FCC EMI TEST REPORT

FCC ID	:	**APYHRO00322**
Equipment	:	**Mobile Router**
Brand Name	:	**SHARP**
Applicant	:	**SHARP CORPORATION** **1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan**
Manufacturer	:	**SHARP CORPORATION** **1 Takumi-cho, Sakai-ku, Sakai City, Osaka 590-8522, Japan**
Standard	:	**FCC 47 CFR FCC Part 15 Subpart B Class B**

The product was received on Sep. 08, 2022 and testing was performed from Oct. 03, 2022 to Oct. 05, 2022. We, Sporton International Inc. EMC & Wireless Communications 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. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Louis Wu

Approved by: Louis Wu

Sporton International Inc. EMC & Wireless Communications Laboratory
No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)

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History of this test report

Report No.	Version	Description	Issue Date
FC262909-02	01	Initial issue of report	Nov. 15, 2022

Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	8.12 dB under the limit at 0.152 MHz
3.2	15.109	Radiated Emission	Pass	5.89 dB under the limit at 53.760 MHz for Quasi-Peak

Declaration of Conformity:

1. The test results (PASS/FAIL) with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
   It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to this report "Uncertainty of Evaluation".

Comments and Explanations:

The product specifications of the EUT presented in the report are declared by the manufacturer who shall take full responsibility for the authenticity.

Reviewed by: Keven Cheng

Report Producer: Lucy Wu

1. General Description

1.1. Product Feature of Equipment Under Test

WCDMA/LTE, and Wi-Fi 2.4GHz 802.11b/g/n/ac/ax

Product Feature	
Antenna Type	WWAN: PIFA Antenna WLAN **<Ant. 1>:** FPC, PIFA Antenna **<Ant. 2>:** FPC, PIFA Antenna

Remark: The EUT's information above is declared by manufacturer. Please refer to Comments and Explanations 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. EMC & Wireless Communications Laboratory
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978
Test Site No.	**Sporton Site No.**
	CO05-HY, 03CH06-HY

FCC designation No.: TW1093

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

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

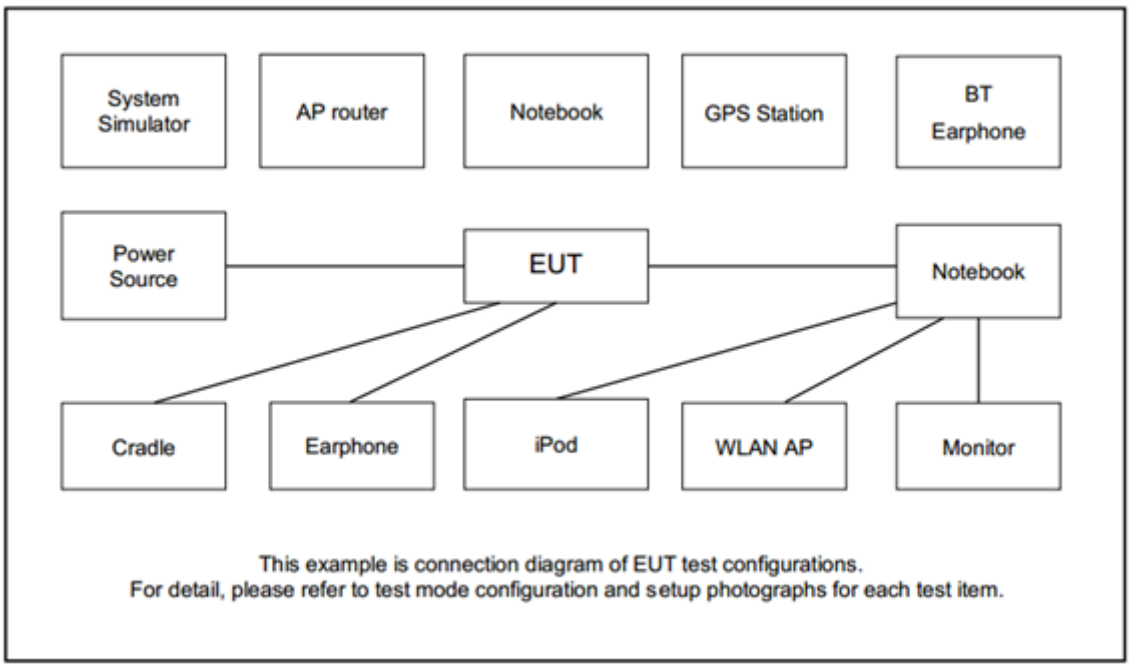
2. Test Configuration of Equipment Under Test

