

RF MEASUREMENT REPORT

FCC ID: 2AYEFAR500PLUS
Applicant: Pylon Technologies Co., Ltd
Product: Rechargeable Lithium-ion Battery
Model No.: AR500 PLUS
FCC Classification: Part 15 Low Power Transmitter Below 1705 kHz (DCD)
FCC Rule Part(s): Part15 Subpart C
Result: Complies
Received Date: 2024-02-29
Test Date: 2024-03-12 ~ 2024-05-17

Reviewed By:

Denise Zhou

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
2402RSU025-U1	V01	Initial Report	2024-04-15	Invalid
2402RSU025-U1	V02	Revise Test Data in Appendix A.2	2024-05-20	Valid

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1.4. Product Information

Product Name	Rechargeable Lithium-ion Battery
Model No.	AR500 PLUS
EUT Identification No.	20240229Sampe#02
WPT Specification	127.7kHz
Operating Temp.	-15°C ~ +40°C
Power Type	Battery or AC/DC Adapter
Accessories	
AC/DC Adapter	Model No.: HKA06012050-0A7 Input: 100-240V, 50/60Hz, 1,7A Output: 12.0V=5.0A 60.0W
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	110 ~ 148kHz
Modulation	FSK
Antenna Type	Coil Antenna
WPT Output Power	Max. 15W

