FCC EMC TEST REPORT

No. 150701-EMC

For

Bullitt Group

Product Name: Smartphone

Model Name: SP4

Trade Name: Kodak

Issued Date: 2015-08-04

Test Laboratory:

GCCT, *Guangdong Telecommunications Terminal Products Quality Supervision and Testing Center*

Technology Road, High-tech Zone, He Yuan, Guang Dong, PR China 517001

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CONTENTS

GENERAL SUMMARY

Product Name	Smartphone
Model Name	SP4
Trade Name	Kodak
Applicant	Bullitt Group
Manufacturer	CK Telecom Limited
Test Laboratory	GCCT, Guangdong Telecommunications Terminal Products Quality Supervision and Testing Center
Reference Standards	FCC Part 15, Subpart B "Radio frequency devices". ANSI C63.4-2014: "American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz"
Test Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in annex B of this test report are below limits specified in the relevant standards. General Judgment: **Pass** Date of issue:2015.08.04
Comment	The test results in this report apply only to the tested sample of the stated device/equipment.

Approved by:	*Reviewed by:*	*Tested by:*
Luo Jian	Wen Xiaoyong	Lin Cong
Manager	Deputy Manager	Test Engineer

1. Test Laboratory

1.1 Testing Location

Company Name:	GCCT, Guangdong Telecommunications Terminal Products Quality Supervision and Testing Center
Address:	Technology Road, High-tech Zone, Heyuan, Guangdong Province, PR.China
FCC Registration No.	303878
CNAS Registration No.	L4992
Postal Code:	517001
Telephone:	+86-762-3607221
Fax:	+86-762-3603336

1.2 Testing Environment

Control room and Power Amplifier room did not exceed following limits along the EMC testing:

Project	Control room	Power Amplifier room
Temperature	15℃~35℃	15℃~35℃
Relative humidity	20% ~80%	20% ~80%
Shielding effectiveness	＞110dB	＞110dB
Electrical insulation	＞2MΩ	＞2MΩ
Ground system resistance	＜1Ω	＜1Ω

Semi-anechoic chamber (9.73 meters×6.70meters×6.12meters) did not exceed following limits along the EMC testing:

Temperature	15℃~30℃
Relative humidity	35% ~60%
Shielding effectiveness	＞110dB
Electrical insulation	＞10kΩ
Ground system resistance	＜1Ω
Normalised site attenuation (NSA)	＜±3.5dB，3m distance, from 30 to 1000 MHz
voltage standing-wave ratio (VSWR)	<±6dB，3m distance, above 1 GHz
Uniformity of field strength(FU)	80MHz ~6000MHz，0 ~6dB

EMC(1) room did not exceed following limits along the EMC testing:

Temperature	15℃～35 ℃
Relative humidity	30%～60%

1.3 Project Data

Project Leader:	Wen Xiaoyong
Testing Start Date:	2015-07-06
Testing End Date:	2015-078-04

2. Client Information

2.1 Applicant Information

Company Name	Bullitt Group
Address	4 The Aquarium, 1-7 King Street, Reading, RG1 2AN, UK
City	/
Postal Code	/
Country	UK

2.2 Manufacturer Information

Company Name	CK Telecom Limited
Address	Technology Road.High-Tech Development Zone. Heyuan, Guangdong,P.R.China.
City	Heyuan
Postal Code	/
Country	China

3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1 About EUT

Model Name	SP4
FCC ID	ZL5SP4
Tx Frequency	GSM850:824～848 MHz UMTS Band V : 826~846MHz PCS1900 : 1850~1909MHz UMTS Band II : 1852~1907MHz Bluetooth/BLE: 2402 ~ 2480 MHz WIFI(802.11b/g/n-20): 2412 ~ 2462 MHz WIFI(n-40): 2422 ~ 2452 MHz
Rx Frequency	GSM850: 869~893 MHz UMTS Band V : 871~891 MHz PCS1900 : 1930~1989 MHz UMTS Band II : 1932~1987 MHz Bluetooth/BLE: 2402 ~ 2480 MHz WIFI(802.11b/g/n-20): 2412 ~ 2462 MHz WIFI(n-40): 2422 ~ 2452 MHz
Number of Channels	GSM850&WCDMA Band V:25 PCS1900&WCDMA Band II: 60 Bluetooth:79 WIFI(802.11b/g/n-20):11 WIFI(n-40):7 BLE:40
Modulation	GSM&DCS:GMSK WCDMA:BPSK/QPSK Bluetooth: GFSK&π/4-DQPSK&8DPSK WIFI:CCK/OFDM BLE:GFSK
Antenna Type	PIFA(GSM/DCS/WCDMA); MONOPOLE (Bluetooth/WIFI)
Antenna Gain	GSM850:-0.5dBi DCS1900: -0.5dBi WCDMA850: -1dBi WCDMA1900: -1dBi Bluetooth/BLE/WIFI: -1dBi
Normal Voltage	3.8V
Extreme Low Voltage	3.6V
Extreme High Voltage	4.2V
Extreme Low Temperature	0℃
Extreme High Temperature	40℃

Note: Photographs of EUT are shown in ANNEX A of this test report.

3.2 Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version
150701-M03	356092022307083 356092022307091	SLFQPLUS-V1.0	SLFQPLUS13B-S29A_BULLITT_L7EN_206_150127

*EUT ID: is used to identify the test sample in the lab internally.

3.3 Internal Identification of AE

AE ID*	Description	Type	SN
150701-B03	Battery	HD395759AR	/
150701-C03	Adapter	A8-510100	/

*AE ID: is used to identify the test sample in the lab internally.

4. Test Mode and Performance Criteria

4.1 Test Mode

Frequency range was investigated: Conducted emission test: from 150 kHz to 30MHz; Radiated emission test: 30MHz to the 5th harmonic of the highest fundamental frequency or to 40GHz, whichever is lower. All test modes were pre-scanned and only shown the worst in bold.

Test Item
Radiated Emission < 1GHz
Mode 1: GSM850 Idle + WIFI+USB Cable (Charging from PC) +Earphone
Mode 2: GSM1900 Idle + WIFI+USB Cable (Charging from Adapter) +Earphone
Mode 3: WCDMA Band II Idle + WIFI+USB Cable (Charging from Adapter) +Earphone
Mode 4: WCDMA Band V Idle + WIFI+ Bluetooth Idle + USB Cable (Data Link with PC) + Earphone
Radiated Emission ≥ 1GHz
Mode 1: GSM850 Idle + WIFI+USB Cable (Charging from Adapter) +Earphone
Mode 2: GSM1900 Idle + WIFI+ USB Cable (Charging from Adapter) +Earphone
Mode 3: WCDMA Band II Idle + WIFI+ Bluetooth Idle + USB Cable (Data Link with PC) + Earphone
Mode 4: WCDMA Band V Idle + WIFI+ USB Cable (Charging from PC) +Earphone
AC Conducted Emission
Mode 1: GSM850 Idle + WIFI+ Bluetooth Idle + USB Cable (Charging from Adapter) + Earphone
Mode 2: GSM1900 Idle + WIFI+ USB Cable (Charging from Adapter) +Earphone
Mode 3: WCDMA Band II Idle + WIFI+ Bluetooth Idle + USB Cable (Charging from Adapter) + Earphone
Mode 4: WCDMA Band V Idle + WIFI+ Bluetooth Idle + USB Cable (Data Link with PC) + Earphone

Remark:

1. The worst case of AC Conducted Emission is mode 2; only the test data of this mode was reported.
2. The worst case of RE < 1G is mode 3; only the test data of this mode was reported.
3. Data Link with PC means data application transferred mode between EUT and PC.

5. Test Results

5.1 Summary of Test Results

Clause (FCC Part 15B)	Test Case	Verdict
15.109(a)	Radiated Emission	Pass
15.107(a)	AC Conducted Emission	Pass

Note: Please refer to Annex B in this test report for the detailed test results.

5.2 Statements

GCCT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.1 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in general summary.

