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TEST REPORT

EMI Test for FCC Certification of WSP-R240A Model

APPLICANT
WOOSIM SYSTEMS INC.

REPORT NO.
HCT-EM-2401-FC003

DATE OF ISSUE
January 16, 2024

Tested by
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TEST REPORT

EMI Test for FCC Certification

REPORT NO.
HCT-EM-2401-FC003

DATE OF ISSUE
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FCC ID.
QDDWSP-R240A

Applicant	**WOOSIM SYSTEMS INC.** 60, Sandan-ro 388beon-gil, Galsan-myeon,Hongseong-gun, Chungcheongnam-do, Republic of Korea
Product Name	Mobile Printer
Model Name	WSP-R240A
Date of Test	December 22, 2023 to December 26, 2023
Location of Test	☒ Permanent Testing Lab ☐ On Site Testing Lab (Address: Refer to the clause 1.6)
Test Standard Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Test Results	Refer to the present document
Manufacturer	**WOOSIM SYSTEMS INC.**

REVISION HISTORY

The revision history for this test report is shown in table.

Revision No.	Date of Issue	Description
0	January 16, 2024	Initial Release

Notice

Content
The results shown in this test report only apply to the sample(s), as received, provided by the applicant, unless otherwise stated. The test results have only been applied with the test methods required by the standard(s). The laboratory is not accredited for the test results marked *. Information provided by the applicant is marked **. Test results provided by external providers are marked ***. When confirmation of authenticity of this test report is required, please contact www.hct.co.kr The test results in this test report are not associated with the ((KS Q) ISO/IEC 17025) accreditation by KOLAS (Korea Laboratory Accreditation Scheme) that are under the ILAC (International Laboratory Accreditation Cooperation) Mutual Recognition Agreement (MRA).

CONTENTS

1. GENERAL INFORMATION

1.1 Description of EUT

FCC ID	QDDWSP-R240A
Model Name	WSP-R240A
Product Name	Mobile Printer
Frequency Range	Bluetooth: 2 402 ㎒ to 2 480 ㎒
Clock Frequency	12 ㎒
Battery	Rechargeable 7.4 V DC, 1 150 mAh (Li-ion)
Manufacturer	WOOSIM SYSTEMS INC.

1.2 Power Source

During the test, the following power supply levels are provided.;

Power supply: AC 120 V, 60 Hz

1.3 Tested System Details

All equipment descriptions used in the tested system (including inserted cards) are:

Device Type	Model Name	Serial Number	Manufacturer
Mobile Printer (EUT)	WSP-R240R	-	WOOSIM SYYSTEMS INC.
Travel Adaptor NOTE 1	P12DUSB050200 EK	B7990-2305	Something High Electric (Xiamen) Company Inc.
Notebook PC	NT551EBE	1AH191AMA00070J	Samsung Electronics Co., Ltd
Notebook PC Adaptor	Pa-1400-96	-	LITE-ON TECHNOLOGY
Gateway	TL-WR747N	-	TP Link
Gateway Adaptor	T090060-2H1	-	TP Link
Cellphone (1)	Galaxy Note20 Ultra 5G	R3CN7086HXJ	Samsung Electronics Co., Ltd
Cellphone (2)	LM-G710EM	-	LG Electronics Inc.

NOTE 1. The travel adapter is not included with the product (EUT).
Input: 100 ~ 240 VAC, 50/60 Hz, 0.3 A, Output: 5.0 VDC, 2.0 A

1.4 Cable Description

EUT + Notebook PC Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	USB	N/A	N/A	(D)1.2
Notebook PC	RJ 45	N/A	N	(D) 1.6
	DC IN	N	N/A	(P) 1.8
Gateway	DC IN	N	N/A	(P) 1.8

"(D)" data cable and "(P)" power cable.

EUT + Travel Adaptor Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	EUT	USB	N/A	N/A

EUT + Bluetooth Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	-	-	-	-
Cellphone (2)	-	-	-	-

EUT + MSR Mode

Product Name	Port	Power Cord Shielded (Y/N)	I/O Cable Shielded (Y/N)	Length (m)
EUT	-	-	-	-
Cellphone (1)	-	-	-	-

1.5 Noise Suppression Parts on Cable (I/O Cable)

EUT + Notebook PC Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	USB	Y	EUT END	Y	Both End
Notebook PC	RJ 45	N	N/A	N	N/A

EUT + Travel Adaptor Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	USB	Y	EUT END	Y	Both End

EUT + Bluetooth Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	-	-	-	-	-

EUT + MSR Mode

Product Name	Port	Ferrite Bead (Y/N)	Location	Metal Hood (Y/N)	Location
EUT	-	-	-	-	-

1.6 Test Facility

Test site is located at 74, Seoicheon-ro 578beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea.
Those measurement facilities are constructed in conformance with the requirements of ANSI C63.4-2014.
The Normalized site attenuations (30 ㎒ to 1 ㎓) and Site validation (1 ㎓ to 18 ㎓) were performed in accordance with the standard in ANSI C63.4-2014 and ANSI C63.4a-2017
Our laboratories are accredited and designated in accordance with the provisions of Radio Waves ACT and International Standard ISO/IEC 17025:2017. (National Radio Research Agency, CABID No. KR0032)

