



RF MEASUREMENT REPORT

FCC ID: 2AZX2-MR000001
Applicant: An Energy Technology Co., Ltd
Product: Onboard 15W Wireless Charging
Model No.: W015CN-03
FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s): Part15 Subpart C (Section 15.209)
Test Date: December 28, 2021 ~ January 14, 2022

Reviewed By:

Vincent Yu

Vincent Yu

Approved By:

Robin Wu

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
2112RSU027-U1	Rev. 01	Initial Report	04-02-2022	Valid

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1. General Information

1.1. Applicant

An Energy Technology Co., Ltd
139 Huaye Road, Jintan District, Changzhou City, Jiangsu, China

1.2. Manufacturer

An Energy Technology Co., Ltd
139 Huaye Road, Jintan District, Changzhou City, Jiangsu, 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	Onboard 15W Wireless Charging
Model No.	W015CN-03
WPT Specification	120 ~ 130kHz
NFC Specification	13.56MHz
Test Sample ID	20211213Sample#14
Operating Temp.	-10 ~ 40°C
Input Voltage	DC 36V
Input Current	2A (MAX)
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

Frequency Range	120 ~ 130kHz
Modulation	ASK
Antenna Type	Coil Antenna

Note: For other features of this EUT, test report will be issued separately.

2. Test Configuration

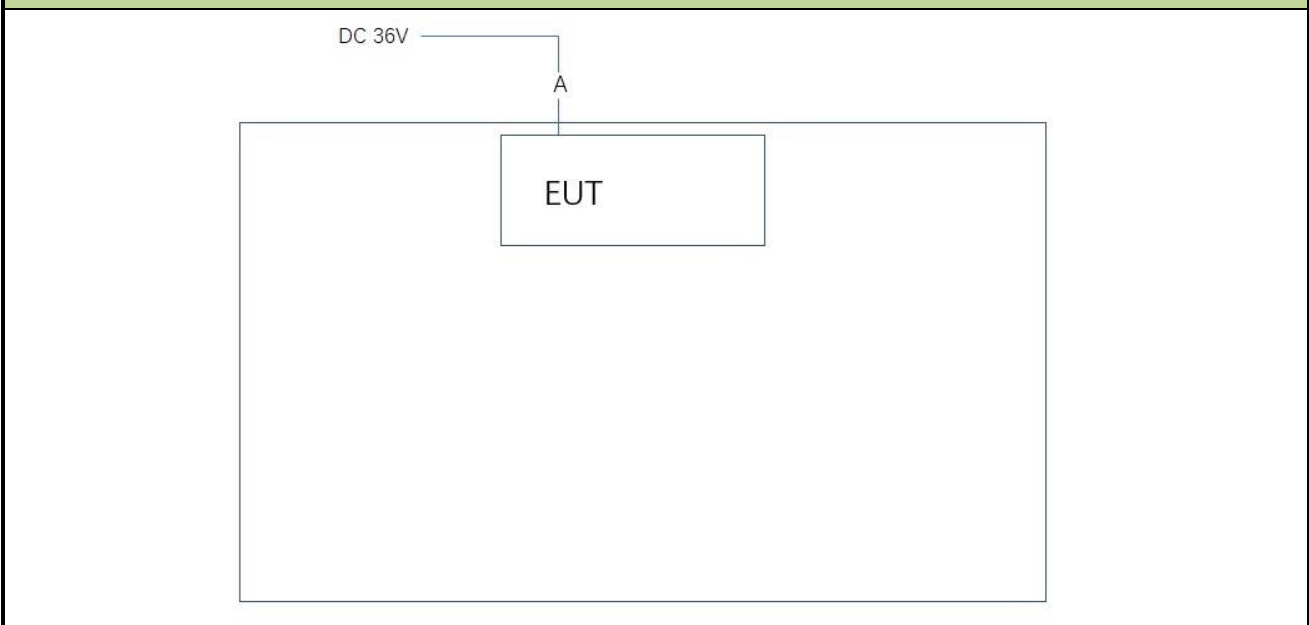
2.1. Test Mode

Mode 1: Standby Mode
Mode 2: Charge the Load
Mode 3: Charge the iPhone

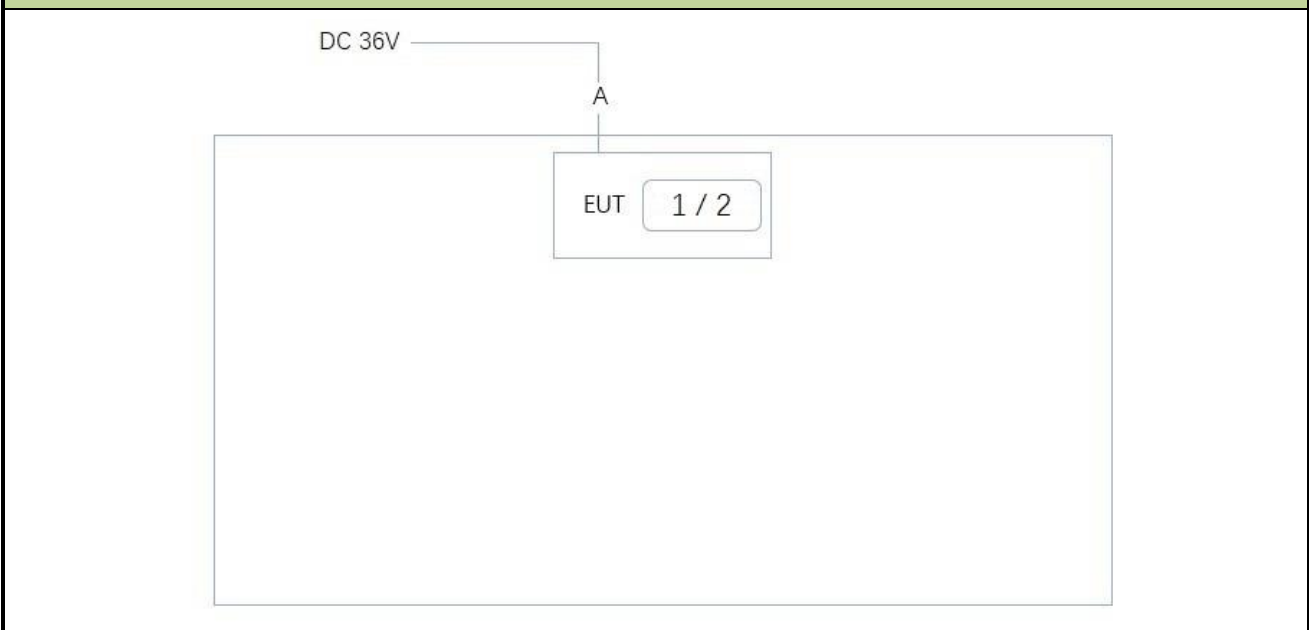
2.2. Test System Connection Diagram

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.

Mode 1



Mode 2 & 3



Cable Type		Cable Description	
A	DC Power Cable	Non-Shielded, 1.5m	
Product		Manufacturer	Model No.
1	Intelligent wireless charging full-function test module	YBZ	N/A
2	iPhone	Apple	iPhone 12

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
EXA Signal Analyzer	Keysight	N9010B	MRTSUE06457	1 year	2022/06/24	WZ-AC1
EXA Signal Analyzer	Keysight	N9020A	MRTSUE06106	1 year	2022/04/13	WZ-AC1
Loop Antenna	Schwarzbeck	FMZB 1519	MRTSUE06025	1 year	2022/10/28	WZ-AC1
Bilog Period Antenna	Schwarzbeck	VULB 9168	MRTSUE06172	1 year	2022/08/05	WZ-AC1
Horn Antenna	Schwarzbeck	BBHA 9120D	MRTSUE06023	1 year	2022/9/16	WZ-AC1
Thermal Hygrometer	testo	608-H1	MRTSUE06403	1 year	2022/06/28	WZ-AC1
Anechoic Chamber	TDK	Chamber-AC1	MRTSUE06212	1 year	2022/04/29	WZ-AC1

Software	Version	Function
EMI Software	V3	EMI Test Software

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 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

