

RF MEASUREMENT REPORT

FCC ID: 2AXPS523A623AWPC
Applicant: BCS Automotive Interface Solutions (Suzhou) Co., Ltd.
Product: WPC
Model No.: 523A/623A WPC
FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s): Part15 Subpart C (Section 15.209)
Test Date: 2022-09-27
Test Result: Complies

Reviewed By:

Vincent Yu

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
2209RSU055-U1	Rev. 01	Initial Report	2022-11-15	Valid

CONTENTS

Description	Page
1. General Information	5
1.1. Applicant	5
1.2. Manufacturer	5
1.3. Testing Facility	5
1.4. Product Information.....	6
1.5. Radio Specification under Test	6
2. Test Configuration	7
2.1. Test Mode.....	7
2.2. Test System Connection Diagram.....	7
2.3. Applied Standards.....	8
2.4. Test Environment Condition	8
3. Antenna Requirements	9
4. Measuring Instrument	10
5. Decision Rules and Measurement Uncertainty	11
5.1. Decision Rules	11
5.2. Measurement Uncertainty	11
6. Test Result.....	12
6.1. Summary.....	12
6.2. 20dB Bandwidth Measurement.....	13
6.2.1. Test Limit	13
6.2.2. Test Procedure.....	13
6.2.3. Test Setting	13
6.2.4. Test Setup	14
6.2.5. Test Result	14
6.3. General Field Strength Measurement.....	15
6.3.1. Test Limit	15
6.3.2. Test Procedure.....	15
6.3.3. Test Setting	15
6.3.4. Test Setup	16
6.3.5. Test Result	17
6.4. AC Conducted Emissions Measurement	18
6.4.1. Test Limit	18
6.4.2. Test Setup	18
6.4.3. Test Result	18
Appendix A - Test Result.....	19

A.1	20dB Bandwidth Test Result	19
A.2	General Field Strength Test Result	20
A.3	AC Conducted Emissions Test Result	22
	Appendix B - Test Setup Photograph	23
	Appendix C - EUT Photograph	24

1.4. Product Information

Product Name	WPC
Model No.	523A/623A WPC
Test Sample ID.	20220922Sample#01
WPT Specification	127.7kHz
NFC Specification	13.56MHz
Operating Temp.	-40 ~ 85°C
Input Voltage	DC 12V
Output	15W (MAX)
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Radio Specification under Test