2. Test Configuration

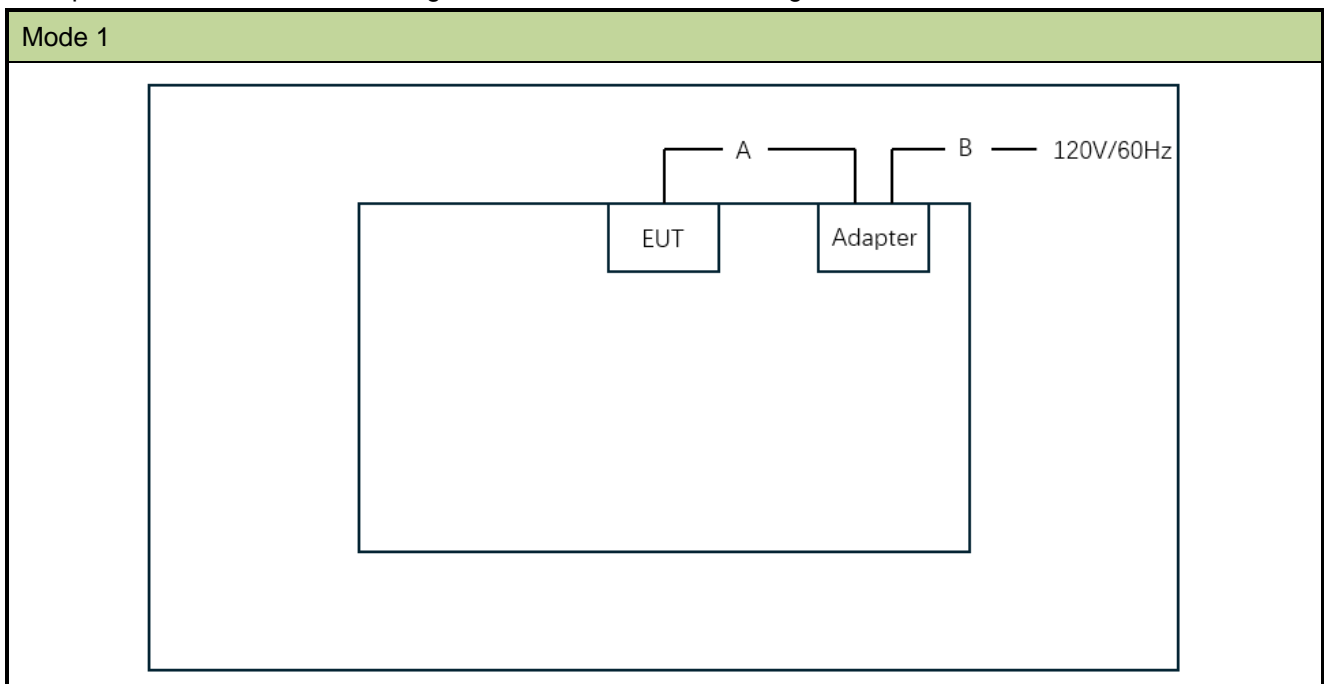
2.1. Test Mode

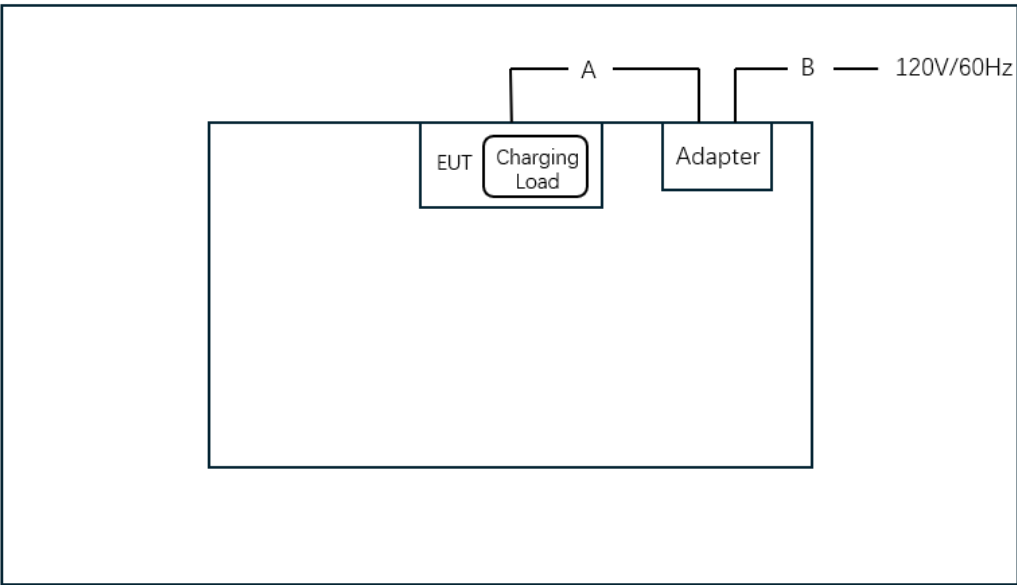
Mode 1: Standby Mode

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.



Mode 2			
			
Cable Type	Cable Description		Length
A	Power Cable	Non-Shielded	1.2m
B	Power Cable	Non-Shielded	1.2m

2.3. Applied Standards

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

- FCC Part 15C
- 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	2024-12-17	WZ-AC1
Anechoic Chamber	TDK	WZ-AC1	MRTSUE06212	1 year	2025-04-19	WZ-AC1
Thermohygrometer	testo	608-H1	MRTSUE11039	1 year	2024-10-25	WZ-AC1
Active Loop Antenna	Schwarzbeck	FMZB 1519-60 D	MRTSUE07076	1 year	2024-12-04	WZ-AC1
EMI Test Receiver	Agilent	N9038A	MRTSUE06125	1 year	2024-05-23	WZ-AC2
Anechoic Chamber	RIKEN	WZ-AC2	MRTSUE06213	1 year	2025-04-18	WZ-AC2
Thermohygrometer	testo	608-H1	MRTSUE11263	1 year	2024-11-07	WZ-AC2
Active Loop Antenna	Schwarzbeck	FMZB 1519-60 D	MRTSUE07076	1 year	2024-12-04	WZ-AC2
Two-Line V-Network	R&S	ENV216	MRTSUE06002	1 year	2024-05-23	WZ-SR2
Shielding Room	MIX-BEP	WZ-SR2	MRTSUE06215	5 years	2026-12-20	WZ-SR2
Thermohygrometer	testo	608-H1	MRTSUE06404	1 year	2024-05-31	WZ-SR2
EMI Test Receiver	R&S	ESR3	MRTSUE06909	1 year	2024-09-27	WZ-SR2

Software	Version	Function
EMI Software	V3.0.0	EMI Test Software
Controller_MF 7802	2.03C	RE Antenna & Turntable
Controller_MF 7802	1.02	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
<p>The maximum measurement uncertainty is evaluated as:</p> <p>9kHz~150kHz: 3.58dB</p> <p>150kHz~30MHz: 3.20dB</p>
Radiated Emission Measurement
<p>The maximum measurement uncertainty is evaluated as:</p> <p>Coaxial: 9kHz~30MHz: 2.61dB</p> <p>Coplanar: 9kHz~30MHz: 2.62dB</p> <p>Horizontal: 30MHz~200MHz: 3.79dB</p> <p style="padding-left: 20px;">200MHz~1GHz: 3.91dB</p> <p style="padding-left: 20px;">1GHz~40GHz: 4.99dB</p> <p>Vertical: 30MHz~200MHz: 4.06dB</p> <p style="padding-left: 20px;">200MHz~1GHz: 5.21dB</p> <p style="padding-left: 20px;">1GHz~40GHz: 4.90dB</p>

