



FCC EMI TEST REPORT

FCC ID : 2AIP8-SR00300W
Equipment : Smartphone
Brand Name : SIRIN LABS
Model Name : SR00300-W
Applicant : SIRIN LABS AG
Freier Platz 10, 8200 Schaffhausen, Switzerland
Manufacturer : SIRIN LABS AG
Freier Platz 10, 8200 Schaffhausen, Switzerland
Standard : FCC 47 CFR FCC Part 15 Subpart B

The product was received on Oct. 05, 2018 and testing was started from Oct. 26, 2018 and completed on Nov. 03, 2018. We, SPORTON INTERNATIONAL INC., 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Joseph Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1. General Description	5
1.1. Product Feature of Equipment Under Test	5
1.2. Modification of EUT	5
1.3. Test Location.....	5
1.4. Applicable Standards	6
2. Test Configuration of Equipment Under Test	7
2.1. Test Mode	7
2.2. Connection Diagram of Test System	8
2.3. Support Unit used in test configuration and system.....	8
2.4. EUT Operation Test Setup	9
3. Test Result	10
3.1. Test of AC Conducted Emission Measurement	10
3.2. Test of Radiated Emission Measurement	12
4. List of Measuring Equipment.....	15
5. Uncertainty of Evaluation.....	16

Appendix A. AC Conducted Emission Test Result

Appendix B. Radiated Emission Test Result

Appendix C. Setup Photographs



History of this test report



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.107	AC Conducted Emission	Pass	Under limit 10.69 dB at 0.152 MHz
3.2	15.109	Radiated Emission	Pass	Under limit 2.92 dB at 86.550 MHz for Quasi-Peak

Reviewed by: Louis Wu

Report Producer: Yimin Ho



1. General Description

1.1. Product Feature of Equipment Under Test

GSM/CDMA/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, Wi-Fi 5GHz 802.11a/n/ac, NFC, and GNSS

Product Specification subjective to this standard	
Antenna Type	WWAN: PIFA Antenna WLAN: <Ant. 1>: PIFA Antenna <Ant. 2>: PIFA Antenna Bluetooth: PIFA Antenna GPS / Glonass / BDS / Galileo: PIFA Antenna NFC: Loop Antenna

1.2. Modification of EUT

No modifications are made to the EUT during all test items.

1.3. Test Location

Sportun Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1093 and TW1095 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No.52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sportun Site No.	
	CO05-HY	03CH06-HY

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 30-2, Dingfu Tsuen, Linkou District, New Taipei City, Taiwan 244, R.O.C. TEL: +886-2-2603-5367 / +886-2-2601-1640 FAX: +886-2-2601-1695	
Test Site No.	Sportun Site No.	
	OS03-LK	



1.4. Applicable Standards

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

- ◆ FCC 47 CFR FCC Part 15 Subpart 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

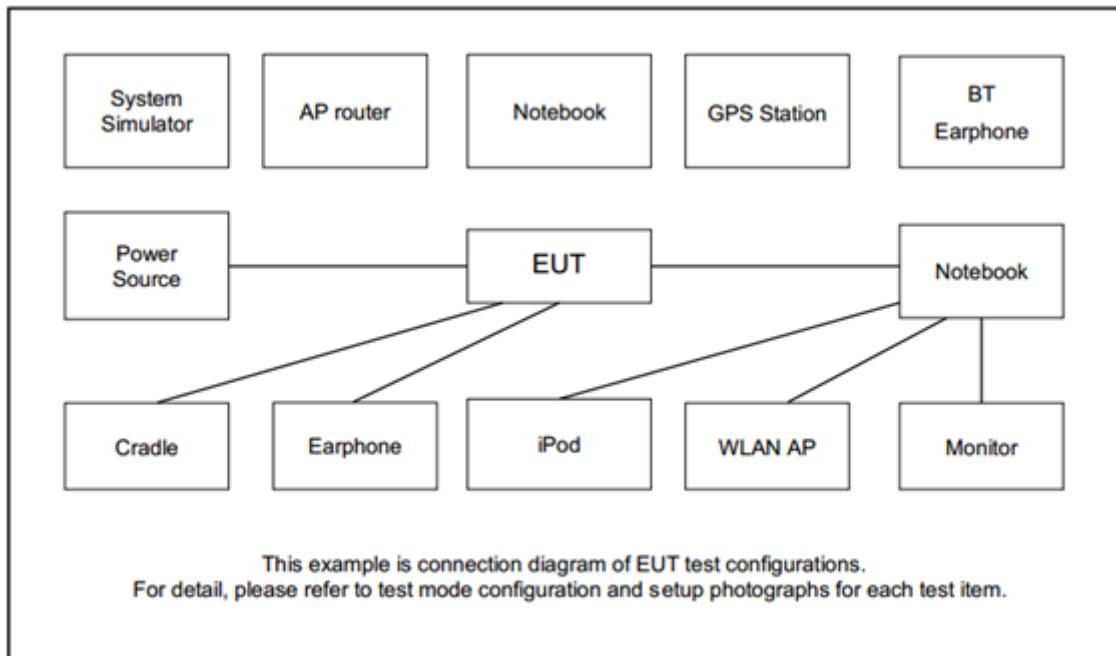
2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

Test Items	Function Type
AC Conducted Emission	Mode 1 : GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + USB Type C Cable (Charging form Adapter) Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Camera (Front) + USB Type C Cable (Charging form Adapter) Mode 3: WCDMA Band II Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + Camera (Rear) + USB Type C Cable (Charging form Adapter) Mode 4: WCDMA Band V Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + MPEG4 + USB Type C Cable (Charging form Adapter) Mode 5: LTE Band 4 Idle + Bluetooth Idle + WLAN (5GHz) Idle + NFC On + USB Type C Cable (Charging form Adapter) Mode 6: LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + MPEG4 + USB Type C Cable (Data Link with Notebook)
Radiated Emissions	Mode 1 : GSM850 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + GPS Rx + Earphone + Audio Cable Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN (5GHz) Idle + Camera (Front) + USB Type C Cable (Charging form Adapter) Mode 3: WCDMA Band II Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + Camera (Rear) + USB Type C Cable (Charging form Adapter) Mode 4: WCDMA Band V Idle + Bluetooth Idle + WLAN (5GHz) Idle + MPEG4 + USB Type C Cable (Charging form Adapter) Mode 5: LTE Band 4 Idle + Bluetooth Idle + WLAN (2.4GHz) Idle + NFC On + USB Type C Cable (Charging form Adapter) Mode 6: LTE Band 17 Idle + Bluetooth Idle + WLAN (5GHz) Idle + MPEG4 + USB Type C Cable (Data Link with Notebook)
Remark:	
1. The worst case of AC is mode 4; only the test data of this mode was reported. 2. The worst case of RE is mode 3; only the test data of this mode was reported. 3. Data Linking with Notebook means data application transferred mode between EUT and Notebook.	