6. Test Equipments Utilized

6.1 List of Measuring Equipment

Table 1. Measurement Equipments

Hardware						
No.	**Name**	**Model**	**SN**	**Manufacturer**	**CAL. DATE**	**CAL. Due DATE**
1	Spectrum Analyzer	E4440A	MY48250641	Agilent	2014-8-14	2015-8-13
2	RF Filter Section	N9039A	MY48260024	Agilent	2014-8-14	2015-8-13
3	BiCoNilog	3142D	00110050	ETS-Lindgren	2013-10-25	2015-10-25
4	Horn Antenna	3117	00129169	ETS-Lindgren	2013-10-25	2015-10-25
5	RF Notch filter	/	/	ETS-Lindgren	/	/
6	Signal Generator	N5183A-532	MY49060563	Agilent	2014-8-14	2015-8-13
7	Signal Generator	N5181A-506	MY49061300	Agilent	2014-8-14	2015-8-13
8	Power Amplifier	AR75A250	0333065	AR	/	/
9	Power Amplifier	250W1000A	0332703	AR	/	/
10	Power Amplifier	AS0860-40/4	AS0860-40/45	Milmega	/	/
11	EMS antenna	ATL80M1G	0332624	AR	/	/
12	EMS antenna	High Gain HornAntenna	BBHA 9120 E 456	SCHWARZBECK	/	/
13	Power Meter	N1913A	MY50000213	Agilent	2014-8-14	2015-8-13
14	Power Meter	N1913A	MY50000214	Agilent	2014-8-14	2015-8-13
15	CDN	FCC-801-M2-16A	100230	FCC	2014-8-14	2015-8-13
16	BCI	F-120-9A	100334	FCC	2014-8-14	2015-8-13
17	LISN	LI-125	191012 191013	Com-power	2014-8-14	2015-8-13
18	Electrostatic Discharge	Dito	V0946105513	EMTEST	2014-8-16	2015-8-15
19	The ultra-compact simulator and its	UCS 500 N5	V0946105514	EMTEST	2014-8-14	2015-8-13
20	Motor driven AC source	MV2616	V0946105516	EMTEST	2014-8-14	2015-8-13

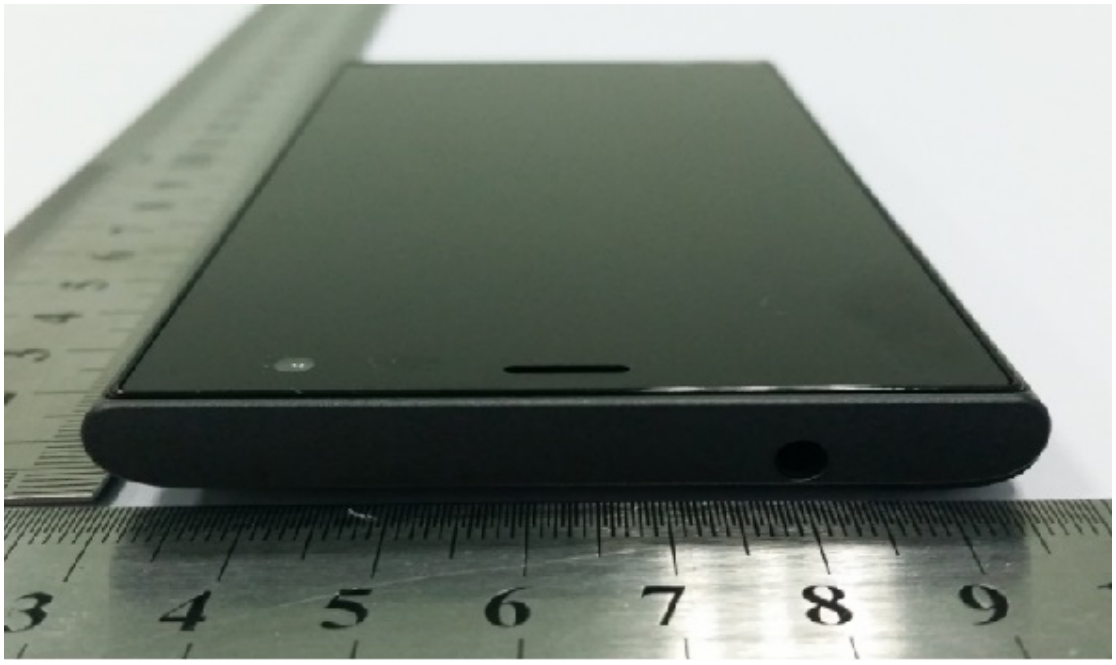
21	Universal Radio Communication Tester	CMU200	118627	R&S	2014-8-14	2015-8-13
22	Universal Radio Communication Tester	E5515C	MY48367105	Agilent	2014-8-14	2015-8-13
23	Bluetooth Tester	MT8852B	1307002	Anristu	2014-8-14	2015-8-13
24	Software	MEAS	/	ETS-Lindgren	/	/
25	PC	G450	/	LENEVO	/	/
Software						
1	Software	TILE4.5	/	ETS-Lindgren	/	

6.2 Uncertainty

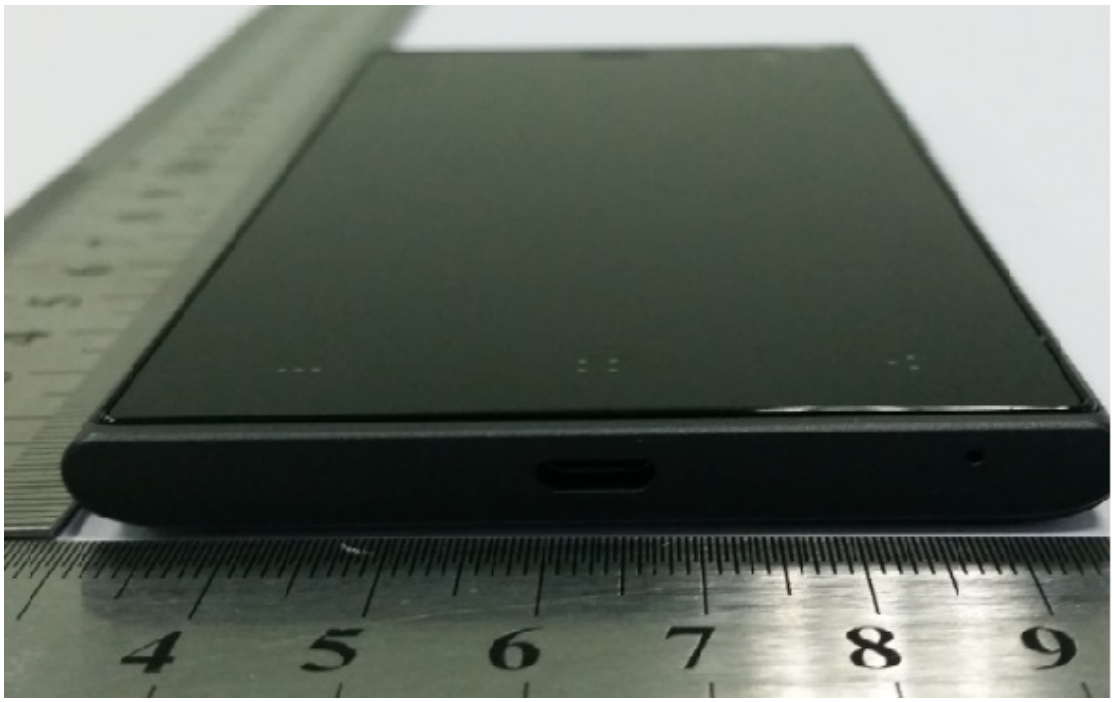
RE Uncertainty Evaluation (30MHz~1000MHz)	
Uncertainty for 95% Confidence	5.2dB
RE Uncertainty Evaluation (Above 1GHz)	
Uncertainty for 95% Confidence	5.4dB
CE Uncertainty Evaluation (150kHz~30MHz)	
Uncertainty for 95% Confidence	3.8dB

