



TEST REPORT

Test Report No. : UL-RPT-RP10295085JD18A V2.0

Manufacturer : Sony Mobile Communications Inc.
FCC ID : PY7PM-0800
Technology : UMTS850 Band V, UMTS Band II & UMTS1700 Band IV
Test Standard(s) : FCC Part 22.913(a)(2), 24.232(c) & 27.50(d)(4)

1. This test report shall not be reproduced in full or partial, without the written approval of UL VS LTD.
2. The results in this report apply only to the sample(s) tested.
3. The sample tested is in compliance with the above standard(s).
4. The test results in this report are traceable to the national or international standards.
5. Version 2.0 supersedes all previous versions.

Date of Issue: 01 August 2014

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Issued by :

pp

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This laboratory is accredited by UKAS.
The tests reported herein have been
performed in accordance with its' terms
of accreditation.

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1. Customer Information

Company Name:	Sony Mobile Communications Inc.
Address:	Nya Vattentornet Mobilvägen 10 Lund 22188 Sweden

2. Summary of Testing

2.1. General Information

Specification Reference:	47CFR22
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 22 Subpart H (Public Mobile Services)
Specification Reference:	47CFR24
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 24 Subpart E (Personal Communication Services)
Specification Reference:	47CFR27
Specification Title:	Code of Federal Regulations Volume 47 (Telecommunications): Part 27 Subpart C (Miscellaneous Wireless Communication Services)
Site Registration:	209735
Location of Testing:	UL VS LTD, Unit 3 Horizon, Wade Road, Kingsland Business Park, Basingstoke, Hampshire, RG24 8AH, United Kingdom
Test Dates:	28 May 2014 to 02 June 2014

2.2. Summary of Test Results

FCC Reference (47CFR)	Measurement	Result
Part 22.913(a)(2)	Transmitter Effective Radiated Power (ERP)	
Part 24.232(c)	Transmitter Output Power (EIRP)	
Part 2.1046/27.50(d)(4)	Transmitter Output Power (EIRP)	
Key to Results		
 = Complied  = Did not comply		

2.3. Methods and Procedures

Reference:	ANSI/TIA-603-C-2004
Title:	Land Mobile Communications Equipment, Measurements and performance Standards
Reference:	FCC KDB 971168 D01 v02r01, 7 June 2013
Title:	Measurement Guidance for Certification of Licensed Digital Transmitters

2.4. Deviations from the Test Specification

For the measurements contained within this test report, there were no deviations from, additions to, or exclusions from the test specification identified above.

3. Equipment Under Test (EUT)

3.1. Identification of Equipment Under Test (EUT)

Brand Name:	Sony
IMEI:	004402452752649 <i>(Conducted sample with RF port)</i>
Test Sample Serial Number:	CB5A1Z1S1P
Hardware Version Number:	A
Software Version Number:	23.0.A.0.204
FCC ID:	PY7PM-0801

Note:

The test results documented in this report are for FCC ID PY7PM-0800.

All physical measurements were performed on FCC ID PY7PM-0801, which is a variant of FCC ID PY7PM-0800. The client has declared that FCC ID PY7PM-0800 is identical in build and design for the bands and technologies to FCC ID PY7PM-0801 as listed in this report.

3.2. Description of EUT

The equipment under test (EUT) was a GSM/WCDMA/LTE Phone + Bluetooth, DTS/UNII a/b/g/n/ac + NFC & ANT+.

3.3. Modifications Incorporated in the EUT

No modifications were applied to the EUT during testing.

3.4. Additional Information Related to Testing

Technology Tested:	UMTS850		
Type of Radio Device:	Transceiver		
Mode:	UMTS FDD V		
Modulation Type:	QPSK / 8PSK		
Channel Spacing:	5 MHz		
Maximum Output Power (ERP):	Voice (12.2 kbps)	23.1 dBm	
	HSDPA Sub-Test 2	24.7 dBm	
	HSUPA Sub-Test 3	24.8 dBm	
Transmit Frequency Range:	824 to 849 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	4132	826.4
	Middle	4183	836.6
	Top	4233	846.6

Additional Information Related to Testing (continued)

