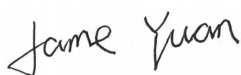




RF MEASUREMENT REPORT

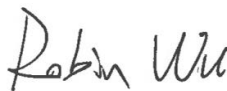
FCC ID: DD4AD2X55
Applicant: Shure Incorporated
Product: Wireless Handheld Transmitter
Model No.: AD2 X55
Brand Name: , **SHURE**[®]
FCC Classification: Licensed LPAS Device (TLD)
FCC Rule Part(s): Part 74 Subpart H (Section 74.861)
Result: Complies
Received Date: 2024-07-23
Test Date: 2024-07-28 ~ 2024-12-27

Reviewed By:



Jame Yuan

Approved By:



Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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
2412RSU056-U5	V01	Initial Report	2025-04-10	Valid

Note: This report is based on original report (2407RSU046-U5) to update the standard version and differential tests were evaluated.

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1. General Information

1.1. Applicant

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

1.2. Manufacturer

Shure Incorporated

5800 West Touhy Avenue, Niles, IL 60714-4608, USA

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	
	☐ R-20025	☐ G-20034	☐ C-20020	☐ T-20020
	VCCI:	☐ 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	Wireless Handheld Transmitter
Model No.	AD2 X55
Serial No.	Conducted Measurement: 2DF17732359 Radiated Measurement: 2DF17732347
Frequency Range	941 ~ 960 MHz
Power Type	2 * AA alkaline batteries or Rechargeable Li-battery
Operating Temperature	-10 ~ 45°C

Note: 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	941 ~ 960 MHz
Declared Power Level	STD: 2mW & 10mW & 35mW HD: 2mW
Type of Modulation	8PSK
Channel Spacing	25kHz
Antenna Type	Helical
Antenna Gain	-3.50 dBi

Note: Power level and transmit frequency can be selected using the front panel controls.

1.6. Working Frequencies

Bottom Channel (MHz)	Middle Channel (MHz)	Top Channel (MHz)
941.625	950.500	959.725

2. Test Configuration

2.1. Test Mode

Mode 1: Transmit at X55 Band by STD Mode (35mW)
Mode 2: Transmit at X55 Band by HD Mode (2mW)

2.2. Test Software

The test utility software used during testing was “teraterm”, and the version was V4.103, all test commands were provided by the manufacturer.

2.3. Applied Standards

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

- FCC Part 74.861
- KDB 206256 D01v03
- ANSI C63.26-2015
- ETSI EN 300 422 - 1 V 2.2.1

2.4. Test Environment Condition

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

3. Measuring Instrument

Instrument Name	Manufacturer	Model No.	Asset No.	Cali. Interval	Cal. Due Date	Test Site
USB Power Sensor	Keysight	U2021XA	MRTSUE06447	1 year	2025-05-08	WZ-SR5
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	MRTSUE11074	1 year	2025-06-05	WZ-SR5
Attenuator	MVE	MVE2213	MRTSUE11075	1 year	2025-06-05	WZ-TR3
Attenuator	MVE	MVE2213	MRTSUE11076	1 year	2025-06-05	WZ-TR3
Signal Analyzer	Keysight	N9010B	MRTSUE06558	1 year	2025-05-20	WZ-TR3
Temperature Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2025-09-02	WZ-TR3
Temperature Chamber	BAOYT	BYH-150CL	MRTSUE06051	1 year	2024-09-27	WZ-TR3
Thermohygrometer	testo	608-H1	MRTSUE11268	1 year	2025-12-10	WZ-TR3
Thermohygrometer	testo	608-H1	MRTSUE11268	1 year	2024-12-14	WZ-TR3
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2025-07-26	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2024-08-09	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2025-11-08	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2024-11-09	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
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2024-10-23	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2025-10-16	WZ-AC1

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

4. Decision Rules and Measurement Uncertainty

4.1. 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.)

4.2. 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%	

5. Test Result

5.1. Summary

FCC Part Section(s)	Test Description	Test Condition	Test Result
74.861(d)(1)	RF Output Power	Conducted	Pass
74.861(c)	99% Occupied Bandwidth		Pass
74.861(d)(4) (i&ii&iii)	Emission Mask		Pass
74.861(d)(4) (iv)	Radiated Spurious Emission	Radiated	Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	N/A

Notes:

- 1) 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.
- 2) "N/A" means that this item is not applicable, and the detail information refer to relevant section.

5.2. RF Output Power Measurement

5.2.1. Test Limit

The conducted power may not exceed 1W in 941~960 MHz band.