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: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery + USB Cable (Charging form Adapter) Mode 2: LTE Band 12 Idle + WLAN (2.4GHz) Link + Battery + USB-Ethernet Dongle (LAN Link) + USB Cable (Charging form Adapter)
Radiated Emissions	Mode 1: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery + USB Cable (Charging form Adapter) Mode 2: LTE Band 12 Idle + WLAN (2.4GHz) Link + Battery + USB-Ethernet Dongle (LAN Link) + USB Cable (Charging form Adapter) Mode 3: LTE Band 5 Idle + WLAN (2.4GHz) Link + Battery
Remark: **1.** The worst case of AC is mode 1; only the test data of this mode was reported. **2.** The worst case of RE is mode 2; only the test data of this mode was reported. **3.** For Radiation Emission after pre-scanned the cellular band between 30MHz ~ 960MHz (LTE Band 5/12); only the worst case for cellular band 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.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	Notebook	DELL	Latitude 3400	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
3.	Adapter	docomo	AC08	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT is in LTE idle mode during the test. The EUT is synchronized with the BCCH, and has been continuous receiving mode by setting paging reorganization of the system simulator.

At the same time, the EUT is attached to the Notebook via WLAN function, and the following programs installed in the EUT are programmed during the test:

1. EUT links with Notebook and executes ping via RJ-45 Cable.

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.

