RF MEASUREMENT REPORT

FCC ID:	DD4AD1X55
Applicant:	Shure Incorporated
Product:	Wireless Bodypack Transmitter
Model No.:	AD1 X55
Brand Name:	SHURE, 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:	2024-07-25 ~ 2024-12-27

Reviewed By: Jame Yuan

Approved By: Robin Wu

ilac-MRA

ACCREDITED
TESTING LABORATORY
CERTIFICATE #3628.01

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
2412RSU055-U5	V01	Initial Report	2025-01-10	Valid

Note: This report is based on original report (2407RSU045-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		
	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	Wireless Bodypack Transmitter
Model No.	AD1 X55
Serial No.	2DF10258826
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	Dipole
Antenna Gain	0.10dBi

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=2Uc(y)): 2.5dB
Output Power
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 1.3dB
Power Spectrum Density
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(y)): 2.5dB
Occupied Bandwidth
Measuring Uncertainty for a Level of Confidence of 95% (U=2Uc(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

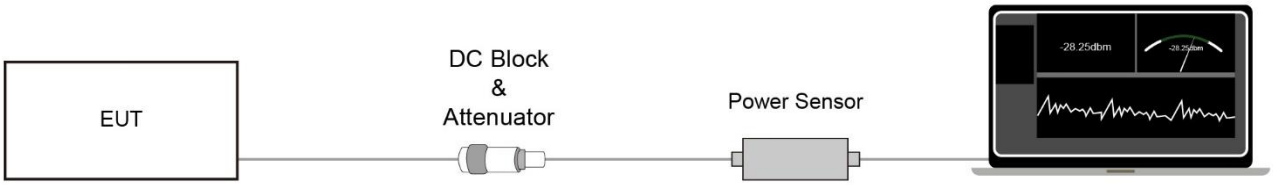
5.2.3. Test Setting

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.

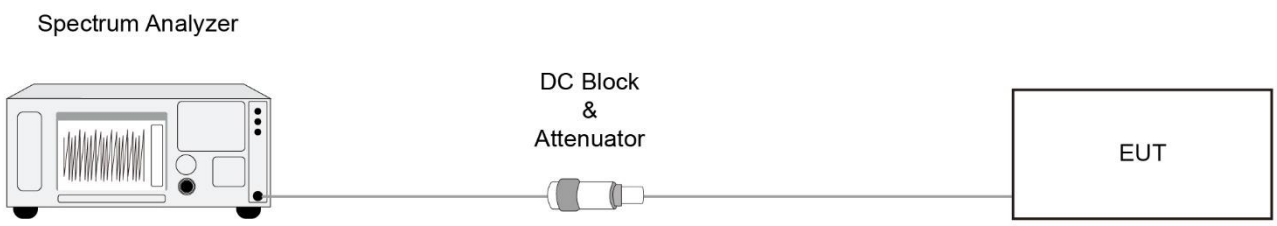
5.3.2. Test Procedure

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 ≥ 3 x 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 × B below to 2.5 × 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.

