



EMC TEST REPORT

No. I15Z40514-EMC15

for

Sony Mobile Communications Inc.

GSM/WCDMA/LTE device

FCC ID: PY7-PM0796

with

Hardware Version: A

Software Version: 28.0.A.0.684

Issued Date: 2015-05-19

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 CTTL Beijing.

Test Laboratory:

FCC 2.948 Listed: No. 525429

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z40514-EMC15	Rev.0	1st edition	2015-04-24
I15Z40514-EMC15	Rev.1	2st edition	2015-05-19

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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

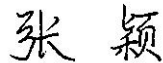
Normal Temperature: 15-35°C
Relative Humidity: 20-75%
Air pressure: 980 - 1040 hPa

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: 2015-03-20
Testing Start Date: 2015-03-23
Testing End Date: 2015-03-24

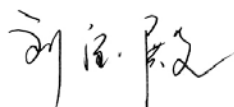
1.4. Signature



Zhang Ying
(Prepared this test report)



Qu Pengfei
(Reviewed this test report)



Liu Baodian
(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
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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 device
FCC ID	PY7-PM0796
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

EUT ID*	SN	IMEI	HW Version	SW Version
EUT10	CB5A24YCVX	004402148060480	A	28.0.A.0.684

*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
#25450	USB Cable	10115W02400154C	/
#25450			
Type		AI-0120	
Manufacturer		SONY	
Length of cable		98cm	

*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/UMTS/LTE device with integrated antenna and embedded battery.

The EUT supports GSM 850/900/1800/1900MHz bands, WCDMA FDD bands 1/2/4/5/8 and LTE FDD bands 1/2/3/4/5/7/8/17/20, TDD bands 38/39/40/41. It supports GPRS service with multi-slots class 33 and EGPRS service with multi-slots class 33. The HSDPA and HSUPA features are also supported.

It has MP3, camera, USB memory, Mobile High-Definition Link (MHL 3.0), FM radio, GPS receiver, NFC, Bluetooth (EDR and Bluetooth 4.1), 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.

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	10-1-13 Edition
ANSI C63.4	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	2014

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	1/2/3/4	The test is performed in test location 1, 2, 3 or 4 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	1
2	Conducted Emission	15.107(a)	B.2	P	1

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	2015-07-16	1 Year
3.	Test Receiver	FSV	101047	R&S	2015-07-03	1 Year
4.	EMI Antenna	3115	9906-5827	ETS-Lindgren	2016-11-19	3 Years
5.	Test Receiver for Conducted Emission	ESU26	100235	R&S	2016-03-02	1 Year
6.	LISN	ENV216	101200	R&S	2015-07-07	1 Year
7.	Universal Radio Communication Tester	CMU200	116455	R&S	2015-05-13	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: EUT10 + #25450

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 (μV/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:

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

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 μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17873.563	58.3	-18.5	45.6	31.200	H
17900.125	57.9	-18.5	45.6	30.800	H
17974.500	57.7	-17.7	45.6	29.800	V
17831.063	57.7	-18.5	45.6	30.600	H
17906.500	57.7	-18.5	45.6	30.600	V
17988.313	57.7	-17.7	45.6	29.800	V

Average detector

Frequency(MHz)	Result(dB μ V/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea} (dB μ V)	Polarity
17900.125	46.6	-18.5	45.6	19.500	V
17888.438	46.5	-18.5	45.6	19.400	H
17876.750	46.4	-18.5	45.6	19.300	V
17884.188	46.4	-18.5	45.6	19.300	H
17869.313	46.3	-18.5	45.6	19.200	V
17910.750	46.3	-18.5	45.6	19.200	V