2.2. Connection Diagram of Test System



2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	System Simulator	Anritsu	MT8820C	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
3.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
4.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded, 1.8 m
5.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
6.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
7.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
8.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
9.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
10.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
11.	Notebook	DELL	Latitude E5480	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m



2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA or LTE idle mode during the testing. The EUT was synchronized with the BCCH, and had been continuous receiving mode by setting paging reorganization of the system simulator.

At the same time, the EUT was attached to the Bluetooth earphone or WLAN AP, and the following programs installed in the EUT were programmed during the test:

1. Data application is transferred between Laptop and EUT via USB cable.
2. Execute "GPS Test" to make the EUT receive continuous signals from GPS station.
3. Execute "Video player" to play MPEG4 files.
4. Turn on camera to capture images.
5. Turn on the NFC function.



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.

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.

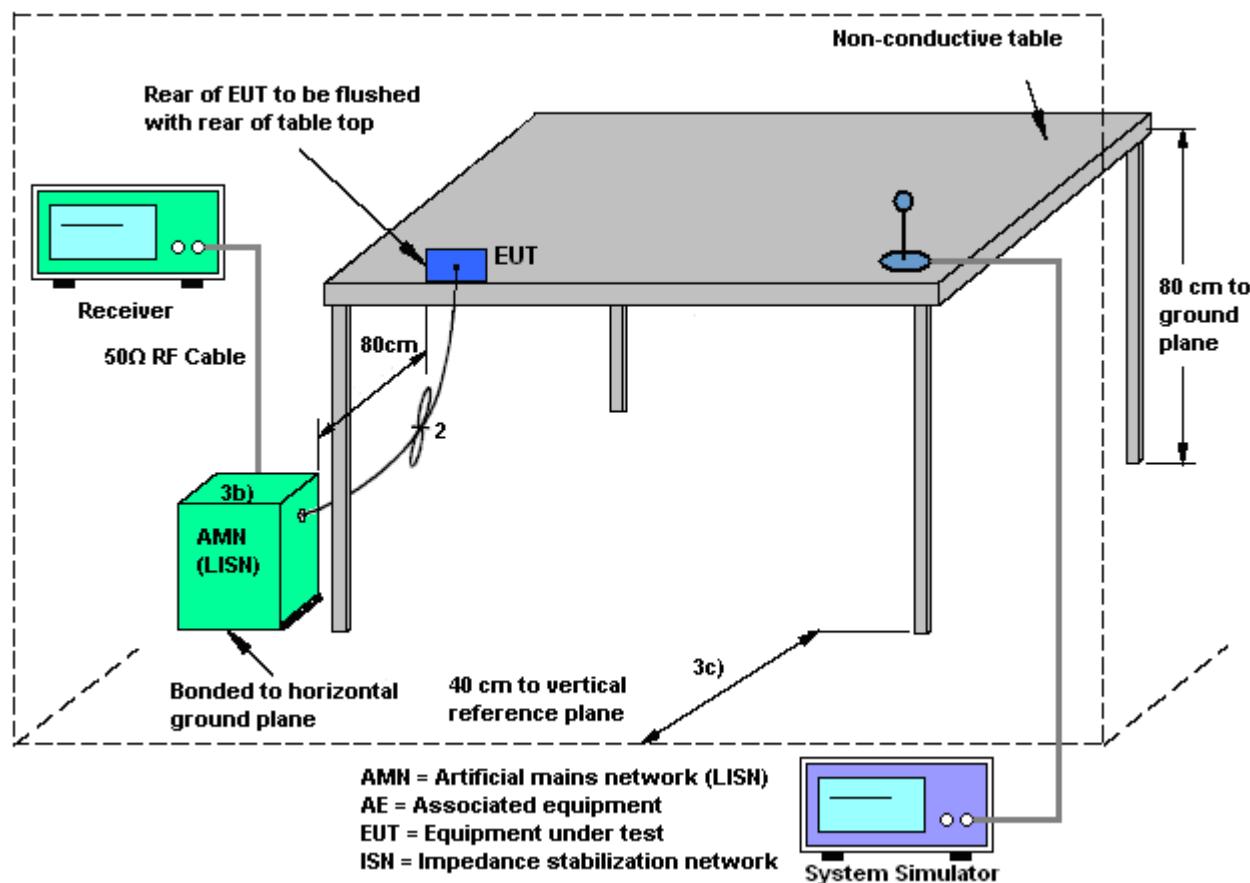
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was 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 should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) 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:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
Above 960	500	3

Frequency (MHz)	Field Strength (dBuV/meter)	Measurement Distance (meters)
30 – 230	30	10
230 – 1000	37	10

Note: Measurement follows the CISPR 22 limit line as below :

15.109 (g) As an alternative to the radiated emission limits shown in paragraphs (a) and (b) of this section, digital devices may be shown to comply with the standards contained in Third Edition of the International Special Committee on Radio Interference (CISPR), Pub. 22, "Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement"

3.2.2. Measuring Instruments

Refer a test equipment and calibration data table in this test report.

