FCC EMI TEST REPORT

FCC ID	:	**2AMK2-RM05CA**
Equipment	:	**Marker Plus**
Brand Name	:	**reMarkable**
Model Name	:	**RM05C**
Applicant	:	**reMarkable AS** **Fridtjof Nansens Vei 12** **0369 Oslo** **Norway**
Manufacturer	:	**reMarkable AS** **Fridtjof Nansens Vei 12** **0369 Oslo** **Norway**
Standard	:	**FCC 47 CFR FCC Part 15 Subpart B Class B**

The product was received on Jan. 30, 2024 and testing was performed from Mar. 01, 2024 to Apr. 03, 2024. We, Sporton International Inc. Wensan Laboratory, would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval from Sporton International Inc. Wensan Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. Wensan Laboratory
No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FC413019	01	Initial issue of report	May 31, 2024

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	14.99 dB under the limit at 2.91 MHz
3.2	15.109	Radiated Emission	Pass	11.05 dB under the limit at 40.80 MHz

Conformity Assessment Condition:
1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented against the regulation limits or in accordance with the requirements stipulated by the applicant/manufacturer who shall bear all the risks of non-compliance that may potentially occur if measurement uncertainty is taken into account.
2. The measurement uncertainty please refer to each test result in the section “Measurement Uncertainty”.
Disclaimer:
The product specifications of the EUT presented in the test report that may affect the test assessments are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng

Report Producer: Rebecca Wu

1. General Description

1.1. Product Feature of Equipment Under Test

Product Feature	
General Specs	Wireless Tx and NFC Rx only
Sample 1	With Battery 1
Sample 2	With Battery 2
Antenna Type	Wireless Tx: Integral Antenna NFC Rx: Ferrite Rod Antenna

Remark: The EUT's information above is declared by manufacturer. Please refer to Disclaimer in report summary.

1.2. Modification of EUT

No modifications made to the EUT during the testing.

1.3. Test Location

Test Site	Sporton International Inc. Wensan Laboratory
Test Site Location	No.58, Aly. 75, Ln. 564, Wenhua 3rd, Rd., Guishan Dist., Taoyuan City 333010, Taiwan (R.O.C.) TEL: +886-3-327-0868 FAX: +886-3-327-0855
Test Site No.	**Sporton Site No.**
	CO07-HT, 03CH10-HY

FCC designation No.: TW1132

1.4. Applicable Standards

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

- FCC 47 CFR FCC Part 15 Subpart B Class B
- ANSI C63.4-2014
- ANSI C63.4a-2017

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

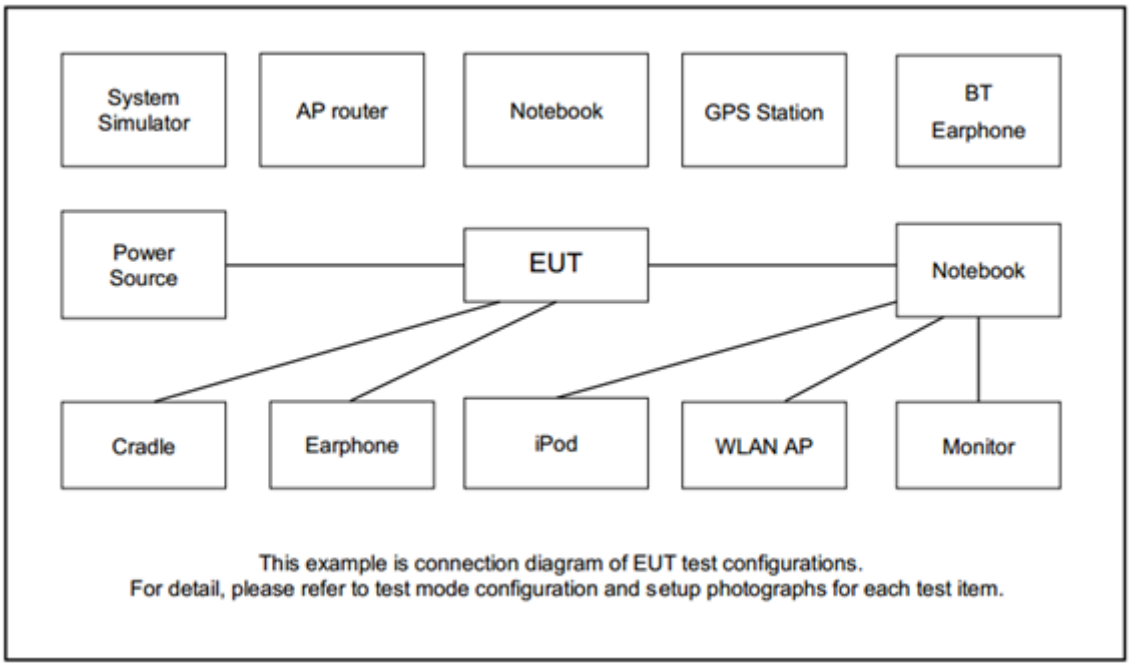
2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT is tested along with the peripherals, operating under possible configurations in compliant with normal operation. The maximum emissions can be identified by a pre-scan carried out in different orientations of placement pursuant to ANSI C63.4-2014. Frequency range covered: Conduction Emission (150 kHz to 30 MHz), Radiation Emission (30 MHz to the 5th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Functions Enabled
AC Conducted Emission	Mode 1 : Wireless Charging with Terminal (E-Book) + USB Cable (Charging form Adapter) for Sample 1 Mode 2 : Pen write with Terminal (E-Book) + USB Cable (Charging form Adapter) for Sample 1 Mode 3 : Pen clear mode with Terminal (E-Book) + USB Cable (Charging form Adapter) for Sample 1 Mode 4 : Pen write with Terminal (E-Book) + USB Cable (Charging form Adapter) for Sample 2
Radiated Emissions	Mode 1 : Wireless Charging with Terminal (E-Book) for Sample 1 Mode 2 : Pen write with Terminal (E-Book) for Sample 1 Mode 3 : Pen clear mode with Terminal (E-Book) for Sample 1 Mode 4 : Wireless Charging with Terminal (E-Book) for Sample 2
Remark: **1.** The worst case of AC is mode 2; only the test data of this mode was reported. **2.** The worst case of RE is mode 1; only the test data of this mode was reported.	

