



RADIO TEST REPORT

Test Report No. : 27FE0246-HO-A-R1

Applicant : Panasonic Corporation of North America
Type of Equipment : Bluetooth Module
Model No. : C5ZZZ0000035
FCC ID : ACJ932C5ZZZ035
Test standard : FCC Part 15 Subpart C
Section 15.207, Section 15.247: 2007
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. Original test report number of this report is 27FE0246-HO-A.

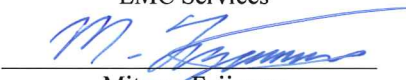
Date of test:

May 7 to 23, 2007

Tested by:


Makoto Kosaka
EMC Services

Approved by :


Mitsuru Fujimura
EMC Services



NVLAP LAB CODE: 200572-0

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CONTENTS	PAGE
SECTION 1: Client information	3
SECTION 2: Equipment under test (E.U.T.).....	3
SECTION 3: Test specification, procedures & results.....	4
SECTION 4: Operation of E.U.T. during testing	7
SECTION 5: Spurious Emission	9
SECTION 6: Carrier Frequency Separation	10
SECTION 7: Bandwidth	10
SECTION 8: Number of Hopping Frequency	10
SECTION 9: Dwell time.....	10
SECTION 10: Maximum Peak Output Power	10
APPENDIX 1: Photographs of test setup	11
Spurious Emission (Radiated)	11
Worst Case Position (Horizontal: Z-axis/ Vertical:Z-axis).....	12
APPENDIX 2: Data of EMI test.....	13
Carrier Frequency Separation	13
20dB Bandwidth.....	15
Number of Hopping Frequency.....	17
Dwell time	19
Maximum Peak Output Power	22
Radiated Spurious Emission (below 1GHz)	23
Radiated Spurious Emission (above 1GHz)	27
Conducted Spurious Emission.....	31
99% Occupied Bandwidth	36
APPENDIX 3:Test instruments	37

SECTION 1: Client information

Company name	:	Matsushita Electric Industrial Co., Ltd. Panasonic Automotive Systems Company *
Address	:	600 Saedo-cho, Tsuzuki-ku, Yokohama, Kanagawa, 224-8539 Japan
Telephone Number	:	+81-50-3686-8415
Facsimile Number	:	+81-45-931-0806
Contact Person	:	Takahisa Sakai

* 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	:	Bluetooth Module
Model No.	:	C5ZZZ0000035
Serial No.	:	A6BD
Country of Manufacture	:	Japan
Receipt Date of Sample	:	April 24, 2007
Condition of EUT	:	Production model
Modification of EUT	:	No modification by the test lab.

2.2 Product Description

Model No: C5ZZZ0000035 (referred to as the EUT in this report) is the Bluetooth Module.
C5ZZZ0000035 has a variant model, C5ZZZ0000037. C5ZZZ0000035 has the function of audio guidance and voice-recognition in English. C5ZZZ0000037 does not have the function, but the radio and electric parts of the both models are identical.

Clock frequency(ies) in the system	:	13.5MHz
Equipment Type	:	Transceiver
Frequency of Operation	:	2402-2480MHz
Bandwidth & Channel spacing	:	1MHz & 1MHz / CH
Modulation	:	FHSS
Antenna Type	:	Inverted-F
Antenna Connector Type	:	U.FL-R-SMT
Antenna Gain	:	1.5 dBi max
Operating voltage	:	DC3.3V, DC1.5V*

*DC1.5V is supplied to BBIC, which does not affect Bluetooth feature.

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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 : 2007
Section 15.247 Operation within the bands 902-928MHz,
2400-2483.5MHz, and 5725-5850MHz : 2007

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.

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.

