



# RADIO TEST REPORT

Test Report No. : 29EE0176-HO-01-A

**Applicant** : YAMAHA CORPORATION  
**Type of Equipment** : Potable Player Dock  
**Model No.** : PDX-60  
**FCC ID** : A6RPDX60A  
**Test regulation** : FCC Part 15 Subpart C 2008  
Section 15.207, Section 15.247  
**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 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:** January 26 and 27, 2009

**Tested by:**

  
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NVLAP LAB CODE: 200572-0

This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.  
\*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://uljapan.co.jp/emc/nvlap.html>

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## **SECTION 1: Customer information**

Company Name : YAMAHA CORPORATION  
Brand Name : YAMAHA  
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Contact Person : Yuichiro Kuzuryu

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

### **2.1 Identification of E.U.T.**

Type of Equipment : Potable Player Dock  
Model No. : PDX-60  
Serial No. : ES-10, ES-11  
Rating : AC 120V/60Hz (DC 15.0V from AC Adapter)  
Receipt Date of Sample : January 26, 2009  
Country of Mass-production : China  
Condition of EUT : Engineering 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: PDX-60 (referred to as the EUT in this report) is the Potable Player Dock.  
Powered speaker system which enable wireless and wired communication with iPod & iPhone. It can play music in iPod & iPhone from banded transmitter (PDX-50TX by wireless) or dock.

Equipment Type	Transceiver
Clock Frequency	10MHz (CPU)
Frequency of Operation	2405.376MHz - 2473.984MHz
Type of Modulation	GFSK
Antenna Type	PCB Pattern antenna
Antenna Gain	1.74dBi
Antenna Connector Type	N/A
Method of frequency generation	Crystal
Power Supply (inner)	DC 3.3V

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### **SECTION 3: Test specification, procedures & results**

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C: 2008, final revised on May 19, 2008

Title : FCC 47CFR Part15 Radio Frequency Devices Subpart C Intentional Radiators  
Section 15.207 Conducted limits  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz

#### **FCC 15.31 (e)**

This EUT is constantly provided with voltage (DC3.3V) from the regular circuit to RF Part regardless of input voltage  
Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

### 3.2 Procedures and results

#### [DSSS and other forms of modulation ]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements ----- IC: RSS-Gen 7.2.2	FCC: Section 15.207 ----- IC: RSS-Gen 7.2.2	Conducted	N/A	[QP] 20.9dB (2.16580MHz, L) (2.16600MHz, N) [AV] 11.1dB (2.16600MHz, N)	Complied
2	6dB Bandwidth	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.6.2	FCC: Section 15.247(a)(2) ----- IC: RSS-210 A8.2(a)	Conducted	N/A	See data.	Complied
3	Maximum Peak Output Power	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.8	FCC: Section 15.247(b)(3) ----- IC: RSS-210 A8.4(4)	Conducted	N/A		Complied
4	Restricted Band Edges	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: -	FCC: Section 15.247 (d) ----- IC: RSS-210 A8.5	Conducted/ Radiated	N/A		Complied
5	Power Density	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: -	FCC: Section 15.247 (e) ----- IC: RSS-210 A8.2(b)	Conducted	N/A		Complied
6	Spurious Emission	FCC: "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247" ----- IC: RSS-Gen 4.9 RSS-Gen 4.10	FCC: Section15.247(d) ----- IC: RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3	Conducted/ Radiated	N/A	[Tx] 4.9dB 4948.0MHz, AV, Horizontal [Rx] 13.3dB 589.798MHz, QP, Vertical	Complied

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

\*These tests were performed without any deviations from test procedure except for addition or exclusion.

\* In case any questions arise about test procedure, ANSI C63.4: 2003 is also referred.

### 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Bandwidth	IC: RSS-Gen 4.6.1	IC: RSS-Gen 4.6.1	Conducted	N/A	N/A	N/A

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### 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 test report has enough margin, more than the site margin.

#### Radiated emission test(3m)

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

[Rx] The data listed in this test report has enough margin, more than the site margin.

#### 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, Data of EMI, and Test instruments

Refer to APPENDIX 1 to 3.