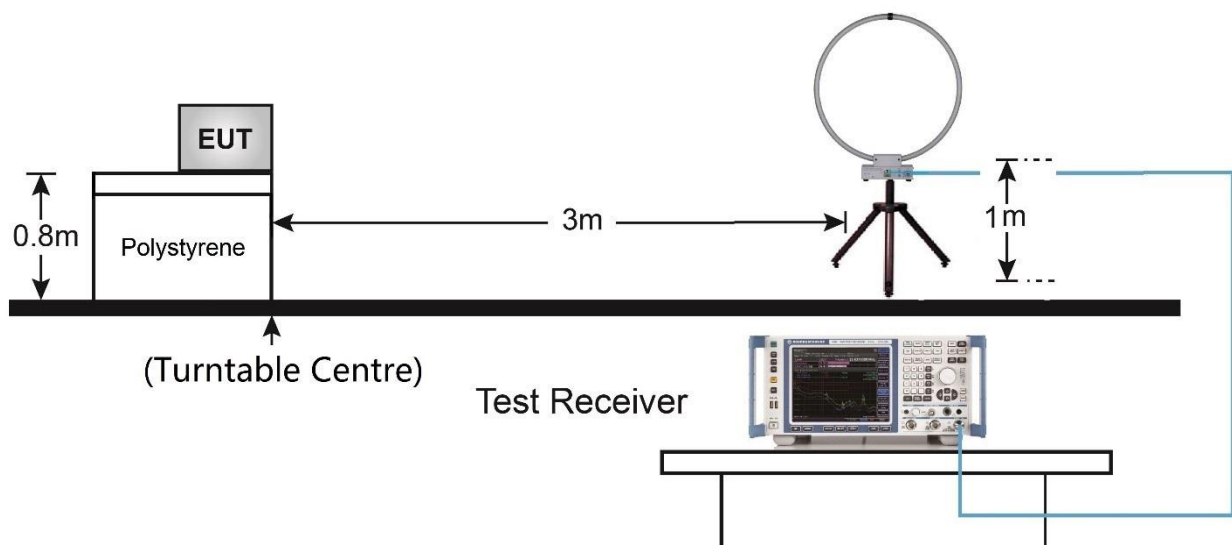
6.2.2. Test Procedure

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 [uV/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

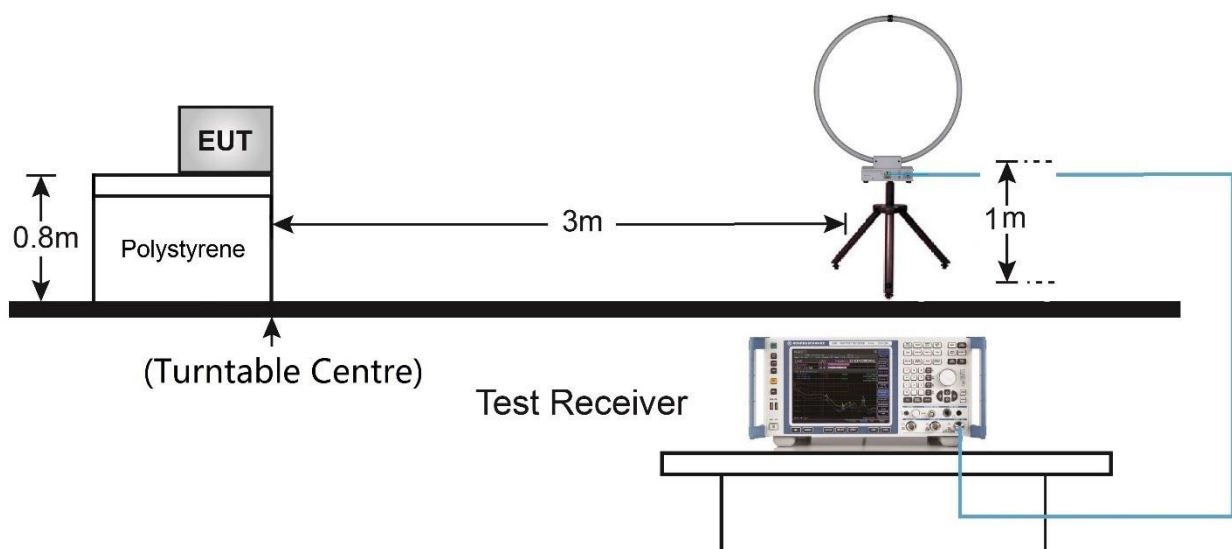
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz