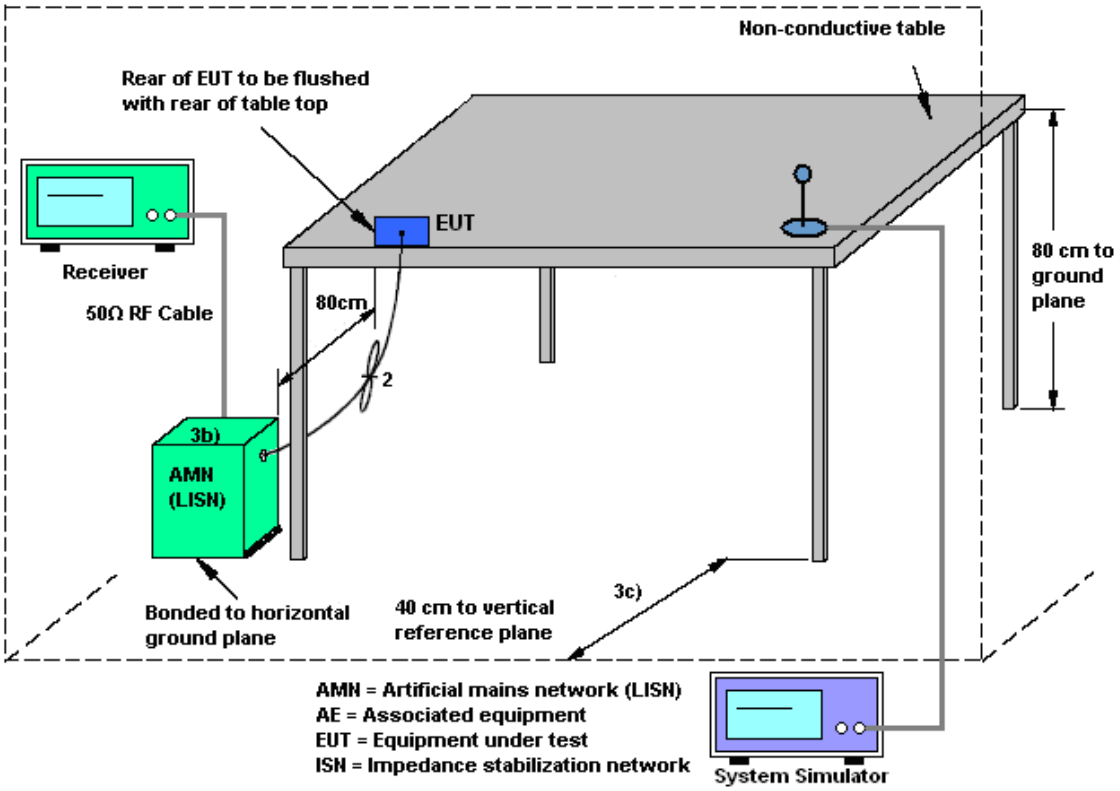
3.1.2. Measuring Instruments

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



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

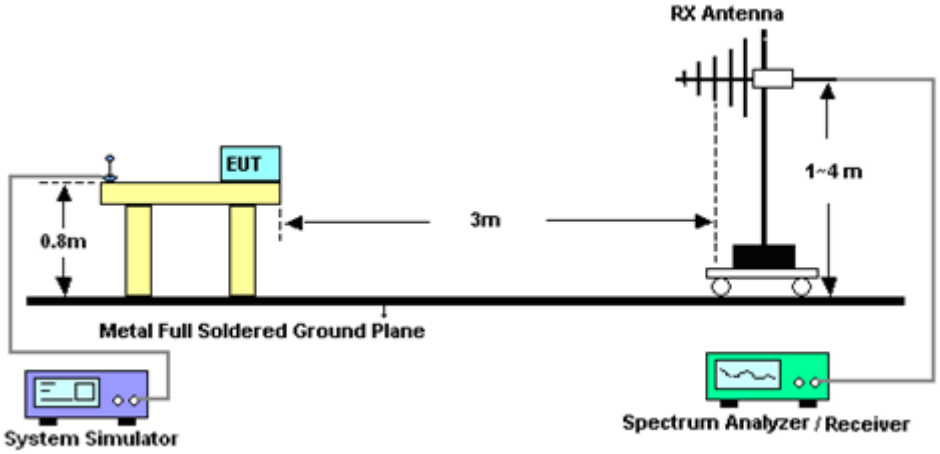
Please refer to the measuring equipment list in this test report.

3.2.3. Test Procedures

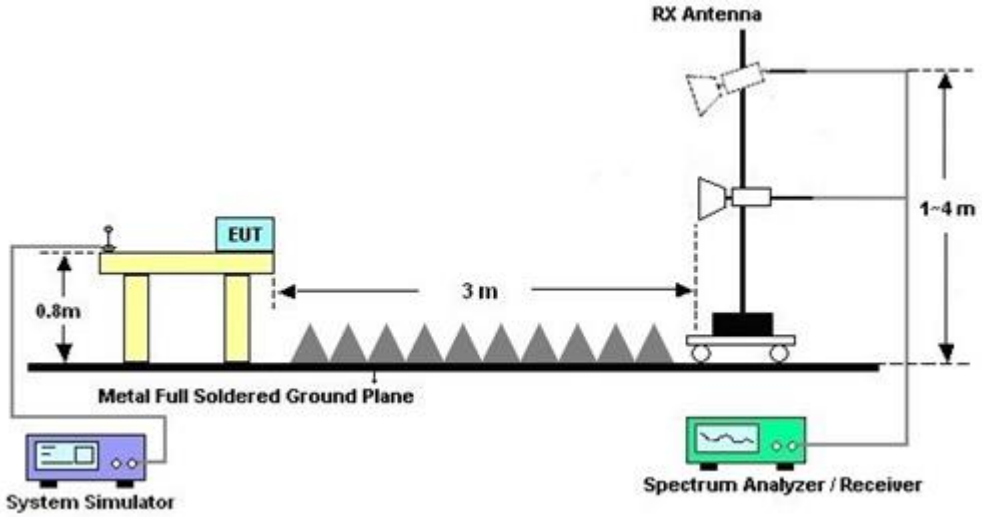
1. The EUT is placed on a turntable with 0.8 meter above ground.
2. The EUT is set 3 meters from the interference receiving antenna, which is mounted on the top of a variable height antenna tower.
3. The table is rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is 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 from 1GHz to 18GHz