Technology Tested:	UMTS1900		
Type of Radio Device:	Transceiver		
Mode:	UMTS FDD II		
Modulation Type:	QPSK / 8PSK		
Channel Spacing:	5 MHz		
Maximum Output Power (EIRP):	Voice (12.2 kbps)	28.6 dBm	
	HSDPA Sub-Test 4	30.5 dBm	
	HSUPA Sub-Test 3	30.3 dBm	
Transmit Frequency Range:	1850 to 1910 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	9262	1852.4
	Middle	9400	1880.0
	Top	9538	1907.6
Technology Tested:	UMTS1700		
Type of Radio Device:	Transceiver		
Mode:	UMTS FDD IV		
Modulation Type:	QPSK / 8PSK		
Channel Spacing:	5 MHz		
Maximum Output Power (EIRP):	Voice (12.2 kbps)	26.7 dBm	
	HSDPA Sub-Test 3	27.8 dBm	
	HSUPA Sub-Test 5	27.9 dBm	
Transmit Frequency Range:	1710 MHz to 1755 MHz		
Transmit Channels Tested:	Channel ID	Channel Number	Channel Frequency (MHz)
	Bottom	1312	1712.4
	Middle	1412	1732.4
	Top	1513	1752.6

3.5. Support Equipment

The following support equipment was used to exercise the EUT during testing:

Description:	2 GB Micro SD Card
Brand Name:	SanDisk
Model Name or Number:	Not marked

Description:	Voltage variation jig
Brand Name:	Not marked
Model Name or Number:	Not marked
Serial Number:	Not marked

4. Operation and Monitoring of the EUT during Testing

4.1. Operating Modes

The EUT was tested in the following operating mode(s):

- Constantly transmitting at full power on bottom, middle and top channels as required.
- ERP/EIRP tests were performed with the EUT in Voice (12.2 kbps), HSDPA (Sub-tests 1 to 4) or HSUPA (Sub-tests 1 to 5) modes.

4.2. Configuration and Peripherals

The EUT was tested in the following configuration(s):

- Connected to a Rohde & Schwarz CMW 500 Wideband Radio Communications Tester, operating in UMTS Bands, II, IV or V
- The voltage variation jig and adaptor were used for conducted measurements set at the nominal voltage.

5. Measurements, Examinations and Derived Results

5.1. General Comments

Measurement uncertainties are evaluated in accordance with current best practice. Our reported expanded uncertainties are based on standard uncertainties, which are multiplied by an appropriate coverage factor to provide a statistical confidence level of approximately 95%. Please refer to *Section 6. Measurement Uncertainty* for details.

In accordance with UKAS requirements all the measurement equipment is on a calibration schedule. All equipment was within the calibration period on the date of testing.

5.2. Test Results

5.2.1. Transmitter Effective Radiated Power (ERP)

Test Summary:

Test Engineer:	David Doyle	Test Date:	28 May 2014
Test Sample IMEI:	004402452752649		

FCC Reference:	Part 22.913(a)(2)
Test Method Used:	As detailed in KDB 971168 Section 5.1.1 and 5.2.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	36

Note(s):

- All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.
- The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
- The customer stated a maximum antenna gain of -2.1 dBi. As the limit is an ERP limit, the gain in dBi has been converted to dBd. The dBd was calculated as:

$$-2.1 \text{ dBi} - 2.15 \text{ dB} = -4.25 \text{ dBd.}$$

- The antenna gain was added to the conducted output power to obtain the ERP.

Results: Peak ERP / HSDPA and Voice

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
850	4132	24.0	23.9	24.1	23.1	22.8	38.5	14.4	Complied
	4183	24.4	24.7	24.5	23.3	23.1	38.5	13.8	Complied
	4233	24.4	24.6	24.5	23.2	22.9	38.5	13.9	Complied
βc		2	11	15	15				
βd		15	15	8	4				
ΔACK, ΔNACK, ΔCQI		8	8	8	8				

Transmitter Effective Radiated Power (ERP) (continued)**Results: RMS ERP / HSDPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
850	4132	17.7	17.7	17.3	17.7	17.7	38.5	20.8	Complied
	4183	18.0	17.9	17.5	17.9	17.9	38.5	20.5	Complied
	4233	17.9	17.9	17.4	17.7	17.7	38.5	20.6	Complied
β_c		2	11	15	15				
β_d		15	15	8	4				
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8				

Results: Peak ERP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
850	4132	23.8	23.5	24.2	23.1	24.2	38.5	14.3	Complied
	4183	24.3	23.7	24.7	23.4	24.7	38.5	13.8	Complied
	4233	24.3	23.5	24.8	23.2	24.7	38.5	13.7	Complied
β_c		10	6	15	2	15			
β_d		15	15	9	15	1			
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8	8			

