RADIO TEST REPORT

Test Report No. : 29GE0129-HO-01-E

Applicant	:	**Panasonic Corporation**
Type of Equipment	:	**Speaker system (Wireless Audio Receiver)**
Model No.	:	**SB-ZT1**
FCC ID	:	**ACJ-SB-ZT1**
Test regulation	:	**FCC Part 15 Subpart C 2009 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.
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Date of test: March 18 to April 14, 2009

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CONTENTS **PAGE**

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SECTION 1: Customer information

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

2.1 Identification of E.U.T.

Type of Equipment	:	Speaker system (Wireless Audio Receiver)
Model No.	:	SB-ZT1
Serial No.	:	001, 002
Power supply	:	AC120V/60Hz
Receipt Date of Sample	:	March 15, 2009
Country of Mass-production	:	Malaysia
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: SB-ZT1 (referred to as the EUT in this report) is the Speaker system (Wireless Audio Receiver).

Feature of EUT:
SB-ZT1: Wireless Audio Receiver

Clock frequency(ies)	:	Wireless card: 16MHz(CPU)

[Speaker part]

Equipment Type (Receiver)	:	Direct conversion
Frequency of Operation	:	2412, 2438, 2462MHz (3ch)
Bandwidth	:	16MHz
Type of Modulation	:	OFDM
Antenna Type	:	PIFA, Sleeve Antenna
Antenna Gain	:	2.0dBi (for PIFA) 2.0dBi (for Sleeve Antenna)
Antenna Connector Type	:	Coaxial Cable Connectors
Operating Voltage (inner)	:	DC3.3V
Method of Frequency generation	:	synthesizer method by crystal oscillator

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C: 2009, final revised on February 27, 2009
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

The EUT complies with FCC Part 15 Subpart B/ICES-003. Refer to the test report No.29GE0129-HO-01-B.

FCC 15.31 (e)
This EUT provides stable voltage(DC3.3V) constantly 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	**FCC:** Section 15.207	Conducted	N/A	[Tx] QP 8.0dB 0.19594MHz, N (ANT 0) AV 9.9dB 0.19594MHz, N (ANT 0) [Rx] QP 8.6dB 0.19544MHz, N (ANT 1) AV 10.3dB 0.19544MHz, N (ANT 1)	Complied
		IC: RSS-Gen 7.2.2	**IC:** RSS-Gen 7.2.2				
2	6dB Bandwidth	**FCC:** "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	**FCC:** Section 15.247(a)(2)	Conducted	N/A	See data.	Complied
		IC: RSS-Gen 4.6.2	**IC:** RSS-210 A8.2(a)				
3	Maximum Peak Output Power	**FCC:** "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	**FCC:** Section 15.247(b)(3)	Conducted	N/A		Complied
		IC: RSS-Gen 4.8	**IC:** RSS-210 A8.4(4)				
4	Restricted Band Edges	**FCC:** "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	**FCC:** Section 15.247 (d)	Conducted/ Radiated	N/A		Complied
		IC: -	**IC:** RSS-210 A8.5				
5	Power Density	**FCC:** "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	**FCC:** Section 15.247 (e)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.2(b)				
6	Spurious Emission	**FCC:** "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247"	**FCC:** Section15.247(d)	Conducted/ Radiated	N/A	[Tx] 6.2dB 2390MHz, Vertical, AV (ANT 1) [Rx] 3.9dB 36.650MHz Vertical, QP (ANT 1)	Complied
		IC: RSS-Gen 4.9 RSS-Gen 4.10	**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.							

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

3.3 Addition to standard

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

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

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. [Tx/Rx]

Radiated emission test(3m)

The data listed in this test report has enough margin, more than the site margin. [Tx]
The data listed in this report meets the limits unless the uncertainty is taken into consideration.[Rx]

Other test except Conducted Emission and Spurious Emission (Radiated)

The measurement uncertainty for this test is 3.0dB.

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

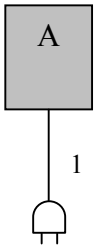
Refer to APPENDIX 1 to 3.

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

4.1 Operating Mode(s)

Test Item	Operating Mode	Tested frequency
Conducted emission Spurious Emission	Transmitting (Tx), ANT 0 Transmitting (Tx), ANT 1	2412MHz(L) 2438MHz(M) 2462MHz(H)
	Receiving (Rx), ANT 0 Receiving (Rx), ANT 1	2438MHz(M)
6dB Bandwidth Maximum Peak Output Power Power Density 99% Occupied Bandwidth	Transmitting (Tx), ANT 0 Transmitting (Tx), ANT 1	2412MHz(L) 2438MHz(M) 2462MHz(H)
Restricted Band Edge	Transmitting (Tx), ANT 0 Transmitting (Tx), ANT 1	2412MHz(L) 2462MHz(H)
*Transmitting duty was 100% on all tests. *Transmitting mode: EUT continuously transmits the random data of 200,000 bit.		

4.2 Configuration and peripherals



AC120V/60Hz

*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	Remark
A	Speaker system (Wireless Audio Receiver)	SB-ZT1	001 *1) 002 *2)	Panasonic	EUT

*1) Used for Conducted and Radiated emission tests
*2) Used for Antenna terminal tests

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	AC Cable	1.6	Unshielded	Unshielded	-

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a carpet for insulation above a reference ground plane.
EUT was set up typical spacing for the other equipment. EUT was located 80cm from LISN and excess AC cable was bundled in center.
Photographs of the set up are shown in Appendix 1.

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.
An overview sweep with peak detection has been performed.

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

[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 Section15.247 ".
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 Section15.247 ".
EUT was placed on a urethane platform of nominal size, 1.0m by 1.5m, 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 and the Spectrum Analyzer.
The radiated emission measurements were made with the following detector function of the test receiver and the Spectrum analyzer.

The result also satisfied with the general limits specified in section FCC 15.209(a) / RSS-210 2.7 (IC).

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

*1) The Spectrum Analyzer was used in 3dB resolution bandwidth.
*2) When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

The test was made on EUT at the normal use position.
This EUT is a device for floor standing, however, the antenna (ANT 1) was installed in the bottom of EUT so that the test was performed as a device for table top not to be affected from a ground plane.

Test data : APPENDIX 2
Test result : Pass

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 Section15.247 ".
The following spectrum analyzer setting was used:

- Span: 50MHz
- 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**

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: 18MHz
- RBW: 30kHz *)
- VBW: 100kHz
- Sweep: 600sec
- Detector: Peak
- Trace: Max Hold

*) The test was not performed at RBW: 3kHz that was stated in the Regulation.
However, the measurement value with RBW:3kHz is less than the value of RBW:30kHz and the test data met the limit with RBW:3kHz.

Test data : APPENDIX 2
Test result : Pass