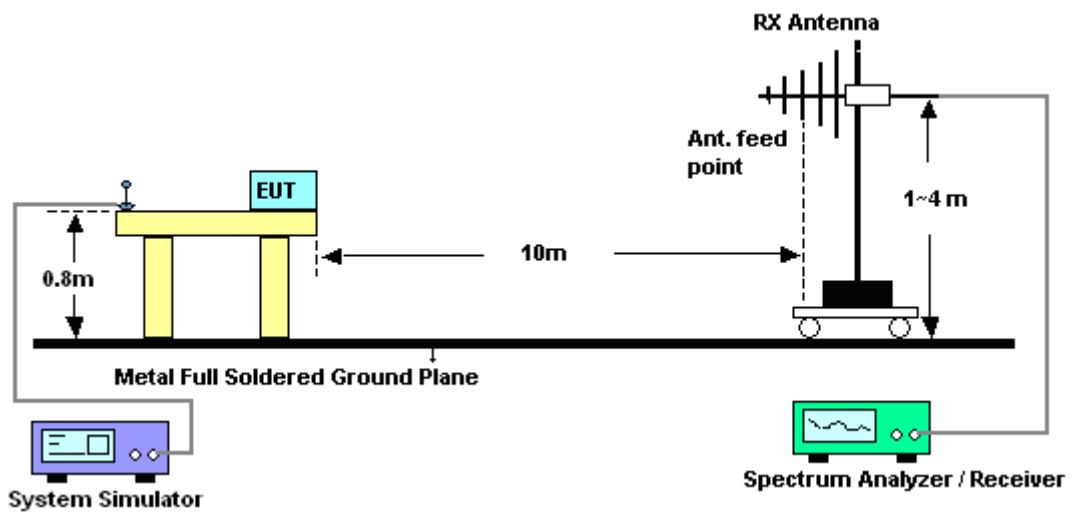


3.2.3. Test Procedures

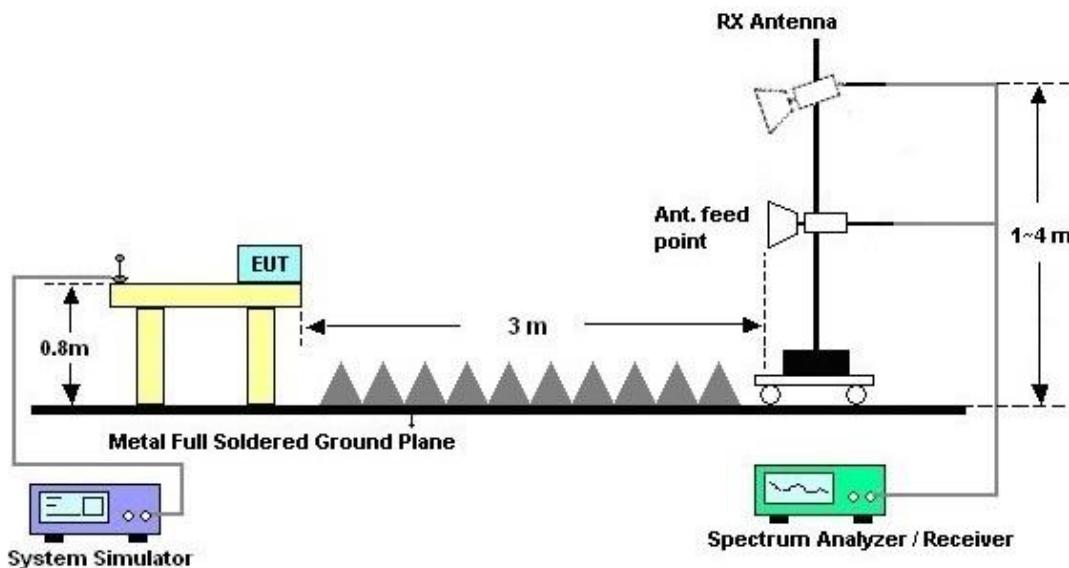
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 10 meters (30M~1G) and 3 meters (1G~ 13G) from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the 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 was 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=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 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.
8. Emission level (dB μ V/m) = 20 log Emission level (μ V/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Please refer to Appendix B.



4. List of Measuring Equipment

Instrument	Manufacturer	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. 26, 2018 ~ Oct. 29, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	9KHz~3.6GHz	Dec. 08, 2017	Oct. 26, 2018 ~ Oct. 29, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Oct. 26, 2018 ~ Oct. 29, 2018	Nov. 29, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Oct. 26, 2018 ~ Oct. 29, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Oct. 26, 2018 ~ Oct. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Oct. 26, 2018 ~ Oct. 29, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Amplifier	HP	8447D	2944A090 68	0.1MHz ~ 1.3GHz	Dec. 12, 2017	Oct. 26, 2018	Dec. 11, 2018	Radiation (OS03-LK)
Spectrum Analyzer	R&S	FSP 7	100639	9 kHz ~ 7 GHz	Nov. 22, 2017	Oct. 26, 2018	Nov. 21, 2018	Radiation (OS03-LK)
Test Receiver	R&S	ESCS 30	100168	9 kHz ~ 2.75 GHz	Dec. 15, 2017	Oct. 26, 2018	Dec. 14, 2018	Radiation (OS03-LK)
Bilog Antenna with 5dB Attenuator	TESEQ & WOKEN	CBL6112D & 00800N1D01 N-05	25236 & 007	30 MHz ~ 1 GHz	Jul. 07, 2018	Oct. 26, 2018	Jul. 06, 2019	Radiation (OS03-LK)
Turn Table	EMCO	2080	9711-2021	0 ~ 360 degree	NCR	Oct. 26, 2018	NCR	Radiation (OS03-LK)
Antenna Mast	EMCO	2075	9711-2115	1 m ~ 4 m	NCR	Oct. 26, 2018	NCR	Radiation (OS03-LK)
RF Cable-R10m	MVE	CFD400E-LW	OS03-250 0	30 MHz ~ 1 GHz	May 18, 2018	Oct. 26, 2018	May 17, 2019	Radiation (OS03-LK)
Software	Audix	E3	Version:4	-	NCR	Oct. 26, 2018	NCR	Radiation (OS03-LK)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Jan. 04, 2018	Nov. 03, 2018	Jan. 03, 2019	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-115 6	1GHz~18GHz	Aug. 24, 2018	Nov. 03, 2018	Aug. 23, 2019	Radiation (03CH06-HY)
Preamplifier	MITEQ	AMF-7D-0010 1800-30-10P	1850117	1GHz ~ 18GHz	May 24, 2018	Nov. 03, 2018	May 23, 2019	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208 212	1m~4m	N/A	Nov. 03, 2018	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Nov. 03, 2018	N/A	Radiation (03CH06-HY)
Test Software	AUDIX	e3	6.2009-8-2 4(k5)	N/A	N/A	Nov. 03, 2018	N/A	Radiation (03CH06-HY)
RF Cable	Infineet/Sunhner	LL142/SF104	CA3601-3 601-HLL	1GHz-26GHz	Nov. 24, 2017	Nov. 03, 2018	Nov. 23, 2018	Radiation (03CH06-HY)
Filter	Microwave	H1G013G1	SN477215	1.0G High Pass	Dec. 07, 2017	Nov. 03, 2018	Dec. 06, 2018	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% ($U = 2U_{C(y)}$)	2.2
---	-----