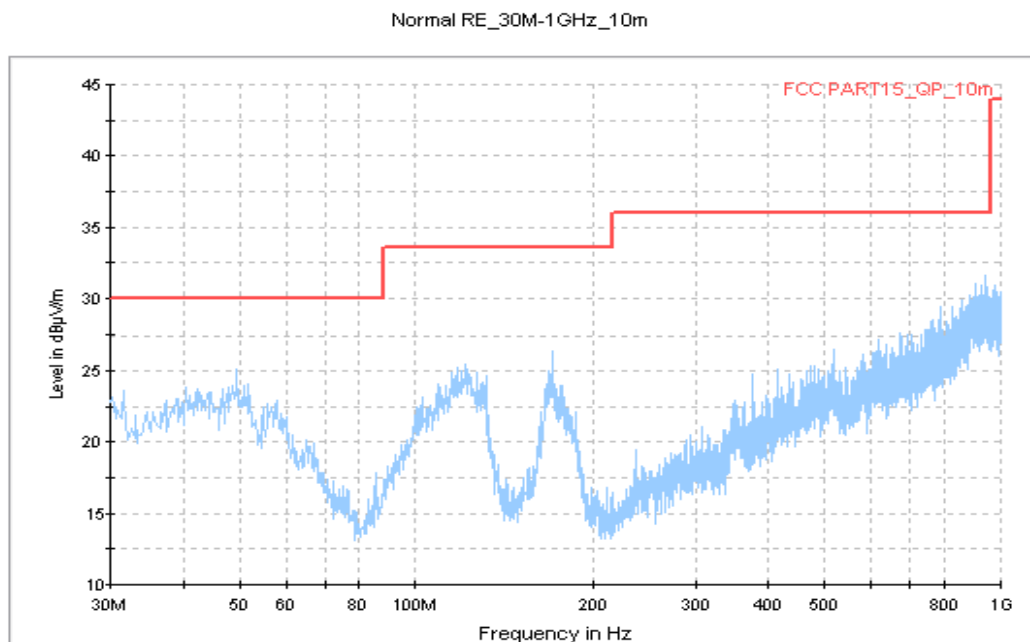


Figure A.1 Radiated Emission from 30MHz to 1GHz

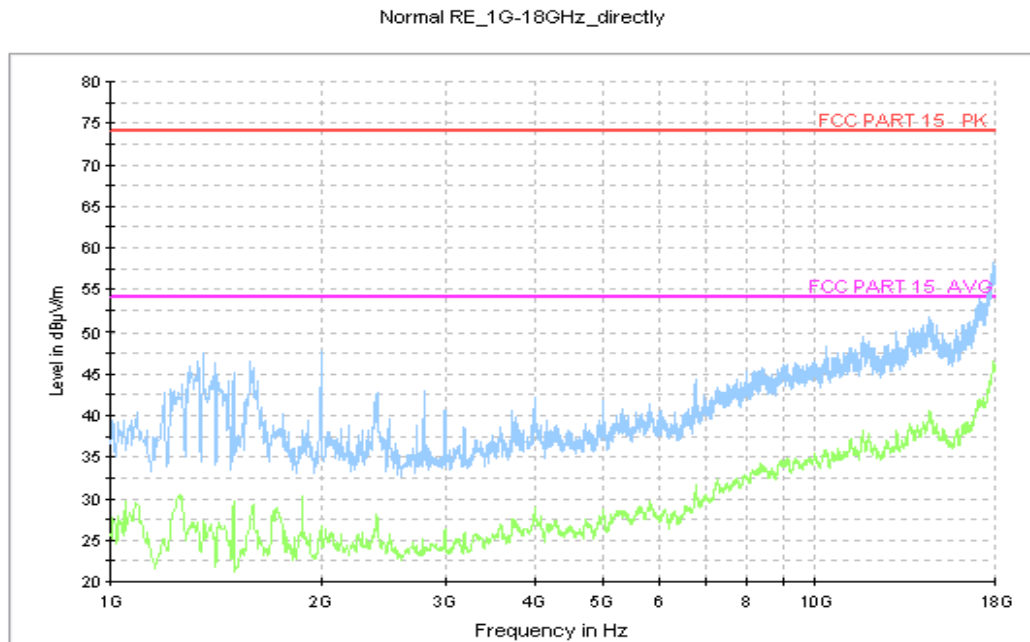


Figure A.2 Radiated Emission from 1GHz to 6GHz

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

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

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: EUT10 + #25450

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 device attached.

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		

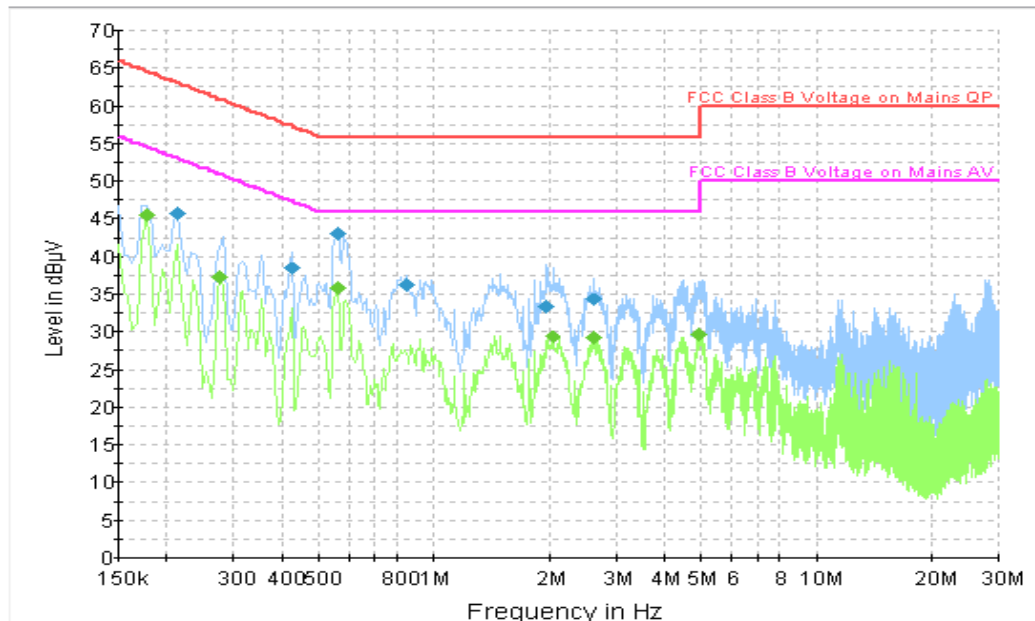
A.2.5 Test Condition in charging mode

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.3 Conducted Continuous Emission from 150 kHz to 30 MHz

Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.213000	45.7	GND	N	19.8	17.4	63.1
0.424500	38.5	GND	N	19.8	18.9	57.4
0.559500	43.2	GND	L1	19.8	12.8	56.0
0.843000	36.3	GND	N	19.8	19.7	56.0
1.977000	33.4	GND	L1	19.6	22.6	56.0
2.616000	34.4	GND	L1	19.7	21.6	56.0

Final Result 2

Frequency (MHz)	CAverage (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.177000	45.6	GND	N	19.7	9.0	54.6
0.276000	37.4	GND	N	19.8	13.6	50.9
0.559500	35.8	GND	L1	19.8	10.2	46.0
2.049000	29.5	GND	N	19.6	16.5	46.0
2.616000	29.2	GND	N	19.7	16.8	46.0
4.960500	29.8	GND	N	19.6	16.2	46.0

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

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