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	ChainTek	APC-1000W	N/A	N/A	N/A	Oct. 05, 2022	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9kHz~3.6GHz	Dec. 01, 2021	Oct. 05, 2022	Nov. 30, 2022	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	Nov. 17, 2021	Oct. 05, 2022	Nov. 16, 2022	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Dec. 03, 2021	Oct. 05, 2022	Dec. 02, 2022	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32	N/A	N/A	N/A	Oct. 05, 2022	N/A	Conduction (CO05-HY)
Pulse Limiter	SCHWARZBECK	VTSD 9561-F N	00691	N/A	Aug. 01, 2022	Oct. 05, 2022	Jul. 31, 2023	Conduction (CO05-HY)
LISN Cable	MVE	RG-400	260260	N/A	Dec. 30, 2021	Oct. 05, 2022	Dec. 29, 2022	Conduction (CO05-HY)
Amplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 28, 2022	Oct. 03, 2022	Apr. 27, 2023	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL 6111C & N-6-06	2725 & AT-N0601	30MHz~1GHz	Nov. 11, 2021	Oct. 03, 2022	Nov. 10, 2022	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Feb. 09, 2022	Oct. 03, 2022	Feb. 08, 2023	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-02037	1GHz~18GHz	Dec. 20, 2021	Oct. 03, 2022	Dec. 19, 2022	Radiation (03CH06-HY)
Preamplifier	Jet-Power	JPA00101800-30-10P	1601180001	1GHz~18GHz	Jul. 18, 2022	Oct. 03, 2022	Jul. 17, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_7000mm	532299/2	30MHz to 40GHz	Jul. 04, 2022	Oct. 03, 2022	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_3000mm	532422/2	30MHz to 40GHz	Jul. 04, 2022	Oct. 03, 2022	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF102_2000mm	532421/2	30MHz to 40GHz	Jul. 04, 2022	Oct. 03, 2022	Jul. 03, 2023	Radiation (03CH06-HY)
RF Cable	HUBER + SUHNER	SF104	802433/4	30Mhz to 18Ghz	Aug. 18, 2022	Oct. 03, 2022	Aug. 17, 2023	Radiation (03CH06-HY)
Controller	INN-CO	EM1000	060782	Control Turn table & Ant Mast	N/A	Oct. 03, 2022	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Oct. 03, 2022	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Oct. 03, 2022	N/A	Radiation (03CH06-HY)
Software	Audix	E3 6.2009-8-24(k5)	N/A	N/A	N/A	Oct. 03, 2022	N/A	Radiation (03CH06-HY)

5. Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.5 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.2 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.6 dB**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.5 dB**

