

FCC Test Report

APPLICANT : Sharp Corporation
EQUIPMENT : Mobile Terminal Equipment
BRAND NAME : SHARP
MODEL NAME : EB-W71LJ-H
FCC ID : APYNAR0075
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on May 18, 2011 and completely tested on May 20, 2011. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2003 and shown the compliance with the applicable 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.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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FCC ID : APYNAR0075

Page Number : 1 of 21

Report Issued Date : Jun. 14, 2011

Report Version : Rev. 01

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FD151805-01	Rev. 01	Initial issue of report	Jun. 14, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
2.4	15.107	7.2.2	AC Conducted Emission	< 15.107 limits < RSS-Gen table 2 limits	PASS	Under limit 5.4 dB at 0.18 MHz
2.5	15.109	7.2.3.2	Radiated Emission	< 15.109 limits or < RSS-Gen table 1 limits (Section 6)	PASS	Under limit 0.92 dB at 33.78 MHz

1. General Description

1.1. Applicant

Sharp Corporation

22-22 Nagaike-cho, Abeno-ku Osaka, 545-8522, Japan

1.2. Manufacturer

Chi Mei Communication Systems, Inc.

No. 4, Mingsheng Street, Tucheng City, Taipei County 23678, Taiwan

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Terminal Equipment
Brand Name	SHARP
Model Name	EB-W71LJ-H
FCC ID	APYNAR0075
Tx Frequency Range	Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz
Rx Frequency Range	Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz GPS : 1.57542 GHz
Antenna Type	PIFA Antenna
HW Version	PR1
SW Version	1.06
Type of Modulation	Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK 802.11b : DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) GPS : BPSK
EUT Stage	Identical Prototype

Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.4. Test Site

Test Site	SPORTON INTERNATIONAL INC.		
Test Site Location	No. 52, Hwa Ya 1 st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978		
Test Site No.	Sporton Site No.		FCC/IC Registration No.
	CO05-HY	03CH06-HY	722060/4086B-1

1.5. Applied 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 C63.4-2003
- IC RSS-Gen Issue 3

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

1.6. Ancillary Equipment List

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	iPod	Apple	A1199	FCC DoC	Shielded, 1.0 m	N/A
4.	iPod Earphone	Apple	A1285	FCC DoC	Unshielded, 1.2 m	N/A
5.	Notebook	DELL	Vostro 1510	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	LCD Monitor	Dell	U2410	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2003 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

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

The following tables are showing the test modes as the worst cases and recorded in this report.

Item	EUT Configuration	Test Condition		
		EMI AC	EMI RE<1G	EMI RE≥1G
1.	Charging Mode (EUT with notebook)	☒	☒	☒

Abbreviations:

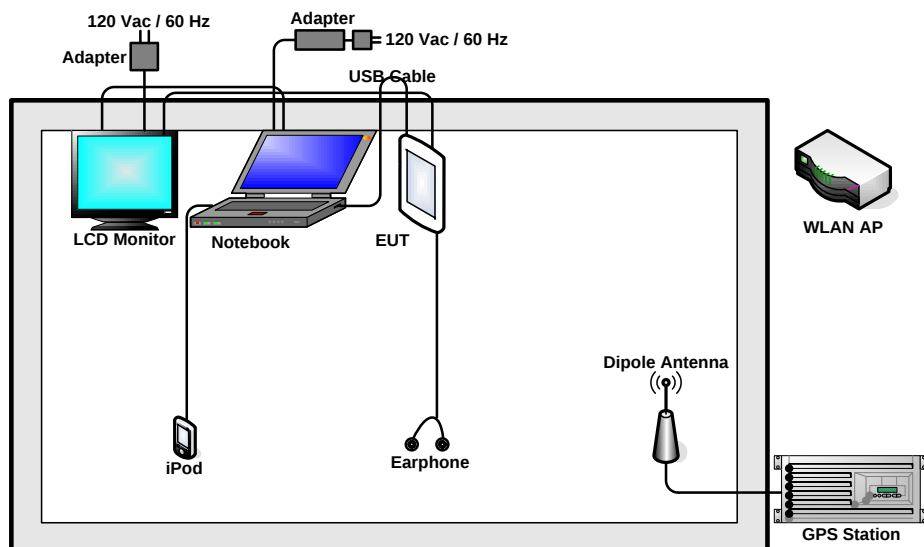
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Note 1: Testing for this mode is not required or not the worst case.