ANNEX A: EUT Photograph

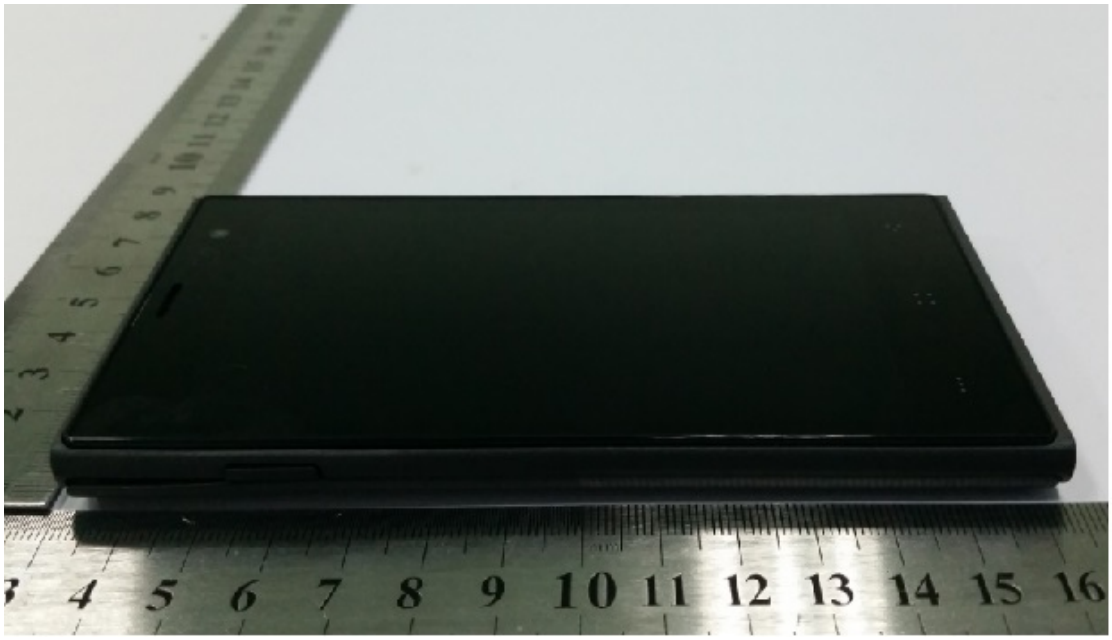
EUT -Top View



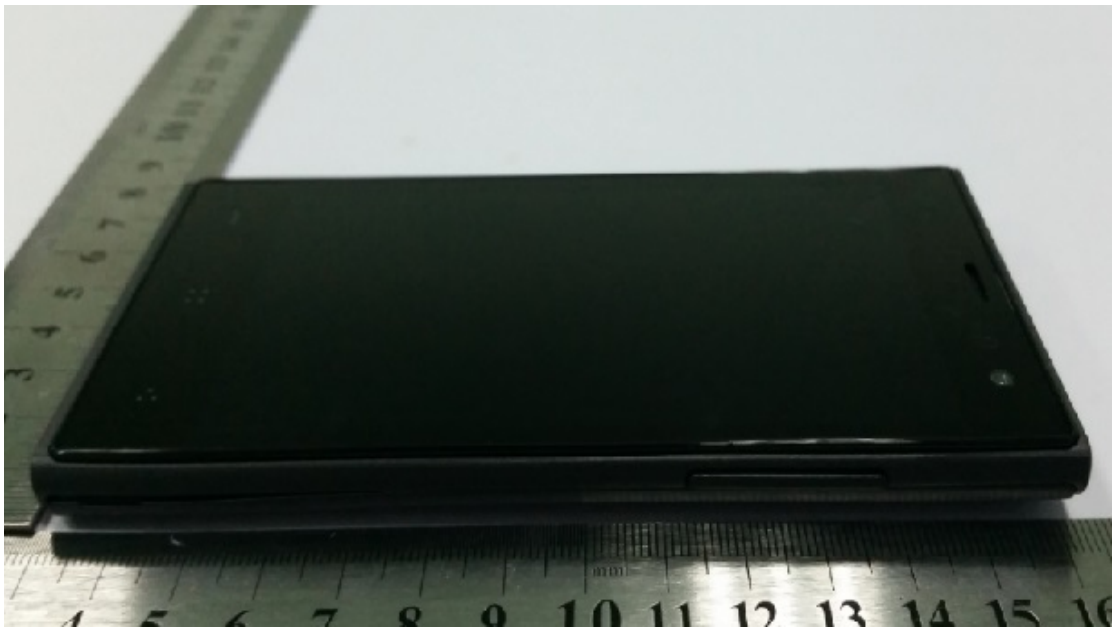
EUT-Bottom View



EUT -Left View

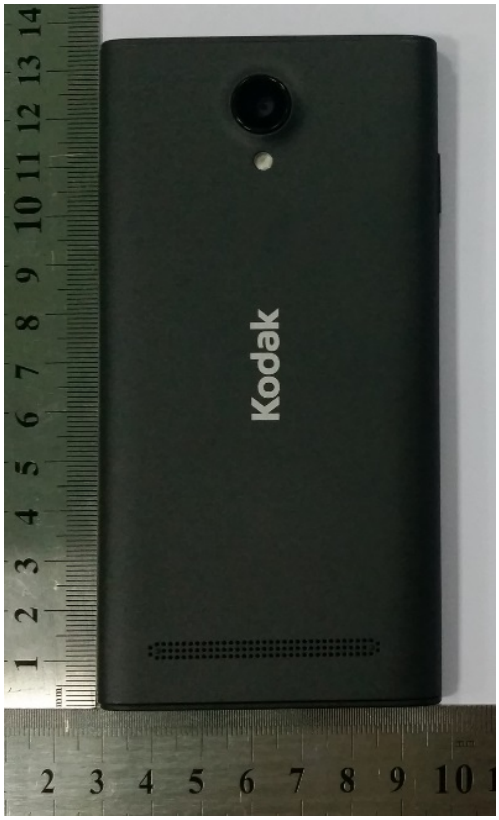


EUT -Right View

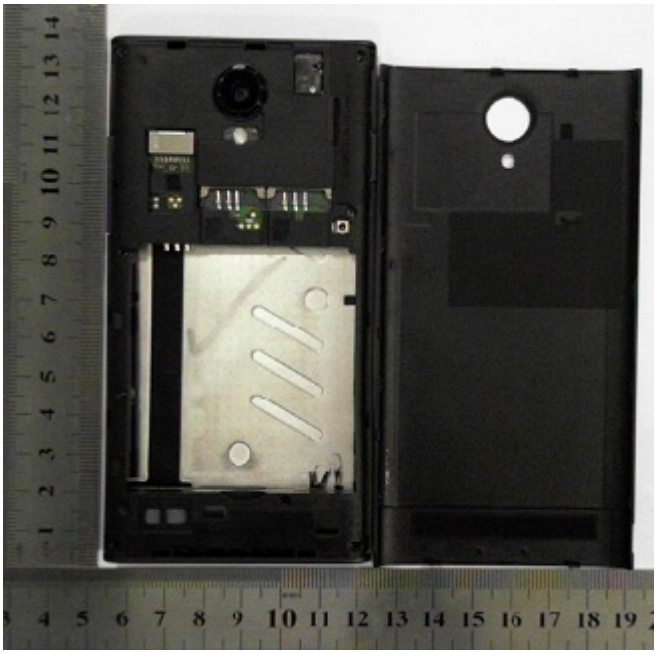


EUT-Front View

