FCC Rule Part(s): Part 15.249

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

Test Date: July 30, 2021

Reviewed By:

Kevin Guo

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
2107RSU051-U1	Rev. 01	Initial Report	08-19-2021	Valid

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1. General Information

1.1. Applicant

Xiamen Autostar Electronics Co., Ltd

NO.190, SimingPark, Tong'an Industrial District 361100 - Xiamen City - Fujian Province China

1.2. Manufacturer

Xiamen Autostar Electronics Co., Ltd

NO.190, SimingPark, Tong'an Industrial District 361100 - Xiamen City - Fujian Province 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			
☐	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	24GHz BSD
Model No.	24GHz BSD
Frequency Range	24.0 ~ 24.25GHz
Temperature	-40°C ~ 85°C
Device Label ID No.	20210721Sample#1
Power Supply	DC 9~16V
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. We selected a typical Power (DC12V) for test.	

1.5. Radio Specification

Frequency Range	24.0 ~ 24.25GHz
Type of Modulation	FMSK
Frame Rate	20Hz
Antenna Type	Array antenna

1.6. Test Mode

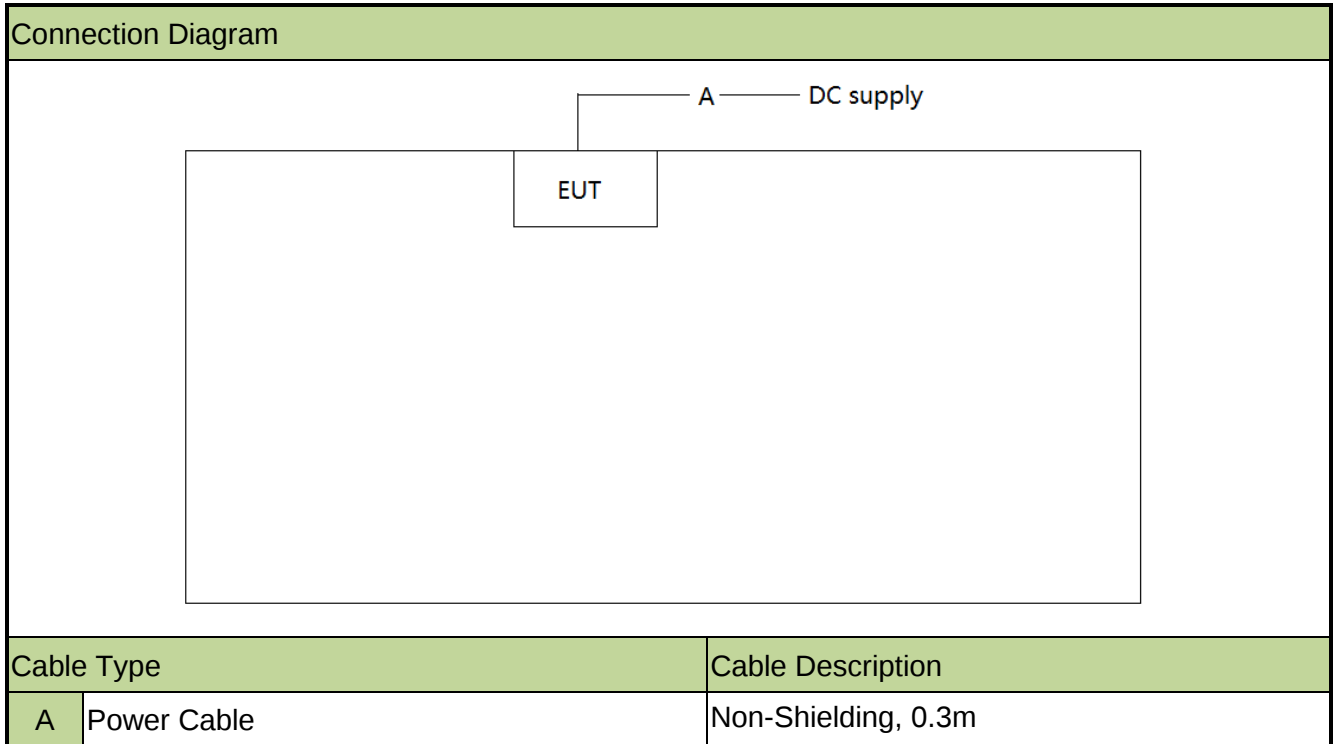
Test Mode	Mode 1: Transmit at 24GHz
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1.7. Test Environment Condition

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

1.8. Test System Connection Diagram

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



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

Conclusion:

This unit complies with the requirement of §15.203.

3. Test Equipment Calibration Date

Radiated Test (SIP-AC2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2022/06/24
EXA Signal Analyzer	Keysight	N9030B	MRTSUE06395	1 year	2021/08/30
Bilog Period Antenna	Schwarzbeck	VULB9168	MRTSUE06646	1 year	2021/08/30
Horn Antenna	Schwarzbeck	BBHA9120D	MRTSUE06648	1 year	2021/11/26
Horn Antenna	Schwarzbeck	BBHA9170	MRTSUE06599	1 year	2021/11/26
Microwave System Amplifier	Agilent	83017A	MRTSUE06076	1 year	2021/11/14
Preamplifier	EMCI	EMC051845SE	MRTSUE06644	1 year	2021/11/12
Micro-Wave Antenna	MI-WWAVE	261U-25	MRTSUE06273	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261E-25	MRTSUE06276	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261F-25	MRTSUE06275	N/A	N/A
Micro-Wave Antenna	MI-WWAVE	261G	MRTSUE06274	N/A	N/A
Standard Gain Horn Antenna	A-INFOMW	LB-10-25-A	MRTSUE06410	N/A	N/A
Standard Gain Horn Antenna	A-INFOMW	LB-15-25-A	MRTSUE06409	N/A	N/A
Waveguide Harmonic Mixer	Keysight	M1970V	MRTSUE06271	N/A	N/A
Waveguide Harmonic Mixer	Keysight	M1970W	MRTSUE06272	N/A	N/A
RF Signal Generator	Keysight	E8257D	MRTSUE06453	1 year	2022/06/24
SA Extension Module	Keysight	N9029AV06	MRTSUE06368	N/A	N/A
SA Extension Module	Keysight	N9029AV05	MRTSUE06367	N/A	N/A
SA Extension Module	Keysight	N9029AV03	MRTSUE06366	N/A	N/A
Millimeter wave signal source frequency expander	Keysight	E8257DV15	MRTSUE06456	N/A	N/A
Thermal Hygrometer	testo	608-H1	MRTSUE06624	1 year	2021/12/03
Anechoic Chamber	RIKEN	SIP-AC2	MRTSUE06781	1 year	2021/12/24