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Brand Name	Model Name	FCC ID	Data Cable	Power Cord
1.	USB Cable type C	a+ plus	acb-u31a	N/A	Shielded, 1.8m	N/A
2.	adapter	Acer	PA-1070-07	N/A	N/A	N/A
3.	E-Book	N/A	N/A	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The following program installed in the EUT is programmed during the test:

1. Execute NFC Charging to be charged by E-Book.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1. Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

<Class B>

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

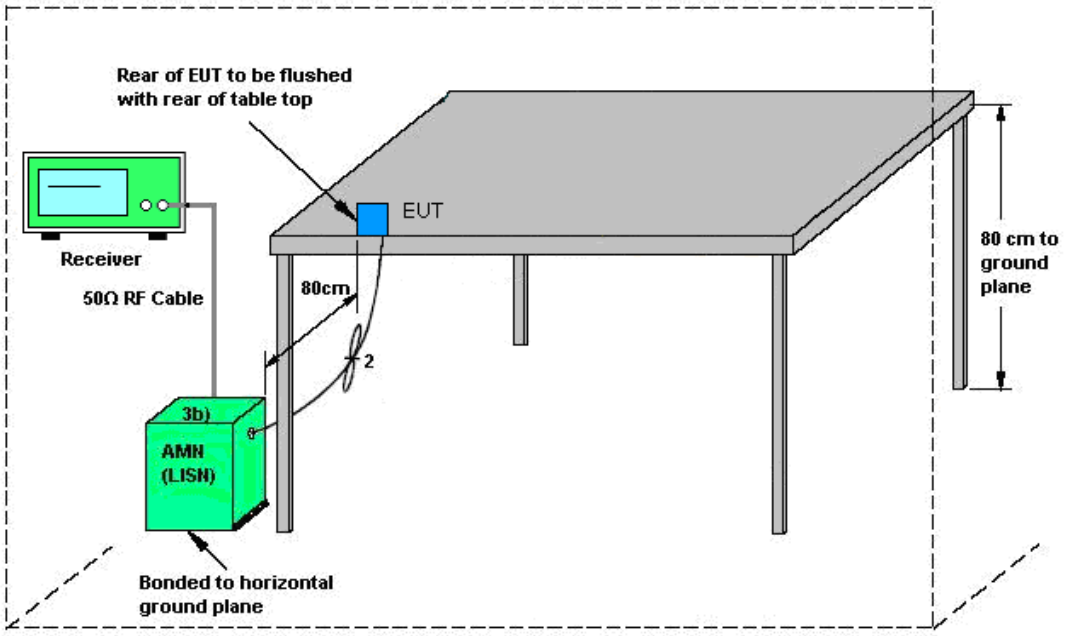
3.1.2. Measuring Instruments

Please refer to the measuring equipment list in this test report.