Results: RMS ERP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
850	4132	17.7	17.2	17.7	17.7	17.8	38.5	20.7	Complied
	4183	17.9	17.5	17.9	17.8	18.0	38.5	20.5	Complied
	4233	17.7	17.4	17.9	17.8	17.9	38.5	20.6	Complied
β_c		10	6	15	2	15			
β_d		15	15	9	15	1			
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8	8			

Transmitter Effective Radiated Power (ERP) (continued)**Test Equipment Used:**

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
A2533	Directional Coupler	Atlan TecRF	CDC-003060-20	14041701717	Calibrated before use	-
A2525	Attenuator	Atlan TecRF	AN18W5-10	832827#3	Calibrated before use	-
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12
M1269	Multimeter	Fluke	179	90250210	19 May 2015	12
S0523	DC Power Supply	TTI	PL320	224235	Calibrated before use	-

5.2.2. Transmitter Output Power (EIRP)**Test Summary:**

Test Engineer:	David Doyle	Test Dates:	29 May 2014 & 30 May 2014
Test Sample IMEI:	004402452752649		

FCC Reference:	Part 24.232(c)
Test Method Used:	As detailed in KDB 971168 Section 5.1.1 and 5.2.1

Environmental Conditions:

Temperature (°C):	25 to 26
Relative Humidity (%):	36 to 39

Note(s):

1. All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
3. The customer stated a maximum antenna gain of 2.1 dBi.
4. The antenna gain was added to the conducted output power to obtain the EIRP.

Transmitter Output Power (EIRP) (continued)**Results: Peak EIRP / HSDPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1900	9262	28.6	30.0	30.2	30.1	28.5	33.0	2.8	Complied
	9400	28.2	29.3	30.2	30.5	28.6	33.0	2.5	Complied
	9538	28.0	29.4	29.6	29.4	28.4	33.0	3.4	Complied
β_c		2	12	11	15				
β_d		15	15	8	4				
$\Delta\text{ACK}, \Delta\text{NACK}, \Delta\text{CQI}$		8	8	8	8				

Results: Peak EIRP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1900	9262	30.0	29.2	30.3	28.5	30.1	33.0	2.7	Complied
	9400	29.3	29.1	29.0	28.2	29.7	33.0	3.3	Complied
	9538	29.3	28.9	29.6	28.1	29.6	33.0	3.4	Complied
β_c		10	6	15	2	15			
β_d		15	15	9	15	1			
$\Delta\text{ACK}, \Delta\text{NACK}, \Delta\text{CQI}$		8	8	8	8	8			

Transmitter Output Power (EIRP) (continued)**Results: RMS EIRP / HSDPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1900	9262	22.4	22.5	22.5	22.4	22.8	33.0	10.2	Complied
	9400	22.4	22.4	22.4	22.2	22.7	33.0	10.3	Complied
	9538	22.3	22.3	22.4	22.3	22.6	33.0	10.4	Complied
β_c		2	11	15	15				
β_d		15	15	8	4				
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8				

Results: RMS EIRP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1900	9262	22.5	22.3	21.6	23.1	23.1	33.0	9.9	Complied
	9400	22.5	22.6	21.6	23.0	23.0	33.0	10.0	Complied
	9538	22.1	22.3	21.6	22.7	22.7	33.0	10.3	Complied
β_c		10	6	15	2	15			
β_d		15	15	9	15	1			
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8	8			

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
A2533	Directional Coupler	Atlan TecRF	CDC-003060-20	14041701717	Calibrated before use	-
A2525	Attenuator	Atlan TecRF	AN18W5-10	832827#3	Calibrated before use	-
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12
M1269	Multimeter	Fluke	179	90250210	19 May 2015	12
S0523	DC Power Supply	TTI	PL320	224235	Calibrated before use	-

5.2.3. Transmitter Output Power (EIRP)**Test Summary:**

Test Engineer:	David Doyle	Test Date:	02 June 2014
Test Sample IMEI:	004402452752649		

FCC Reference:	Parts 2.1046 & 27.50(d)(4)
Test Method Used:	As detailed in FCC KDB 971168 Section 5.1.1 and 5.2.1

Environmental Conditions:

Temperature (°C):	25
Relative Humidity (%):	39

Note(s):

1. All modes were compared on each channel and the highest power recorded was subtracted from the limit to show the margin.
2. The signal analyser was connected to the RF port on the EUT using suitable attenuation and RF cable. An RF level offset was entered on the signal analyser to compensate for the loss of the attenuator and RF cable.
3. The customer stated a maximum antenna gain of 0 dBi.
4. The antenna gain was added to the conducted output power to obtain the EIRP.