Conducted Emission (SIP-SR2)

Instrument	Manufacturer	Type No.	Asset No.	Cali. Interval	Cali. Due Date
EMI Test Receiver	R&S	ESR3	MRTSUE06613	1 year	2022/06/24
Two-Line V-Network	R&S	ENV216	MRTSUE06003	1 year	2022/06/08
Thermal Hygrometer	testo	608-H1	MRTSUE06621	1 year	2021/12/03

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

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
15.207	AC Conducted Emissions 150kHz - 30MHz	< FCC 15.207 limits	Line Conducted	N/A	Section 5.2
15.209 15.249	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	Radiated	Pass	Section 5.3 & 5.4
15.215(c)	20dB Spectrum Bandwidth	20 dB bandwidth of the emission in the specific band	Radiated	Pass	Section 5.5

Notes:

1. 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.
3. "N/A" means that the test item is not applicable, and the details information refers to relevant section.

5.2. AC Conducted Emissions Measurement

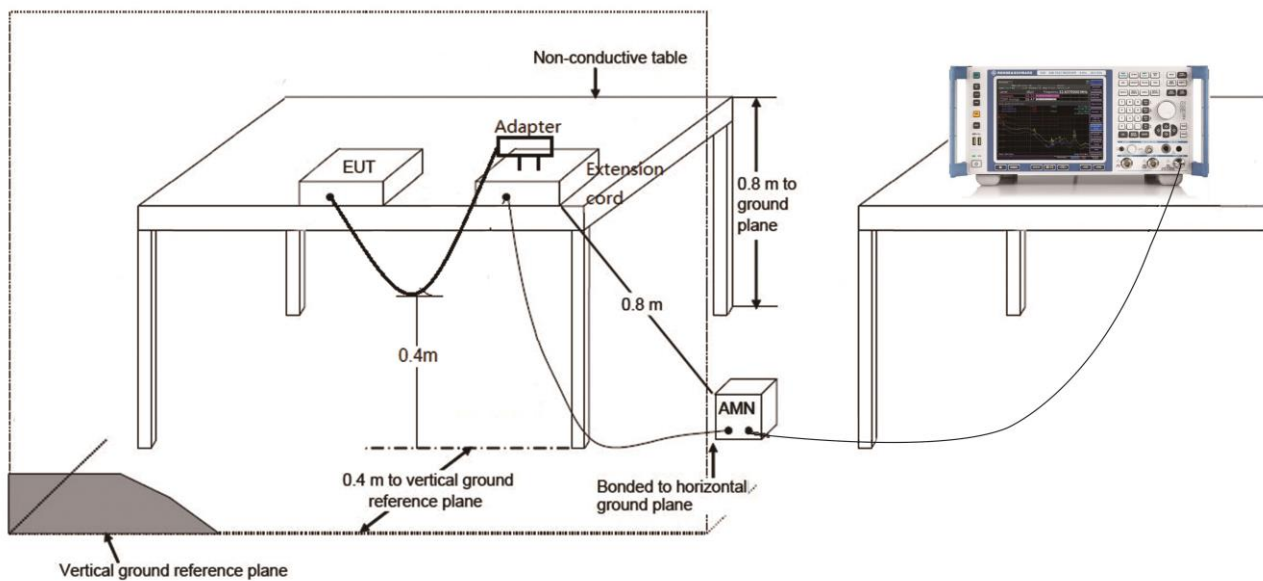
5.2.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	Average (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.

5.2.2. Test Setup



5.2.3. Test Result

The EUT is powered by DC Power Source, so this item is not applicable.

5.3. Radiated Emission

5.3.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.249		
Fundamental Frequency (MHz)	Field Strength of Fundamental (mV/m)	Field Strength of Harmonics (uV/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 (uV/m)	Measurement Distance (m)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(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 (dBµV/m) = 20 log E field strength (uV/m).		

5.3.2. Test Procedure Used

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

5.3.3. Test Setting

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

Measurements below 1GHz

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. Detector = CISPR quasi-peak (a linear average detector for 9-90 kHz and 110-490 kHz)
4. Sweep time = auto couple
5. Trace was allowed to stabilize

Peak Measurements above 1GHz

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

7. Trace was allowed to stabilize

Average Measurements above 1GHz (Method VB)

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

2. RBW = 1MHz

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

If the EUT duty cycle is $< 98\%$, set $\text{VBW} \geq 1/T$. T is the minimum transmission duration.

