FCC Test Report

APPLICANT	:	**SHARP CORPORATION**
EQUIPMENT	:	**Smart phone**
FCC ID	:	**APYHRO00262**
STANDARD	:	**FCC 47 CFR FCC Part 15 Subpart B**
CLASSIFICATION	:	**Certification**

The product was received on Mar. 24, 2018 and testing was completed on Apr. 04, 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 test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Louis Wu

Reviewed by: Louis Wu / Manager

Jones Tsai

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC832404	Rev. 01	Initial issue of report	Apr. 27, 2018

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 3.00 dB at 0.177 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 5.56 dB at 30.540 MHz for peak

1. General Description

1.1. Applicant

SHARP CORPORATION
2-13-1, HACHIHONMATSU-IIDA, HIGASHI-HIROSHIMA-SHI, HIROSHIMA PREFECTURE 739-0192, Japan

1.2. Manufacturer

SHARP CORPORATION
2-13-1, HACHIHONMATSU-IIDA, HIGASHI-HIROSHIMA-SHI, HIROSHIMA PREFECTURE 739-0192, Japan

1.3. Product Feature of Equipment Under Test

GSM/WCDMA/LTE, Bluetooth, Wi-Fi 2.4GHz 802.11b/g/n, and GNSS.

Product Specification subjective to this standard	
Antenna Type	WWAN: Monopole Antenna WLAN: Monopole Antenna Bluetooth: Monopole Antenna GPS / Glonass : Monopole Antenna

1.4. Modification of EUT

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

1.5. Test Location

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

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	Sporton Site No.	
	CO05-HY	03CH06-HY