1.7 Calibration of Measuring Instrument

The measuring equipment, which was utilized in performing the tests documented herein, has been calibrated in accordance with the manufacturers recommendations for utilizing calibration equipment, which is traceable to recognized national standards.
Especially, all antenna for measurement is calibrated in accordance with the requirements of C63.5:2017

1.8 Measurement Uncertainty

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95 % level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Parameter	Test Site	Expanded Uncertainty
Conducted Emission	EMI Shield Room	2.0 dB
Radiated Emission (30 ㎒ to 1 ㎓)	3 m Semi Anechoic Chamber #1	5.8 dB
Radiated Emission (1 ㎓ to 18 ㎓)	3 m Semi Anechoic Chamber #1	4.8 dB

2. DESCRIPTION OF TESTING

2.1 Measurement of Conducted Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 7.3

a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN).
If the EUT is connected to the PC through USB, the AC power-line adapter of the PC is directly connected to a line impedance stabilization network (LISN).
Other support units were connected to the power mains through another LISN. The two LISNs provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

b. Both conducted lines are measured in Quasi-Peak and Average mode, including the worst-case data points for each tested configuration.

c. The frequency range from 150 ㎑ to 30 ㎒ was searched.

Conducted Emission Limits

Frequency (㎒)	Resolution Bandwidth (㎑)	Class A		Class B	
		Quasi-Peak (dBμV)	Average (dBμV)	Quasi-Peak (dBμV)	Average (dBμV)
0.15 to 0.5	9	79	66	66 to 56*	56 to 46*
0.5 to 5	9	73	60	56	46
5 to 30	9	73	60	60	50

NOTE. Decreases with the logarithm of the frequency.

2.2 Measurement of Radiated Emission

The test procedure was in accordance with ANSI C63.4-2014, Clause 8.3

a. The EUT was placed on the top of a turn table 0.8 meters above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. The EUT was set 3 m away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
c. The antenna height is varied from 1 m to 4 m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 m to 4 m and the turn table was turned from 0 degrees to 360 degrees to find the maximum reading.
e. The test-receiver system was set to Quasi-Peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 ㎓.
f. The test-receiver system was set to Peak and Average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 ㎓.
g. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. (1 ㎓ to 40 ㎓)

Radiated Emission Limits

Frequency (㎒)	Class A			Class B		
	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)	Antenna Distance (m)	Field Strength (μV/m)	Quasi-Peak (dBμV/m)
30 to 88	10	90	39.0	3	100	40.0
88 to 216	10	150	43.5	3	150	43.5
216 to 960	10	210	46.4	3	200	46.0
Above 960	10	300	49.5	3	500	54.0

Frequency (㎒)	Antenna Distance (m)	Class A		Class B	
		Peak (dBμV/m)	Average (dBμV/m)	Peak (dBμV/m)	Average (dBμV/m)
Above 1 000	3	80	60	74	54

2.2.1 Frequency Range of Radiated Measurements

An unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a Radiated Emission limit is specified, up to the frequency shown in the following table

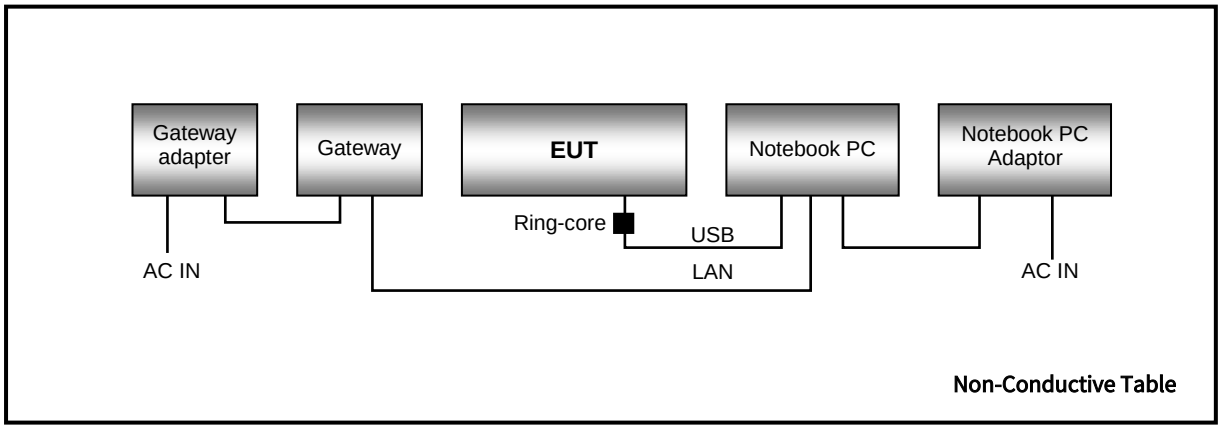
Highest frequency generated or used in the device or on which the device operates or tunes (MHz)	Upper frequency of measurement range (MHz)
Below 1.705	30
1.705 to 108	1 000
108 to 500	2 000
500 to 1 000	5 000
Above 1 000	5th harmonic of the highest frequency or 40 GHz, whichever is lower

2.3 Configuration of Tested System

The EUT was configured in the following manner.
At the request of the manufacturer, the configuration of the tests was arranged.

