



FCC Test Report

APPLICANT : Motorola Mobility, LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola Mobility, LLC
MODEL NAME : 4079
FCC ID : IHDT56PK2
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Aug. 26, 2014 and testing was completed on Sep. 05, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2009 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



SPORTON INTERNATIONAL INC.

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FCC ID : IHDT56PK2

Page Number : 1 of 21

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APPENDIX A. ORIGINAL REPORT



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 8.50 dB at 0.174 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.03 dB at 240.06 MHz for Quasi-Peak



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. Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola Mobility, LLC
Model Name	4079
FCC ID	IHDT56PK2
IMEI	990005280005639
EUT supports Radios application	GSM/EGPRS/WCDMA/HSPA/LTE/NFC 2.4GHz WLAN 11b/g/n HT20 WLAN 11ac VHT20 5GHz WLAN 11a/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v3.0 EDR Bluetooth v4.0 - LE
HW Version	P3
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.

Accessory List	
USB Cable	Brand Name : Motorola
	Model Name : SKN6461A
Battery	Brand Name : Motorola
	Model Name : EQ40
Earphone	Brand Name : Motorola
	Model Name : SJYN1305A



Product Specification subjective to this standard	
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) LTE : QPSK / 16QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps) : 8-DPSK GPS : BPSK NFC: ASK

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 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 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.	
	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
1.	Data application transferred mode (EUT with notebook)	☒	☒

Abbreviations:

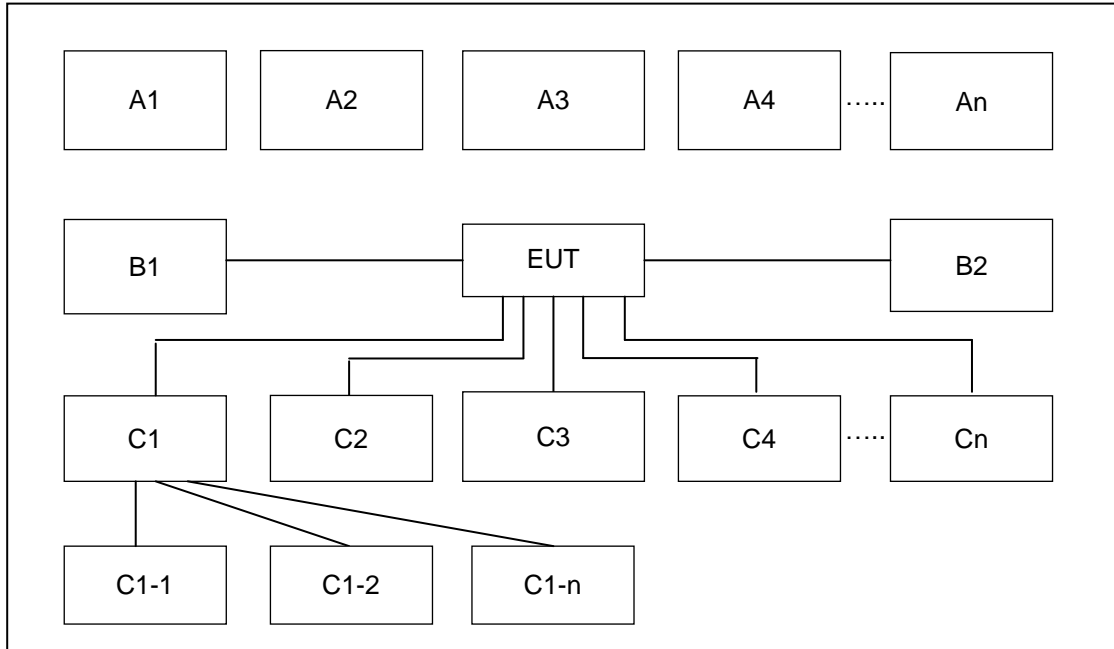
- EMI AC: AC conducted emissions
- EMI RE 1G: EUT radiated emissions

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1 : GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)
Radiated Emissions	1	Mode 1 : GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)

Remark:

1. Data Link with Notebook means data application transferred mode between EUT and Notebook.
2. This report only assessed GSM850, other frequency band exposure evaluation which refer to the Sporton FCC Report, FCC ID: IHDT56PK1, Report No: FC462024, and Appendix A.

2.2. Connection Diagram of Test System



Test Setup									
No.	Wireless Station	Connection Type	Test Mode						
			1	-	-	-	-	-	-
A1	Bluetooth Earphone	Bluetooth	X						
A2	System Simulator	GSM/UMTS/CDMA/ WCDMA/LTE	X						
A3	GPS Station	GPS	X						
A4	WLAN AP	WiFi	X						
No.	Power Source	Connection Type	1	-	-	-	-	-	-
B1	AC : 120V/60Hz	AC Power Cable	X						
No.	Setup Peripherals	Connection Type	1	-	-	-	-	-	-
C1	Notebook	USB cable	X						
C1-1	iPod	USB Cable to C1	X						
C1-2	WLAN AP	RJ-45 Cable to C1	X						
C2	Earphone	Earphone jack	X						

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.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-865L	KA2DIR865LA1	N/A	Unshielded, 1.8 m
4.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
5.	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
6.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
7.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A

2.4. EUT Operation Test Setup

The EUT was in GSM 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.

The EUT was attached to the Bluetooth earphone and 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 continuously receive 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.

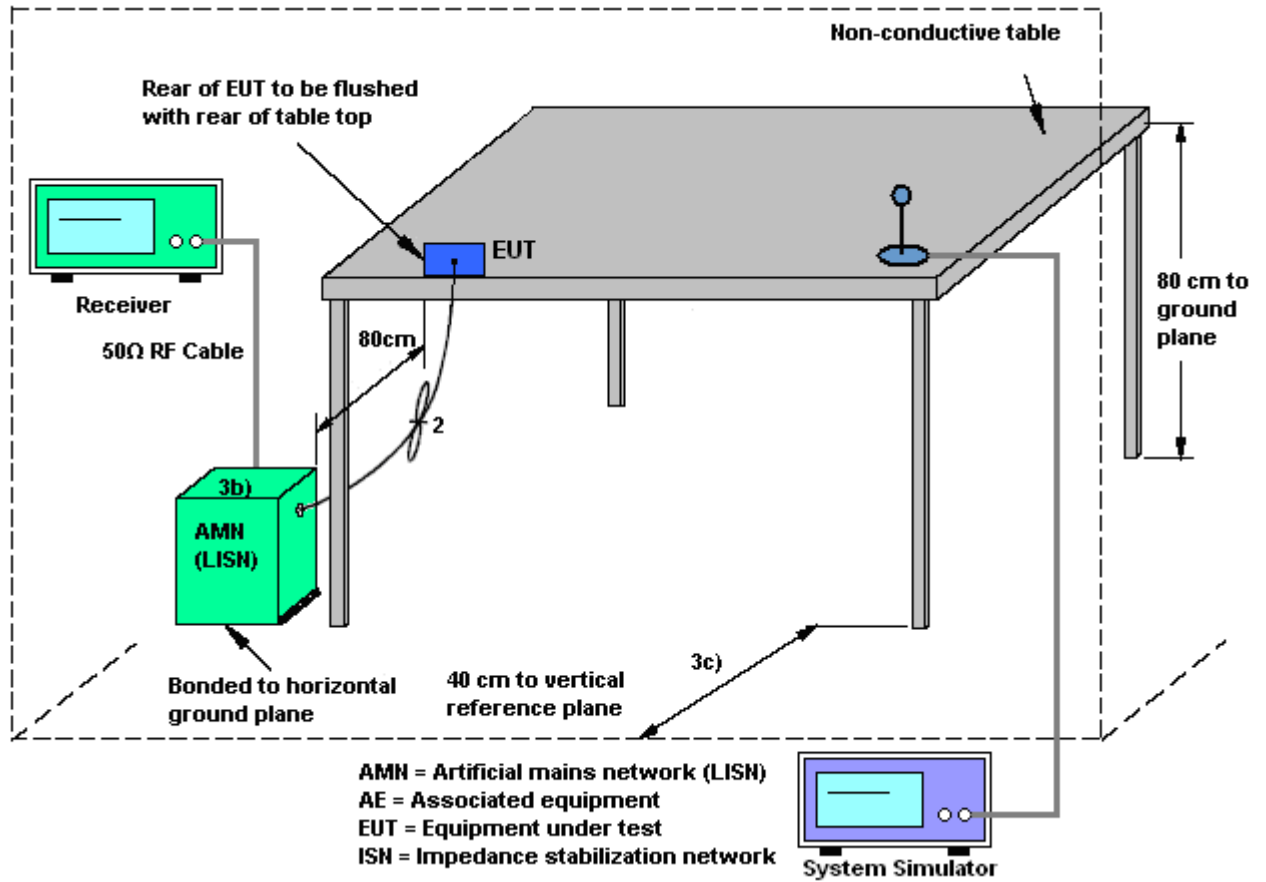
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