4. Detector = Peak

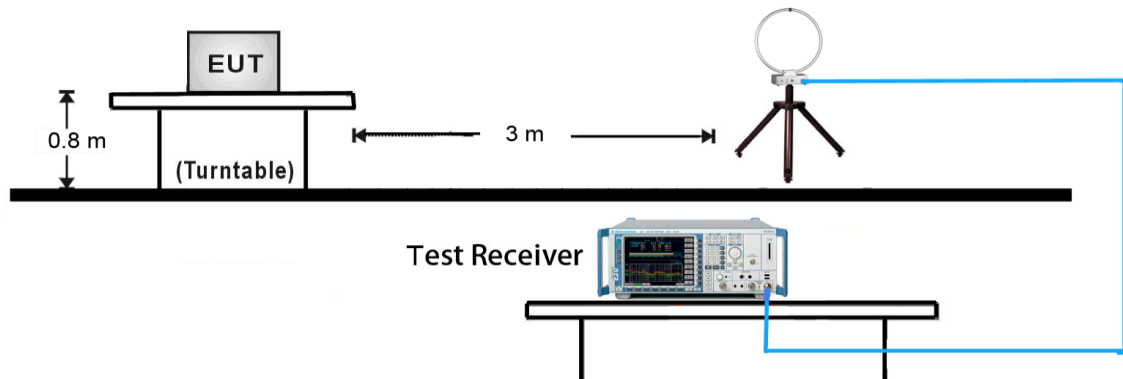
5. Sweep time = auto

6. Trace mode = max hold

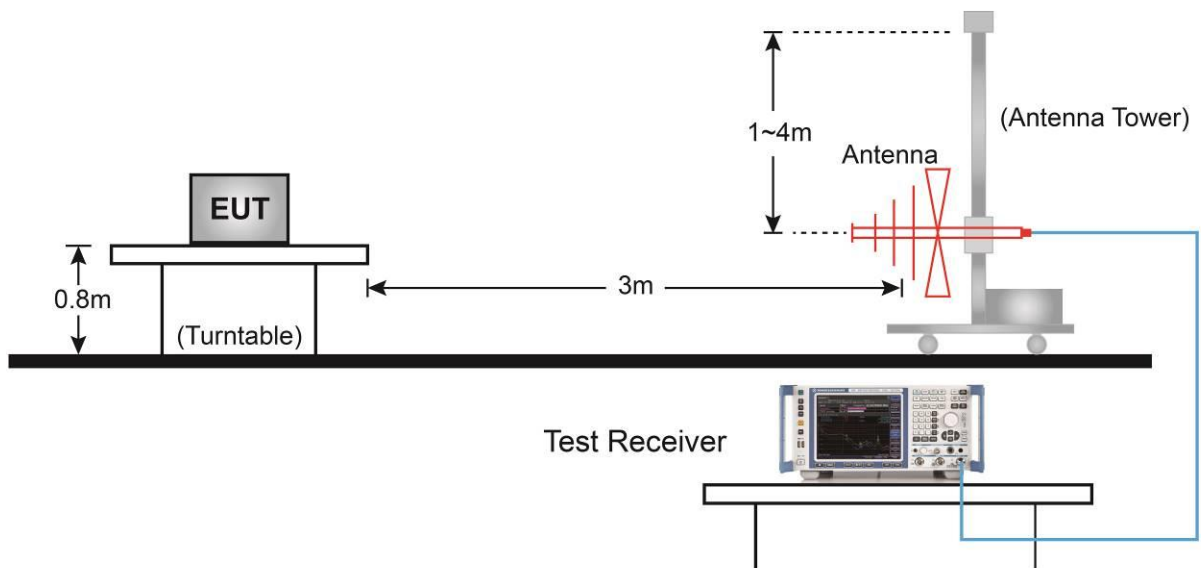
7. Trace was allowed to stabilize

5.3.4. Test Setup

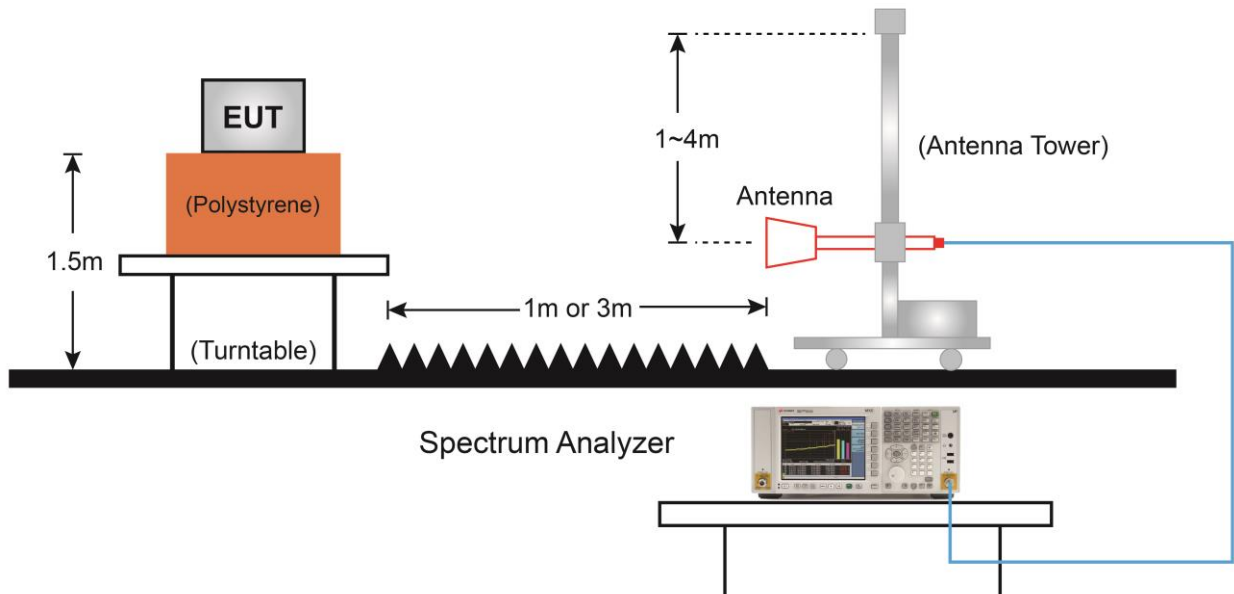
9kHz ~ 30MHz Test Setup:



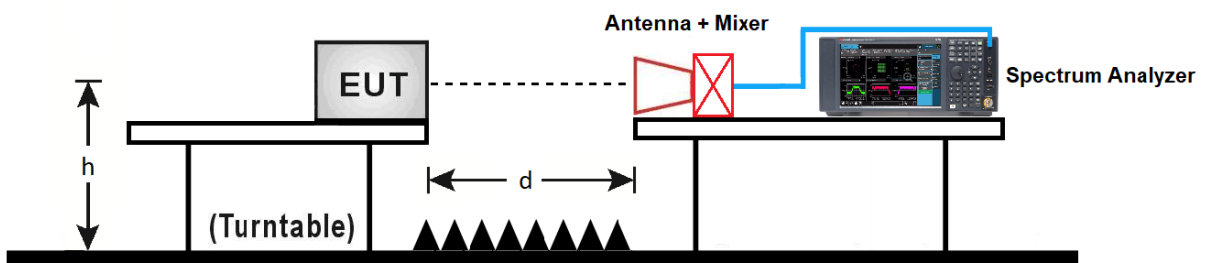
30MHz ~ 1GHz Test Setup:



1GHz ~ 40GHz Test Setup:



Above 40GHz Test Setup:



d = Substitution Distance; h = EUT Height

5.3.5. Test Result

Test Site	SIP-AC2	Test Engineer	Edward Zhang
Test Date	2021/07/30		
Test Item	Fundamental Radiated Emission		

Frequency (GHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
24	90.8	-9.2	81.6	128.0	-46.4	Peak	Horizontal
	87.6	-9.2	78.4	108.0	-29.6	Average	Horizontal
	95.0	-9.0	86.0	128.0	-42.0	Peak	Vertical
	93.2	-8.9	84.3	108.0	-23.7	Average	Vertical

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

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

Test Site	SIP-AC2	Test Engineer	Edward Zhang
Test Date	2021/07/30		
Test Item	Radiated Emission - Below 1GHz @ 3m		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
67.8	2.1	15.7	17.8	40.0	-22.2	QP	Horizontal
135.7	2.0	17.0	19.0	43.5	-24.5	QP	Horizontal
249.7	3.1	16.5	19.6	46.0	-26.4	QP	Horizontal
495.6	2.2	22.7	24.9	46.0	-21.1	QP	Horizontal
668.3	2.2	25.8	28.0	46.0	-18.0	QP	Horizontal
912.4	3.7	29.1	32.8	46.0	-13.2	QP	Horizontal
33.9	0.9	16.9	17.8	40.0	-22.2	QP	Vertical
114.9	3.0	15.2	18.2	43.5	-25.3	QP	Vertical
146.9	0.4	18.0	18.4	43.5	-25.1	QP	Vertical
527.1	2.0	23.3	25.3	46.0	-20.7	QP	Vertical
798.2	1.9	27.7	29.6	46.0	-16.4	QP	Vertical
904.9	2.2	29.0	31.2	46.0	-14.8	QP	Vertical

Note:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)
- The test trace is same as the ambient noise (the test frequency range: 9kHz ~ 30MHz), therefore no data appear in the report.

Test Site	SIP-AC2	Test Engineer	Edward Zhang
Test Date	2021/07/30		
Test Item	Radiated Emission - 1GHz ~ 18GHz @ 3m		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
7392.0	47.9	-1.4	46.5	74.0	-27.5	Peak	Horizontal
8208.0	47.2	-0.4	46.8	74.0	-27.2	Peak	Horizontal
9381.0	46.8	2.3	49.1	74.0	-24.9	Peak	Horizontal
11234.0	45.0	4.9	49.9	74.0	-24.1	Peak	Horizontal
7383.5	48.1	-1.5	46.6	74.0	-27.4	Peak	Vertical
9364.0	45.9	2.4	48.3	74.0	-25.7	Peak	Vertical
11421.0	45.5	5.6	51.1	74.0	-22.9	Peak	Vertical
15450.0	42.1	6.3	48.4	74.0	-25.6	Peak	Vertical

Note:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
Factor (dB) = 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-AC2	Test Engineer	Edward Zhang
Test Date	2021/07/30		
Test Item	Radiated Emission - 18GHz ~ 40GHz @ 3m		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
20618.0	57.5	-10.5	47.0	74.0	-27.0	Peak	Horizontal
23137.0	57.3	-8.9	48.4	68.2	-19.8	Peak	Horizontal
31255.0	59.4	-10.1	49.3	74.0	-24.7	Peak	Horizontal
37019.0	57.6	-5.3	52.3	74.0	-21.7	Peak	Horizontal
22730.0	56.4	-9.0	47.4	74.0	-26.6	Peak	Vertical
23665.0	56.2	-9.1	47.1	74.0	-26.9	Peak	Vertical
31629.0	59.3	-10.5	48.8	74.0	-25.2	Peak	Vertical
37371.0	57.1	-4.8	52.3	74.0	-21.7	Peak	Vertical

Note:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
Factor (dB) = 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-AC2	Test Engineer	Edward Zhang
Test Date	2021/07/30		
Test Item	Radiated Emission - 40GHz ~ 100GHz @ 1m		

