TEST REPORT

No. 2013TAR687

for

Sony Mobile Communications AB

GSM/WCDMA/LTE mobile phone

Type: PM-0590-BV

FCC ID: PY7PM-0590

with

Hardware Version: AP1

Software Version: 14.1.F.0.111

Issued Date: Oct. 16th, 2013

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of TMC Beijing.

Test Laboratory:

DAkks accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629B-1

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology

No. 52, Huayuan Bei Road, Haidian District, Beijing, P. R. China 100191.

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CONTENTS

1. Test Laboratory

1.1. Testing Location

Location D

Company Name:	TMC Beijing, Telecommunication Metrology Center of MIIT
Address:	No.18A, Kangding Street, Beijing Economic-Technological Development Area, Beijing, China
Postal Code:	100176

1.2. Testing Environment

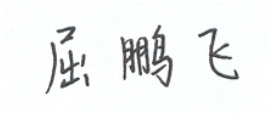
Normal Temperature:	15-35℃
Relative Humidity:	20-75%
Air pressure:	980 - 1040 hPa

The climatic requirements above are general exclude the special requirements for dedicated test environments listed in section 5 and some specific test cases in other parts of this report.

1.3. Project data

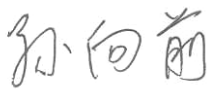
Receipt of Sample:	Jul. 26th, 2013
Testing Start Date:	Aug. 03rd, 2013
Testing End Date:	Aug. 08th, 2013

1.4. Signature



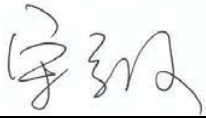
Qu Pengfei

(Prepared this test report)



Sun Xiangqian

(Reviewed this test report)



Song Chongwen

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Sony Mobile Communications AB
Address /Post:	Sony Mobile R&D Center, No. 16, Guangshun South Street, Chaoyang District
City:	Beijing
Postal Code:	100102
Country:	China
Contact Person:	Ma, Gang
Telephone:	+86-10-58656312
Fax:	+86-10-58659049

2.2. Manufacturer Information

Company Name:	Sony Mobile Communications AB
Address /Post:	Sony Mobile R&D Center, No. 16, Guangshun South Street, Chaoyang District
City:	Beijing
Postal Code:	100102
Country:	China
Contact Person:	Ma, Gang
Telephone:	+86-10-58656312
Fax:	+86-10-58659049

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

3.1. About EUT

Description	GSM 850/900/1800/1900 quad bands, GPRS, EDGE, WCDMA FDD bands 1/2/4/5/8, HSDPA, HSUPA, LTE FDD bands 4/17, Bluetooth (EDR and 4.0), ANT+, WLAN (802.11 a/ac/b/g/n), NFC, FM, GPS mobile phone
Type	PM-0590-BV
FCC ID	PY7PM-0590
GSM Frequency Band	GSM 850/900/1800/1900
UMTS Frequency Band	FDD Band 1 / FDD Band 2 / FDD Band 4 / FDD Band 5/ FDD Band 8
LTE Frequency Band	FDD Band 4/ FDD Band 17
Antenna	Internal
Power supply	Battery (charged by travel adapter or vehicle charger)
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 3.8VDC)
Extreme temp. Tolerance	-30°C to +50°C

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Telecommunication Metrology Center of MIIT of People's Republic of China.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN	IMEI	HW Version	SW Version
EUT1	CB5A1TE7N2	004402451356103	AP1	14.1.F.0.111

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN	Revision
#23815	USB Cable	123107D30009FA0	1

#23815

Commercial name	EC801
Type	AI-0401
Manufacturer	Sony Mobile
Length of cable	98.5 cm

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

3.4. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA/LTE mobile phone with integrated antenna and inbuilt battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD band 1/2/4/5/8 and LTE FDD bands 4/17. It supports GPRS service with multi-slots class 12 and EGPRS service with multi-slots class 12. The HSDPA and HSUPA features are also supported.

It has MP3, camera, USB memory, Mobile High-Definition Link (MHL), FM radio, GPS receiver, NFC, Bluetooth (EDR and Bluetooth 4.0), ANT+, WLAN (802.11 a/ac/b/g/n) and Wi-Fi hotspot functions. For WLAN 802.11n, it supports 20MHz bandwidth on 2.4GHz band and 20MHz/40MHz bandwidths on 5GHz/5.8GHz band. For WLAN 802.11 ac, it supports 20MHz/40MHz/80MHz bandwidths.