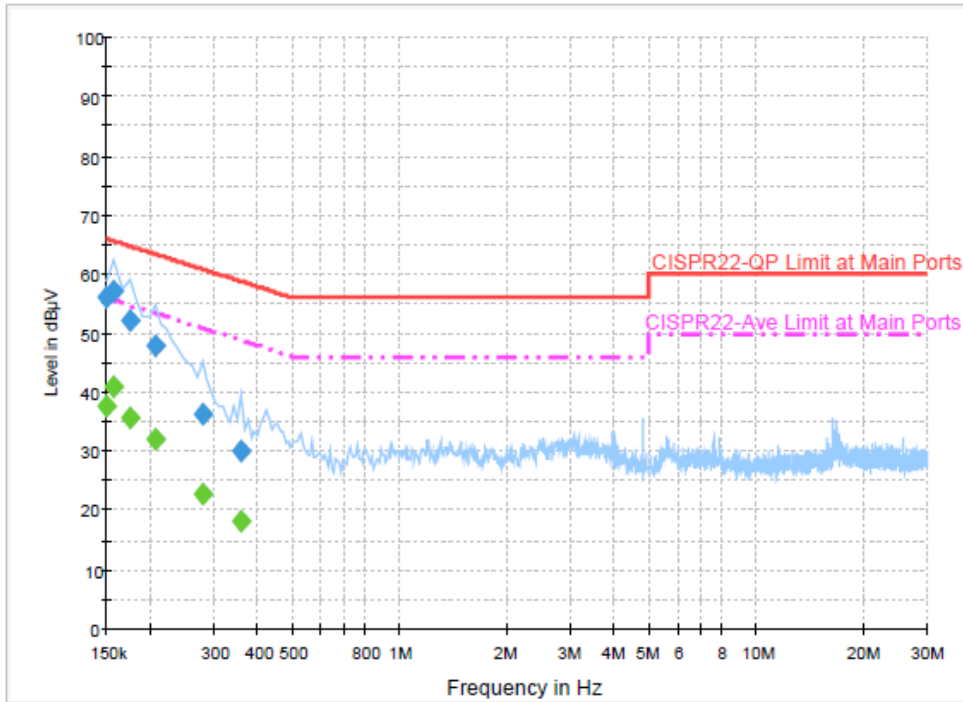
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. The AC adapter of Notebook was connected to the line impedance stabilization network (LISN).
3. The LISN provides 50 ohm coupling impedance for the measuring instrument.
4. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth=9KHz) 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 :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		



Final Result : Quasi-Peak

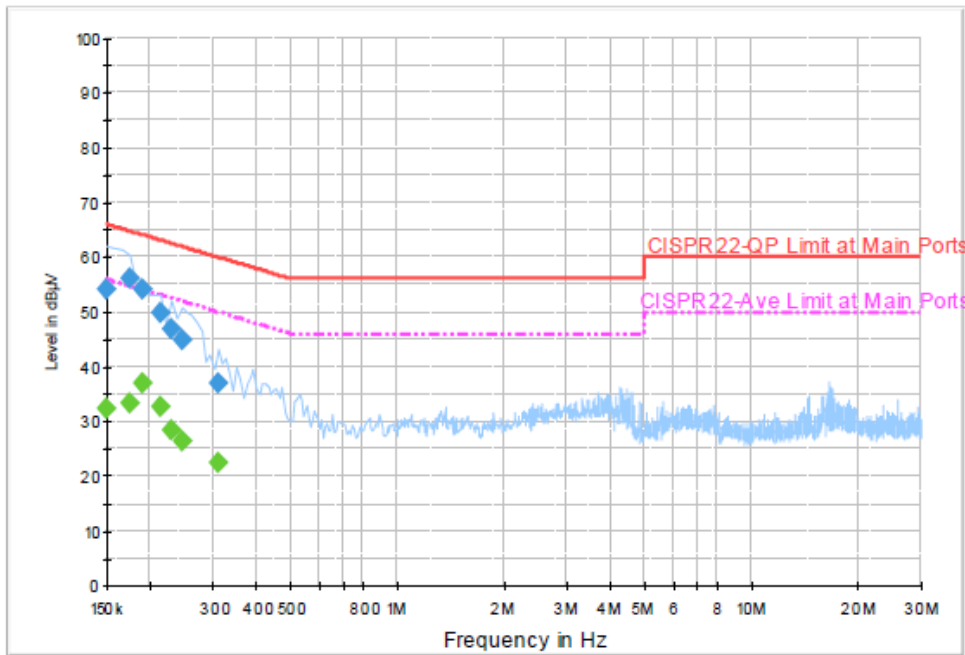
Frequency (MHz)	Quasi-Peak (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	56.1	Off	L1	19.3	9.9	66.0
0.158000	56.9	Off	L1	19.3	8.7	65.6
0.174000	52.2	Off	L1	19.3	12.6	64.8
0.206000	47.8	Off	L1	19.3	15.6	63.4
0.278000	36.4	Off	L1	19.3	24.5	60.9
0.358000	30.1	Off	L1	19.4	28.7	58.8

Final Result : Average

Frequency (MHz)	Average (dBμV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.150000	37.6	Off	L1	19.3	18.4	56.0
0.158000	40.9	Off	L1	19.3	14.7	55.6
0.174000	35.8	Off	L1	19.3	19.0	54.8
0.206000	32.1	Off	L1	19.3	21.3	53.4
0.278000	22.8	Off	L1	19.3	28.1	50.9
0.358000	18.3	Off	L1	19.4	30.5	48.8