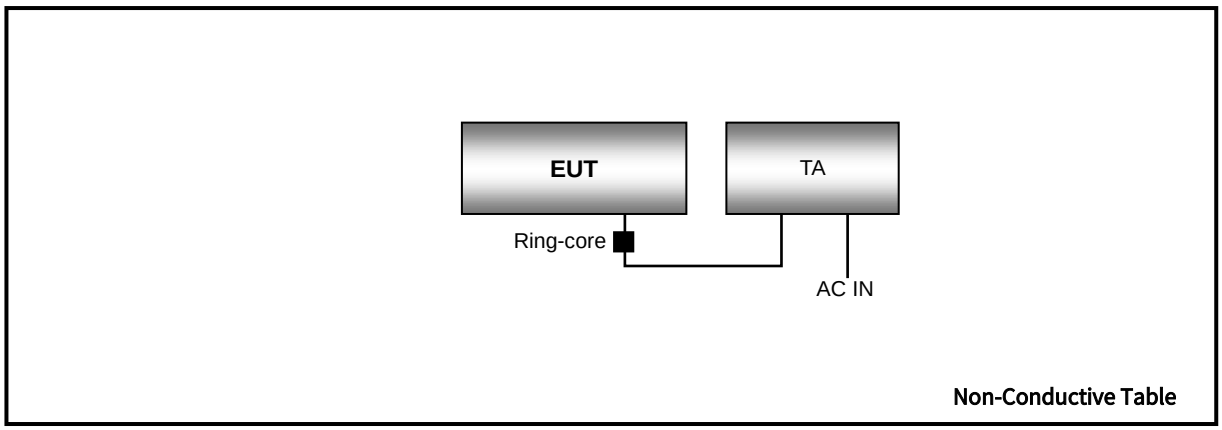
NOTE. The layout of the test was specified in the report with representative photos.

EUT + Notebook PC Mode

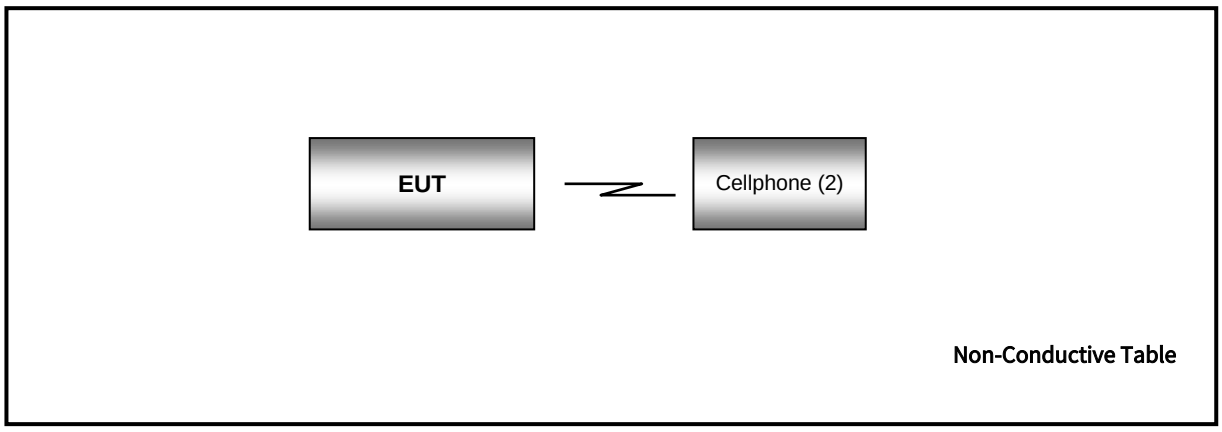


NOTE. The layout of the test was specified in the report with representative photos.