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	4.2
---	-----

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_{C(y)}$)	4.7
---	-----



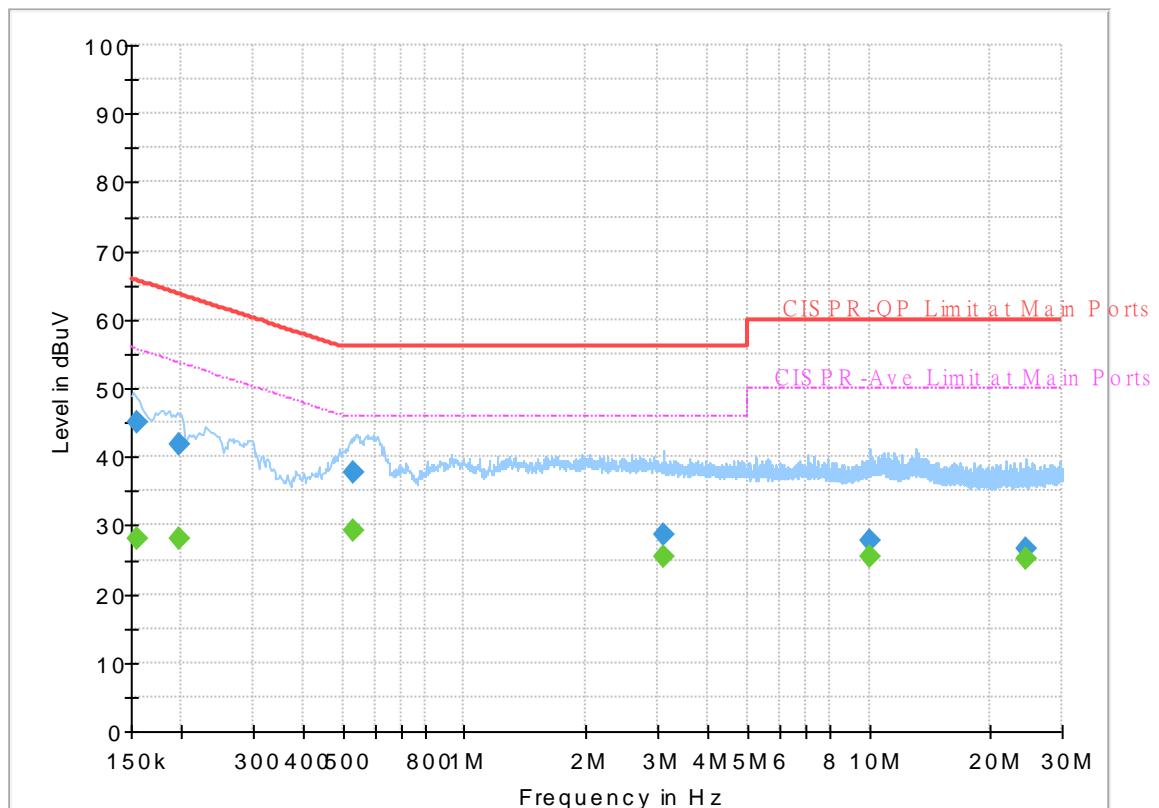
Appendix A. AC Conducted Emission Test Results

Test Engineer :	Rick Lin and Jimmy Chang	Temperature :	24~26°C
		Relative Humidity :	51~53%

