TL-637

TEST REPORT

1. Applicant
Name : NEUBILITY.INC
Address : 115, Wangsimni-ro, Seongdong-gu, Seoul, Republic of Korea

2. Use of Report : For FCC

3. Type of Equipment / Model : NEUBIE / NB015
Variant Model : N/A

4. Wireless Module Name : N/A

5. Date of Test : May 13 to 22, 2024
Issue Date : May 28, 2024

6. Test Standard(method) used (EMC Class A):
FCC PART 15 SUBPART B

7. Test Results : Complied

Prepared by

UL Korea, Ltd. Suwon Laboratory
218 Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 16675, Korea
TEL: +82-31-337-9902
FAX: +82-31-213-5433

Revision History

Rev.	Issue Date	Revisions	Revised By
V1	05/28/24	Initial issue	Hyerim Song
V2	07/11/24	Added test data	Hyerim Song

[Brief summary of EMI test]

Test Title	Frequency	Margin	Detector	Tested Mode
Conducted Emission Test	0.631978 MHz	13.24 dB	CAV	Charging Mode 1
Radiated Emission Test (30 MHz ~ 1 GHz)	625.021111 MHz	4.01 dB	QP	Charging Mode 1
Radiated Emission Test (1 GHz ~ 18 GHz)	1125.125000 MHz	12.97 dB	CAV	Charging Mode 2
Radiated Emission Test (18 GHz ~ 40 GHz)	N/A	N/A	N/A	N/A

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218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea TEL: (031) 337-9902 FAX: (031) 213-5433

1. ATTESTATION OF TEST RESULTS

APPLICANT	:	NEUBILITY.INC
MANUFACTURER	:	NEUBILITY.INC 115, Wangsimni-ro, Seongdong-gu, Seoul, Republic of Korea
EUT DESCRIPTION	:	NEUBIE
MODEL NUMBER	:	NB015
VARIANT MODEL	:	N/A
VARIANT MODEL DIFFERENCES	:	N/A
SERIAL NUMBER	:	N/A
DATE TESTED	:	May 13 to 22, 2024

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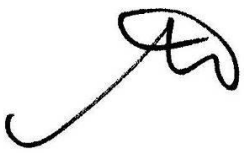
APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART B	Pass

Equipment Class	**Class A**

UL Korea Ltd. tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL Korea Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL Korea Ltd. and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL Korea Ltd. will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For
UL Korea, Ltd. By:



Hyungmin Choi
Senior Laboratory Engineer
UL Korea, Ltd

Tested By:

Hyerim Song
Laboratory Engineer
UL Korea, Ltd.

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2. TEST METHODOLOGY

All tests were performed in accordance with the procedures documented in ANSI C63.4a-2017, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

Reference standards	Test requirements	Applied	Results
FCC Part15 Subpart B	Conducted emission	☒	Pass
FCC Part15 Subpart B	Radiated emission (Below 1 GHz)	☒	Pass
FCC Part15 Subpart B	Radiated emission (Above 1 GHz)	☒	Pass
FCC Part15 Subpart B	Antenna Conducted Power	☐	N/A[Note1]
Note1: No ports apply to the standard.			

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3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 218 Maeyeong-ro, Yeongtong-gu, Suwon-si, Gyeonggi-do, 16675, Korea.

UL Korea, Ltd. Suwon Laboratory	
☒	Semi-anechoic 10 m chamber – RE
☐	Full-anechoic chamber - RS
☐	Shield room 1
☒	Shield room 2

UL Korea, Ltd. is accredited by RRA, Laboratory Code KR0161. The full scope of accreditation can be viewed at https://www.rra.go.kr/ko/include/view.do?type=1

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Test Item	Sample
Field Strength (dBuV/m)	Measured Voltage (dBuV/m) = Receiver Reading + Correction *Correction = Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)
	28.9 dBuV/m = 36.5 dBuV - 7.6 dB
Conducted (dBuV)	Measured Voltage (dBuV) = Receiver Reading + Correction *Correction = AMN(AAN) Factor (dB) + Cable Loss (dB)
	55.3 dBuV = 45.5 dBuV + 9.8 dB

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Test Item	Measurement uncertainty
Conducted Emission (0.15 to 30 MHz Below)	2.88 dB, Note 1
Radiated emission (1 GHz Below)	4.23 dB, Note 1
Radiated emission (1 GHz Above)	4.65 dB, Note 1
Note 1: Measurement uncertainty is calculated in according with CISPR 16-4-2 (2011-06). The measurement uncertainty is given with a confidence of 95 % with the coverage factor, *k*=2.	

Uncertainty figures are valid to a confidence level of 95%, k=2.

4.4. DECISION RULE

Decision rule for statement(s) of conformity is based on Clause 4.3.3 in IEC Guide 115:2023.
Measurement Uncertainty is not applied when providing statements of conformity in accordance with IEC Guide 115:2023, 4.3.3

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

GENERAL INFORMATION

Rated Power	EUT	DC 25.9 V
	SERVER (Only for test)	AC 100-240 V, 50/60 Hz
Max Clock		2 200 MHz
LTE Router		B1, B3, B5, B7, B8, B20, B40
GPS		1 559 ~ 1 610 MHz
		1 197 ~ 1 254 MHz
Controller(RX)		2 408 ~ 2 475 MHz

5.2. MODIFICATIONS

N/A

6. DESCRIPTION OF TEST SETUP

6.1. Preliminaty Test Configurations

The system was configured for testing in a typical fashion that a customer would normally use.

6.2. Operating mode

The mode(s):

1. Operating Mode 1
   : The EUT was tested in LTE communication and continuous operation mode.
   Before the test, checked LTE connection using a Notebook PC.
2. Operating Mode 2
   : The EUT was tested in LTE communication with only master LTE router and continuous operation mode.
   Before the test, checked LTE connection using a Notebook PC.
3. Charging Mode 1
   : The EUT was tested in LTE communication and continuous charging mode.
   Before the test, checked LTE connection using a Notebook PC.
4. Charging Mode 2
   : The EUT was tested in LTE communication with only master LTE router and continuous charging mode.
   Before the test, checked LTE connection using a Notebook PC.
5. Idle Mode
   : The EUT was tested in Idle mode.

- Operating summary

Operation Mode 1	Operating Mode 1
Operation Mode 2	Operating Mode 2
Operation Mode 3	Charging Mode 1
Operation Mode 4	Charging Mode 2
Operation Mode 5	Idle Mode

[Test Voltage / Frequency]

Voltage (V)	AC 120 V	All tests
Frequency (Hz)	60 Hz	All tests

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6.3. Description of EUT and Support equipment

Support Equipment List				
Description	Manufacturer	Model	Serial Number	FCC ID/SDoC
NEUBIE	NEUBILITY.INC	NB015	N/A	2BFYJNB015A
LTE Router (Included in NEUBIE)	UAB TELTONIKA Networks	RUT241AF	N/A	2AET4RUT241AF
Controller (For NEUBIE)	FLY SKY	FS-i6S	2E014472	N4ZFLYSKYI6S
SWITCHING POWER SUPPLY BATTERY CHARGER (For NEUBIE)	GUANGDONG LIANYUNDA ELECTRONIC CO., LTD.	LYD2946000	N/A	-
Antenna	N/A	N/A	N/A	-
Notebook PC	LG	15UD50N	N/A	-

6.4. List of cables used

[Operating Mode, Idle Mode]

I/O Cable List							
Cable No	Start		End		Cable		
	Name	I/O Port	Name	I/O Port	Cable Length (m)	Shield	With Ferrite
1	EUT	-	-	-	-	-	-
2	Controller	-	-	-	-	-	-
3	Antenna	-	-	-	-	-	-

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[Charging Mode_Radiated Emission]

I/O Cable List							
Cable No	Start		End		Cable		
	Name	I/O Port	Name	I/O Port	Cable Length (m)	Shield	With Ferrite
1	EUT	DC IN	SWITCHING POWER SUPPLY BATTERY CHARGER	DC OUT	1.0	Shield	O
2	SWITCHING POWER SUPPLY BATTERY CHARGER	AC IN	AC Main	AC OUT	1.8	Unshield	X
3	Controller	-	-	-	-	-	-
4	Antenna	-	-	-	-	-	-

[Charging Mode_Conducted Emission]

I/O Cable List							
Cable No	Start		End		Cable		
	Name	I/O Port	Name	I/O Port	Cable Length (m)	Shield	With Ferrite
1	EUT	DC IN	SWITCHING POWER SUPPLY BATTERY CHARGER	DC OUT	1.0	Shield	O
2	SWITCHING POWER SUPPLY BATTERY CHARGER	AC IN	AC Main	AC OUT	1.8	Unshield	X
3	Controller	-	-	-	-	-	-