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	Pass

6.2. 20dB Bandwidth Measurement

6.2.1. Test Limit

N/A

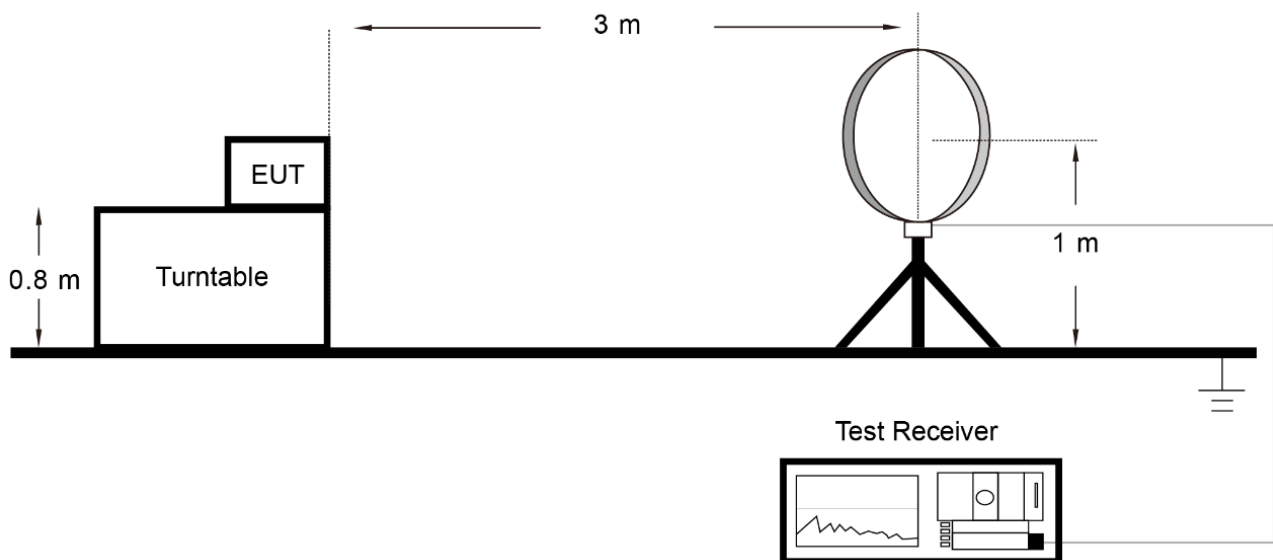
6.2.2. Test Procedure

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

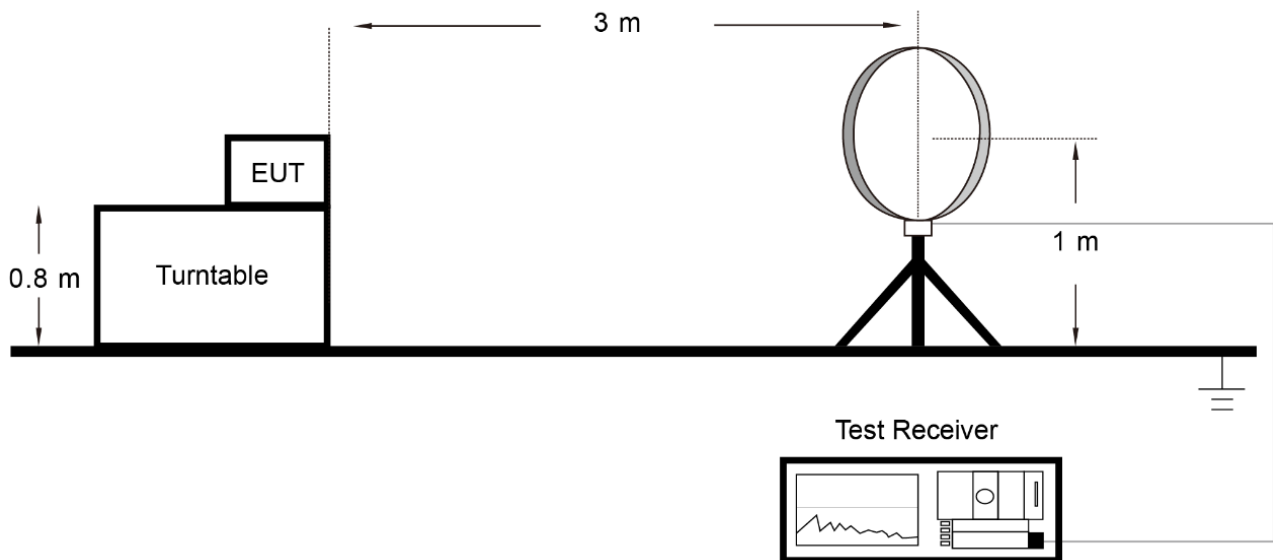
Quasi-Peak Measurements below 1GHz

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:



6.3.5. Test Result

Refer to Appendix A.2.