1.6. 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

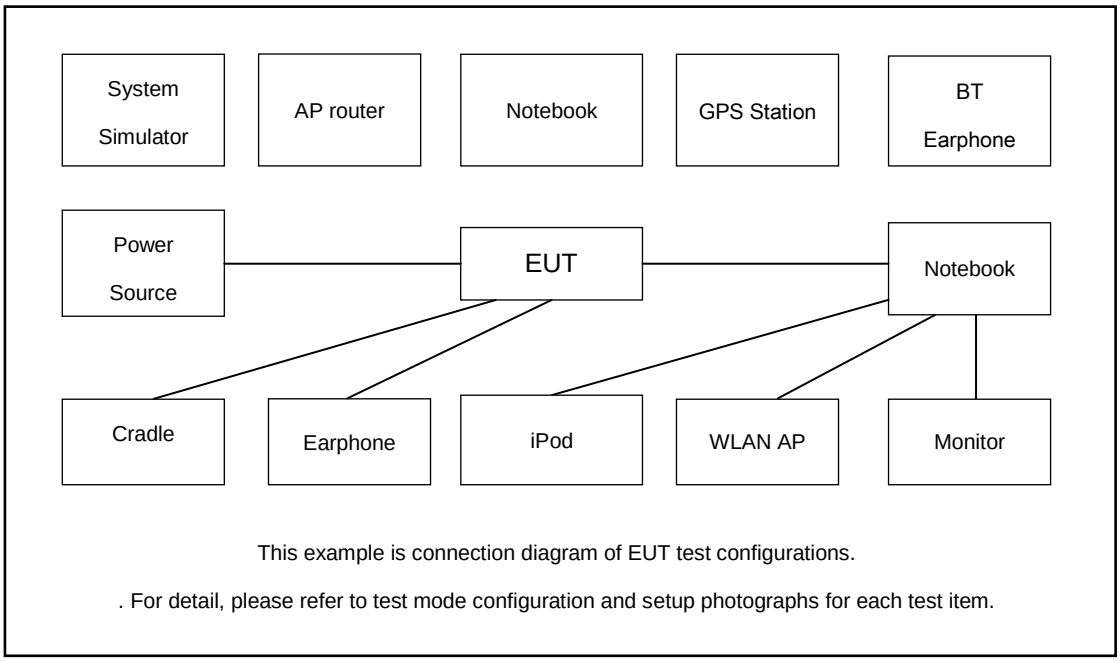
2.1. Test Mode

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: GSM1900 Idle + Bluetooth Idle + WLAN Idle + GPS Rx + Alarm Function + Earphone + USB Cable (Charging from Adapter) Mode 2: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle + Camera (Rear) + Earphone + USB Cable (Charging from Adapter) Mode 3: LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + Camera (Front) + Earphone + USB Cable (Charging from Adapter) Mode 4: LTE Band 4 Idle + Bluetooth Idle + WLAN Idle + Color Bar + Earphone + Charging Base + USB Cable (Charging from Adapter) Mode 5: WCDMA Band IV Idle + Bluetooth Idle + WLAN Idle + DTV + Earphone + USB Cable (Data Link with Notebook)
Radiated Emissions	Mode 1: GSM1900 Idle + Bluetooth Idle + WLAN Idle + GPS Rx + Alarm Function + Earphone + USB Cable (Charging from Adapter) Mode 2: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle + Camera (Rear) + Earphone + USB Cable (Charging from Adapter) Mode 3: LTE Band 2 Idle + Bluetooth Idle + WLAN Idle + Camera (Front) + Earphone + USB Cable (Charging from Adapter) Mode 4: LTE Band 4 Idle + Bluetooth Idle + WLAN Idle + Color Bar + Earphone + Charging Base + USB Cable (Charging from Adapter) Mode 5: WCDMA Band IV Idle + Bluetooth Idle + WLAN Idle + DTV + Earphone + USB Cable (Data Link with Notebook)
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 4; only the test data of this mode was reported. **3.** Data Link with Notebook means data application transferred mode between EUT and Notebook.	

2.2. Connection Diagram of Test System



This example is connection diagram of EUT test configurations.

. For detail, please refer to test mode configuration and setup photographs for each test item.

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.	DTV Station	Dektec	DTU-215	FCC DoC	N/A	N/A
3.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
4.	iPod Earphone	Apple	N/A	Verification	Unshielded, 1.0 m	N/A
5.	WLAN AP	ASUS	RT-AC66U	MSQ-RTAC66U	N/A	Unshielded,1.8m
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
7.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
8.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A
9.	US Adapter	Salcomp	AD-18WU	N/A	N/A	N/A
10.	USB Cable	FIT	CUDU01B-FA 204-DH	N/A	Shielded 1.0m	N/A

2.4. EUT Operation Test Setup

The EUT was in GSM or WCDMA LTE idle mode during the testing. The EUT was synchronized to the BCCH, and is in continuous receiving mode by setting system simulator's paging reorganization.

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. Execute "GPS Test" to make the EUT receive continuous signals from GPS station.
2. Data application is transferred between Laptop and EUT via USB cable.
3. Turn on camera to capture images.
4. Turn on the Color Bar function.
5. Turn on the Alarm function.
6. Turn on the DTV function to play video.

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.