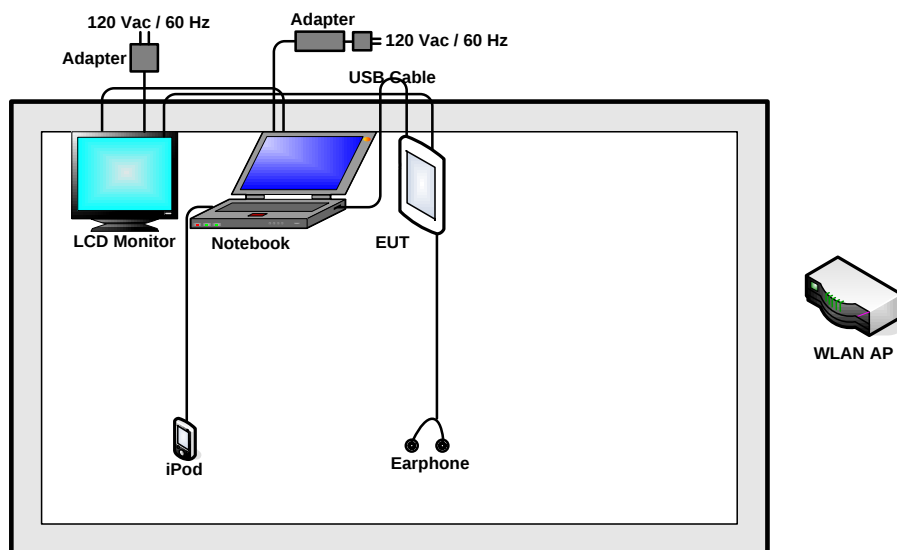
Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1: WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)
Radiated Emissions	1	Mode 1: WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)

2.2. Connection Diagram of Test System

<EUT with GPS Rx Mode>



<EUT without GPS Rx Mode>



2.3. Test Software

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

1. Execute the program "Winthrax", installed in notebook for active sync files transfer with EUT via USB cable.
2. Execute "GPS Test" to make the EUT receive signals from GPS station continuously.
3. Execute "Video Player" to play MPEG4 files.
4. Turn on camera to capture images.
5. Turn on Bluetooth and WLAN function.

1. Test Result

2.4. 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.