5.2.2. Test Procedure

ANSI C63.26-2015 - Section 5.2.4.2

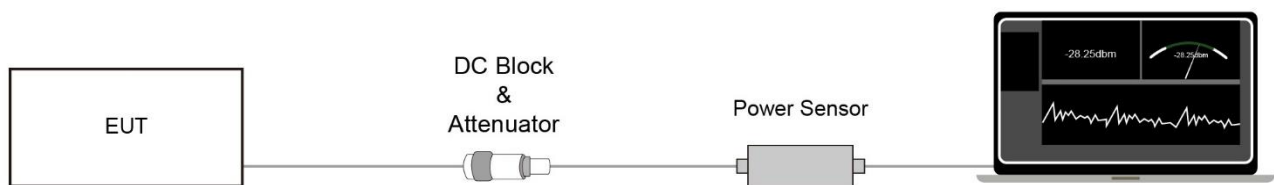
5.2.3. Test Setting

The output of the EUT was connected to an RF average power meter through fixed attenuation.

The EUT was set to transmit on the low, middle, and high frequencies in each power level.

Measure the average power of the transmitter.

5.2.4. Test Setup



5.2.5. Test Result

Refer to Appendix A.1.

5.3. 99% Occupied Bandwidth Measurement

5.3.1. Test Limit

Low power auxiliary transmitters not required to operate on specific carrier frequencies shall operate sufficiently within the authorized frequency band edges to insure the emission bandwidth falls entirely within the authorized band.

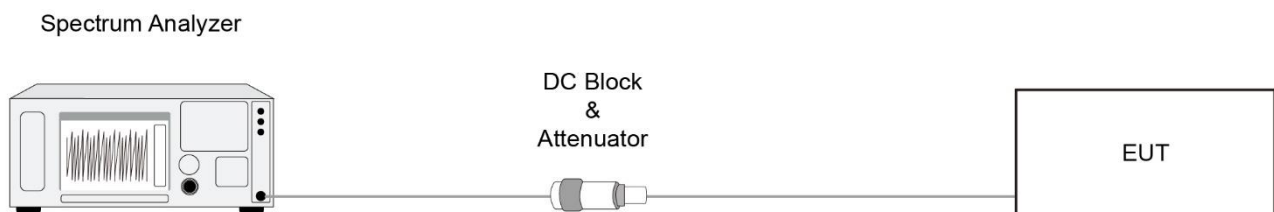
5.3.2. Test Procedure

ANSI C63.26-2015 - Section 5.4.4

5.3.3. Test Setting

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 - 5% of the expected OBW
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. Reported the measured 99% occupied bandwidth

5.3.4. Test Setup



5.3.5. Test Result

Refer to Appendix A.2.

5.4. Emission Mask Measurement

5.4.1. Test Limit

(ii) Digital systems. Emissions within the band from $2.5 \times B$ below to $2.5 \times B$ above the carrier frequency, where B is the channel bandwidth, shall comply with the emission mask in Figure 2 of section 4.2.4.2.2 of ETSI EN 300 422-1 V2.2.1 (2021-11) (incorporated by reference, see § 74.35).

The mean Power Density, measured with 1 kHz measurement bandwidth and RMS detector, of the transmitter unwanted emissions shall not exceed the limits of the masks provided in figure 1 for equipment employing analogue modulation and figure 2 for equipment employing digital modulation, but excluding WMAS. B is the Declared Channel Bandwidth.



Figure 2: Transmit spectral power mask for equipment employing digital modulation, except WMAS, RBW = 1 kHz

5.4.2. Test Procedure

EN 300 422-1 V2.2.1 clause 5.4.3.2.

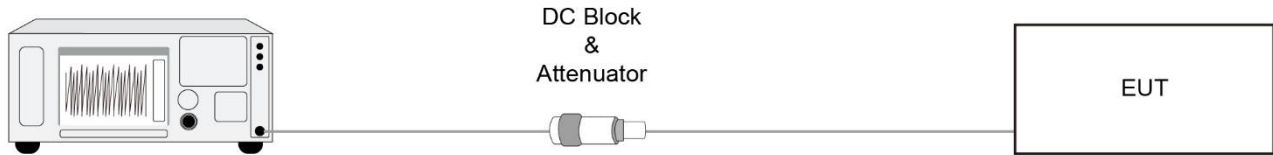
5.4.3. Test Setting

The EUT was powered up and the transmit frequency & power output of the EUT were selected.

The spectrum analyzer center frequency is set to the nominal EUT channel center frequency.

5.4.4. Test Setup

Spectrum Analyzer



5.4.5. Test Result

Refer to Appendix A.3.

