FCC Test Report

APPLICANT	:	Motorola Mobility, LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola Mobility, LLC
MODEL NAME	:	4009
FCC ID	:	IHDT56PH2
STANDARD	:	FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION	:	Certification

The product was received on May 05, 2014 and testing was completed on May 24, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures given in ANSI C63.4-2009 and shown to be compliant 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 Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC450533	Rev. 01	Initial issue of report	Jun. 05, 2014

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 15.30 dB at 0.182 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 7.51 dB at 240.060 MHz

1. General Description

1.1. Applicant

Motorola Mobility, LLC
222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

1.2. Manufacturer

Motorola Mobility, LLC
222 W Merchandise Mart Plaza, Suite 1800, Chicago, IL 60654, United States

1.3. Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola Mobility, LLC
Model Name	4009
FCC ID	IHDT56PH2
IMEI Code	990005290038943 990005290035352
EUT supports Radios application	CDMA/EV-DO/LTE WLAN 11b/g/n(HT20) Bluetooth v3.0 + EDR Bluetooth v4.0 + LE
HW Version	P3
SW Version	peregrine_usc_userdebug_4.4.3_KXB21.14-L1.12_14_intcfg_test-keys_usc_US
EUT Stage	Production Unit

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

Accessory List	
AC Adapter	Brand Name : Motorola
	Model Name : Agate Lite US/CAN WHT - SPN5810A
Earphone	Brand Name : Motorola
	Model Name : SJN1181A

1.4. Product Specification of Equipment Under Test

Product Specification subjective to this standard	
Tx Frequency	CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz LTE Band 5 : 824.7 MHz ~ 848.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 12 : 699.7 MHz ~ 715.3 MHz LTE Band 17 : 706.5 MHz ~ 713.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	CDMA2000 BC0 : 869.70 MHz ~ 893.31 MHz CDMA2000 BC1 : 1931.25 MHz ~ 1988.75 MHz LTE Band 5 : 869.7 MHz ~ 893.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 12 : 729.7 MHz ~ 745.3 MHz LTE Band 17 : 736.5 MHz ~ 743.5 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz GPS : 1.57542 GHz
Antenna Type	CDMA : Fixed Internal Antenna LTE : Fixed Internal Antenna WLAN : PIFA Antenna Bluetooth : PIFA Antenna GPS : Fixed Internal Antenna
Type of Modulation	CDMA2000 : QPSK CDMA2000 1xEV-DO : QPSK/8PSK LTE: QPSK / 16QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps) : 8-DPSK GPS : BPSK

1.5. Modification of EUT

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

1.6. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW1022 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 Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	CO05-HY	03CH06-HY

1.7. 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 C63.4-2009

Remark:

1. All test items were verified and recorded according to the standards and without any deviation during the test.
2. For FCC 15 Subpart B - Unintentional Radiators, device supports FM Radio (Receiver) shall be authorized as “FM broadcast receiver” per the Section 15.101 (a) Equipment authorization of unintentional radiators.
3. For other Unintentional Radiators features of this EUT, test reports are issued separately.
   Per the Note of the Section 15.101, when device supports features (USB, FM Radio, digital devices…etc.) more than one category of authorization, type of authorization shall be appropriately chosen for FCC 15B compliance rule, and the Section 15.101 (b), only those receivers that operate (tune) within the frequency range of 30-960 MHz, CB receivers and radar detectors are subject to the authorizations shown in paragraph (a) of the Section 15.101. However, receivers indicated as being subject to Declaration of Conformity that are contained within a transceiver, the transmitter portion of which is subject to certification, shall be authorized under the verification procedure

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2009 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.	Data application transferred mode (EUT with notebook)	☒	☒	☒

Abbreviations:

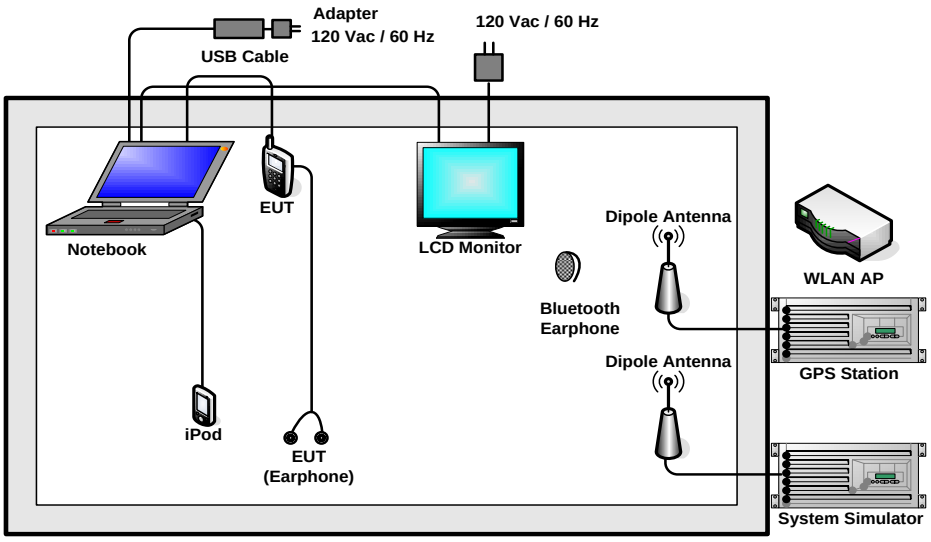
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1: LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) Mode 2: CDMA BC1 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)
Radiated Emissions <1GHz	1	Mode 1: LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) Mode 2: CDMA BC1 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)
Radiated Emissions ≥ 1GHz	1	Mode 1: LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)

Remark:

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



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	R&S	CMU 200	N/A	N/A	Unshielded, 1.8 m
2.	System Simulator	R&S	CMW 500	N/A	N/A	Unshielded, 1.8 m
3.	GPS Station	T&E	GS-50	N/A	N/A	Unshielded, 1.8 m
4.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
5.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
6.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	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.	Notebook	DELL	Latitude E7440	FCC DoC	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
9.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
10.	LCD MONITOR	Dell	U2410	FCC DoC	Shielded, 1.6m	Unshielded,1.8m
11.	SD Card	SanDisk	MicroSD HC	FCC DoC	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was in CDMA2000 or LTE idle mode during the testing. The EUT was synchronized to the BCCH, and was 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. 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. 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.

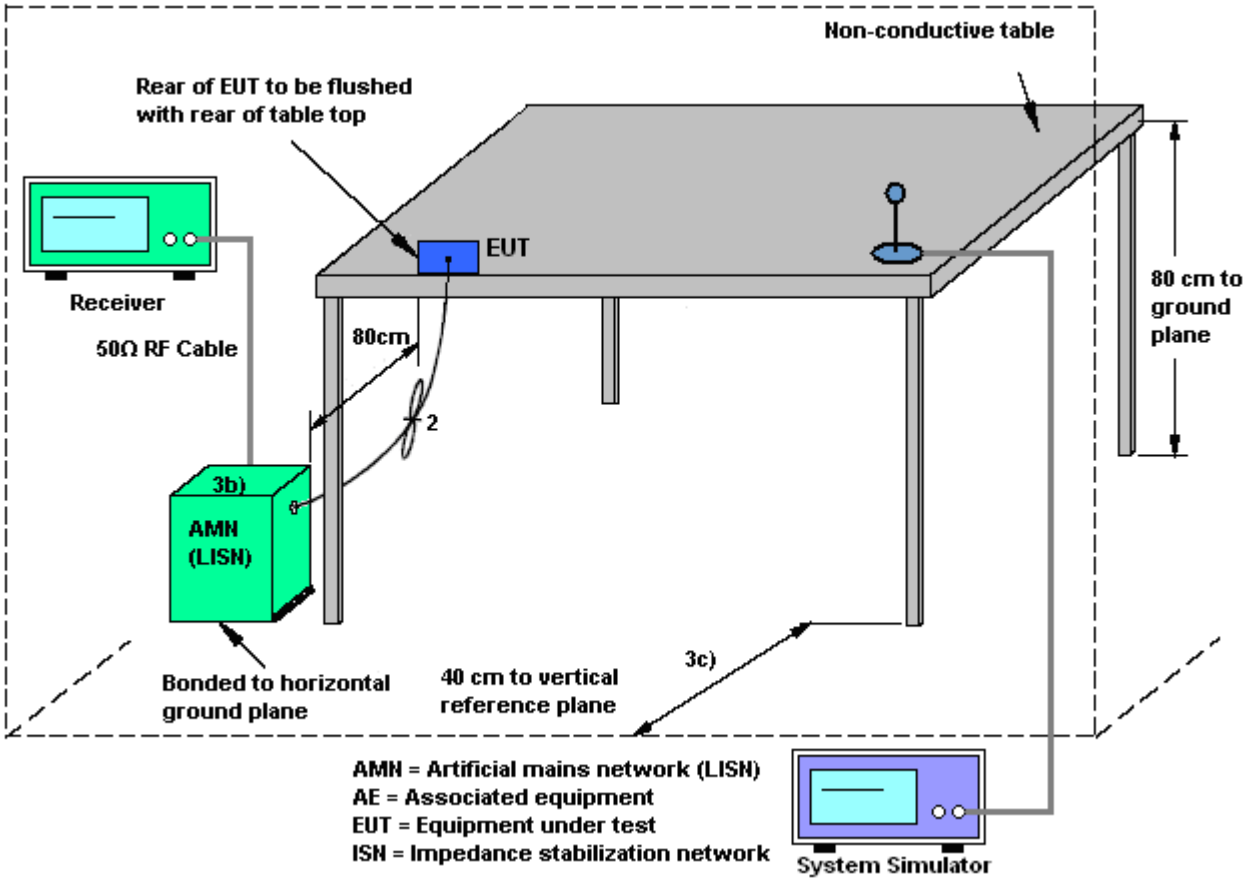
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