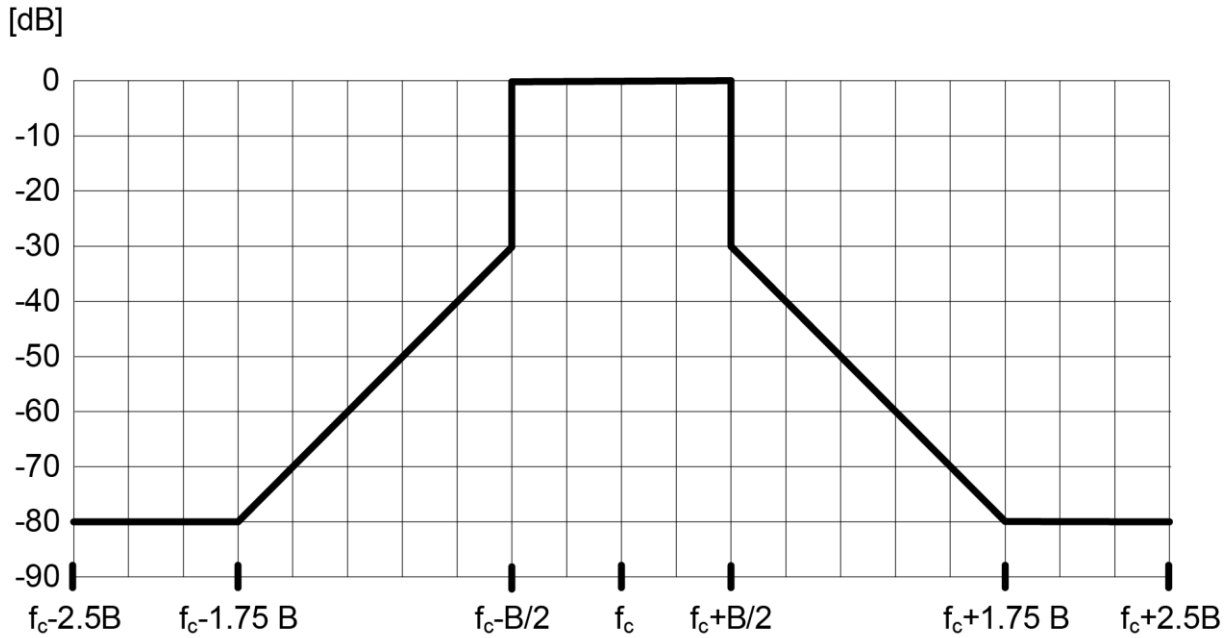


Figure 2: Transmit spectral power mask for equipment employing digital modulation, except WMAS, RBW = 1 kHz

5.4.2. Test Procedure

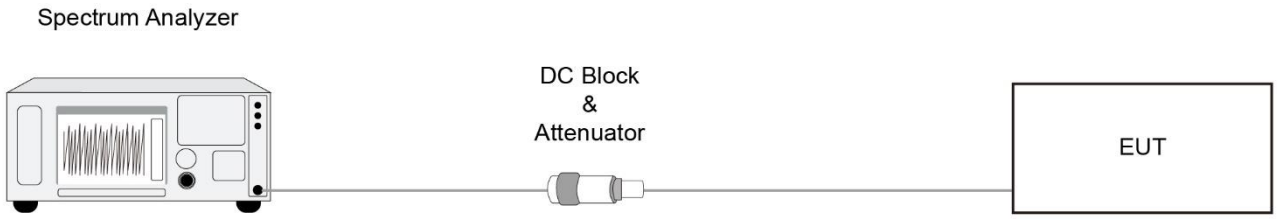
EN 300 422-1 V2.2.1 clause 5.4.3.2.

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



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	$F_c + 2.5B \le f \le F_c + 4B$: 1kHz $F_c + 4B < f \le F_c + 10B$: 10kHz $f > F_c + 10B$: 100kHz $f < F_c - 10B$: 100kHz $F_c - 10B \le f < F_c - 4B$: 10kHz $F_c - 4B \le f \le F_c – 2.5B$: 1kHz
Except:		
47MHz to 74MHz 87.5MHz to 118MHz	-54dBm	100kHz
174MHz to 230MHz 470MHz to 862MHz	-54dBm	$F_c + 2.5B \le f \le F_c + 4B$: 1kHz $F_c + 4B < f \le F_c + 10B$: 10kHz $f > F_c + 10B$: 100kHz $f < F_c - 10B$: 100kHz $F_c - 10B \le f < F_c - 4B$: 10kHz $F_c - 4B \le f \le F_c – 2.5B$: 1kHz
1GHz < f≤ F_{upper}	-30dBm	$F_c + 2.5B \le f \le F_c + 10B$: 30kHz $F_c + 10B < f \le F_c + 12B$: 300kHz $f > F_c + 12B$: 1MHz $f < F_c - 12B$: 1MHz $F_c - 12B \le f < F_c - 10B$: 300kHz $F_c - 10B \le f \le F_c – 2.5B$: 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.