Quasi-Peak Measurements below 1GHz

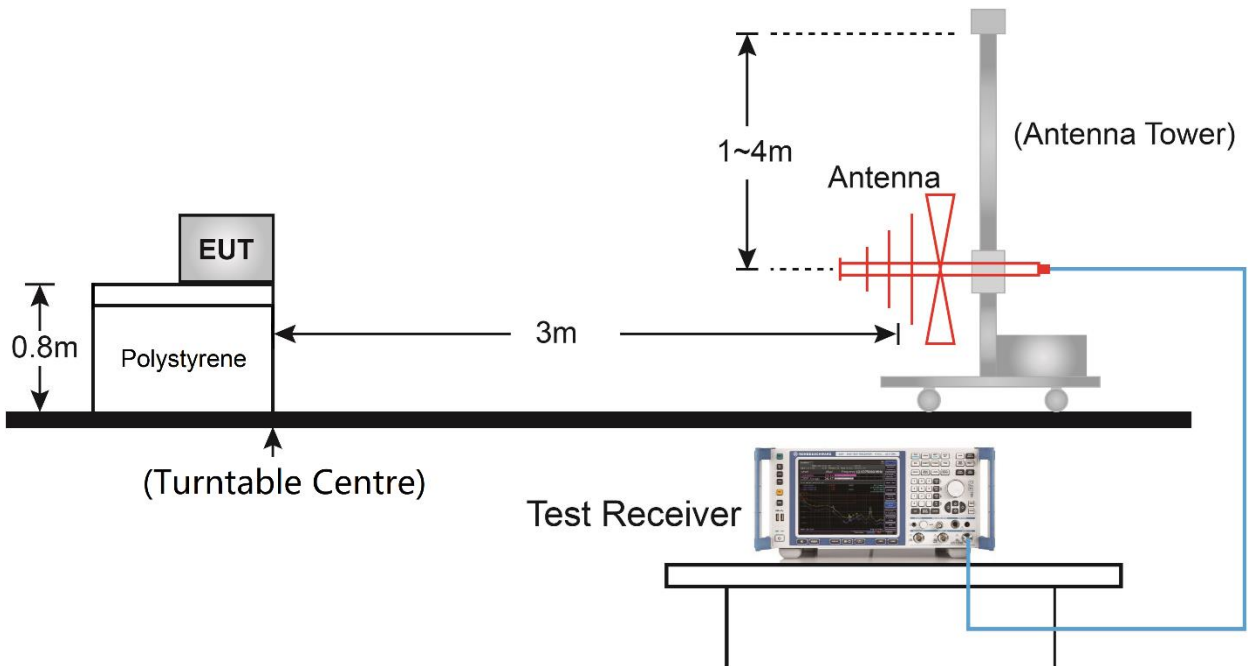
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. Span was set greater than 1MHz
3. RBW = as specified in Table 1
4. Detector = CISPR quasi-peak
5. Sweep time = auto couple
6. Trace was allowed to stabilize

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

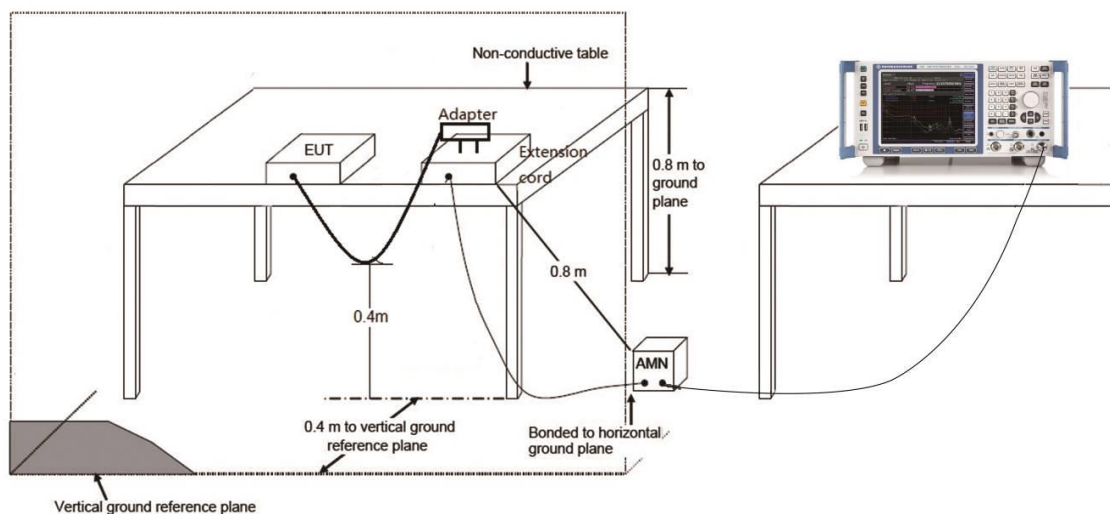
6.4.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
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

