



# EMC TEST REPORT

No. I15Z40385-EMC05

for

**Sony Mobile Communications Inc.**

**GSM/WCDMA/LTE Mobile Phone**

**FCC ID: PY7-PM0817**

with

**Hardware Version: A**

**Software Version: KK-MR1-SHINANO2-DSDS-150114-0317**

**Issued Date: 2015-04-14**

**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:**

**FCC 2.948 Listed: No. 525429**

**IC O.A.T.S listed: No. 12389A-1**

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

Tel:+86(0)10-62304633-2512, Fax:+86(0)10-62304633-2504

Email: [ctl\\_terminals@catr.cn](mailto:ctl_terminals@catr.cn), website: [www.chinattl.com](http://www.chinattl.com)



## **REPORT HISTORY**

<b>Report Number</b>	<b>Revision</b>	<b>Description</b>	<b>Issue Date</b>
I15Z40385-EMC05	Rev.0	1st edition	2015-03-09
I15Z40385-EMC05	Rev.1	2st edition	2015-04-14



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## 1. Test Laboratory

### 1.1. Testing Location

#### Location 1: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China 100191

### 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: Jul. 08<sup>th</sup>, 2014  
Testing Start Date: Jul. 17<sup>th</sup>, 2014  
Testing End Date: Jul. 22<sup>nd</sup>, 2014

### 1.4. Signature



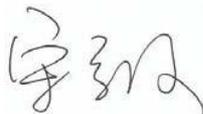
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**Qu Pengfei**  
**(Prepared this test report)**



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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 Inc.  
Address /Post: 1-8-15 Konan, Minato-ku, Tokyo, 108-0075, Japan  
City: Tokyo  
Postal Code: 108-0075  
Country: Japan

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

#### **3.1. About EUT**

Description	GSM, GPRS, EDGE, WCDMA, HSDPA, HSUPA, LTE Bluetooth (EDR and BLE), ANT+, WLAN ( 802.11 a/ac/b/g/n), NFC, FM, GPS mobile phone
FCC ID	PY7-PM0817
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	-10°C to +55°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>
EUT7	CB5A1ZTFL3	004402452521127	A	23.0.F.0.56

\*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>
AE3	USB Cable	134912A21208328	AP1.0

AE3

Commercial name	EC803
Type	AI-0404
Manufacturer	Sony Mobile
Length of cable	100 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 embedded battery.

The EUT supports GSM, WCDMA and LTE. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA (Cat 24) 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.

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.

Note: The GSM/WCDMA/LTE Mobile Phone with FCC ID is PY7-PM0817 manufactured by Sony Mobile Communications Inc. is a variant model based on GSM/WCDMA/LTE Mobile Phone with FCC ID is PY7-PM0808 for conformance test. According to the declaration of changes, the results are inherited from the initial model. The report number of initial model is I14Z47255-EMC05.

## **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	A
2	Conducted Emission	15.107(a)	B.2	P	A

### 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.	NAME	TYPE	SERIES NUMBER	PRODUCER	CAL. DUE DATE	CAL. INTERVAL
1.	EMI Antenna	VULB 9163	9163-234	Schwarzbeck	2016-09-15	3 Years
2.	Test Receiver	ESCI 7	100948	R&S	2015-07-18	1 Year
3.	Test Receiver	FSV40	101047	R&S	2015-07-03	1 Year
4.	EMI Antenna	3115	6914	ETS-Lindgren	2014-12-16	3 Years
5.	Test Receiver	ESCI	100344	R&S	2015-03-03	1 Year
6.	LISN	ESH2-Z5	829991/012	R&S	2015-04-14	1 Year
7.	Universal Radio Communication Tester	CMU200	109914	R&S	2015-04-13	1 Year
8.	PC	OPTIPLEX 380	2X1YV2X	DELL	/	/
9.	Monitor	E1709Wc	CN-OJ672H-6 4180-9BF-1CR L	DELL	/	/
10.	Printer	P1606dn	VNC3L52122	HP	/	/
11.	Keyboard	L100	CN-ORH656-6 5890-03S-041 Y	DELL	/	/
12.	Mouse	M-UAR	LZ013HC1YLV	DELL	/	/

## **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 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: EUT7 + AE3

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 380, and the serial number of the PC is 2X1YV2X. 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 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.1.4 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.1.5 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:

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

Where

$G_A$ : Antenna factor of receive antenna

$G_{PL}$ : Path Loss

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

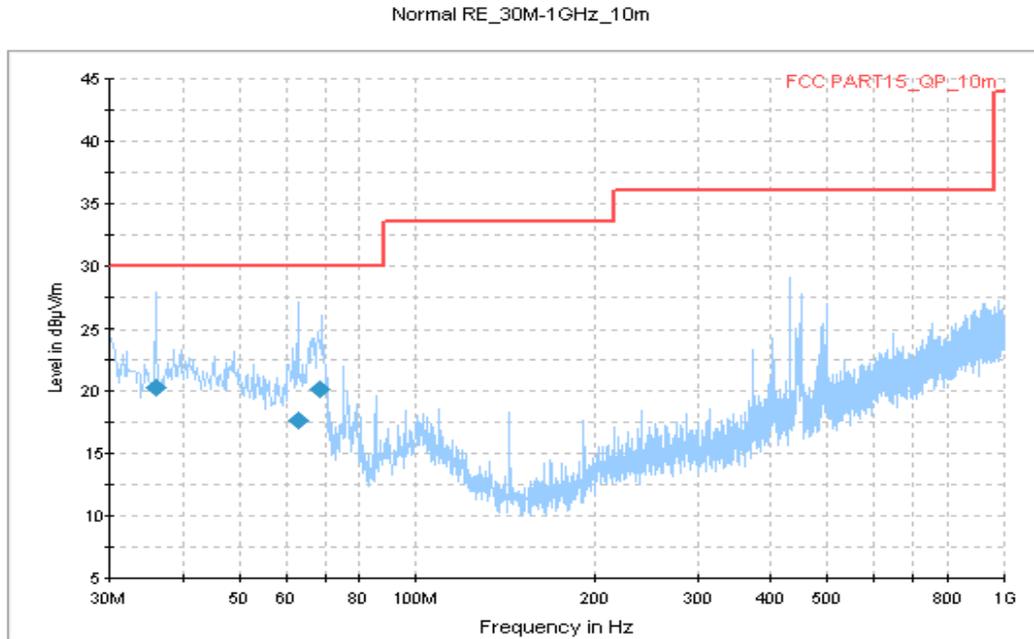
**Measurement result for USB mode :**

**Peak detector**

Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{Mea}$ (dB $\mu$ V)	Polarity
17877.281	62.0	-18.5	45.6	34.900	V
17918.719	61.5	-17.7	45.6	33.600	V
17921.375	61.5	-17.7	45.6	33.600	V
17878.875	61.5	-18.5	45.6	34.400	H
17867.188	61.3	-18.5	45.6	34.200	V
17880.469	61.2	-18.5	45.6	34.100	V

**Average detector**

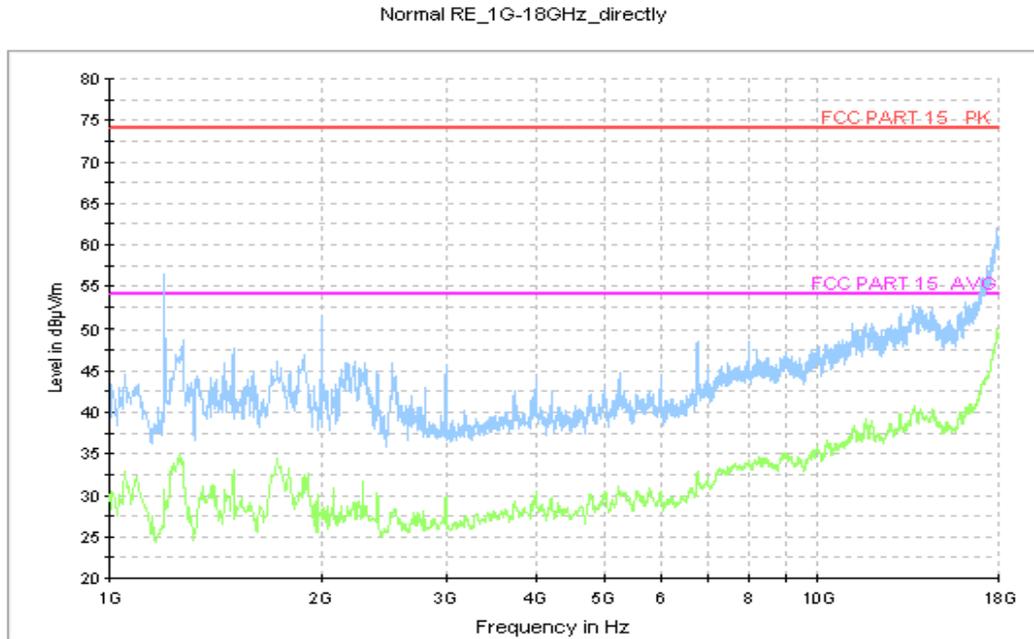
Frequency(MHz)	Result(dB $\mu$ V/m)	$G_{PL}$ (dB)	$G_A$ (dB/m)	$P_{Mea}$ (dB $\mu$ V)	Polarity
17892.688	49.7	-18.5	45.6	22.600	H
17879.938	49.7	-18.5	45.6	22.600	V
17886.844	49.7	-18.5	45.6	22.600	V
17903.844	49.6	-18.5	45.6	22.500	V
17888.438	49.6	-18.5	45.6	22.500	H
17887.375	49.6	-18.5	45.6	22.500	V