Frequency Range	127.7kHz
Modulation	ASK
Antenna Type	Coil Antenna

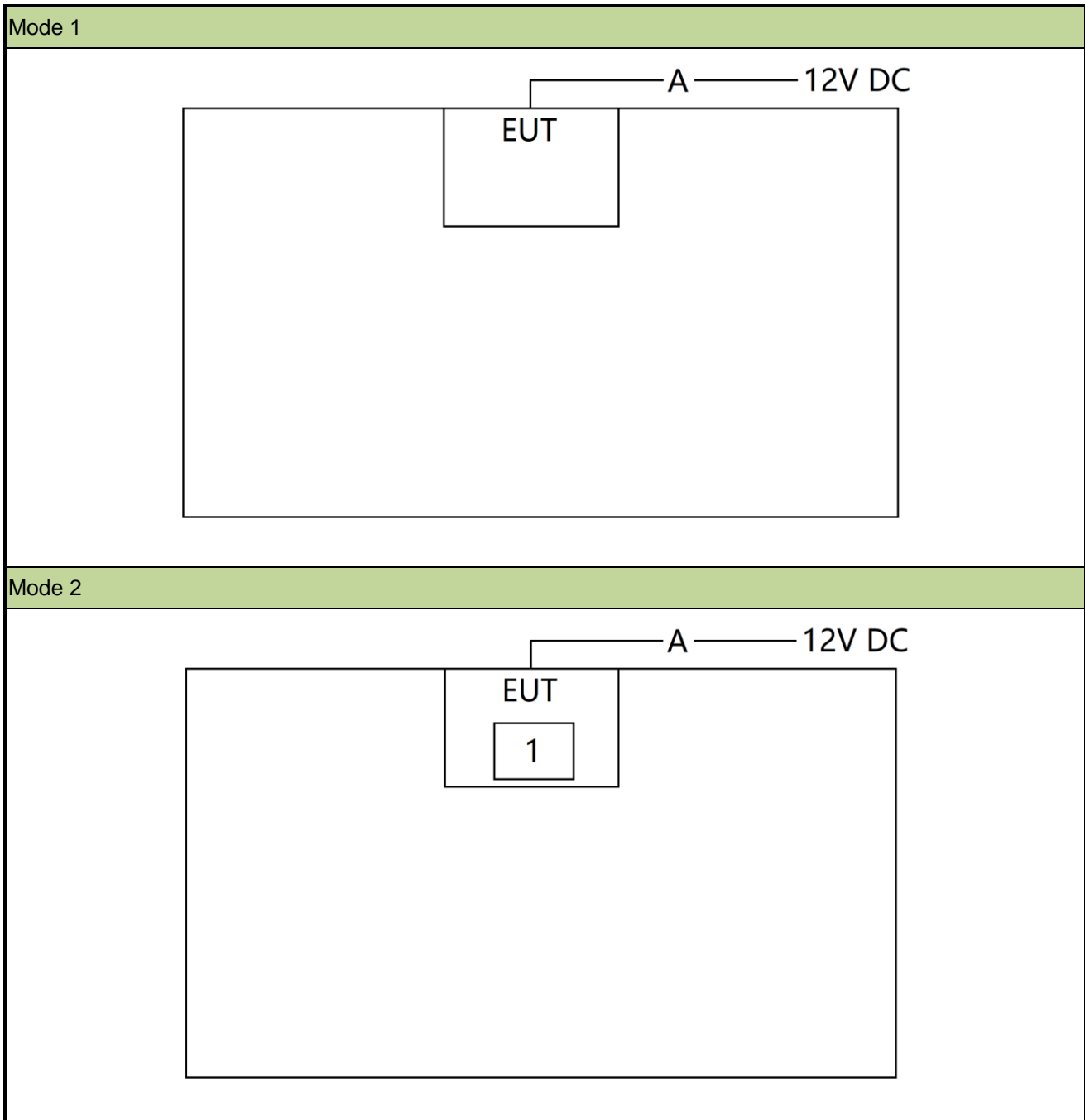
2. Test Configuration

2.1. Test Mode

Mode 1: Standby Mode
Mode 2: Charge the Load

2.2. Test System Connection Diagram

The device was tested per the guidance ANSI C63.10: 2013 was used to reference the appropriate EUT setup for radiated emissions testing and AC line conducted testing.



Cable Type		Cable Spec.	Length
A	DC Power Cable	Non-Shielding	3.0m
Product		Manufacturer	Model No.
1	15W Load	BCS	N/A

2.3. Applied Standards

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

- FCC Part 15.209
- ANSI C63.10-2013

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:

The unit complies with the requirement of §15.203.

4. Measuring Instrument

Instrument	Manufacturer	Model No.	Asset No.	Cali. Interval	Cali. Due Date	Test Site
EMI Test Receiver	R&S	ESR7	MRTSUE06001	1 year	2022-12-29	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2023-08-22	WZ-AC1
Preamplifier	Agilent	83017A	MRTSUE06076	1 year	2022-11-12	WZ-AC1
TRILOG Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2023-06-21	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2023-04-21	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE06403	1 year	2023-06-06	WZ-AC1
Signal Analyzer	Keysight	N9010B	MRTSUE06607	1 year	2022-12-29	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2022-11-11	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022-10-28	WZ-AC1

Software	Version	Function
EMI Software	V3	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable

5. Decision Rules and Measurement Uncertainty

5.1. Decision Rules

The Decision Rule is based on Simple Acceptance in accordance with ISO Guide 98-4: 2012 Clause 8.2. (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)

5.2. Measurement Uncertainty

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

AC Conducted Emission Measurement
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

6. Test Result

6.1. Summary

FCC Section(s)	Test Description	Test Condition	Verdict
15.215 (c)	20dB Bandwidth	Radiated	Pass
15.209	General Field Strength Limits		Pass
15.207	AC Conducted Emissions 150kHz - 30MHz	Line Conducted	N/A

Remark:

1. For radiated emission tests, every axis (X, Y, Z) was also verified. The test results shown in the following sections represent the worst-case emissions.
2. "N/A" means not applicable.