3.1.3. Test Procedure

1. The EUT is placed 0.4 meter away from the conducting wall of the shielding room, and is kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN shall be used.
6. Both Line and Neutral shall be tested in order to find out the maximum conducted emission.
7. The frequency range from 150 kHz to 30 MHz is scanned.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (If Bandwidth = 9 kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

3.1.4. Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5. Test Result of AC Conducted Emission

Please refer to Appendix A.

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

<Class B>

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

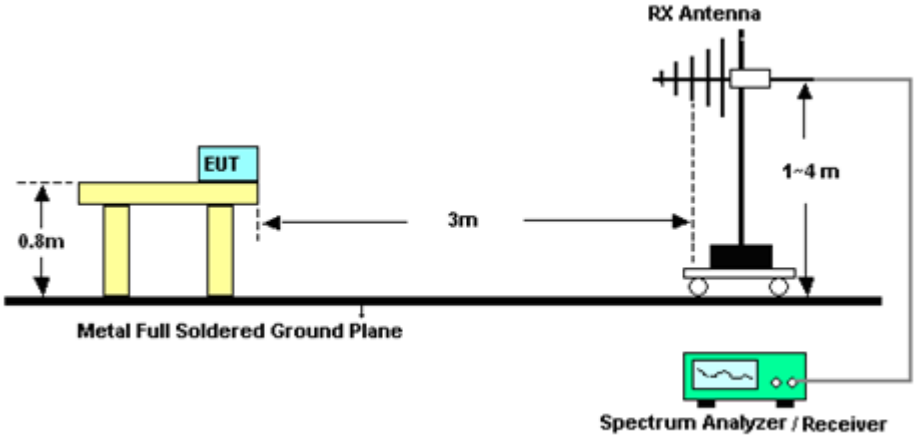
Please refer to the measuring equipment list in this test report.

3.2.3. Test Procedures

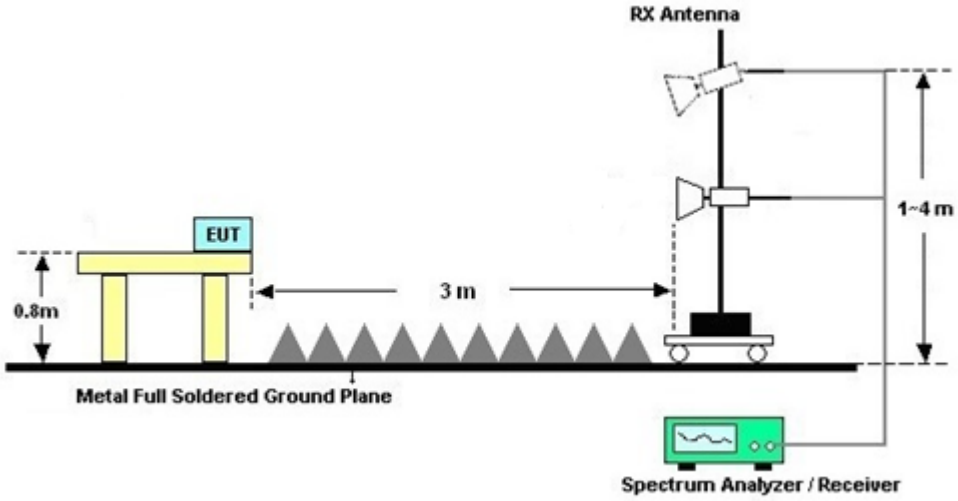
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT is arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120 kHz/VBW=300 kHz for frequency below 1 GHz; RBW=1 MHz VBW=3 MHz (Peak), RBW=1 MHz/VBW=10 Hz (Average) for frequency above 1 GHz).
7. If the emission level of the EUT in peak mode is 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.

3.2.4. Test Setup of Radiated Emission

For Radiated Emissions from 30 MHz to 1 GHz



For Radiated Emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.