EUT -Rear View

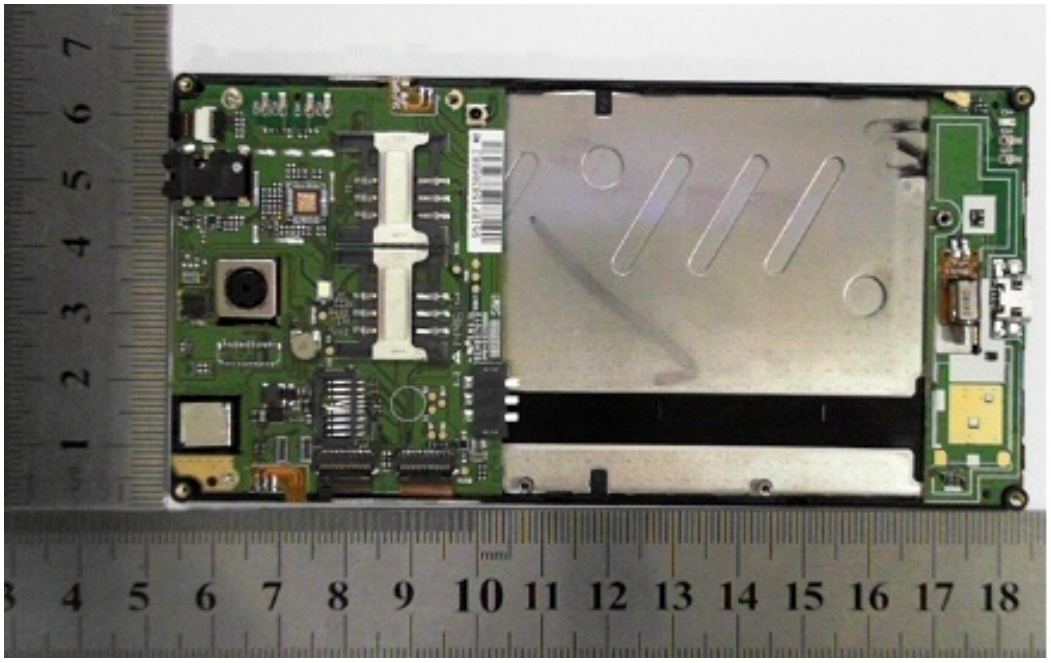


Cover off-Top view

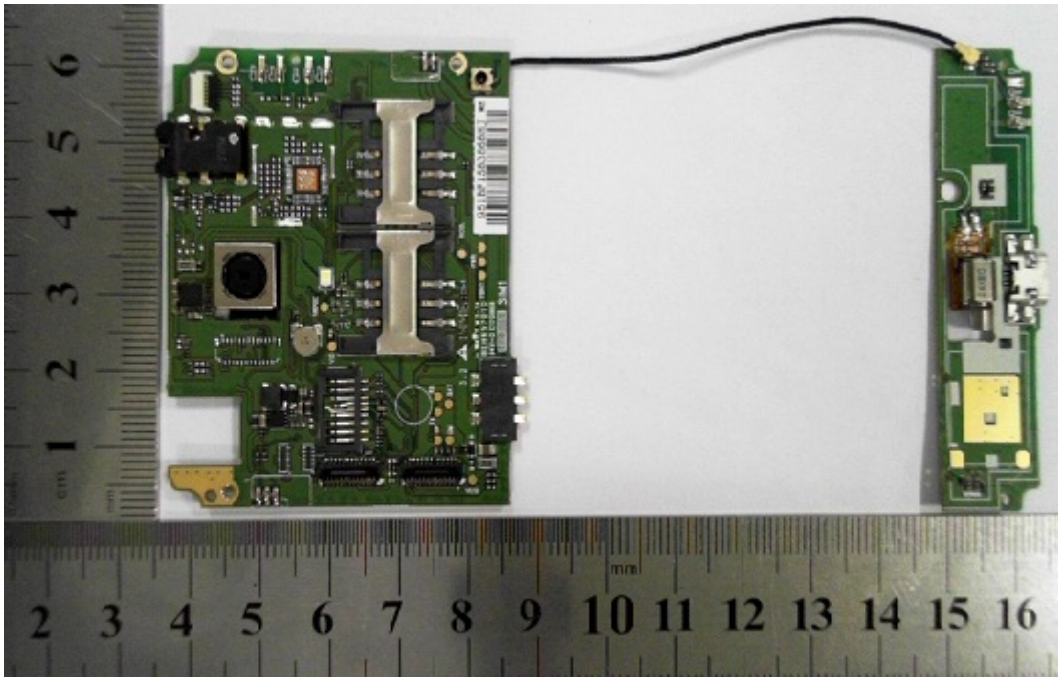


All

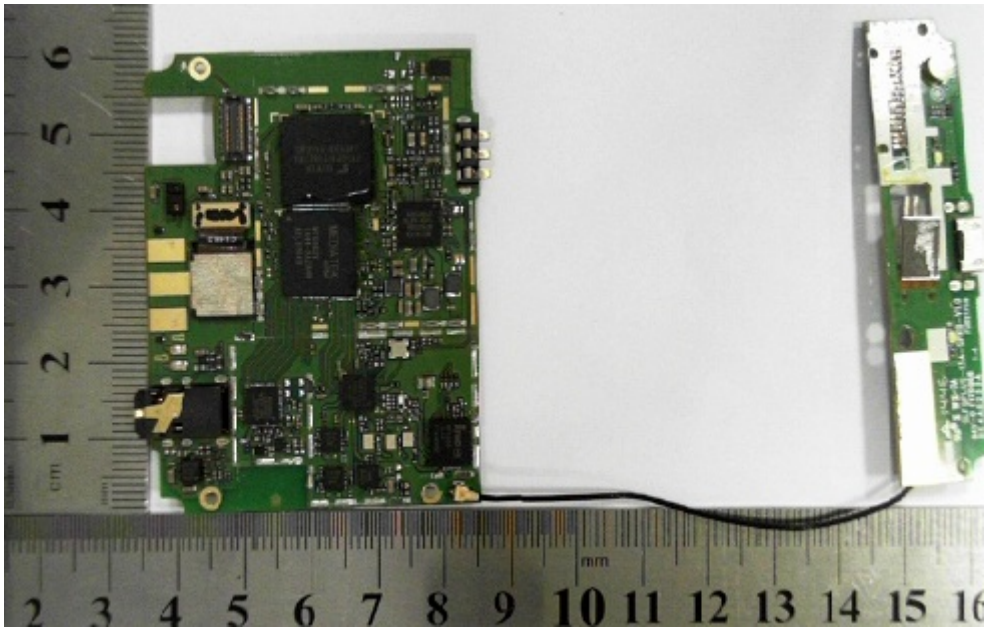
Main board With shielding -Front View



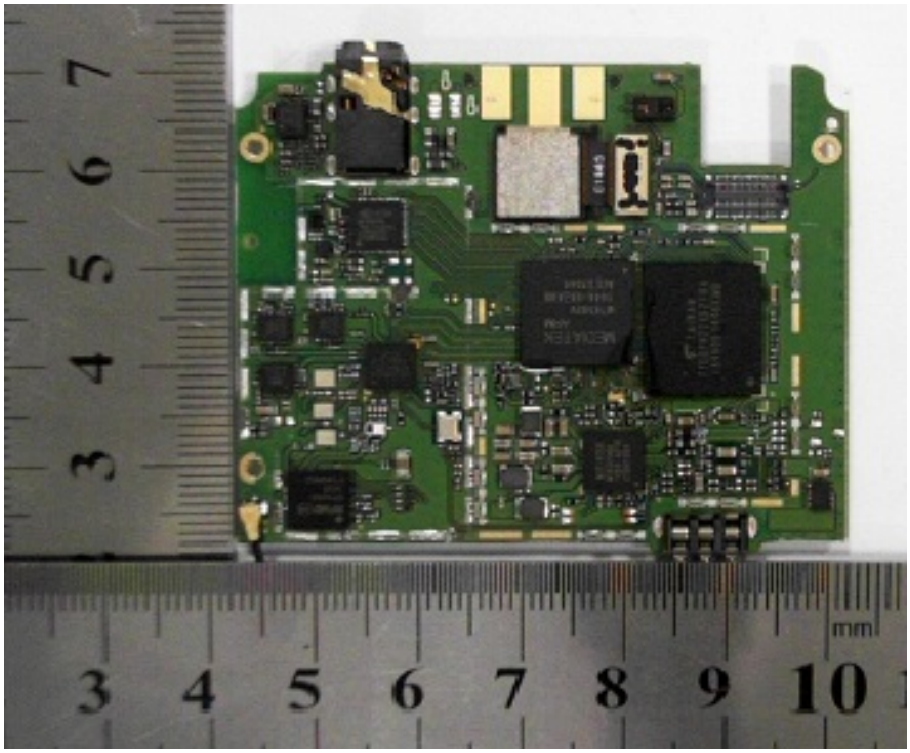
Main board Without shielding -Front View