Frequency (MHz)	Reading Level (dBμV)	Factor (dB)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
49201.0	26.3	46.6	72.9	83.5	-10.6	Peak	Horizontal
49242.0	26.4	46.6	73.0	83.5	-10.5	Peak	Vertical
49118.0	5.1	46.6	51.7	63.5	-11.8	Average	Horizontal
49106.0	4.9	46.6	51.5	63.5	-12.0	Average	Vertical
72444.0	34.6	42.7	77.3	97.5	-20.2	Peak	Horizontal
72444.0	33.8	42.7	76.5	97.5	-21.0	Peak	Vertical
72444.0	23.5	42.7	66.2	77.5	-11.3	Average	Horizontal
72444.0	23.6	42.7	66.3	77.5	-11.2	Average	Vertical

Note:

- Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB)
Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre-Amplifier Gain (dB)
- Limit (dBμV/m)@1m = Average Limit (dBμV/m)@3m + 20*log (3m/1m) = 54dBμV/m + 20*log(3/1) = 63.5dBμV/m (Average detector), and 83.5dBμV/m (Peak detector)
- Limit@1m = 20*log(2500μV/m) + 20log(3m/1m)} dBμV/m = 77.5 dBμV/m (Average detector), and 97.5 dBμV/m (Peak detector).
- Average measurement was not performed when the peak level lower than average limit.

5.4. Radiated Restricted Band Edge Measurement

5.4.1. 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 [uV/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

5.4.2.Test Procedure Used

ANSI C63.10-2013 Section 6.3

ANSI C63.10-2013 Section 6.6

ANSI C63.10-2013 Section 6.10

5.4.3.Test Setting

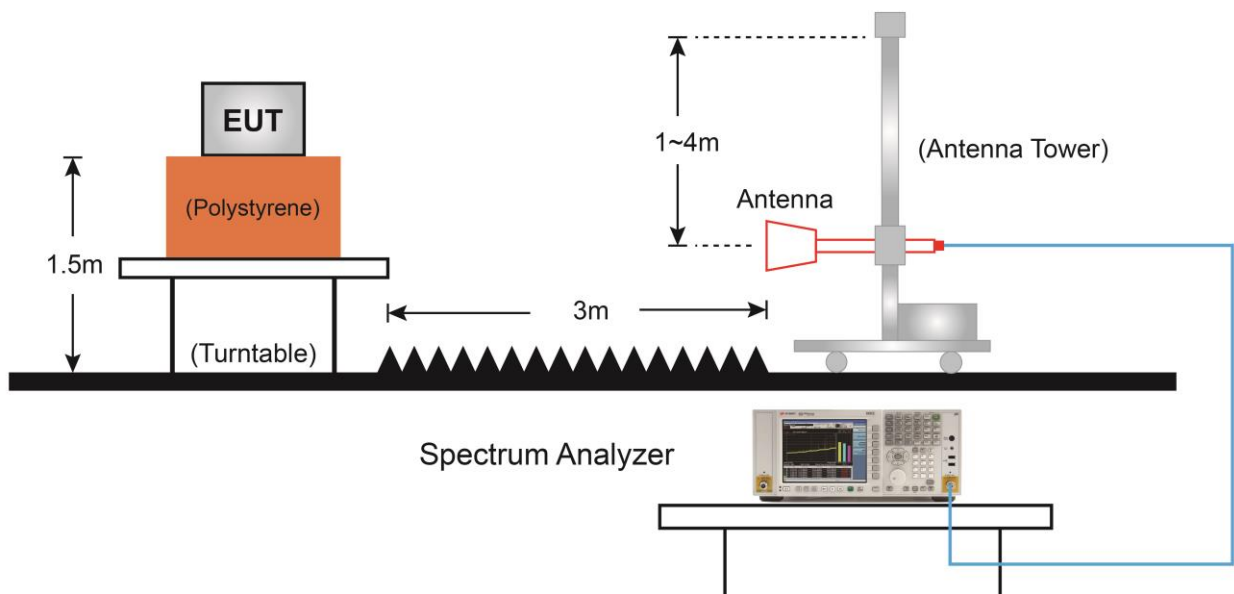
Peak Field Strength Measurements

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

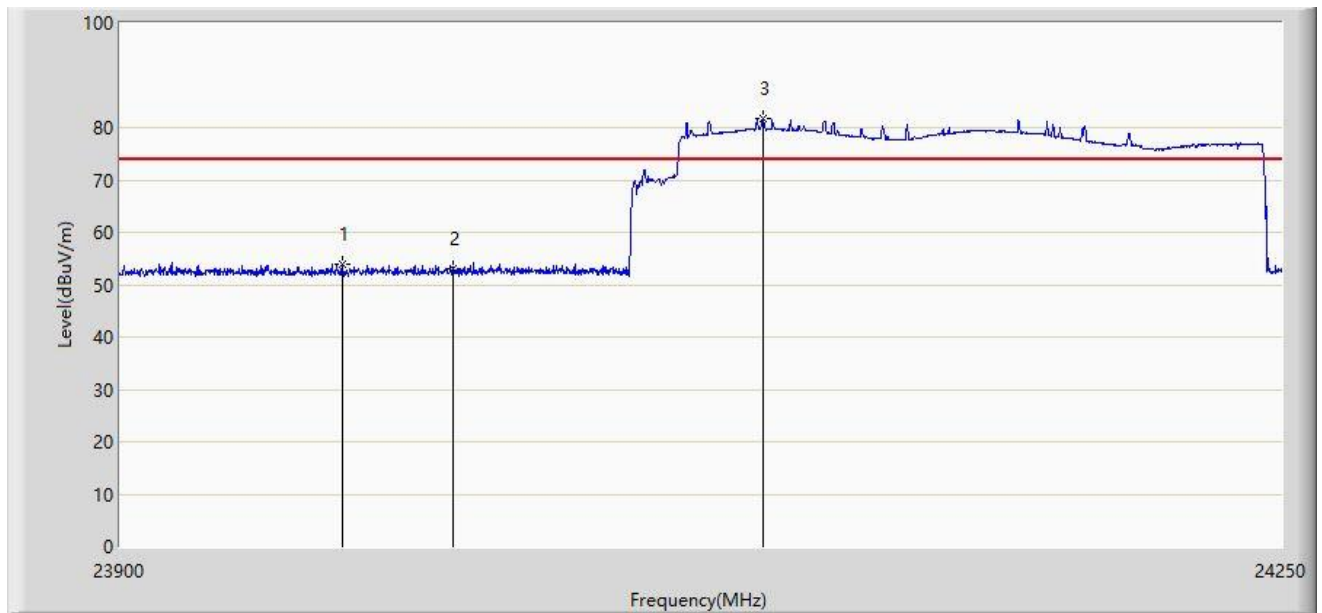
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). 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

