

FCC Test Report

APPLICANT : PSION INC.
EQUIPMENT : EP10 Hand-Held Computer
BRAND NAME : 
MODEL NAME : 7515C
FCC ID : GM37515CA
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Apr. 30, 2011 and completely tested on Jun. 29, 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 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.

Reviewed by:



Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

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

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC143002	Rev. 01	Initial issue of report	Jul. 19, 2011

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 7.9 dB at 0.182 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.16 dB at 407.80 MHz



1. General Description

1.1. Applicant

PSION INC.

2100 Meadowvale Blvd, Mississauga ON L5N 7J9, CANADA

1.2. Manufacturer

PSION INC.

2100 Meadowvale Blvd, Mississauga ON L5N 7J9, CANADA

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	EP10 Hand-Held Computer
Brand Name	P510n
Model Name	7515C
FCC ID	GM37515CA
Tx Frequency Range	CDMA2000 BC0 : 824 MHz ~ 849 MHz CDMA2000 BC1 : 1850 MHz ~ 1910 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz WLAN : 5150 MHz ~ 5250 MHz WLAN : 5250 MHz ~ 5350 MHz WLAN : 5470 MHz ~ 5725 MHz WLAN : 5725 MHz ~ 5850 MHz
Rx Frequency Range	CDMA2000 BC0 : 869 ~ 894 MHz CDMA2000 BC1 : 1930 ~ 1990 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz WLAN : 5150 MHz ~ 5250 MHz WLAN : 5250 MHz ~ 5350 MHz WLAN : 5470 MHz ~ 5725 MHz WLAN : 5725 MHz ~ 5850 MHz GPS : 1.57542 GHz
Antenna Type	PIFA Antenna
HW Version	2
SW Version	1.1
Type of Modulation	CDMA2000 : QPSK Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : $\pi/4$ -DQPSK Bluetooth EDR (3Mbps) : 8-DPSK 802.11b : DSSS (BPSK / QPSK / CCK) 802.11a/g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) GPS : BPSK
EUT Stage	Identical Prototype

Remark:

1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. The EUT didn't support 5600MHz ~ 5650MHz.

List of Accessory:

Specification of Accessory		
AC Adapter 1	Brand Name	Leader
	Model Name	IU18-2050300-WP
AC Adapter 2	Brand Name	Phihong
	Model Name	PSA15R-050P
Battery	Brand Name	PSION / ETI
	Model Name	RV3010 / BP08-000760
Car Charger	Brand Name	AOEM
	Model Name	C15C-0520CD0-C0
Desktop Charger Cradle (Single Dock)	Brand Name	PSION
	Model Name	RV4000
Desktop Charger Cradle (AC Adapter)	Brand Name	FSP
	Model Name	FSP050-DBAB1
Charger Snap Module 1	Brand Name	PSION
	Model Name	RV4001
Charger Snap Module 2	Brand Name	PSION
	Model Name	RV4002
LCD Panel	Brand Name	Sharp
	Model Name	LS037V7DW01
Pouch	Brand Name	Psion
	Model Name	RV6091

Remark: For accessories equipped with this EUT, please refer to Appendix A.

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

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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
3.	Car Battery	YUASA	46B24R(S)	N/A	N/A	N/A
4.	Bluetooth Earphone	Nokia	BH-102	PYAHS-107W	N/A	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	Lenovo	6135-AB1	FCC DoC	Shielded, 1.6 m	Unshielded, 1.8 m
7.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
8.	GPS Station	T&E	GS-50	N/A	N/A	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 adapter)	☒	☒	Note 1
2.	Charging Mode (EUT with car charger)	☒	☒	☒

Abbreviations:

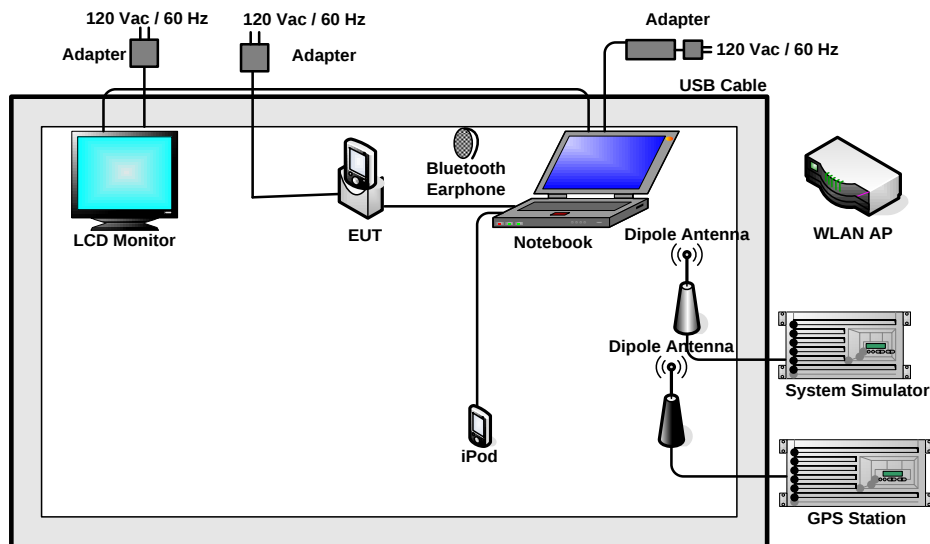
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

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

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx Mode 2: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (12V) + GPS Rx Mode 3: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (24V) + GPS Rx Mode 4: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx Mode 5: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 2 + GPS Rx Mode 6: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + USB Cable (Link with Notebook) + Single Dock Adapter + Adapter 1 + GPS Rx
Radiated Emissions < 1GHz	1/2	Mode 1: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx Mode 2: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (12V) + GPS Rx Mode 3: CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (24V) + GPS Rx Mode 4: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx Mode 5: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Adapter 2 + GPS Rx Mode 6: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Single Dock Adapter + GPS Rx
Radiated Emissions ≥ 1GHz	2	Mode 2: CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (12V) + GPS Rx
Remark: The worst case of AC is mode 1; only the test data of this mode was reported.		

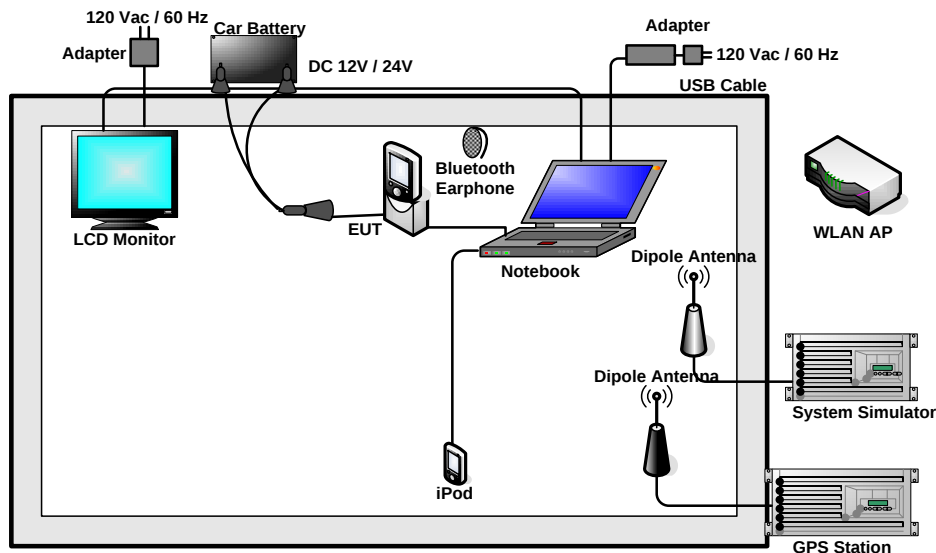
2.2. Connection Diagram of Test System

<EUT with Adapter Mode>



(Diagram for AC conducted emission from mode 1~6 and Radiated Emission mode 1, 4, 5, 6)

<EUT with Car charger Mode>



(Diagram for radiated emission mode 2, 3)

2.3. Test Software

The EUT was in CDMA2000 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 the programs, "EMI.Test.exe", installed in notebook for active sync files transfer with EUT via USB cable / iPod.
2. Execute "VisualGPSCe" to make the EUT receive signals from GPS station continuously.
3. Execute "Music Player" to play MP3 file.
4. Turn on camera to capture images.