Main board- RearView



Main board- RearView



Headset

USB cable

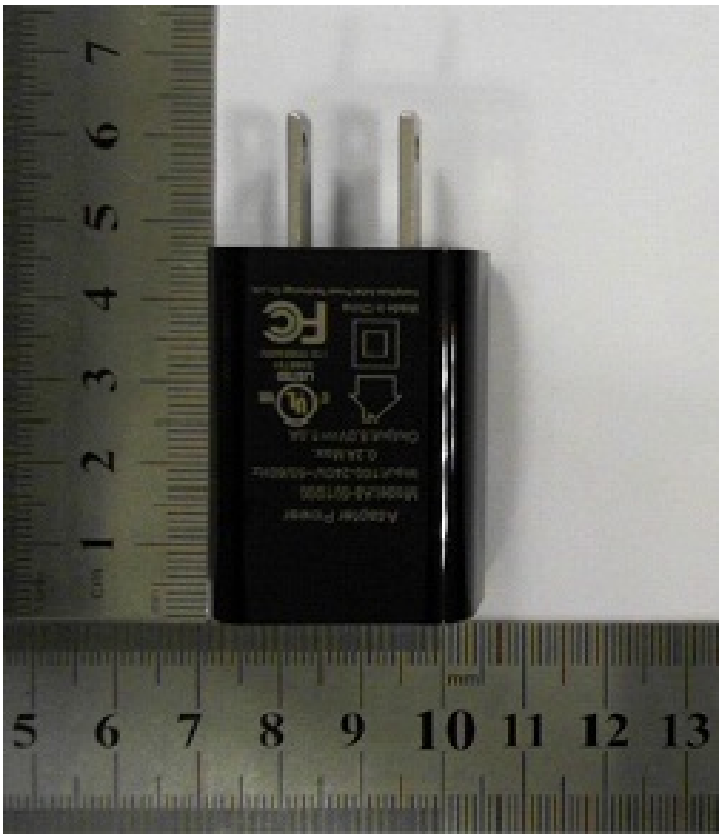
GSM/DCS Antenna View

BT Antenna View

Battery View

Adapter label view

Adapter view



ANNEX B: EMC Emission Measurements Test Results

B.1 Test of Radiated Emissions

B.1.1 Limit of Radiated Emissions (At a measuring distance of 3 m)

Frequency range (MHz)	Field Strength (microvolts/m)
30 to 88	100
88 to 216	150
216 to 960	200
Above 960	500

B.1.2 Test Procedure

 a. The EUT was placed on a turntable with 1.5 meter above ground.

 b. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

 c. The table was rotated 360 degrees to determine the position of the highest radiation.

 d. The height of the antenna is varied 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.

 e. 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.

 f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

 g. If the emission level of the EUT in peak mode was 20dB 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.

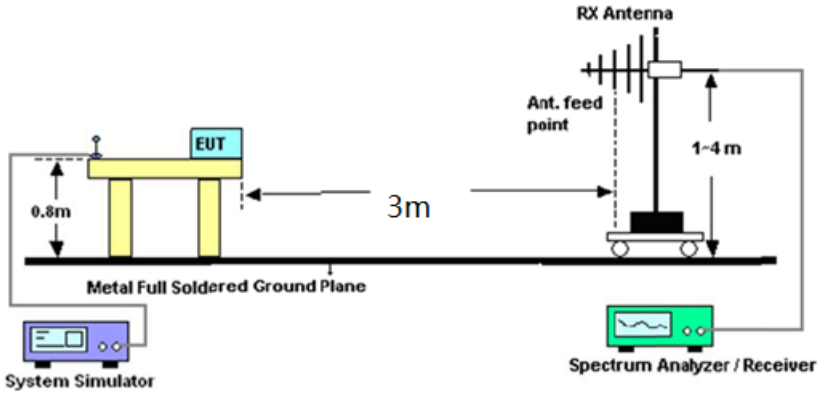
 h. Emission level (dBμV/m) = 20 log Emission level (μV/m).

 During the radiated emission test, the Spectrum Analyzer was set with the following configurations:

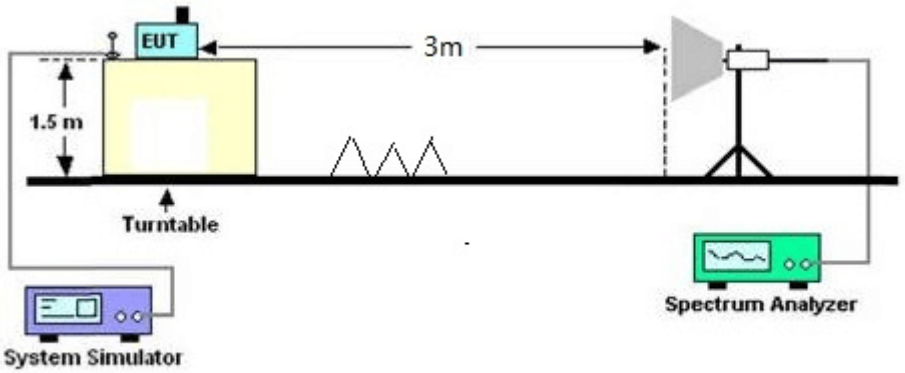
Frequency Band(MHz)	Function	Resolution Bandwidth	Video Bandwidth
30 to 1000	Peak	100kHz	100kHz
Above 1000	Peak	1MHz	1MHz
	Average	1MHz	10Hz

B.1.3 Test Setup

B.1.3.1 Radiated Emissions Frequency: 30MHz to 1000MHz

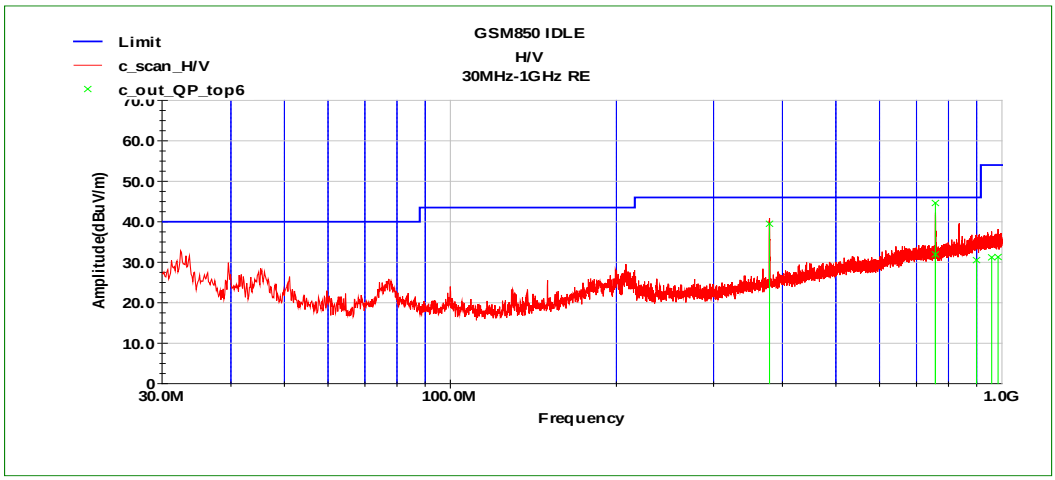


B.1.3.2 Radiated Emissions Frequency: Above 1000 MHz



B.1.4 Test Results

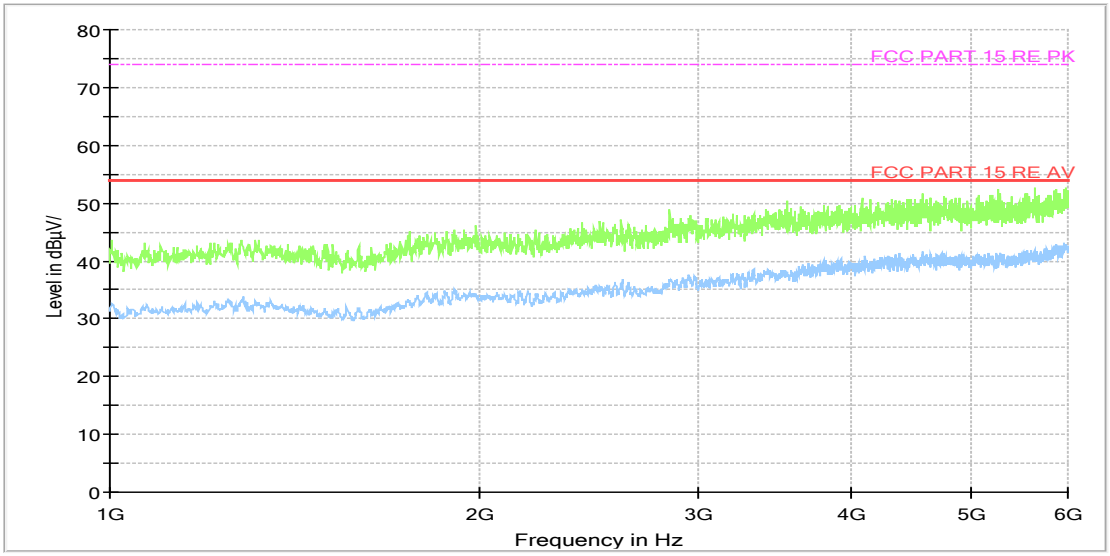
Mode 1: GSM850 Idle + USB Cable (Charging from PC) +Earphone (30MHz-1GHz)



