



FCC ID : AK8CXN5100
Test report No. : 31JE0261-SH-01-A-R1
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Issued date : November 17, 2011
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RADIO TEST REPORT

Test Report No.: 31JE0261-SH-01-A-R1

Applicant : Sony Corporation
Type of Equipment : TransferJet module
Model No. : CXN5100
FCC ID : AK8CXN5100
Test regulation : FCC Part15 Subpart F: 2011
Test result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
5. This report is a revised version of 31JE0261-SH-01-A. 31JE0261-SH-01-A is replaced with this report.

Date of test:

June 14 – 22, 2011

**Representative
test engineer:**

Tatsuya Arai

Engineer of WiSE Japan, UL Verification Service

Approved by:

Toyokazu Imamura

Leader of WiSE Japan, UL Verification Service

UL Japan, Inc.

SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

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1 Applicant information

Company Name : Sony Corporation
Address : 1-7-1 Konan, Minato-ku, Tokyo 108-0075, Japan
Telephone Number : +81-3-6748-2111
Contact Person : Akihiro Koyama
Telephone and Facsimile : TEL: +81-3-5448-4019
Number of Contact Person : FAX: +81-3-5448-3992

2 Equipment under test (E.U.T.)

2.1 Identification of E.U.T.

Type of Equipment : TransferJet module
Model No. : CXN5100
Serial No. : 4
Rating : DC3.3V, 1.8V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.
Receipt Date of Sample : June 14, 2011

2.2 Product description

Model: CXN5100 (referred to as the EUT in this report) is a TransferJet module.

Equipment type : Transceiver
Frequency of operation : 4200 - 4760MHz
Center frequency: 4480MHz (used only 1ch)
Clock frequency : 20MHz
Effective Bandwidth : 560MHz
(not 10dB Bandwidth)
Type of modulation : DSSS
Antenna type : TransferJet Coupler
Antenna connector type : JSC
Antenna gain@4.48GHz : Antenna gain (without cable loss)
Type A (LDA5M4G4820L-302): -9.71dBi
Type B (LDA5M4G4815L-301): -12.7dBi
Antenna cable loss
Type A: 0.1364dB, Type B: 1.364dB
ITU code : Q7D
Operation temperature range : -20 ~ +70 deg.C.

FCC 15.31 (e)

The RF Module is provided with stable power supply DC 3.3V and 1.8V from the host device and has power supply regulator which provides DC1.2V, therefore, the equipment complies power supply regulation.

FCC Part 15.203

The EUT has a unique coupling/antenna connector JSC. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart F: 2011, final revised on July 8, 2011 and effective August 8, 2011
 Title : FCC 47CFR Part15 Radio Frequency Device
 Subpart F Ultra-Wideband Operation
 Section 15.519 Technical requirements for hand held UWB systems

*The revision on November 17, 2011 does not influence the test specification applied to the EUT.

* The EUT complies with FCC Part 15 Subpart B: 2011, final revised on July 8, 2011 and effective August 8, 2011

3.2 Procedures & Results (Hand held UWB systems)

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted Emission	ANSI C63.4:2003	FCC 15.505(a) FCC 15.207	-	N/A	29.8dB 0.18428MHz, N, QP	Complied
UWB Bandwidth	ANSI C63.4:2003 FCC 15.503 (a)	FCC 15.503 (d) FCC 15.519 (b)	Conducted	N/A	-	Complied
Radiated Emission	ANSI C63.4:2003 FCC 15.521 (d)	15.519 (c) (d)	Radiated	N/A	9.3dB 1596.00MHz, Vertical	Complied
Peak level of the Emission	ANSI C63.4:2003 FCC 15.521 (e) (g)	FCC 15.209 FCC 15.519 (e)	Radiated	N/A	35.4dB 4620.00MHz, Vertical	Complied
Transmitter Timeout	ANSI C63.4:2003	FCC 15.519 (a) (1)	Conducted	N/A	-	Complied

Note: UL Japan's EMI Work Procedures No.QPM05.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	N/A

* Other than above, no addition, exclusion nor deviation has been made from the standard.

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SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
 Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

3.4 Uncertainty

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Item	Frequency range	No.1 SAC*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.0 dB	2.7 dB	3.1 dB
Radiated emission	30MHz-300MHz	4.7 dB	4.5 dB	4.7 dB
	300MHz-1GHz	4.5 dB	4.6 dB	4.6 dB
	1GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-40GHz	4.4 dB	4.2 dB	4.2 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

The data listed in this test report has enough margin, more than site margin.

Radiated emission test

The data listed in this test report has enough margin, more than site margin.

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.

1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone number : +81 463 50 6400

Facsimile number : +81 463 50 6401

No.1/ No.2/ No.3 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on April 17, 2009 (Registration No.: 697847).

IC Registration No. : 2973D-1 (No1 anechoic chamber)
 2973D-2 (No2 anechoic chamber)
 2973D-3 (No3 anechoic chamber)

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.1 Shielded room	6.8 x 4.1 x 2.7
No.2 Semi-anechoic chamber	20.6 x 11.3 x 7.65 Maximum measurement distance: 10m	No.2 Shielded room	6.8 x 4.1 x 2.7
No.3 Semi-anechoic chamber	12.7 x 7.7 x 5.35 Maximum measurement distance: 5m	No.3 Shielded room	6.3 x 4.7 x 2.7
No.4 Semi-anechoic chamber	8.1 x 5.1 x 3.55	No.4 Shielded room	4.4 x 4.7 x 2.7
		No.5 Shielded room	7.8 x 6.4 x 2.7
		No.6 Shielded room	7.8 x 6.4 x 2.7

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1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

4 System test configuration

4.1 Justification

The system was configured in typical fashion (as a customer would normally use it) for testing.

