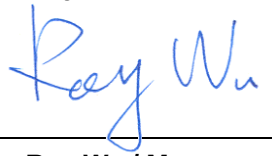
FCC Test Report

APPLICANT	:	Motorola Mobility, Inc.
EQUIPMENT	:	Mobile Phone
BRAND NAME	:	MOTOROLA
MODEL NAME	:	XT316
GPPD NUMBER	:	3039
FCC ID	:	IHDT56ML1
STANDARD	:	FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION	:	Certification

The product was received on Mar. 04, 2011 and completely tested on Mar. 19, 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:



Roy Wu / Manager

Testing Laboratory
1190

SPORTON INTERNATIONAL INC.
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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC130415A	Rev. 01	Initial issue of report	Mar. 28, 2011

SUMMARY OF TEST RESULT

Report Section	FCC Rule	IC Rule	Description	Limit	Result	Remark
3.1	15.107	7.2.2	AC Conducted Emission	< 15.107 limits < RSS-Gen table 2 limits	PASS	Under limit 9.1 dB at 4.91 MHz
3.2	15.109	7.2.3.2	Radiated Emission	< 15.109 limits or < RSS-Gen table 1 limits (Section 6)	PASS	Under limit 5.66 dB at 719.30 MHz

1. General Description

1.1. Applicant

Motorola Mobility, Inc.
8F., No. 9, Songgao Rd., Taipei 110, Taiwan, R.O.C.

1.2. Manufacturer

Chi Mei Communication Systems, Inc.
No. 4, Mingsheng Street, Tucheng District, New Taipei City, 23678, Taiwan

1.3. Feature of Equipment Under Test

Product Feature & Specification	
Equipment	Mobile Phone
Brand Name	MOTOROLA
Model Name	XT316
FCC ID	IHDT56ML1
Tx Frequency Range	GSM850 : 824 MHz ~ 849 MHz GSM1900 : 1850 MHz ~ 1910 MHz WCDMA Band V : 824 MHz ~ 849 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz
Rx Frequency Range	GSM850 : 869 MHz ~ 894 MHz GSM1900 : 1930 MHz ~ 1990 MHz WCDMA Band V : 869 MHz ~ 894 MHz Bluetooth : 2400 MHz ~ 2483.5 MHz WLAN : 2400 MHz ~ 2483.5 MHz GPS : 1.57542 GHz
Antenna Type	WWAN : Fixed Internal Antenna WLAN/Bluetooth : PIFA Antenna
HW Version	V2.0
SW Version	V3.190
Type of Modulation	GSM / GPRS : GMSK EDGE : 8PSK WCDMA : QPSK HSDPA : QPSK / 16QAM Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/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 1st 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.	System Simulator	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
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	A1199	FCC DoC	Unshielded, 1.2 m	N/A
8.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

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 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.

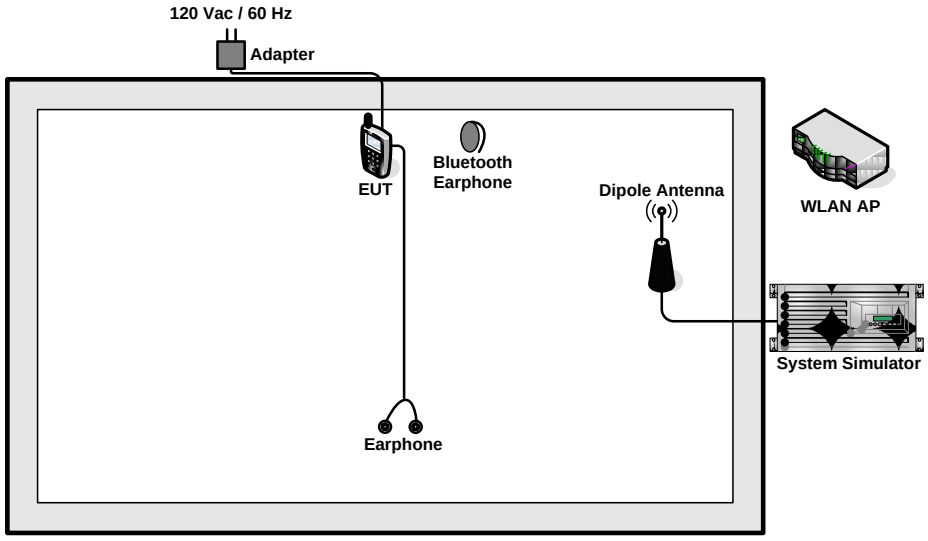
Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1/2	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + Camera + Adapter Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + USB Cable (Link with Notebook) Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN Idle + Earphone + MPEG4 + Adapter
Radiated Emissions < 1GHz	1/2	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + Camera + Adapter Mode 2: GSM1900 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + USB Cable (Link with Notebook) Mode 3: WCDMA Band V Idle + Bluetooth Idle + WLAN Idle + Earphone + MPEG4 + Adapter
Radiated Emissions ≥ 1GHz	2	Mode 1: GSM1900 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + USB Cable (Link with Notebook)