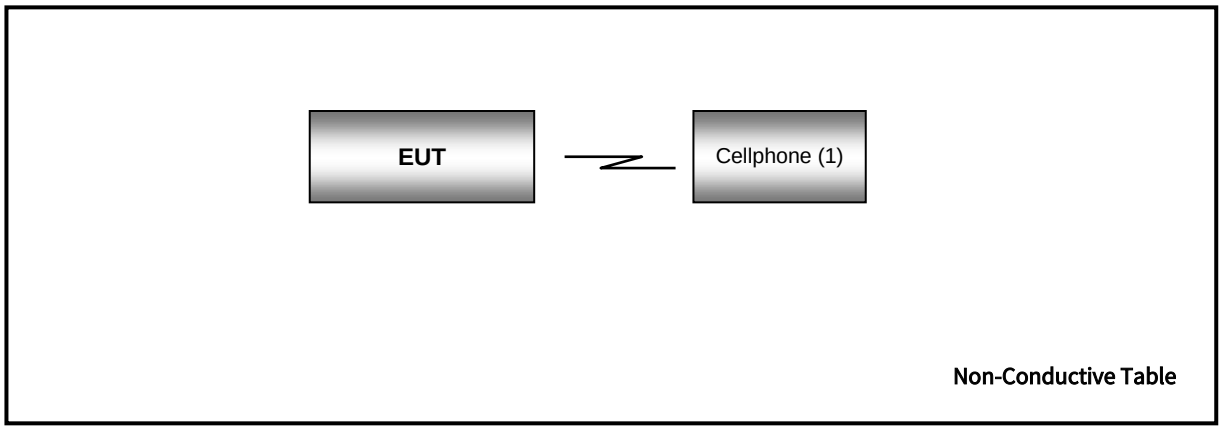
EUT + Travel Adaptor Mode



EUT + Bluetooth Mode



EUT + MSR Mode



3. OPERATION OF THE EUT

During preliminary test and final tests, the following operating mode was investigated.
It was tested the following operating mode, after connecting all peripheral devices.;

EUT + Notebook PC Mode

The laptop was connected to the EUT and tested continuously in printing mode.

EUT + Travel Adaptor Mode

TA was connected and tested in charging mode.

EUT + Bluetooth Mode

The cellphone was connected to the EUT and tested continuously in printing mode.

EUT + MSR Mode

The cellphone was connected to the EUT and tested continuously in MSR mode

4. MEASURING INSTRUMENTS

	Type	Model Name	Manufacturer	Serial Number	Calibration Cycle	Next Calibration Date
Conducted emission						
☒	EMI Test Receiver	ESR7	Rohde & Schwarz	101910	1 year	05.26.2024
☒	LISN	ENV216	Rohde & Schwarz	102245	1 year	08.02.2024
☒	LISN	ENV216	Rohde & Schwarz	100073	1 year	05.11.2024
☒	Software	EMC32	Rohde & Schwarz	-	-	-
Radiated emission below 1 ㎓						
☒	EMI Test Receiver	ESU40	Rohde & Schwarz	100524	1 year	05.09.2024
☒	Bilog Antenna	VULB9168	Schwarzbeck	255	2 year	03.15.2025
☒	Antenna master	MA4640-XP-ET	INNCO SYSTEM	-	N/A	-
☒	Antenna master controller	CO3000	INNCO SYSTEM	CO3000/870 /35990515/L	N/A	-
☒	Turn Table	1060	INNCO SYSTEM	-	N/A	-
☒	Turn Table controller	CO2000	INNCO SYSTEM	CO2000/095 /7590304/L	N/A	-
☒	Software	EMC32	Rohde & Schwarz	-	-	-
Radiated emission above 1 ㎓						
☒	EMI test receiver	ESU40	Rohde & Schwarz	100524	1 year	05.09.2024
☒	Horn Antenna	Schwarzbeck	BBHA 9120D	01836	1 year	07.21.2024
☒	Power Amplifier	TESTEK	TK-PA18H	170034-L	1 year	11.01.2024
☒	Antenna master	INNCO SYSTEM	MA4640-XP-ET	-	N/A	-
☐	Horn Antenna	Schwarzbeck	BBHA 9170	BBHA 9170 #786	1 year	11.01.2024
☐	Power Amplifier	TESTEK	TK-PA1840H	170030-L	1 year	02.22.2024
☒	Antenna master controller	INNCO SYSTEM	CO3000	CO3000/870/ 35990515/L	N/A	-
☒	Turn Table	INNCO SYSTEM	1060	-	N/A	-
☒	Turn Table controller	INNCO SYSTEM	CO2000	CO2000/095/ 7590304/L	N/A	-
☒	Software	EMC32	Rohde & Schwarz	-	-	-

5. EMISSION TEST SUMMARY

5.1 Conducted Emission

5.1.1 Operating Condition

The test results of conducted emission at mains ports provide the following information:

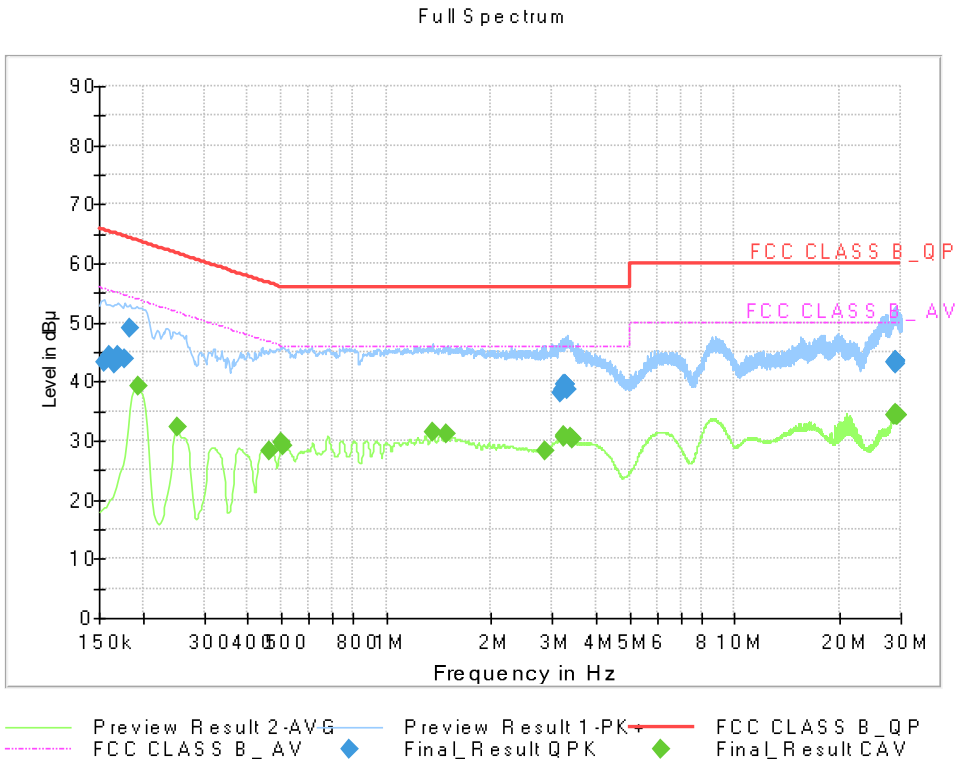
Test Standard Used	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Frequency Range	150 ㎑ to 30 ㎒
Detector	Quasi-Peak, CISPR-Average
Bandwidth	9 ㎑ (6 dB)
Operating Mode	EUT + Notebook PC Mode EUT + Travel Adaptor Mode
Test Site	EMI Shielded Room
Temperature	min. 19.8 °C / max. 21.4 °C
Relative Humidity	min. 30.8 % / max. 35.5 %
Test Date	December 26, 2023

A conducted emission is calculated by the following equation.;

Calculation Formula: QuasiPeak or CAverage= Receiver Reading + Corr.
Corr. = LISN Factor + Cable Loss
Margin = Limit – QuasiPeak or CAverage
Conductor L1 = Live, Conductor N = Neutral

5.1.2 Measuring Data

Figure 1: Conducted Emission (150 kHz to 30 MHz), EUT + Notebook PC Mode



Two graphs measurement for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

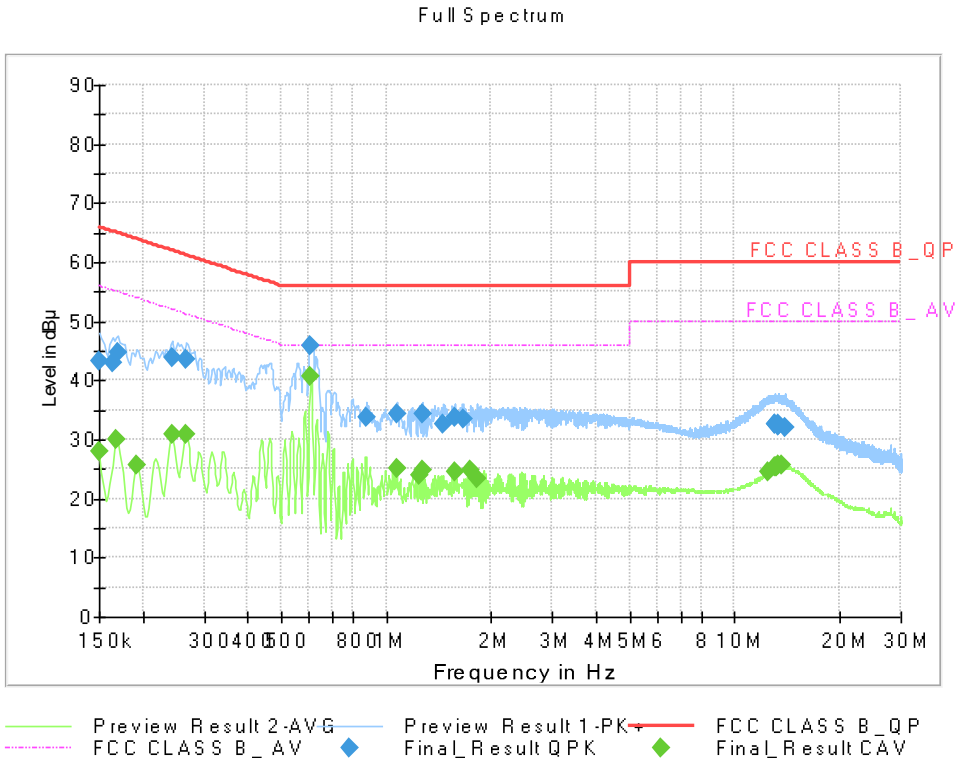
Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1545	43.37	65.75	22.38	9.000	L1	9.7
0.1613	44.45	65.40	20.95	9.000	N	9.7
0.1658	43.09	65.17	22.08	9.000	N	9.7
0.1703	44.30	64.95	20.65	9.000	L1	9.7
0.1770	43.84	64.63	20.78	9.000	N	9.7
0.1838	48.98	64.31	15.34	9.000	N	9.7
3.1640	38.15	56.00	17.85	9.000	N	10.0
3.1933	38.67	56.00	17.33	9.000	N	10.0
3.2428	39.38	56.00	16.62	9.000	L1	10.0
3.2540	39.48	56.00	16.52	9.000	L1	10.0
3.2698	39.50	56.00	16.50	9.000	L1	10.0
3.2968	38.66	56.00	17.34	9.000	N	10.0
28.7533	43.24	60.00	16.76	9.000	N	11.4
28.8770	43.47	60.00	16.53	9.000	N	11.4
28.9265	42.88	60.00	17.12	9.000	L1	11.2
29.0008	43.46	60.00	16.54	9.000	N	11.4
29.0998	43.22	60.00	16.78	9.000	N	11.4
29.1223	43.57	60.00	16.43	9.000	N	11.4