5.5. Radiated Spurious Emissions Measurement

5.5.1. Test Limit

Spurious emission limits. Emissions outside of the emission masks listed in paragraphs (e)(7)(i) through (e)(7)(iii) shall comply with the limits specified in section 4.2.4.1.2 of ETSI EN 300 422-1 V2.2.1 (2021-11) (incorporated by reference, see § 74.35).

The level of transmitter unwanted emissions in the spurious domain shall not exceed the limits given in table Transmitter unwanted emission limits

Frequency Range	Maximum power	RBW
9kHz – 150kHz	-36dBm	1kHz
150kHz – 30MHz	-36dBm	10kHz
30MHz – 1GHz	-36dBm	$F_c + 2.5B \leq f \leq F_c + 4B$: 1kHz $F_c + 4B < f \leq F_c + 10B$: 10kHz $f > F_c + 10B$: 100kHz $f < F_c - 10B$: 100kHz $F_c - 10B \leq f < F_c - 4B$: 10kHz $F_c - 4B \leq f \leq F_c - 2.5B$: 1kHz
Except:		
47MHz to 74MHz 87.5MHz to 118MHz	-54dBm	100kHz
174MHz to 230MHz 470MHz to 862MHz	-54dBm	$F_c + 2.5B \leq f \leq F_c + 4B$: 1kHz $F_c + 4B < f \leq F_c + 10B$: 10kHz $f > F_c + 10B$: 100kHz $f < F_c - 10B$: 100kHz $F_c - 10B \leq f < F_c - 4B$: 10kHz $F_c - 4B \leq f \leq F_c - 2.5B$: 1kHz
$1\text{GHz} < f \leq F_{\text{upper}}$	-30dBm	$F_c + 2.5B \leq f \leq F_c + 10B$: 30kHz $F_c + 10B < f \leq F_c + 12B$: 300kHz $f > F_c + 12B$: 1MHz $f < F_c - 12B$: 1MHz $F_c - 12B \leq f < F_c - 10B$: 300kHz $F_c - 10B \leq f \leq F_c - 2.5B$: 30kHz
With B being the Declared Channel Bandwidth. F_{upper} is defined in table 5.		

Table 5: Frequency range for measurement of unwanted emissions

Applicable fundamental frequency range	Frequency range for measurements	
	Lower frequency	Upper frequency
9 kHz - 100 MHz	9 kHz	1GHz
100 MHz - 300 MHz	9 kHz	10th harmonic of the operating frequency
300 MHz - 600 MHz	30MHz	3GHz
600 MHz - 3 GHz	30MHz	5th harmonic of the operating frequency

5.5.2. Test Procedure

ETSI EN 300 422-1 V2.2.1 clause 5.4.4

5.5.3. Test Setting

Table 1 - RBW as a function of frequency

Frequency	RBW
30 ~ 1000 MHz	100 kHz
1000 ~ 10000 MHz	1 MHz

Emissions shall be investigated up to the 10th harmonic of the fundamental.

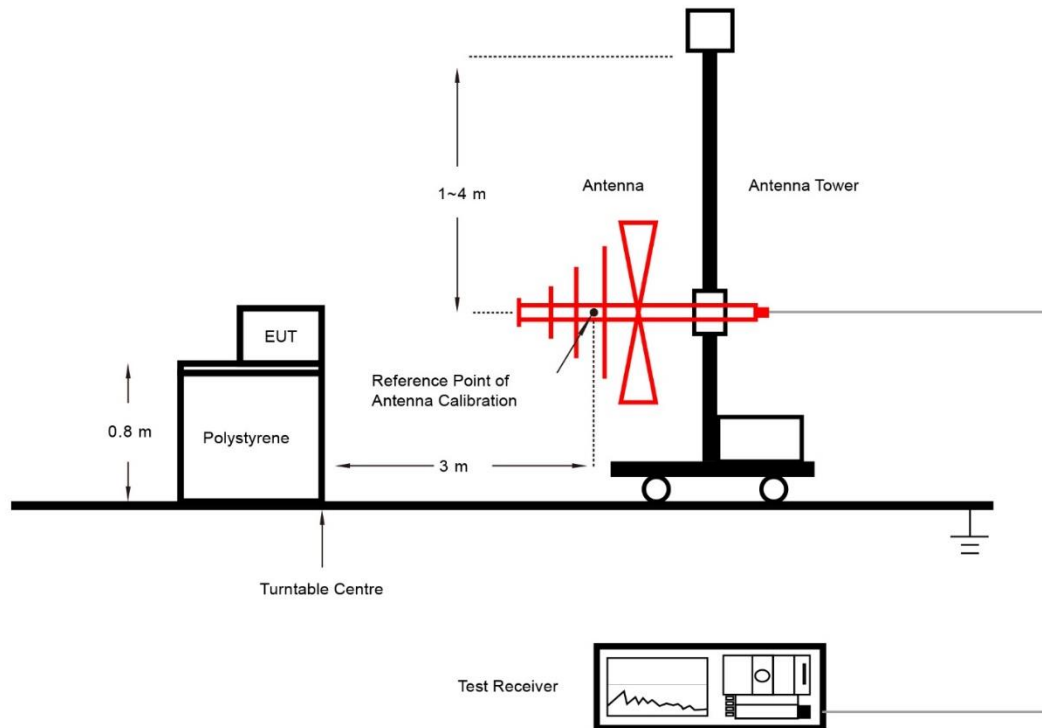
Compliance with the emission limits shall be demonstrated using an RMS Average detector.