5.4.4. Test Setup



5.4.5. Test Result

Site: SIP-AC2	Time: 2021/07/30 - 14:19
Limit: FCC_Part15.209_RE(3m)	Engineer: Edward Zhang
Probe: SIP-AC2_BBHA9170_18-40GHz	Polarity: Horizontal
EUT: 24GHz BSD	Power: DC 12V
Note: Transmit by 24GHz	

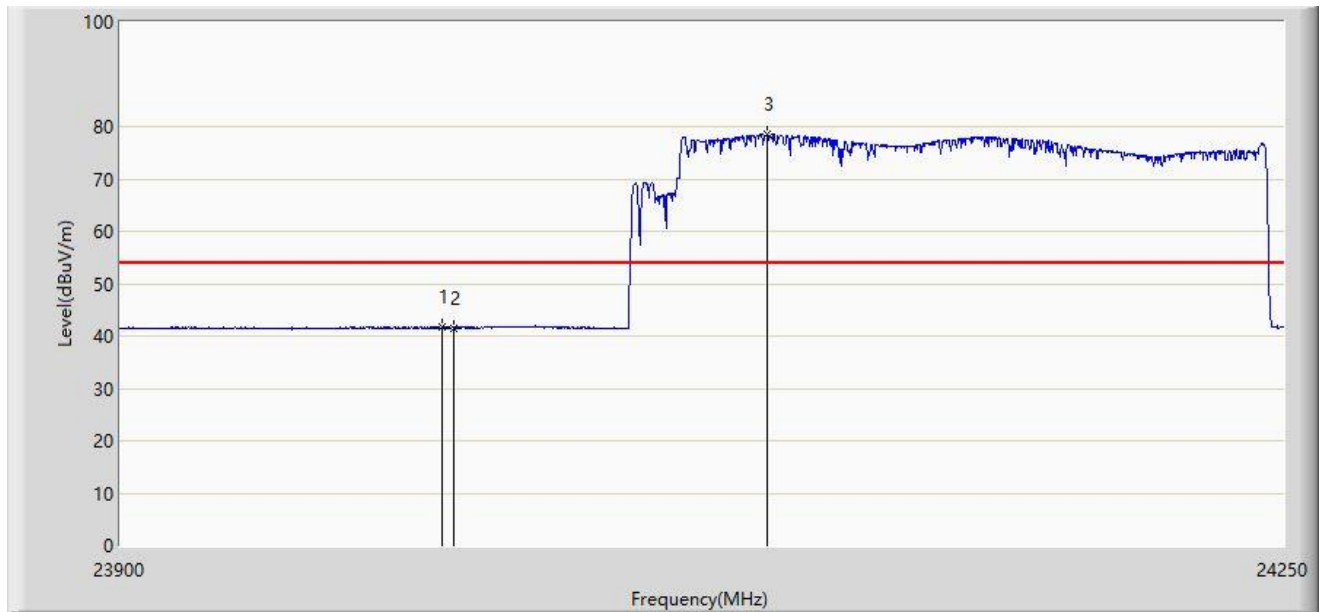


No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB)	Type
1			23966.500	53.805	63.133	-20.195	74.000	-9.328	PK
2			24000.000	53.031	62.154	-20.969	74.000	-9.123	PK
3		*	24093.199	81.656	90.814	N/A	N/A	-9.158	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre-Amplifier Gain (dB)

Site: SIP-AC2	Time: 2021/07/30 - 14:36
Limit: FCC_Part15.209_RE(3m)	Engineer: Edward Zhang
Probe: SIP-AC2_BBHA9170_18-40GHz	Polarity: Horizontal
EUT: 24GHz BSD	Power: DC 12V
Note: Transmit by 24GHz	