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.

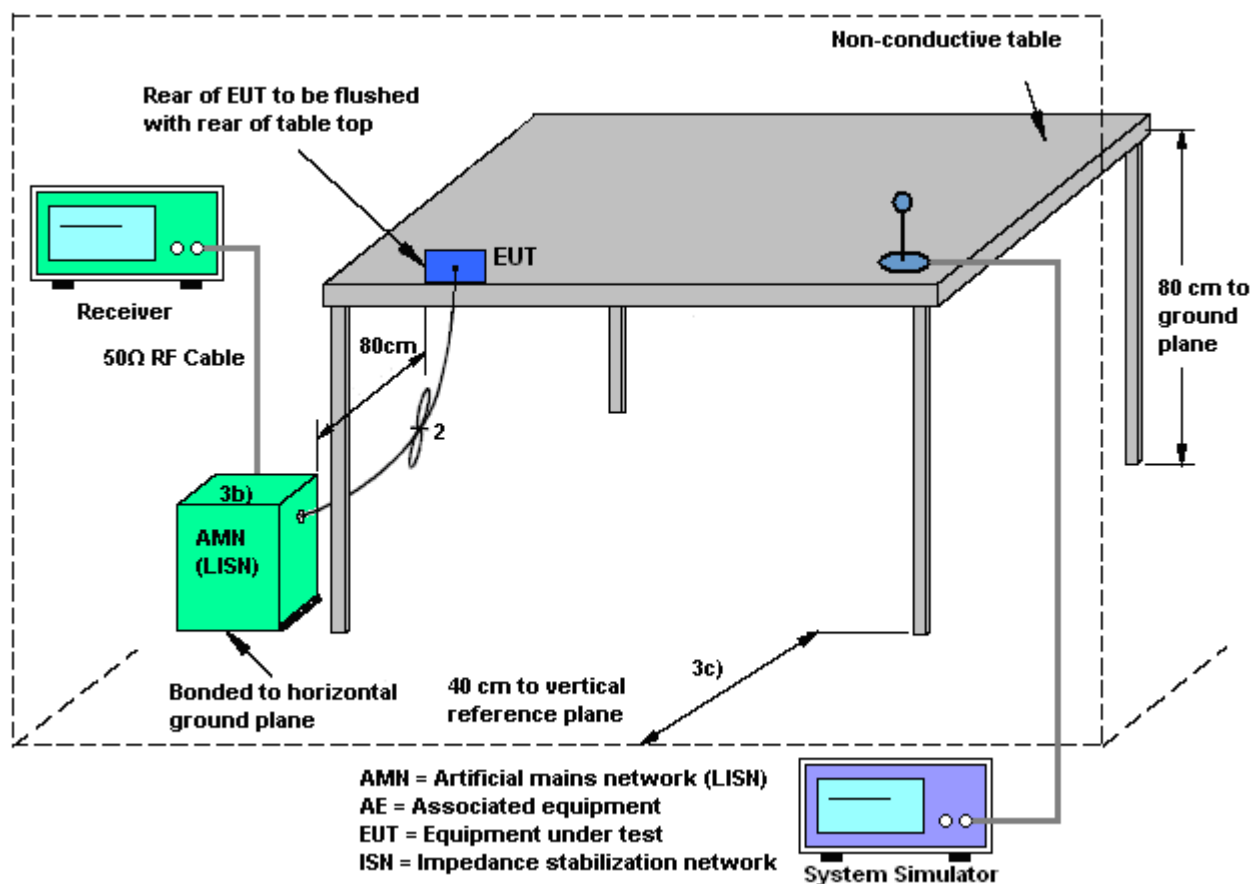
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