All significant broadband and narrowband signals found in the preliminary sweeps were measured using a peak detector at a test distance of 3 meters.

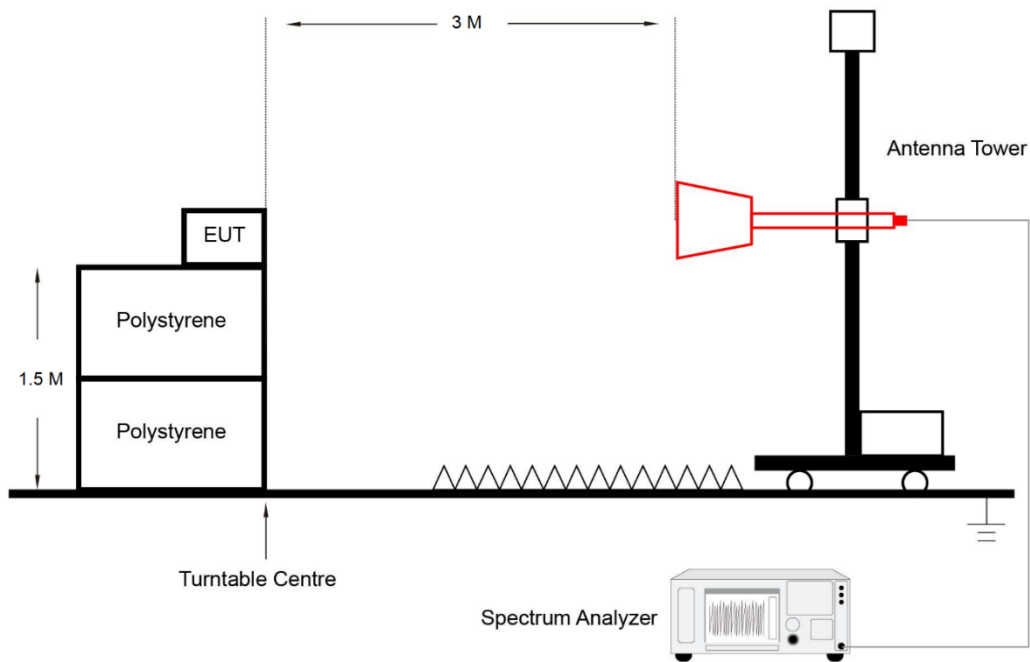
At each frequency at which a component is detected, the sample shall be rotated to obtain maximum response and the effective radiated power of that component determined by a substitution measurement.

5.5.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.5.5. Test Result

Refer to Appendix A.4.