Final_Result_CAV

Frequency (MHz)	CAverage (dBµV)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1950	39.14	53.82	14.68	9.000	N	9.7
0.2513	32.28	51.72	19.44	9.000	N	9.7
0.4628	28.21	46.64	18.43	9.000	L1	9.7
0.5000	29.61	46.00	16.39	9.000	L1	9.7
0.5068	29.23	46.00	16.77	9.000	L1	9.7
1.3618	31.31	46.00	14.69	9.000	L1	9.9
1.4923	31.03	46.00	14.97	9.000	L1	9.9
2.8423	28.24	46.00	17.76	9.000	N	10.0
3.2383	30.78	46.00	15.22	9.000	L1	10.0
3.2518	30.68	46.00	15.32	9.000	L1	10.0
3.3665	30.53	46.00	15.47	9.000	L1	10.0
3.4070	30.42	46.00	15.58	9.000	L1	10.0
28.7218	34.47	50.00	15.53	9.000	N	11.4
29.0008	34.72	50.00	15.28	9.000	N	11.4
29.0975	34.31	50.00	15.69	9.000	N	11.4
29.2348	34.31	50.00	15.69	9.000	N	11.4
29.2460	34.35	50.00	15.65	9.000	N	11.4
29.4395	34.37	50.00	15.63	9.000	N	11.4

Figure 2: Conducted Emission (150 kHz to 30 MHz), EUT + Travel Adaptor Mode



Two graphs measurement for both Live(L1) and Neutral(N) of the LISN are combined into one graph.

Final_Result_QPK

Frequency (MHz)	QuasiPeak (dBµV)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1500	43.14	66.00	22.86	9.000	N	9.7
0.1635	42.89	65.28	22.40	9.000	N	9.7
0.1703	44.75	64.95	20.19	9.000	N	9.7
0.2423	43.80	62.02	18.22	9.000	N	9.7
0.2670	43.65	61.21	17.56	9.000	N	9.7
0.6035	45.90	56.00	10.10	9.000	L1	9.8
0.8780	33.80	56.00	22.20	9.000	L1	9.8
1.0715	34.21	56.00	21.79	9.000	L1	9.8
1.2650	34.22	56.00	21.78	9.000	L1	9.8
1.4630	32.60	56.00	23.40	9.000	L1	9.9
1.5710	33.70	56.00	22.30	9.000	L1	9.9
1.6588	33.33	56.00	22.67	9.000	L1	9.9
12.9875	32.70	60.00	27.30	9.000	N	10.6
13.0933	32.49	60.00	27.51	9.000	N	10.6
13.3385	32.35	60.00	27.65	9.000	N	10.6
13.3475	32.41	60.00	27.59	9.000	N	10.6
13.3723	32.50	60.00	27.50	9.000	N	10.6
13.9595	32.14	60.00	27.86	9.000	N	10.7

Final_Result_CAV

Frequency (㎒)	CAverage (dBµV)	Limit (dBµV/m)	Margin (dB)	Bandwidth (kHz)	Line	Corr. (dB)
0.1500	27.87	56.00	28.13	9.000	L1	9.7
0.1680	30.07	55.06	24.99	9.000	L1	9.7
0.1928	25.74	53.92	28.18	9.000	L1	9.7
0.2423	30.86	52.02	21.16	9.000	L1	9.7
0.2670	30.79	51.21	20.42	9.000	L1	9.7
0.6080	40.65	46.00	5.35	9.000	L1	9.8
1.0693	25.16	46.00	20.84	9.000	L1	9.8
1.2403	24.00	46.00	22.00	9.000	L1	9.8
1.2650	24.77	46.00	21.23	9.000	L1	9.8
1.5710	24.61	46.00	21.39	9.000	L1	9.9
1.7375	24.85	46.00	21.15	9.000	L1	9.9
1.8298	23.24	46.00	22.76	9.000	L1	9.9
12.5443	24.58	50.00	25.42	9.000	L1	10.5
13.0550	25.32	50.00	24.68	9.000	L1	10.5
13.2395	25.48	50.00	24.52	9.000	L1	10.5
13.2643	25.50	50.00	24.50	9.000	L1	10.5
13.3138	25.63	50.00	24.37	9.000	L1	10.5
13.6760	25.69	50.00	24.31	9.000	L1	10.6