6.4. AC Conducted Emissions Measurement

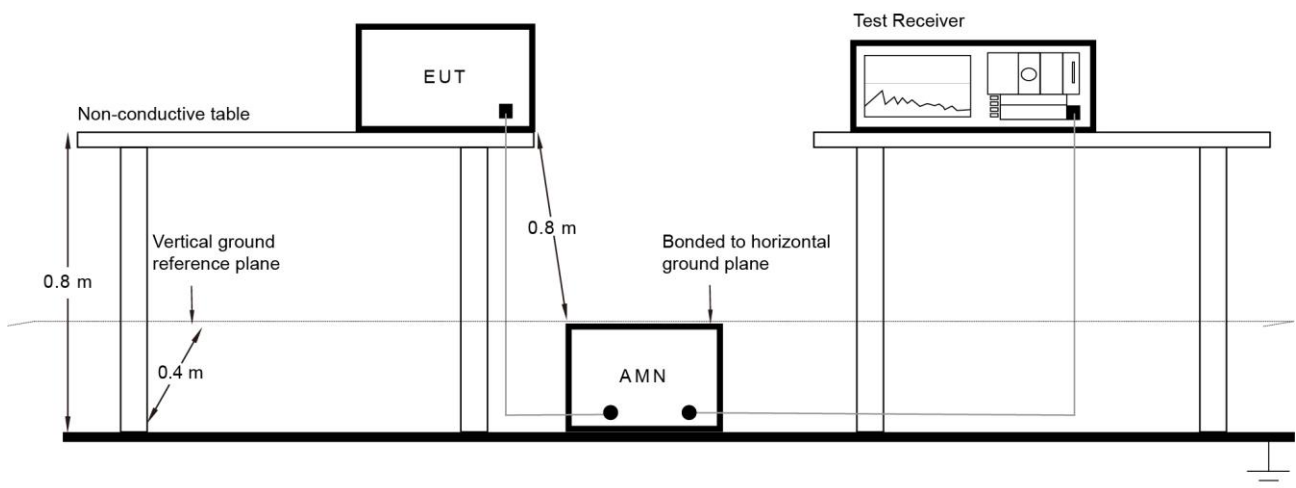
6.4.1. Test Limit

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

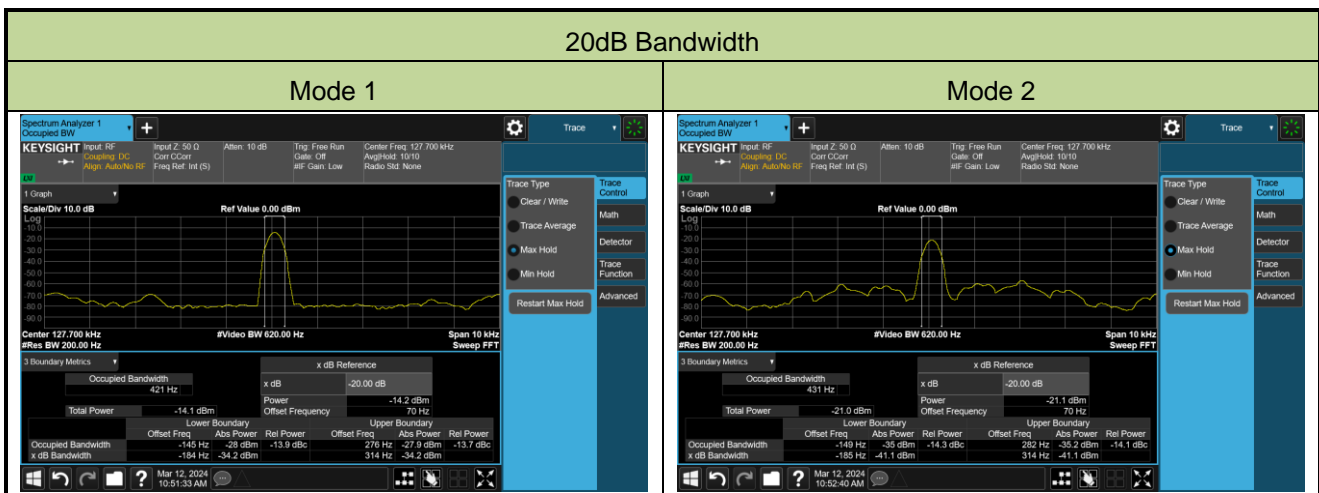
Refer to Appendix A.3.

Appendix A - Test Result

A.1 20dB Bandwidth Test Result

Test Site	WZ-AC2	Test Engineer	Bob Zhang
Test Date	2024-03-12		

Test Mode	20dB Bandwidth (Hz)
Mode 1	498
Mode 2	499



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 2.5 times of the RBW.