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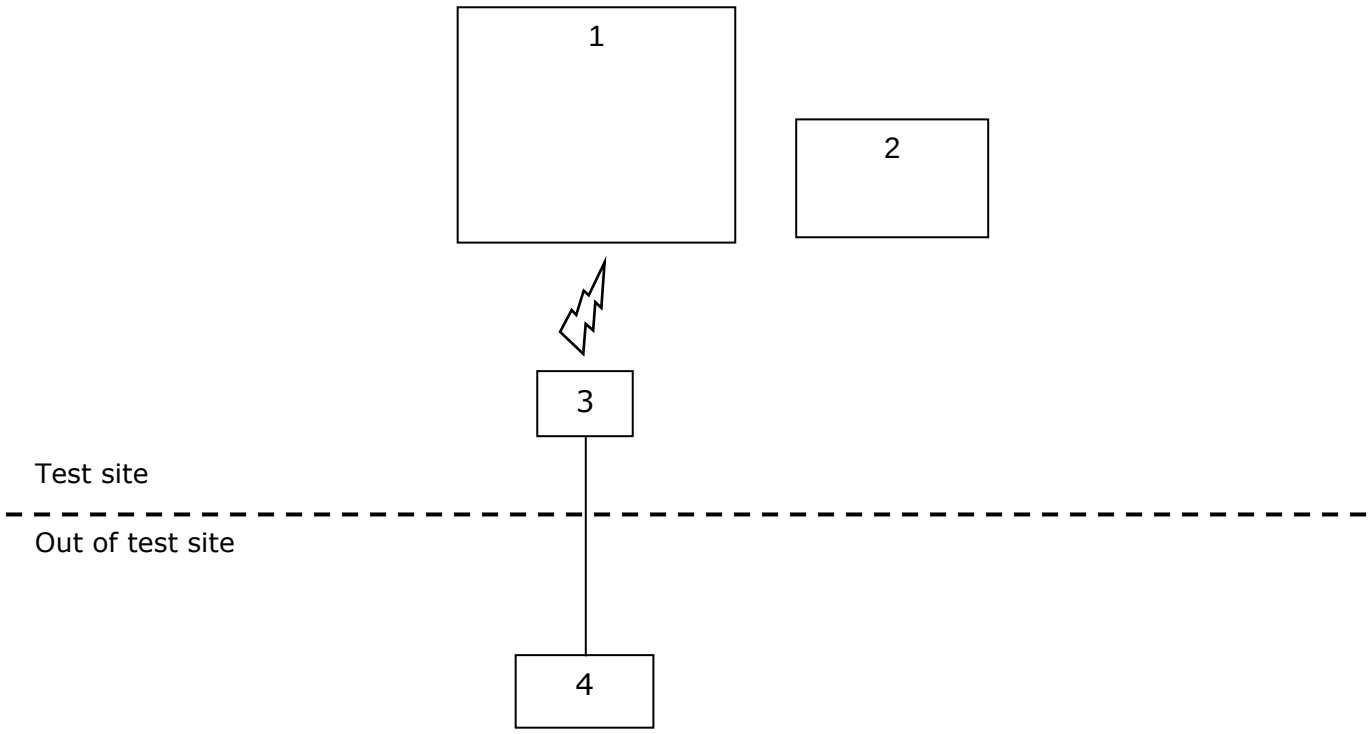
6.5. Configuration and peripherals

[Operating Mode, Idle Mode]

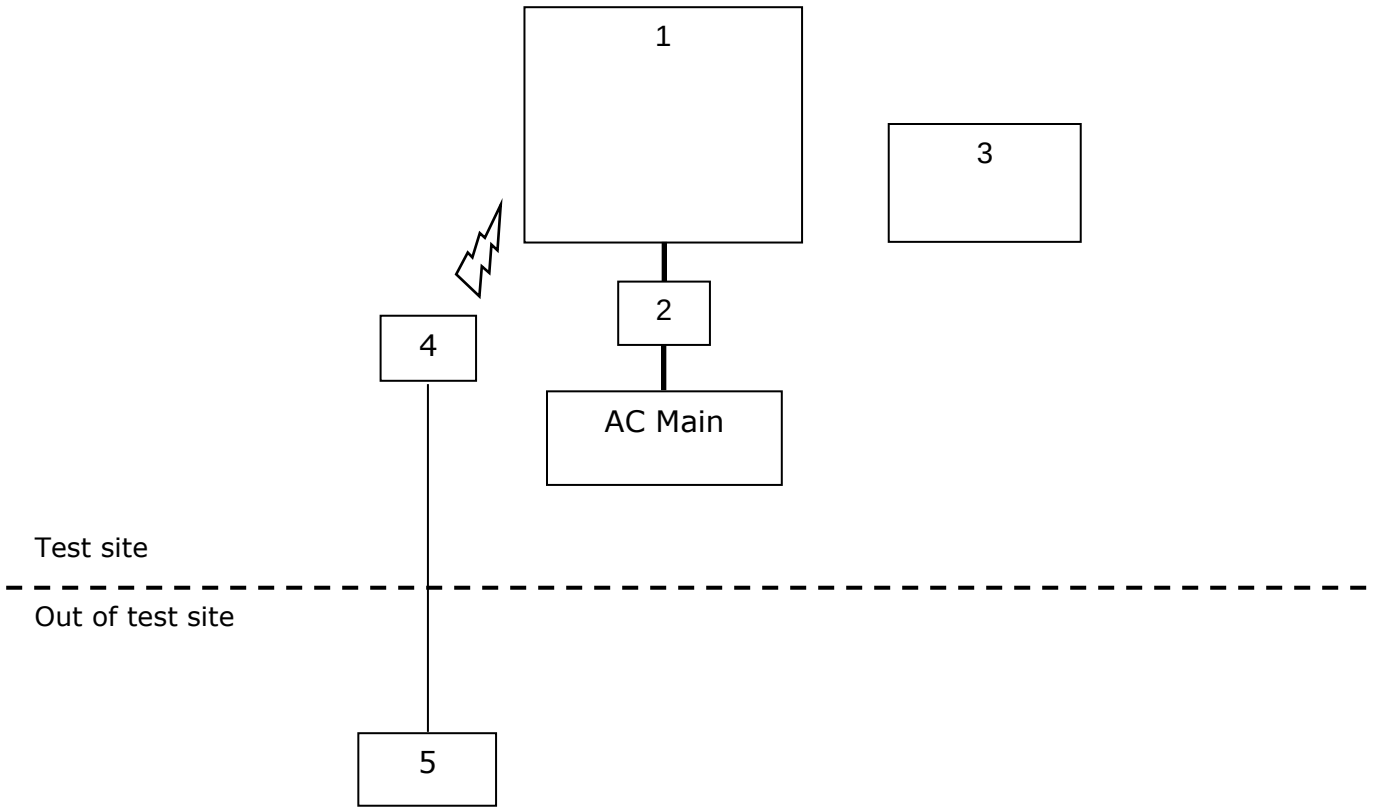


——— : Signal Line

——— : Power Line

1. EUT
2. Controller
3. Antenna
4. LTE Signal

[Charging Mode_Radiated Emission]

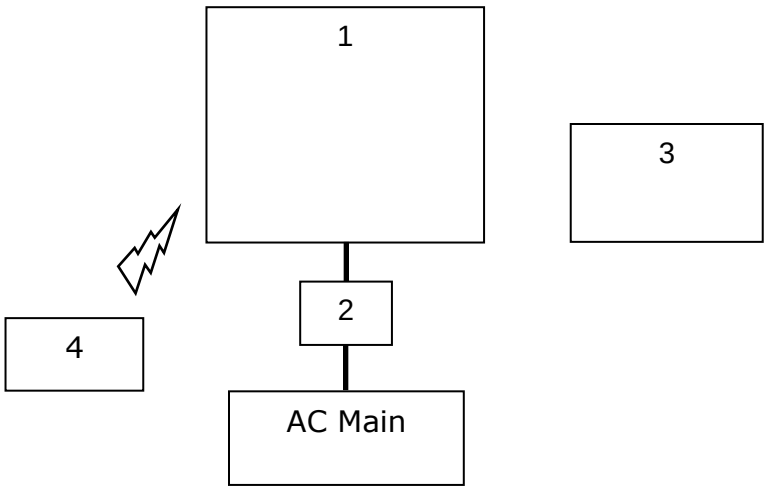


1. EUT
2. SWITCHING POWER SUPPLY
   BATTERY CHARGER
3. Controller
4. Antenna
5. LTE Signal

——— : Signal Line

━━━ : Power Line

[Charging Mode_Conducted Emission]



——— : Signal Line

▬▬▬ : Power Line

1. EUT
2. SWITCHING POWER SUPPLY
   BATTERY CHARGER
3. Controller
4. LTE Signal

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7. Test condition and results

7.1. RADIATED EMISSIONS

TEST: Limits for Radiated emission	
Method	ANSI C63.4: 2014 amended as per ANSI C63.4a-2017 The radiated disturbance was measured and set-up was made accordance with ANSI C63.4. If the EUT is tabletop equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 3 m or 10 m away from the interference receiving antenna in the 10m semi-anechoic chamber. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane. Rotate the EUT from (0 - 360)° and position the receiving antenna at heights from (1 - 4) m above the reference ground plane continuously to determine associated with higher emission levels and record them. The measurement was made in both the vertical and horizontal polarization, and the maximum value is presented in the report. For below 1 ㎓ frequency range, Quasi-Peak detector with 120 ㎑ RBW was used. Also Peak and Average detector with 1 ㎒ RBW were used for above 1 ㎓ frequency range. For further description of the configuration refer to the picture of the test set-up.

Basic Standard	FCC Part15 Subpart B	
Parameters recorded during the test	Laboratory Ambient Temperature	23.8 ± 1 °C
	Relative Humidity	39.7 ± 1 % R.H.
	Frequency range	Measurement Point
Fully configured sample scanned over the following frequency range	30.0 MHz – 18.0 GHz	Product Enclosure

Limit_Radiated Emission below 1 000 ㎒

Frequency range (MHz)	Class A Equipment (10 m distance)		Class B Equipment (3 m distance)	
	Quasi-peak (dBμV/m)	Results	Quasi-peak (dBμV/m)	Results
30 to 88	39.1	**PASS**	40	N/A
88 to 216	43.5	**PASS**	43.5	N/A
216 to 960	46.4	**PASS**	46	N/A
960 to 1 000	49.5	**PASS**	54	N/A

Note 1 The lower limit shall apply at the transition frequency.

Note 2 Additional provisions may be required for cases where interference occurs.

Note 3 According to 15.109(g), as an alternative to the radiated emission limit shown above, digital devices may be shown to comply with the Standards(CISPR), Pub. 22 shown as below.

Note 4 Test data in this report has been taken against the FCC 15.109(a) or (g) limit as it is the most stringent limit.

By complying with the more restrictive FCC 15.109 limit compliance with the ICES-003 Issue 7 limit is also demonstrated.

