



# TEST REPORT

**No. I14Z45356-EMC04**

**for**

**Sony Mobile Communications AB**

**GSM/WCDMA/LTE mobile phone**

**FCC ID: PY7PM-0611**

**with**

**Hardware Version: A**

**Software Version: 14.3.B.0.53**

**Issued Date: Mar. 24<sup>th</sup>, 2014**

**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.6629A-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.

Tel: +86(0) 10-62304633-2561, Fax:+86(0)10-62304633-2504 Email:welcome@emcite.com. www.emcite.com

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## 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°C  
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

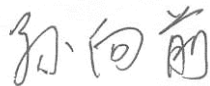
Receipt of Sample: Feb. 27<sup>th</sup>, 2014  
Testing Start Date: Mar. 05<sup>th</sup>, 2014  
Testing End Date: Mar. 11<sup>th</sup>, 2014

### 1.4. Signature



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Qu Pengfei  
(Prepared this test report)



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Sun Xiangqian  
(Reviewed this test report)



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Song Chongwen  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Sony Mobile Communications (China) Co. Ltd  
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: Mobilvägen, 22188 Lund, Sweden  
City: Lund  
Postal Code: 22188  
Country: Sweden  
Contact Person: Nilsson, Mikael  
Telephone: +46 703 227503  
Fax: +46 706 127385

### **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 1/5/6/19, HSDPA, HSUPA, LTE FDD bands 1/3/19/21, Bluetooth (EDR and 4.0), ANT+, WLAN ( 802.11 a/ac/b/g/n), NFC, FM, GPS mobile phone
FCC ID	PY7PM-0611
GSM Frequency Band	GSM 850/900/1800/1900
UMTS Frequency Band	FDD Band 1 / FDD Band 5 / FDD Band 6 / FDD Band 19
LTE Frequency Band	FDD Band 1/ FDD Band 3 / FDD Band 19 / FDD Band 21
Antenna	Internal
Power supply	Battery ( charged by travel adapter or vehicle charger )
Extreme vol. Limits	3.6VDC to 4.2VDC (nominal: 4.2VDC)
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**

<b>EUT ID*</b>	<b>SN</b>	<b>IMEI</b>	<b>HW Version</b>	<b>SW Version</b>
EUT4	CB5A1XBH0C	004402541458448	A	14.3.B.0.53

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

#### **3.3. Internal Identification of AE used during the test**

<b>AE ID*</b>	<b>Description</b>	<b>SN</b>	<b>Revision</b>
#23815	USB Cable	123307DD003654E	1
#23823	Vehicle Charger	123714060270742	1

#23815

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

#23823

Type	CAA-0003013
Manufacturer	Sony Mobile
Length of cable	98.5 cm (the length of USB cable)

\*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 bands 1/5/6/19 and LTE FDD bands 1/3/19/21. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA (Cat 10) and HSUPA (Cat 6) features are also supported.

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

It includes normal options: vehicle charger and 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.

<b>Reference</b>	<b>Title</b>	<b>Version</b>
FCC Part 15, Subpart B	Radio frequency devices	10-1-13 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	2009

## 5. LABORATORY ENVIRONMENT

**Semi-anechoic chamber SAC-1** (23 meters×17meters×10meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
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/10m 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 °C, Max. = 35 °C
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

### 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 GPS receiver 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 7	100948	R&S	2014-07-18
2.	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-16
3.	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-16
4.	LISN	ESH3-Z6	829997/012	R&S	2014-06-08
5.	LISN	ESH3-Z6	100057	R&S	2014-06-08
6.	Vector Signal Generator	SMU200A	102082	R&S	2014-11-01
7.	Test Receiver	FSV	101047	R&S	2014-06-30
8.	Universal Radio Communication Tester	CMU200	109914	R&S	2014-04-18
9.	Universal Radio Communication Tester	E5515C	MY48363198	Agilent	2014-07-08

## 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 GPS receiver of MS at a distance of 10 meters is tested. Tested in accordance with the procedures of ANSI C63.4 - 2009, section 8.3.

#### A.1.2 EUT Operating Mode:

EUT Setup: EUT4 + #23815 + #23823

A vector signal generator is used to provide the simulated GPS signal, and the frequency is set to 1575.42 MHz. Before the test starts, the integrated GPS application in MS is started up and locked to the simulated GPS signal.

Meanwhile, the EUT is synchronized to universal radio communication tester, and able to respond to paging messages and incoming call. An established call has been released.

**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 ( $\mu\text{V}/\text{m}$ )		
	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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{PL}$ : Path Loss

$P_{Mea}$ : Measurement result on receiver.

