



# RADIO TEST REPORT

**Test Report No. : 27HE0140-HO-A-R1**

**Applicant : Panasonic Corporation of North America**

**Type of Equipment : PCB assy with Bluetooth for car audio**

**Model No. / FCC ID : YEP0PT9918A0 / ACJ932CQ-EX0770  
 YEP0PT9919A0 / ACJ932CQ-EX0772**

**Test standard : FCC Part 15 Subpart C : 2007  
 Section 15.207, Section 15.247**

**Test Result : Complied**

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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 is used for the application of two FCC IDs: ACJ932CQ-EX0770 / ACJ932CQ-EX0772.
6. Original test report number of this report is 27HE0140-HO-A.

**Date of test:**

May 9 to 31, 2007

**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,

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## **SECTION 1: Client information**

Company Name : Matsushita Electric Industrial Co., Ltd.  
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Contact Person : Kazuhiro Morishita

\* Matsushita Electric Industrial Co., Ltd. Panasonic Automotive Systems Company is on behalf of the applicant:  
Panasonic Corporation of North America.

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

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

Type of Equipment : PCB assy with Bluetooth for car audio  
Model No. / Serial No. : YEP0PT9918A0 / 9X7 001, 9X7 002  
YEP0PT9919A0 / E1-001  
Rating : 5.0V  
Country of Manufacture : Japan  
Receipt Date of Sample : April 25, 2007  
Condition of EUT : Production model  
Modification of EUT : No modification by the test lab.

### **2.2 Product Description**

Model No: YEP0PT9918A0 and YEP0PT9919A0 (referred to as the EUT in this report) are the PCB assy with Bluetooth for car audio.

Model No: YEP0PT9918A0 and YEP0PT9919A0 have the same BT module and antenna, and therefore radio specification for both models are identical.

However, as the size of the board on which BT module and the antenna are mounted is different, all the tests were performed with model No. YEP0PT9918A0 as representative, and only radiated emission test was performed with Model No YEP0PT9919A0 for confirmation.

### **Radio Specification**

Equipment Type : Transceiver  
Frequency of Operation : 2402-2480MHz  
Bandwidth & Channel spacing : 1MHz & 1MHz / CH  
Modulation : FHSS  
Power Supply (inner) : DC 3.3V / 1.5V  
Antenna Type : Chip  
Antenna Gain : 0dBi (MAX)

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

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C : 2007

Title : FCC 47CFR Part15 Radio Frequency Device 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)**

The stable voltage (DC3.3/1.5V) is constantly supplied to RF Module regardless of input voltage. Therefore, the 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 end-product (Car Audio) manufactured by Matsushita Electric Industrial Co., Ltd. Therefore, the equipment complies with the antenna requirement of Section 15.203.

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### 3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin*0)	Results
1	Conducted emission	FCC: ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC: Section 15.207	-	N/A	N/A	N/A*1)
		IC: RSS-Gen 7.2.2	IC: RSS-Gen 7.2.2				
2	Carrier Frequency Separation	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)	Conducted	N/A	See data.	Complied
		IC: -	IC: RSS-210 A8.1 (b)				
3	20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)	Conducted	N/A		Complied
		IC: -	IC: RSS-210 A8.1 (a)				
4	Number of Hopping Frequency	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)(iii)	Conducted	N/A		Complied
		IC: -	IC: RSS-210 A8.1 (d)				
5	Dwell time	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(a)(1)(iii)	Conducted	N/A		Complied
		IC: -	IC: RSS-210 A8.1 (d)				
6	Maximum Peak Output Power	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(b)(1)	Conducted	N/A	Complied	
		IC: RSS-Gen 4.6	IC: RSS-210 A8.4 (2)				
7	Band Edge Compliance	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(d)	Conducted	N/A	Complied	
		IC: -	IC: RSS-210 A8.5				
8	Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators	FCC: Section15.247(d)	Conducted/ Radiated	N/A	Complied	
		IC: RSS-Gen 4.7 RSS-Gen 4.8	IC: RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3				

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

\*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*1) The test is not applicable since the EUT is for vehicular use.