It includes normal option: USB cable.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

4. Reference Documents

4.1. Reference Documents for testing

The following documents listed in this section are referred for testing.

Reference	Title	Version
FCC Part 15, Subpart B	Radio frequency devices	10-1-12 Edition
ANSI C63.4	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2003

5. LABORATORY ENVIRONMENT

Semi-anechoic chamber SAC-2 (10 meters×6.7meters×6.1meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ± 4 dB, 3m distance, from 30 to 1000 MHz
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

6. SUMMARY OF TEST RESULTS

6.1. Summary of test results

Abbreviations used in this clause:		
Verdict Column	P	Pass
	F	Fail
	NA	Not applicable
	NM	Not measured
Location Column	A/B/C/D	The test is performed in test location A, B, C or D which are described in section 1.1 of this report

Items	Test Name	Clause in FCC rules	Section in this report	Verdict	Test Location
1	Radiated Emission	15.109(a)	B.1	P	D
2	Conducted Emission	15.107(a)	B.2	P	D

6.2. Statements

The test cases listed in section 6.1 of this report for the EUT specified in section 3 were performed by TMC according to the standards or reference documents in section 4.1

The EUT met all applicable requirements of the standards or reference documents in section 4.1.

This report only deals with the USB memory function among the features described in section 3.

7. Test Equipments Utilized

NO.	Description	TYPE	SERIES NUMBER	MANUFACTURE	CAL DUE DATE
1.	Test Receiver	ESCI	100766	R&S	2014-04-08
2.	Test Receiver	ESU26	100376	R&S	2013-11-07
3.	EMI Antenna	VULB 9163	9163-514	Schwarzbeck	2014-11-10
4.	EMI Antenna	3117	00139065	ETS-Lindgren	2014-07-31
5.	LISN	ESH3-Z5	825562/028	R&S	2014-06-12
6.	Universal Radio Communication Tester	CMU200	100680	R&S	2013-09-05
7.	Universal Radio Communication Tester	E5515C	MY48361083	Agilent	2014-03-16
8.	PC	OPTIPLEX 755	3908243625	DELL	N/A
9.	Monitor	E178FPc	CN-OWR979-64180-7AJ-D2MS	DELL	N/A
10.	Printer	DeskJet D2368	TH72E12G7Q	HP	N/A
11.	Keyboard	L100	CN0RH659658907ATOI40	DELL	N/A
12.	Mouse	M-BZ96C	810-000207	Logitech	N/A

ANNEX A: MEASUREMENT RESULTS

A.1 Radiated Emission

Reference

FCC: CFR Part 15.109(a)

A.1.1 Method of measurement

The field strength of radiated emissions from the unintentional radiator (USB mode of MS) at a distance of 3 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2003, section 8.3.

A.1.2 EUT Operating Mode:

EUT Setup: EUT1 + #23815

The MS is operating under the USB mode. During the test MS is connected to a PC via a USB cable in the case of USB mode. The model of the PC is OPTIPLEX 755, and the serial number of the PC is 3908243625. A software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.1.3 Test layout: see Pic.1 in ANNEX B.

A.1.4 Measurement Limit

Limit from CFR Part 15.109(a)

Frequency range (MHz)	Field strength limit (μV/m)		
	Quasi-peak	Average	Peak
30-88	100		
88-216	150		
216-960	200		
960-1000	500		
>1000		500	5000

A.1.5 Test Condition

Frequency range (MHz)	RBW/VBW	Sweep Time (s)	Detector
30-1000	120kHz (IF Bandwidth)	5	Peak/Quasi-peak
Above 1000	1MHz/1MHz	15	Peak, Average

A.1.6 Measurement Results

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”. It includes the antenna factor of receive antenna and the path loss.

The measurement results are obtained as described below:

Result = $P_{Mea} + A_{Rpl} = P_{Mea} + G_A + G_{PL}$

Where

G_A: Antenna factor of receive antenna

G_{PL}: Path Loss

P_{Mea}: Measurement result on receiver.