Frequency (MHz)	Polarization (H/ V)	Tower (cm)	Table (°)	QP	
				Limit dB(μV/m)	QP dB(μV/m)
378.99	H	109.7	84	46	39.51
757.48	V	200	0	46	31.93
757.65	H	110.3	293	46	44.62
899.50	V	200	0	46	30.52
958.28	H	183	23	54	31.21
984.17	H	104	187	54	31.3

Note: only record low 6dB or measuring higher than the limit value than the limit value.

Mode 4: WCDMA Band V Idle + USB Cable (Charging from Adapter) (Above 1000 MHz)

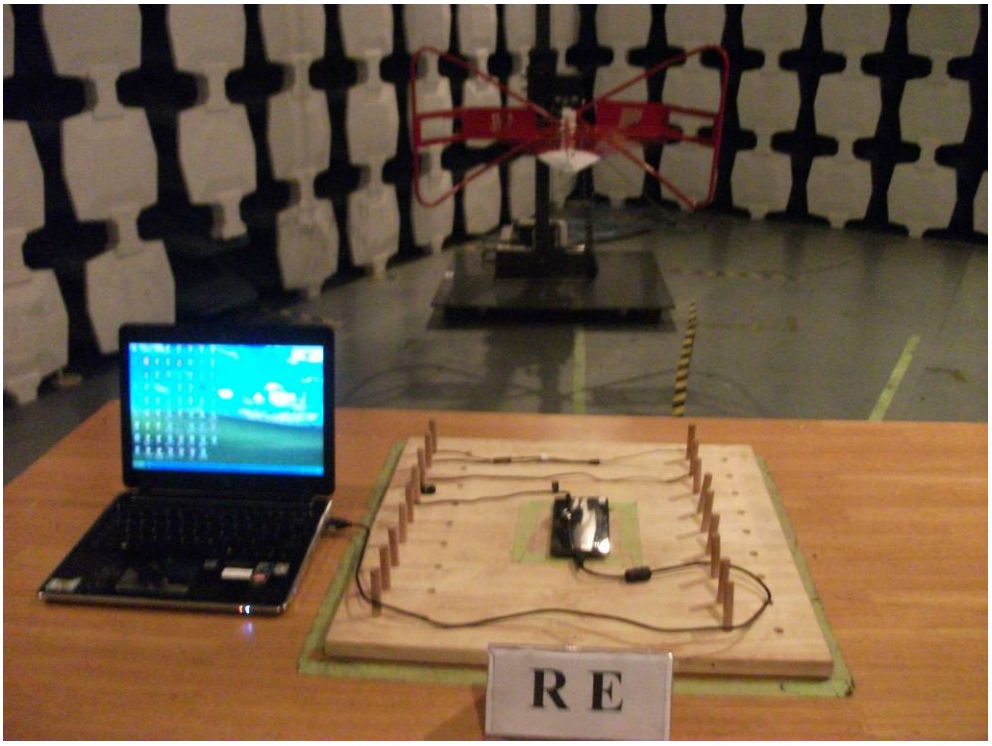


Frequency (MHz)	Polarization (H/ V)	Tower (cm)	Table (°)	PK		AV	
				Limit dB(μV/m)	PK dB(μV/m)	Limit dB(μV/m)	AV dB(μV/m)
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/
/	/	/	/	/	/	/	/

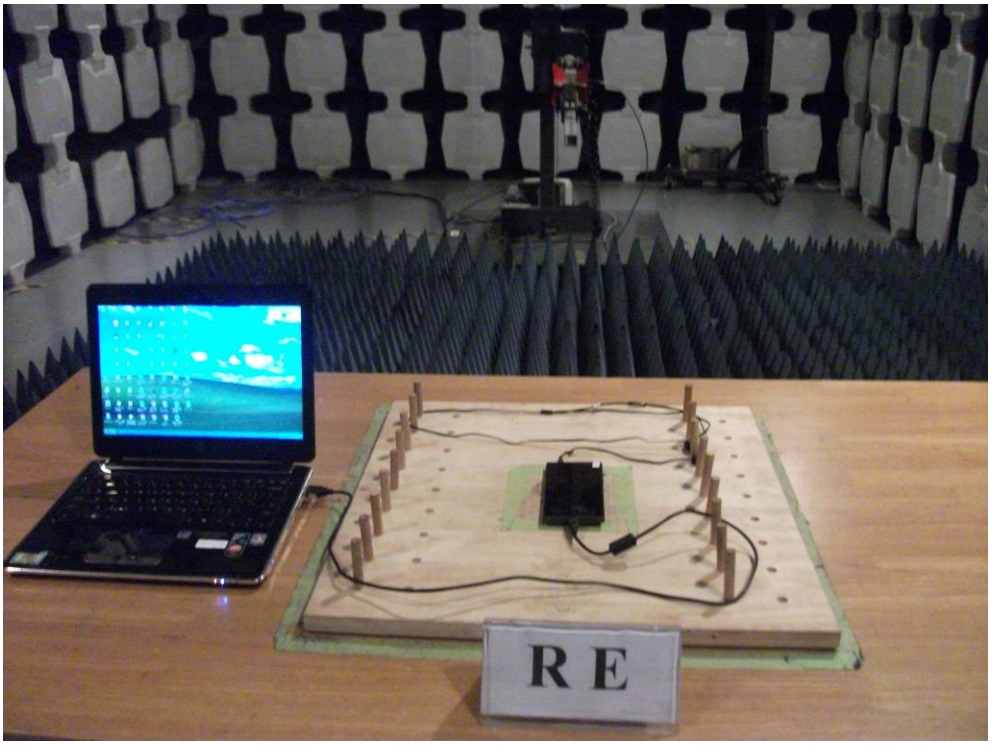
Note: only record low 6dB or measuring higher than the limit value than the limit value.

B.1.5 Test Setup

B.1.5.1 Radiated Emissions Frequency: 30MHz to 1000MHz



B.1.5.2 Radiated Emissions Frequency: Above 1000 MHz



B.1.6 Measurement Uncertainty

RE Uncertainty Evaluation (30MHz~1000MHz)	
Uncertainty for 95% Confidence	5.2dB
RE Uncertainty Evaluation (1GHz~6GHz)	
Uncertainty for 95% Confidence	5.4dB

B.2 Test of AC Conducted Emission

B.2.1 Limit of AC Conducted Emission

Frequency (MHz)	QP Limit (dBμV)	AV Limit (dBμV)
0.15～0.5	66～56	56～46
0.5～5	56	46
5～30	60	50

*Decreases with the logarithm of the frequency.

B.2.2 Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meters from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.

b. Connect EUT to the power mains through a line impedance stabilization network (LISN).

c. All the support units are connecting to the other LISN.

d. The LISN provides 50 ohm coupling impedance for the measuring instrument.

e. The FCC states that a 50 ohm, 50 microhenry LISN should be used.