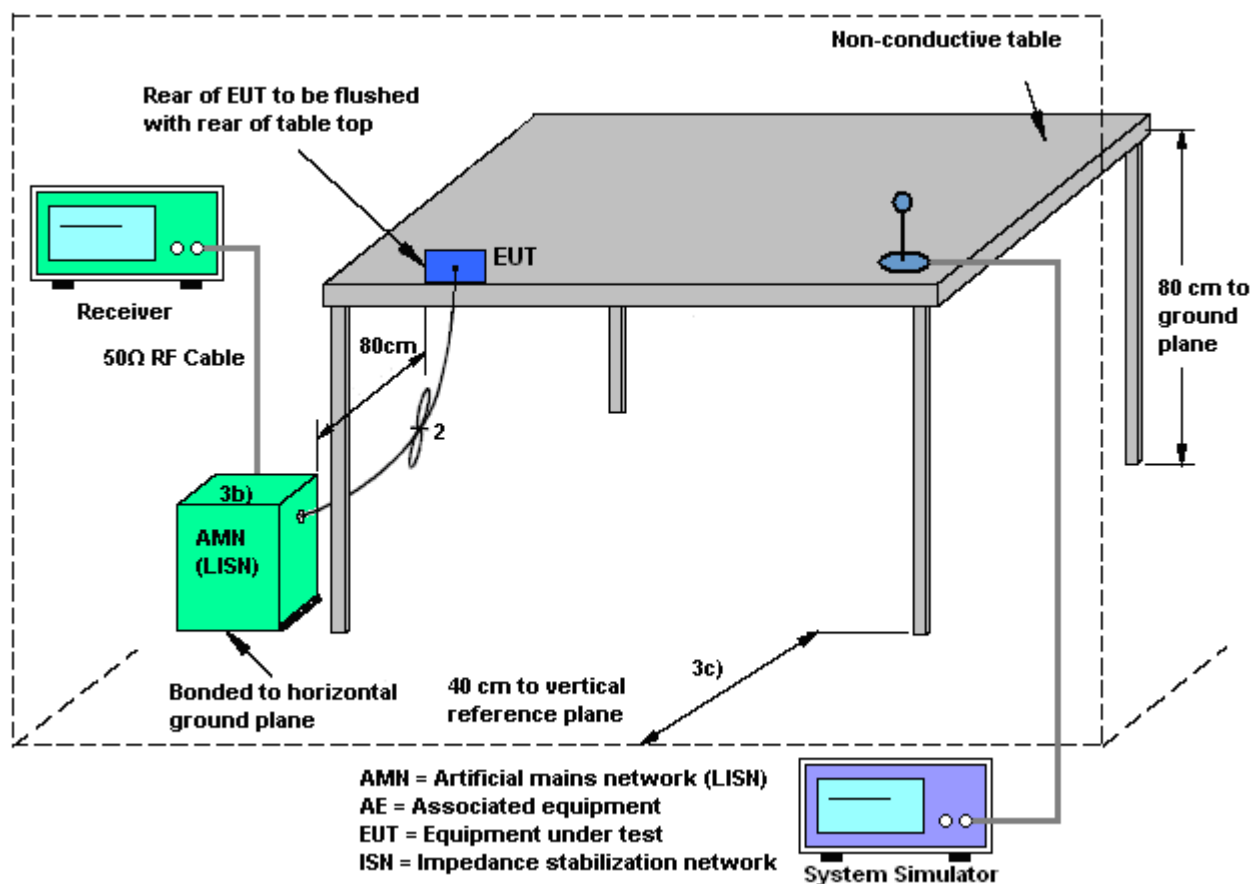
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

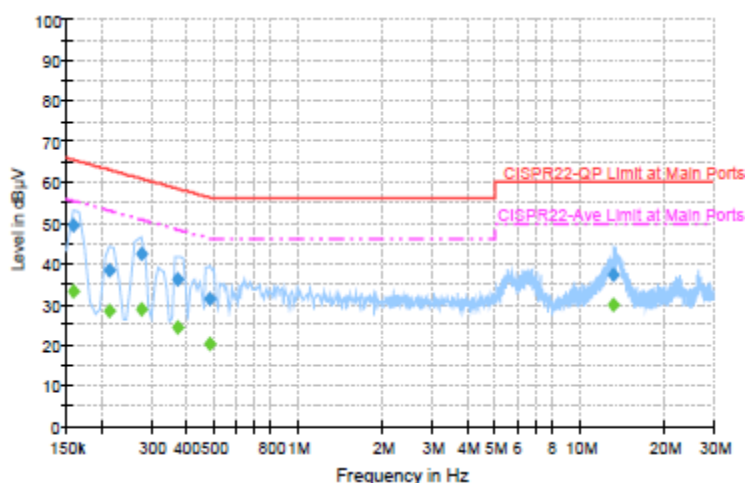
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.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