Frequency range (MHz)	Class A Equipment (10 m distance)		Class B Equipment (10 m distance)	
	Quasi-peak (dBµV/m)	Results	Quasi-peak (dBµV/m)	Results
30 to 230	40	N/A	30	N/A
230 to 1 000	47	N/A	37	N/A

Limits_Radiated Emission above 1 000 ㎒ at a measuring distance of 3 m

Frequency (GHz)	Class A Equipment			Class B Equipment		
	Peak (dBµV/m)	Average (dBµV/m)	Result	Peak (dBµV/m)	Average (dBµV/m)	Result
1 to 18	80	60	**PASS**	74	54	N/A
18 to 40	80	60	N/A	74	54	N/A

Note 1 Measure up to the 5th harmonic of the highest frequency, or 40 GHz, whichever is lower

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TEST EQUIPMENT USED:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI Receiver	R&S	ESW44	101848	2023.07.26	2024.07.26
TRILOG Broadband Antenna	Schwarzbeck	VULB9163	1241	2022.11.16	2024.11.16
Double-Ridged Guide Antenna	ETS-Lindgren	3117	227047	2022.09.08	2024.09.08
Pre-Amplifier	R&S	SCU08F2	100725	2023.07.26	2024.07.26
Pre-Amplifier	R&S	SCU18F	100726	2023.07.25	2024.07.25
Open switch and control	R&S	OSP220	101456	N/A	N/A
TEST Program	R&S	EMC 32 (Version 10.60.10)	N/A	N/A	N/A

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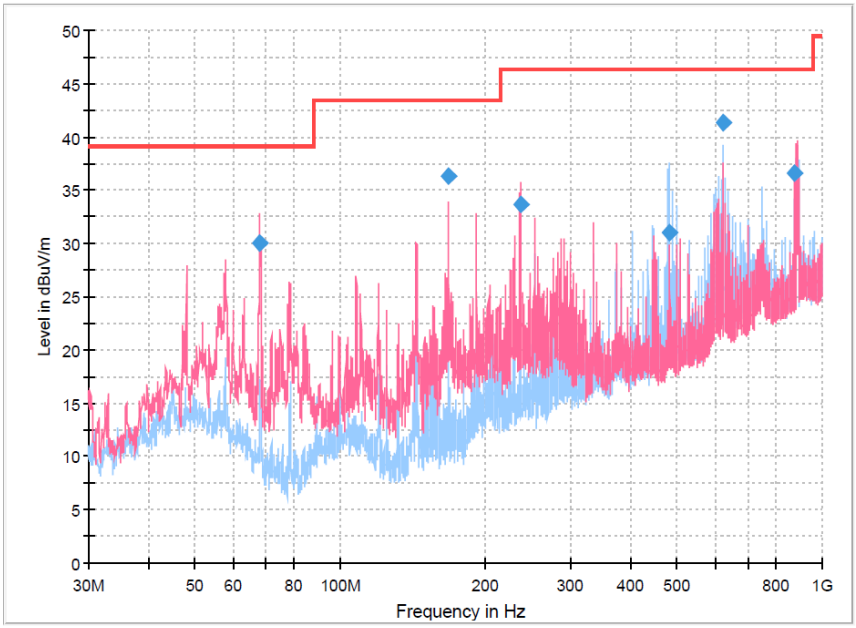
Table 1. Radiated Emissions Data 30 MHz to 1 000 MHz

Date: May 13, 2024 Test engineer: Hyerim Song

[Operating Mode 1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Operating Mode 1
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
68.227222	30.01	39.10	9.09	250.0	V	112.0	-24.1
167.989444	36.38	43.50	7.12	103.0	V	4.0	-24.9
236.214444	33.68	46.40	12.72	120.0	V	192.0	-20.7
480.315556	30.99	46.40	15.41	105.0	H	108.0	-15.0
625.021111	41.38	46.40	5.02	185.0	H	229.0	-12.1
875.011667	36.66	46.40	9.74	104.0	V	175.0	-9.5

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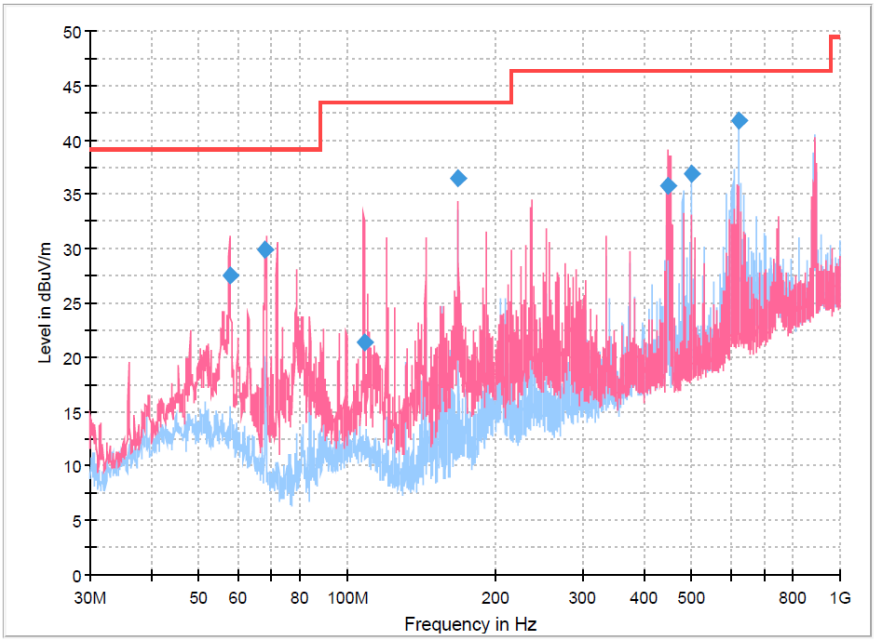
[Operating Mode 2]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Operating Mode 2
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
57.732778	27.49	39.10	11.61	106.0	V	334.0	-20.8
68.241111	29.83	39.10	9.27	156.0	V	276.0	-24.1
108.077222	21.34	43.50	22.16	109.0	V	296.0	-22.2
167.989444	36.51	43.50	6.99	110.0	V	20.0	-24.9
448.308889	35.73	46.40	10.67	108.0	V	195.0	-15.7
499.998889	36.87	46.40	9.53	256.0	H	348.0	-14.5
625.021111	41.79	46.40	4.61	190.0	H	225.0	-12.1

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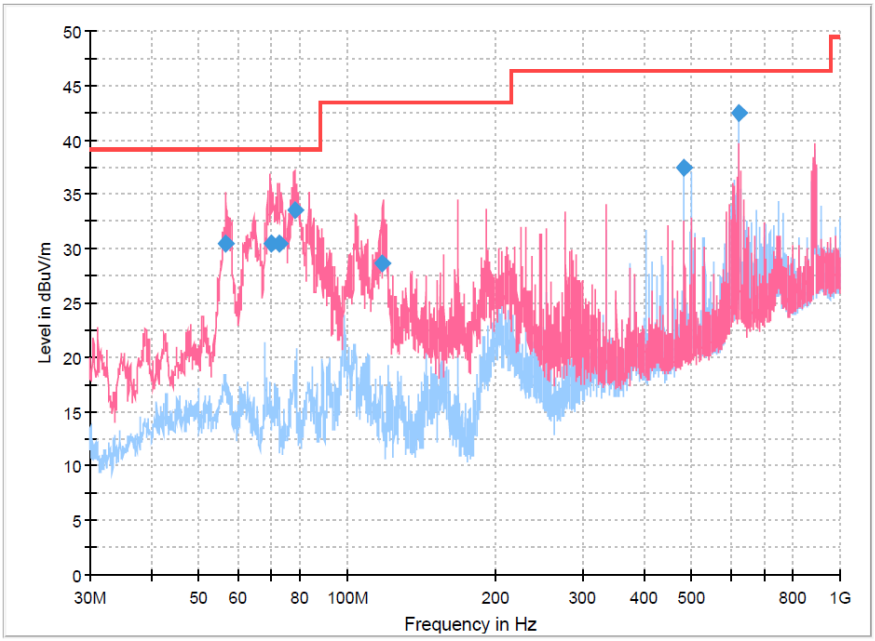
[Charging Mode 1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 1
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
56.508889	30.50	39.10	8.60	110.0	V	21.0	-20.6
70.070000	30.38	39.10	8.72	209.0	V	241.0	-25.0
72.602778	30.51	39.10	8.59	157.0	V	244.0	-25.8
78.328889	33.55	39.10	5.55	175.0	V	244.0	-27.5
117.940556	28.66	43.50	14.84	163.0	V	18.0	-23.8
480.006111	37.50	46.40	8.90	218.0	H	337.0	-15.1
625.021111	42.39	46.40	4.01	194.0	H	225.0	-12.1

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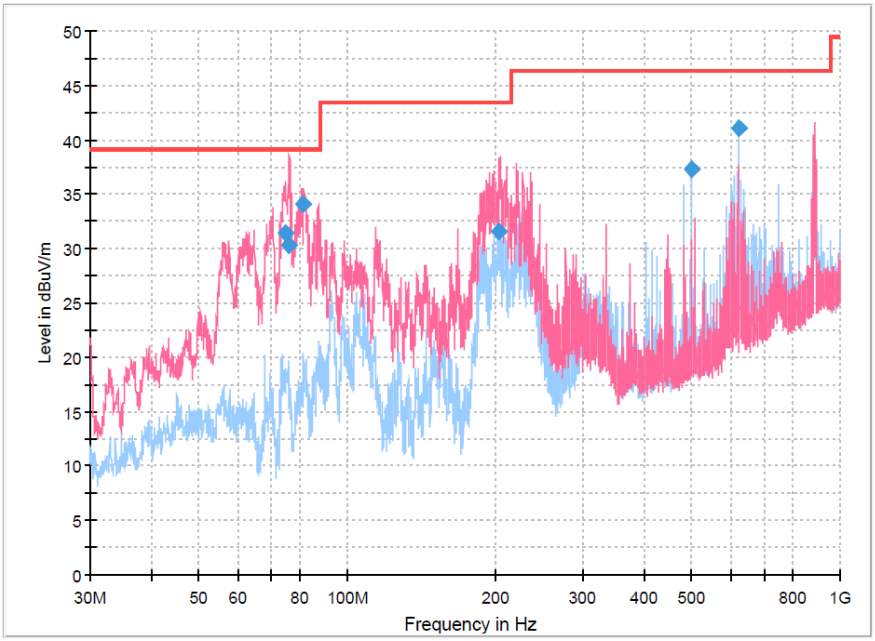
[Charging Mode 2]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 2
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
74.869444	31.47	39.10	7.63	163.0	V	256.0	-26.7
76.124444	30.33	39.10	8.77	182.0	V	245.0	-27.2
81.337778	34.07	39.10	5.03	150.0	V	253.0	-26.9
203.531667	31.59	43.50	11.91	130.0	V	4.0	-22.7
499.998889	37.27	46.40	9.13	308.0	H	335.0	-14.5
625.021111	41.09	46.40	5.31	178.0	H	224.0	-12.1