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 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)
0.150000	54.1	Off	N	19.4	11.9	66.0
0.174000	56.3	Off	N	19.3	8.5	64.8
0.190000	54.2	Off	N	19.3	9.8	64.0
0.214000	49.8	Off	N	19.3	13.2	63.0
0.230000	47.0	Off	N	19.4	15.4	62.4
0.246000	45.0	Off	N	19.4	16.9	61.9
0.310000	37.0	Off	N	19.4	23.0	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	32.4	Off	N	19.4	23.6	56.0
0.174000	33.3	Off	N	19.3	21.5	54.8
0.190000	37.0	Off	N	19.3	17.0	54.0
0.214000	32.5	Off	N	19.3	20.5	53.0
0.230000	28.4	Off	N	19.4	24.0	52.4
0.246000	26.3	Off	N	19.4	25.6	51.9
0.310000	22.3	Off	N	19.4	27.7	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

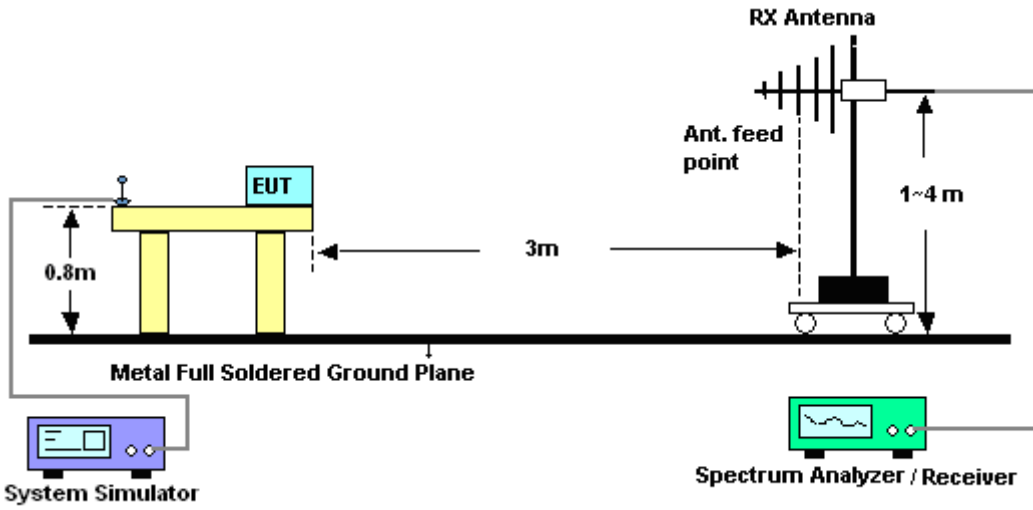
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

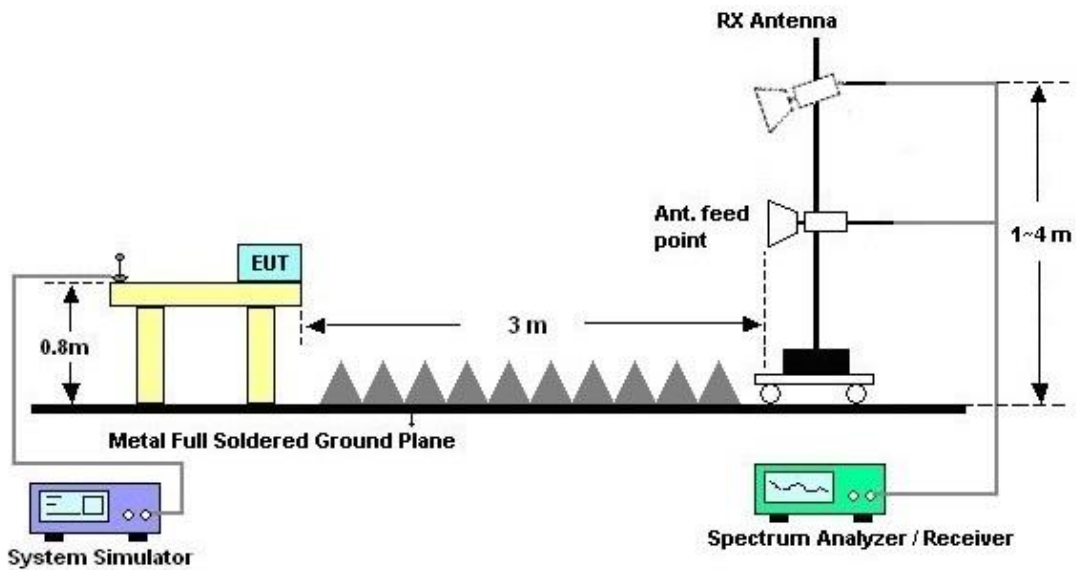
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna 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.
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).
6. 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.
7. Emission level (dBµV/m) = 20 log Emission level (µV/m)
8. 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



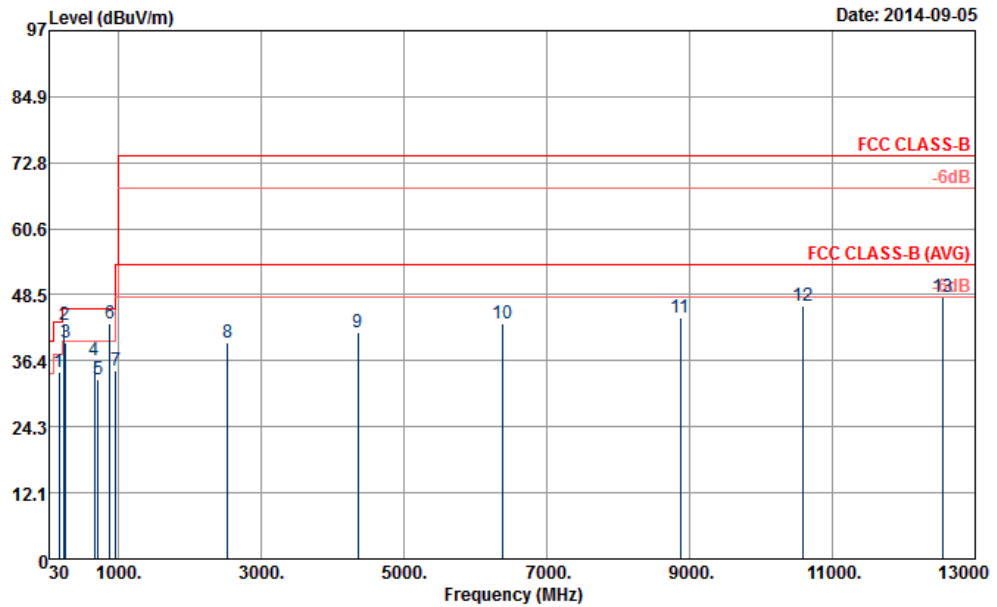
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	25~26°C
Test Engineer :	Kai Wang	Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		
Remark :	#6 is system simulator signal which can be ignored.		