Remark:

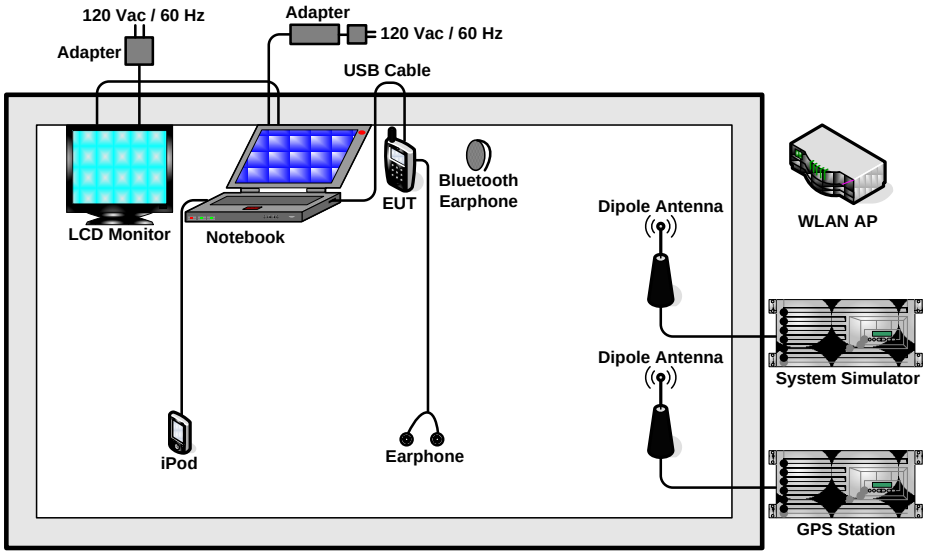
1. The worst case of AC is mode 3; only the test data of this mode was reported.
2. The worst case of RE < 1G is mode 2; only the test data of this mode was reported.

2.2. Connection Diagram of Test System

<EUT with Adapter Mode>



<EUT with USB Cable (Link with Notebook) Mode>



2.3. Test Software

The EUT was in GSM or WCDMA 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 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.

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.