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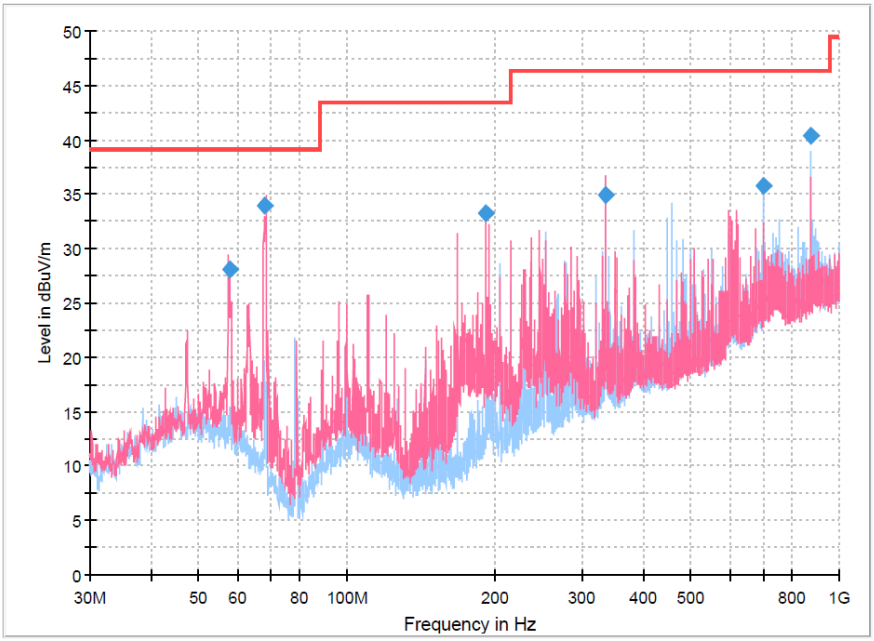
[Idle Mode]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Idle Mode
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result

Frequency (MHz)	QuasiPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
57.757222	28.13	39.10	10.97	332.0	V	227.0	-20.8
68.242778	33.93	39.10	5.17	228.0	V	204.0	-24.1
191.902222	33.24	43.50	10.26	107.0	V	214.0	-22.4
335.882778	34.90	46.40	11.50	350.0	H	73.0	-18.0
700.020556	35.74	46.40	10.66	250.0	H	172.0	-11.7
875.011667	40.42	46.40	5.98	167.0	H	344.0	-9.5

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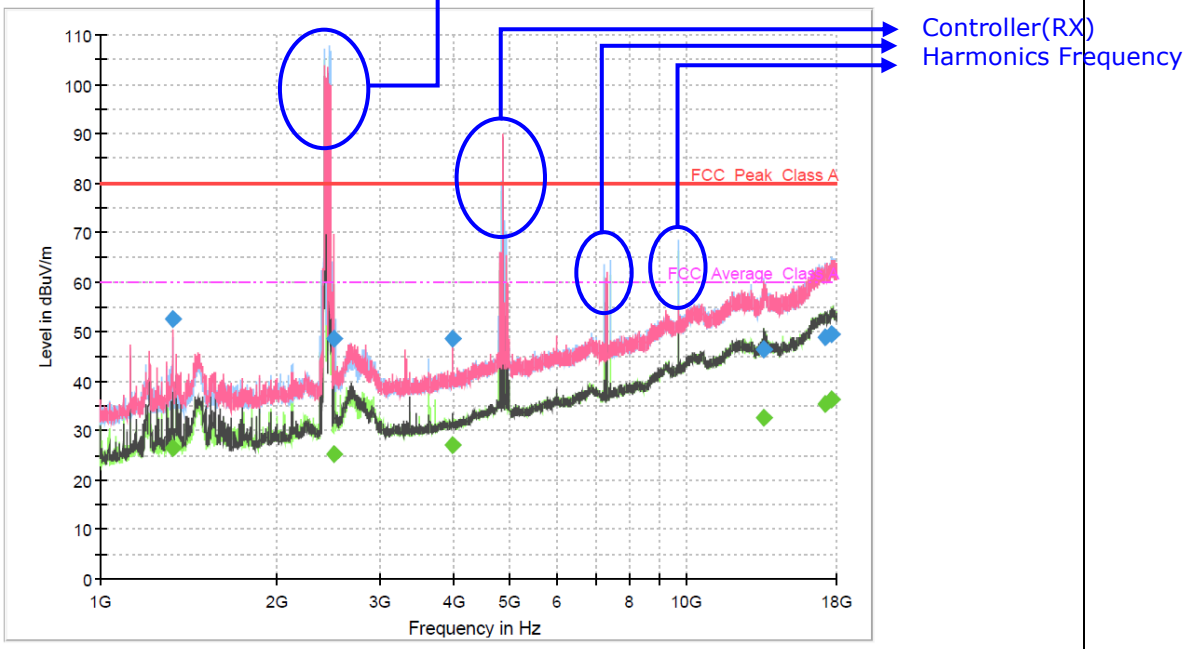
Table 2. Radiated Emissions Data 1 000 MHz to 18 000 MHz

[Operating Mode 1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Operating Mode 1
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final_Result_PK+

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1328.550000	52.65	80.00	27.35	175.0	V	253.0	-9.4
2511.050000	48.59	80.00	31.42	194.0	V	207.0	-4.4
3997.025000	48.55	80.00	31.45	101.0	V	341.0	-0.8
13534.850000	46.31	80.00	33.69	225.0	H	236.0	11.6
17276.125000	48.99	80.00	31.01	285.0	H	124.0	16.4
17620.600000	49.49	80.00	30.51	410.0	H	234.0	17.3

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1328.550000	26.33	60.00	33.67	175.0	V	253.0	-9.4
2511.050000	25.13	60.00	34.87	194.0	V	207.0	-4.4
3997.025000	26.96	60.00	33.04	101.0	V	341.0	-0.8
13534.850000	32.57	60.00	27.43	225.0	H	236.0	11.6
17276.125000	35.25	60.00	24.75	285.0	H	124.0	16.4
17620.600000	36.18	60.00	23.82	410.0	H	234.0	17.3

Note) Radiated emission(Tx/Rx Frequency and Harmonics) from the transceiver shall be ignored

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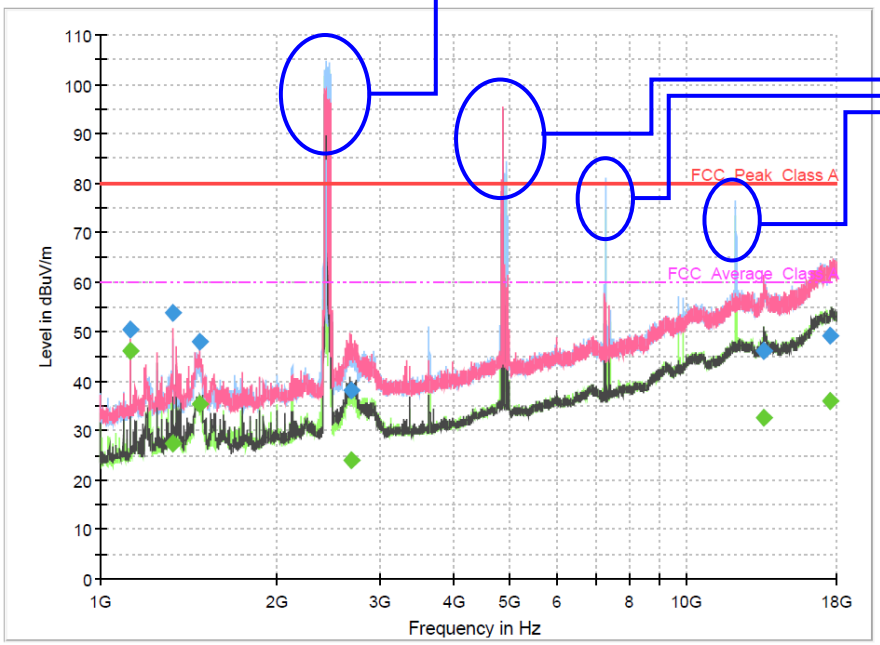
[Operating Mode 2]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Operating Mode 2
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result PK+

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1124.750000	50.52	80.00	29.48	103.0	V	140.0	-10.8
1330.325000	53.64	80.00	26.36	311.0	V	2.0	-9.4
1478.325000	47.98	80.00	32.02	325.0	V	0.0	-10.5
2686.250000	38.11	80.00	41.89	401.0	V	289.0	-4.0
13511.600000	46.00	80.00	34.00	299.0	V	76.0	11.5
17583.450000	49.20	80.00	30.80	125.0	V	23.0	17.3

Final Result CAV

Frequency (MHz)	CAverage (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1124.750000	46.10	60.00	13.90	103.0	V	140.0	-10.8
1330.325000	27.41	60.00	32.59	311.0	V	2.0	-9.4
1478.325000	35.24	60.00	24.76	325.0	V	0.0	-10.5
2686.250000	24.11	60.00	35.89	401.0	V	289.0	-4.0
13511.600000	32.49	60.00	27.51	299.0	V	76.0	11.5
17583.450000	36.08	60.00	23.92	125.0	V	23.0	17.3

Note) Radiated emission(Tx/Rx Frequency and Harmonics) from the transceiver shall be ignored