A.2 General Field Strength Test Result

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2024-05-17	Test Mode	Mode 1

Frequency (MHz)	Reading Level (dB μ V)	Factor (dB/m)	Measure Level@3m (dB μ V/m)	Measure Level@300m or 30m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission								
0.128	54.006	20.230	74.236	-5.764	25.460	-31.224	Peak	Coaxial
0.128	37.554	20.230	57.784	-22.216	25.460	-47.676	Peak	Coplanar
Radiated Spurious Emission								
0.019	32.237	20.321	52.558	-27.442	42.029	-69.471	Peak	Coaxial
0.062	30.677	20.284	50.960	-29.040	31.756	-60.796	Peak	Coaxial
0.089	25.483	20.254	45.737	-34.263	28.616	-62.879	Peak	Coaxial
0.382	29.787	20.168	49.956	-30.044	15.963	-46.007	Peak	Coaxial
0.639	21.639	20.195	41.834	1.834	31.494	-29.660	Peak	Coaxial
1.029	17.767	20.203	37.970	-2.030	27.356	-29.386	Peak	Coaxial
0.019	33.814	20.321	54.135	-25.865	42.029	-67.894	Peak	Coplanar
0.024	32.039	20.322	52.361	-27.639	40.000	-67.639	Peak	Coplanar
0.062	26.611	20.284	46.894	-33.106	31.756	-64.862	Peak	Coplanar
0.252	19.794	20.168	39.961	-40.039	19.576	-59.615	Peak	Coplanar
0.623	19.336	20.193	39.529	-0.471	31.714	-32.185	Peak	Coplanar
0.988	18.345	20.205	38.550	-1.450	27.709	-29.159	Peak	Coplanar

Note 1: Measure Level@3m (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m)

Note 2: For frequencies below 0.49MHz, the Measure Level was converted to 300m.

For frequencies above 0.49MHz, the Measure Level was converted to 30m.

Note 3: Measure Level@300m (dB μ V/m) = Measure Level@3m (dB μ V/m) - 40*log(300/3).

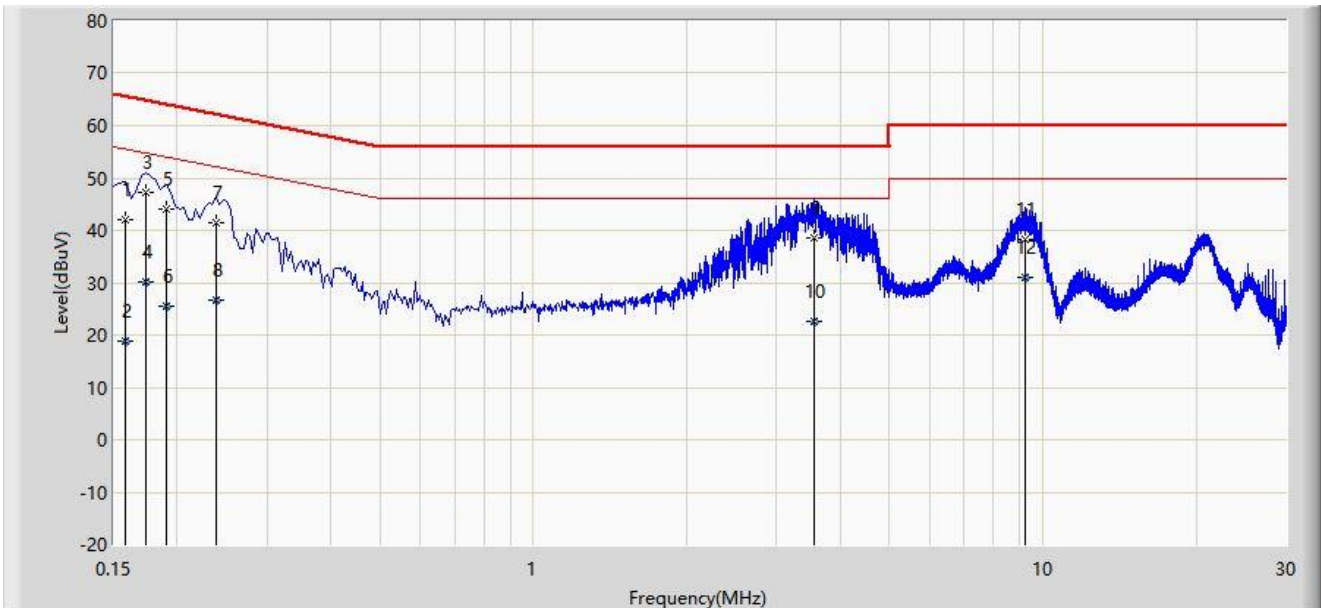
Measure Level@30m (dB μ V/m) = Measure Level@3m (dB μ V/m) - 40*log(30/3).