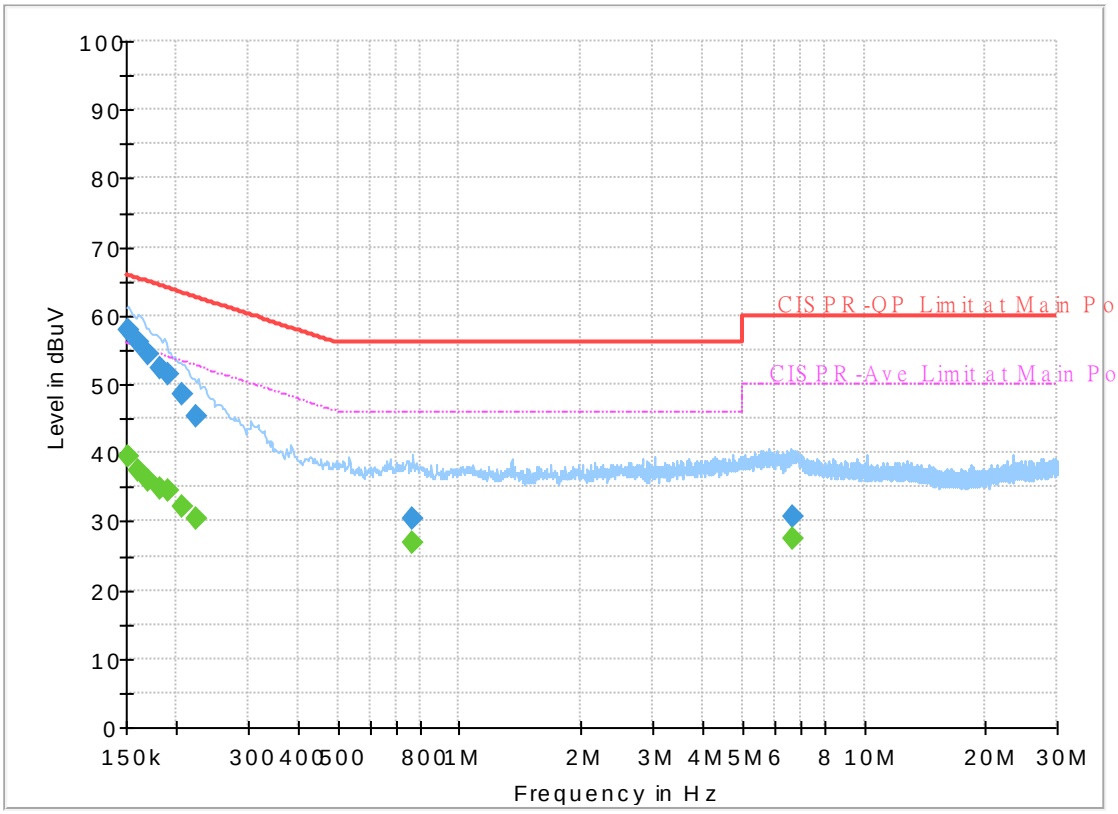
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Calvin Wang	**Temperature :**	23~26℃
		Relative Humidity :	45~55%