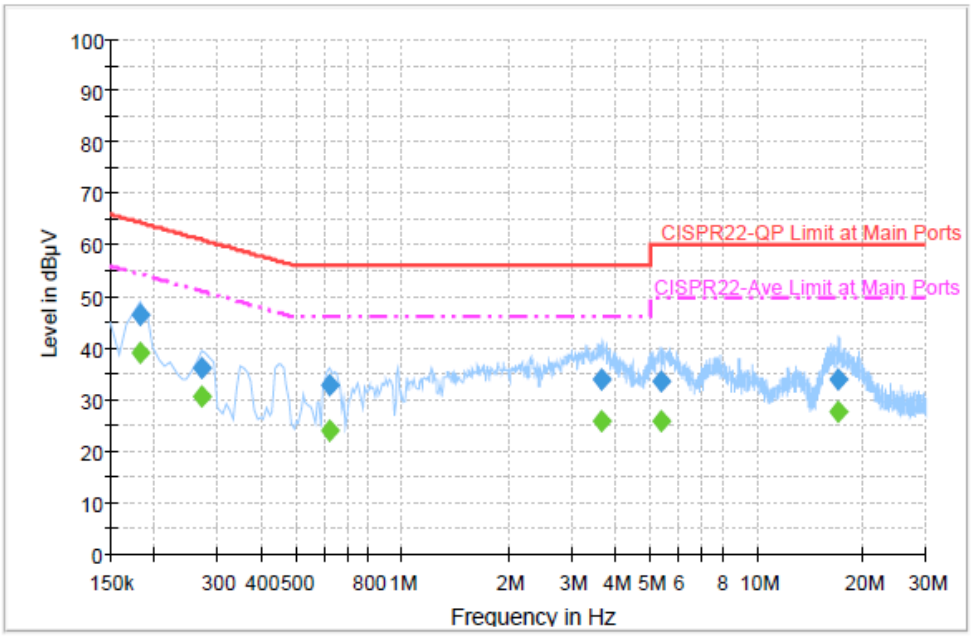
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
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 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℃
Test Engineer :	Cosmo Xu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		