Measurement result for USB mode :

Peak detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17978.250	58.2	-22.9	42.3	38.823	VERTICAL
17508.750	57.5	-22.8	42.8	37.515	VERTICAL
17747.250	57.5	-22.8	42.1	38.261	HORIZONTAL
17759.250	57.4	-22.8	42.2	38.071	HORIZONTAL
17700.750	57.3	-22.8	42.8	37.311	HORIZONTAL
17711.250	57.3	-22.8	42.8	37.311	HORIZONTAL

Average detector

Frequency(MHz)	Result(dBμV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBμV)	Polarity
17460.750	45.7	-22.8	42.6	25.885	HORIZONTAL
17520.750	45.7	-22.8	42.8	25.715	HORIZONTAL
17488.500	45.7	-22.8	43.0	25.445	VERTICAL
17518.500	45.7	-22.8	42.8	25.715	VERTICAL
17499.000	45.6	-22.8	43.0	25.345	HORIZONTAL
17499.750	45.6	-22.8	43.0	25.345	VERTICAL

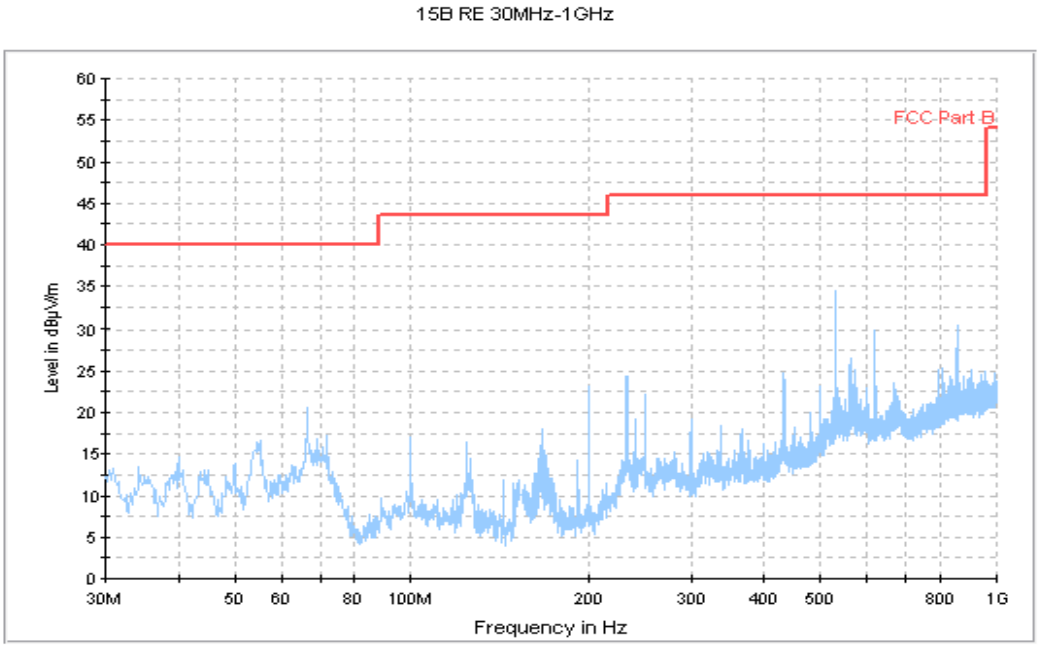


Figure A.1 Radiated Emission from 30MHz to 1GHz

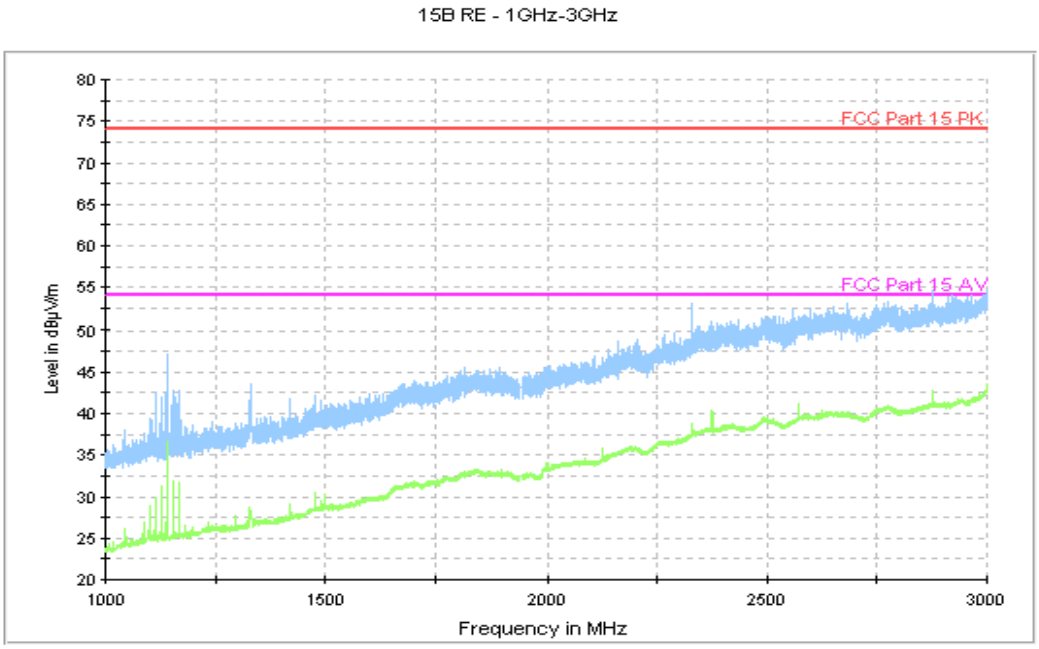


Figure A.2 Radiated Emission from 1GHz to 3GHz

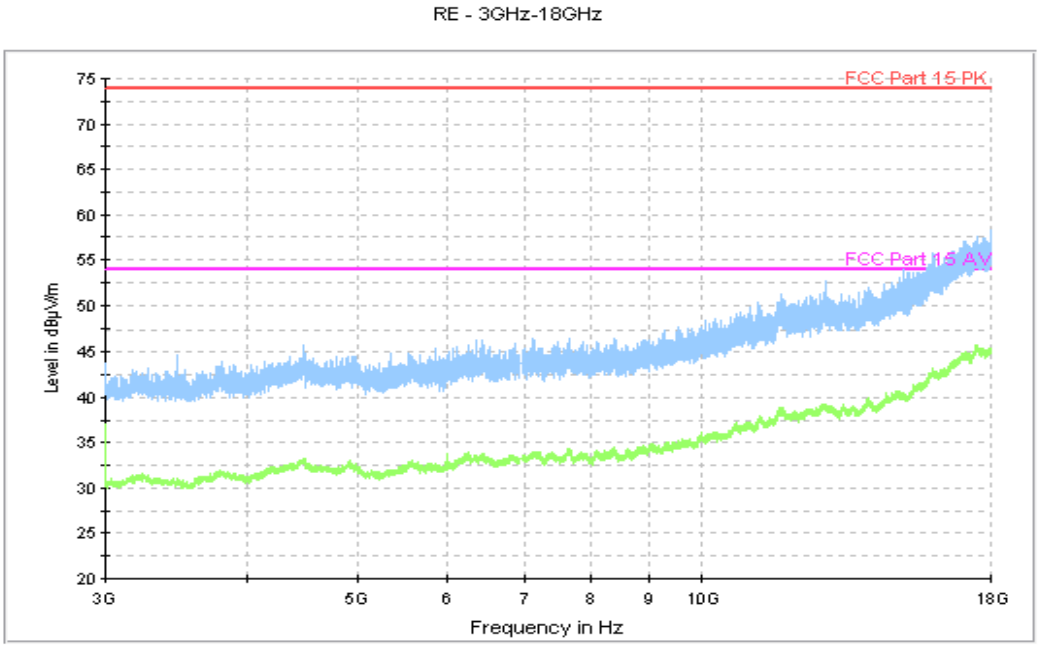


Figure A.3 Radiated Emission from 3GHz to 18GHz

Maximum expanded measurement uncertainty (30MHz - 1GHz): U = 3.9 dB, k =2.