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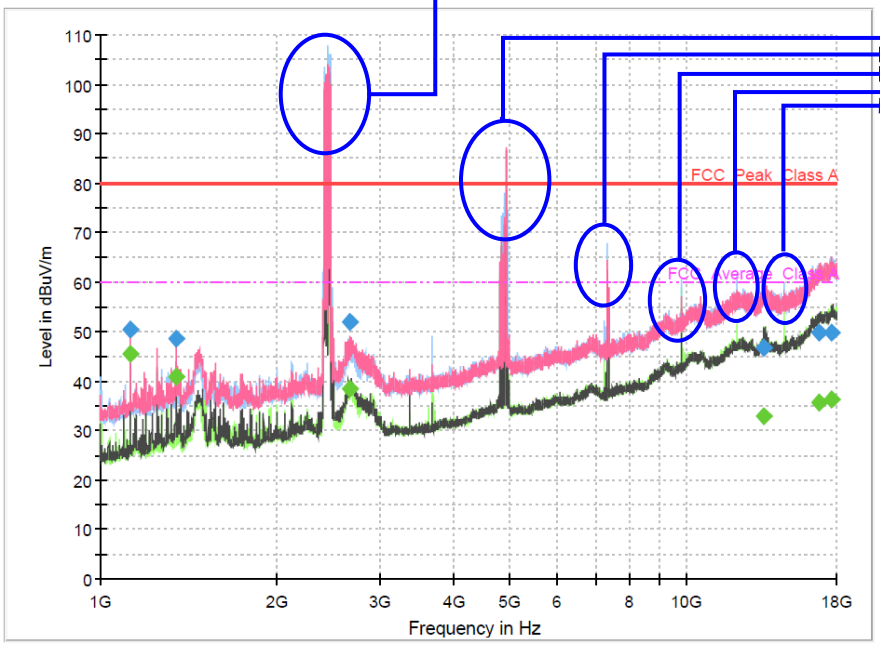
[Charging Mode 1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 1
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result PK+

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1124.725000	50.39	80.00	29.61	103.0	V	135.0	-10.8
1350.375000	48.66	80.00	31.34	103.0	V	5.0	-9.4
2662.725000	51.84	80.00	28.16	290.0	V	289.0	-4.0
13543.475000	46.77	80.00	33.23	179.0	H	3.0	11.6
16863.475000	49.79	80.00	30.21	125.0	V	46.0	16.4
17720.875000	49.77	80.00	30.23	105.0	V	45.0	17.5

Final Result CAV

Frequency (MHz)	CAverage (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1124.725000	45.37	60.00	14.63	103.0	V	135.0	-10.8
1350.375000	40.95	60.00	19.05	103.0	V	5.0	-9.4
2662.725000	38.26	60.00	21.74	290.0	V	289.0	-4.0
13543.475000	32.78	60.00	27.22	179.0	H	3.0	11.6
16863.475000	35.52	60.00	24.48	125.0	V	46.0	16.4
17720.875000	36.24	60.00	23.76	105.0	V	45.0	17.5

Note) Radiated emission(Tx/Rx Frequency and Harmonics) from the transceiver shall be ignored

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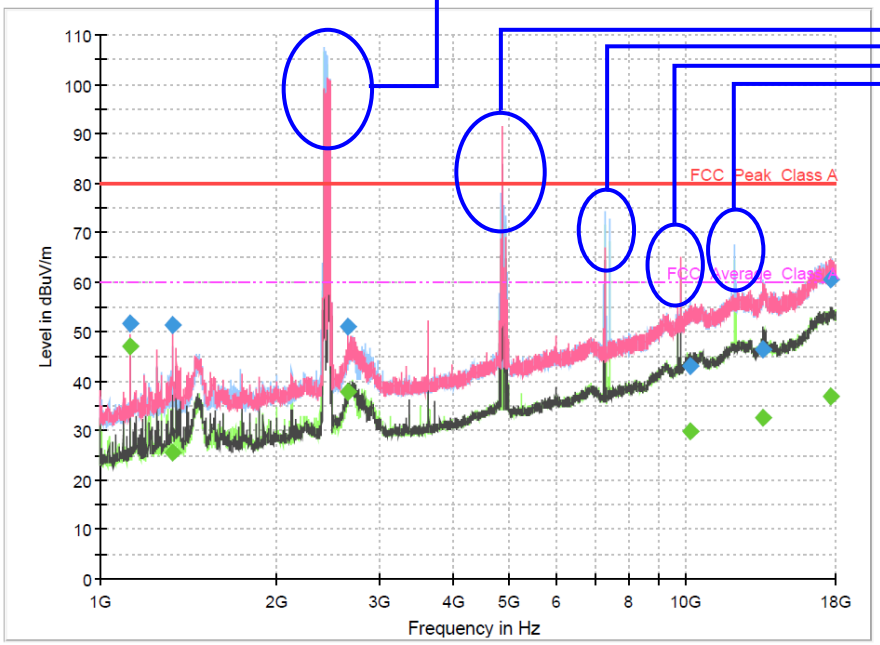
[Charging Mode 2]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 2
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final Result PK+

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1125.125000	51.63	80.00	28.37	101.0	V	138.0	-10.8
1329.400000	51.21	80.00	28.79	410.0	V	192.0	-9.4
2654.450000	51.13	80.00	28.87	296.0	V	292.0	-4.0
10173.625000	43.14	80.00	36.86	212.0	H	276.0	9.6
13539.975000	46.36	80.00	33.64	125.0	H	266.0	11.6
17660.800000	60.57	80.00	19.43	321.0	V	36.0	17.4

Final Result CAV

Frequency (MHz)	CAverage (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1125.125000	47.03	60.00	12.97	101.0	V	138.0	-10.8
1329.400000	25.37	60.00	34.63	410.0	V	192.0	-9.4
2654.450000	37.85	60.00	22.15	296.0	V	292.0	-4.0
10173.625000	29.66	60.00	30.34	212.0	H	276.0	9.6
13539.975000	32.52	60.00	27.48	125.0	H	266.0	11.6
17660.800000	36.87	60.00	23.13	321.0	V	36.0	17.4

Note) Radiated emission(Tx/Rx Frequency and Harmonics) from the transceiver shall be ignored

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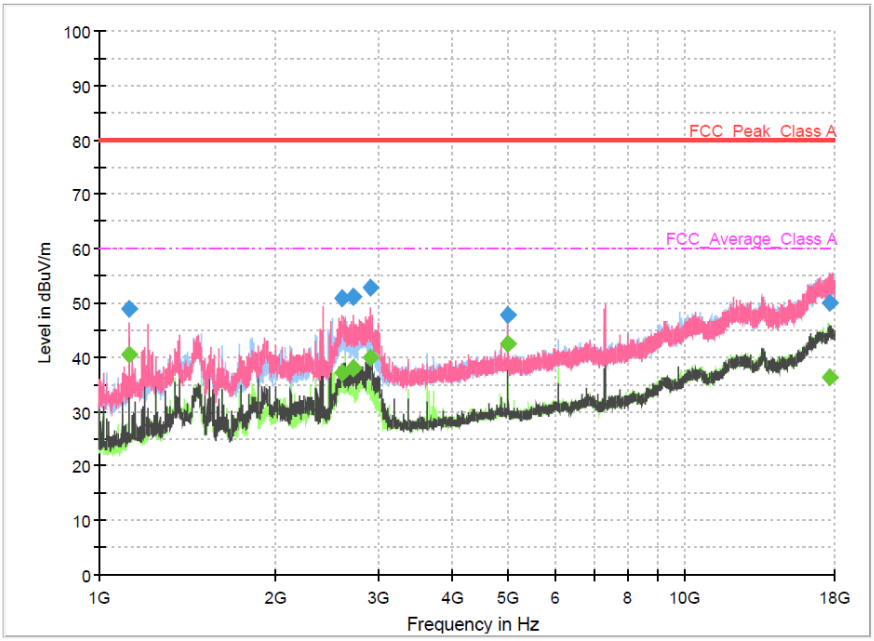
[Idle Mode]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Idle Mode
Test Engineer	Hyerim Song
Test Date	2024.05.13



Final_Result_PK+

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1125.125000	48.96	80.00	31.04	100.0	V	332.0	-10.8
2603.025000	50.91	80.00	29.09	190.0	V	144.0	-4.2
2713.225000	51.10	80.00	28.90	286.0	V	150.0	-4.0
2910.750000	52.86	80.00	27.14	315.0	V	132.0	-3.6
4999.900000	47.87	80.00	32.13	194.0	H	190.0	1.6
17692.450000	49.95	80.00	30.05	302.0	V	349.0	17.4

Final_Result_CAV

Frequency (MHz)	CAverage (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB/m)
1125.125000	40.50	60.00	19.50	100.0	V	332.0	-10.8
2603.025000	37.07	60.00	22.93	190.0	V	144.0	-4.2
2713.225000	37.95	60.00	22.05	286.0	V	150.0	-4.0
2910.750000	39.96	60.00	20.04	315.0	V	132.0	-3.6
4999.900000	42.38	60.00	17.62	194.0	H	190.0	1.6
17692.450000	36.21	60.00	23.79	302.0	V	349.0	17.4

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7.2. AC MAINS LINE CONDUCTED EMISSIONS

TEST: Limits of Conducted emission	
Method	ANSI C63.4: 2014 amended as per ANSI C63.4a-2017 If the EUT is table top equipment, it was placed on a wooden table with a height of 0.8 m above the reference ground plane and 0.4 m from the conducting wall of the shielded room. Also if the EUT is floor-standing equipment, it was placed on a non-conducted support with a height up to 0.15 m above the reference ground plane. Connect the EUT's power source lines to the appropriate power mains / peripherals through the LISN. All the other peripherals are connected to the 2nd LISN, if any. Unused measuring port of the LISN was resistively terminated by 50 ohm terminator. The measuring port of the LISN for EUT was connected to spectrum analyzer. Using conducted emission test software, the emissions were scanned with peak detector mode. After scanning over the frequency range, suspected emissions were selected to perform final measurement. When performing final measurement, the receiver was used which has Quasi-Peak detector and Average detector. By varying the configuration of the test sample and the cable routing it was attempted to maximize the emission. For further description of the configuration refer to the picture of the test set-up

Basic Standard	FCC PART15 SUBPART B	
Parameters recorded during the test	Laboratory Ambient Temperature	24.0 ± 1 °C
	Relative Humidity	39.9 ± 1 % R.H.
-	Frequency range on each side of line	Measurement Point
Fully configured sample scanned over the following frequency range	150 kHz to 30 MHz	AC Power Input Port

Limits - Class A

Frequency (MHz)	Limit (dBµV)			
	Quasi-Peak	Result	Average	Result
0.15 to 0.50	79	**PASS**	66	**PASS**
0.50 to 30	73	**PASS**	60	**PASS**

Limits – Class B

Frequency (MHz)	Limit (dBµV)			
	Quasi-Peak	Result	Average	Result
0.15 to 0.50	66 to 56	N/A	56 to 46	N/A
0.50 to 5	56	N/A	46	N/A
5 to 30	60	N/A	50	N/A