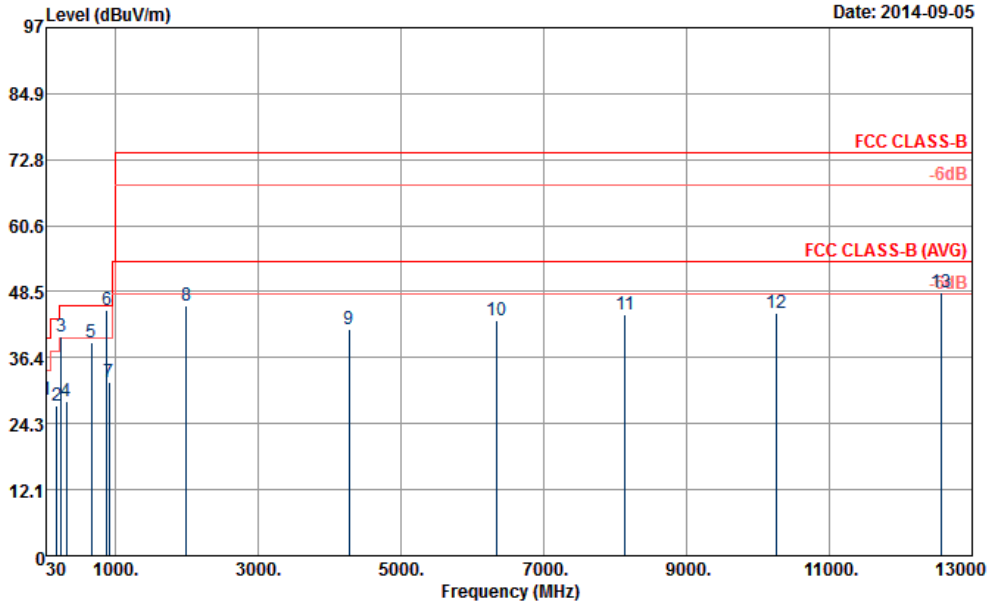
Site : 03CH06-HY
 Condition : FCC CLASS-B 3m HF-ANT_583_140731 HORIZONTAL

Power : From System
 Mode : Mode 1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	171.75	34.40	-9.10	43.50	54.83	9.72	1.60	31.75	---	---	Peak
2	240.06	42.97	-3.03	46.00	61.53	11.49	1.69	31.74	156	333	QP
3	265.44	39.63	-6.37	46.00	56.20	13.36	1.80	31.73	---	---	Peak
4	664.00	36.59	-9.41	46.00	46.34	19.45	2.83	32.03	---	---	Peak
5	720.00	32.84	-13.16	46.00	42.10	19.80	2.95	32.01	---	---	Peak
6	881.40	43.11			50.50	20.90	3.32	31.61	---	---	Peak
7	959.40	34.64	-11.36	46.00	40.88	21.39	3.35	30.98	---	---	Peak
8	2534.00	39.84	-34.16	74.00	61.95	32.05	6.37	60.53	---	---	Peak
9	4350.00	41.69	-32.31	74.00	61.16	33.89	8.27	61.63	---	---	Peak
10	6386.00	43.20	-30.80	74.00	58.20	35.68	9.75	60.43	---	---	Peak
11	8866.00	44.31	-29.69	74.00	55.55	35.89	13.03	60.16	---	---	Peak
12	10580.00	46.60	-27.40	74.00	56.18	37.45	13.23	60.26	---	---	Peak
13	12554.00	48.11	-25.89	74.00	53.00	39.33	15.63	59.85	100	248	Peak



Test Mode :	Mode 1	Temperature :	25~26°C
Test Engineer :	Kai Wang	Relative Humidity :	48~49%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook)		
Remark :	#6 is system simulator signal which can be ignored.		



Site : 03CH06-HY
 Condition : FCC CLASS-B 3m HF-ANT_583_140731 VERTICAL

Power : From System
 Mode : Mode 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	30.00	28.57	-11.43	40.00	41.23	18.50	0.64	31.80	---	---	Peak
2	175.26	27.46	-16.04	43.50	48.13	9.55	1.53	31.75	---	---	Peak
3	240.06	40.37	-5.63	46.00	58.93	11.49	1.69	31.74	123	74	Peak
4	308.40	28.41	-17.59	46.00	44.85	13.36	1.93	31.73	---	---	Peak
5	665.40	39.12	-6.88	46.00	48.87	19.45	2.83	32.03	---	---	Peak
6	881.40	45.17		46.00	52.56	20.90	3.32	31.61	---	---	Peak
7	916.00	31.77	-14.23	46.00	38.74	21.05	3.36	31.38	---	---	Peak
8	1990.00	45.93	-28.07	74.00	69.42	31.58	5.43	60.50	---	---	Peak
9	4268.00	41.61	-32.39	74.00	60.86	33.77	8.63	61.65	---	---	Peak
10	6340.00	43.10	-30.90	74.00	58.17	35.63	9.70	60.40	---	---	Peak
11	8138.00	44.33	-29.67	74.00	55.84	35.74	12.39	59.64	---	---	Peak
12	10256.00	44.64	-29.36	74.00	55.51	37.20	12.78	60.85	---	---	Peak
13	12570.00	48.45	-25.55	74.00	53.34	39.33	15.65	59.87	100	32	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	Sep. 01, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Sep. 01, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Sep. 01, 2014	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	Sep. 05, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz ~26.5GHz	Dec. 02, 2013	Sep. 05, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1000MHz	May 06, 2014	Sep. 05, 2014	May 05, 2015	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Oct. 10, 2013	Sep. 05, 2014	Oct. 09, 2014	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Jul. 24, 2014	Sep. 05, 2014	Jul. 23, 2015	Radiation (03CH06-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Sep. 05, 2014	Dec. 03, 2014	Radiation (03CH06-HY)
Amplifier	SONOMA	310N	186713	9kHz ~ 1GHz	Apr. 16, 2014	Sep. 05, 2014	Apr. 15, 2015	Radiation (03CH06-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159075	1GHz ~ 18GHz	Apr. 11, 2014	Sep. 05, 2014	Apr. 10, 2015	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0 ~ 360 degree	N/A	Sep. 05, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF78020821 2	1 m ~ 4 m	N/A	Sep. 05, 2014	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% ($U = 2Uc(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.50
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Appendix A. Original Report

Please refer to Sporton report number FC462024 as below.



FCC Test Report

APPLICANT : Motorola Mobility, LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola Mobility, LLC
MODEL NAME : 3584
FCC ID : IHDT56PK1
STANDARD : FCC 47 CFR FCC Part 15 Subpart B
CLASSIFICATION : Certification

The product was received on Jun. 20, 2014 and testing was completed on Aug. 05, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2009 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

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SPORTON INTERNATIONAL INC.

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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 9.70 dB at 0.150 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.07 dB at 240.060 MHz for peak



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. Product Feature of Equipment Under Test

Product Feature	
Equipment	Mobile Cellular Phone
Brand Name	Motorola Mobility, LLC
Model Name	3584
FCC ID	IHDT56PK1
IMEI	990005110007243 990005110019875
EUT supports Radios application	CDMA/EV-DO/GSM/EGPRS/WCDMA/HSPA/LTE/NFC 2.4GHz WLAN 11b/g/n HT20 WLAN 11ac VHT20 5GHz WLAN 11a/b/g/n HT20/HT40 WLAN 11ac VHT20/VHT40/VHT80 Bluetooth v3.0 EDR Bluetooth v4.0 - LE
HW Version	P2
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.