Maximum expanded measurement uncertainty (>1GHz): U = 4.2 dB, k =2

A.2 Conducted Emission

Reference

FCC: CFR Part 15.107(a)

A.2.1 Method of measurement

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 30MHz shall not exceed the limits. Test is performed in accordance with the procedures of ANSI C63.4-2003, section 7.2.

A.2.2 EUT Operating Mode:

EUT Setup: EUT1 + #23815

The MS is operating in the USB mode. During the test MS is connected to a PC via a USB cable in the case of USB mode. The model of the PC is OPTIPLEX 755, and the serial number of the PC is 3908243625. A software is used to let the PC keep on copying data to MS, reading and erasing the data after copy action was finished.

A.2.3 Test layout:

The AC line of PC is connected to LISN. This conducted emission measurement is performed on the AC mains port of the PC with mobile phone attached. See Pic.2 in ANNEX B.

A.2.4 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dBμV)	
	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		

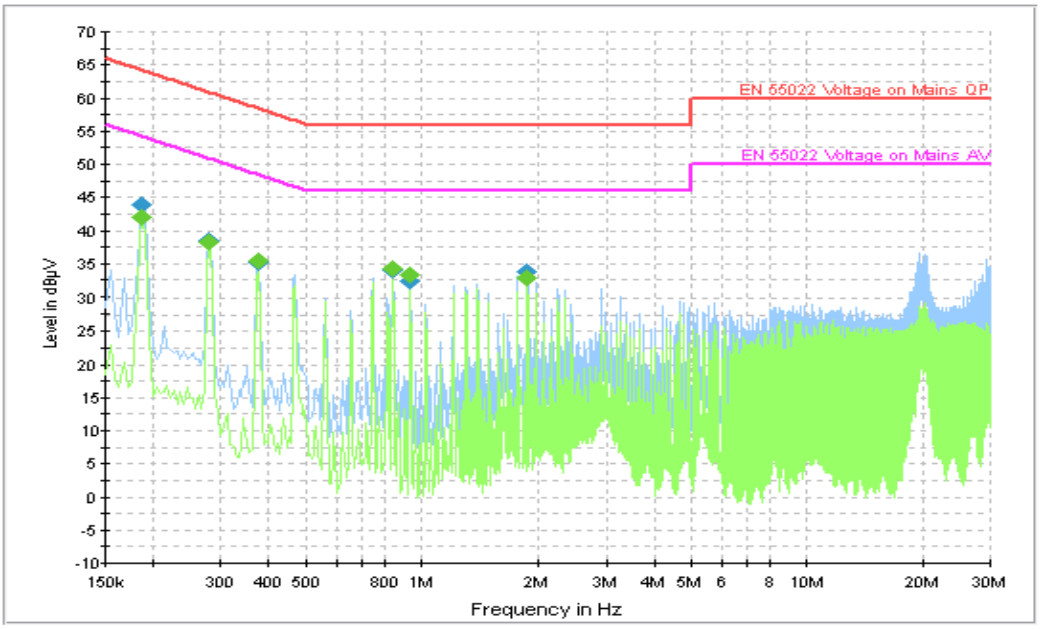
A.2.5 Test Condition in charging mode

Voltage（V）	Frequency（Hz）
120	60

RBW/IF bandwidth	Sweep Time(s)
9kHz	1

A.2.6 Measurement Results

USB Mode



Note: The graphic result above is the maximum of the measurements for both phase line and neutral line.

Fig A.4 Conducted Continuous Emission from 150 kHz to 30 MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186001	43.9	GND	N	9.9	20.3	64.2
0.280501	38.4	GND	L1	9.9	22.4	60.8
0.375001	35.2	GND	L1	9.9	23.1	58.4
0.843001	34.0	GND	L1	9.9	22.0	56.0
0.937501	32.4	GND	L1	9.9	23.6	56.0
1.869001	33.8	GND	N	9.9	22.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.186001	42.1	GND	N	9.9	12.1	54.2
0.280501	38.3	GND	L1	9.9	12.5	50.8
0.375001	35.4	GND	L1	9.9	13.0	48.4
0.843001	34.2	GND	L1	9.9	11.8	46.0
0.933001	33.3	GND	L1	9.9	12.7	46.0
1.869001	32.8	GND	N	9.9	13.2	46.0

Maximum expanded measurement uncertainty: U= 2.9 dB, k=2.