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Test Equipment used:					
Description	Manufacturer	Model	Identifier	Cal. Date	Cal. Due
EMI TEST RECEIVER	R&S	ESR3	102592	2023.07.24	2024.07.24
TWO-LINE V-NETWORK	R&S	ENV216	102478	2023.08.02	2024.08.02
TEST PROGRAM	R&S	EMC 32 (VERSION 10.60.10)	N/A	N/A	N/A

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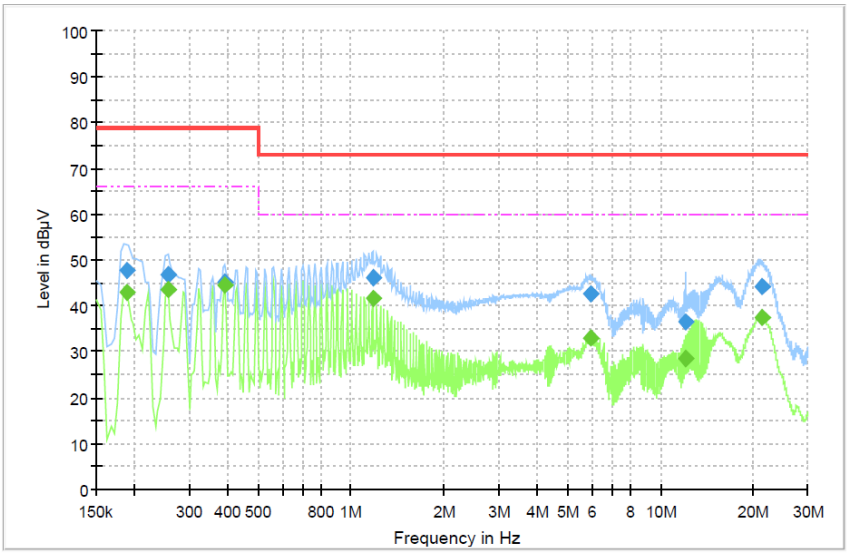
Table 1. Conducted emission Test data

Date: May 22, 2024 Test engineer: Hyerim Song

[Charging Mode 1_L1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 1_L
Test Engineer	Hyerim Song
Test Date	2024.05.22



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.188618	47.80	79.00	31.20	L1	ON	10.0
0.254853	46.82	79.00	32.18	L1	ON	9.8
0.390934	45.23	79.00	33.77	L1	ON	10.0
1.179305	46.20	73.00	26.80	L1	ON	9.9
5.968161	42.47	73.00	30.53	L1	ON	9.9
11.997827	36.69	73.00	36.31	L1	ON	10.0
21.212002	44.11	73.00	28.89	L1	ON	10.1

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.188618	43.05	66.00	22.95	L1	ON	10.0
0.254853	43.74	66.00	22.26	L1	ON	9.8
0.390934	44.56	66.00	21.44	L1	ON	10.0
1.179305	41.76	60.00	18.24	L1	ON	9.9
5.968161	32.99	60.00	27.01	L1	ON	9.9
11.997827	28.40	60.00	31.60	L1	ON	10.0
21.212002	37.51	60.00	22.49	L1	ON	10.1

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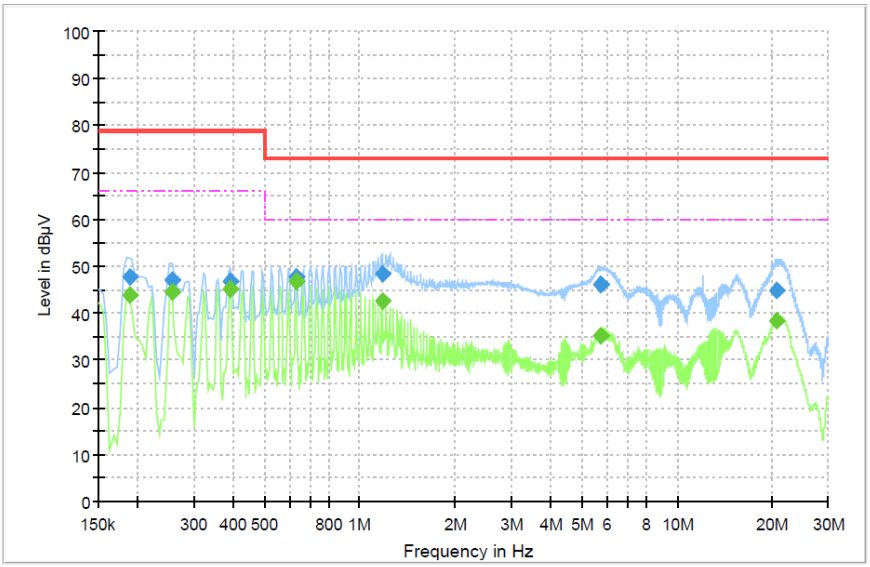
[Charging Mode 1_N]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 1_N
Test Engineer	Hyerim Song
Test Date	2024.05.22



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.189007	47.74	79.00	31.26	N	ON	10.0
0.254853	47.19	79.00	31.81	N	ON	9.8
0.390934	46.78	79.00	32.22	N	ON	10.0
0.631978	47.65	73.00	25.35	N	ON	10.0
1.179305	48.26	73.00	24.74	N	ON	9.9
5.735935	46.21	73.00	26.79	N	ON	10.0
20.591781	44.98	73.00	28.02	N	ON	10.1

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.189007	43.82	66.00	22.18	N	ON	10.0
0.254853	44.45	66.00	21.55	N	ON	9.8
0.390934	45.17	66.00	20.83	N	ON	10.0
0.631978	46.76	60.00	13.24	N	ON	10.0
1.179305	42.65	60.00	17.35	N	ON	9.9
5.735935	35.17	60.00	24.83	N	ON	10.0
20.591781	38.31	60.00	21.69	N	ON	10.1

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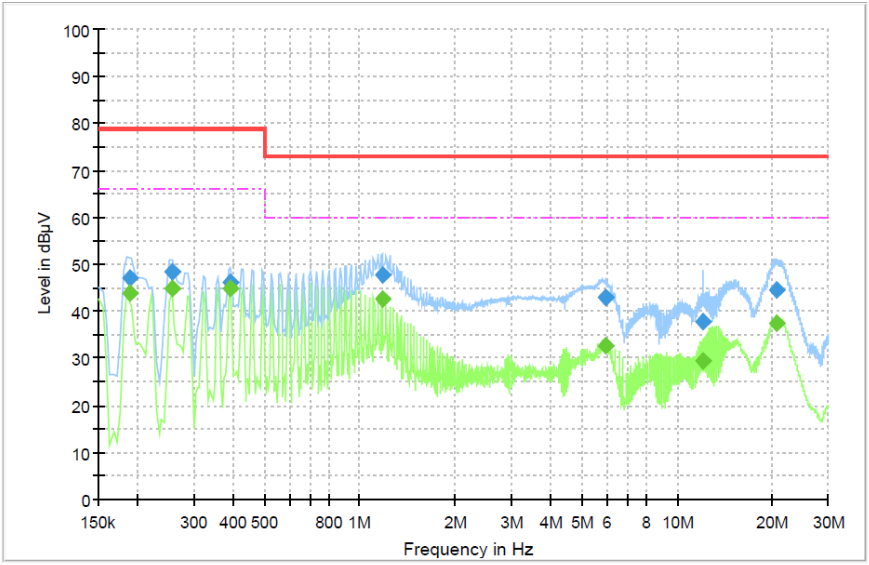
[Charging Mode 2_L1]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 2_L
Test Engineer	Hyerim Song
Test Date	2024.05.22



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.189007	47.16	79.00	31.84	L1	ON	10.0
0.255463	48.33	79.00	30.67	L1	ON	9.8
0.390934	46.31	79.00	32.69	L1	ON	10.0
1.179305	47.67	73.00	25.33	L1	ON	9.9
5.956896	42.82	73.00	30.18	L1	ON	9.9
11.997827	37.75	73.00	35.25	L1	ON	10.0
20.626677	44.42	73.00	28.58	L1	ON	10.1

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.189007	43.80	66.00	22.20	L1	ON	10.0
0.255463	44.83	66.00	21.17	L1	ON	9.8
0.390934	44.90	66.00	21.10	L1	ON	10.0
1.179305	42.56	60.00	17.44	L1	ON	9.9
5.956896	32.68	60.00	27.32	L1	ON	9.9
11.997827	29.46	60.00	30.54	L1	ON	10.0
20.626677	37.35	60.00	22.65	L1	ON	10.1

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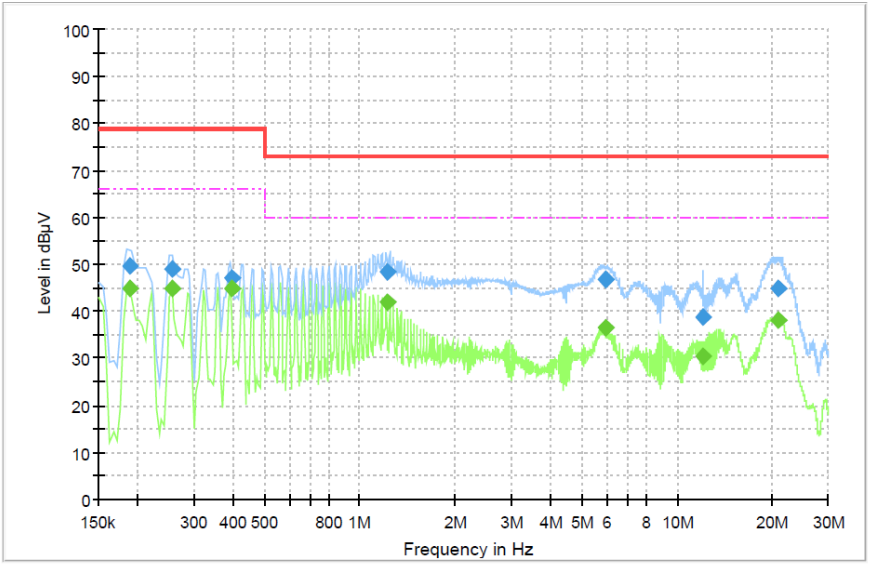
[Operating Mode_N_AC IN 2]