5.2 Radiated Emission Below 1 GHz

5.2.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Frequency Range	30 MHz to 1 000 MHz
Detector	Quasi-Peak
Bandwidth	120 kHz (6 dB)
Measurement Distance	3 m
Antenna Height	1 m to 4 m
Antenna Polarity	Horizontal, Vertical
Operating Mode	EUT + Notebook PC Mode EUT + Travel Adaptor Mode EUT + Bluetooth Mode EUT + MSR Mode
Test Site	3 m Semi Anechoic Chamber #1
Temperature	min. 19.8 °C, max. 20.9 °C
Relative Humidity	min. 26.8 %, max. 29.5 %
Test Date	December 22, 2023

A field strength is calculated by the following equation.;

Calculation Formula: QuasiPeak = Reading (Receiver Reading) + Corr.
Corr. (Correction Factor) = Antenna Factor + Cable Loss
Margin = Limit - QuasiPeak

5.2.2 Measuring Data

Figure 3: Radiated Emission (30 to 1 000) ㎒, EUT + Notebook PC Mode

Frequency (㎒)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
204.7325	37.00	43.50	6.50	100.0	V	18.0	17.2
672.0529	37.72	46.00	8.28	100.0	V	8.0	28.5
720.0262	43.28	46.00	2.72	100.0	H	50.0	29.2
768.0608	41.00	46.00	5.00	100.0	H	72.0	30.0
816.1313	42.00	46.00	4.00	100.0	H	112.0	30.7
864.0783	42.00	46.00	4.00	100.0	H	61.0	31.2

Figure 4: Radiated Emission (30 to 1 000) ㎒, EUT + Travel Adaptor Mode

Frequency (㎒)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
200.7575	36.00	43.50	7.50	100.0	V	293.0	17.1
672.0590	40.00	46.00	6.00	100.0	V	30.0	28.5
720.0590	43.20	46.00	2.80	100.0	H	212.0	29.2
768.1070	42.00	46.00	4.00	100.0	H	219.0	30.0
816.0942	42.00	46.00	4.00	100.0	H	254.0	30.7
960.1007	43.00	54.00	11.00	125.0	V	64.0	32.3

Figure 5: Radiated Emission (30 to 1 000) ㎒, EUT + Bluetooth Mode

Frequency (㎒)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
39.9353	16.44	40.00	23.56	125.3	V	0.0	19.4
51.4544	17.31	40.00	22.69	400.0	H	30.0	20.1
60.8835	16.63	40.00	23.37	306.8	H	61.0	19.4
494.1170	23.93	46.00	22.07	325.0	V	310.0	25.2
663.7955	27.87	46.00	18.13	303.9	V	174.0	28.4
872.0987	30.69	46.00	15.31	125.0	H	181.0	31.3

Figure 6: Radiated Emission (30 to 1 000) ㎒, EUT + MSR Mode

Frequency (㎒)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Polarization (H/V)	Azimuth (deg)	Corr. (dB)
41.2578	16.51	40.00	23.49	216.8	V	238.0	19.5
46.2710	16.92	40.00	23.08	100.0	H	245.0	19.9
63.1879	16.44	40.00	23.56	125.2	H	328.0	19.1
493.0505	23.98	46.00	22.02	107.9	V	162.0	25.2
674.0453	28.16	46.00	17.84	303.8	V	118.0	28.5
864.0544	40.10	46.00	5.90	100.0	H	281.0	31.2

5.3 Radiated Emission Above 1 GHz

5.3.1 Operating Condition

The test results of radiated emission provide the following information:

Used Test Standard	FCC CFR 47 PART 15 Subpart B Class B ANSI C63.4-2014
Detector	Peak, CISPR-Average
Bandwidth	1 MHz
Tested Frequency Range	1 GHz to 18 GHz
Measurement Distance	3 m
Antenna Height	1 m to 4 m
Antenna Polarity	Horizontal, Vertical
Operating Mode	EUT + Notebook PC Mode EUT + Travel Adaptor Mode EUT + Bluetooth Mode EUT + MSR Mode
Test Site	3 m Semi Anechoic Chamber #1
Temperature	min. 19.4 °C, max. 21.3 °C
Relative Humidity	min. 25.7 %, max. 28.7 %
Test Date	December 26, 2023

A field strength is calculated by the following equation.;

Calculation Formula: Peak or CAverage = Reading (Receiver Reading) + Corr.
Corr. (Correction Factor) = Antenna Factor+ Cable Loss
Margin = Limit - Peak or CAverage