5.6. AC Conducted Emissions Measurement

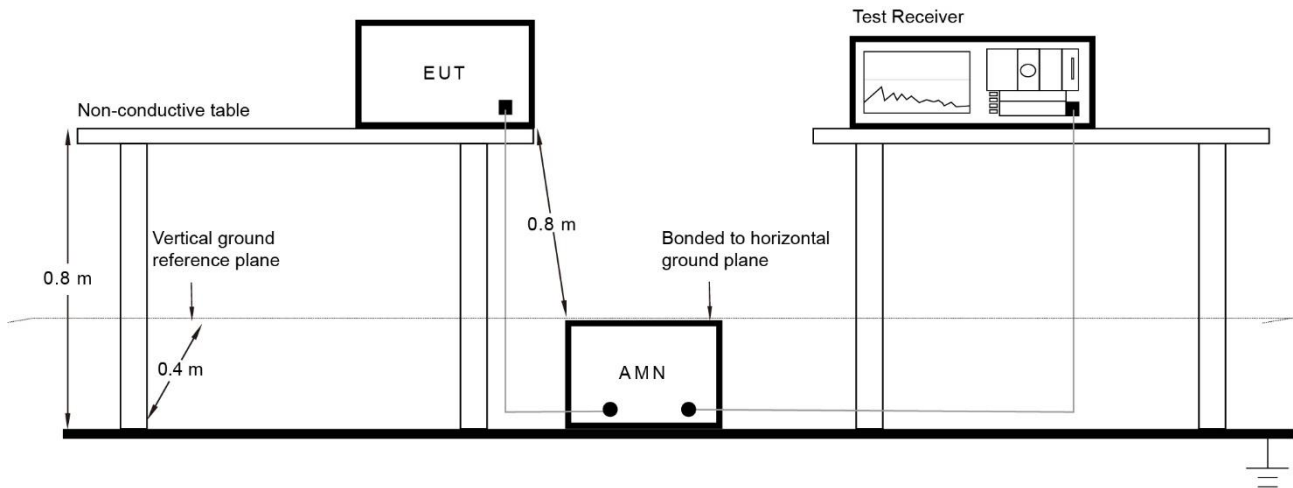
5.6.1. Test Limit

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.

5.6.2. Test Setup



5.6.3. Test Result

Refer to Appendix A.5.

Appendix A – Test Result

A.1 RF Output Power Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-08-08		

Frequency (MHz)	Conducted Output Power (dBm)	Limit (dBm)	Test Result
35mW Power Level			
941.625	14.83	≤ 30.00	Pass
950.500	14.49	≤ 30.00	Pass
959.725	14.41	≤ 30.00	Pass
2mW Power Level			
941.625	3.02	≤ 30.00	Pass
950.500	2.92	≤ 30.00	Pass
959.725	2.80	≤ 30.00	Pass

Note: Limit = $10 \cdot \log(1000\text{mW}) = 30.00$ dBm.

A.2 99% Occupied Bandwidth Test Result

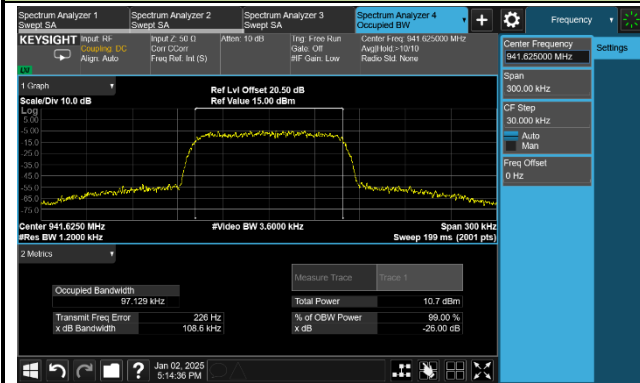
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-07-28, 2025-01-02		

Test Mode	Frequency (MHz)	99% Bandwidth (kHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit (MHz)	Result
Mode 1	941.625	179.37	941.5353	941.7147	941.50~944.00	Pass
	950.500	180.170	950.4099	950.5901	944.00~952.00	Pass
	959.725	179.700	959.6352	959.8149	956.45~959.85	Pass
Mode 2	941.625	97.129	941.5764	941.6736	941.50~944.00	Pass
	950.500	97.986	950.4510	950.5490	944.00~952.00	Pass
	959.725	97.451	959.6763	959.7737	956.45~959.85	Pass