\*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

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

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### 3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	99% Occupied Band Width	RSS-Gen 4.6.1	-	Conducted	N/A	N/A	N/A

### 3.4 Uncertainty

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

#### Spurious Emission (Radiated)

The measurement uncertainty for this test using Biconical antenna is  $\pm 4.59\text{dB}(3\text{m})$ .

The measurement uncertainty for this test using Logperiodic antenna is  $\pm 4.62\text{dB}(3\text{m})$ .

The measurement uncertainty for this test using Horn antenna is  $\pm 5.27\text{dB}$ .

#### **[YEP0PT9918A0]**

(Tx/Rx) The data listed in this test report has enough margin, more than the site margin.

#### **[YEP0PT9919A0]**

(Tx) The data listed in this test report has enough margin, more than the site margin.

(Rx) 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  $\pm 3.0\text{dB}$ .

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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	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
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	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	2.0 x 2.0 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 5.4 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	-

\* 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**

The mode used for test : Transmitting mode(Packet size DH5, Data packet: PRBS9)

- Low Channel : 2402MHz

- Mid Channel : 2441MHz

- High Channel : 2480MHz

Receiving mode

-Mid Channel : 2441MHz

Inquiry mode

\*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum rated power.

\*Remarks: Test was not performed at AFH mode, because the decrease of number of channel (min: 20ch) at AFH mode does not influence on the output power and bandwidth of the EUT. However, the limit level 125mW of AFH mode was used for the test.

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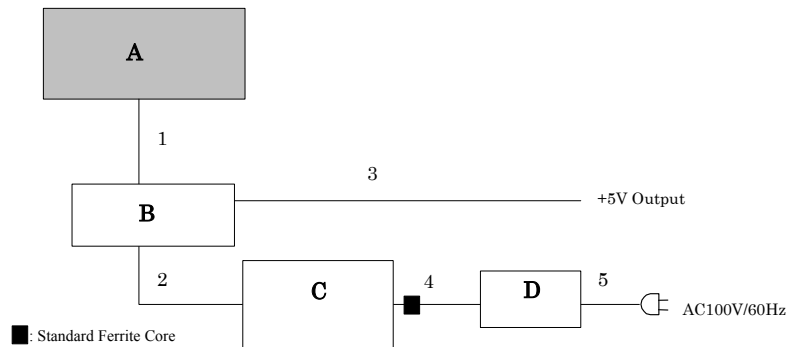
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## 4.2 Configuration and peripherals



\*Cabling and setup 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	PCB assy with Bluetooth for car audio	YEP0PT9918A0	9X7 001 *1) 9X7 002 *2)	Matsushita Electric Industrial Co., Ltd.	EUT
		YEP0PT9919A0	E1-001 *2)	Panasonic Automotive Systems Company	
B	UART-Serial Convert board	-	MB0208007	-	Jig
C	Personal Computer	2647-LJ3	97-ALT9W	IBM	-
D	AC Adapter	02K6750	11S02K6750Z1Z2 UP2950KD	-	-

\*1) Used for Antenna terminal conducted test.

\*2) Used for Radiated spurious emission test.

### List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	Signal Cable (UART, DC)	0.3	Unshielded	Unshielded
2	RS232C Cable	1.5	Shielded	Shielded
3	DC Cable	3.4	Unshielded	Unshielded
4	DC Cable	1.8	Unshielded	Unshielded
5	AC Cable	1.0	Unshielded	Unshielded

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## **SECTION 5: Spurious Emission**

### **[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, 0.5m by 1m, 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) 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 (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

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

In any 100kHz bandwidth outside the frequency 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 FCC15.205 / 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: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

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

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

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## **SECTION 6: Bandwidth**

### **Test Procedure**

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

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 7: 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.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 8: Carrier Frequency Separation**

### **Test Procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 9: Number of Hopping Frequency**

### **Test Procedure**

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 2  
Test result : Pass

## **SECTION 10: Dwell time**

### **Test Procedure**

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

Test data : APPENDIX 2  
Test result : Pass

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