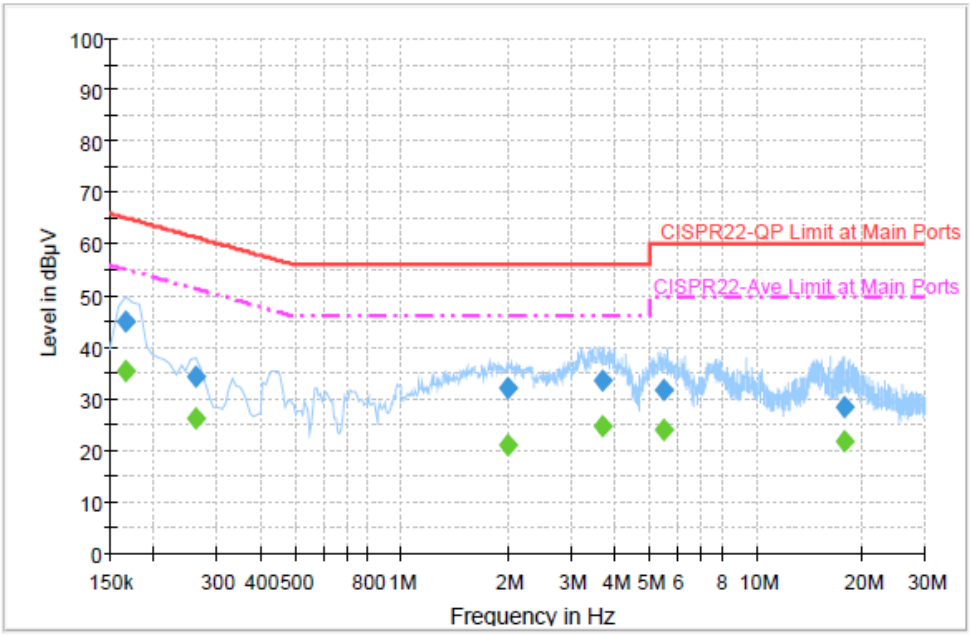
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	46.5	Off	L1	19.3	17.9	64.4
0.270000	36.2	Off	L1	19.3	24.9	61.1
0.622000	33.0	Off	L1	19.4	23.0	56.0
3.630000	33.8	Off	L1	19.6	22.2	56.0
5.382000	33.6	Off	L1	19.6	26.4	60.0
16.974000	34.0	Off	L1	19.8	26.0	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.182000	39.1	Off	L1	19.3	15.3	54.4
0.270000	30.7	Off	L1	19.3	20.4	51.1
0.622000	24.0	Off	L1	19.4	22.0	46.0
3.630000	25.7	Off	L1	19.6	20.3	46.0
5.382000	25.8	Off	L1	19.6	24.2	50.0
16.974000	27.8	Off	L1	19.8	22.2	50.0

Test Mode :	Mode 1	Temperature :	20~22℃
Test Engineer :	Cosmo Xu	Relative Humidity :	46~48%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	45.2	Off	N	19.3	20.0	65.2
0.262000	34.3	Off	N	19.4	27.1	61.4
1.990000	32.0	Off	N	19.5	24.0	56.0
3.694000	33.5	Off	N	19.6	22.5	56.0
5.502000	31.9	Off	N	19.6	28.1	60.0
17.710000	28.6	Off	N	19.9	31.4	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.166000	35.4	Off	N	19.3	19.8	55.2
0.262000	26.4	Off	N	19.4	25.0	51.4
1.990000	21.2	Off	N	19.5	24.8	46.0
3.694000	24.9	Off	N	19.6	21.1	46.0
5.502000	24.0	Off	N	19.6	26.0	50.0
17.710000	21.7	Off	N	19.9	28.3	50.0