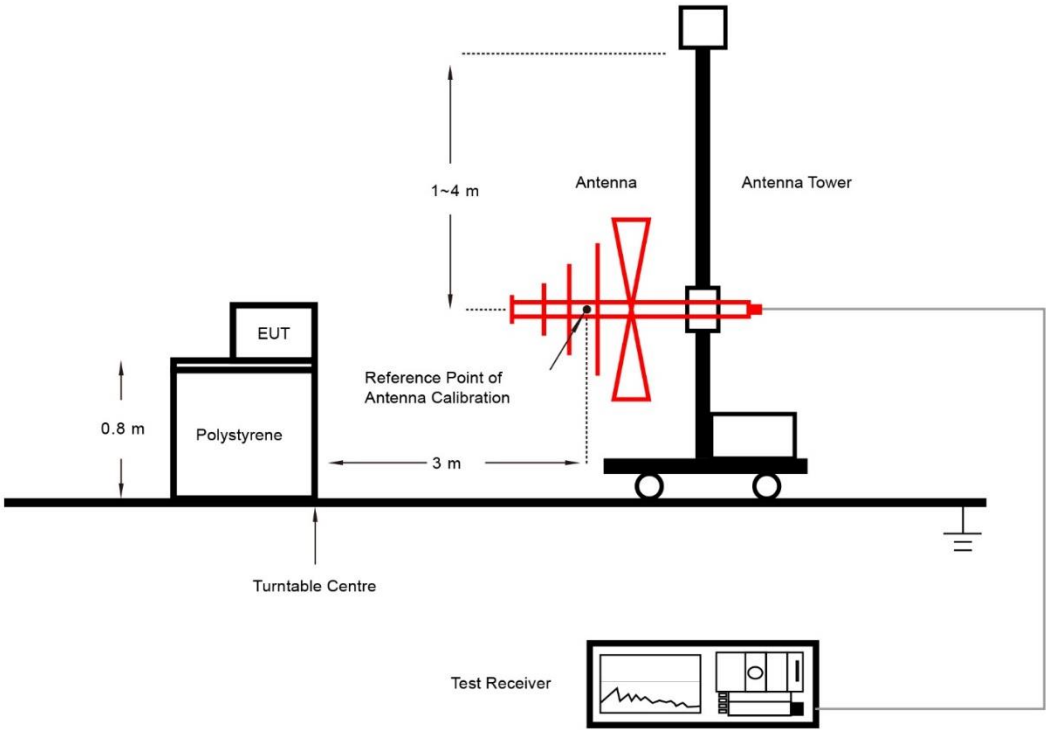
Compliance with the emission limits shall be demonstrated using an RMS Average detector.

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

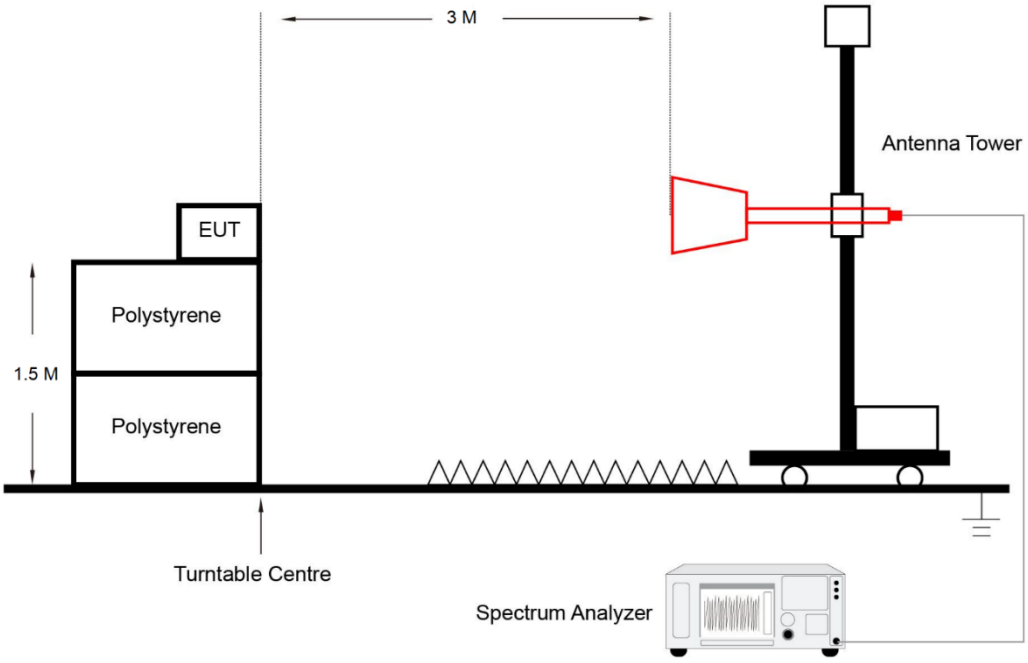
At each frequency at which a component is detected, the sample shall be rotated to obtain maximum response and the effective radiated power of that component determined by a substitution measurement.