EUT Information

Report NO : 800518
 Test Mode : Mode 4
 Test Voltage : 120Vac/60Hz
 Phase : Line

Full Spectrum



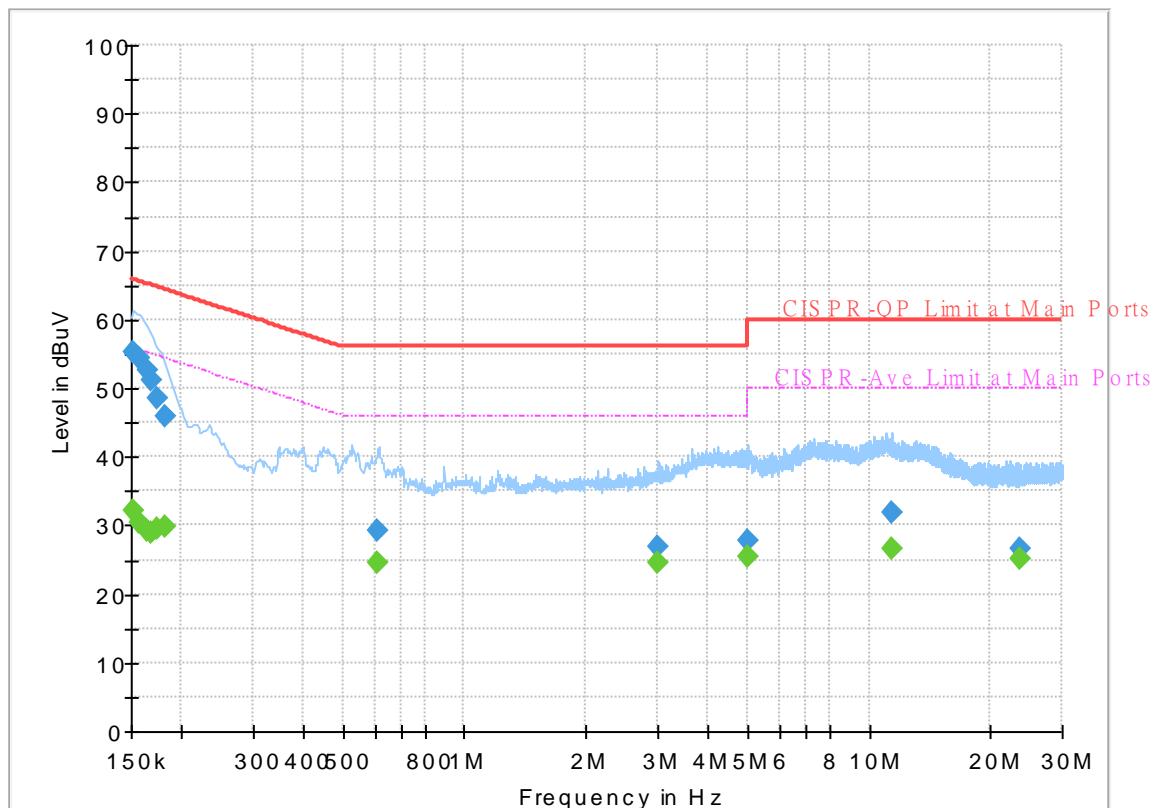
Final Result

Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.154500	---	28.01	55.75	27.74	L1	OFF	19.5
0.154500	44.94	---	65.75	20.81	L1	OFF	19.5
0.197250	---	28.21	53.73	25.52	L1	OFF	19.5
0.197250	41.94	---	63.73	21.79	L1	OFF	19.5
0.530250	---	29.11	46.00	16.89	L1	OFF	19.5
0.530250	37.62	---	56.00	18.38	L1	OFF	19.5
3.097500	---	25.54	46.00	20.46	L1	OFF	19.6
3.097500	28.54	---	56.00	27.46	L1	OFF	19.6
10.097250	---	25.58	50.00	24.42	L1	OFF	19.9
10.097250	27.83	---	60.00	32.17	L1	OFF	19.9
24.402750	---	25.20	50.00	24.80	L1	OFF	20.4
24.402750	26.59	---	60.00	33.41	L1	OFF	20.4

EUT Information

Report NO : 800518
 Test Mode : Mode 4
 Test Voltage : 120Vac/60Hz
 Phase : Neutral