6.2. 20dB Bandwidth Measurement

6.2.1. Test Limit

N/A

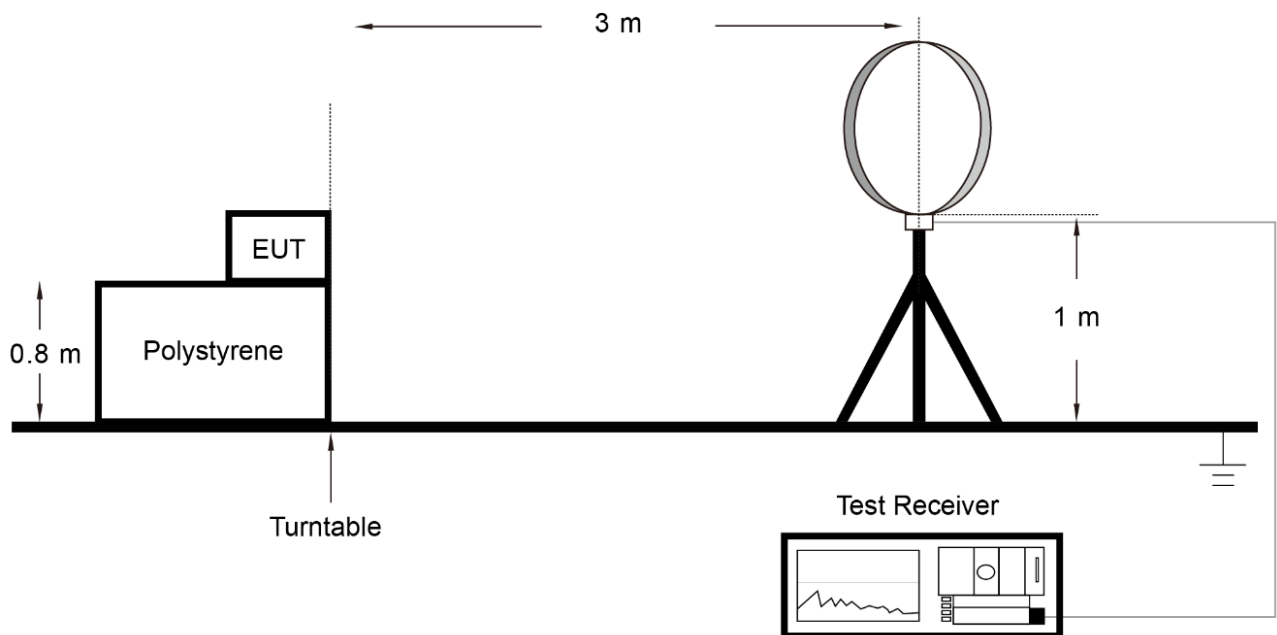
6.2.2. Test Procedure

ANSI C63.10:2013 Clause 6.9.2

6.2.3. Test Setting

1. The Spectrum's automatic bandwidth measurement capability was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 20$. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. The span range shall be between two times and five times the OBW
3. Set RBW = 1% ~ 5% of the OBW
4. $VBW \geq 3 \times RBW$
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. Allow the trace to stabilize.

6.2.4. Test Setup



6.2.5. Test Result

Refer to Appendix A.1.