Accessory List	
USB Cable	Brand Name : Motorola (shielded)
	Model Name : SKN6461A
Battery	Brand Name : Motorola
	Model Name : EQ40



1.4. Product Specification subjective to this standard

Product Specification subjective to this standard	
Tx Frequency	GSM850 : 824.2 MHz ~ 848.8 MHz GSM1900 : 1850.2 MHz ~ 1909.8MHz WCDMA Band V : 826.4 MHz ~ 846.6 MHz WCDMA Band II : 1852.4 MHz ~ 1907.6 MHz CDMA2000 BC0: 824.70 MHz ~ 848.31 MHz CDMA2000 BC1: 1851.25 MHz ~ 1908.75 MHz LTE Band 2 : 1850.7 MHz ~ 1909.3 MHz LTE Band 4 : 1710.7 MHz ~ 1754.3 MHz LTE Band 13 : 779.5 MHz ~ 784.5 MHz 802.11b/g/n/ac: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Rx Frequency	GSM850 : 869.2 MHz ~ 893.8 MHz GSM1900 : 1930.2 MHz ~ 1989.8 MHz WCDMA Band V : 871.4 MHz ~ 891.6 MHz WCDMA Band II : 1932.4 MHz ~ 1987.6 MHz CDMA2000 BC0: 869.70 MHz ~ 893.31 MHz CDMA2000 BC1: 1931.25 MHz ~ 1988.75 MHz LTE Band 2 : 1930.7 MHz ~ 1989.3 MHz LTE Band 4 : 2110.7 MHz ~ 2154.3 MHz LTE Band 13 : 748.5 MHz ~ 753.5 MHz 802.11b/g/n/ac: 2412 MHz ~ 2462 MHz 802.11a/n/ac: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5580 MHz and 5660 MHz ~ 5700 MHz ; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz GPS : 1.57542 GHz NFC : 13.56 MHz
Antenna Type	WWAN : Fixed Internal Antenna LTE : Fixed Internal Antenna WLAN : Fixed Internal Antenna Bluetooth : Fixed Internal Antenna GPS : Fixed Internal Antenna NFC : FPC + Ferrite Antenna



Product Specification subjective to this standard	
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE(MCS 0-4): GMSK / (MCS 5-9): 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) CDMA2000 : QPSK CDMA2000 1xEV-DO : 8PSK LTE : QPSK / 16QAM 802.11b : DSSS (DBPSK / DQPSK / CCK) 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM /256QAM) Bluetooth LE : GFSK Bluetooth (1Mbps) : GFSK Bluetooth (2Mbps) : π /4-DQPSK Bluetooth (3Mbps) : 8-DPSK GPS : BPSK NFC: ASK

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 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 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.	
	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:

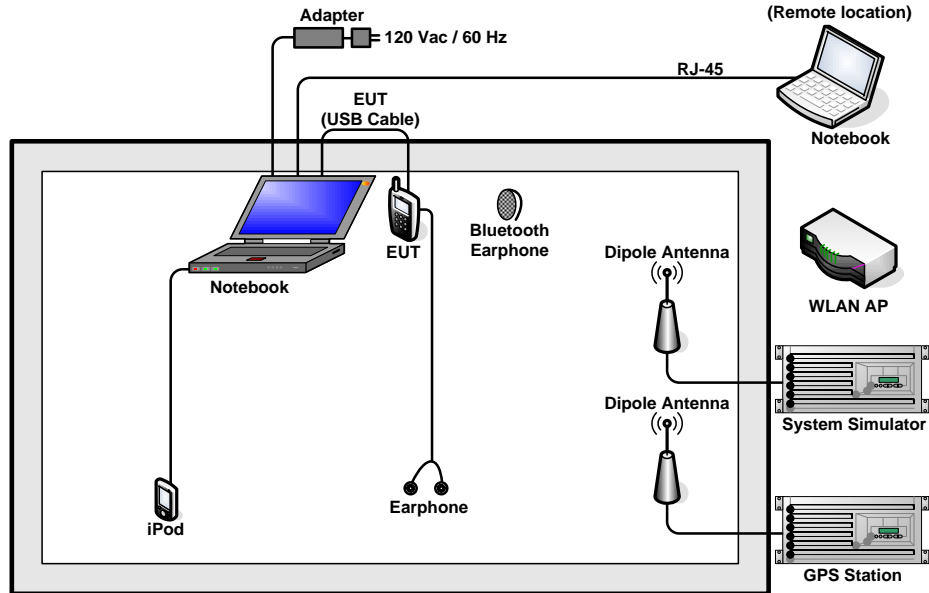
- EMI AC: AC conducted emissions
- EMI RE ≥ 1G: EUT radiated emissions ≥ 1GHz
- EMI RE < 1G: EUT radiated emissions < 1GHz

Test Items	EUT Configure Mode	Function Type
AC Conducted Emission	1	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1 Mode 2: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1
Radiated Emissions < 1GHz	1	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1 Mode 2: WCDMA Band II Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1
Radiated Emissions ≥ 1GHz	1	Mode 1: GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1

Remark:

- The worst case of AC is mode 1; only the test data of this mode was reported.
- The worst case of RE < 1G is mode 1; only the test data of this mode was reported.
- 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.	GPS Station	Pendulum	GSG-54	N/A	N/A	Unshielded, 1.8 m
3.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
4.	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
5.	Bluetooth Earphone	Sony Ericsson	MW600	PY7DDA-2029	N/A	N/A
6.	iPod	Apple	A1285	FCC DoC	Shielded, 1.0 m	N/A
7.	Earphone	Motorola	SJYN1181B	Verification	Unshielded, 1.25 m	N/A



2.4. EUT Operation Test Setup

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.

The EUT was attached to the Bluetooth earphone and 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 continuously receive 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.