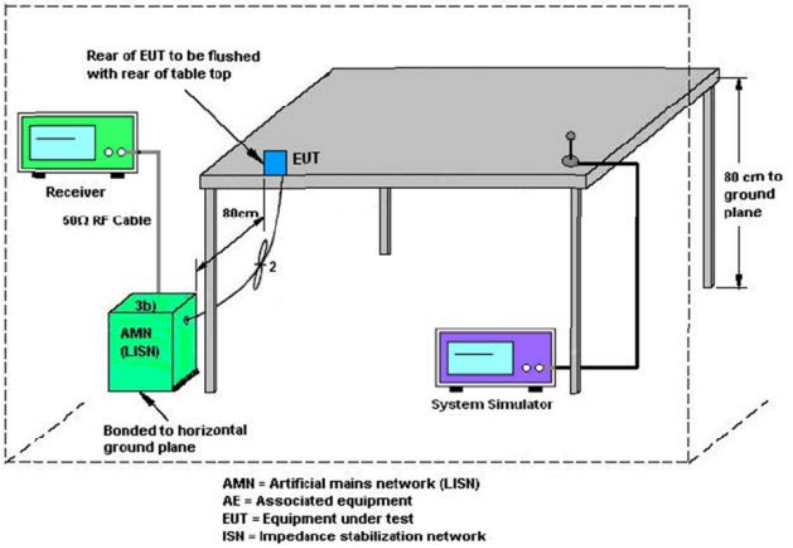
f. Both sides of AC line were checked for maximum conducted interference.

g. The frequency range from 150 kHz to 30 MHz was scanned.

h. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.

i. The EMI test receiver was then turned to the selected frequencies and the necessary measurements made with a receiver bandwidth setting of 10kHz .For FCC test, only Quasi-peak measurements were made.

B.2.3 Test Setup



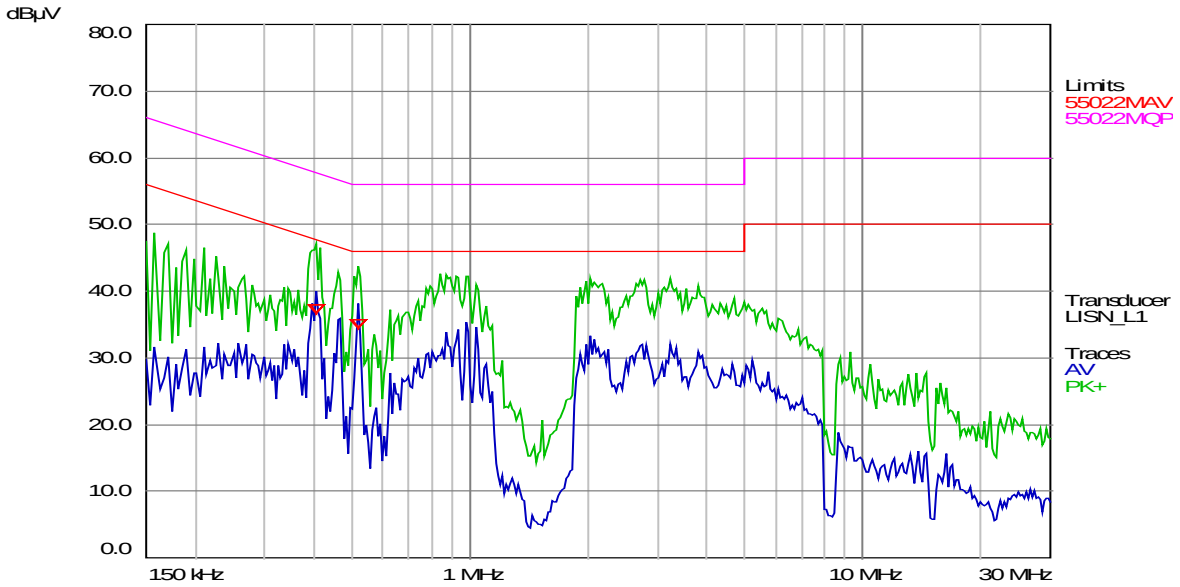
B.2.4 Measurement Uncertainty

CE Uncertainty Evaluation (150kHz~30MHz)	
Uncertainty for 95% Confidence	3.8dB

B.2.5 Test Results

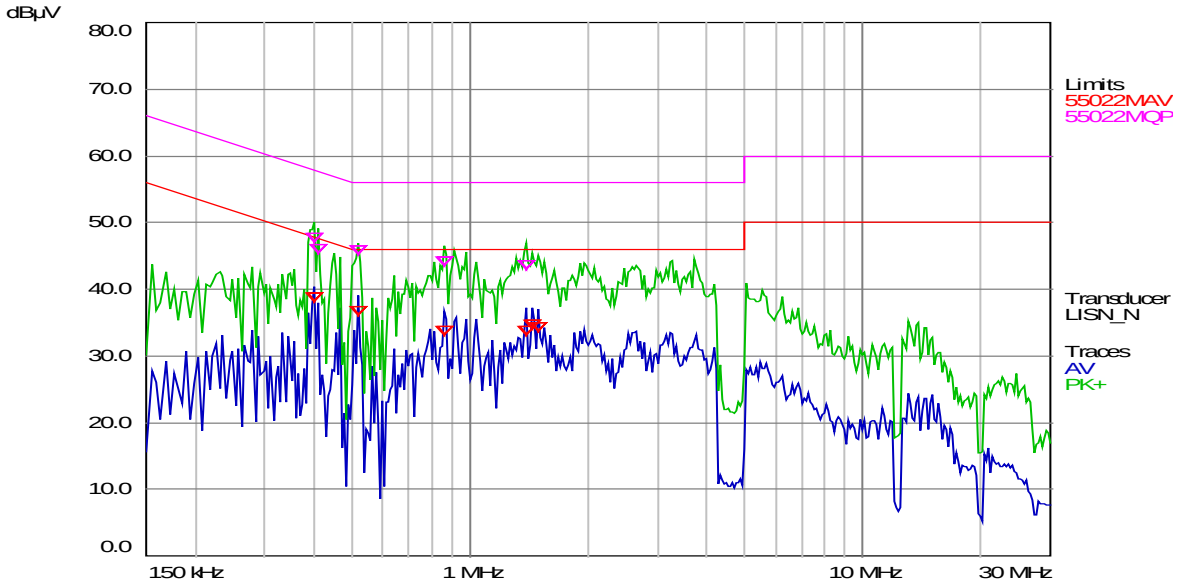
Mode 2: GSM1900 Idle + USB Cable (Charging from Adapter) +Earphone

LINE L:



Trace	Frequency	Level	Limit	Delta Limit	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	
1 AV	0.406	36.72	47.73	-11.01	L1 / on
1 AV	0.522	34.45	46.00	-11.55	L1 / on

LINE N:



Trace	Frequency	Level	Limit	Delta Limit	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	
1 AV	0.402	38.20	47.81	-9.61	N / on
2 QP	0.402	47.08	57.81	-10.73	N / on
2 QP	0.411	45.35	57.63	-12.28	N / on

Trace	Frequency	Level	Limit	Delta Limit	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	
1 AV	0.519	36.10	46.00	-9.90	N / on
2 QP	0.519	45.17	56.00	-10.83	N / on
1 AV	0.861	33.18	46.00	-12.82	N / on
2 QP	0.861	43.55	56.00	-12.45	N / on
1 AV	1.3875	33.06	46.00	-12.94	N / on
2 QP	1.3875	42.98	56.00	-13.02	N / on
1 AV	1.4415	34.13	46.00	-11.87	N / on
1 AV	1.4955	33.60	46.00	-12.40	N / on

Note: only record low 6dB or measuring higher than the limit value than the limit value.