6.3. General Field Strength Measurement

6.3.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [$\mu\text{V/m}$]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

6.3.2. Test Procedure

ANSI C63.10 - 2013 - Section 6.3 (General Requirements)

ANSI C63.10 - 2013 - Section 6.4 (Standard test method below 30MHz)

ANSI C63.10 - 2013 - Section 6.5 (Standard test method above 30MHz to 1GHz)

6.3.3. Test Setting

Table 1 - RBW as a function of frequency

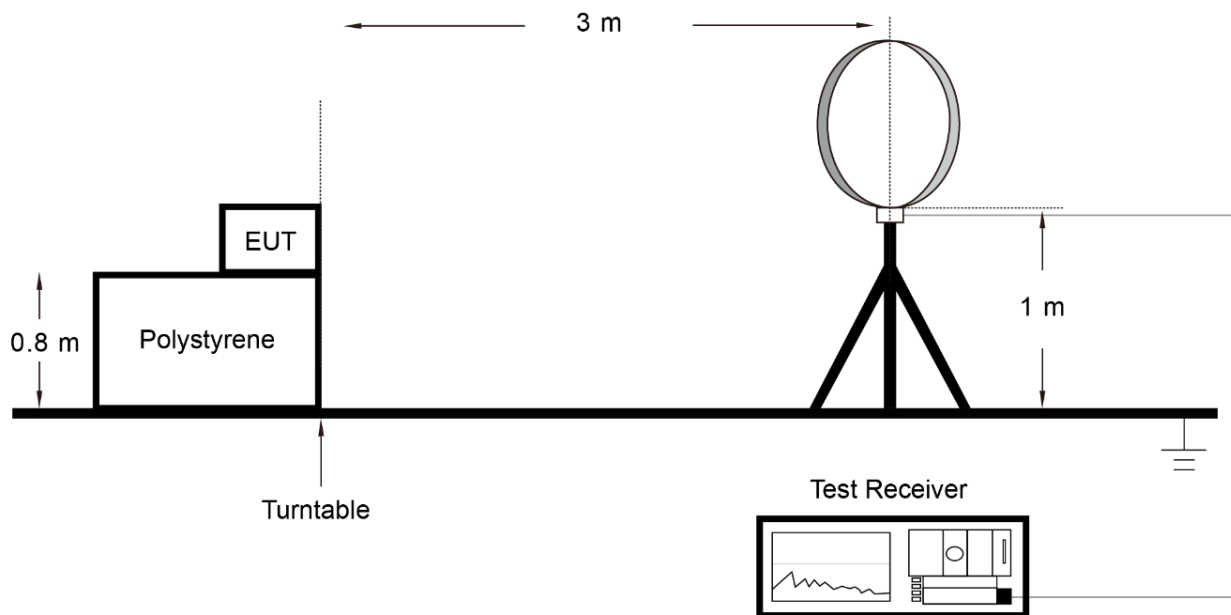
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz

Quasi-Peak Measurements below 1GHz

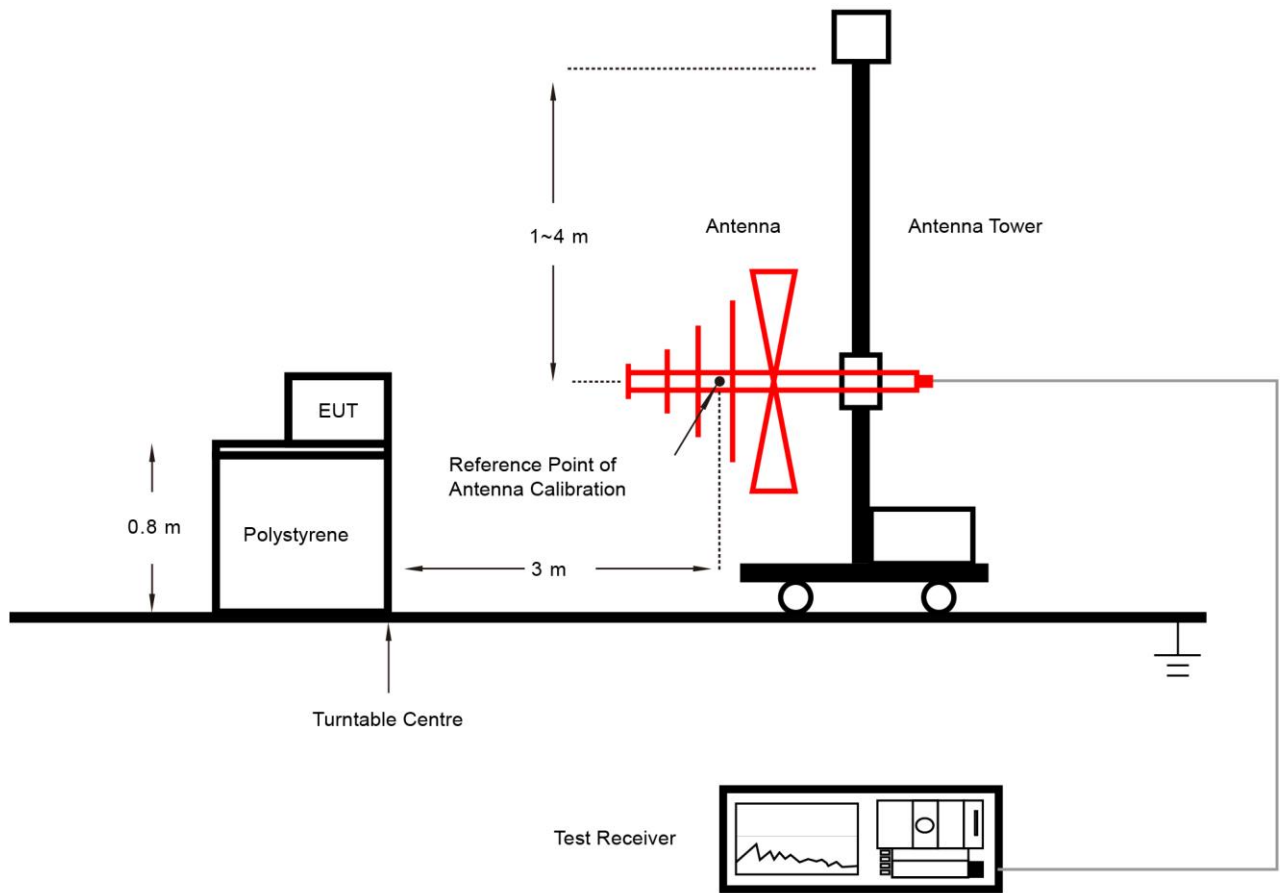
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

6.3.4. Test Setup

Below 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



6.3.5. Test Result

Refer to Appendix A.2.

6.4. AC Conducted Emissions Measurement

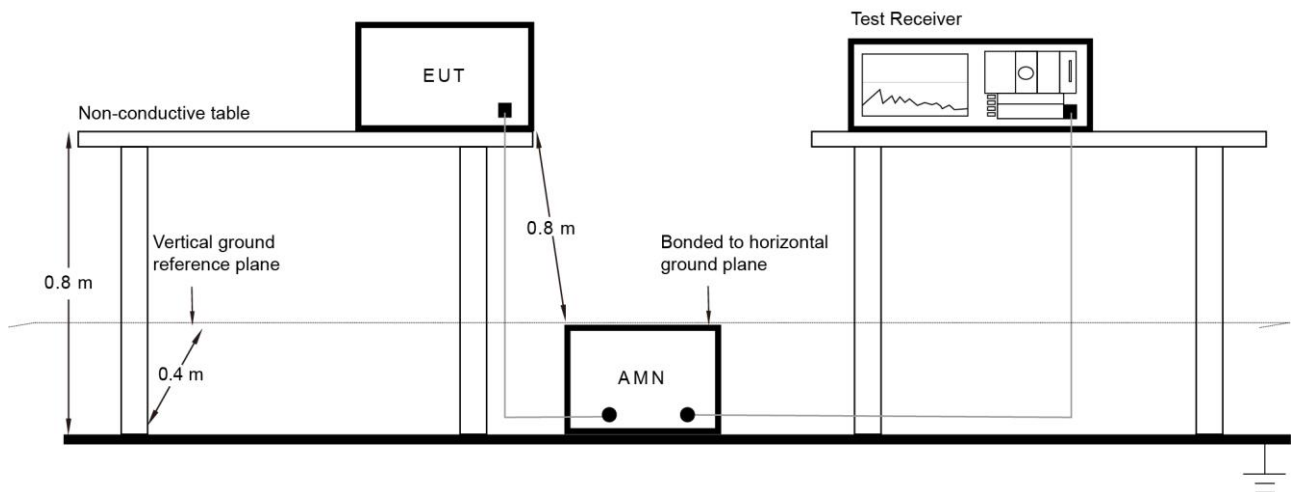
6.4.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dB μ V)	AV (dB μ V)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

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

6.4.2. Test Setup



6.4.3. Test Result

Refer to Appendix A.3.