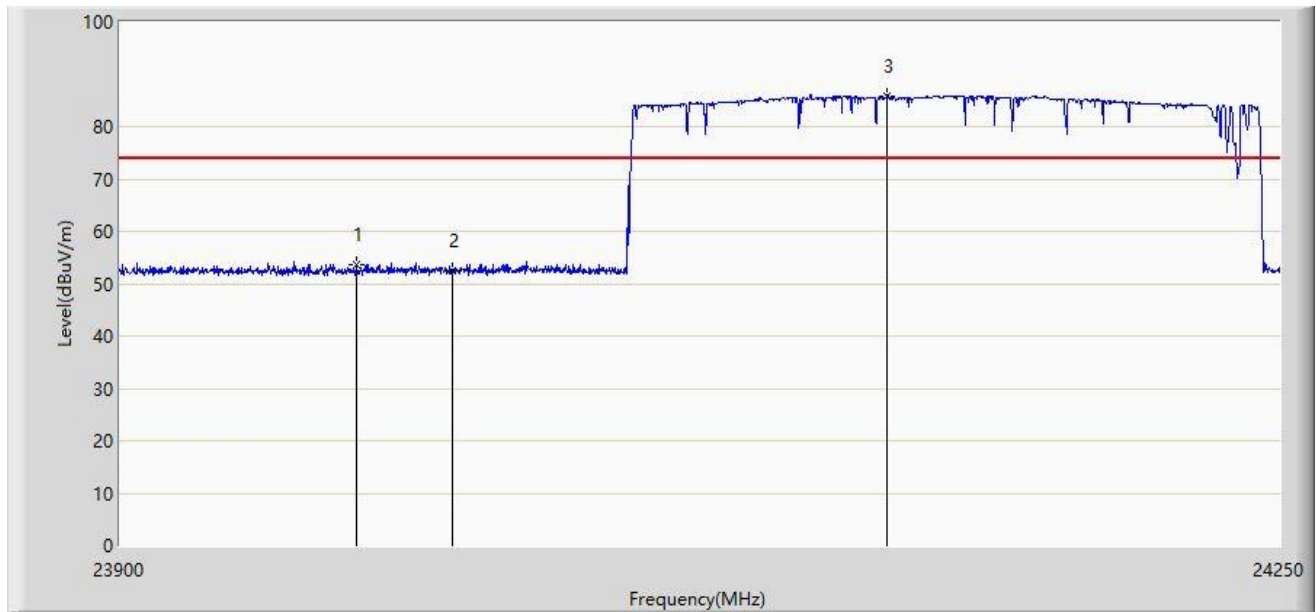


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23996.600	41.788	50.931	-12.212	54.000	-9.143	AV
2			24000.000	41.535	50.658	-12.465	54.000	-9.123	AV
3		*	24093.900	78.431	87.588	N/A	N/A	-9.157	AV

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre-Amplifier Gain (dB)

Site: SIP-AC2	Time: 2021/07/30 - 14:00
Limit: FCC_Part15.209_RE(3m)	Engineer: Edward Zhang
Probe: SIP-AC2_BBHA9170_18-40GHz	Polarity: Vertical
EUT: 24GHz BSD	Power: DC 12V
Note: Transmit by 24GHz	

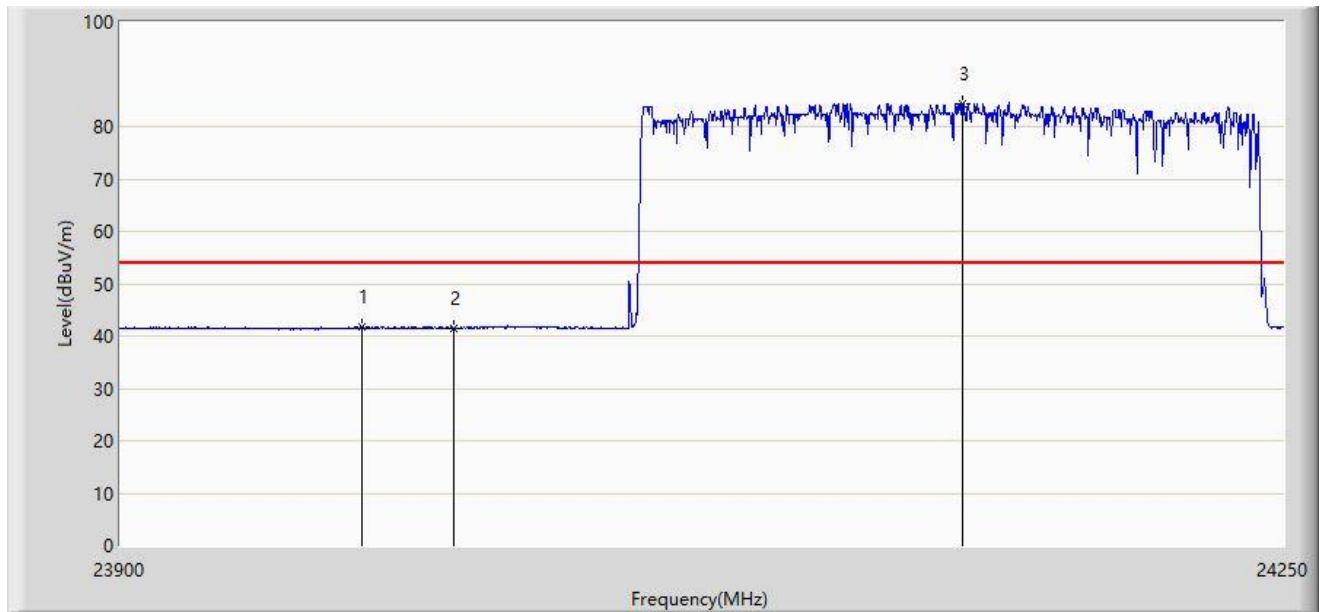


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Margin (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			23971.225	53.740	63.038	-20.260	74.000	-9.297	PK
2			24000.000	52.603	61.726	-21.397	74.000	-9.123	PK
3		*	24131.176	85.930	94.967	N/A	N/A	-9.038	PK

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre-Amplifier Gain (dB)

Site: SIP-AC2	Time: 2021/07/30 - 14:13
Limit: FCC_Part15.209_RE(3m)	Engineer: Edward Zhang
Probe: SIP-AC2_BBHA9170_18-40GHz	Polarity: Vertical
EUT: 24GHz BSD	Power: DC 12V
Note: Transmit by 24GHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBμV/m)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV/m)	Factor (dB)	Type
1			23972.275	41.791	51.082	-12.209	54.000	-9.291	AV
2			24000.000	41.526	50.649	-12.474	54.000	-9.123	AV
3		*	24152.875	84.319	93.209	N/A	N/A	-8.890	AV