4. List of Measuring Equipment

Instrument	Brand Name	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ACPOWER	AFC-11003G	F317040033	N/A	N/A	Apr. 03, 2024	N/A	Conduction (CO07-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Apr. 03, 2024	N/A	Conduction (CO07-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	9561-F N00373	9kHz-200MHz	Oct. 20, 2023	Apr. 03, 2024	Oct. 19, 2024	Conduction (CO07-HY)
RF Cable	HUBER + SUHNER	RG 214/U	1358175	9kHz~30MHz	Mar. 14, 2024	Apr. 03, 2024	Mar. 13, 2025	Conduction (CO07-HY)
Two-Line V-Network	TESEQ	NNB 51	45051	N/A	Mar. 10, 2024	Apr. 03, 2024	Mar. 09, 2025	Conduction (CO07-HY)
Four-Line V-Network	TESEQ	NNB 52	36122	N/A	Mar. 07, 2024	Apr. 03, 2024	Mar. 06, 2025	Conduction (CO07-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102317	9kHz~3.6GHz	Sep. 20, 2023	Apr. 03, 2024	Sep. 19, 2024	Conduction (CO07-HY)
Amplifier	SONOMA	310N	187311	9kHz~1GHz	Oct. 16, 2023	Mar. 01, 2024~ Mar. 19, 2024	Oct. 15, 2024	Radiation (03CH10-HY)
Bilog Antenna	TESEQ	CBL 6111D & 00800N1D01N -06	35413 & 02	30MHz~1GHz	Nov. 03, 2023	Mar. 01, 2024~ Mar. 19, 2024	Nov. 02, 2024	Radiation (03CH10-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1325	1GHz~18GHz	Oct. 18, 2023	Mar. 01, 2024~ Mar. 19, 2024	Oct. 17, 2024	Radiation (03CH10-HY)
Preamplifier	Jet-Power	JAP00101800-30-10P	160118550004	1GHz~18GHz	Feb. 26, 2023	Mar. 01, 2024~ Mar. 19, 2024	Feb. 25, 2025	Radiation (03CH10-HY)
Controller	EMEC	EM 1000	N/A	Control Turn table & Ant Mast	N/A	Mar. 01, 2024~ Mar. 19, 2024	N/A	Radiation (03CH10-HY)
Antenna Mast	EMEC	AM-BS-4500-B	N/A	1~4m	N/A	Mar. 01, 2024~ Mar. 19, 2024	N/A	Radiation (03CH10-HY)
Turn Table	EMEC	TT 2200	N/A	0~360 Degree	N/A	Mar. 01, 2024~ Mar. 19, 2024	N/A	Radiation (03CH10-HY)
Software	Audix	E3 6.2009-8-24	RK-001042	N/A	N/A	Mar. 01, 2024~ Mar. 19, 2024	N/A	Radiation (03CH10-HY)
EMI Test Receiver	Keysight	N9038A	MY59053012	3Hz~26.5GHz	Nov. 08, 2023	Mar. 01, 2024~ Mar. 19, 2024	Nov. 07, 2024	Radiation (03CH10-HY)
RF Cable	HUBER + SUHNER	SUCOFLEX 102	519226/2, 804014/2, 804026/2	30MHz~40GHz	Nov. 01, 2023	Mar. 01, 2024~ Mar. 19, 2024	Oct. 31, 2024	Radiation (03CH10-HY)

5. Measurement Uncertainty

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.44 dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**6.34 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 6000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.68 dB**

Uncertainty of Radiated Emission Measurement (6000 MHz ~ 18000 MHz)

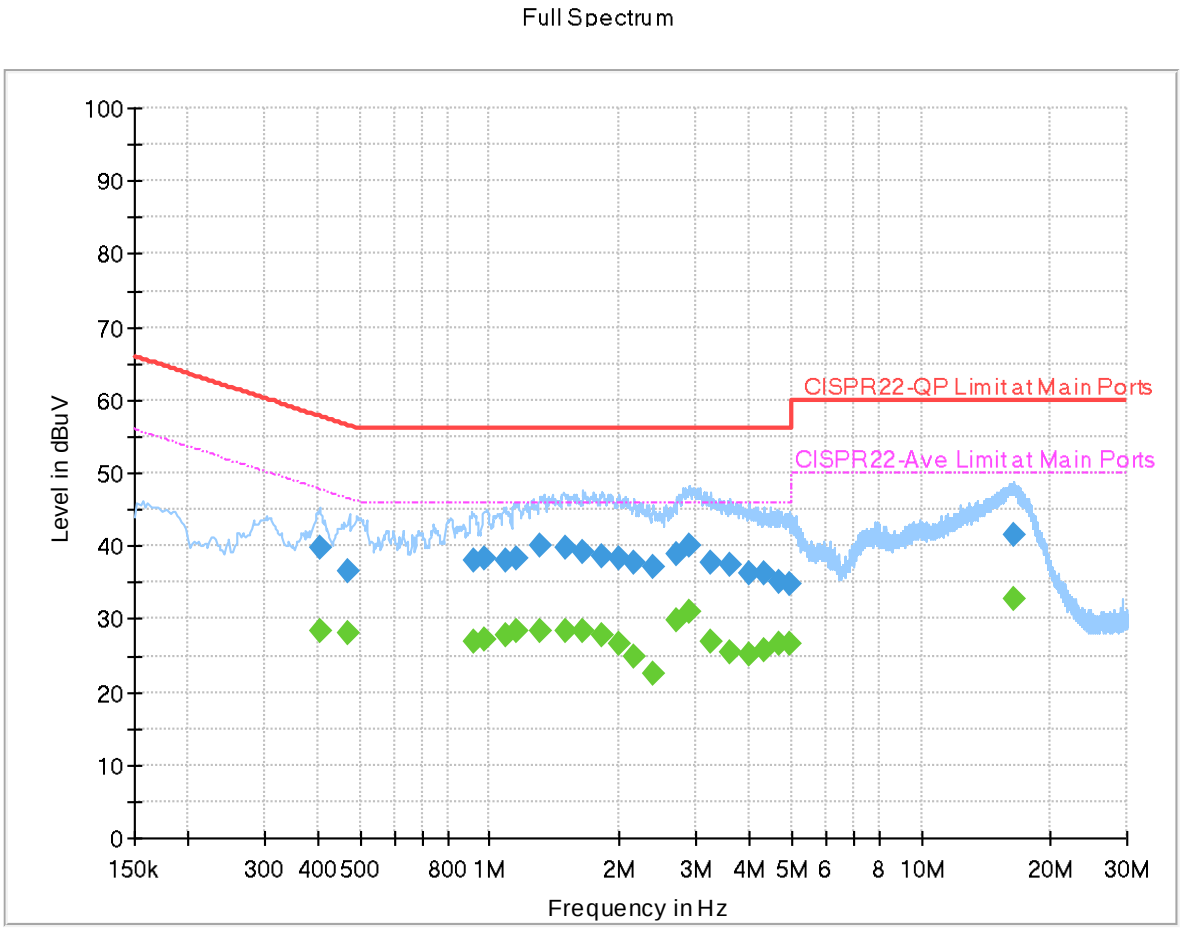
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.30 dB**