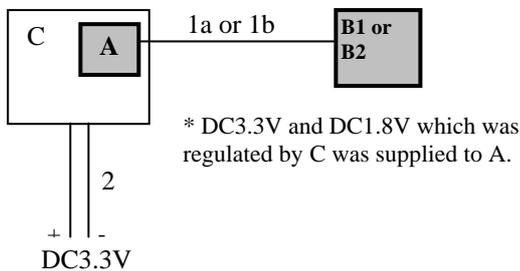
Test item	Operating mode	Tested frequency
Except Trasmmitter Time Out	Transmitting (Data system: M18)	4480MHz
Trasmmitter Time Out	Communication	4480MHz

EEPROM Ver.: 3.00, Power Setting: 0x33

Processing Gain Gsf: 1, 16

Above setting of software is the worst case. Any conditions under the normal use do not exceed the condition of setting.

4.2 Configuration of tested system



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remarks)
A	TransferJet module	CXN5100	4	Sony Corporation	AK8CXN5100 (EUT)
B1	TransferJet coupler (Antenna Type A)	LDA5M4G4820L-302	4	MURATA MANUFACTURING CO., LTD.	(EUT)
B2	TransferJet coupler (Antenna Type B)	LDA5M4G4815L-301	4	MURATA MANUFACTURING CO., LTD.	(EUT)
C	CXN5100_Eva-Board	-	4	Sony Corporation	(Test jig)

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1a	JSC Cable (Type A)	0.02	Shielded	Shielded	-
1b	JSC Cable (Type B)	0.20	Shielded	Shielded	-
2	DC Cable	2.0	Unshielded	Unshielded	-

UL Japan, Inc. SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
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5 Conducted emissions

5.1 Operating environment

The test was carried out in No.3 Shield Room.

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.

The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface.

EUT was located 80cm from LISN and excess AC cable was bundled in center.

Each EUT current-carrying power lead, except the ground (safety) lead, was individually connected through a LISN to the input power source.

Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top
EUT operation mode: Transmitting

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT within a screened room.

The EUT via to power supply was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detector of the test receiver.

Detector Type : Quasi-Peak/ Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass
Date : June 22, 2011 Test engineer : Minoru Nakatake

6 UWB bandwidth & Occupied bandwidth (99%)

Test procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Date : June 17, 2011 Test engineer : Tatsuya Arai

UL Japan, Inc.

SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

7 Radiated Emission and Peak level of the Emission

7.1 Operating environment

The test was carried out in No.3 anechoic chamber.

7.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.15m by 0.05m, raised 1.0m above the conducting ground plane. Photographs of the set up are shown in Appendix 1.

7.3 Test conditions

Frequency range : 30MHz - 40GHz
 Test distance : 3m (30-960MHz), 0.5m (960MHz-10.6GHz), 0.3m (10.6-17GHz),
 0.1m (17-40GHz)

7.4 Test procedure

The Radiated Emission has been measured with a ground plane and at a distance of 3m, 0.5m, 0.3m and 0.1m. The measuring antenna height was varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for both vertical and horizontal antenna polarization. Measurements were performed with QP, RMS and Peak detector.

The radiated emission measurements were made with the following detector function of the test receiver.

Frequency	:	30-960MHz	960MHz-40GHz
Detector Type	:	Quasi-Peak	RMS Peak
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:1MHz RBW:3MHz/VBW:3MHz RBW:1kHz/VBW:1kHz (15.519(d))

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Combinations of the worst position

Model	Worst position		
	Below 1GHz	Above 1GHz	Fundamental
Module	Horizontal: X, Vertical: X	Horizontal: X, Vertical: Z	Horizontal: X, Vertical: Z
Antenna	Horizontal: X, Vertical: X	Horizontal: Y, Vertical: X	Horizontal: Y, Vertical: X

The carrier level and noise levels were confirmed at each case of Antenna Type A and Type B, Cable Type A, and Type B of EUT to see the case of maximum noise, and the test was made at the case that has the maximum noise.

Combinations of the worst case

Model	Worst case
Antenna	Type A
Cable	Type A

7.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.

Date : June 14 - 16, 2011 Test engineer : Shinichi Takano

UL Japan, Inc.

SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
 Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

8 Transmitter Timeout

Test procedure

The Transmitter Timeout was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass

Date : June 17, 2011

Test engineer : Tatsuya Arai

UL Japan, Inc.

SHONAN EMC LAB.

1-22-3 Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN

Telephone: +81 463 50 6400 Facsimile: +81 463 50 6401

APPENDIX 1: Photographs of test setup

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APPENDIX 2: Test data

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Page 19 - 21	:	Radiated Emission
Page 22	:	Peak level of the Emission
Page 23	:	Transmitter Timeout
Page 24	:	Pre-check worst case

APPENDIX 3: Test instruments

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