



RADIO TEST REPORT

Test Report No. : 28KE0141-HO-A

Applicant : Sony Corporation
Type of Equipment : Wireless Link
Model No. : DMX-WL1T (Transmitter Unit)
FCC ID : AK8DMXWL1T
Test regulation : FCC Part 15 Subpart E: 2008
Section 15.207, Section 15.407
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 above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

Date of test:

June 24 to July 1, 2008

Tested by:

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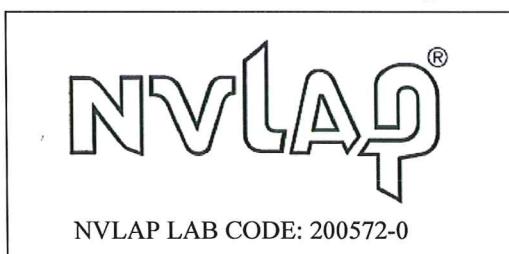
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SECTION 1: Customer information

Company Name : Sony Corporation
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 Contact Person : Tsutomu Shibusawa

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

2.1 Identification of E.U.T.

Type of Equipment : Wireless Link
 Model No. : DMX-WL1T (Transmitter Unit)
 Serial No. : 11, 64
 Receipt Date of Sample : June 24, 2008
 Country of Manufacture : 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

2.2 Product Description

Model No: DMX-WL1T (Transmitter Unit) (referred to as the EUT in this report) is the Wireless Link. The EUT has IEEE802.15.4 module and WHDI module. In this report, WHDI module was tested. As for IEEE802.15.4 module, please refer to Test Report No. 28KE0141-HO-C of UL Japan, Inc.

2.2.1 Product Specification

Operation Clock	DMX-WL1T (Transmitter Unit)
	Radio part: 40MHz
	The other part: 16.5MHz, 27MHz, 12.288MHz, 8MHz, 74.25MHz, 74.176MHz, 27.027MHz, 27MHz

2.2.2 Radio Specification

Type of radio	IEEE802.15.4 module (Zigbee) *1)	WHDI module *2)
Equipment Type	Transceiver	Transceiver
Clock frequencies	16MHz	40MHz
Frequency of Operation	2405-2480 MHz	5180-5240MHz
Method of frequency generation	Crystal	Crystal
Type of Modulation	DSSS	OFDM
Antenna Type	Chip antenna	Printed Inverted F antenna
Antenna Connector Type	Coaxial U-FL	N/A
Antenna Gain	1.0dBi	3.12 dBi
Power Supply	DC 3.3V	DC 3.3V

*1) Tested in this report as Co-location & Co-operation test only

*2) Tested in this report

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SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification : FCC Part15 Subpart E: 2008, final revised on May 19, 2008
Title : FCC 47CFR Part15 Radio Frequency Device
Subpart E Unlicensed National Information Infrastructure Devices
Section 15.407 General technical requirements

FCC 15.31 (e)

This EUT provides stable voltage(DC3.3V) constantly to RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

Antenna requirement

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT.

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3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted Emission	FCC :ANSI C63.4:2003 IC: RSS-Gen 7.2.2	FCC: 15.407(b)(6) / 15.207 IC: RSS-Gen 7.2.2	Conducted	N/A	[QP] 2.8dB, 0.15440MHz, L [AV] 3.2dB, 0.54332MHz, L	Complied
2	26dB Emission Bandwidth	FCC :ANSI C63.4:2003 IC: -	FCC : 15.407(a)(1) IC: RSS-210 A9.2 (1)	Conducted	N/A		N/A
3	Maximum Peak Output Power	FCC :ANSI C63.4:2003, FCC Public Notice DA 02-2138A1 IC: -	FCC : 15.407(a) (1) IC: RSS-210 A9.2 (1)	Conducted	N/A		Complied
4	Peak Power Spectral Density	FCC :ANSI C63.4:2003, FCC Public Notice DA 02-2138A1 IC: -	FCC : 15.407(a) (1) IC: RSS-210 A9.2 (1)	Conducted	N/A		Complied
5	Peak Excursion Ratio	FCC :ANSI C63.4:2003, FCC Public Notice DA 02-2138A1 IC: -	FCC : 15.407(a)(6) IC: -	Conducted	N/A		Complied
6	Spurious Emission	FCC: ANSI C63.4:2003 IC: -	FCC : 15.407(b) (1) (5)(6)(7), 15.205and15.209 IC: RSS-210 A.9.3 (1)	Conducted / Radiated	N/A	[Tx] 1.7dB, QP 308.466MHz, Horizontal [Rx] 2.0dB, AV 6498.65MHz, Vertical	Complied
7	Band Edge Compliance	FCC :ANSI C63.4:2003 IC: -	FCC : 15.407(b) (1) (5), 15.205and15.209 IC: RSS-210 A.9.3 (1)	Conducted / Radiated	N/A	See data	Complied
8	20dB Emission Bandwidth	FCC :ANSI C63.4:2003	FCC : 15.215(c)	Conducted	N/A	See data	Complied *1)

Note: UL Japan, Inc.'s EMI Work Procedures No.QPM05 and QPM15.