Appendix A. AC Conducted Emission Test Results

Test Engineer :	Louis Chung	**Temperature :**	21.7~23.8℃
		Relative Humidity :	45.9~63.2%

EUT Information

Report NO :	413019
Test Mode :	Mode 2
Test Voltage :	Battery
Phase :	Line



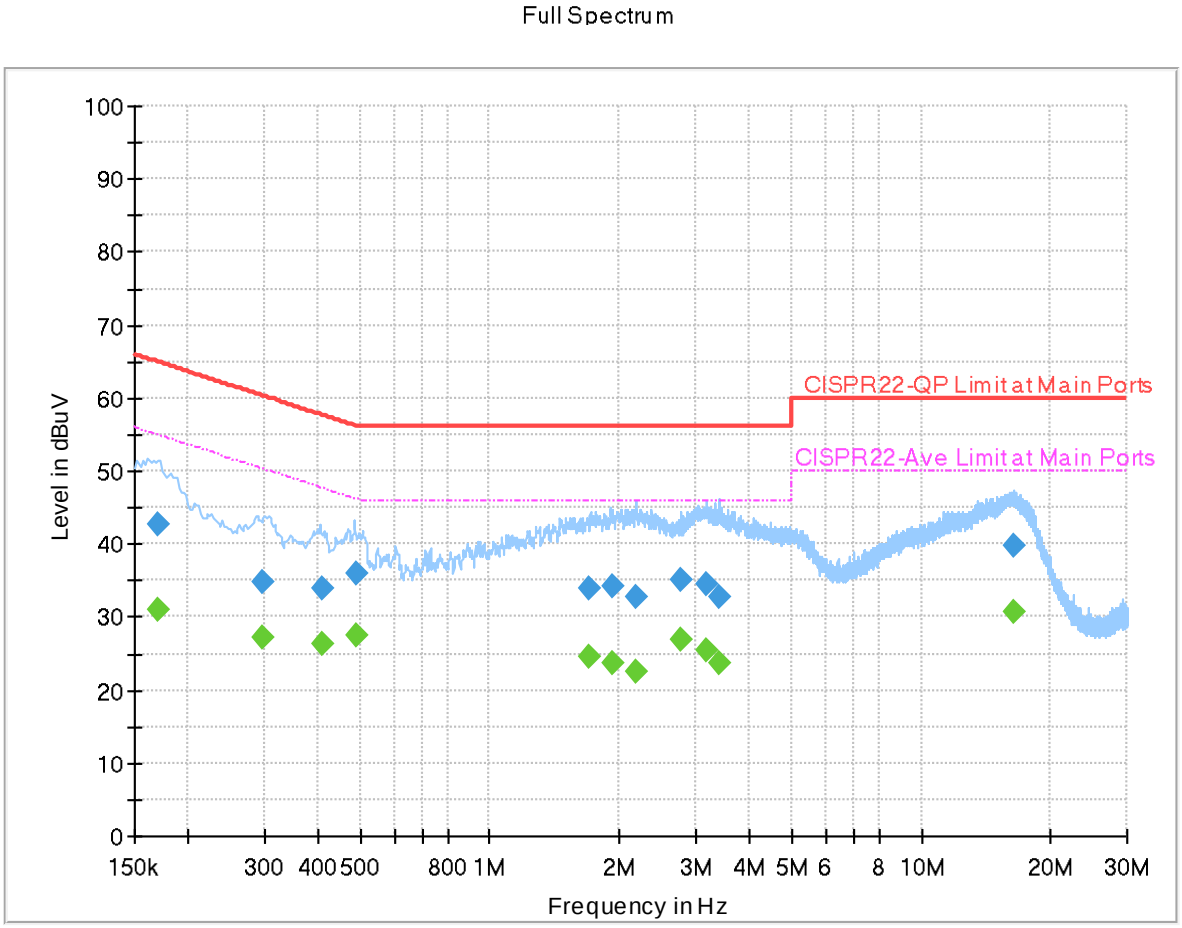
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.406500	---	28.45	47.72	19.27	L1	OFF	19.9
0.406500	39.69	---	57.72	18.03	L1	OFF	19.9
0.469680	---	28.10	46.52	18.42	L1	OFF	19.9
0.469680	36.67	---	56.52	19.85	L1	OFF	19.9
0.915000	---	27.02	46.00	18.98	L1	OFF	19.9
0.915000	38.13	---	56.00	17.87	L1	OFF	19.9
0.973500	---	27.21	46.00	18.79	L1	OFF	19.9
0.973500	38.16	---	56.00	17.84	L1	OFF	19.9
1.086000	---	27.89	46.00	18.11	L1	OFF	19.9
1.086000	38.03	---	56.00	17.97	L1	OFF	19.9
1.148820	---	28.31	46.00	17.69	L1	OFF	19.9
1.148820	38.35	---	56.00	17.65	L1	OFF	19.9
1.311720	---	28.28	46.00	17.72	L1	OFF	19.9
1.311720	40.02	---	56.00	15.98	L1	OFF	19.9
1.491000	---	28.42	46.00	17.58	L1	OFF	19.9
1.491000	39.66	---	56.00	16.34	L1	OFF	19.9
1.648770	---	28.49	46.00	17.51	L1	OFF	19.9
1.648770	39.11	---	56.00	16.89	L1	OFF	19.9
1.812840	---	27.69	46.00	18.31	L1	OFF	19.9