Transmitter Effective Radiated Power (EIRP) (continued)**Results: Peak EIRP / HSDPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1700	1312	26.2	27.5	27.8	27.8	26.7	30.0	2.2	Complied
	1412	26.0	27.4	27.6	27.6	26.6	30.0	2.4	Complied
	1513	25.8	27.4	27.5	27.5	26.6	30.0	2.5	Complied
β_c		2	11	15	15				
β_d		15	15	8	4				
$\Delta\text{ACK}, \Delta\text{NACK}, \Delta\text{CQI}$		8	8	8	8				

Results: Peak EIRP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1700	1312	27.5	27.1	27.8	26.1	27.9	30.0	2.1	Complied
	1412	27.4	26.9	27.6	26.0	27.7	30.0	2.3	Complied
	1513	27.4	26.8	27.6	25.9	27.7	30.0	2.3	Complied
β_c		10	6	15	2	15			
β_d		15	15	9	15	1			
$\Delta\text{ACK}, \Delta\text{NACK}, \Delta\text{CQI}$		8	8	8	8	8			

Transmitter Effective Radiated Power (EIRP) (continued)**Results: RMS EIRP / HSDPA and Voice**

Modes		HSDPA				Voice			
Sub-test		1	2	3	4	12.2 kbps			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1700	1312	19.7	19.7	19.7	20.4	20.7	30.0	9.3	Complied
	1412	19.5	19.6	19.7	20.0	20.7	30.0	9.3	Complied
	1513	19.7	19.8	19.9	20.0	20.7	30.0	9.3	Complied
β_c		2	12	15	15				
β_d		15	15	8	4				
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8				

Results: RMS EIRP / HSUPA

Modes		HSUPA							
Sub-test		1	2	3	4	5			
Band	Channel	Power (dBm)	Limit (dBm)	Margin (dB)	Result				
1700	1312	20.2	20.2	19.7	19.6	22.0	30.0	8.0	Complied
	1412	20.2	20.4	19.7	19.6	21.5	30.0	8.5	Complied
	1513	20.3	20.4	19.6	21.6	22.0	30.0	8.0	Complied
β_c		11	6	15	2	15			
β_d		15	15	9	15	15			
$\Delta ACK, \Delta NACK, \Delta CQI$		8	8	8	8	8			

Test Equipment Used:

Asset No.	Instrument	Manufacturer	Type No.	Serial No.	Date Calibration Due	Cal. Interval (Months)
M1656	Thermohygrometer	JM Handelspunkt	30.5015.13	None stated	14 Mar 2015	12
A2533	Directional Coupler	Atlan TecRF	CDC-003060-20	14041701717	Calibrated before use	-
A2525	Attenuator	Atlan TecRF	AN18W5-10	832827#3	Calibrated before use	-
L1138	Signal Analyser	Rohde & Schwarz	FSV13.6	101389	17 Apr 2015	12
M1269	Multimeter	Fluke	179	90250210	19 May 2015	12
S0523	DC Power Supply	TTI	PL320	224235	Calibrated before use	-

6. Measurement Uncertainty

No measurement or test can ever be perfect and the imperfections give rise to error of measurement in the results. Consequently the result of a measurement is only an approximation to the value of the measurand (the specific quantity subject to measurement) and is only complete when accompanied by a statement of the uncertainty of the approximation.

The expression of uncertainty of a measurement result allows realistic comparison of results with reference values and limits given in specifications and standards.

The uncertainty of the result may need to be taken into account when interpreting the measurement results.

The reported expanded uncertainties below are based on a standard uncertainty multiplied by an appropriate coverage factor such that a confidence level of approximately 95% is maintained. For the purposes of this document "approximately" is interpreted as meaning "effectively" or "for most practical purposes".

Measurement Type	Range	Confidence Level (%)	Calculated Uncertainty
Conducted Output Power	824 MHz to 1910 MHz	95%	±1.13 dB

The methods used to calculate the above uncertainties are in line with those recommended within the various measurement specifications. Where measurement specifications do not include guidelines for the evaluation of measurement uncertainty the published guidance of the appropriate accreditation body is followed.

7. Report Revision History

Version Number	Revision Details		
	Page No(s)	Clause	Details
1.0	-	-	Initial Version
2.0	-	-	EUT Description update

--- END OF REPORT ---