240V/60Hz

LINE L

Scan Settings (1 Range)

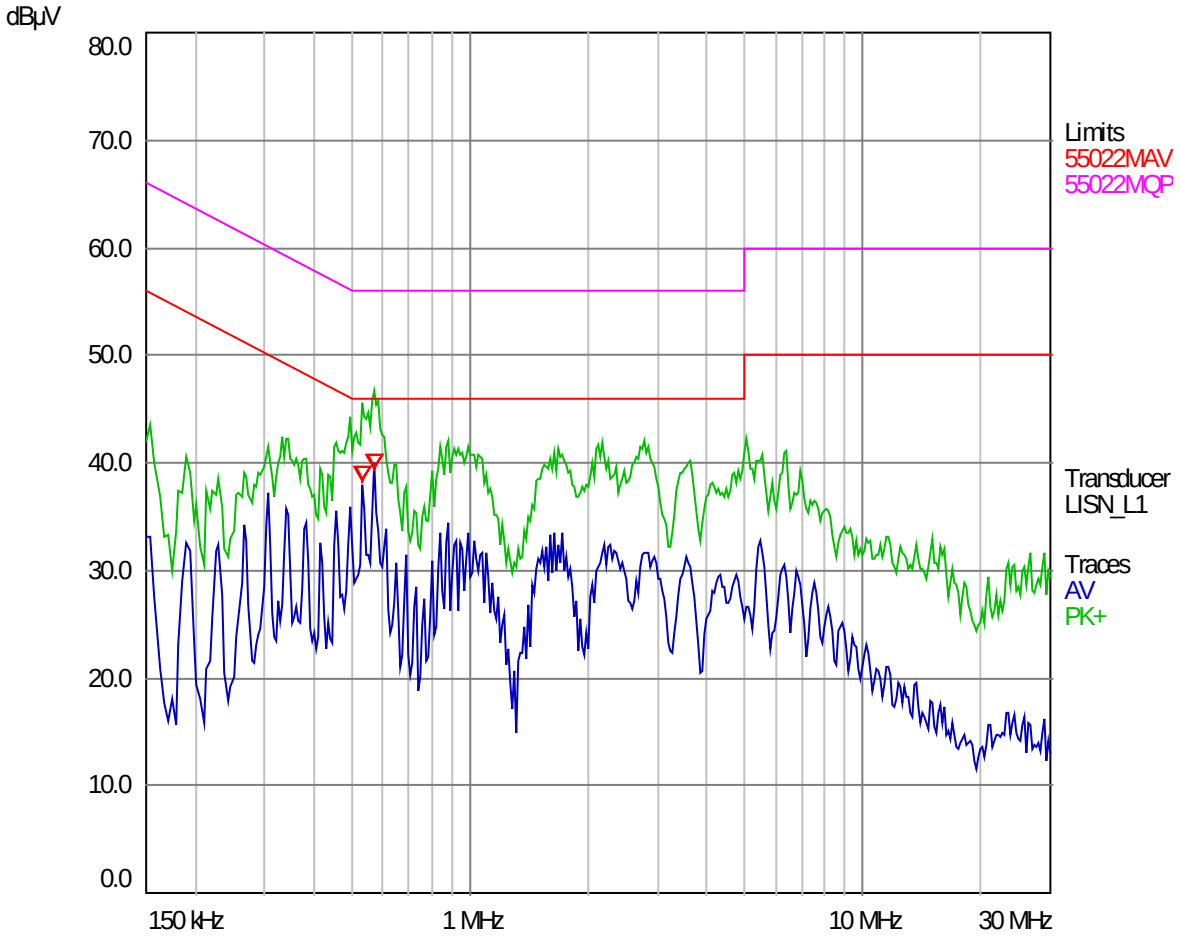
Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	30 MHz	4 kHz	9 kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors: AV, QP Meas Time: 2 s

Peaks: 6 Acc. Margin: 10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency	Level	Limit	Delta Limit	Delta Ref	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	(dB)	
1 AV	0.534	38.34	46.00	-7.66		L1 / on
1 AV	0.574	39.41	46.00	-6.59		L1 / on

* = limit exceeded

LINE N

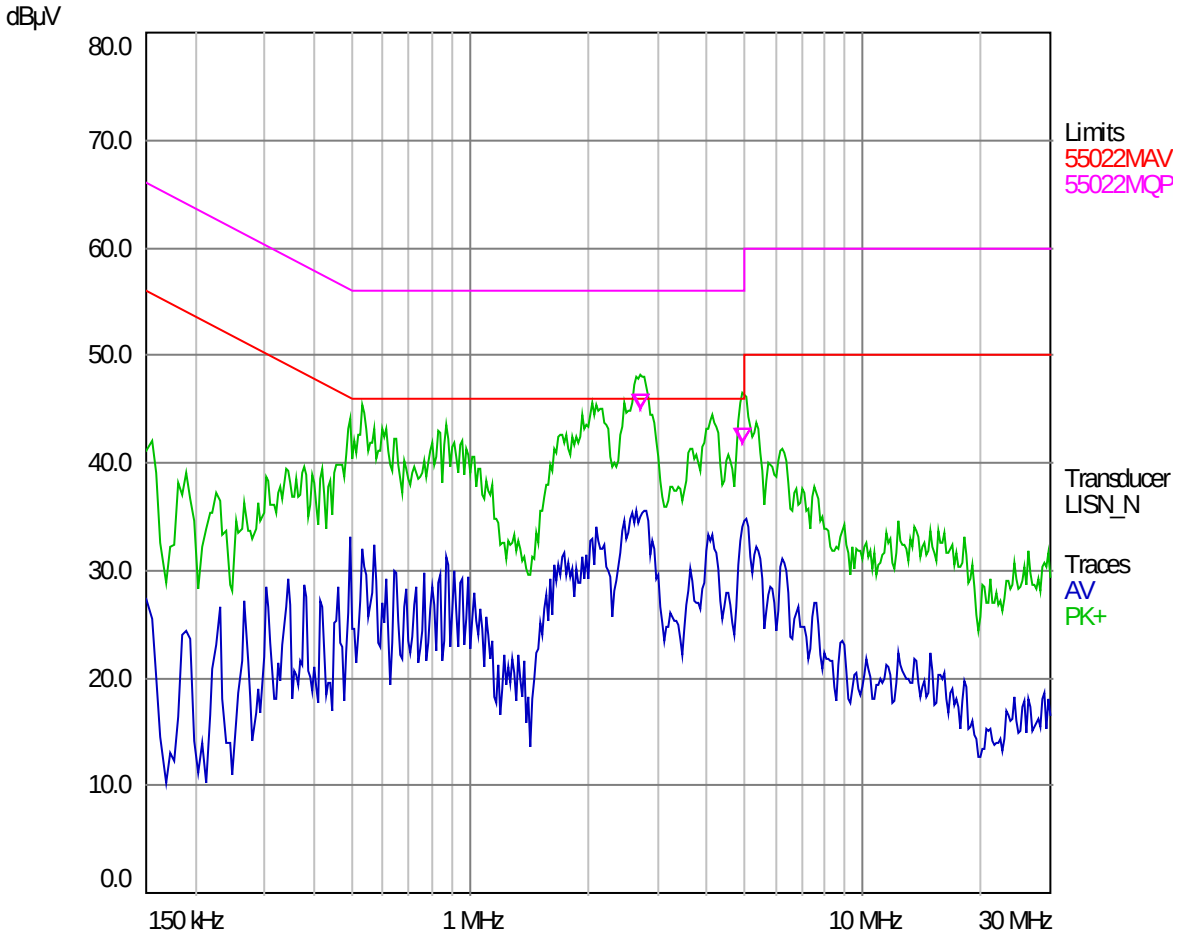
Scan Settings (1 Range)

Frequencies			Receiver Settings			
Start	**Stop**	**Step**	**Res BW**	**M-Time**	**Atten**	**Preamp**
150 kHz	30 MHz	4.5 kHz	9 kHz (6dB)	15 ms	Auto	Off

Final Measurement

Detectors: AV, QP
Meas Time: 2 s
Peaks: 6
Acc. Margin: 10 dB

Pre-measurement Graph



Final Measurement Results

Trace	Frequency	Level	Limit	Delta Limit	Delta Ref	Comment
	(MHz)	(dBµV)	(dBµV)	(dB)	(dB)	
2 QP	2.7015	44.97	56.00	-11.03		N / on
2 QP	4.9425	41.92	56.00	-14.08		N / on

* = limit exceeded

ANNEX C: Report Revision History

Report NO.	Report version	Description	Issue Date
150701-EMC	NONE	Original	2015.07.10

*** END OF REPORT***