1.812840	38.72	---	56.00	17.28	L1	OFF	19.9
1.983750	---	26.73	46.00	19.27	L1	OFF	19.9
1.983750	38.41	---	56.00	17.59	L1	OFF	19.9
2.161500	---	24.91	46.00	21.09	L1	OFF	20.0
2.161500	37.61	---	56.00	18.39	L1	OFF	20.0
2.384340	---	22.65	46.00	23.35	L1	OFF	20.0
2.384340	37.17	---	56.00	18.83	L1	OFF	20.0
2.719500	---	29.85	46.00	16.15	L1	OFF	20.0
2.719500	38.82	---	56.00	17.18	L1	OFF	20.0
2.908500	---	31.01	46.00	14.99	L1	OFF	20.0
2.908500	39.91	---	56.00	16.09	L1	OFF	20.0
3.257250	---	26.93	46.00	19.07	L1	OFF	20.0
3.257250	37.80	---	56.00	18.20	L1	OFF	20.0
3.589350	---	25.56	46.00	20.44	L1	OFF	20.0
3.589350	37.38	---	56.00	18.62	L1	OFF	20.0
3.979500	---	25.08	46.00	20.92	L1	OFF	20.0
3.979500	36.38	---	56.00	19.62	L1	OFF	20.0
4.319250	---	25.72	46.00	20.28	L1	OFF	20.0
4.319250	36.22	---	56.00	19.78	L1	OFF	20.0
4.663590	---	26.50	46.00	19.50	L1	OFF	20.0
4.663590	35.20	---	56.00	20.80	L1	OFF	20.0
4.942500	---	26.47	46.00	19.53	L1	OFF	20.0
4.942500	34.67	---	56.00	21.33	L1	OFF	20.0
16.323000	---	32.62	50.00	17.38	L1	OFF	20.1
16.323000	41.57	---	60.00	18.43	L1	OFF	20.1