*1) Frequency of operation does not exist in the band of 5250MHz-5350MHz.

*These tests were also referred to FCC Public Notice DA 02-2138A1 "Measurement Procedure Updated for Peak Transmit Power in the Unlicensed National Information Infrastructure (U-NII) Bands".

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	Conducted	N/A	N/A	N/A
2	Co-location & Co-operation (Confirmation testing for Conducted Emission at simultaneous transmission)	ANSI C63.4:2003	FCC: Section15.407(b)(6) / 15.207 IC: RSS-210 A7.2.2	Conducted *1)	N/A	[QP] 2.6dB, 0.15130MHz, N [AV] 3.5dB, 0.54350MHz L	Complied
	Co-location & Co-operation (Confirmation testing for Radiated Spurious Emission at simultaneous transmission)	ANSI C63.4:2003	FCC : 15.407(b) (1) (5)(6)(7), 15.205and15.209 IC: RSS-210 A.9.3 (1)	Radiated	N/A	3.2dB 323.462MHz Horizontal, QP	Complied

*1) The test was performed on the frequency of worst power level in transmitting mode.

3.4 Uncertainty

EMI

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

Test room	Conducted emission	Radiated emission (10m*)				Radiated emission (3m*)				Radiated emission (3m*)	
		150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-40GHz	
No.1 semi-anechoic Chamber (±)	3.7dB	3.1dB	4.4dB	4.2dB	3.2dB	3.8dB	3.9dB	5.9dB	6.1dB		
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.4dB	4.0dB	5.9dB	6.1dB		
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.6dB	4.0dB	5.9dB	6.1dB		
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	3.9dB	3.9dB	5.9dB	6.1dB		

*10m/3m = Measurement distance

Conducted emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Radiated emission test(3m and/or 10m)

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is ±3.0dB.

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3.5 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	2973C-1	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	2973C-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	2973C-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	2973C-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3, and No.4 semi-anechoic chambers and No.3 and No.4 shielded rooms.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

Test Item	Operating Mode	Tested frequency
Conducted emission	WHDI (Tx) from Ant 1 to 4 (Simultaneously)	5180MHz, 5200MHz, 5240MHz
	WHDI (Rx) from Ant 1 to 5 (Simultaneously)	5200MHz
	<Co-location & Co-operation> Zigbee + WHDI (Tx) (Simultaneously)	2405MHz+5240MHz
Spurious Emission (Radiated)	WHDI (Tx) from Ant 1 to 4 (Simultaneously)	5180MHz, 5200MHz, 5240MHz
	WHDI (Rx) from Ant 1 to 5 (Simultaneously)	5200MHz
	<Co-location & Co-operation> Zigbee + WHDI (Tx) (Simultaneously)	2405MHz+5180MHz 2405MHz+5200MHz 2405MHz+5240MHz 2480MHz+5180MHz 2480MHz+5200MHz 2480MHz+5240MHz
Spurious Emission (Conducted)	WHDI (Tx) from Ant 1 to 4 (Simultaneously)	5180MHz, 5200MHz, 5240MHz
	WHDI (Rx) from Ant 1 to 5 (Simultaneously)	5240MHz
Band Edge Compliance	WHDI (Tx) from Ant 1 to 4 (Simultaneously)	5180MHz, 5240MHz
26dB Emission Bandwidth, 99% Occupied Bandwidth, Maximum Peak Output Power, Peak Power Spectral Density, Peak Excursion Ratio	WHDI (Tx) All antennas from Ant 1 to 4	5180MHz, 5200MHz, 5240MHz

*The antenna terminal tests were performed with each Antenna (from 1 to 4).

Transmitting duty was 100% on all the tests.