5.5.4. Test Setup

Below 1GHz Test Setup:



Above 1GHz Test Setup:



5.5.5. Test Result

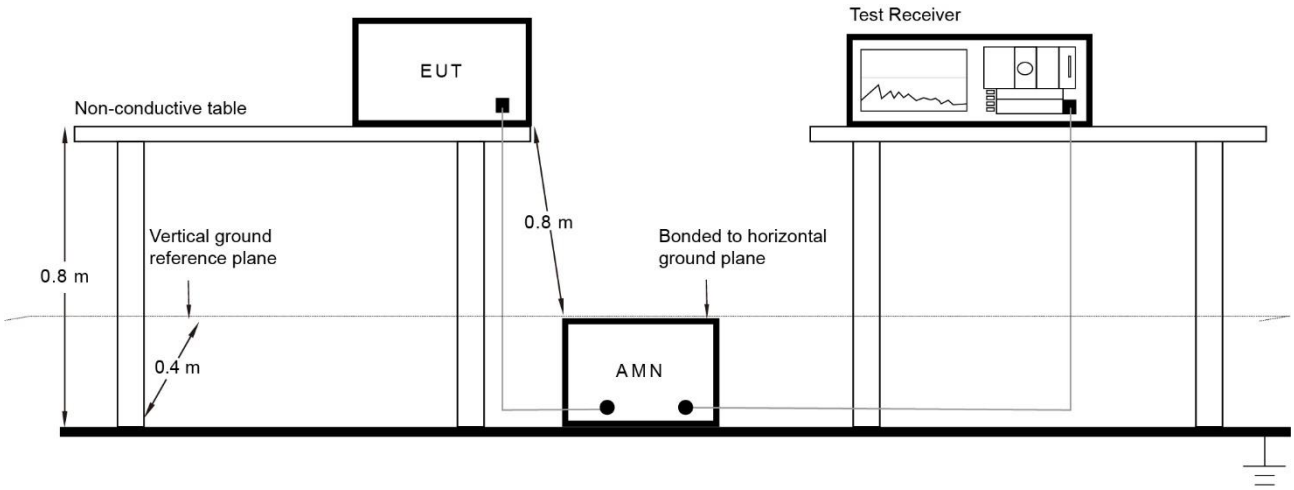
Refer to Appendix A.4.

5.6. AC Conducted Emissions Measurement

5.6.1. Test Limit

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

5.6.2. 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	14.34	≤ 30	Pass
950.500	14.17	≤ 30	Pass
959.725	13.90	≤ 30	Pass
2mW Power Level			
941.625	2.59	≤ 30	Pass
950.500	2.56	≤ 30	Pass
959.725	2.34	≤ 30	Pass

Note: Limit = 10*Log (1000mW) = 30 dBm.