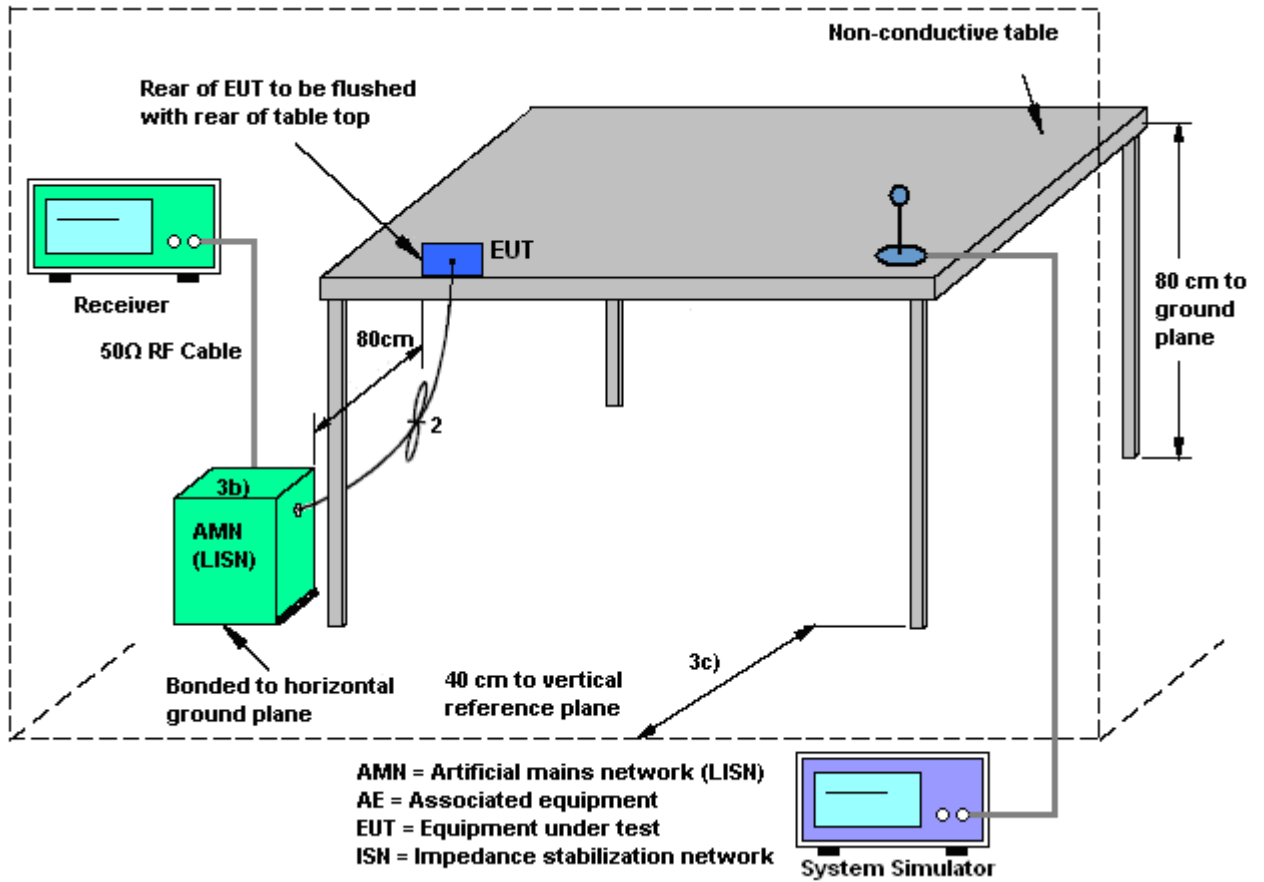
3.1.2 Measuring Instruments

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

3.1.3 Test Procedure

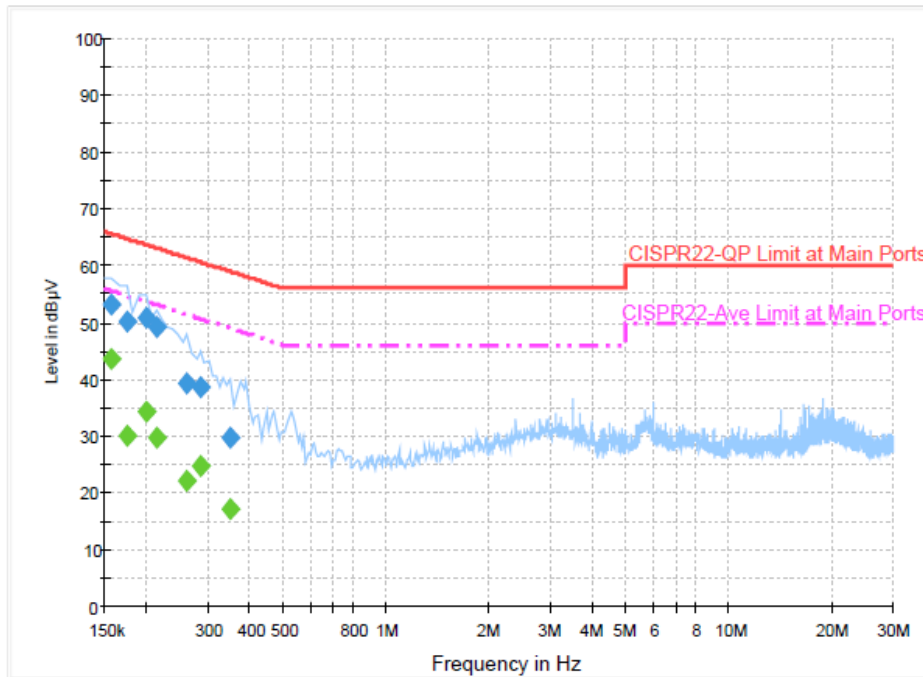
1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. The AC adapter of Notebook was connected to the line impedance stabilization network (LISN).
3. The LISN provides 50 ohm coupling impedance for the measuring instrument.
4. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
5. Both sides of AC line were checked for maximum conducted interference.
6. The frequency range from 150 kHz to 30 MHz was searched.
7. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth=9KHz) 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 :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Line
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1		



Final Result : Quasi-Peak

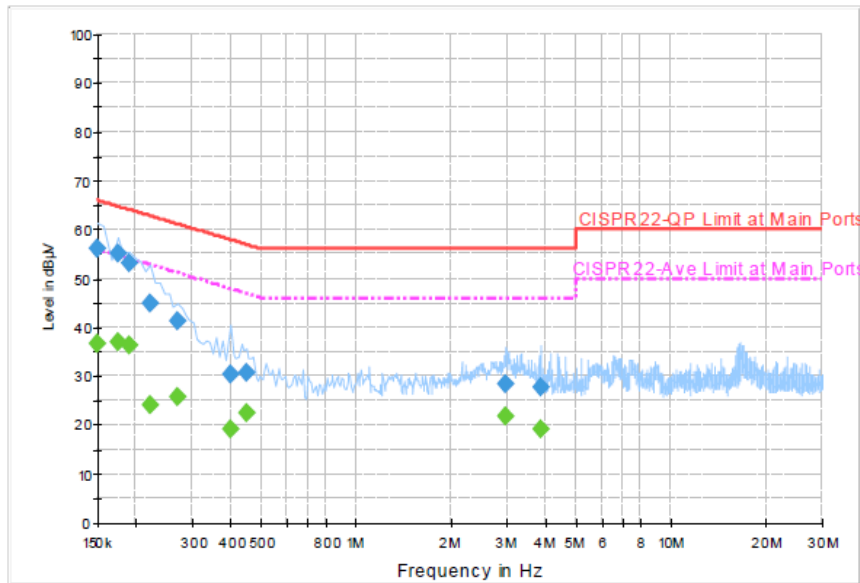
Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	53.2	Off	L1	19.3	12.4	65.6
0.174000	50.2	Off	L1	19.3	14.6	64.8
0.198000	50.8	Off	L1	19.3	12.9	63.7
0.214000	49.3	Off	L1	19.4	13.7	63.0
0.262000	39.3	Off	L1	19.4	22.1	61.4
0.286000	38.8	Off	L1	19.3	21.8	60.6
0.350000	29.8	Off	L1	19.3	29.2	59.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	43.6	Off	L1	19.3	12.0	55.6
0.174000	30.2	Off	L1	19.3	24.6	54.8
0.198000	34.5	Off	L1	19.3	19.2	53.7
0.214000	29.7	Off	L1	19.4	23.3	53.0
0.262000	22.1	Off	L1	19.4	29.3	51.4
0.286000	24.8	Off	L1	19.3	25.8	50.6
0.350000	17.0	Off	L1	19.3	32.0	49.0



Test Mode :	Mode 1	Temperature :	20~22°C
Test Engineer :	Cosmo Xu	Relative Humidity :	45~47%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1		



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	56.3	Off	N	19.4	9.7	66.0
0.174000	55.0	Off	N	19.3	9.8	64.8
0.190000	53.2	Off	N	19.3	10.8	64.0
0.222000	44.9	Off	N	19.3	17.8	62.7
0.270000	41.1	Off	N	19.4	20.0	61.1
0.398000	30.5	Off	N	19.4	27.4	57.9
0.446000	30.8	Off	N	19.4	26.1	56.9
2.982000	28.3	Off	N	19.6	27.7	56.0
3.830000	27.7	Off	N	19.6	28.3	56.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.150000	36.6	Off	N	19.4	19.4	56.0
0.174000	36.8	Off	N	19.3	18.0	54.8
0.190000	36.2	Off	N	19.3	17.8	54.0
0.222000	24.0	Off	N	19.3	28.7	52.7
0.270000	25.7	Off	N	19.4	25.4	51.1
0.398000	19.1	Off	N	19.4	28.8	47.9
0.446000	22.4	Off	N	19.4	24.5	46.9
2.982000	21.8	Off	N	19.6	24.2	46.0
3.830000	19.0	Off	N	19.6	27.0	46.0