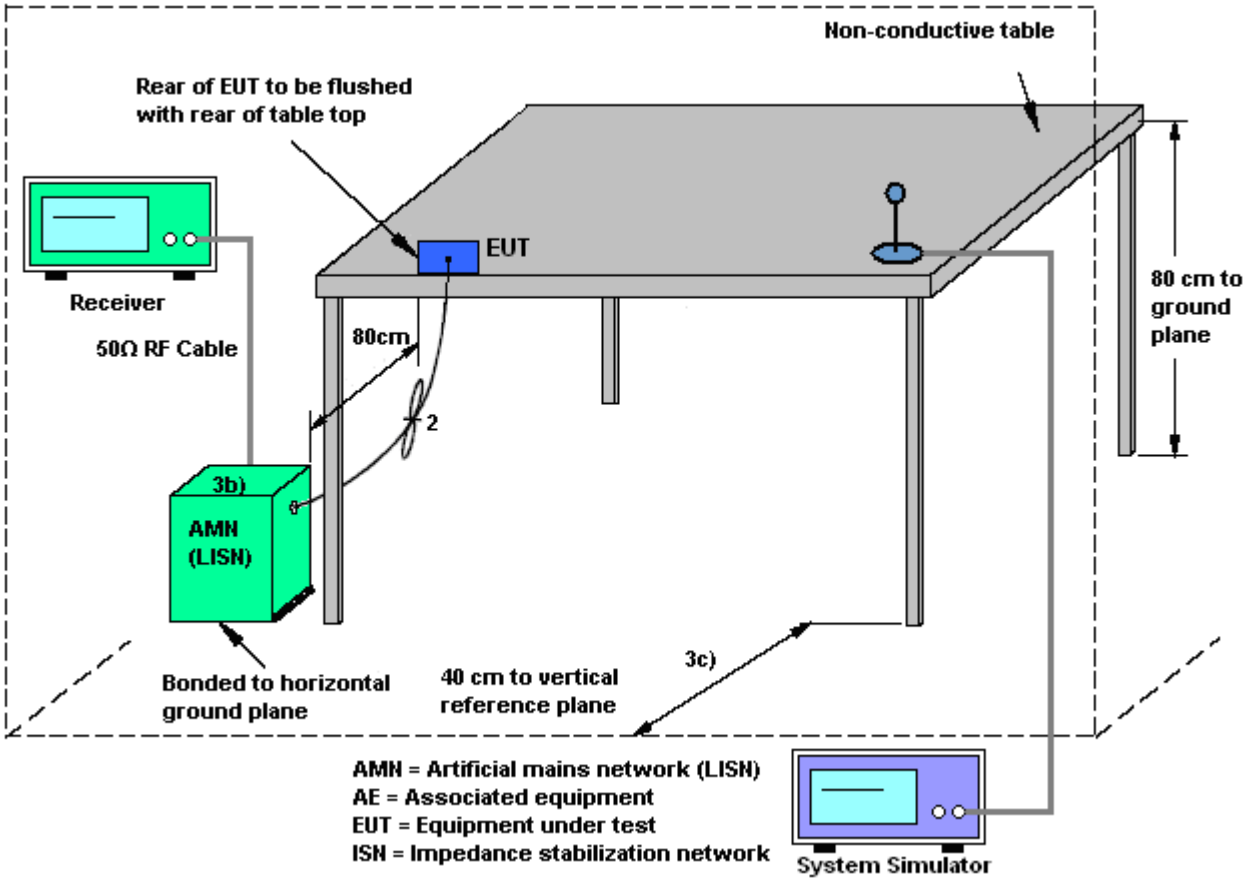
3.1.2 Measuring Instruments

See list of measuring instruments of this test report.

3.1.3 Test Procedure

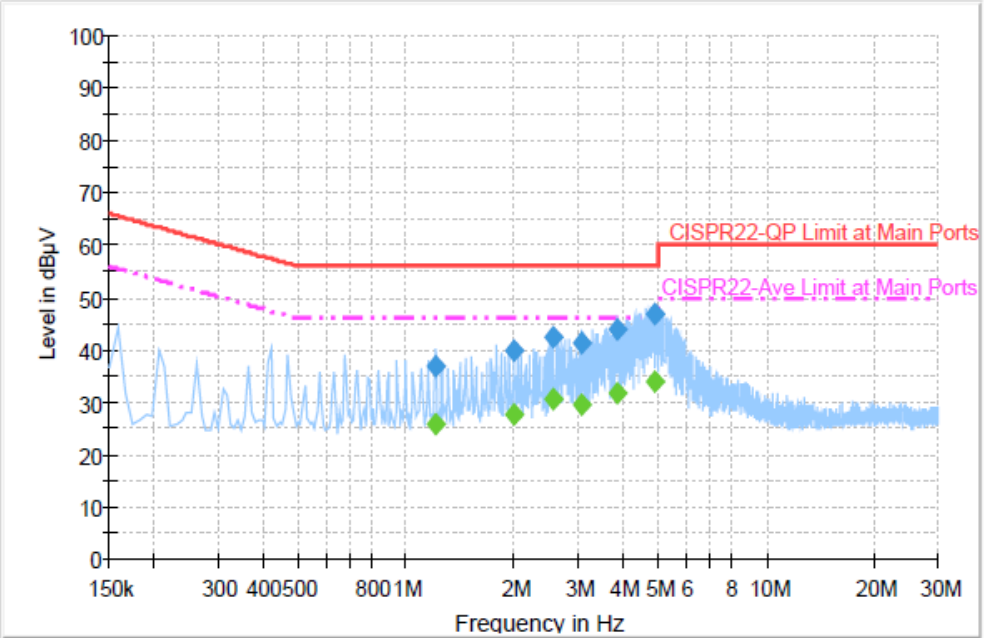
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 3	**Temperature :**	20~22℃
Test Engineer :	Novic Chiang	**Relative Humidity :**	40~42%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Function Type :	WCDMA Band V Idle + Bluetooth Idle + WLAN Idle + Earphone + MPEG4 + Adapter		
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