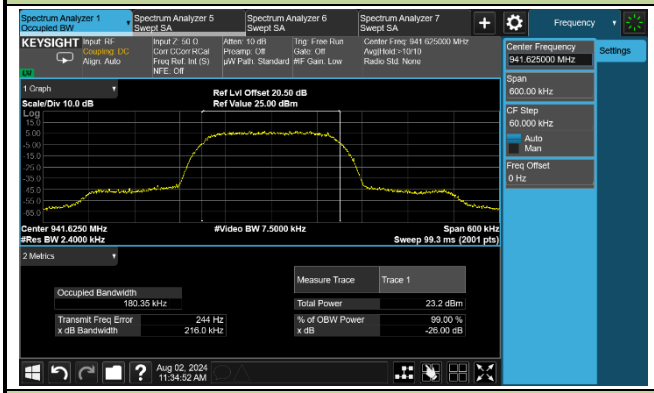
A.2 99% Occupied Bandwidth Test Result

Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-07-28 ~ 2024-08-02		

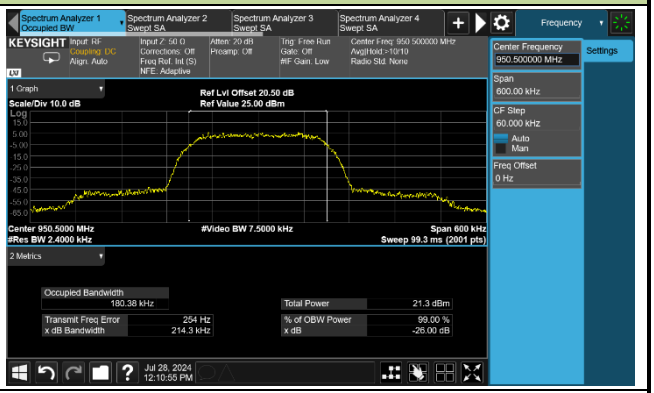
Test Mode	Frequency (MHz)	99% Bandwidth (kHz)	Lower Edge (MHz)	Upper Edge (MHz)	Limit (MHz)	Result
Mode 1	941.625	180.350	941.5348	941.7152	941.50~944.00	Pass
	950.500	180.380	950.4098	950.5902	944.00~952.00	Pass
	959.725	180.340	959.6348	959.8152	956.45~959.85	Pass
Mode 2	941.625	97.424	941.5763	941.6737	941.50~944.00	Pass
	950.500	97.343	950.4513	950.5487	944.00~952.00	Pass
	959.725	97.629	959.6762	959.7738	956.45~959.85	Pass

99% Occupied Bandwidth - 35mW

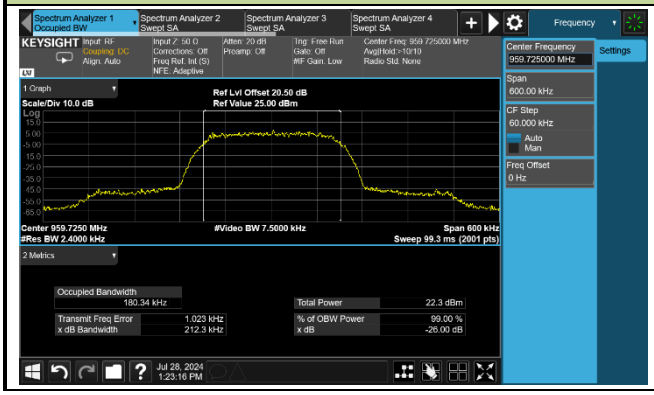
941.625 MHz

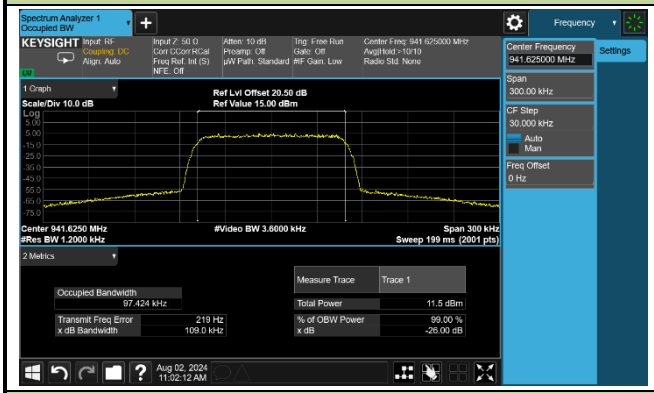
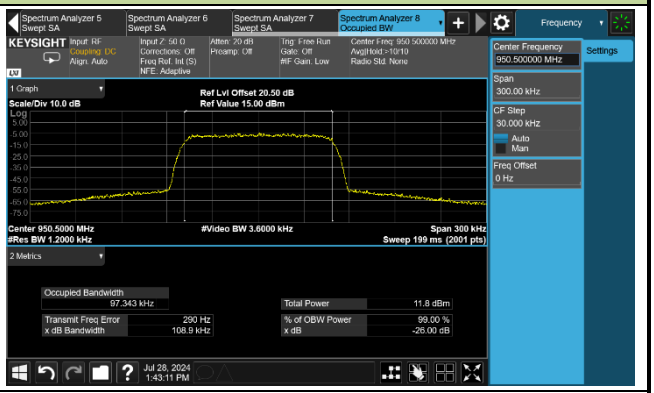
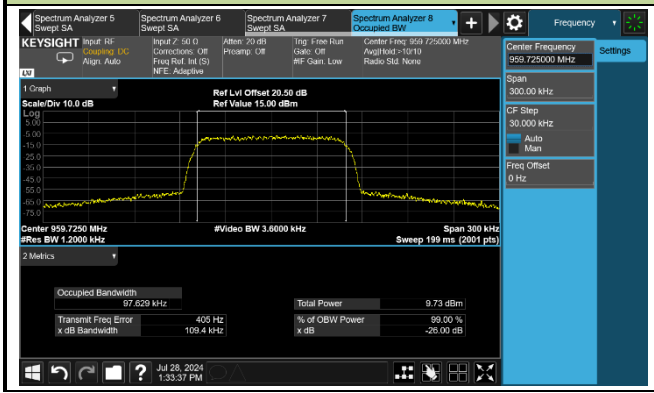