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

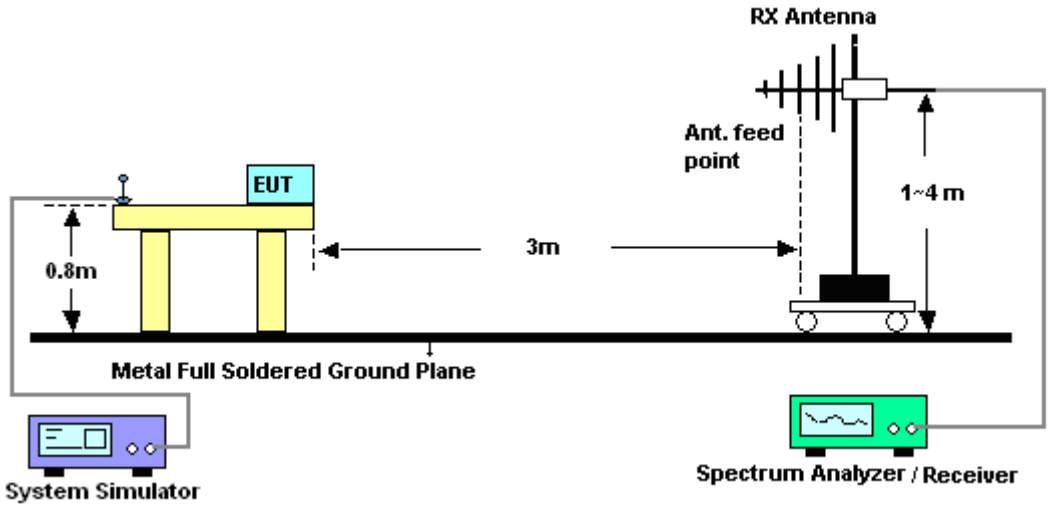
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

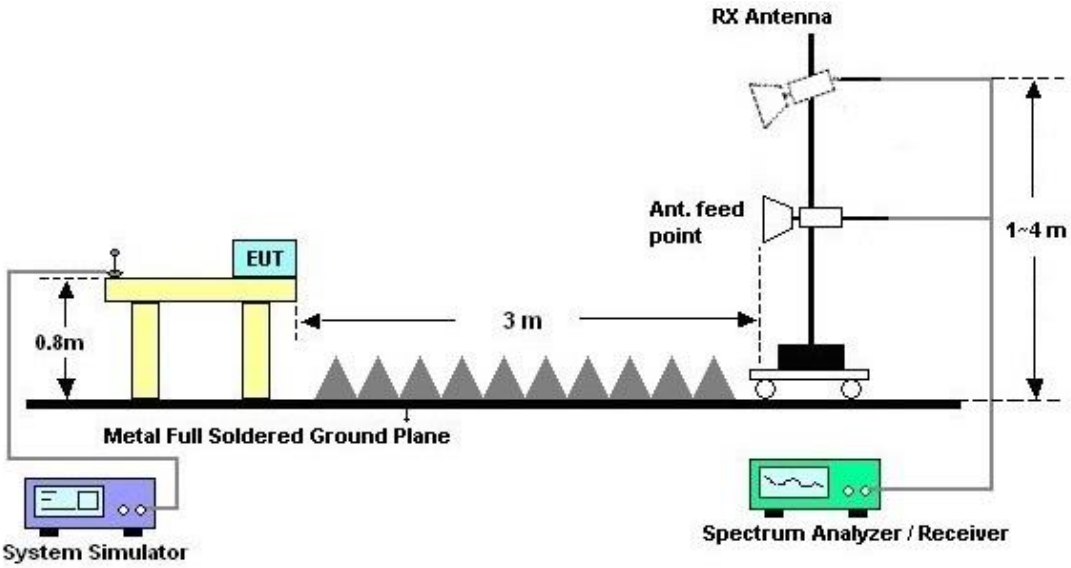
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