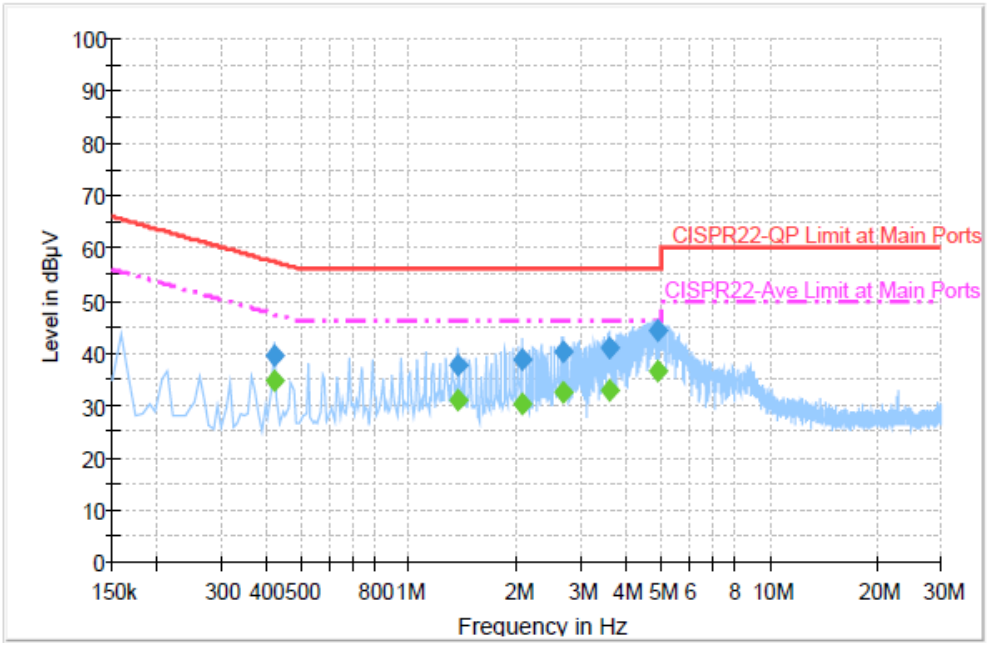
Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.206000	36.8	Off	L1	19.4	19.2	56.0
1.990000	39.7	Off	L1	19.4	16.3	56.0
2.566000	42.5	Off	L1	19.5	13.5	56.0
3.086000	41.2	Off	L1	19.5	14.8	56.0
3.878000	43.8	Off	L1	19.5	12.2	56.0
4.918000	46.9	Off	L1	19.5	9.1	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.206000	25.7	Off	L1	19.4	20.3	46.0
1.990000	27.6	Off	L1	19.4	18.4	46.0
2.566000	30.5	Off	L1	19.5	15.5	46.0
3.086000	29.5	Off	L1	19.5	16.5	46.0
3.878000	31.6	Off	L1	19.5	14.4	46.0
4.918000	33.9	Off	L1	19.5	21.1	46.0

Test Mode :	Mode 3	Temperature :	20~22℃
Test Engineer :	Novic Chiang	Relative Humidity :	40~42%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	WCDMA Band V Idle + Bluetooth Idle + WLAN Idle + Earphone + MPEG4 + 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)
0.422000	39.6	Off	N	19.4	17.8	57.4
1.374000	37.7	Off	N	19.5	18.3	56.0
2.062000	38.9	Off	N	19.5	17.1	56.0
2.694000	40.4	Off	N	19.5	15.6	56.0
3.590000	40.8	Off	N	19.5	15.2	56.0
4.910000	44.1	Off	N	19.6	11.9	56.0