Test Site	WZ-AC1	Test Engineer	Carl Jiang
Test Date	2024-05-17	Test Mode	Mode 2

Frequency (MHz)	Reading Level (dB μ V)	Factor (dB/m)	Measure Level@3m (dB μ V/m)	Measure Level@300m or 30m (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
Fundamental Radiated Emission								
0.128	69.065	20.230	89.295	9.295	25.460	-16.165	Peak	Coaxial
0.128	63.216	20.230	83.446	3.446	25.460	-22.014	Peak	Coplanar
Radiated Spurious Emission								
0.019	31.577	20.321	51.898	-28.102	42.029	-70.131	Peak	Coaxial
0.062	30.888	20.284	51.171	-28.829	31.756	-60.585	Peak	Coaxial
0.066	29.162	20.277	49.438	-30.562	31.213	-61.775	Peak	Coaxial
0.382	42.401	20.168	62.570	-17.430	15.963	-33.393	Peak	Coaxial
0.639	33.458	20.195	53.653	13.653	31.494	-17.841	Peak	Coaxial
0.893	27.757	20.203	47.960	7.960	28.587	-20.627	Peak	Coaxial
0.019	30.357	20.321	50.678	-29.322	42.029	-71.351	Peak	Coplanar
0.024	32.632	20.322	52.954	-27.046	40.000	-67.046	Peak	Coplanar
0.062	25.85	20.284	46.133	-33.867	31.756	-65.623	Peak	Coplanar
0.382	41.886	20.168	62.055	-17.945	15.963	-33.908	Peak	Coplanar
0.639	33.222	20.195	53.417	13.417	31.494	-18.077	Peak	Coplanar
0.894	27.406	20.203	47.609	7.609	28.577	-20.968	Peak	Coplanar
Note 1: Measure Level@3m (dB μ V/m) = Reading Level (dB μ V) + Factor (dB/m) Note 2: For frequencies below 0.49MHz, the Measure Level was converted to 300m. For frequencies above 0.49MHz, the Measure Level was converted to 30m. Note 3: Measure Level@300m (dB μ V/m) = Measure Level@3m (dB μ V/m) - 40*log(300/3). Measure Level@30m (dB μ V/m) = Measure Level@3m (dB μ V/m) - 40*log(30/3).								

A.3 AC Conducted Emissions Test Result

Site: WZ-SR2	Test Date: 2024-04-08
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Line
EUT: Rechargeable Lithium-ion Battery	Power: AC 120V/60Hz
Mode 1	



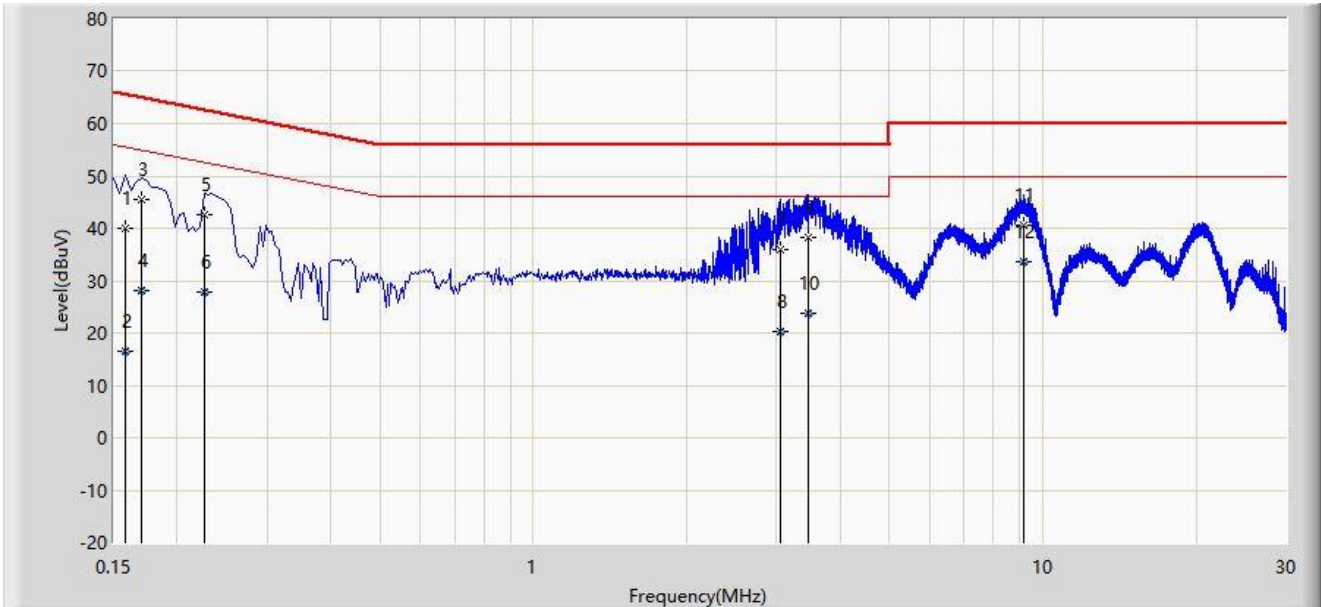
No	Mark	Frequency (MHz)	Measure Level (dBμV)	Reading Level (dBμV)	Margin (dB)	Limit (dBμV)	Factor (dB)	Type
1		0.158	42.059	32.289	-23.510	65.568	9.770	QP
2		0.158	18.831	9.062	-36.737	55.568	9.770	AV
3		0.174	47.379	37.603	-17.388	64.767	9.777	QP
4		0.174	30.122	20.345	-24.646	54.767	9.777	AV
5		0.190	44.039	34.256	-19.997	64.037	9.783	QP
6		0.190	25.502	15.718	-28.535	54.037	9.783	AV
7		0.238	41.500	31.697	-20.666	62.166	9.803	QP
8		0.238	26.548	16.744	-25.618	52.166	9.803	AV
9	*	3.562	38.637	28.022	-17.363	56.000	10.615	QP
10		3.562	22.681	12.066	-23.319	46.000	10.615	AV
11		9.238	38.195	26.997	-21.805	60.000	11.198	QP
12		9.238	31.009	19.811	-18.991	50.000	11.198	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Test Date: 2024-04-08
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Neutral
EUT: Rechargeable Lithium-ion Battery	Power: AC 120V/60Hz
Mode 1	