950.500 MHz



959.725MHz

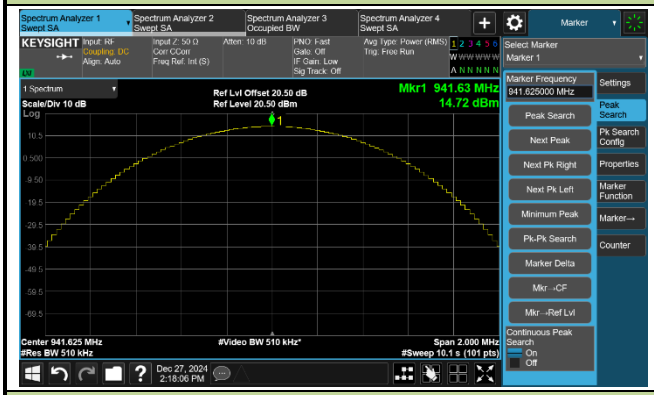


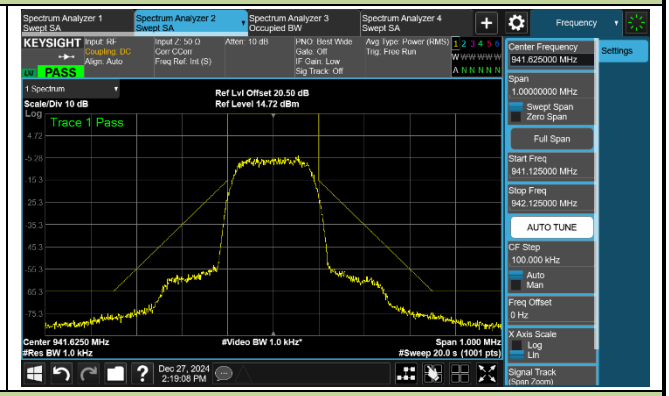
99% Occupied Bandwidth - 2mW	
941.625 MHz	950.500 MHz
	
959.725MHz	
	

A.3 Emission Mask Test Result

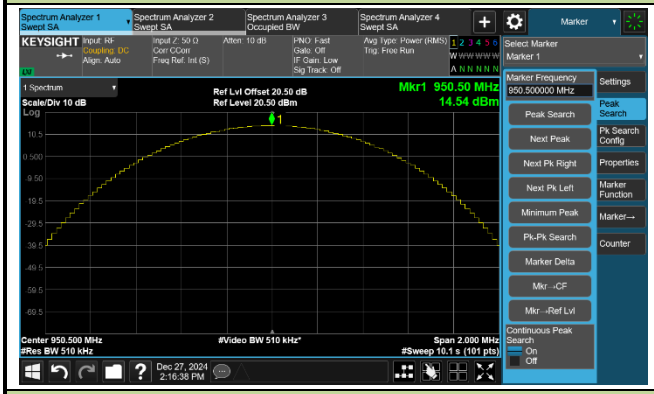
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-27	Test Mode	Mode 1