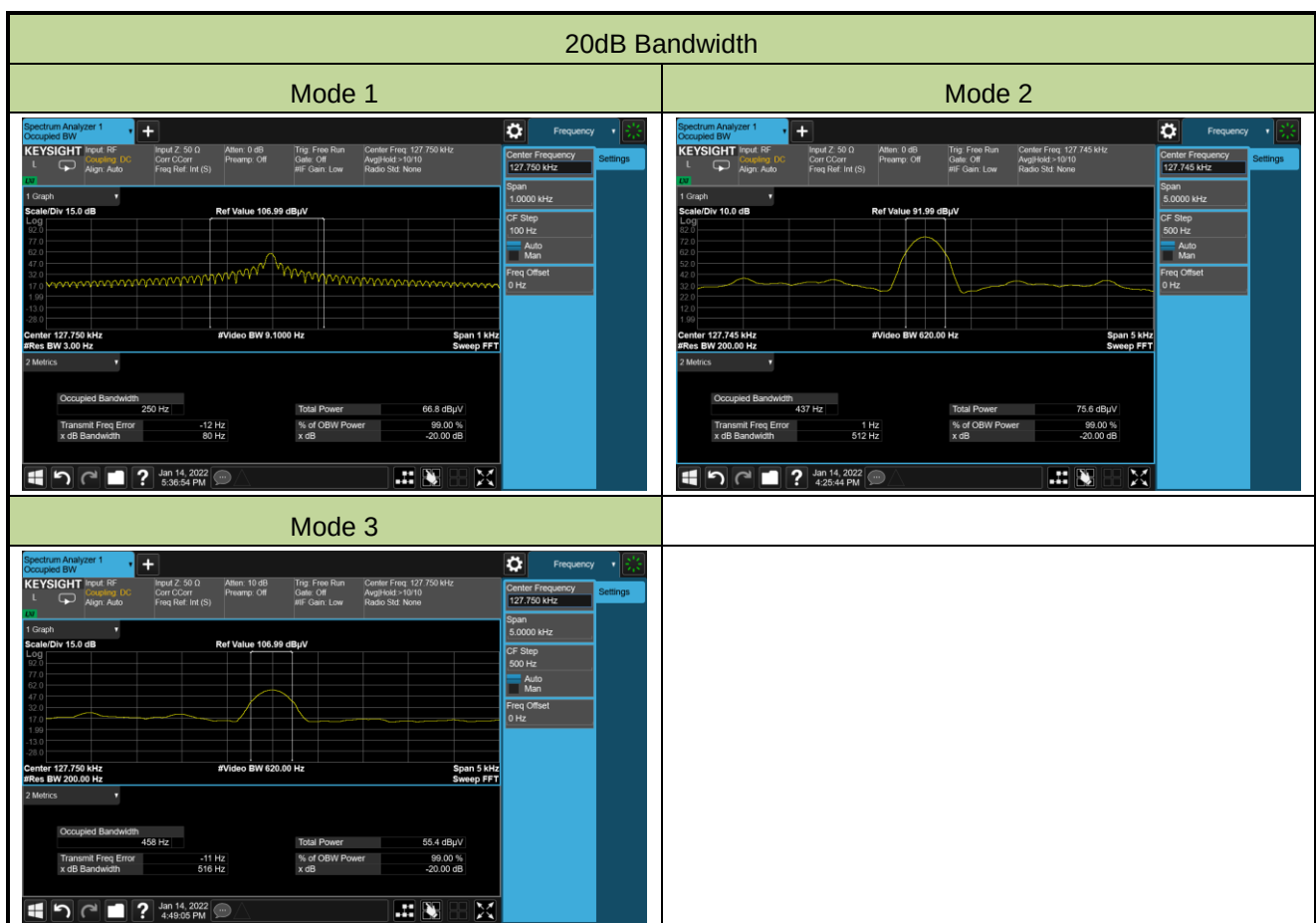
Refer to Appendix A.3.