EUT Information

Report NO :	413019
Test Mode :	Mode 2
Test Voltage :	Battery
Phase :	Neutral



Final_Result

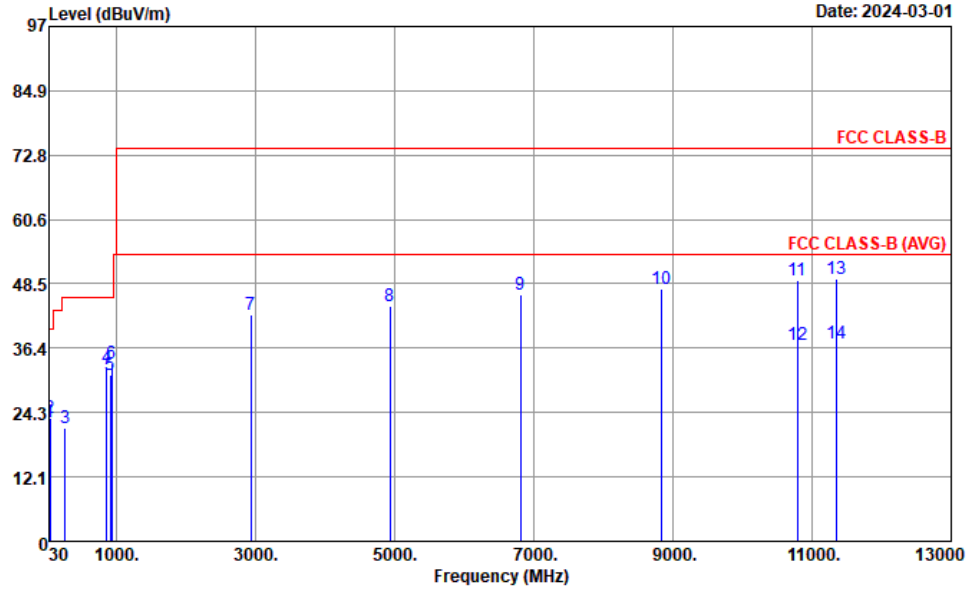
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.170790	---	30.92	54.92	24.00	N	OFF	19.9
0.170790	42.68	---	64.92	22.24	N	OFF	19.9
0.298230	---	27.13	50.29	23.16	N	OFF	19.9
0.298230	34.86	---	60.29	25.43	N	OFF	19.9
0.411000	---	26.32	47.63	21.31	N	OFF	19.9
0.411000	34.00	---	57.63	23.63	N	OFF	19.9
0.489750	---	27.53	46.17	18.64	N	OFF	19.9
0.489750	36.10	---	56.17	20.07	N	OFF	19.9
1.702500	---	24.46	46.00	21.54	N	OFF	19.9
1.702500	33.86	---	56.00	22.14	N	OFF	19.9
1.922010	---	23.67	46.00	22.33	N	OFF	19.9
1.922010	34.21	---	56.00	21.79	N	OFF	19.9
2.172750	---	22.62	46.00	23.38	N	OFF	20.0
2.172750	32.61	---	56.00	23.39	N	OFF	20.0
2.762520	---	27.01	46.00	18.99	N	OFF	20.0
2.762520	35.23	---	56.00	20.77	N	OFF	20.0
3.170670	---	25.48	46.00	20.52	N	OFF	20.0
3.170670	34.39	---	56.00	21.61	N	OFF	20.0
3.401700	---	23.78	46.00	22.22	N	OFF	20.0

3.401700	**32.73**	**---**	**56.00**	**23.27**	**N**	**OFF**	**20.0**
16.444950	**---**	**30.66**	**50.00**	**19.34**	**N**	**OFF**	**20.2**
16.444950	**39.91**	**---**	**60.00**	**20.09**	**N**	**OFF**	**20.2**

Appendix B. Radiated Emission Test Result

Test Engineer :	Donny Tang	**Temperature :**	22.2~23.0˚C
		Relative Humidity :	50.9~55.3%
Test Distance :	3m	**Polarization :**	Horizontal

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)
■ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