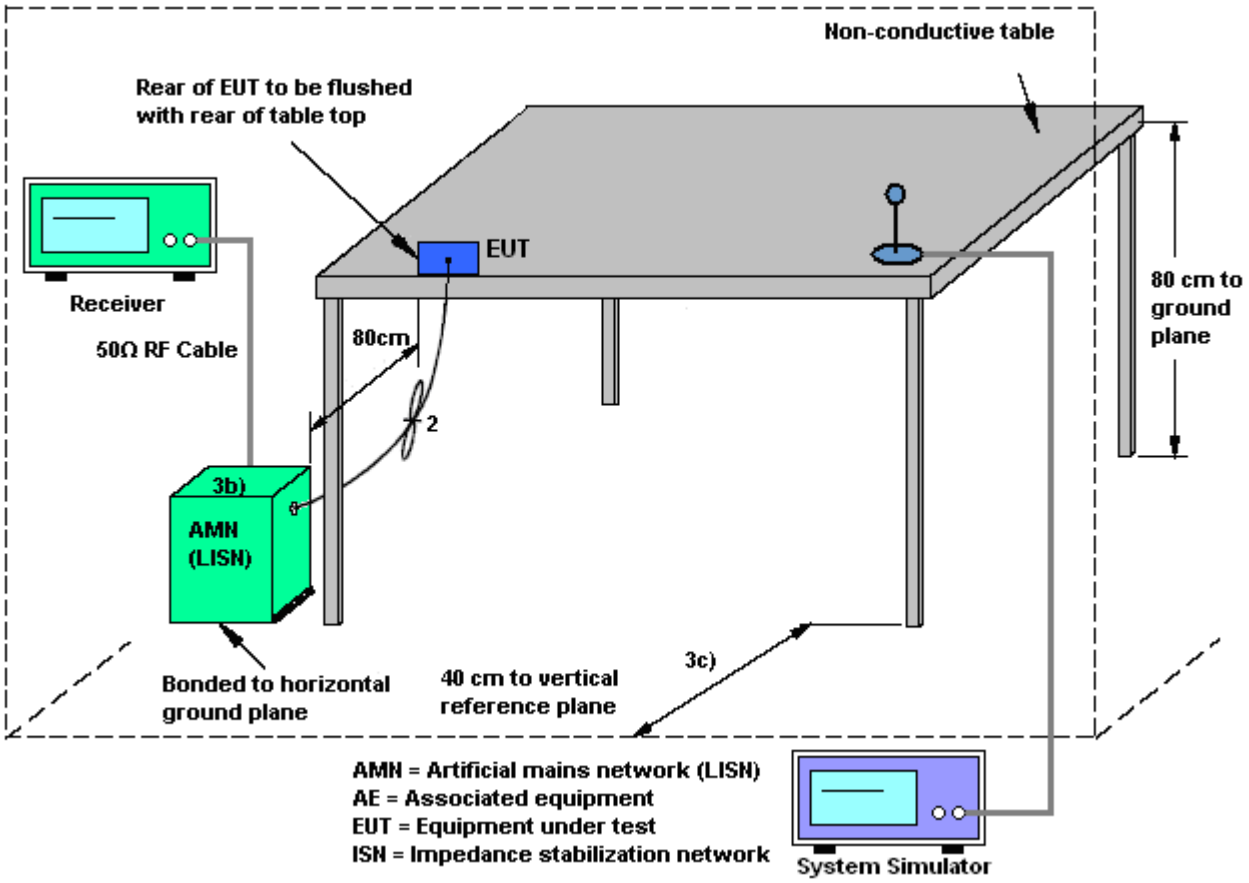
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

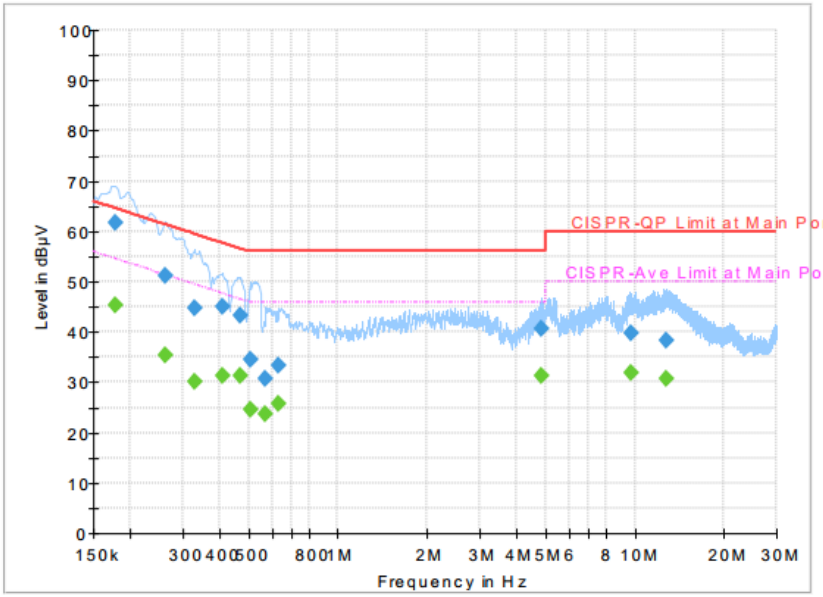
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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