Appendix A - Test Result

A.1 20dB Bandwidth Test Result

Test Site	WZ-AC1	Test Engineer	Charles
Test Date	2022/01/14		

Test Mode	20dB Bandwidth (Hz)
Mode 1	80
Mode 2	512
Mode 3	516



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 and the result will be approximately twice the RBW.

A.2 General Field Strength Test Result

Test Site	WZ-AC1	Test Engineer	Charles
Test Date	2021/12/28	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	73.0	17.2	90.2	105.5	-15.3	Peak	Face On
0.128	67.3	17.2	84.5	105.5	-21.0	Peak	Face Off
Radiated Spurious Emission							
0.009	30.7	20.4	51.1	128.5	-77.4	Peak	Face On
0.012	29.2	20.1	49.3	126.0	-76.7	Peak	Face On
0.019	29.4	19.4	48.8	122.0	-73.2	Peak	Face On
0.052	19.6	17.4	37.0	113.3	-76.3	Peak	Face On
0.063	23.8	17.3	41.1	111.6	-70.5	Peak	Face On
0.099	27.3	17.2	44.5	107.7	-63.2	Peak	Face On
0.013	29.5	20.0	49.5	125.3	-75.8	Peak	Face Off
0.019	30.2	19.4	49.6	122.0	-72.4	Peak	Face Off
0.024	30.7	18.9	49.6	120.0	-70.4	Peak	Face Off
0.052	19.8	17.4	37.2	113.3	-76.1	Peak	Face Off
0.062	20.1	17.3	37.4	111.7	-74.3	Peak	Face Off
0.098	22.0	17.2	39.2	107.8	-68.6	Peak	Face Off
0.374	46.1	17.2	63.3	96.1	-32.8	Peak	Face On
0.628	36.6	17.4	54.0	71.7	-17.7	Peak	Face On
0.881	30.9	17.5	48.4	68.7	-20.3	Peak	Face On
1.135	26.9	17.5	44.4	66.5	-22.1	Peak	Face On
1.404	23.4	17.5	40.9	64.7	-23.8	Peak	Face On
4.21	24.0	17.5	41.5	69.5	-28.0	Peak	Face On
0.374	29.7	17.2	46.9	96.1	-49.2	Peak	Face Off
0.628	20.3	17.4	37.7	71.7	-34.0	Peak	Face Off
0.881	13.5	17.5	31.0	68.7	-37.7	Peak	Face Off
1.15	8.3	17.5	25.8	66.4	-40.6	Peak	Face Off
1.404	6.8	17.5	24.3	64.7	-40.4	Peak	Face Off
4.21	9.2	17.5	26.7	69.5	-42.8	Peak	Face Off

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Note 2: "Face On" means that loop plane perpendicular to the ground plane and to the measurement axis.

"Face Off" means that loop plane perpendicular to the ground plane and coplanar with the measurement axis.