3.1.4 Test Setup



3.1.5 Test Result of AC Conducted Emission

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



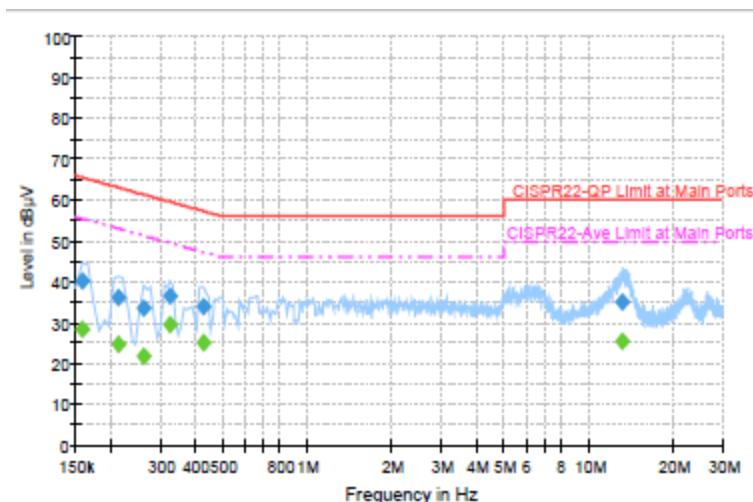
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	49.6	Off	L1	19.4	16.0	65.6
0.214000	38.5	Off	L1	19.4	24.5	63.0
0.278000	42.6	Off	L1	19.4	18.3	60.9
0.374000	36.2	Off	L1	19.4	22.2	58.4
0.486000	31.4	Off	L1	19.4	24.8	56.2
13.190000	37.2	Off	L1	19.6	22.8	60.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.158000	33.2	Off	L1	19.4	22.4	55.6
0.214000	28.2	Off	L1	19.4	24.8	53.0
0.278000	28.6	Off	L1	19.4	22.3	50.9
0.374000	24.5	Off	L1	19.4	23.9	48.4
0.486000	20.5	Off	L1	19.4	25.7	46.2
13.190000	29.9	Off	L1	19.6	20.1	50.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		


Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	40.3	Off	N	19.4	25.3	65.6
0.214000	36.3	Off	N	19.4	26.7	63.0
0.262000	33.7	Off	N	19.4	27.7	61.4
0.326000	36.6	Off	N	19.4	23.0	59.6
0.430000	33.9	Off	N	19.5	23.4	57.3
13.262000	35.0	Off	N	19.7	25.0	60.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	28.3	Off	N	19.4	27.3	55.6
0.214000	24.7	Off	N	19.4	28.3	53.0
0.262000	21.9	Off	N	19.4	29.5	51.4
0.326000	29.7	Off	N	19.4	19.9	49.6
0.430000	25.3	Off	N	19.5	22.0	47.3
13.262000	25.5	Off	N	19.7	24.5	50.0

2.5. Test of Radiated Emission Measurement

1.3.1 Limit of Radiated Emission

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

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 – 0.490	$2400/F(\text{kHz})$	300
0.490 – 1.705	$24000/F(\text{kHz})$	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

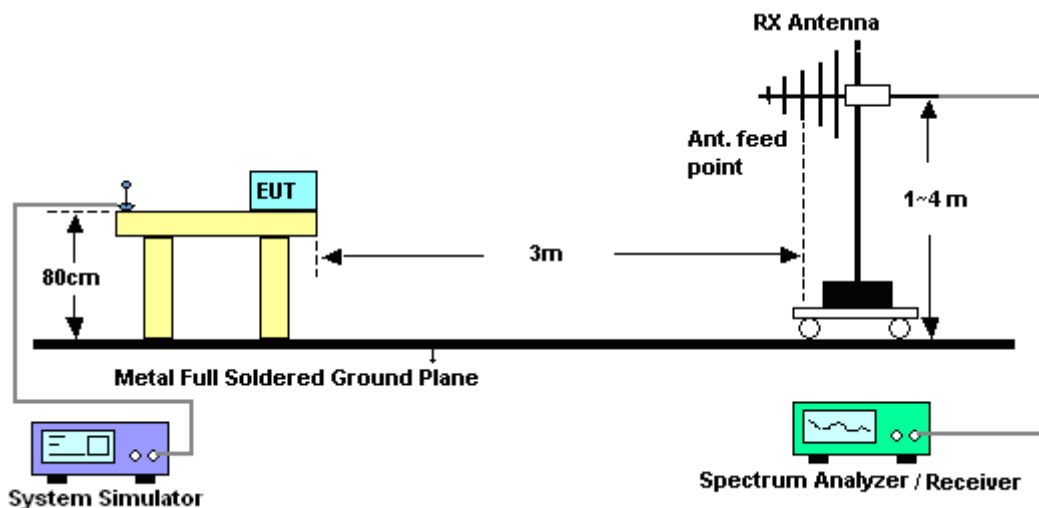
1.3.2 Measuring Instruments

See list of measuring instruments of this test report.