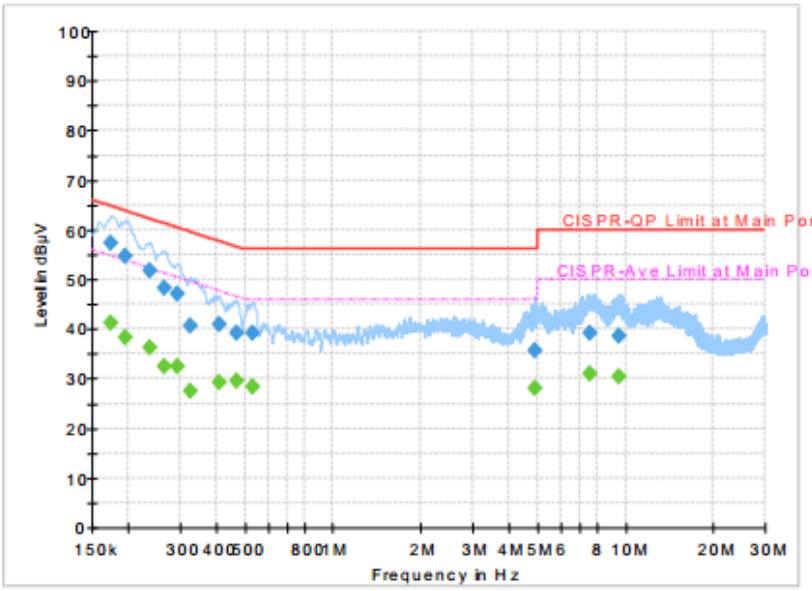
Test Engineer :	Shareef Yu	Temperature :	23~24℃
		Relative Humidity :	56~58%
Test Voltage :	120Vac / 60Hz	Phase :	Line



Final Result :

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.177	61.63	---	64.63	3.00	L1	OFF	19.5
0.177	---	45.27	54.63	9.36	L1	OFF	19.5
0.2625	51.26	---	61.35	10.09	L1	OFF	19.5
0.2625	---	35.34	51.35	16.01	L1	OFF	19.5
0.32775	44.86	---	59.51	14.65	L1	OFF	19.5
0.32775	---	30.2	49.51	19.31	L1	OFF	19.5
0.40875	45.13	---	57.67	12.54	L1	OFF	19.5
0.40875	---	31.28	47.67	16.39	L1	OFF	19.5
0.4695	43.21	---	56.52	13.31	L1	OFF	19.5
0.4695	---	31.35	46.52	15.17	L1	OFF	19.5
0.50775	34.36	---	56	21.64	L1	OFF	19.5
0.50775	---	24.62	46	21.38	L1	OFF	19.5
0.57075	30.58	---	56	25.42	L1	OFF	19.5
0.57075	---	23.67	46	22.33	L1	OFF	19.5
0.63375	33.23	---	56	22.77	L1	OFF	19.5
0.63375	---	25.68	46	20.32	L1	OFF	19.5
4.84125	40.53	---	56	15.47	L1	OFF	19.6
4.84125	---	31.24	46	14.76	L1	OFF	19.6
9.67875	39.77	---	60	20.23	L1	OFF	19.7
9.67875	---	31.83	50	18.17	L1	OFF	19.7
12.768	38.44	---	60	21.56	L1	OFF	19.7
12.768	---	30.72	50	19.28	L1	OFF	19.7