Final Result 2

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.422000	34.7	Off	N	19.4	12.7	47.4
1.374000	31.1	Off	N	19.5	14.9	46.0
2.062000	30.3	Off	N	19.5	15.7	46.0
2.694000	32.6	Off	N	19.5	13.4	46.0
3.590000	33.0	Off	N	19.5	13.0	46.0
4.910000	36.5	Off	N	19.6	9.5	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

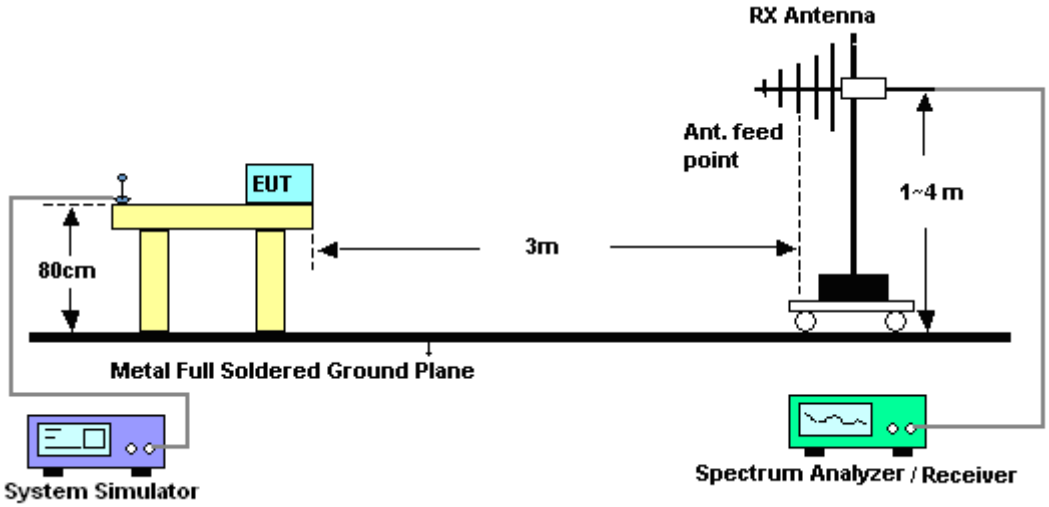
3.2.2. Measuring Instruments

See list of measuring instruments of this test report.

3.2.3. Test Procedures

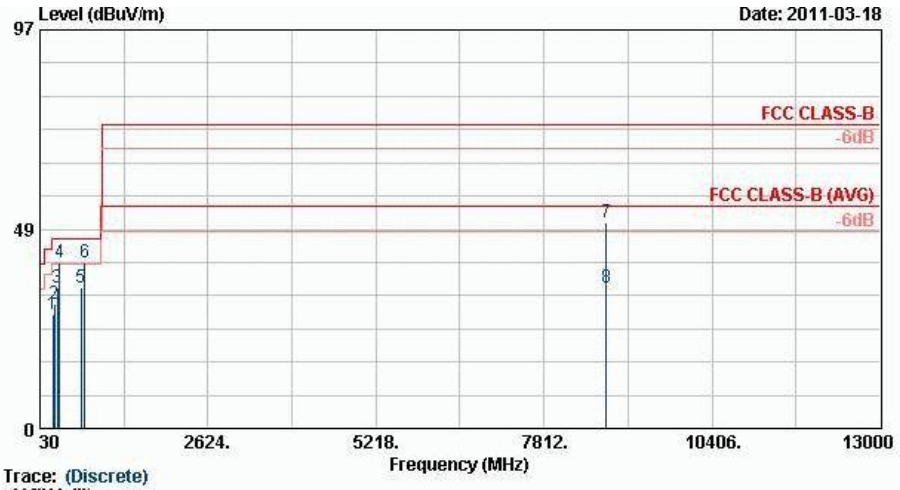
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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 :	22~23°C
Test Engineer :	Avis Chuang	Relative Humidity :	42~44%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM1900 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + USB Cable (Link with Notebook)		