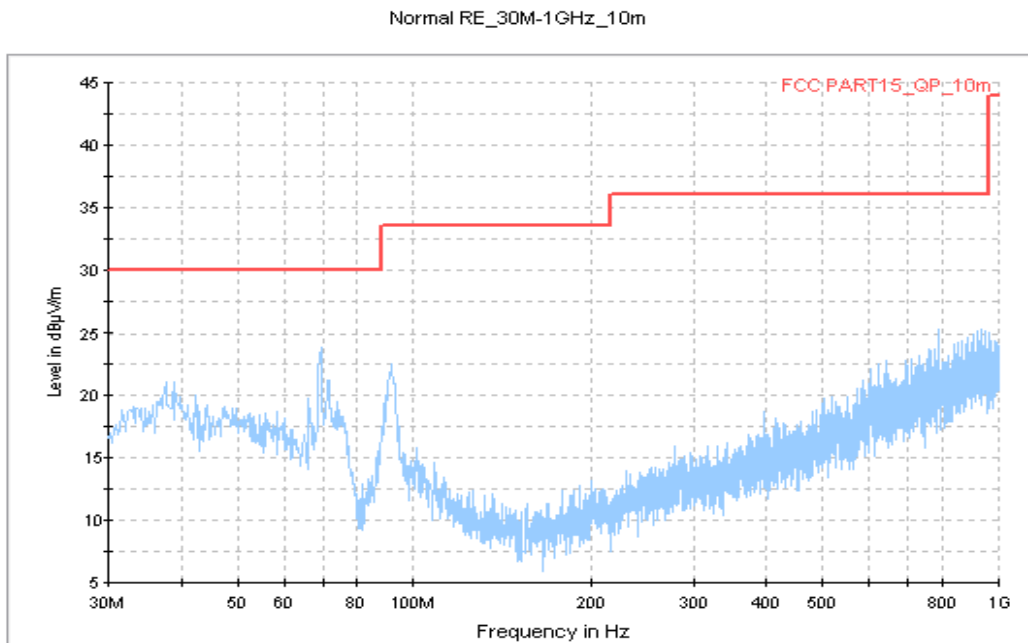
**Measurement result for GPS mode:**

**Peak detector**

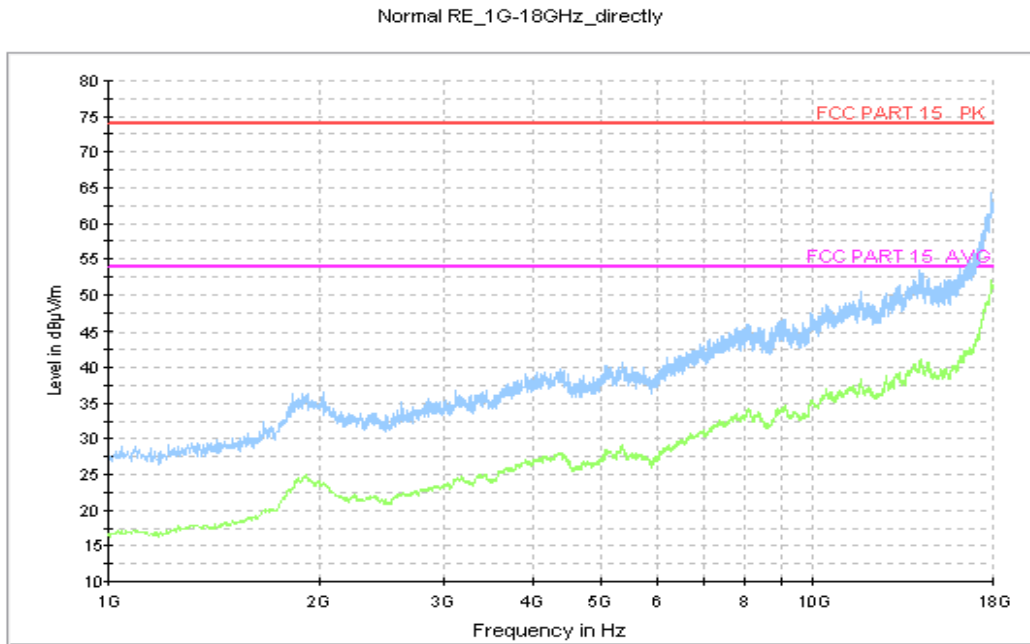
Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{Mea}$ (dB $\mu$ V)	Polarity
17916.594	64.2	-17.7	45.6	36.300	V
17903.313	64.2	-18.5	45.6	37.100	H
17913.406	63.7	-18.5	45.6	36.600	H
17907.563	63.3	-18.5	45.6	36.200	V
17858.688	63.3	-18.5	45.6	36.200	V
17880.469	63.3	-18.5	45.6	36.200	H

**Average detector**

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{Mea}$ (dB $\mu$ V)	Polarity
17877.281	52.1	-18.5	45.6	25.000	H
17898.531	52.0	-18.5	45.6	24.900	V
17904.906	52.0	-18.5	45.6	24.900	H
17903.844	52.0	-18.5	45.6	24.900	V
17900.656	52.0	-18.5	45.6	24.900	V
17879.406	52.0	-18.5	45.6	24.900	H



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



**Figure A.2 Radiated Emission from 1GHz to 18GHz**

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

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