Test Engineer :	Shareef Yu	Temperature :	23~24℃
		Relative Humidity :	56~58%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Final Result :

Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Line	Filter	Corr. (dB)
0.174750	---	41.32	54.73	13.41	N	OFF	19.5
0.174750	57.41	---	64.73	7.32	N	OFF	19.5
0.195000	---	38.34	53.82	15.48	N	OFF	19.5
0.195000	54.60	---	63.82	9.22	N	OFF	19.5
0.237750	---	36.36	52.17	15.81	N	OFF	19.5
0.237750	51.85	---	62.17	10.32	N	OFF	19.5
0.264750	---	32.39	51.28	18.89	N	OFF	19.5
0.264750	48.17	---	61.28	13.11	N	OFF	19.5
0.294000	---	32.53	50.41	17.88	N	OFF	19.5
0.294000	47.09	---	60.41	13.32	N	OFF	19.5
0.325500	---	27.63	49.57	21.94	N	OFF	19.5
0.325500	40.59	---	59.57	18.98	N	OFF	19.5
0.411000	---	29.12	47.63	18.51	N	OFF	19.5
0.411000	40.97	---	57.63	16.66	N	OFF	19.5
0.467250	---	29.60	46.56	16.96	N	OFF	19.5
0.467250	39.26	---	56.56	17.30	N	OFF	19.5
0.532500	---	28.48	46.00	17.52	N	OFF	19.5
0.532500	39.09	---	56.00	16.91	N	OFF	19.5
4.915500	---	28.13	46.00	17.87	N	OFF	19.6
4.915500	35.53	---	56.00	20.47	N	OFF	19.6
7.527750	---	31.12	50.00	18.88	N	OFF	19.7
7.527750	39.17	---	60.00	20.83	N	OFF	19.7
9.447000	---	30.47	50.00	19.53	N	OFF	19.7
9.447000	38.73	---	60.00	21.27	N	OFF	19.7

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)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

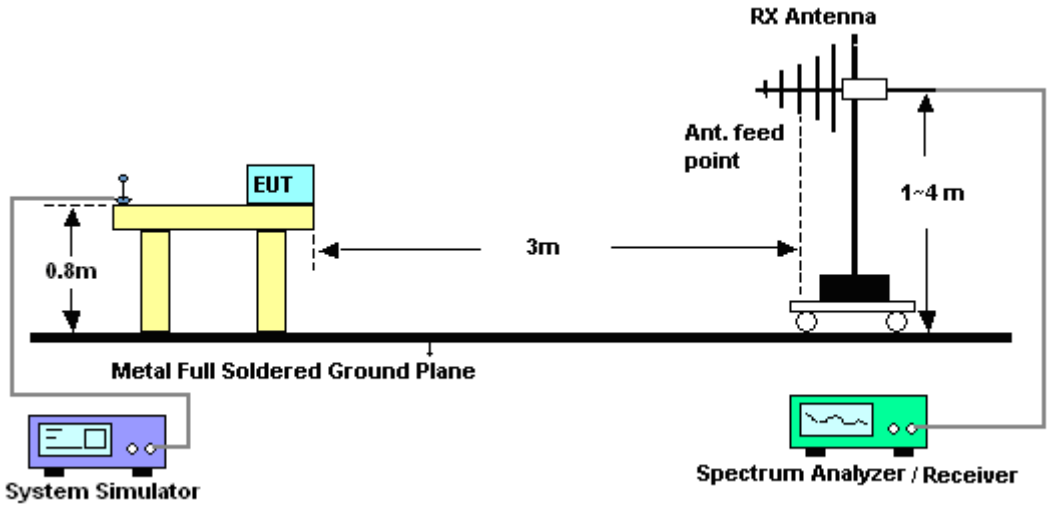
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