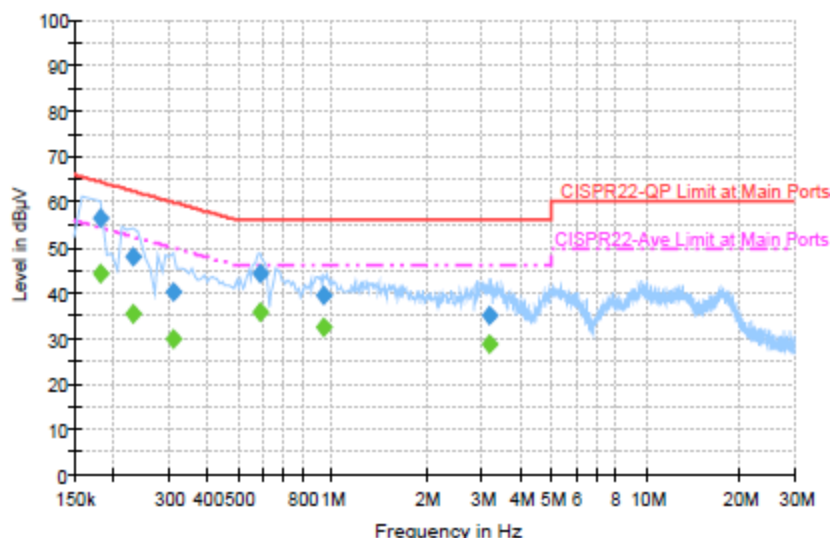
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 :	CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



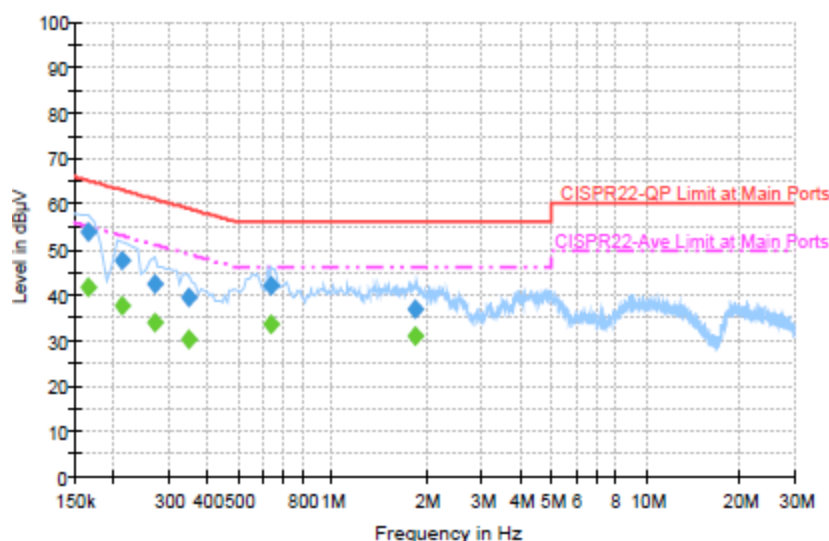
Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	56.5	Off	L1	19.4	7.9	64.4
0.230000	48.0	Off	L1	19.4	14.4	62.4
0.310000	40.1	Off	L1	19.4	19.9	60.0
0.590000	44.2	Off	L1	19.4	11.8	56.0
0.934000	39.5	Off	L1	19.4	16.5	56.0
3.190000	35.1	Off	L1	19.5	20.9	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.182000	44.2	Off	L1	19.4	10.2	54.4
0.230000	35.3	Off	L1	19.4	17.1	52.4
0.310000	29.8	Off	L1	19.4	20.2	50.0
0.590000	35.9	Off	L1	19.4	10.1	46.0
0.934000	32.3	Off	L1	19.4	13.7	46.0
3.190000	28.7	Off	L1	19.5	17.3	46.0

Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	CDMA850 Idle + WLAN Idle (2.4G) + Bluetooth Idle + MP3 / Camera + Sleeve (USB Port) + USB Cable (Link with Notebook) + Adapter 1 + GPS Rx		
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)
0.166000	53.9	Off	N	19.4	11.3	65.2
0.214000	47.5	Off	N	19.4	15.5	63.0
0.270000	42.4	Off	N	19.4	18.7	61.1
0.350000	39.4	Off	N	19.4	19.6	59.0
0.638000	41.9	Off	N	19.4	14.1	56.0
1.846000	36.9	Off	N	19.5	19.1	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.166000	41.6	Off	N	19.4	13.6	55.2
0.214000	37.8	Off	N	19.4	15.2	53.0
0.270000	34.0	Off	N	19.4	17.1	51.1
0.350000	30.4	Off	N	19.4	18.6	49.0
0.638000	33.5	Off	N	19.4	12.5	46.0
1.846000	30.9	Off	N	19.5	15.1	46.0

3.2. Test of Radiated Emission Measurement

3.2.1. 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(kHz)	300
0.490 – 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

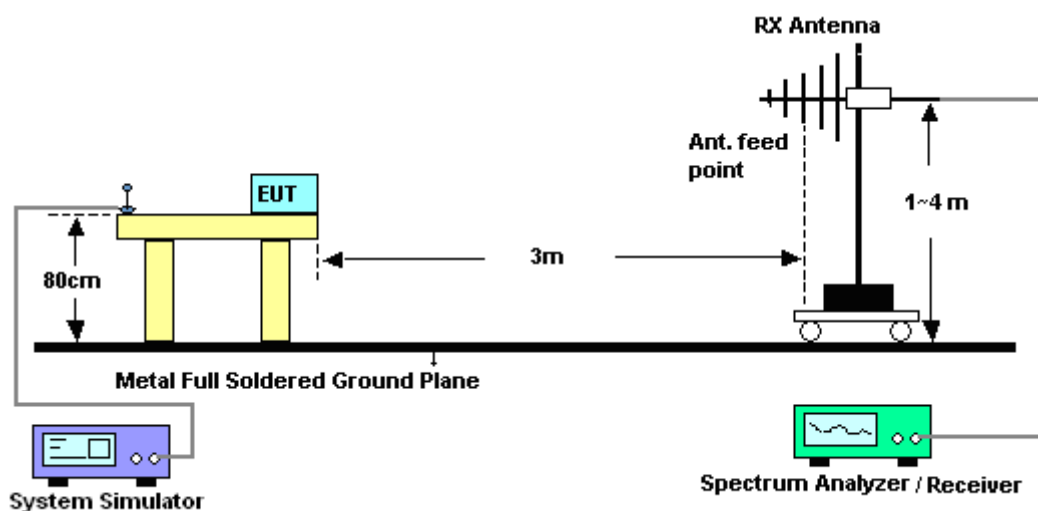
3.2.2. Measuring Instruments

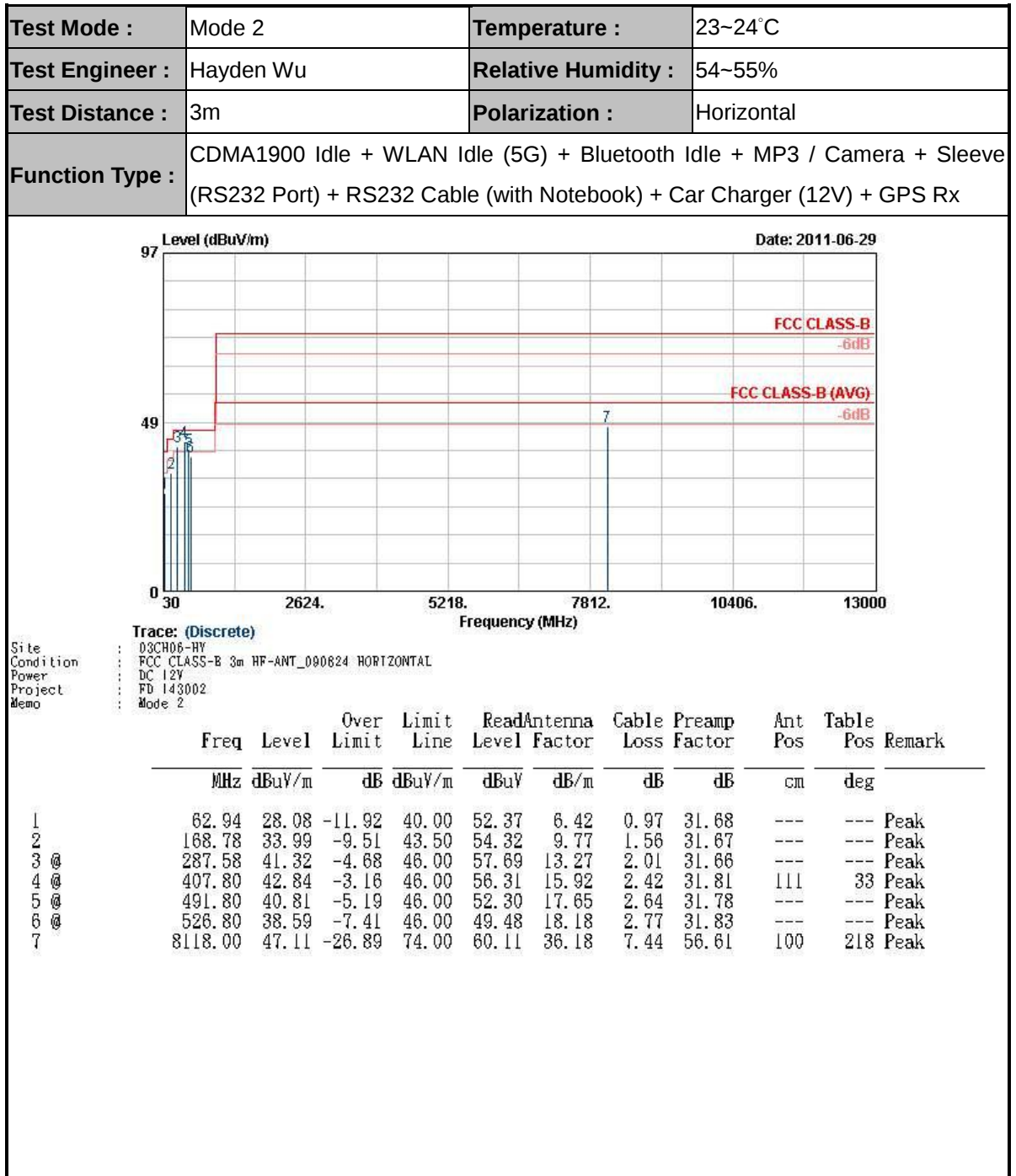
See list of measuring instruments of this test report.