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

**Final Result 1**

Frequency (MHz)	QuasiPeak (dB µV/m)	Height (cm)	Polarization	Azimuth (deg)	Corr. (dB)	Margin (dB)	Limit (dB µV/m)
36.061250	20.3	120.0	V	61.0	-18.4	9.7	30.0
62.858750	17.6	100.0	V	26.0	-18.4	12.4	30.0
68.442500	20.2	125.0	V	80.0	-20.0	9.8	30.0



**Figure A.2 Radiated Emission from 1GHz to 6GHz**

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 C63.4-2009, section 7.2.

### A.2.2 EUT Operating Mode:

EUT Setup: EUT7 + AE3

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 380, and the serial number of the PC is 2X1YV2X. 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.

### A.2.4 Measurement Limit

Frequency of emission (MHz)	Conducted limit (dB $\mu$ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

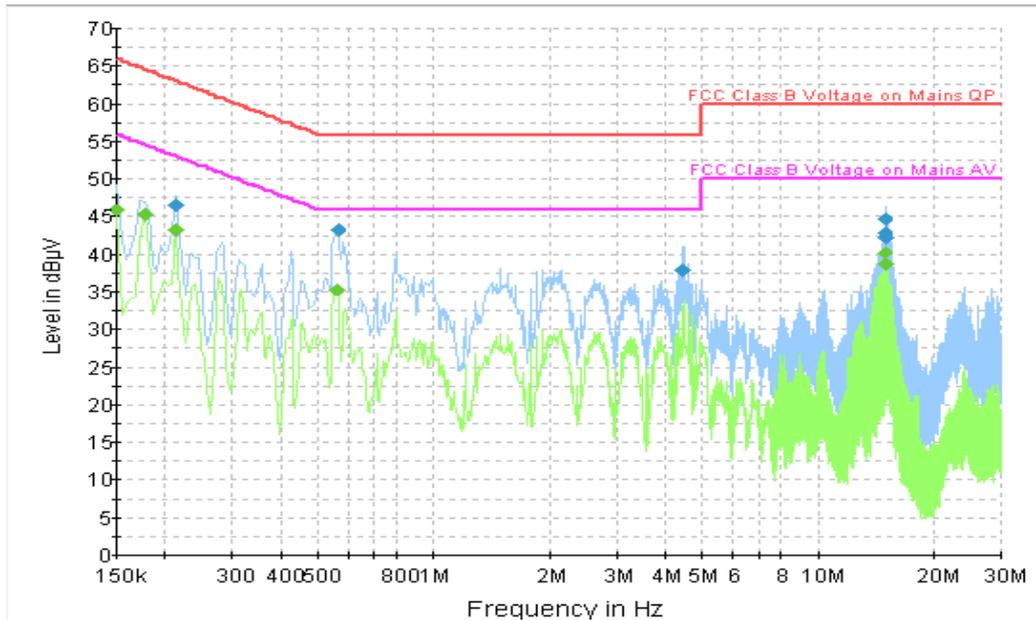
\*Decreases with the logarithm of the frequency

### 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.3 Conducted Continuous Emission from 150 kHz to 30 MHz**

**Final Result 1**

Frequency (MHz)	QuasiPeak (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.213000	46.5	GND	N	9.8	16.6	63.1
0.564000	43.2	GND	L1	9.8	12.8	56.0
4.425000	37.9	GND	L1	9.7	18.1	56.0
14.874000	42.9	GND	L1	9.5	17.1	60.0
14.968500	44.8	GND	L1	9.5	15.2	60.0
15.058500	42.3	GND	L1	9.5	17.7	60.0

**Final Result 2**

Frequency (MHz)	CAverage (dB µV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dB µV)
0.150000	45.9	GND	N	9.8	10.1	56.0
0.177000	45.4	GND	N	9.8	9.2	54.6
0.213000	43.2	GND	N	9.8	9.9	53.1
0.559500	35.3	GND	L1	9.8	10.7	46.0
14.968500	40.2	GND	L1	9.5	9.8	50.0
15.058500	38.7	GND	L1	9.5	11.3	50.0

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

**\*\*\*END OF REPORT\*\*\***