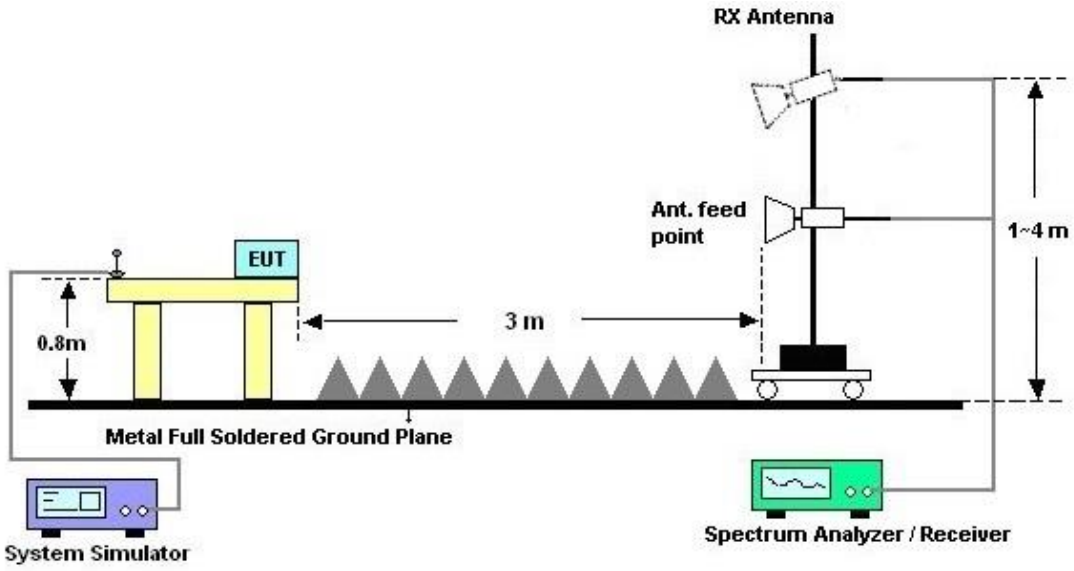
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 (dBμV/m) = 20 log Emission level (μV/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