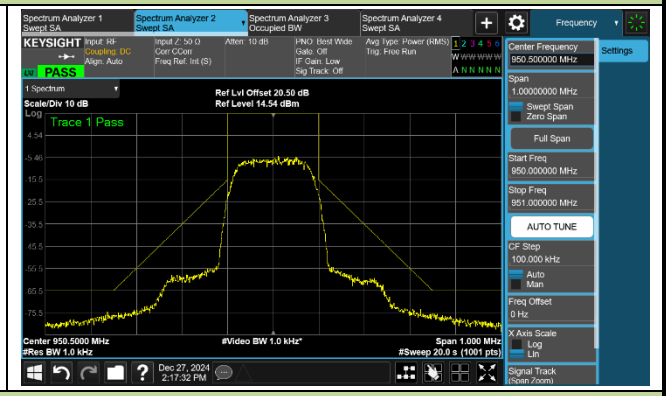
Emission Mask - 35mW, 941.625MHz



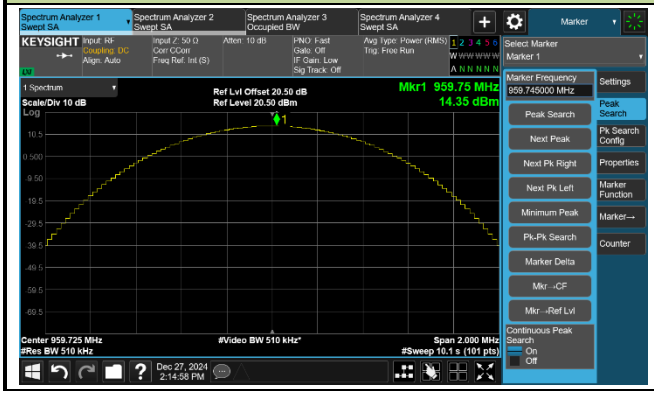


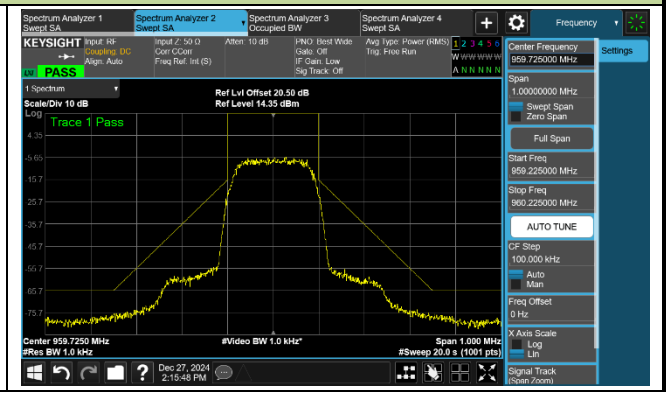
Emission Mask - 35mW, 950.500MHz





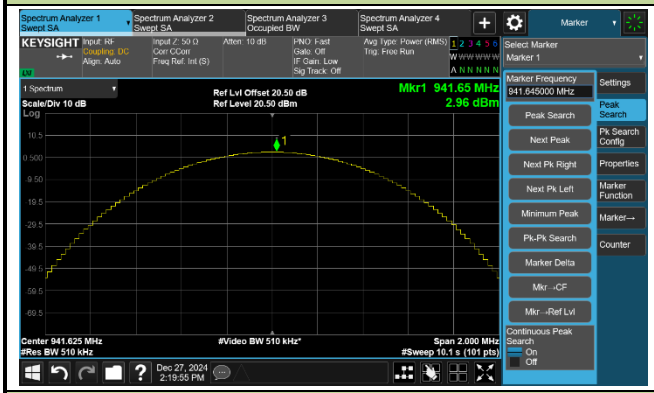
Emission Mask - 35mW, 959.725MHz

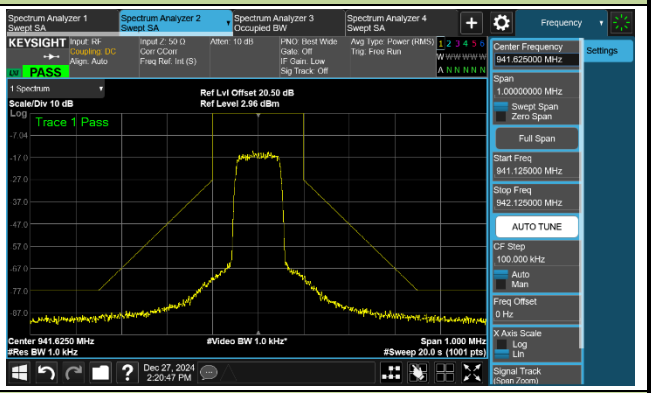




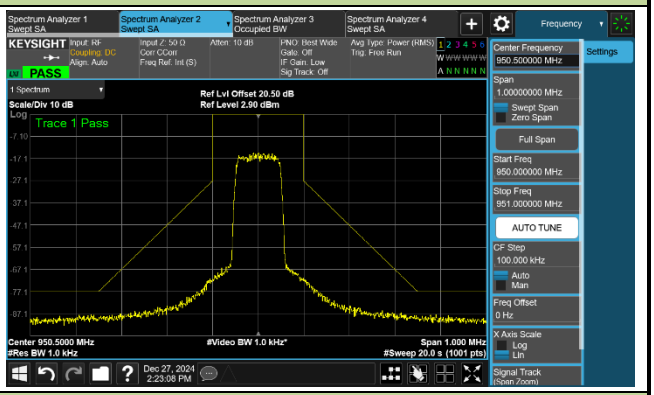
Test Site	WZ-SR5	Test Engineer	Lynn Yang
Test Date	2024-12-27	Test Mode	Mode 2