EUT Information

Report NO :	262909-02
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Line

Full Spectrum



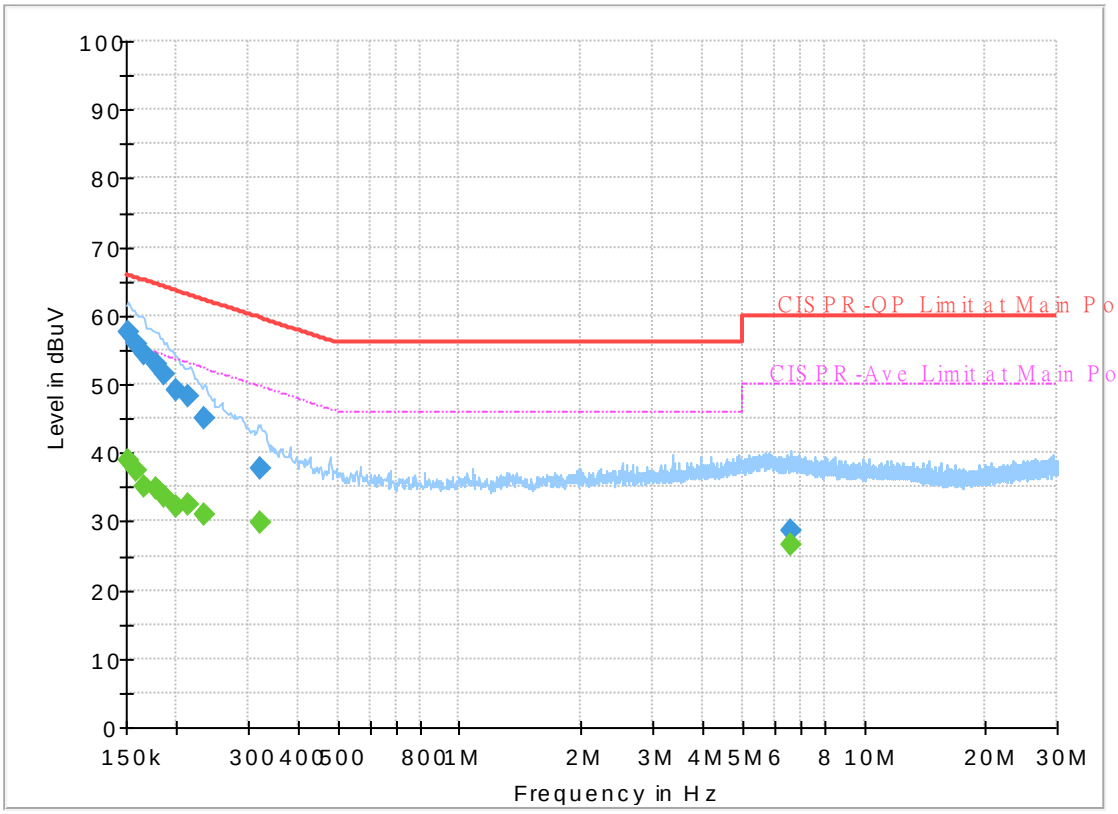
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	39.50	55.88	16.38	L1	OFF	19.8
0.152250	57.76	---	65.88	8.12	L1	OFF	19.8
0.161250	---	37.49	55.40	17.91	L1	OFF	19.8
0.161250	56.17	---	65.40	9.23	L1	OFF	19.8
0.170250	---	36.10	54.95	18.85	L1	OFF	19.8
0.170250	54.38	---	64.95	10.57	L1	OFF	19.8
0.181500	---	34.74	54.42	19.68	L1	OFF	19.8
0.181500	52.29	---	64.42	12.13	L1	OFF	19.8
0.190500	---	34.46	54.02	19.56	L1	OFF	19.8
0.190500	51.60	---	64.02	12.42	L1	OFF	19.8
0.206250	---	32.23	53.36	21.13	L1	OFF	19.8
0.206250	48.48	---	63.36	14.88	L1	OFF	19.8
0.224250	---	30.38	52.66	22.28	L1	OFF	19.8
0.224250	45.43	---	62.66	17.23	L1	OFF	19.8
0.766500	---	26.81	46.00	19.19	L1	OFF	19.8
0.766500	30.44	---	56.00	25.56	L1	OFF	19.8
6.666000	---	27.43	50.00	22.57	L1	OFF	20.1
6.666000	30.61	---	60.00	29.39	L1	OFF	20.1

EUT Information

Report NO :	262909-02
Test Mode :	Mode 1
Test Voltage :	120Vac/60Hz
Phase :	Neutral