Test Site	WZ-AC1	Test Engineer	Charles
Test Date	2021/12/28	Test Mode	Mode 2

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	76.2	17.2	93.4	105.5	-12.1	Peak	Face On
0.128	70.7	17.2	87.9	105.5	-17.6	Peak	Face Off
Radiated Spurious Emission							
0.012	29.1	20.1	49.2	126.0	-76.8	Peak	Face On
0.019	30.8	19.4	50.2	122.0	-71.8	Peak	Face On
0.07	30.3	17.3	47.6	110.7	-63.1	Peak	Face On
0.078	33.8	17.2	51.0	109.8	-58.8	Peak	Face On
0.082	32.7	17.2	49.9	109.3	-59.4	Peak	Face On
0.09	31.9	17.2	49.1	108.5	-59.4	Peak	Face On
0.019	32.4	19.4	51.8	122.0	-70.2	Peak	Face Off
0.024	30.6	18.9	49.5	120.0	-70.5	Peak	Face Off
0.078	26.2	17.2	43.4	109.8	-66.4	Peak	Face Off
0.094	24.8	17.2	42.0	108.1	-66.1	Peak	Face Off
0.11	25.0	17.2	42.2	106.8	-64.6	Peak	Face Off
0.114	24.6	17.2	41.8	106.5	-64.7	Peak	Face Off
0.374	49.4	17.2	66.6	96.1	-29.5	Peak	Face On
0.628	38.8	17.4	56.2	71.7	-15.5	Peak	Face On
0.881	31.2	17.5	48.7	68.7	-20.0	Peak	Face On
1.135	25.2	17.5	42.7	66.5	-23.8	Peak	Face On
1.404	22.6	17.5	40.1	64.7	-24.6	Peak	Face On
1.657	20.5	17.5	38.0	63.2	-25.2	Peak	Face On
0.374	47.4	17.2	64.6	96.1	-31.5	Peak	Face Off
0.628	37.2	17.4	54.6	71.7	-17.1	Peak	Face Off
0.881	29.6	17.5	47.1	68.7	-21.6	Peak	Face Off
1.15	23.6	17.5	41.1	66.4	-25.3	Peak	Face Off
1.404	22.2	17.5	39.7	64.7	-25.0	Peak	Face Off
4.971	21.2	17.5	38.7	69.5	-30.8	Peak	Face Off

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Note 2: "Face On" means that loop plane perpendicular to the ground plane and to the measurement axis.

"Face Off" means that loop plane perpendicular to the ground plane and coplanar with the measurement axis.

Test Site	WZ-AC1	Test Engineer	Charles
Test Date	2021/12/28	Test Mode	Mode 3

Frequency (MHz)	Reading Level (dBμV)	Factor (dB/m)	Measure Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission							
0.128	55.9	17.2	73.1	105.5	-32.4	Peak	Face On
0.128	49.8	17.2	67.0	105.5	-38.5	Peak	Face Off
Radiated Spurious Emission							
0.013	29.6	20.0	49.6	125.3	-75.7	Peak	Face On
0.019	30.6	19.4	50.0	122.0	-72.0	Peak	Face On
0.032	22.9	18.1	41.0	117.5	-76.5	Peak	Face On
0.063	23.3	17.3	40.6	111.6	-71.0	Peak	Face On
0.118	17.0	17.2	34.2	106.2	-72.0	Peak	Face On
0.121	15.7	17.2	32.9	105.9	-73.0	Peak	Face On
0.015	28.1	19.8	47.9	124.1	-76.2	Peak	Face Off
0.019	33.2	19.4	52.6	122.0	-69.4	Peak	Face Off
0.024	31.2	18.9	50.1	120.0	-69.9	Peak	Face Off
0.026	25.3	18.7	44.0	119.3	-75.3	Peak	Face Off
0.035	21.9	17.8	39.7	116.7	-77.0	Peak	Face Off
0.062	18.4	17.3	35.7	111.7	-76.0	Peak	Face Off
0.374	32.6	17.2	49.8	96.1	-46.3	Peak	Face On
0.419	29.8	17.2	47.0	95.2	-48.2	Peak	Face On
0.628	20.9	17.4	38.3	71.7	-33.4	Peak	Face On
0.881	19.4	17.5	36.9	68.7	-31.8	Peak	Face On
1.15	17.0	17.5	34.5	66.4	-31.9	Peak	Face On
1.404	14.4	17.5	31.9	64.7	-32.8	Peak	Face On
0.374	29.1	17.2	46.3	96.1	-49.8	Peak	Face Off
0.404	25.4	17.2	42.6	95.5	-52.9	Peak	Face Off
0.628	18.7	17.4	36.1	71.7	-35.6	Peak	Face Off
0.881	15.6	17.5	33.1	68.7	-35.6	Peak	Face Off
1.135	14.7	17.5	32.2	66.5	-34.3	Peak	Face Off
3.702	11.7	17.5	29.2	69.5	-40.3	Peak	Face Off

Note 1: Measure Level (dBμV/m) = Reading Level (dBμV) + Factor (dB/m)

Note 2: "Face On" means that loop plane perpendicular to the ground plane and to the measurement axis.

"Face Off" means that loop plane perpendicular to the ground plane and coplanar with the measurement axis.

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 “2112RSU027-UT” file.

Appendix C - EUT Photograph

Refer to “2112RSU027-UE” file.