Full Spectrum



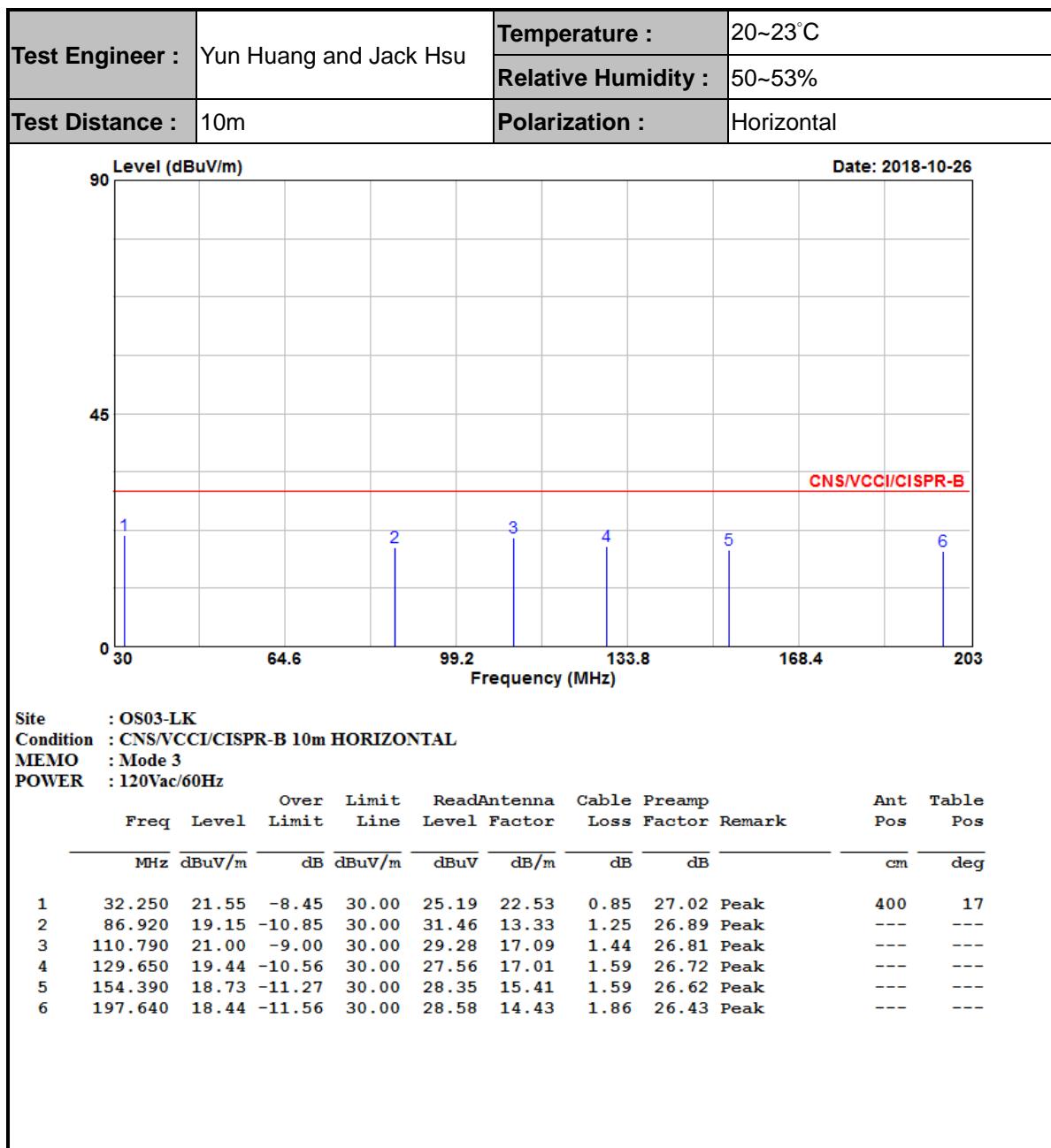
Final Result

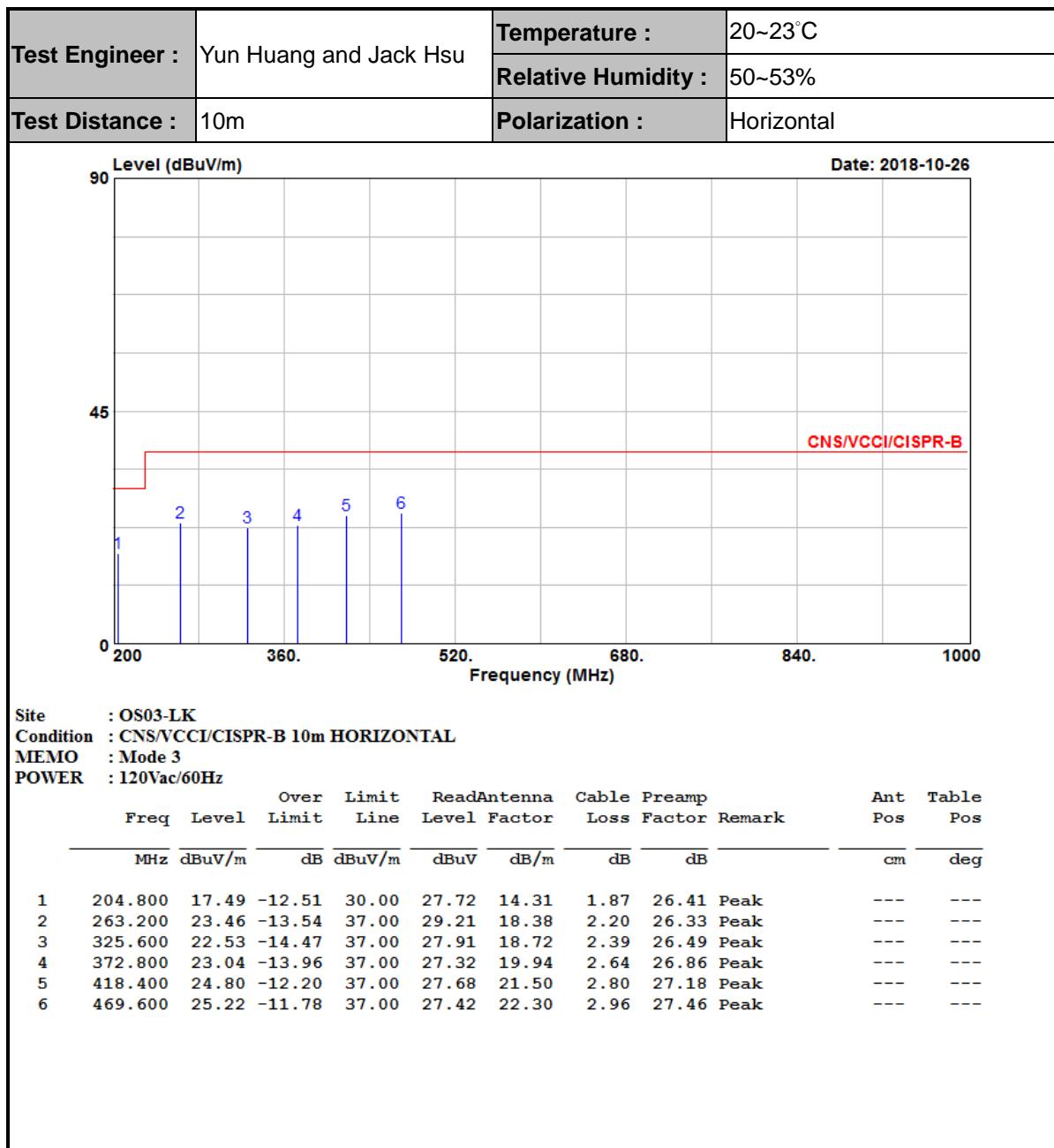
Frequency (MHz)	QuasiPeak (dBuV)	CAverage (dBuV)	Limit (dBuV)	Margin (dB)	Line	Filter	Corr. (dB)
0.152250	---	32.03	55.88	23.85	N	OFF	19.5
0.152250	55.19	---	65.88	10.69	N	OFF	19.5
0.156750	---	30.37	55.63	25.26	N	OFF	19.5
0.156750	54.47	---	65.63	11.16	N	OFF	19.5
0.163500	---	29.38	55.28	25.90	N	OFF	19.5
0.163500	52.52	---	65.28	12.76	N	OFF	19.5
0.168000	---	29.05	55.06	26.01	N	OFF	19.5
0.168000	51.08	---	65.06	13.98	N	OFF	19.5
0.174750	---	29.58	54.73	25.15	N	OFF	19.5
0.174750	48.66	---	64.73	16.07	N	OFF	19.5
0.181500	---	29.95	54.42	24.47	N	OFF	19.5
0.181500	45.86	---	64.42	18.56	N	OFF	19.5
0.611250	---	24.48	46.00	21.52	N	OFF	19.6
0.611250	29.17	---	56.00	26.83	N	OFF	19.6
3.018750	---	24.59	46.00	21.41	N	OFF	19.6
3.018750	26.93	---	56.00	29.07	N	OFF	19.6
4.994250	---	25.58	46.00	20.42	N	OFF	19.7
4.994250	27.75	---	56.00	28.25	N	OFF	19.7
11.341500	---	26.74	50.00	23.26	N	OFF	20.0
11.341500	31.88	---	60.00	28.12	N	OFF	20.0
23.581500	---	25.23	50.00	24.77	N	OFF	20.5