1.3.3 Test Procedures

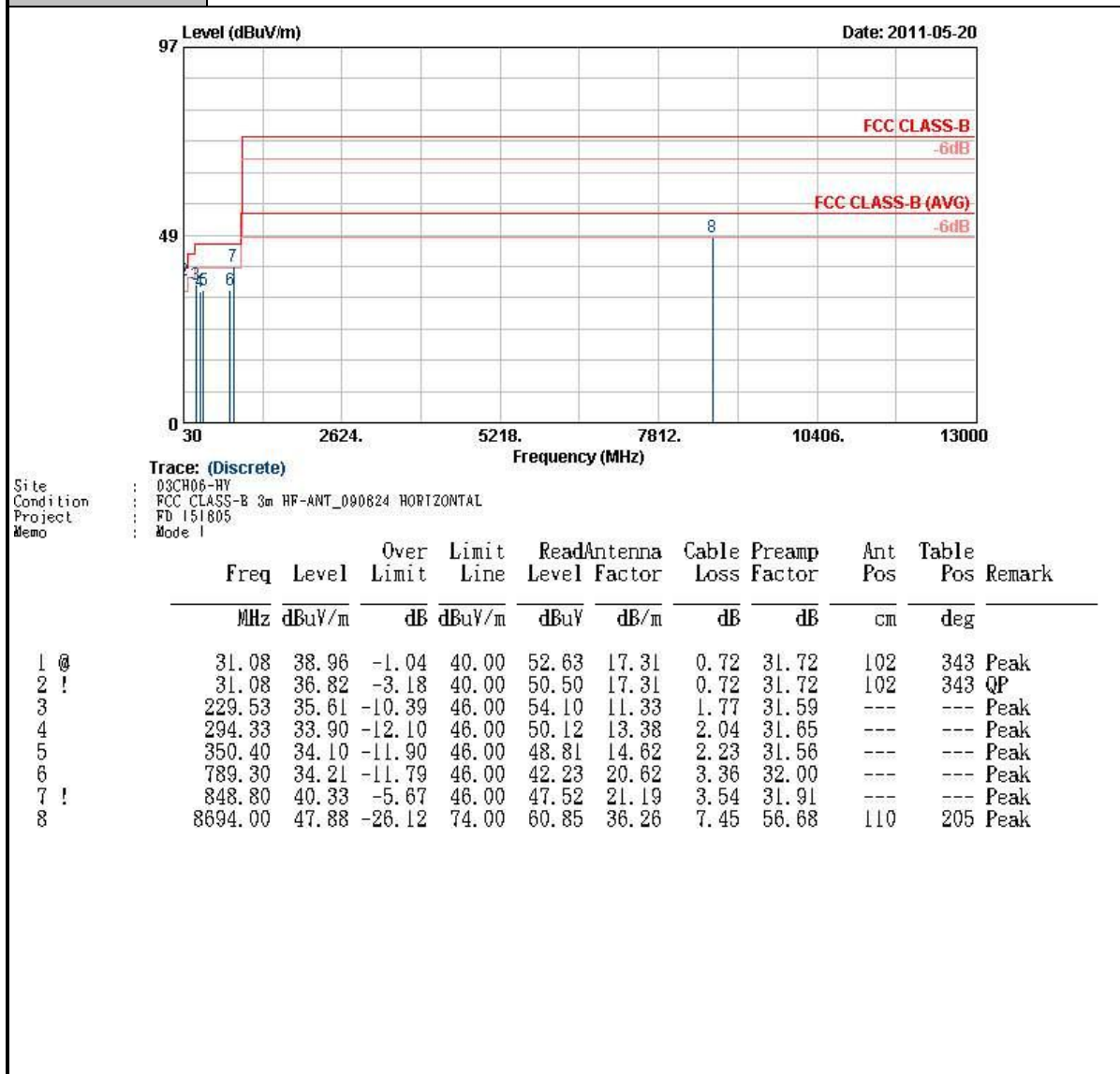
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one meter and 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.
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the quasi-peak method and reported
8. Emission level (dBuV/m) = 20 log Emission level (uV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