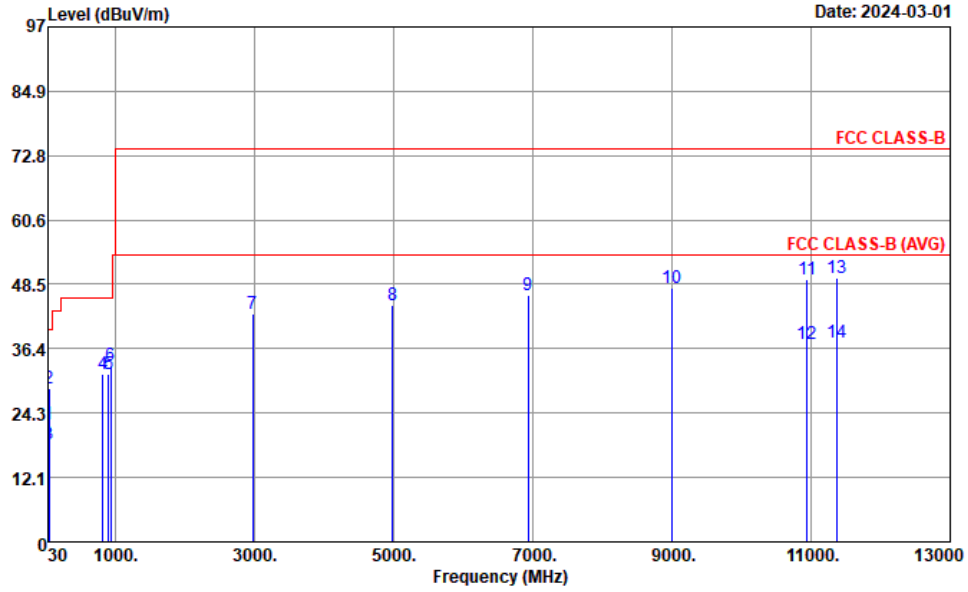


Site : 03CH10-HY
Condition : FCC CLASS-B 3m 9120D-1325_231018 HORIZONTAL
Project : 413019
Power : From System
Mode : 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	31.89	22.33	-17.67	40.00	30.18	23.39	1.36	32.60	---	---	Peak
2	40.80	23.27	-16.73	40.00	35.22	19.13	1.52	32.60	---	---	Peak
3	260.31	21.22	-24.78	46.00	31.02	19.62	3.16	32.58	---	---	Peak
4	864.20	32.80	-13.20	46.00	30.64	28.73	5.43	32.00	---	---	Peak
5	911.80	31.41	-14.59	46.00	28.92	28.47	5.58	31.56	---	---	Peak
6	935.60	33.38	-12.62	46.00	29.58	29.43	5.66	31.29	---	---	Peak
7	2928.00	42.67	-31.33	74.00	62.60	28.90	9.75	58.58	---	---	Peak
8	4928.00	44.33	-29.67	74.00	57.76	32.82	12.71	58.96	---	---	Peak
9	6806.00	46.43	-27.57	74.00	54.99	35.88	15.36	59.80	---	---	Peak
10	8844.00	47.66	-26.34	74.00	53.29	37.60	17.41	60.64	---	---	Peak
11	10792.00	49.21	-24.79	74.00	50.90	38.98	19.12	59.79	---	---	Peak
12	10792.00	36.98	-17.02	54.00	38.67	38.98	19.12	59.79	---	---	Average
13	11352.00	49.55	-24.45	74.00	50.78	38.70	19.59	59.52	---	---	Peak
14	11352.00	37.33	-16.67	54.00	38.56	38.70	19.59	59.52	---	---	Average

Test Engineer :	Donny Tang	**Temperature :**	22.2~23.0°C
		Relative Humidity :	50.9~55.3%
Test Distance :	3m	**Polarization :**	Vertical

■ Emission level (dBμV/m) = 20 log Emission level (μV/m)
■ Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level



Site : 03CH10-HY
Condition : FCC CLASS-B 3m 9120D-1325_231018 VERTICAL
Project : 413019
Power : From System
Mode : 1

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	31.35	22.15	-17.85	40.00	29.68	23.72	1.35	32.60	---	---	Peak
2	40.80	28.95	-11.05	40.00	40.90	19.13	1.52	32.60	---	---	Peak
3	46.74	18.27	-21.73	40.00	33.48	15.84	1.58	32.63	---	---	Peak
4	813.80	31.51	-14.49	46.00	31.15	27.39	5.31	32.34	---	---	Peak
5	902.70	31.68	-14.32	46.00	29.40	28.39	5.55	31.66	---	---	Peak
6	937.00	33.30	-12.70	46.00	29.60	29.31	5.67	31.28	---	---	Peak
7	2972.00	42.84	-31.16	74.00	62.38	29.22	9.83	58.59	---	---	Peak
8	4980.00	44.60	-29.40	74.00	57.55	33.06	12.94	58.95	---	---	Peak
9	6932.00	46.60	-27.40	74.00	55.51	35.64	15.34	59.89	---	---	Peak
10	8990.00	47.73	-26.27	74.00	53.52	37.58	17.46	60.83	---	---	Peak
11	10946.00	49.48	-24.52	74.00	51.30	38.70	19.27	59.79	---	---	Peak
12	10946.00	37.25	-16.75	54.00	39.07	38.70	19.27	59.79	---	---	Average
13	11380.00	49.71	-24.29	74.00	50.95	38.64	19.61	59.49	---	---	Peak
14	11380.00	37.49	-16.51	54.00	38.73	38.64	19.61	59.49	---	---	Average