Emission Mask - 2mW, 941.625MHz

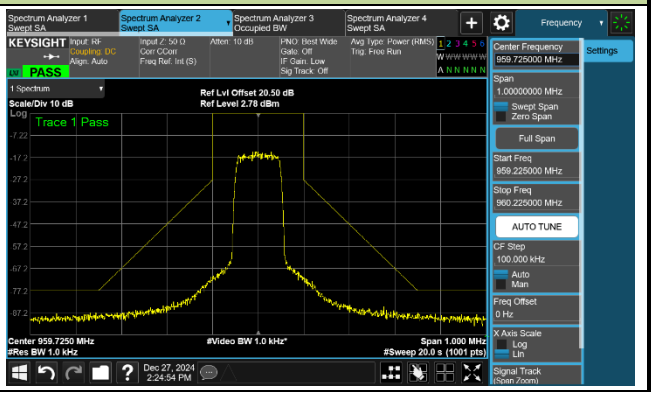




Emission Mask - 2mW, 950.500MHz



Emission Mask - 2mW, 959.725MHz



A.4 Radiated Spurious Emissions Test Result

Test Site	WZ-AC1	Test Engineer	Lucas Wang
Test Date	2024-07-31 ~ 2024-08-06		

Test Channel (MHz)	Frequency (MHz)	Reading Level (dBm)	Substitution Factor (dB)	Measure Level (dBm)	Limit (dBm)	Margin (dB)	Detector	Polarization
941.625	616.462	-96.2	33.5	-62.7	-54.0	-8.7	RMS	Horizontal
	715.305	-95.7	37.5	-58.2	-54.0	-4.2	RMS	Horizontal
	580.766	-95.2	33.5	-61.7	-54.0	-7.7	Peak	Vertical
	809.104	-98.9	37.4	-61.5	-54.0	-7.5	Peak	Vertical
	1089.100	-56.8	2.1	-54.7	-30.0	-24.7	Peak	Horizontal
	2825.200	-60.3	9.8	-50.5	-30.0	-20.5	Peak	Horizontal
	2825.200	-58.0	10.1	-47.9	-30.0	-17.9	Peak	Vertical
	8035.300	-70.7	22.4	-48.3	-30.0	-18.3	Peak	Vertical
950.500	686.399	-98.5	37.0	-61.5	-54.0	-7.5	RMS	Horizontal
	830.444	-97.0	37.3	-59.7	-54.0	-5.7	RMS	Horizontal
	653.419	-98.9	35.4	-63.5	-54.0	-9.5	Peak	Vertical
	827.922	-99.3	37.4	-61.9	-54.0	-7.9	Peak	Vertical
	1106.200	-56.6	2.7	-53.9	-30.0	-23.9	Peak	Horizontal
	2851.300	-55.7	10.0	-45.7	-30.0	-15.7	Peak	Horizontal
	2851.300	-50.0	11.1	-38.9	-30.0	-8.9	Peak	Vertical
	8213.500	-71.3	22.4	-48.9	-30.0	-18.9	Peak	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	580.669	-95.5	33.5	-62.0	-54.0	-8.0	RMS	Horizontal
	708.612	-95.8	36.9	-58.9	-54.0	-4.9	RMS	Horizontal
	583.773	-93.3	33.5	-59.8	-54.0	-5.8	Peak	Vertical
	842.084	-97.8	37.2	-60.6	-54.0	-6.6	Peak	Vertical
	3679.300	-69.1	13.0	-56.1	-30.0	-26.1	Peak	Horizontal
	9642.700	-74.1	26.3	-47.8	-30.0	-17.8	Peak	Horizontal
	3217.600	-69.2	12.7	-56.5	-30.0	-26.5	Peak	Vertical
	9637.300	-74.1	25.6	-48.5	-30.0	-18.5	Peak	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 “2412RSU055-UT” file.

Appendix C – EUT Photograph

Refer to “2412RSU055-UE” file.