Common Information

Project No.	4791264811-FE1V1
Test Mode	Charging Mode 2_N
Test Engineer	Hyerim Song
Test Date	2024.05.22



Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.188618	49.52	79.00	29.48	N	ON	10.1
0.254853	48.97	79.00	30.03	N	ON	9.8
0.394934	47.18	79.00	31.82	N	ON	10.0
1.214248	48.45	73.00	24.55	N	ON	9.9
5.942322	46.68	73.00	26.32	N	ON	10.0
11.997827	38.89	73.00	34.11	N	ON	10.0
20.938304	44.84	73.00	28.16	N	ON	10.1

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.188618	44.73	66.00	21.27	N	ON	10.1
0.254853	44.97	66.00	21.03	N	ON	9.8
0.394934	44.77	66.00	21.23	N	ON	10.0
1.214248	42.05	60.00	17.95	N	ON	9.9
5.942322	36.48	60.00	23.52	N	ON	10.0
11.997827	30.31	60.00	29.69	N	ON	10.0
20.938304	38.17	60.00	21.83	N	ON	10.1

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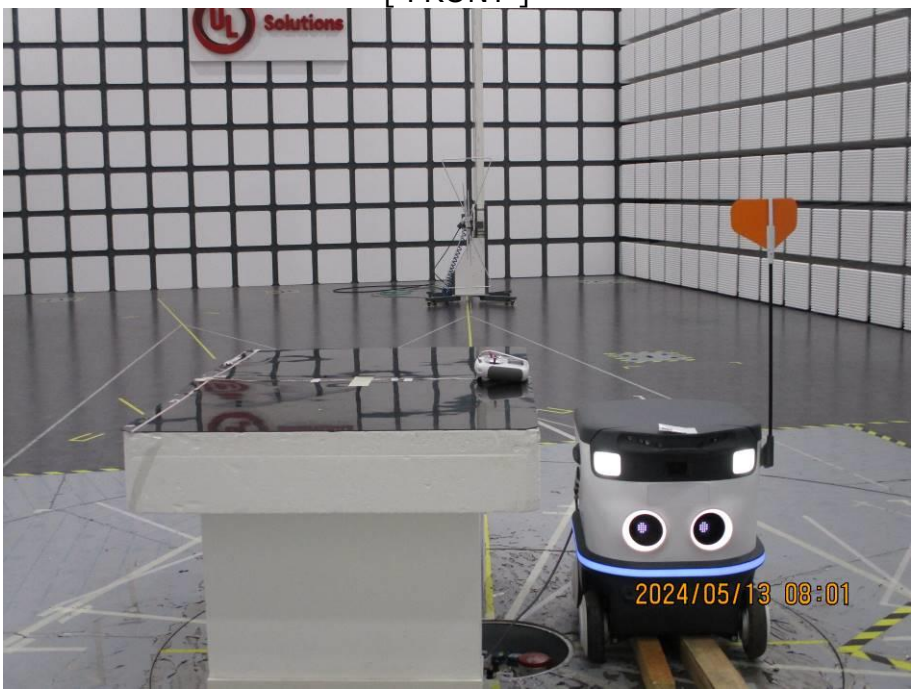
8. SETUP PHOTOS

8.1. RADIATED EMISSIONS (30 MHz ~ 1 000 MHz)

[Operating Mode]

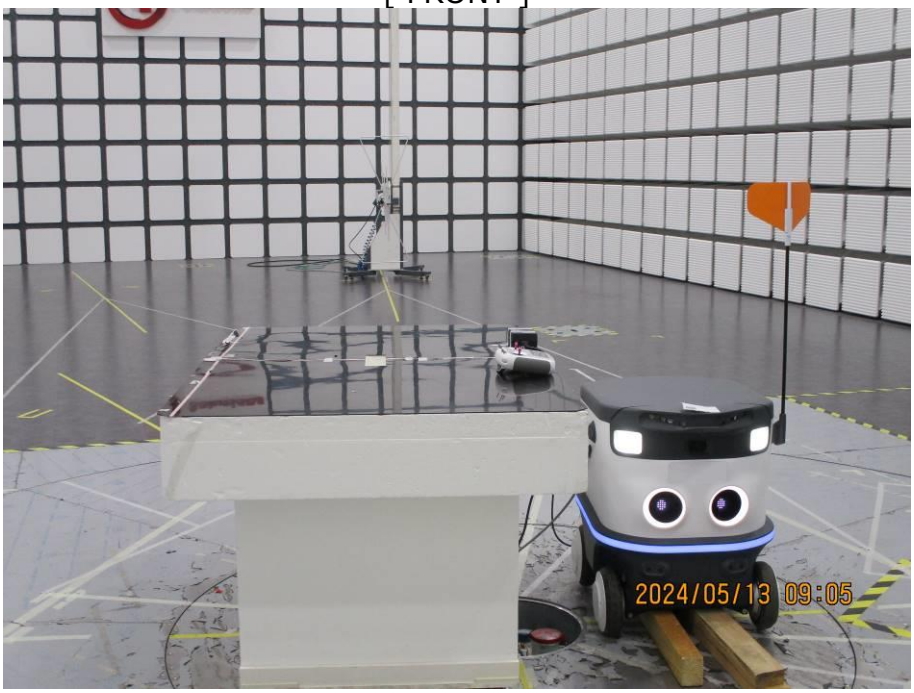
[FRONT]



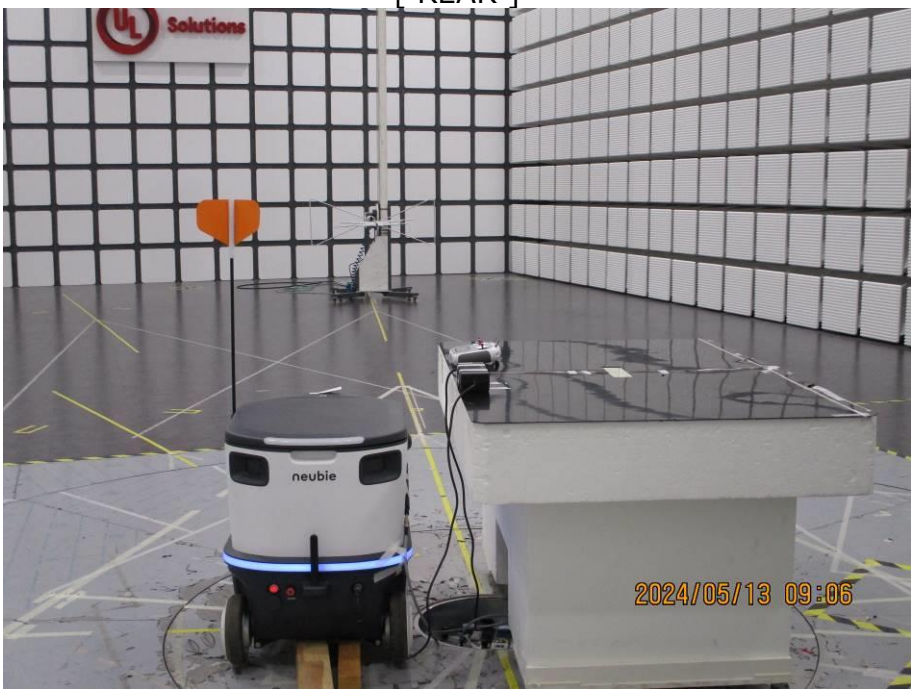
[REAR]

[Charging Mode]

[FRONT]



[REAR]



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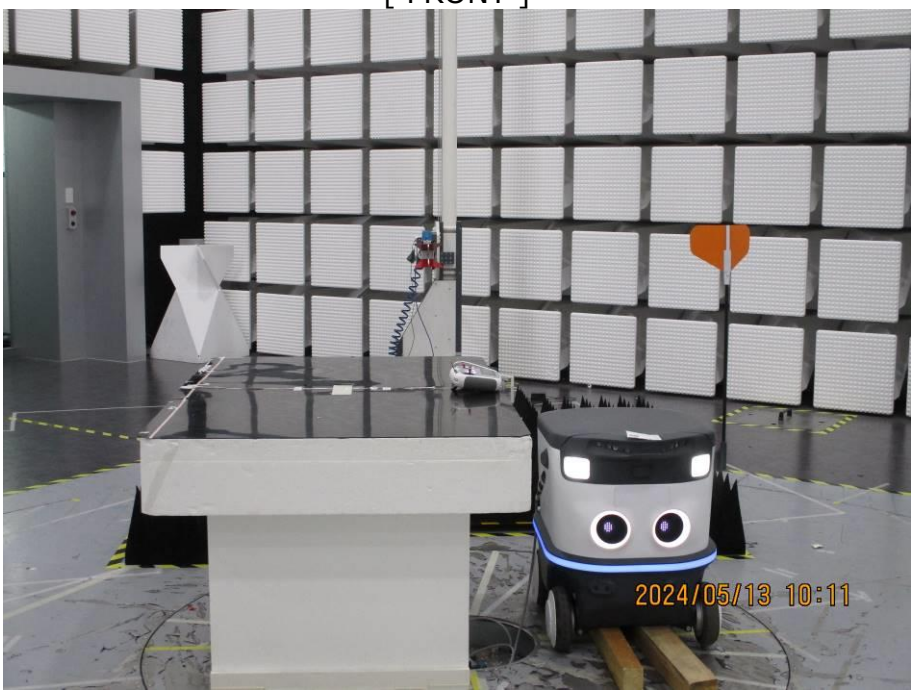
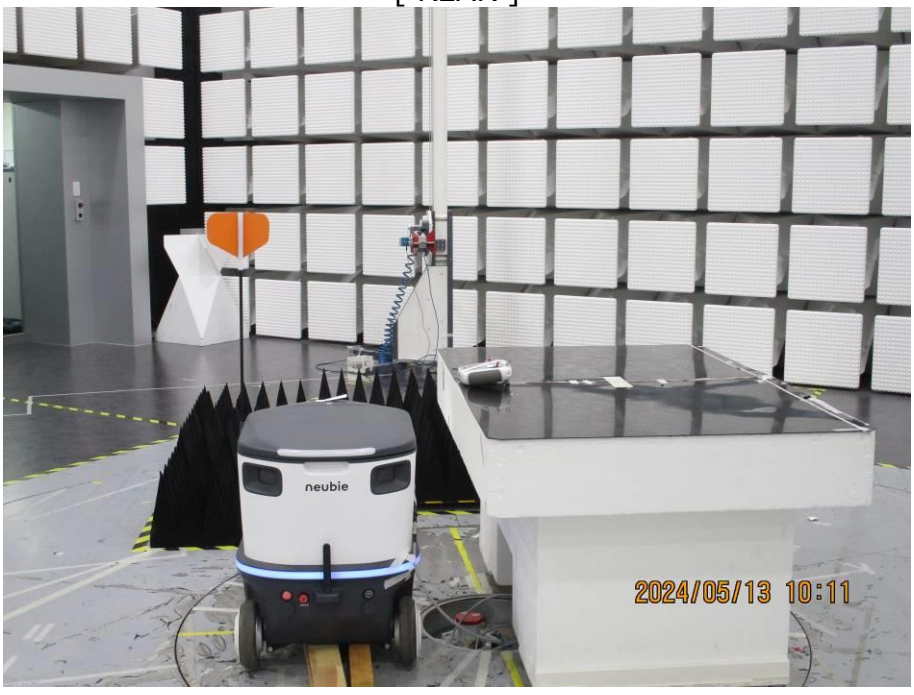
8.2. RADIATED EMISSIONS (1 000 MHz ~ 18 000 MHz)