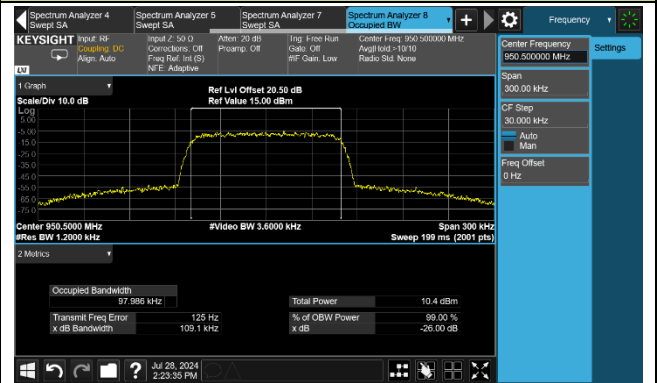


99% Occupied Bandwidth - Mode 2

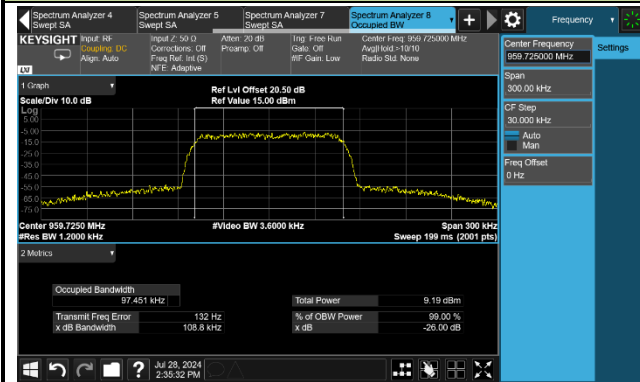
941.625MHz



950.500MHz



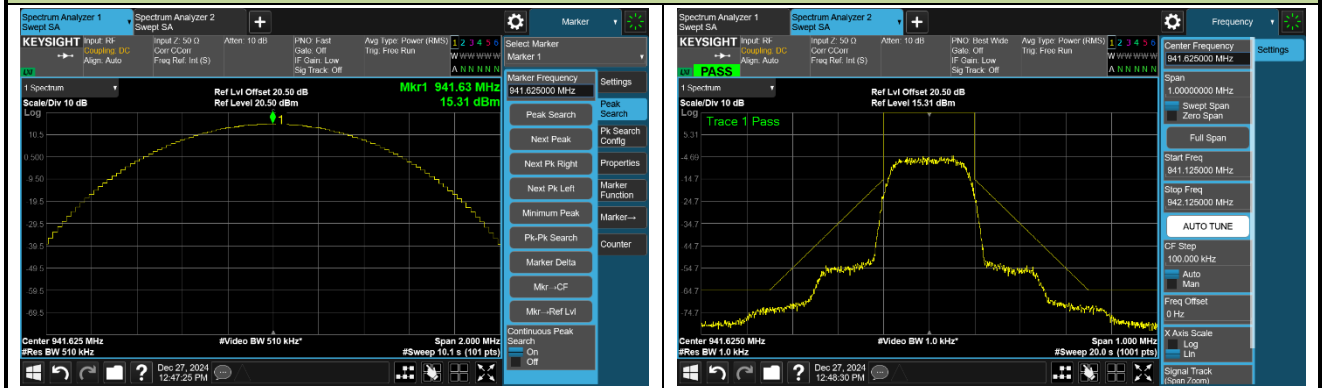
959.725MHz



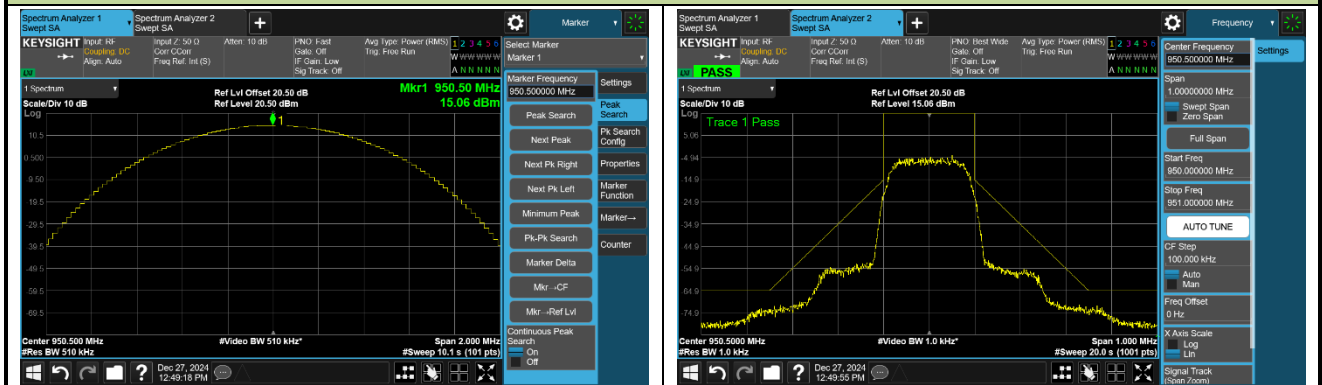
A.3 Emission Mask Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-27	Test Mode	Mode 1