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

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre-Amplifier Gain (dB)

5.5. 20dB Spectrum Bandwidth Measurement

5.5.1. Test Limit

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

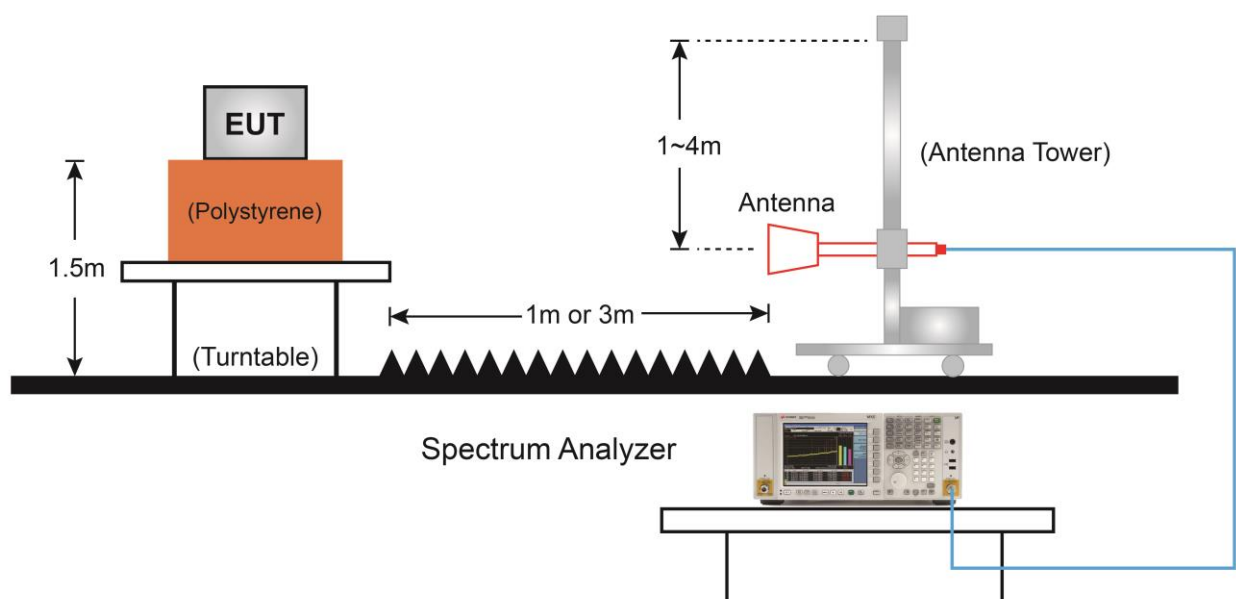
5.5.2. Test Procedure used

ANSI C63.10-2013 Clause 6.9.2

5.5.3. Test Setting

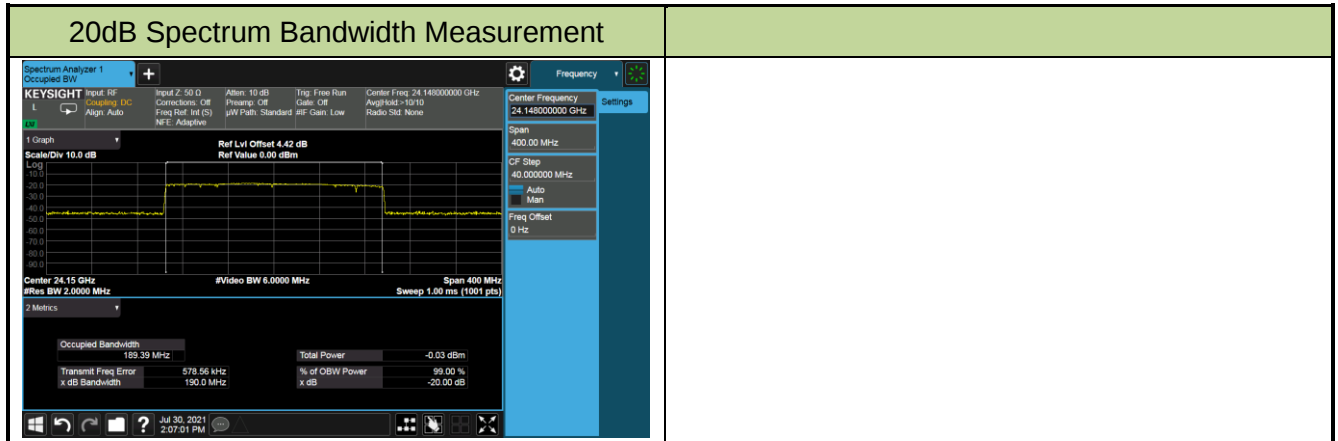
1. Set the spectrum span range to overlap the nominal center frequency
2. Set RBW = 1% ~ 5% of the OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. Allow the trace to stabilize and marker the highest level
8. Determine the display level (the highest level - 20dB) and place two markers, one at the lowest frequency and the other at the highest frequency

5.5.4. Test Setup



5.5.5.Test Result

Test Site	SIP-AC2	Test Engineer	Allen Zou
Test Date	2021/07/30		



6. Conclusion

The data collected relate only the item(s) tested and show that this device is compliance with Part 15.249 of the FCC Rules.

The End

Appendix A - Test Setup Photograph

Refer to “2107RSU051-UT” file.

Appendix B - EUT Photograph

Refer to “2107RSU051-UE” file.