5.3.2 Measuring Data

Figure 7: Radiated Emission (1 to 18) ㎓, EUT + Notebook PC Mode

Frequency (㎒)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol (H/V)	Azimuth (deg)	Corr. (dB)
1394.7650	43.29	---	74.00	30.71	224.8	H	149.0	-30.2
1394.7650	---	26.90	54.00	27.10	224.8	H	149.0	-30.2
2666.3550	52.62	---	74.00	21.38	100.0	V	107.0	-24.9
2666.3550	---	26.17	54.00	27.83	100.0	V	107.0	-24.9
5302.7650	45.30	---	74.00	28.70	107.8	H	3.0	-17.0
5302.7650	---	25.36	54.00	28.64	107.8	H	3.0	-17.0
5313.6650	56.87	---	74.00	17.13	116.5	V	108.0	-17.0
5313.6650	---	26.80	54.00	27.20	116.5	V	108.0	-17.0
14767.6700	47.87	---	74.00	26.13	363.8	V	20.0	-0.1
14767.6700	---	34.82	54.00	19.18	363.8	V	20.0	-0.1
17831.4650	53.73	---	74.00	20.27	100.0	H	183.0	8.4
17831.4650	---	41.33	54.00	12.67	100.0	H	183.0	8.4

Figure 8: Radiated Emission (1 to 18) ㎓, EUT + Travel Adaptor Mode

Frequency (㎒)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol (H/V)	Azimuth (deg)	Corr. (dB)
1151.9500	43.93	---	74.00	30.07	352.6	H	341.0	-31.1
1151.9500	---	42.34	54.00	11.66	352.6	H	341.0	-31.1
1248.0000	45.46	---	74.00	28.54	197.7	H	225.0	-30.7
1248.0000	---	44.22	54.00	9.78	197.7	H	225.0	-30.7
1343.9950	---	43.69	54.00	10.31	100.0	H	338.0	-30.4
1343.9950	45.23	---	74.00	28.77	100.0	H	338.0	-30.4
1728.1800	---	36.28	54.00	17.72	360.6	H	150.0	-29.0
1728.1800	39.56	---	74.00	34.44	360.6	H	150.0	-29.0
1776.1500	---	36.49	54.00	17.51	341.8	H	150.0	-28.9
1776.1500	39.75	---	74.00	34.25	341.8	H	150.0	-28.9
17830.9900	---	41.21	54.00	12.79	224.8	V	147.0	8.4
17830.9900	53.80	---	74.00	20.20	224.8	V	147.0	8.4

Figure 9: Radiated Emission (1 to 18) GHz, EUT + Bluetooth Mode

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol (H/V)	Azimuth (deg)	Corr. (dB)
1248.0150	45.78	---	74.00	28.22	204.5	H	209.0	-30.7
1248.0150	---	43.74	54.00	10.26	204.5	H	209.0	-30.7
1344.0000	---	43.38	54.00	10.62	100.0	H	336.0	-30.4
1344.0000	44.94	---	74.00	29.06	100.0	H	336.0	-30.4
1775.8950	40.40	---	74.00	33.60	351.7	H	167.0	-28.9
1775.8950	---	33.52	54.00	20.48	351.7	H	167.0	-28.9
6731.2250	---	28.06	54.00	25.94	124.9	V	30.0	-12.4
6731.2250	40.96	---	74.00	33.04	124.9	V	30.0	-12.4
8360.0850	42.57	---	74.00	31.43	125.2	V	157.0	-9.8
8360.0850	---	29.99	54.00	24.01	125.2	V	157.0	-9.8
10754.7350	45.64	---	74.00	28.36	214.5	V	75.0	-4.5
10754.7350	---	33.39	54.00	20.61	214.5	V	75.0	-4.5

Figure 10: Radiated Emission (1 to 18) GHz, EUT + MSR Mode

Frequency (MHz)	MaxPeak (dBµV/m)	CAverage (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Height (cm)	Pol (H/V)	Azimuth (deg)	Corr. (dB)
1152.0900	46.21	---	74.00	27.79	362.8	H	23.0	-31.1
1152.0900	---	44.62	54.00	9.38	362.8	H	23.0	-31.1
1247.9500	---	43.30	54.00	10.70	201.6	H	210.0	-30.7
1247.9500	44.59	---	74.00	29.41	201.6	H	210.0	-30.7
1344.0450	---	42.31	54.00	11.69	100.0	H	29.0	-30.4
1344.0450	43.98	---	74.00	30.02	100.0	H	29.0	-30.4
5016.1400	37.97	---	74.00	36.03	303.6	V	198.0	-17.5
5016.1400	---	24.84	54.00	29.16	303.6	V	198.0	-17.5
13251.3000	---	33.38	54.00	20.62	330.7	H	9.0	-2.8
13251.3000	46.30	---	74.00	27.70	330.7	H	9.0	-2.8
17912.6850	---	40.95	54.00	13.05	202.5	V	266.0	9.6
17912.6850	52.77	---	74.00	21.23	202.5	V	266.0	9.6

6. APPENDIX A. TEST SETUP PHOTO

Please refer to Appendix. A and test setup photo file no. as follows;

File No.	Date of Issue	Description
HCT-EM-2401-FC003-P	January 16, 2024	Initial Release

End of report