23.581500	26.72	---	60.00	33.28	N	OFF	20.5
-----------	-------	-----	-------	-------	---	-----	------

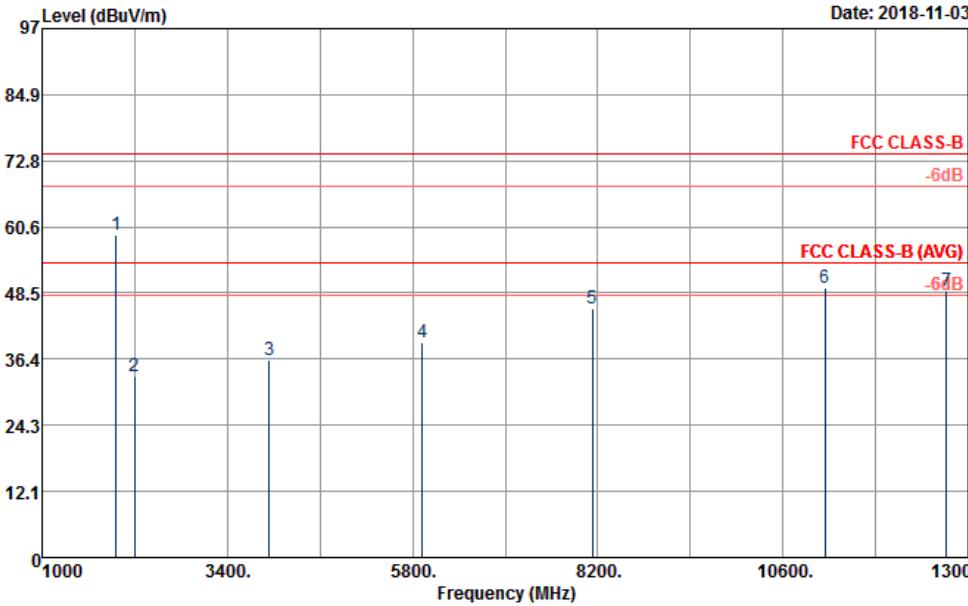


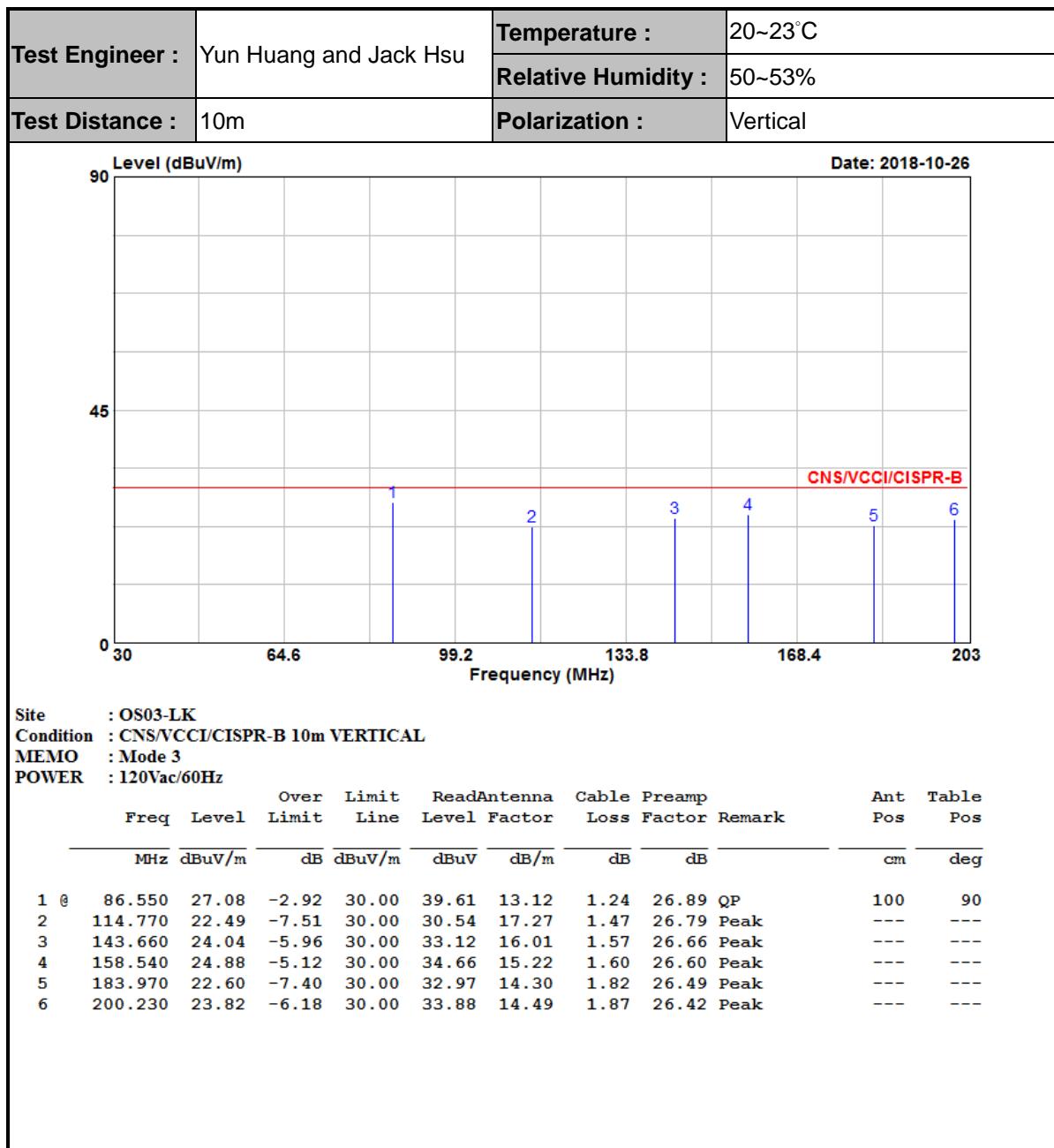
Appendix B. Radiated Emission Test Result