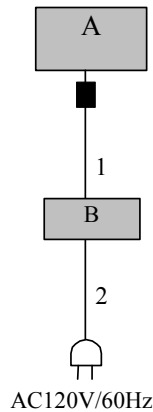
## SECTION 4: Operation of E.U.T. during testing

### 4.1 Operating Mode(s)

Test Item	Operating Mode	Tested frequency
Conducted Emission, Spurious Emission (Radiated / Conducted)	Transmitting (Tx) *1)	2405.376MHz(L) 2436.096MHz(M) 2473.984MHz(H)
	Receiving (Rx)	2436.096MHz(M)
6dB Bandwidth, Maximum Peak Output Power, Power Density, 99% Occupied Bandwidth	Transmitting (Tx) *1)	2405.376MHz(L) 2436.096MHz(M) 2473.984MHz(H)
Band Edge Compliance (Conducted)	Transmitting (Tx) *1)	2405.376MHz(L) 2473.984MHz(H)

\*1) The EUT transmits with GFSK modulated and 100% Duty of Pulse.

### 4.2 Configuration and peripherals



■: Standard Ferrite Core

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

#### Description of EUT

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Potable Player Dock	PDX-60	ES-10 *1) ES-11 *2)	YAMAHA CORPORATION	EUT
B	AC Adapter	NU40-2150267-I3	SP-1	YAMAHA CORPORATION	EUT

\*1) Used for Conducted emission and Spurious emission tests (Radiated)

\*2) Used for Antenna Terminal Conducted test

#### List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC Cable	1.8	Unshielded	Unshielded	-
2	AC Cable	2.0	Unshielded	Unshielded	-

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, raised 0.8m 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.

#### 2) For the tests on EUT itself (as a stand alone equipment)

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

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

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

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## **SECTION 6: Spurious Emission**

### **[Conducted]**

#### **Test Procedure**

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

It was measured based on "1. RF antenna conducted test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

The following spectrum analyzer setting was used:

- RBW: 100kHz
- VBW: 300kHz
- Sweep: Auto
- Detector: Peak
- Trace: Max Hold

**Test data** : APPENDIX 2

**Test result** : Pass

### **[Radiated]**

#### **Test Procedure**

It was measured based on "2. Radiated emission test" of "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

EUT was placed on a urethane platform of nominal size, 1.0m by 0.5m, raised 0.8m 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) and 1m (Upper 10GHz).

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.

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

In any 100kHz bandwidth outside the restricted band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

**20dBc was applied to the frequency over the limit of FCC 15.209 / Table 2 of RSS-210 2.7 (IC) and outside the restricted band of FCC 15.205 / Table 1 of RSS-210 2.7 (IC).**

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW: 1MHz/VBW: 1MHz
IF Bandwidth	20dBc : RBW: 100kHz VBW: 300kHz (S/A)	AV *1): RBW: 1MHz/VBW: 10Hz *2) 20dBc: RBW: 100kHz/VBW: 300kHz

\*1) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

\*2) The test was performed by VBW 10Hz for Average measurement according to DA00-705, since the duty cycle on the transmitting mode for Spurious Emission test was 100%.

The test was made on EUT at the normal use position.

**Test data** : APPENDIX 2

**Test result** : Pass

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## **SECTION 7: Bandwidth**

### **6dB Bandwidth**

#### **Test Procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port. It was measured based on "Guidance on Measurement of Digital Transmission Systems Operating under Section 15.247".

The following spectrum analyzer setting was used:

- Span: 20MHz
- RBW: 100kHz
- VBW: 300kHz
- Sweep: Auto
- Detector: Peak
- Trace: Max Hold

**Test data : APPENDIX 2**

**Test result : Pass**

### **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 20dB 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
- Trace: Max Hold

**Test data : APPENDIX 2**

**Test result : Pass**

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## **SECTION 8: Maximum Peak Output Power**

### **Test Procedure**

The Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.

It was measured based on "Power Output Option 1" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".

**Test data** : APPENDIX 2  
**Test result** : Pass

## **SECTION 9: Peak Power Density**

[Conducted]

### **Test Procedure**

The Peak Power Density was measured with a spectrum analyzer connected to the antenna port.

It was measured based on "PSD Option 1" of "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".

- Span: 1.5MHz
- RBW: 3kHz
- VBW: 100kHz
- Sweep: 500sec
- Detector: Peak
- Trace: Max Hold

**Test data** : APPENDIX 2  
**Test result** : Pass

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