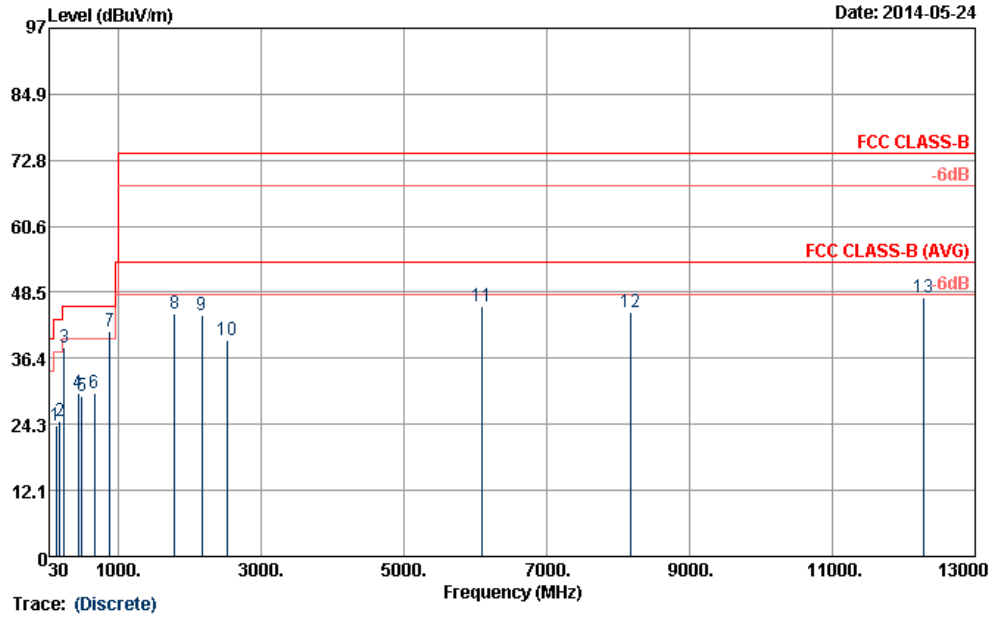


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 1	**Temperature :**	22~24°C
Test Engineer :	Luke Chang	**Relative Humidity :**	40~42%
Test Distance :	3m	**Polarization :**	Horizontal
Function Type :	LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		
Remark :	#7 is system simulator signal which can be ignored.		



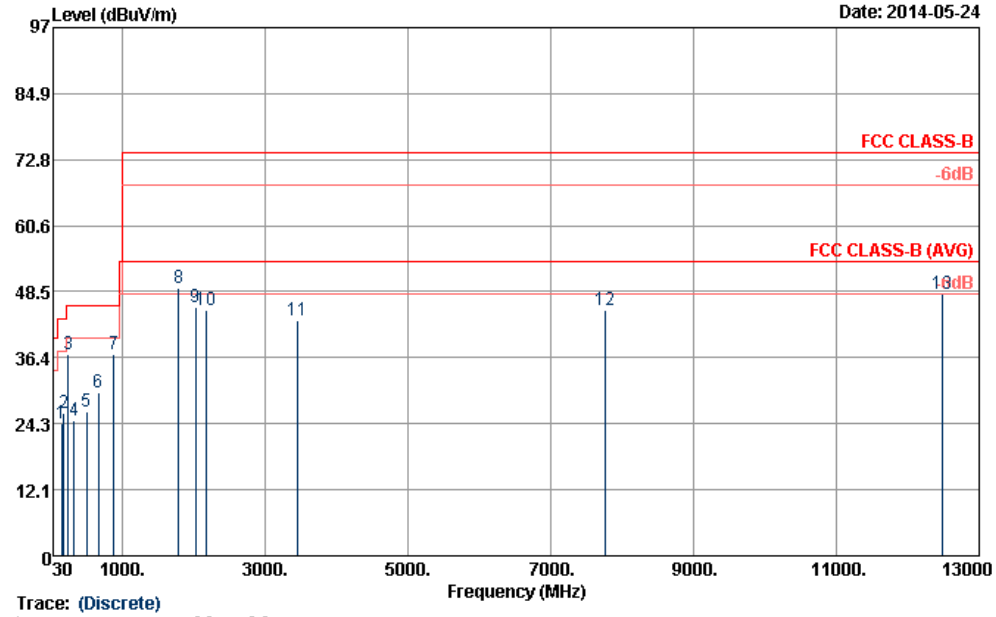
Trace: (Discrete)

Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_583_130802 HORIZONTAL

Power : From System
Mode : Mode 1

		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		131.25	23.96	-19.54	43.50	43.00	11.44	1.27	31.75	---	---	Peak
2		179.04	24.91	-18.59	43.50	45.84	9.35	1.47	31.75	---	---	Peak
3		240.06	38.49	-7.51	46.00	57.05	11.49	1.69	31.74	100	14	Peak
4		438.60	29.87	-16.13	46.00	42.64	16.80	2.29	31.86	---	---	Peak
5		492.50	29.50	-16.50	46.00	41.27	17.73	2.42	31.92	---	---	Peak
6		664.00	29.95	-16.05	46.00	39.70	19.45	2.83	32.03	---	---	Peak
7	!	881.50	41.31			48.70	20.90	3.32	31.61	---	---	Peak
8		1792.00	44.66	-29.34	74.00	69.64	30.08	5.40	60.46	---	---	Peak
9		2166.00	44.35	-29.65	74.00	66.97	31.74	6.14	60.50	---	---	Peak
10		2534.00	39.67	-34.33	74.00	61.46	32.05	6.69	60.53	---	---	Peak
11		6102.00	45.91	-28.09	74.00	59.00	35.38	11.79	60.26	---	---	Peak
12		8168.00	44.88	-29.12	74.00	58.02	35.60	10.89	59.63	---	---	Peak
13		12268.00	47.52	-26.48	74.00	56.53	38.98	11.36	59.35	100	0	Peak

Test Mode :	Mode 1	Temperature :	22~24°C
Test Engineer :	Luke Chang	Relative Humidity :	40~42%
Test Distance :	3m	Polarization :	Vertical
Function Type :	LTE Band 5 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		
Remark :	#7 is system simulator signal which can be ignored.		



Site : 03CH06-HY
Condition : FCC CLASS-B 3m HF-ANT_583_130802 VERTICAL

Power : From System
Mode : Mode 1

	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	152.04	24.26	-19.24	43.50	44.14	10.50	1.37	31.75	---	---	Peak
2	183.36	26.15	-17.35	43.50	47.32	9.12	1.46	31.75	---	---	Peak
3	240.06	36.93	-9.07	46.00	55.49	11.49	1.69	31.74	100	201	Peak
4	322.40	24.76	-21.24	46.00	40.84	13.70	1.96	31.74	---	---	Peak
5	503.00	26.39	-19.61	46.00	38.00	17.83	2.49	31.93	---	---	Peak
6	667.50	29.87	-16.13	46.00	39.60	19.47	2.83	32.03	---	---	Peak
7	881.50	37.04			44.43	20.90	3.32	31.61	---	---	Peak
8	1786.00	49.29	-24.71	74.00	74.40	29.95	5.40	60.46	100	31	Peak
9	2024.00	45.79	-28.21	74.00	68.75	31.61	5.93	60.50	---	---	Peak
10	2182.00	45.04	-28.96	74.00	67.65	31.75	6.14	60.50	---	---	Peak
11	3458.00	43.23	-30.77	74.00	63.82	32.79	7.99	61.37	---	---	Peak
12	7760.00	45.25	-28.75	74.00	58.88	35.55	10.94	60.12	---	---	Peak
13	12486.00	48.08	-25.92	74.00	57.31	39.20	11.37	59.80	---	---	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100356	9kHz ~ 2.75GHz	Nov. 15, 2013	May 21, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN (for auxiliary equipment)	Rohde & Schwarz	ENV216	100081	9kHz ~ 30MHz	Dec. 12, 2013	May 21, 2014	Dec. 11, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	May 21, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	May 21, 2014	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	May 24, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz ~ 26.5GHz	Dec. 02, 2013	May 24, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1000MHz	May 06, 2014	May 24, 2014	May 05, 2015	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Oct. 10, 2013	May 24, 2014	Oct. 09, 2014	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Aug. 02, 2013	May 24, 2014	Aug. 01, 2014	Radiation (03CH06-HY)
Amplifier	SONOMA	310N	186713	9kHz ~ 1GHz	Apr. 16, 2014	May 24, 2014	Apr. 15, 2015	Radiation (03CH06-HY)
Pre Amplifier	EMCI	EMC051845	SN980048	1GHz ~ 18GHz	Jul. 18, 2013	May 24, 2014	Jul. 17, 2014	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0 ~ 360 degree	N/A	May 24, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1 m ~ 4 m	N/A	May 24, 2014	N/A	Radiation (03CH06-HY)
Loop Antenna	Rohde & Schwarz	HFH2-Z2	860004/0001	9kHz ~ 30MHz	Jul. 03, 2012	May 24, 2014	Jul. 02, 2014	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))	**2.26**

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.50**