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

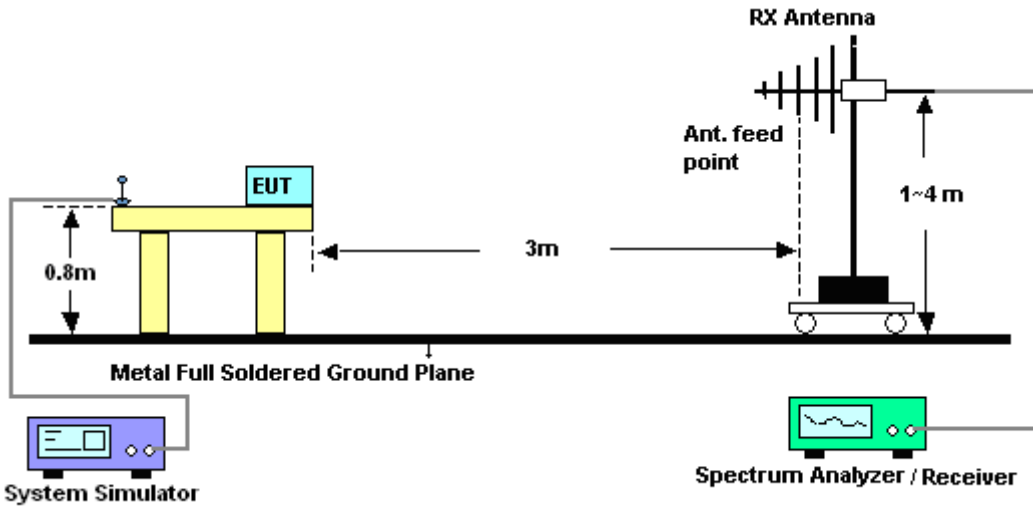
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna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

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).

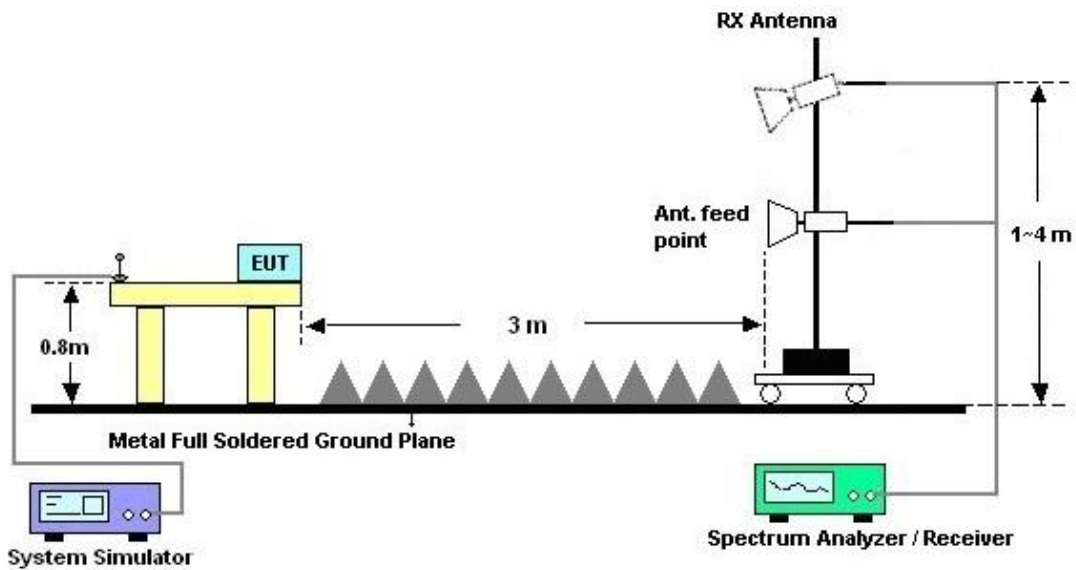
6. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
7. Emission level (dBµV/m) = 20 log Emission level (µV/m)
8. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz



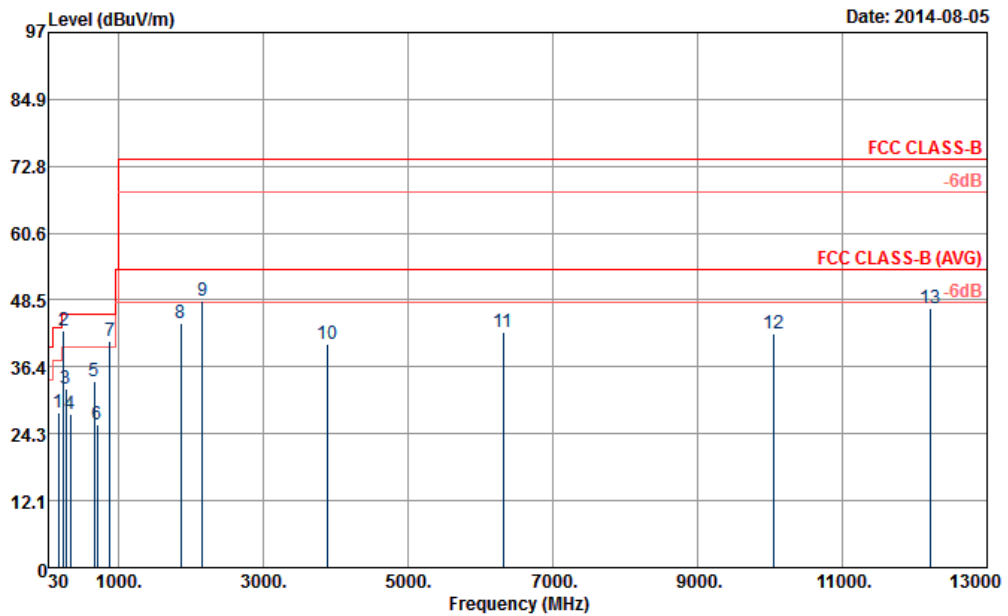
For radiated emissions above 1GHz





3.2.5. Test Result of Radiated Emission

Test Mode :	Mode 1	Temperature :	24~26°C
Test Engineer :	Hyden Wu	Relative Humidity :	42~44%
Test Distance :	3m	Polarization :	Horizontal
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1		
Remark :	#7 is system simulator signal which can be ignored.		