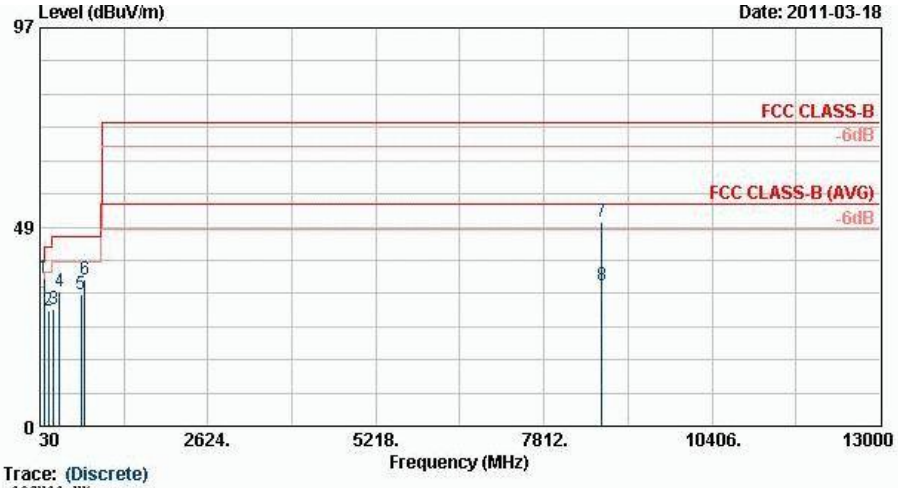


Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 HORIZONTAL
Power : From system
Project : FD 130415
Memo : Mode 2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	231.69	27.77	-18.23	46.00	46.13	11.46	1.78	31.60	---	---	Peak
2	249.78	30.27	-15.73	46.00	47.40	12.67	1.85	31.65	---	---	Peak
3	297.84	34.34	-11.66	46.00	50.52	13.43	2.05	31.66	---	---	Peak
4 @	332.90	40.25	-5.75	46.00	55.44	14.22	2.17	31.58	---	---	Peak
5	665.40	34.13	-11.87	46.00	43.68	19.31	3.12	31.98	---	---	Peak
6 @	719.30	40.34	-5.66	46.00	49.43	19.66	3.30	32.05	100	203	Peak
7	8772.00	50.06	-23.94	74.00	60.27	36.31	10.20	56.71	---	---	Peak
8	8772.00	34.18	-19.82	54.00	44.38	36.31	10.20	56.71	100	258	Average

Test Mode :	Mode 2	Temperature :	22~23°C
Test Engineer :	Avis Chuang	Relative Humidity :	42~44%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GSM1900 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + USB Cable (Link with Notebook)		



Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_090824 VERTICAL
Power : From system
Project : FD 130415
Memo : Mode 2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1 @	92.64	36.06	-7.44	43.50	57.04	9.56	1.16	31.71	100	235	Peak
2	165.54	27.98	-15.52	43.50	48.23	9.88	1.53	31.66	---	---	Peak
3	239.79	28.51	-17.49	46.00	46.38	11.97	1.81	31.65	---	---	Peak
4	330.80	32.83	-13.17	46.00	48.08	14.17	2.16	31.59	---	---	Peak
5	666.10	31.94	-14.06	46.00	41.49	19.32	3.12	31.98	---	---	Peak
6	719.30	35.75	-10.25	46.00	44.84	19.66	3.30	32.05	---	---	Peak
7	8708.00	49.61	-24.39	74.00	59.84	36.26	10.18	56.68	100	158	Peak
8	8708.00	34.25	-19.75	54.00	44.49	36.26	10.18	56.68	100	158	Average

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	ESVS10	834468/003	20MHz-1000MHz	Apr. 28, 2010	Apr. 27, 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. 15, 2010	Apr. 14, 2011	Radiation (03CH06-HY)
Amplifier	Agilent	310N	186713	9KHz~1GHz	Apr. 15, 2010	Apr. 14, 2011	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 Uc(y)	**1.13**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(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 Uc(y)	**1.27**		
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(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 Γ1 = 0.197 Antenna VSWR Γ2 = 0.194 Uncertainty = 20Log(1-Γ1*Γ2)	+0.34 / -0.35	U-Shape	0.244	1	0.244
Combined Standard Uncertainty Uc(y)	**2.36**				
Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.72**				