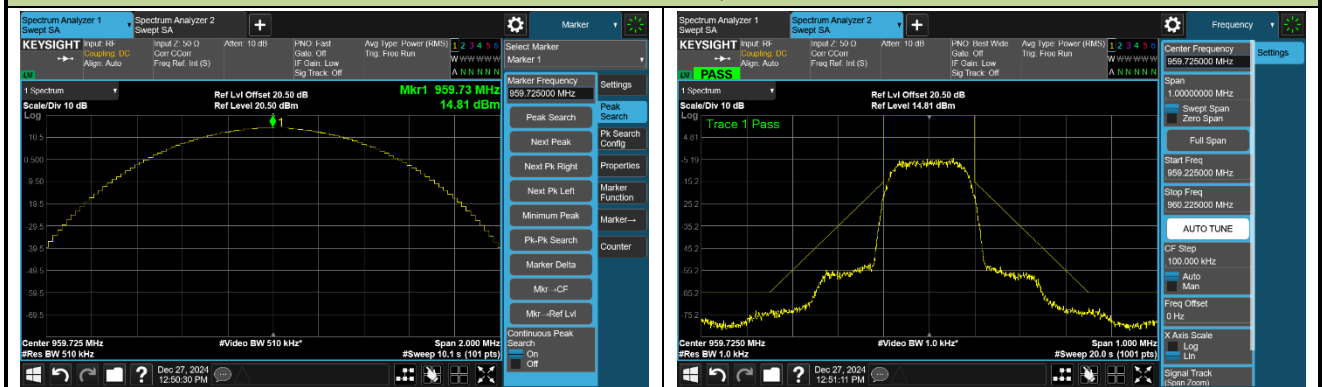
Emission Mask - 35mW, 941.625MHz



Emission Mask - 35mW, 950.500MHz

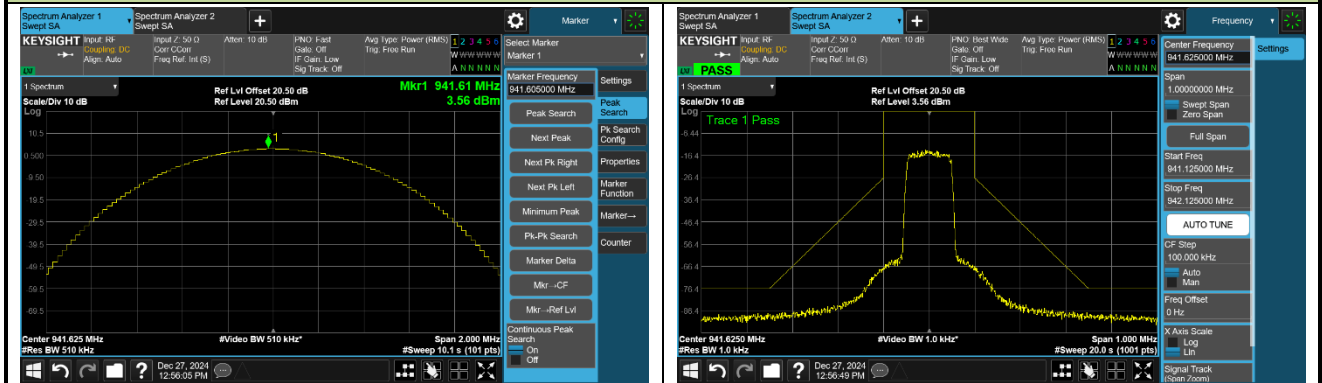


Emission Mask - 35mW, 959.725MHz

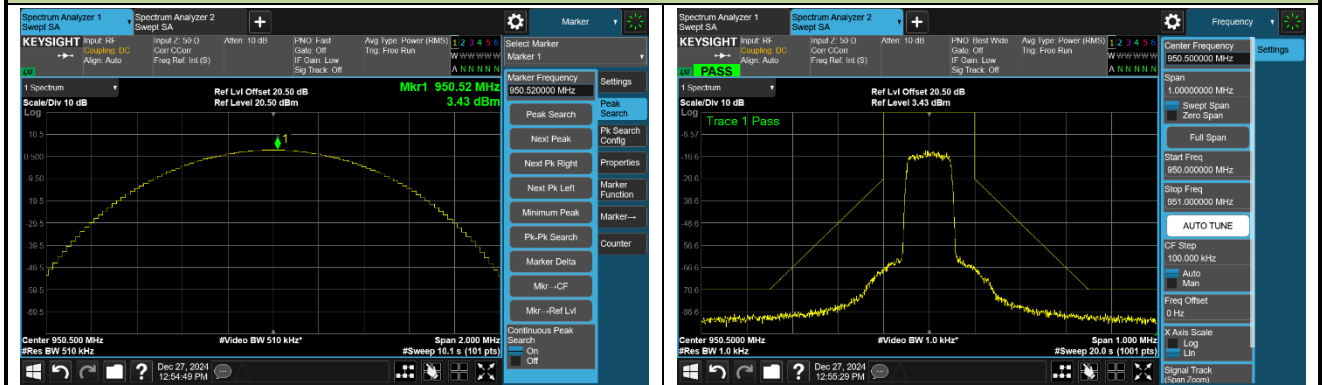


Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-27	Test Mode	Mode 2

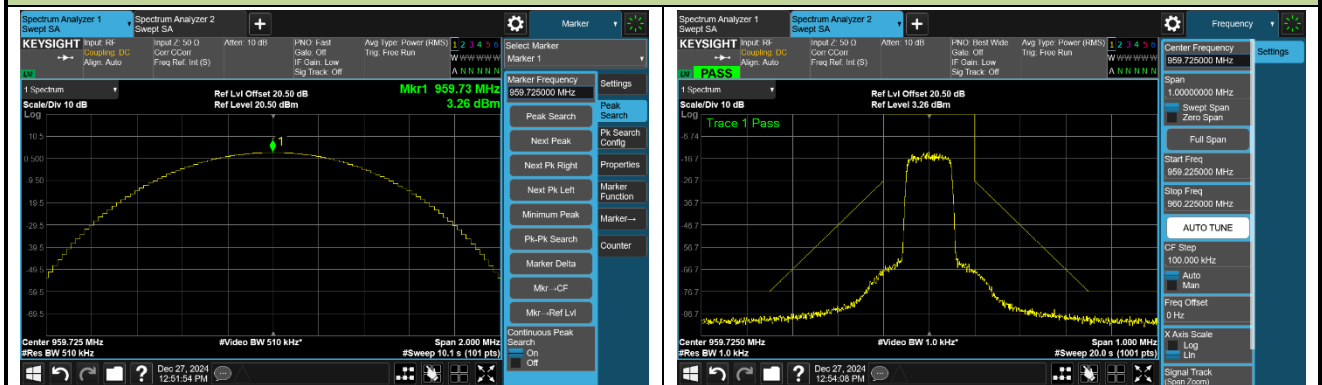
Emission Mask - 35mW, 941.625MHz



Emission Mask - 35mW, 950.500MHz



Emission Mask - 35mW, 959.725MHz



A.4 Radiated Spurious Emissions Test Result

Test Site	WZ-AC1	Test Engineer	Lucas Wang
Test Date	2024-08-02 ~ 2024-08-05		

Test Channel (MHz)	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
941.625	478.625	-94.2	30.7	-63.5	-54.0	-9.5	Average	Horizontal
	753.232	-102.0	36.0	-66.0	-54.0	-12.0	Average	Horizontal
	474.939	-96.8	31.4	-65.4	-54.0	-11.4	Peak	Vertical
	808.813	-98.2	37.5	-60.7	-54.0	-6.7	Peak	Vertical
	2825.200	-44.7	9.8	-34.9	-30.0	-4.9	Average	Horizontal
	4708.000	-64.8	15.4	-49.4	-30.0	-19.4	Average	Horizontal
	2825.200	-48.4	10.1	-38.3	-30.0	-8.3	Average	Vertical
	4708.000	-58.1	16.0	-42.1	-30.0	-12.1	Average	Vertical
950.500	482.893	-96.2	31.7	-64.5	-54.0	-10.5	Average	Horizontal
	837.719	-102.8	37.7	-65.1	-54.0	-11.1	Average	Horizontal
	485.609	-98.6	31.7	-66.9	-54.0	-12.9	Peak	Vertical
	833.645	-100.5	37.9	-62.6	-54.0	-8.6	Peak	Vertical