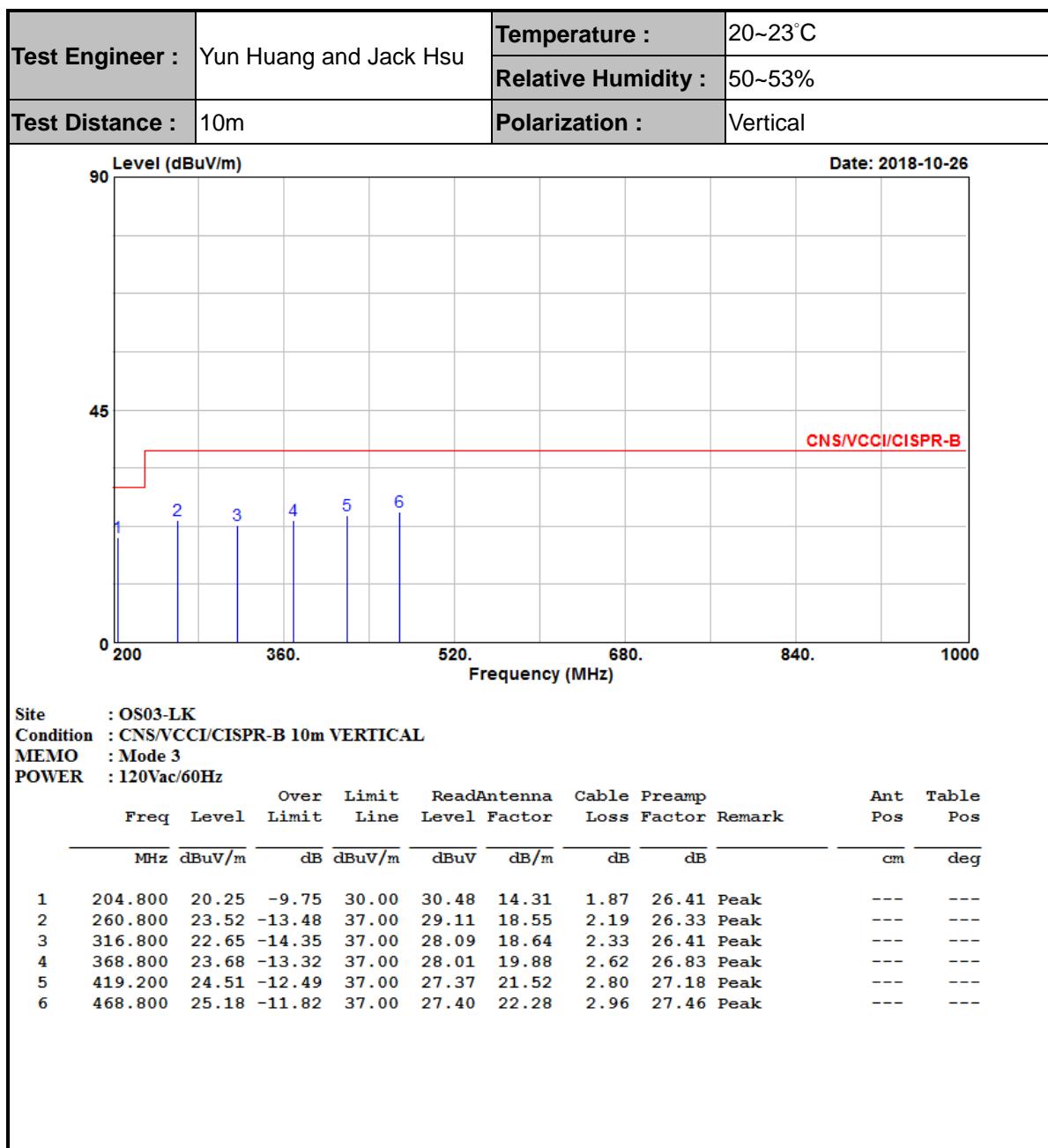






Test Engineer :	Eric Jeng	Temperature :		23~25°C						
		Relative Humidity :		52~54%						
Test Distance :	3m	Polarization :		Horizontal						
Remark :	#1 is system simulator signal which can be ignored.									
										
Site	: 03CH06-HY									
Condition	: FCC CLASS-B 3m 9120D_1156_180824 HORIZONTAL									
Project	: 800518									
Power	: 120Vac/60Hz									
Memo	: Mode 3									
	Freq	Level	Over Limit	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	1960.00	59.29			88.07	26.00	6.32	61.10	---	--- Peak
2	2195.00	33.18	-40.82	74.00	59.40	28.07	6.81	61.10	---	--- Peak
3	3940.00	36.26	-37.74	74.00	58.70	29.70	9.46	61.60	---	--- Peak
4	5930.00	39.51	-34.49	74.00	53.26	32.53	11.80	58.08	---	--- Peak
5	8135.00	45.59	-28.41	74.00	51.98	37.23	14.04	57.66	---	--- Peak
6	11145.00	49.33	-24.67	74.00	48.70	39.95	17.06	56.38	100	23 Peak
7	12720.00	49.01	-24.99	74.00	49.96	38.77	18.90	58.62	---	--- Peak







Test Engineer :	Eric Jeng	Temperature :		23~25°C						
		Relative Humidity :		52~54%						
Test Distance :	3m	Polarization :		Vertical						
Remark :	#1 is system simulator signal which can be ignored.									
Site	: 03CH06-HY									
Condition	: FCC CLASS-B 3m 9120D_1156_180824 VERTICAL									
Project	: 800518									
Power	: 120Vac/60Hz									
Memo	: Mode 3									
	Freq	Level	Over Limit	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg
1	1960.00	62.77			91.55	26.00	6.32	61.10	---	--- Peak
2	2680.00	35.78	-38.22	74.00	61.61	27.87	7.51	61.21	---	--- Peak
3	4000.00	38.79	-35.21	74.00	61.35	29.50	9.54	61.60	---	--- Peak
4	5715.00	40.32	-33.68	74.00	54.46	31.83	11.73	57.70	---	--- Peak
5	8093.00	45.43	-28.57	74.00	51.79	37.33	14.01	57.70	---	--- Peak
6	11033.00	49.14	-24.86	74.00	48.37	40.37	16.87	56.47	100	3 Peak
7	12867.00	48.41	-25.59	74.00	49.00	39.17	19.02	58.78	---	--- Peak