[Operating Mode]

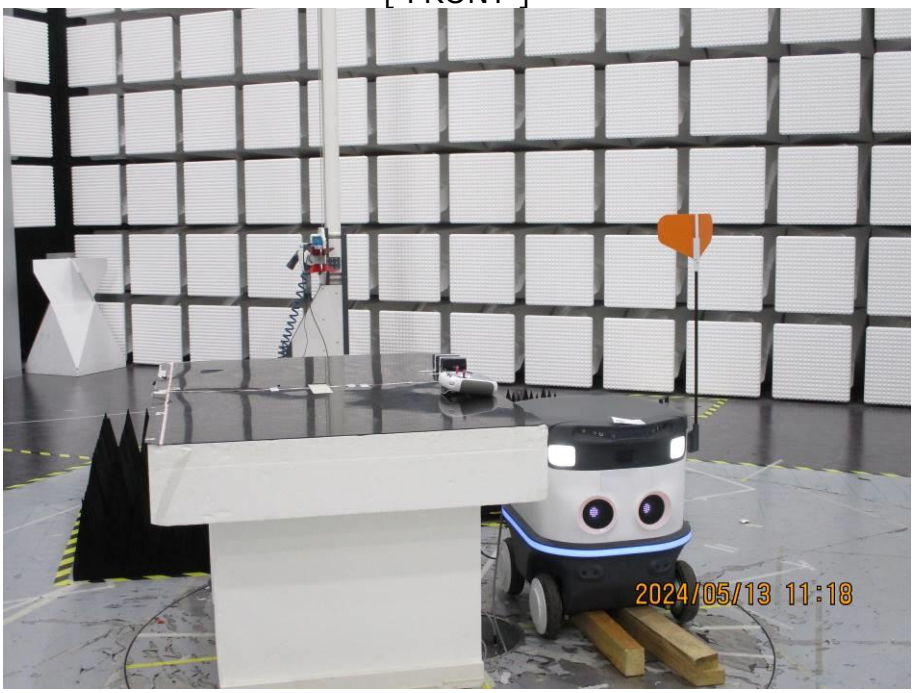
[FRONT]



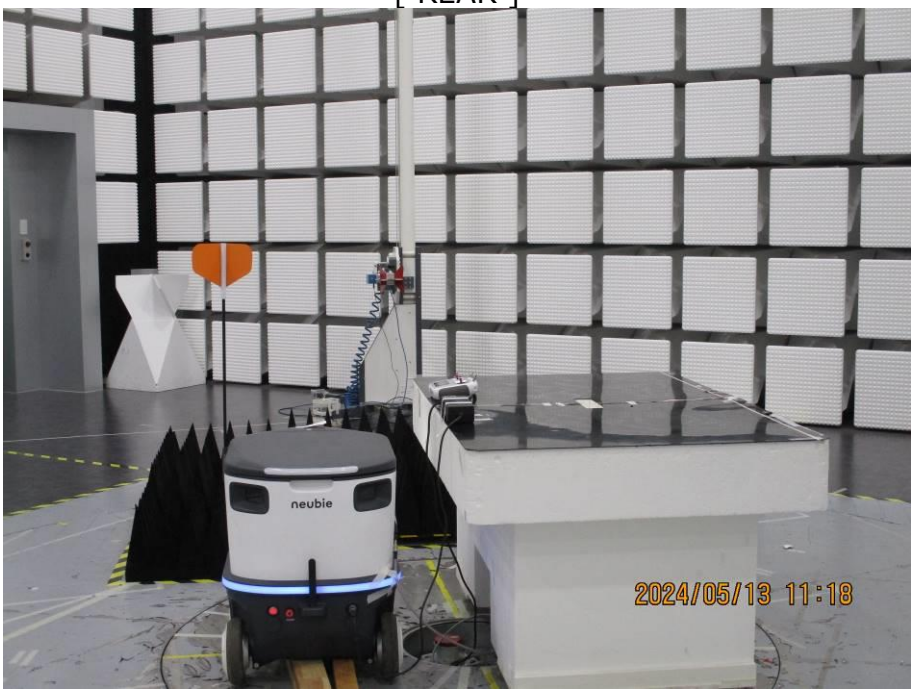
[REAR]



[Charging Mode]
[FRONT]



[REAR]



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8.3. RADIATED EMISSIONS (18 000 MHz ~ 40 000 MHz)

[FRONT]

N/A

[REAR]

N/A

8.4. AC MAINS LINE CONDUCTED EMISSIONS

[FRONT]

[REAR]

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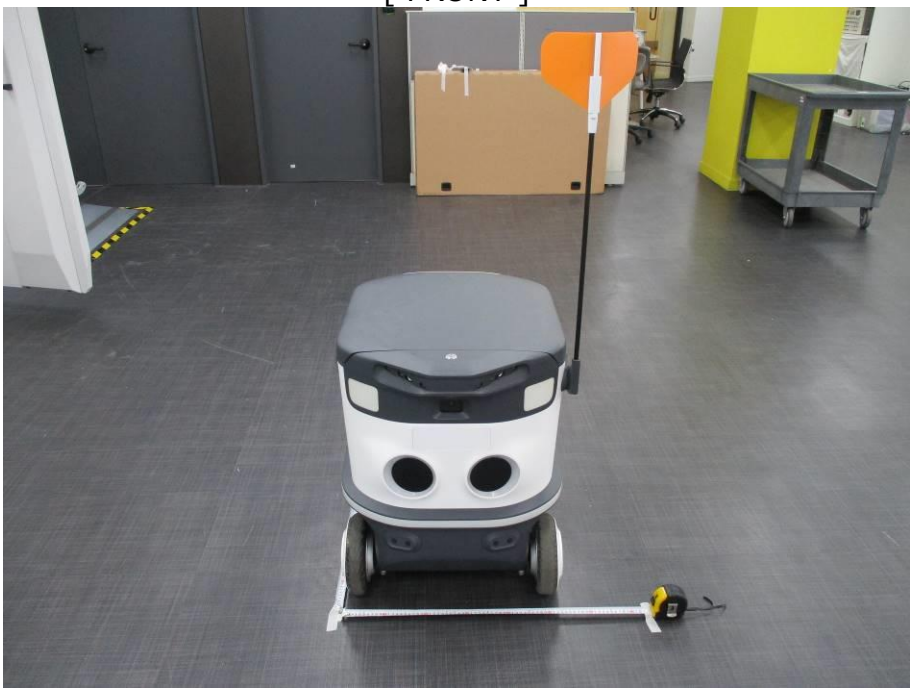
9. EUT PHOTOS

[FRONT]



[REAR]

[SIDE(RIGHT)]

[SIDE(LEFT)]

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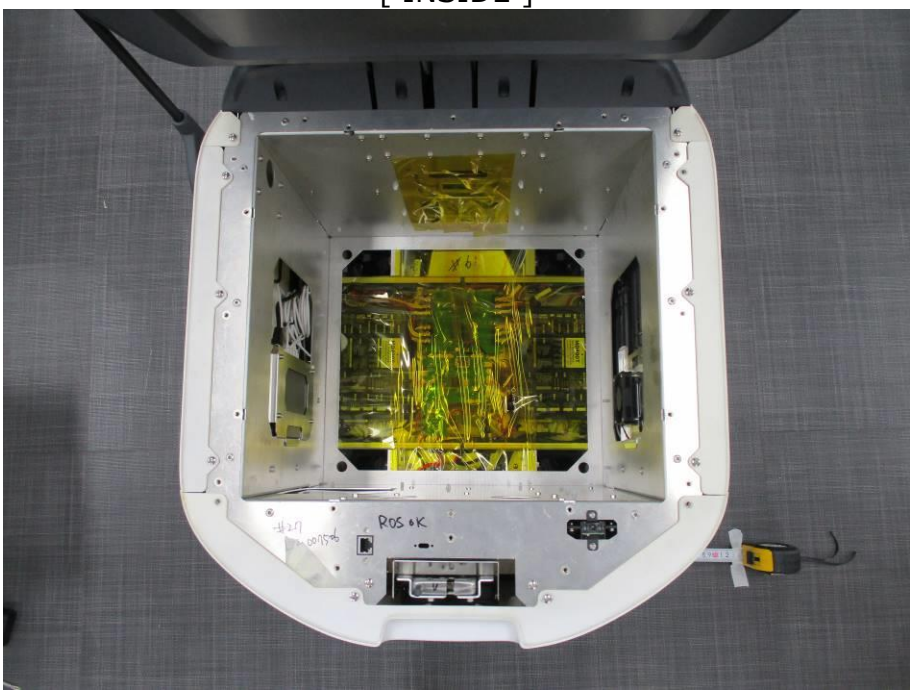
[INSIDE]



END OF REPORT

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