	2851.300	-45.1	10.0	-35.1	-30.0	-5.1	Average	Horizontal
	4753.000	-63.6	15.6	-48.0	-30.0	-18.0	Average	Horizontal
	2851.300	-49.8	11.1	-38.7	-30.0	-8.7	Average	Vertical
	4752.100	-58.8	16.2	-42.6	-30.0	-12.6	Average	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)

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

Test Channel (MHz)	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
959.725	471.932	-94.6	31.0	-63.6	-54.0	-9.6	Average	Horizontal
	806.388	-104.7	36.5	-68.2	-54.0	-14.2	Average	Horizontal
	476.394	-96.7	31.4	-65.3	-54.0	-11.3	Peak	Vertical
	834.324	-98.7	37.7	-61.0	-54.0	-7.0	Peak	Vertical
	2880.100	-48.8	9.7	-39.1	-30.0	-9.1	Average	Horizontal
	4798.000	-59.8	15.5	-44.3	-30.0	-14.3	Average	Horizontal
	2879.200	-50.9	10.4	-40.5	-30.0	-10.5	Average	Vertical
	4798.900	-55.9	16.2	-39.7	-30.0	-9.7	Average	Vertical

Note 1: Measure Level (dBm) = Reading Level (dBm) + Substitution Factor (dB)

Note 2: Substitution Factor (dB) = Cable Loss (dB) + Space Attenuation (dB) - Antenna Gain (dBi) - 2.15 (dB)

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

A.5 AC Conducted Emissions Test Result

The EUT is powered by battery, so this item is not applicable.

Appendix B – Test Setup Photograph

Refer to “2412RSU056-UT” file.

Appendix C – EUT Photograph

Refer to “2412RSU056-UE” file.