1.3.4 Test Setup of Radiated Emission

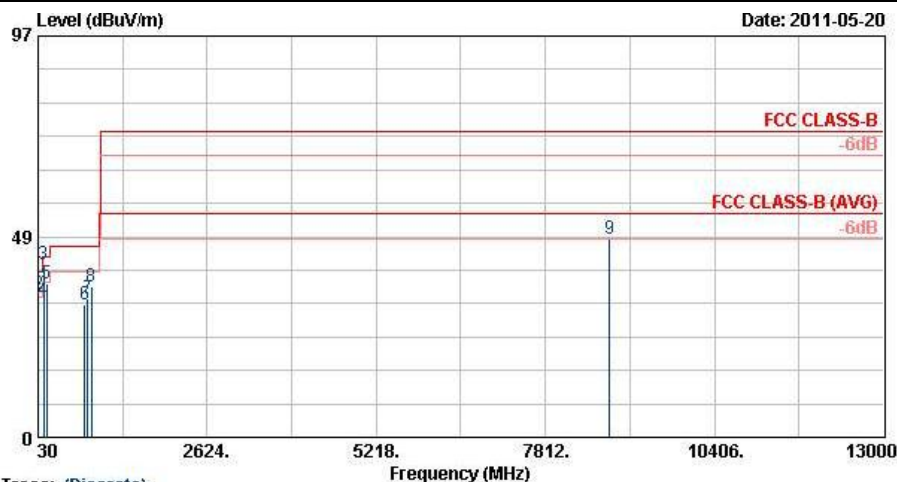


1.3.5 Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	47~49%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)		



Test Mode :	Mode 1	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	47~49%
Test Distance :	3m	Polarization :	Vertical
Function Type :	WLAN Idle + Bluetooth On + USB Link + Battery + HDMI Cable + GPS Rx + HDMI TV + Earphone + USB Cable (Charging from Adapter)		



Trace: (Discrete)

Site: 03CH06-HV
Condition: FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Project: FD 151805
Memo: Mode 1

	Freq	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Remark
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	
			dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	33.78	39.08	-0.92	40.00	54.52	15.53	0.74	31.70	100	98	Peak
2 !	33.78	34.76	-5.24	40.00	50.20	15.53	0.74	31.70	100	98	QP
3 !	118.83	41.98	-1.52	43.50	60.20	12.16	1.33	31.71	100	174	Peak
4	118.83	33.07	-10.43	43.50	51.30	12.16	1.33	31.71	100	174	QP
5	157.98	37.31	-6.19	43.50	57.29	10.20	1.48	31.66	---	---	Peak
6	742.40	32.09	-13.91	46.00	40.88	19.97	3.34	32.09	---	---	Peak
7	787.90	33.44	-12.56	46.00	41.49	20.60	3.36	32.01	---	---	Peak
8	848.80	36.29	-9.71	46.00	43.47	21.19	3.54	31.91	---	---	Peak
9	8796.00	47.87	-26.13	74.00	60.70	36.34	7.56	56.73	100	215	Peak

2. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Due Date	Remark
EMI Test Receive	R&S	ESCS 30	100356	9KHz – 2.75GHz	Aug. 16, 2010	Aug. 15, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100081	9KHz – 30MHz	Dec. 03, 2010	Dec. 02, 2011	Conduction (CO05-HY)
Two-LISN	R&S	ENV216	11-100080	9KHz – 30MHz	Dec. 01, 2010	Nov. 30, 2011	Conduction (CO05-HY)
AC Power Source	APC	APC-1000W	N/A	N/A	N/A	N/A	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T400A	25696	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
ISN	Teseq GmbH	ISN T800	27134	N/A	Jun. 19, 2010	Jun. 18, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000485	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-HY)
DC- LISN	R&S	ESH3-26	1000484	0.1MHz~200MHz	Jun. 17, 2010	Jun. 16, 2011	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP40	100057	9KHz-40GHz	Oct. 25, 2010	Oct. 24, 2011	Radiation (03CH06-HY)
EMI TEST RECEIVER	R&S	ESCI 7	100724	9kHz~7GHz	Aug.19, 2010	Aug.19, 2011	Radiation (03CH06-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2885	30MHz -2GHz	Oct. 31, 2010	Oct. 31, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz~18GHz	Aug. 02, 2010	Aug. 01, 2011	Radiation (03CH06-HY)
Double Ridge Horn Antenna	Training Research	AH-0801	95119	8GHz~18GHz	Oct. 20, 2010	Oct. 19, 2011	Radiation (03CH06-HY)
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	BBHA9170251	15GHz- 40GHz	Oct. 18, 2010	Oct. 17, 2011	Radiation (03CH06-HY)
Pre Amplifier	Agilent	8449B	3008A01917	1GHz- 26.5GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 14, 2011	Apr. 13, 2012	Radiation (03CH06-HY)
Loop Antenna	R&S	HFH2-Z2	860004/001	9 kHz~30 MHz	Jul. 29, 2010	Jul. 28, 2011	Radiation (03CH06-HY)
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	-

3. Uncertainty of Evaluation

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.10	Normal (k=2)	0.05
Cable Loss	0.10	Normal (k=2)	0.05
AMN Insertion Loss	2.50	Rectangular	0.63
Receiver Specification	1.50	Rectangular	0.43
Site Imperfection	1.39	Rectangular	0.80
Mismatch	+0.34 / -0.35	U-Shape	0.24
Combined Standard Uncertainty $U_c(y)$	1.13		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.26		

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

Contribution	Uncertainty of X_i		$u(X_i)$
	dB	Probability Distribution	
Receiver Reading	0.41	Normal (k=2)	0.21
Antenna Factor Calibration	0.83	Normal (k=2)	0.42
Cable Loss Calibration	0.25	Normal (k=2)	0.13
Pre-Amplifier Gain Calibration	0.27	Normal (k=2)	0.14
RCV/SPA Specification	2.50	Rectangular	0.72
Antenna Factor Interpolation for Frequency	1.00	Rectangular	0.29
Site Imperfection	1.43	Rectangular	0.83
Mismatch	+0.39 / -0.41	U-Shape	0.28
Combined Standard Uncertainty $U_c(y)$	1.27		
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	2.54		

Uncertainty of Radiated Emission Measurement (1 GHz ~ 40 GHz)

Contribution	Uncertainty of X_i		$u(X_i)$	C_i	$C_i * u(X_i)$
	dB	Probability Distribution			
Receiver Reading	± 0.10	Normal (k=2)	0.10	1	0.10
Antenna Factor Calibration	± 1.70	Normal (k=2)	0.85	1	0.85
Cable Loss Calibration	± 0.50	Normal (k=2)	0.25	1	0.25
Receiver Correction	± 2.00	Rectangular	1.15	1	1.15
Antenna Factor Directional	± 1.50	Rectangular	0.87	1	0.87
Site Imperfection	± 2.80	Triangular	1.14	1	1.14
Mismatch Receiver VSWR $\Gamma_1 = 0.197$ Antenna VSWR $\Gamma_2 = 0.194$ Uncertainty = $20\text{Log}(1-\Gamma_1\Gamma_2)$	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty $U_c(y)$	2.36				
Measuring Uncertainty for a Level of Confidence of 95% ($U = 2U_c(y)$)	4.72				



Appendix A. Photographs of EUT

Please refer to Sporton report number EP151805-01 as below.