Appendix A - Test Result

A.1 20dB Bandwidth Test Result

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-09-27		

Test Mode	20dB Bandwidth (kHz)
Mode 1	4.929
Mode 2	2.895



Note: Because the measured signal is CW or CW-like adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW.

A.2 General Field Strength Test Result

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-09-27	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dB μ V)	Factor (dB/m)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	71.3	18.9	90.2	105.5	-15.3	Peak	Coaxial
0.128	67.1	18.9	86.0	105.5	-19.5	Peak	Coplanar
Radiated Spurious Emission							
0.048	31.7	19.0	50.7	114.0	-63.3	Peak	Coaxial
0.097	33.0	18.9	51.9	107.9	-56.0	Peak	Coaxial
0.145	24.4	18.9	43.3	104.4	-61.1	Peak	Coaxial
0.170	47.3	18.8	66.1	103.0	-36.9	Peak	Coaxial
0.185	47.2	18.8	66.0	102.3	-36.3	Peak	Coaxial
1.232	13.8	18.9	32.7	65.8	-33.1	Peak	Coaxial
0.062	29.5	19.0	48.5	111.7	-63.2	Peak	Coplanar
0.097	29.6	18.9	48.5	107.9	-59.4	Peak	Coplanar
0.145	22.0	18.9	40.9	104.4	-63.5	Peak	Coplanar
0.184	43.4	18.8	62.2	102.3	-40.1	Peak	Coplanar
0.193	42.5	18.8	61.3	101.9	-40.6	Peak	Coplanar
1.217	14.0	18.9	32.9	65.9	-33.0	Peak	Coplanar

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m).

Note 2: QP measurement was not performed when peak measure level was lower than the QP limit below 1GHz.

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2022-09-27	Test Mode	Mode 2

Frequency (MHz)	Reading Level (dB μ V)	Factor (dB/m)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	76.8	18.9	95.7	105.5	-9.8	Peak	Coaxial
0.128	71.7	18.9	90.6	105.5	-14.9	Peak	Coplanar
Radiated Spurious Emission							
0.079	43.9	18.9	62.8	109.6	-46.8	Peak	Coaxial
0.049	46.4	19.0	65.4	113.8	-48.4	Peak	Coaxial
0.141	36.9	18.9	55.8	104.6	-48.8	Peak	Coaxial
0.640	34.3	18.9	53.2	71.5	-18.3	Peak	Coaxial
0.894	28.1	18.9	47.0	68.6	-21.6	Peak	Coaxial
1.145	23.0	18.9	41.9	66.4	-24.5	Peak	Coaxial
0.048	39.8	19.0	58.8	114.0	-55.2	Peak	Coplanar
0.097	33.0	18.9	51.9	107.9	-56.0	Peak	Coplanar
0.145	22.8	18.9	41.7	104.4	-62.7	Peak	Coplanar
0.640	29.6	18.9	48.5	71.5	-23.0	Peak	Coplanar
0.893	24.0	18.9	42.9	68.6	-25.7	Peak	Coplanar
1.160	18.4	18.9	37.3	66.3	-29.0	Peak	Coplanar
Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m). Note 2: QP measurement was not performed when peak measure level was lower than the QP limit below 1GHz.							

A.3 AC Conducted Emissions Test Result

This device is powered by external DC source, so the item is not applicable.

Appendix B - Test Setup Photograph

Refer to "2209RSU055-UT" file.

Appendix C - EUT Photograph

Refer to "2209RSU055-UE" file.

————— The End —————