3.2.3. Test Procedures

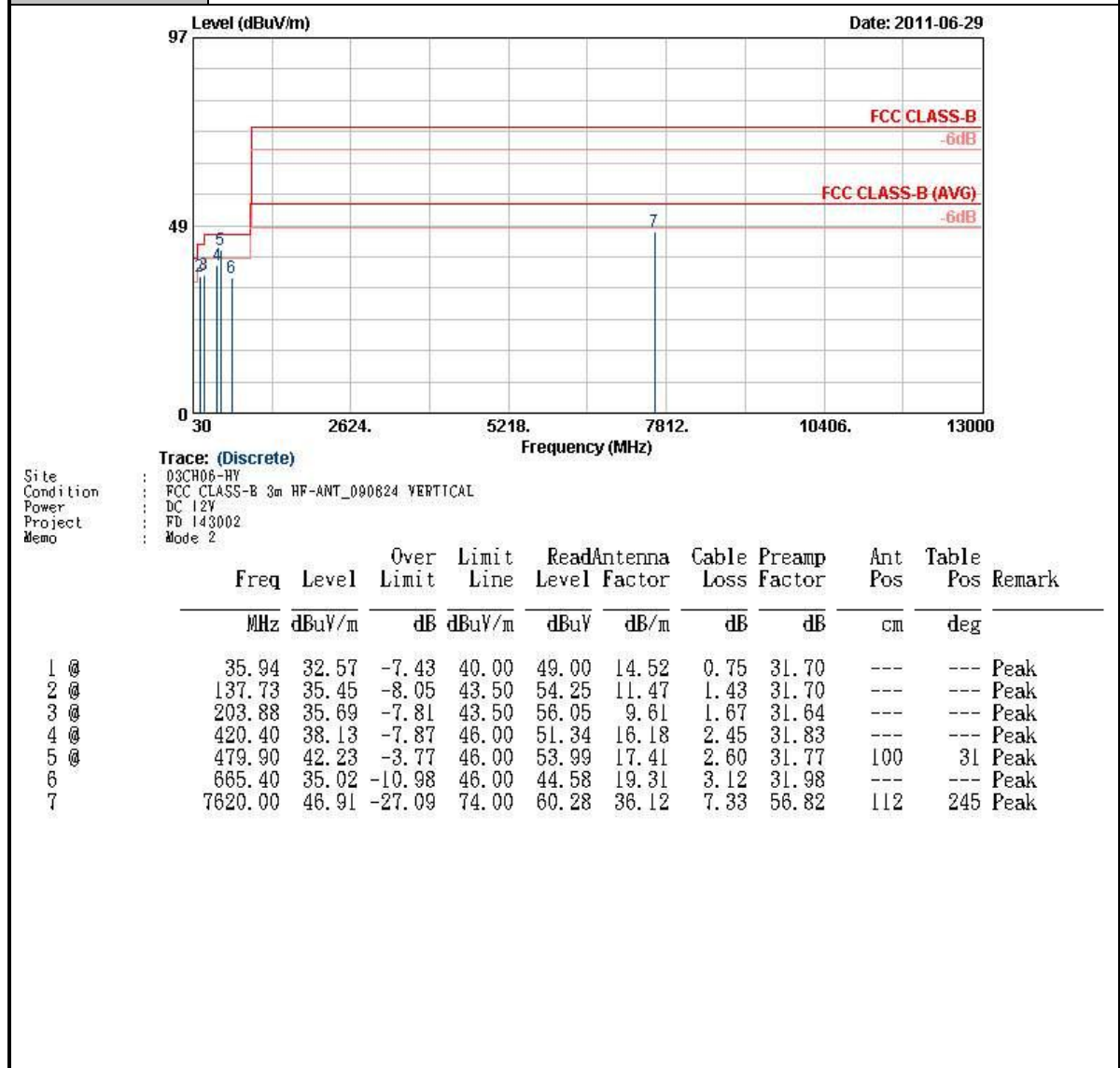
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one 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

3.2.4. Test Setup of Radiated Emission



3.2.5. Test Result of Radiated Emission


Test Mode :	Mode 2	Temperature :	23~24°C
Test Engineer :	Hayden Wu	Relative Humidity :	54~55%
Test Distance :	3m	Polarization :	Vertical
Function Type :	CDMA1900 Idle + WLAN Idle (5G) + Bluetooth Idle + MP3 / Camera + Sleeve (RS232 Port) + RS232 Cable (with Notebook) + Car Charger (12V) + GPS Rx		



4. 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)
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)
System Simulator	R&S	CMU200	117591	N/A	Oct. 18, 2010	Oct. 17, 2011	-
GPS Station	T&E	GS-50	N/A	N/A	N/A	N/A	-

5. 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 EP143002 as below.