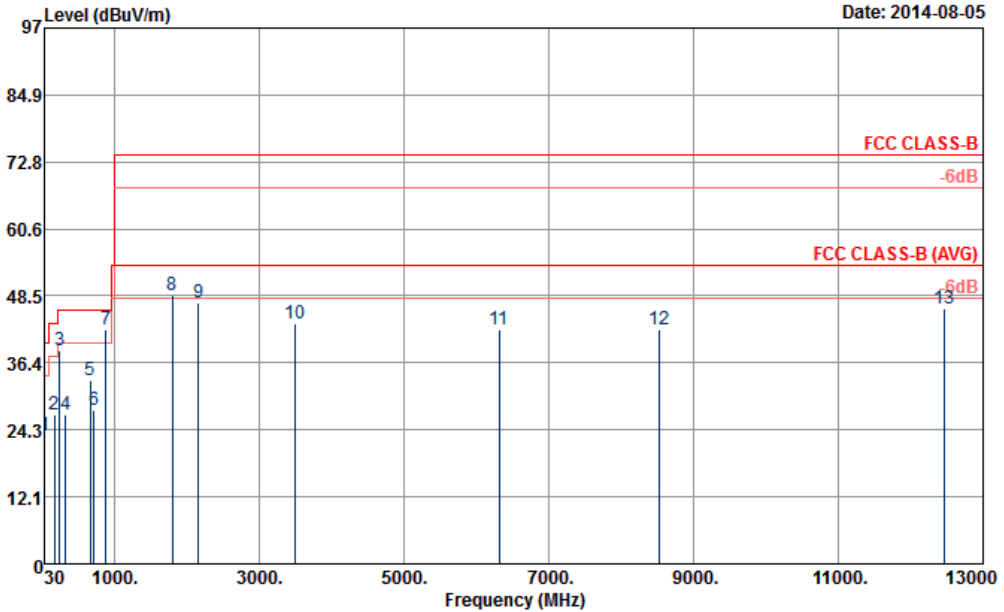


Site : 03CH06-HY
 Condition : FCC CLASS-B 3m HF-ANT_583_130802 HORIZONTAL
 Project : 462024
 Power : From System
 Mode : Mode 1

	Freq	Level	Over	Limit	ReadAntenna	Cable	Preamp	A/Pos	T/Pos	Remark	
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	167.70	28.13	-15.37	43.50	48.44	9.84	1.60	31.75	---	---	Peak
2	240.06	42.93	-3.07	46.00	61.49	11.49	1.69	31.74	112	247	Peak
3	267.60	32.36	-13.64	46.00	49.10	13.18	1.81	31.73	---	---	Peak
4	331.50	27.73	-18.27	46.00	43.74	13.75	1.99	31.75	---	---	Peak
5	664.00	33.67	-12.33	46.00	43.42	19.45	2.83	32.03	---	---	Peak
6	707.40	26.03	-19.97	46.00	35.67	19.47	2.91	32.02	---	---	Peak
7	881.40	41.18			48.57	20.90	3.32	31.61	---	---	Peak
8	1856.00	44.25	-29.75	74.00	68.69	30.46	5.57	60.47	---	---	Peak
9	2164.00	48.41	-25.59	74.00	71.08	31.72	6.11	60.50	100	0	Peak
10	3884.00	40.63	-33.37	74.00	60.27	33.28	8.72	61.64	---	---	Peak
11	6316.00	42.58	-31.42	74.00	55.68	35.55	11.74	60.39	---	---	Peak
12	10050.00	42.41	-31.59	74.00	56.11	36.85	10.58	61.13	---	---	Peak
13	12208.00	46.97	-27.03	74.00	55.92	38.91	11.35	59.21	---	---	Peak



Test Mode :	Mode 1	Temperature :	24~26°C
Test Engineer :	Hyden Wu	Relative Humidity :	42~44%
Test Distance :	3m	Polarization :	Vertical
Function Type :	GSM850 Idle + Bluetooth Idle + WLAN Idle + Earphone + GPS Rx + Battery + USB Cable (Data Link with Notebook) + RJ-45 Cable + SIM 1		
Remark :	#7is system simulator signal which can be ignored.		



Site : 03CH06-HY
 Condition : FCC CLASS-B 3m HF-ANT_583_130802 VERTICAL
 Project : 462024
 Power : From System
 Mode : Mode 1

	Freq	Level	Over Limit	Limit Line	ReadAntenna 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	30.00	23.30	-16.70	40.00	35.96	18.50	0.64	31.80	---	---	Peak
2	170.94	27.06	-16.44	43.50	47.44	9.76	1.61	31.75	---	---	Peak
3	240.06	38.56	-7.44	46.00	57.12	11.49	1.69	31.74	100	258	Peak
4	324.50	26.90	-19.10	46.00	42.97	13.70	1.97	31.74	---	---	Peak
5	664.00	33.15	-12.85	46.00	42.90	19.45	2.83	32.03	---	---	Peak
6	720.00	27.96	-18.04	46.00	37.22	19.80	2.95	32.01	---	---	Peak
7	881.40	42.29	---	---	49.68	20.90	3.32	31.61	---	---	Peak
8	1796.00	48.60	-25.40	74.00	73.58	30.08	5.40	60.46	100	0	Peak
9	2164.00	47.36	-26.64	74.00	70.03	31.72	6.11	60.50	---	---	Peak
10	3492.00	43.56	-30.44	74.00	64.13	32.80	8.03	61.40	---	---	Peak
11	6318.00	42.47	-31.53	74.00	55.57	35.55	11.74	60.39	---	---	Peak
12	8516.00	42.35	-31.65	74.00	55.57	35.61	10.70	59.53	---	---	Peak
13	12464.00	46.30	-27.70	74.00	55.49	39.17	11.37	59.73	---	---	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	Aug. 01, 2014	Nov. 14, 2014	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz ~ 30MHz	Dec. 04, 2013	Aug. 01, 2014	Dec. 03, 2014	Conduction (CO05-HY)
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Aug. 01, 2014	N/A	Conduction (CO05-HY)
Spectrum Analyzer	R&S	FSP30	101067	9kHz ~ 30GHz	Nov. 20, 2013	Aug. 05, 2014	Nov. 19, 2014	Radiation (03CH06-HY)
Spectrum Analyzer	Agilent	E4408B	MY44211030	9kHz ~26.5GHz	Dec. 02, 2013	Aug. 05, 2014	Dec. 01, 2014	Radiation (03CH06-HY)
EMI Test Receiver	R&S	ESVS10	834468/0003	20MHz ~ 1000MHz	May 06, 2014	Aug. 05, 2014	May 05, 2015	Radiation (03CH06-HY)
Bilog Antenna	Schaffner	CBL6112B	2885	30MHz ~ 2GHz	Oct. 10, 2013	Aug. 05, 2014	Oct. 09, 2014	Radiation (03CH06-HY)
Double Ridge Horn Antenna	EMCO	3117	00066583	1GHz ~ 18GHz	Jul. 24, 2014	Aug. 05, 2014	Jul. 23, 2015	Radiation (03CH06-HY)
Loop Antenna	TESEQ	HLA 6120	31244	9kHz ~ 30MHz	Dec. 02, 2012	Aug. 05, 2014	Dec. 03, 2014	Radiation (03CH06-HY)
Amplifier	SONOMA	310N	186713	9kHz ~ 1GHz	Apr. 16, 2014	Aug. 05, 2014	Apr. 15, 2015	Radiation (03CH06-HY)
Pre Amplifier	MITEQ	AMF-7D-0010 1800-30-10P	159075	1GHz ~ 18GHz	Apr. 11, 2014	Aug. 05, 2014	Apr. 10, 2015	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0 ~ 360 degree	N/A	Aug. 05, 2014	N/A	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF78020821 2	1 m ~ 4 m	N/A	Aug. 05, 2014	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% ($U = 2Uc(y)$)	2.26
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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