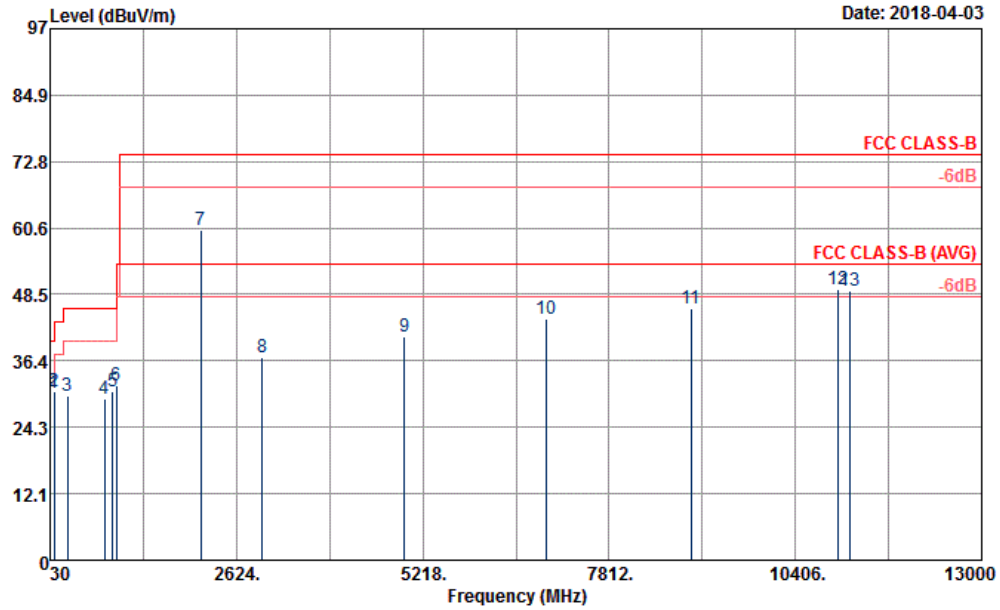


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

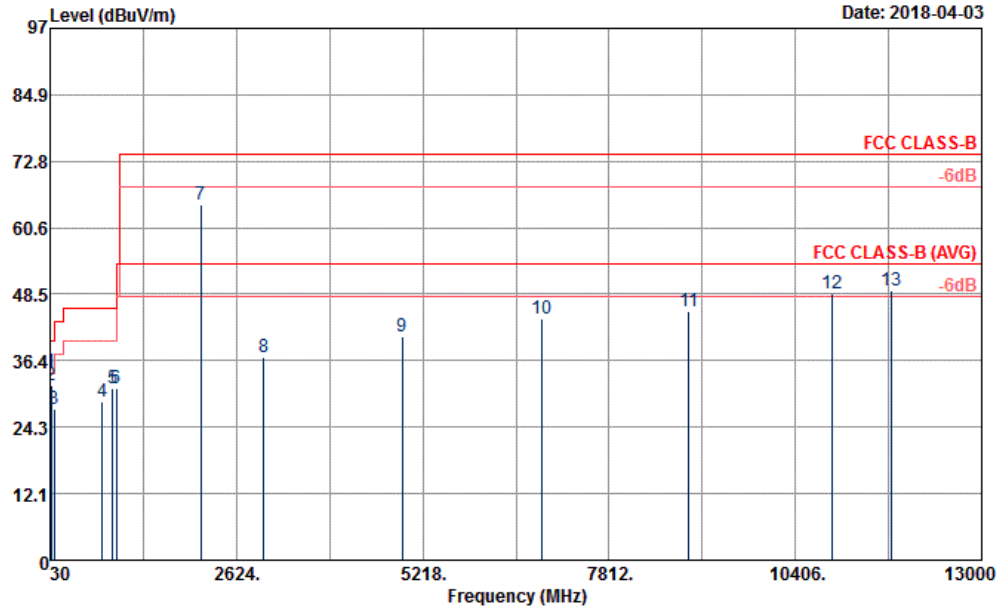
Test Engineer :	Eric Jeng and Kai-Chun Chu	**Temperature :**	21~24°C
		Relative Humidity :	52~55%
Test Distance :	3m	**Polarization :**	Horizontal
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_170915 HORIZONTAL
Project : 832404
Power : 120Vac/60Hz
Mode : Mode 4

	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	86.97	30.41	-9.59	40.00	46.86	14.14	1.23	31.82	100	66	Peak
2	91.29	30.68	-12.82	43.50	46.53	14.72	1.25	31.82	---	---	Peak
3	269.76	29.99	-16.01	46.00	40.44	19.24	2.06	31.75	---	---	Peak
4	792.10	29.44	-16.56	46.00	29.92	28.08	3.43	31.99	---	---	Peak
5	901.30	30.78	-15.22	46.00	29.68	28.99	3.65	31.54	---	---	Peak
6	955.90	31.96	-14.04	46.00	28.29	30.92	3.81	31.06	---	---	Peak
7	2132.50	60.12			88.30	26.16	6.66	61.00	---	---	Peak
8	2988.00	37.02	-36.98	74.00	61.49	28.69	8.13	61.29	---	---	Peak
9	4966.00	40.81	-33.19	74.00	57.82	31.39	10.72	59.12	---	---	Peak
10	6936.00	43.96	-30.04	74.00	54.98	35.32	12.89	59.23	---	---	Peak
11	8952.00	45.93	-28.07	74.00	52.49	36.90	14.89	58.35	---	---	Peak
12	11000.00	49.32	-24.68	74.00	49.36	40.13	16.83	57.00	100	68	Peak
13	11162.00	49.17	-24.83	74.00	49.08	39.86	17.06	56.83	---	---	Peak