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 IC: RSS-Gen 7.2.2	FCC: Section 15.207 IC: RSS-Gen 7.2.2	-	N/A *1)	N/A	N/A
2	Carrier Frequency Separation	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (b)	Conducted	N/A	See data.	Complied
3	20dB Bandwidth	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.247(a)(1) IC: RSS-210 A8.1 (a)	Conducted	N/A		Complied
4	Number of Hopping Frequency	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied
5	Dwell time	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.247(a)(1)(iii) IC: RSS-210 A8.1 (d)	Conducted	N/A		Complied
6	Maximum Peak Output Power	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.6	FCC: Section 15.247(b)(1) IC: RSS-210 A8.4 (2)	Conducted	N/A		Complied
7	Band Edge Compliance	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: -	FCC: Section 15.247(d) IC: RSS-210 A8.5	Conducted	N/A		Complied
8	Spurious Emission	FCC: ANSI C63.4:2003 13. Measurement of intentional radiators IC: RSS-Gen 4.7 RSS-Gen 4.8	FCC: Section 15.247(d) IC: RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3	Conducted/ Radiated	N/A	[Tx] 3.5dB 2390.0MHz AV, Vert. [Rx] 14.1dB 7323.0MHz AV, Hori., Vert.	Complied

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.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	-	Conducted	N/A	N/A	N/A

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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 $\pm 5.27\text{dB}$.

[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 $\pm 3.0\text{dB}$.

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

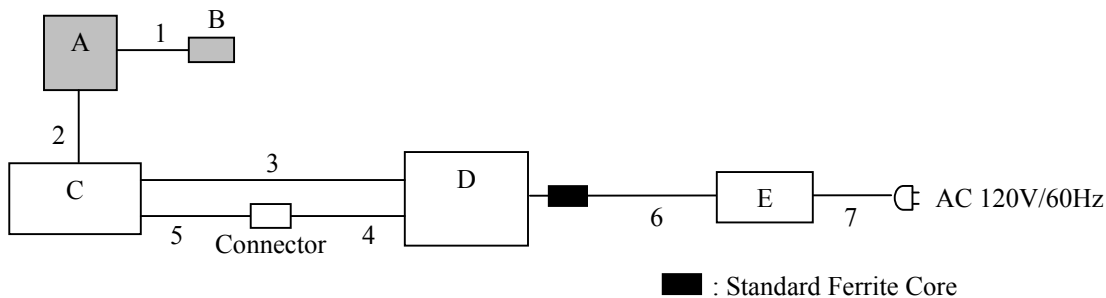
The mode used for test : Transmitting mode(Packet size DH5, Data packet: PRBS9)
- Low Channel : 2402MHz
- Mid Channel : 2441MHz
- High Channel : 2480MHz

Inquiry mode
- Mid Channel : 2441MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the max power rate.

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.

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	Bluetooth Module	C5ZZZ0000035	A6BD	Matsushita Electric Industrial Co., Ltd. Panasonic Automotive Systems Company	EUT
B	Bluetooth Antenna	N1KYYYY0003	-	Matsushita Electric Industrial Co., Ltd. Panasonic Automotive Systems Company	EUT
C	Bluetooth Module Test Board	-	-	Matsushita Electric Industrial Co., Ltd. Panasonic Automotive Systems Company	-
D	Note PC	PP19L	11827258845	DELL	-
E	AC Adapter	HA65NS0-00	CN-0DF261-47890-73F-B23U	DELL	-

List of cables used

No.	Name	Length (m)	Shield	
			Cable	Connector
1	Antenna Cable	0.06	Shielded	Shielded
2	Flat Cable	0.18	Unshielded	Unshielded
3	USB Cable	2.1	Shielded	Shielded
4	USB-Serial Cable	0.9	Shielded	Shielded
5	Interlink Cable	2.1	Shielded	Shielded
6	DC Cable	1.9	Unshielded	Unshielded
7	AC Cable	0.9	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, 1.0m by 0.5m, 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) 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 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.

Test data : APPENDIX 2

Test result : Pass

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SECTION 6: 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 7: Bandwidth

Test Procedure

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

Test data	: APPENDIX 2
Test result	: Pass

SECTION 8: 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 9: 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

SECTION 10: 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

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