Full Spectrum



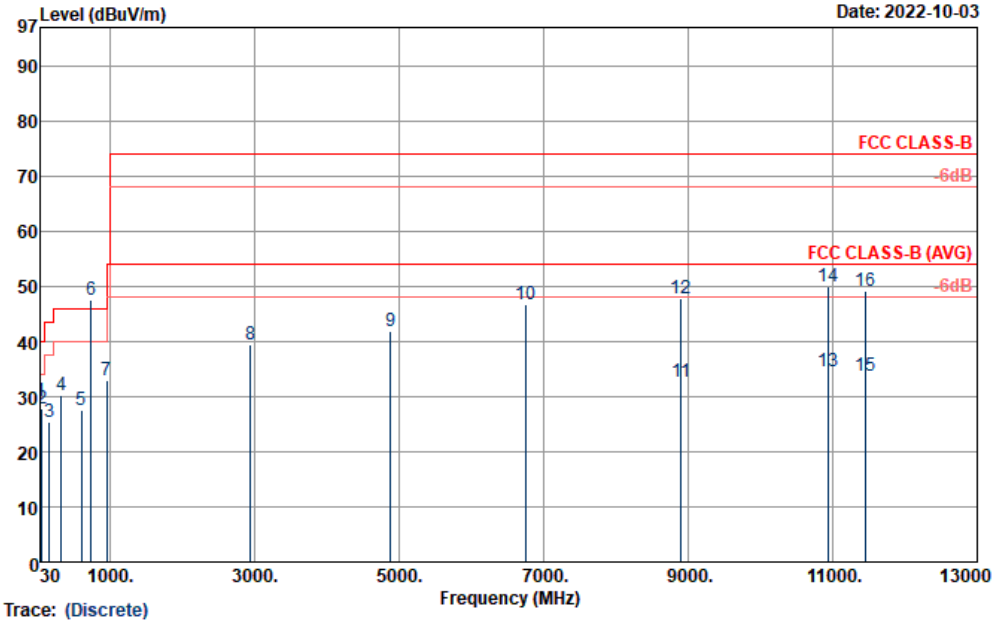
Final_Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	38.84	55.88	17.04	N	OFF	19.8
0.152250	57.54	---	65.88	8.34	N	OFF	19.8
0.159000	---	37.41	55.52	18.11	N	OFF	19.8
0.159000	55.91	---	65.52	9.61	N	OFF	19.8
0.165750	---	35.04	55.17	20.13	N	OFF	19.8
0.165750	54.41	---	65.17	10.76	N	OFF	19.8
0.177000	---	34.82	54.63	19.81	N	OFF	19.8
0.177000	52.92	---	64.63	11.71	N	OFF	19.8
0.186000	---	33.61	54.21	20.60	N	OFF	19.8
0.186000	51.36	---	64.21	12.85	N	OFF	19.8
0.199500	---	32.18	53.63	21.45	N	OFF	19.8
0.199500	49.26	---	63.63	14.37	N	OFF	19.8
0.213000	---	32.50	53.09	20.59	N	OFF	19.8
0.213000	48.24	---	63.09	14.85	N	OFF	19.8
0.233250	---	30.87	52.33	21.46	N	OFF	19.8
0.233250	44.95	---	62.33	17.38	N	OFF	19.8
0.321000	---	29.83	49.68	19.85	N	OFF	19.8
0.321000	37.69	---	59.68	21.99	N	OFF	19.8
6.596250	---	26.50	50.00	23.50	N	OFF	20.1
6.596250	28.62	---	60.00	31.38	N	OFF	20.1

Appendix B. Radiated Emission Test Result

Test Engineer :	You Xian Chen	**Temperature :**	24~26°C
		Relative Humidity :	43~50%
Test Distance :	3m	**Polarization :**	Horizontal
Remark :	#6 is system simulator signal which can be ignored.		

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

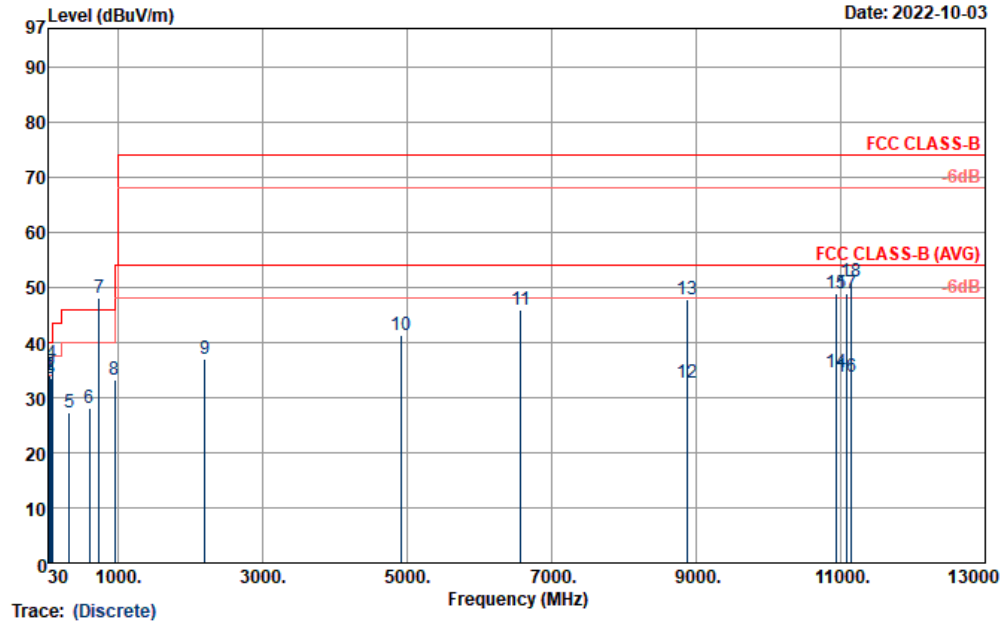


Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_02037 HORIZONTAL
Project : 262909-02
Power : 120Vac/60Hz
Memo : Mode 2