Test Engineer :	Eric Jeng and Kai-Chun Chu	**Temperature :**	21~24°C
		Relative Humidity :	52~55%
Test Distance :	3m	**Polarization :**	Vertical
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_170915 VERTICAL
Project : 832404
Power : 120Vac/60Hz
Mode : Mode 4

	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	30.54	34.44	-5.56	40.00	41.83	23.70	0.75	31.84	100	77	Peak
2	40.80	31.75	-8.25	40.00	44.05	18.68	0.86	31.84	---	---	Peak
3	87.24	27.52	-12.48	40.00	43.97	14.14	1.23	31.82	---	---	Peak
4	761.30	29.00	-17.00	46.00	29.73	27.91	3.39	32.03	---	---	Peak
5	903.40	31.24	-14.76	46.00	30.08	29.02	3.66	31.52	---	---	Peak
6	955.90	31.39	-14.61	46.00	27.72	30.92	3.81	31.06	---	---	Peak
7	2132.50	64.92			93.10	26.16	6.66	61.00	---	---	Peak
8	3000.00	36.91	-37.09	74.00	61.34	28.74	8.13	61.30	---	---	Peak
9	4936.00	40.93	-33.07	74.00	58.06	31.36	10.70	59.19	---	---	Peak
10	6878.00	44.10	-29.90	74.00	55.28	35.18	12.89	59.25	---	---	Peak
11	8918.00	45.37	-28.63	74.00	51.92	36.88	14.88	58.31	---	---	Peak
12	10922.00	48.73	-25.27	74.00	49.13	40.05	16.72	57.17	---	---	Peak
13	11734.00	49.15	-24.85	74.00	49.35	38.85	17.92	56.97	100	85	Peak

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	Apr. 02, 2018 ~ Apr. 03, 2018	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESR3	102388	3.6GHz	Dec. 08, 2017	Apr. 02, 2018 ~ Apr. 03, 2018	Dec. 07, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 30, 2017	Apr. 02, 2018 ~ Apr. 03, 2018	Nov. 29, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 08, 2017	Apr. 02, 2018 ~ Apr. 03, 2018	Dec. 07, 2018	Conduction (CO05-HY)
Software	Rohde & Schwarz	EMC32 V10.30	N/A	N/A	N/A	Apr. 02, 2018 ~ Apr. 03, 2018	N/A	Conduction (CO05-HY)
LF Cable	HUBER + SUHNER	RG-214/U	LF01	N/A	Jan. 03, 2018	Apr. 02, 2018 ~ Apr. 03, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100851	N/A	Jan. 03, 2018	Apr. 02, 2018 ~ Apr. 03, 2018	Jan. 02, 2019	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Oct. 14, 2017	Apr. 03, 2018 ~ Apr. 04, 2018	Oct. 13, 2018	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Jan. 04, 2018	Apr. 03, 2018 ~ Apr. 04, 2018	Jan. 03, 2019	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1156	1GHz~18GHz	Aug. 08, 2017	Apr. 03, 2018 ~ Apr. 04, 2018	Aug. 07, 2018	Radiation (03CH06-HY)
Preamplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 25, 2017	Apr. 03, 2018 ~ Apr. 04, 2018	Apr. 24, 2018	Radiation (03CH06-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1850117	1GHz ~ 18GHz	May 22, 2017	Apr. 03, 2018 ~ Apr. 04, 2018	May 21, 2018	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Apr. 03, 2018 ~ Apr. 04, 2018	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Apr. 03, 2018 ~ Apr. 04, 2018	N/A	Radiation (03CH06-HY)
Test Software	AUDIX	e3	6.2009-8-24 (k5)	N/A	N/A	Apr. 03, 2018 ~ Apr. 04, 2018	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))	**2.7**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7**