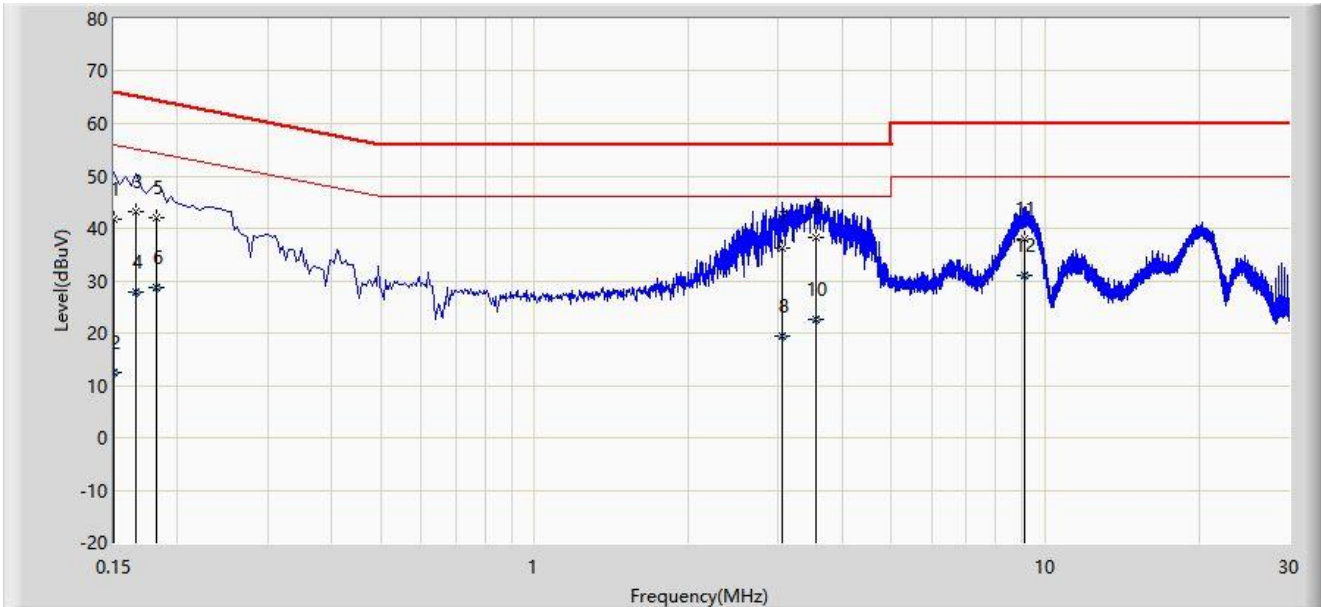
No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1		0.158	40.088	30.313	-25.480	65.568	9.776	QP
2		0.158	16.621	6.846	-38.947	55.568	9.776	AV
3		0.170	45.627	35.849	-19.333	64.960	9.779	QP
4		0.170	28.099	18.320	-26.862	54.960	9.779	AV
5		0.226	42.622	32.824	-19.973	62.595	9.798	QP
6		0.226	27.783	17.985	-24.813	52.595	9.798	AV
7		3.050	35.982	25.325	-20.018	56.000	10.657	QP
8		3.050	20.178	9.521	-25.822	46.000	10.657	AV
9		3.474	38.360	27.595	-17.640	56.000	10.765	QP
10		3.474	23.766	13.001	-22.234	46.000	10.765	AV
11		9.182	40.535	29.195	-19.465	60.000	11.340	QP
12	*	9.182	33.709	22.369	-16.291	50.000	11.340	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Test Date: 2024-04-08
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Line
EUT: Rechargeable Lithium-ion Battery	Power: AC 120V/60Hz
Mode 2	