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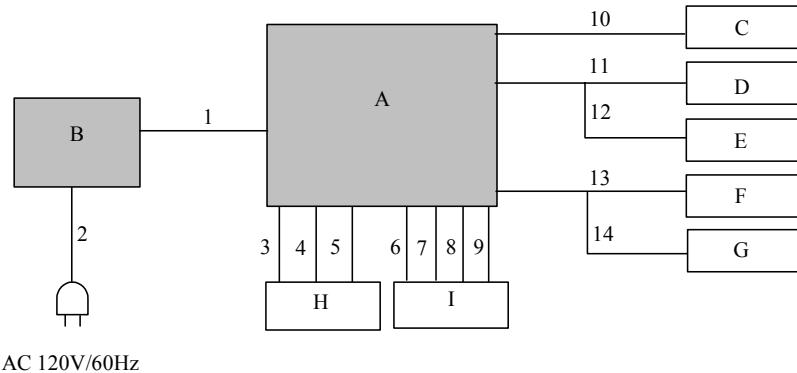
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4.2 Configuration and peripherals



* Cabling and setup(s) were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Wireless Link	DMX-WL1T (Transmitter)	11 *1) 64 *2)	Sony Corporation	EUT
B	AC adapter	EADP-16AB A	76W0652000317	Sony Corporation	EUT
C	IR Blaster	-	-	Sony Corporation	-
D	IR Blaster	-	-	Sony Corporation	-
E	IR Blaster	-	-	Sony Corporation	-
F	IR Blaster	-	-	Sony Corporation	-
G	IR Blaster	-	-	Sony Corporation	-
H	Terminator	-	-	Sony Corporation	-
I	Terminator	-	-	Sony Corporation	-

*1) used for Antenna Terminal Conducted test

*2) used for Conducted Emission test and Radiated Emission test

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	DC Cable	1.8	Unshielded	Unshielded
2	AC Cable	2.0	Unshielded	Unshielded
3	Stereo Cable (IN)	1.2	Shielded	Shielded
4	Component Cable (IN)	1.5	Shielded	Shielded
5	Stereo Cable	1.0	Shielded	Shielded
6	HDMI Cable	1.5	Shielded	Shielded
7	HDMI Cable	1.5	Shielded	Shielded
8	HDMI Cable	1.5	Shielded	Shielded
9	HDMI Cable	1.5	Shielded	Shielded
10	IR Blaster Cable	2.0	Shielded	Shielded
11	IR Blaster Cable	2.0	Shielded	Shielded
12	IR Blaster Cable	2.0	Shielded	Shielded
13	IR Blaster Cable	2.0	Shielded	Shielded
14	IR Blaster Cable	2.0	Shielded	Shielded

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SECTION 5: Conducted Emission

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and 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 a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center .

Detector	: quasi-peak and average detector (IF BW 9 kHz)
Measurement range	: 0.15-30MHz
Test data	: APPENDIX 2
Test result	: Pass

SECTION 6: Spurious Emission and Band Edge Compliance

[Conducted]

Test Procedure

The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2
Test result : Pass

[Radiated]

Test Procedure

EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, raised 80cm above the conducting ground plane. The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz), 1m(10-26.5GHz, Distance Factor : $20\log(3[m]/1[m])$) and 0.5m(Upper 26.5GHz, Distance Factor : $20\log(3[m]/0.5[m])$).

The height of the measuring 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 with the Test Receiver or the Spectrum Analyzer.

Below 1GHz

The result also satisfied with the general limits specified in section 15.209(a).

Above 1GHz

Inside of the restricted bands (Section 15.205): Apply to limit in the Section 15.209(a)

Outside of the restricted bands (Section 15.407): Limit -27dBm EIRP

Frequency	Below 1GHz	Above 1GHz (Inside of the restricted bands)	Above 1GHz (Outside of the restricted bands)
Instrument used	Test Receiver	Spectrum Analyzer	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW: 10Hz	RBW:1MHz/VBW: 1MHz

Test data : APPENDIX 2
Test result : Pass

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

*The noise from the EUT was not seen in the above 18GHz. The measurement was made in the residual noise levels.

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SECTION 7: 26dB and 20dB Emission Bandwidth, and 99% Occupied Bandwidth

Test Procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The following spectrum analyzer setting was used:

- Span: Enough width to display the Bandwidth
- RBW: as close to 1% of the Span as is possible without being below 1%
- VBW: Three times of RBW
- Sweep: Auto
- Detector: Peak

Test data : APPENDIX 2
Test result : Pass

SECTION 8: Maximum Peak Output Power

Test Procedure

The Peak Transmit Power was measured with a spectrum analyzer connected to the antenna port.
The test was made with the spectrum analyzer that has a function of channel-power measurement.
We followed the method 1 specified in DA-02-2138A1.

Test data : APPENDIX 2
Test result : Pass

SECTION 9: Peak Power Spectral Density

Test Procedure

The Peak Power Spectral Density was measured with a spectrum analyzer connected to the antenna port.
We followed the method 2 specified in DA-02-2138A1.

Test data : APPENDIX 2
Test result : Pass

SECTION 10: Peak Excursion Ratio

Test Procedure

The Peak Excursion Ratio was measured with a spectrum analyzer connected to the antenna port.
The second sweep was measured based on method 1 (Maximum Peak Output Power) specified in DA-02-2138A1.

Test data : APPENDIX 2
Test result : Pass

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