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg	
1		35.67	29.23	-10.77	40.00	38.30	-9.07	---	---	Peak
2		52.95	27.94	-12.06	40.00	45.50	-17.56	250	224	QP
3		159.87	25.46	-18.04	43.50	38.69	-13.23	---	---	Peak
4		322.40	30.20	-15.80	46.00	39.33	-9.13	---	---	Peak
5		602.40	27.43	-18.57	46.00	29.17	-1.74	---	---	Peak
6	*	737.50	47.60			46.83	0.77	---	---	Peak
7		948.90	33.07	-12.93	46.00	27.91	5.16	---	---	Peak
8		2946.00	39.41	-34.59	74.00	63.85	-24.44	---	---	Peak
9		4878.00	41.85	-32.15	74.00	59.82	-17.97	---	---	Peak
10		6758.00	46.66	-27.34	74.00	60.48	-13.82	---	---	Peak
11		8902.00	32.67	-21.33	54.00	43.51	-10.84	---	---	Average
12		8902.00	47.94	-26.06	74.00	58.78	-10.84	---	---	Peak
13		10938.00	34.52	-19.48	54.00	41.50	-6.98	100	105	Average
14		10938.00	49.91	-24.09	74.00	56.89	-6.98	100	105	Peak
15		11456.00	33.87	-20.13	54.00	40.31	-6.44	100	311	Average
16		11456.00	49.16	-24.84	74.00	55.60	-6.44	100	311	Peak

Test Engineer :	You Xian Chen	**Temperature :**	24~26°C
		Relative Humidity :	43~50%
Test Distance :	3m	**Polarization :**	Vertical
Remark :	#7 is system simulator signal which can be ignored.		

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



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_02037 VERTICAL
Project : 262909-02
Power : 120Vac/60Hz
Memo : Mode 2

		Freq	Level	Over Limit	Limit Line	Read Level	Factor	A/Pos	T/Pos	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	cm	deg	
1	!	42.42	34.03	-5.97	40.00	46.50	-12.47	100	300	QP
2	!	53.76	34.11	-5.89	40.00	51.90	-17.79	100	170	QP
3		62.40	33.39	-6.61	40.00	52.00	-18.61	100	330	QP
4		91.02	36.30	-7.20	43.50	51.50	-15.20	100	310	QP
5		319.60	27.35	-18.65	46.00	36.58	-9.23	---	---	Peak
6		601.70	28.05	-17.95	46.00	29.81	-1.76	---	---	Peak
7	*	737.50	48.06			47.29	0.77	---	---	Peak
8		956.60	33.30	-12.70	46.00	27.95	5.35	---	---	Peak
9		2196.00	36.97	-37.03	74.00	64.95	-27.98	---	---	Peak
10		4924.00	41.25	-32.75	74.00	59.15	-17.90	---	---	Peak
11		6572.00	45.95	-28.05	74.00	59.72	-13.77	---	---	Peak
12		8876.00	32.79	-21.21	54.00	43.69	-10.90	---	---	Average
13		8876.00	47.86	-26.14	74.00	58.76	-10.90	---	---	Peak
14		10938.00	34.52	-19.48	54.00	41.50	-6.98	100	58	Average
15		10938.00	49.01	-24.99	74.00	55.99	-6.98	100	58	Peak
16		11082.00	33.78	-20.22	54.00	40.70	-6.92	100	303	Average
17		11082.00	48.82	-25.18	74.00	55.74	-6.92	100	303	Peak
18		11148.00	51.07	-22.93	74.00	57.90	-6.83	---	---	Peak

THE END