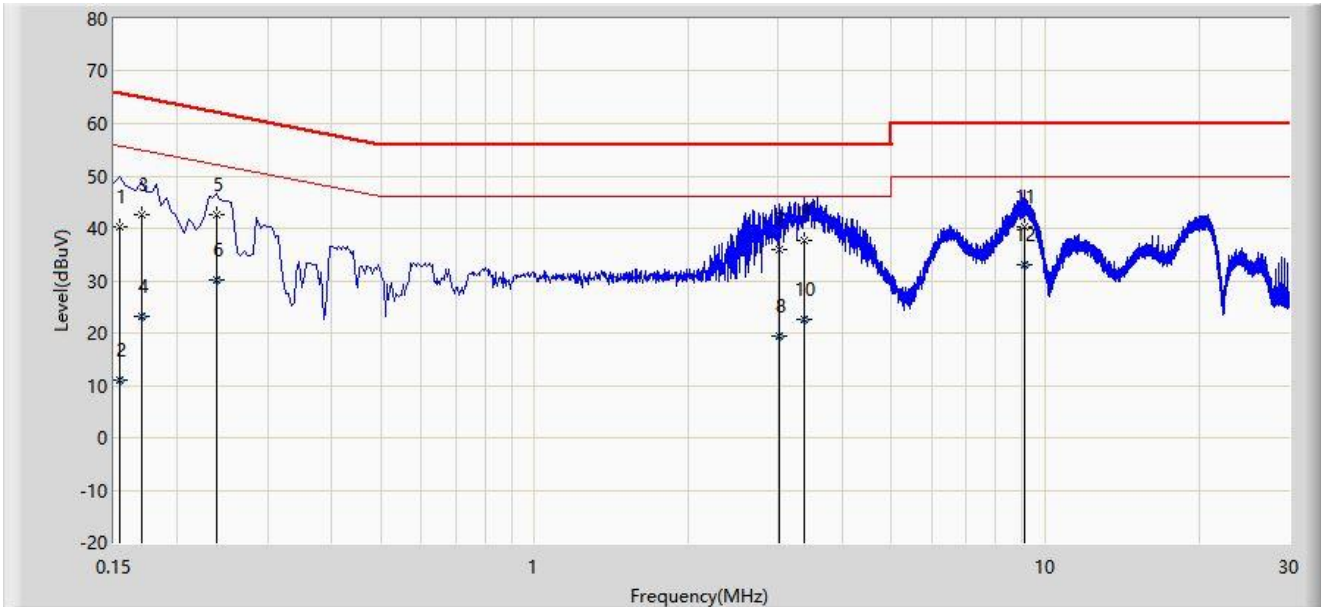
No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1		0.150	41.615	31.850	-24.385	66.000	9.766	QP
2		0.150	12.350	2.585	-43.650	56.000	9.766	AV
3		0.166	43.252	33.479	-21.906	65.158	9.773	QP
4		0.166	27.859	18.086	-27.299	55.158	9.773	AV
5		0.182	42.110	32.330	-22.284	64.394	9.780	QP
6		0.182	28.555	18.775	-25.839	54.394	9.780	AV
7		3.050	36.322	25.780	-19.678	56.000	10.542	QP
8		3.050	19.456	8.914	-26.544	46.000	10.542	AV
9	*	3.562	38.143	27.528	-17.857	56.000	10.615	QP
10		3.562	22.516	11.901	-23.484	46.000	10.615	AV
11		9.078	38.035	26.852	-21.965	60.000	11.183	QP
12		9.078	30.885	19.701	-19.115	50.000	11.183	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Site: WZ-SR2	Test Date: 2024-04-08
Limit: FCC_Part15.207_CE_AC Power	Engineer: Linda Wei
Probe: ENV216_101683_Filter Off_E	Polarity: Neutral
EUT: Rechargeable Lithium-ion Battery	Power: AC 120V/60Hz
Mode 2	



No	Mark	Frequency (MHz)	Measure Level (dBµV)	Reading Level (dBµV)	Margin (dB)	Limit (dBµV)	Factor (dB)	Type
1		0.154	40.156	30.382	-25.625	65.781	9.774	QP
2		0.154	10.968	1.194	-44.814	55.781	9.774	AV
3		0.170	42.672	32.894	-22.288	64.960	9.779	QP
4		0.170	23.081	13.302	-31.879	54.960	9.779	AV
5		0.238	42.664	32.860	-19.502	62.166	9.803	QP
6		0.238	30.250	20.446	-21.916	52.166	9.803	AV
7		3.006	35.923	25.276	-20.077	56.000	10.647	QP
8		3.006	19.455	8.808	-26.545	46.000	10.647	AV
9		3.378	37.775	27.035	-18.225	56.000	10.741	QP
10		3.378	22.490	11.750	-23.510	46.000	10.741	AV
11		9.078	40.173	28.838	-19.827	60.000	11.335	QP
12	*	9.078	33.157	21.822	-16.843	50.000	11.335	AV

Note 1: " * ", means this data is the worst emission level.

Note 2: Measure Level (dBµV) = Reading Level (dBµV) + Factor (dB).

Note 3: Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

Appendix B - Test Setup Photograph

Refer to "2402RSU025-UT" file.

Appendix C - EUT Photograph

Refer to "2402RSU025-UE" file.

_____ The End _____