



RADIO TEST REPORT

Test Report No. : 27KE0336-YK-A

Applicant : Sony Corporation
Type of Equipment : Stereo Transmitter
Model No. : TMR-BT8iP
FCC ID : AK8TMRBT8IP
Test Standard : FCC Part15 Subpart C: 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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: July 26 and August 6, 27, 2007

Tested by:

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1 Applicant Information

Company Name : Sony Corporation
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Contact Person : Kikuo Murata

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

2.1 Identification of E.U.T.

Type of Equipment : Stereo Transmitter
Model No. : TMR-BT8iP
Serial No. : 177
Rating : DC3.3V
Country of Manufacture : Malaysia
Receipt Date of Sample : July 26, 2007
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: TMR-BT8iP (referred to as the EUT in this report) is a Stereo Transmitter for iPod.

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Clock frequency : Micom clock: 8MHz, Bluetooth IC Clock: 24MHz,
Bluetooth IC DD converter: 1.333MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS
Antenna type : Sheet metal reverse F antenna
Antenna connector type : Integral
Antenna gain : 2dBi
ITU code : F1D
Operation temperature range : 0 ~ +35 deg.C.

FCC Part15.31 (e)

The Bluetooth module is provided with stable power supply (DC 1.8 V), therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

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

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3 Test Specification, Procedures and 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 15.209 Radiated emission limits, general requirements
 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz,
 and 5725-5850MHz

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	FCC 15. 207	-	N/A *1)	N/A	N/A
Carrier Frequency Separation	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A	*See data.	Complied
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)	Conducted	N/A		Complied
Number of Hopping Frequency	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Dwell time	ANSI C63.4:2003 13.Measurement of intentional radiators	FCC 15.247 (a)(1)(iii)	Conducted	N/A		Complied
Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (b)(1)	Conducted	N/A		Complied
Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.247 (d) & 15.209	Conducted / Radiated	N/A		6.5dB (9920.00MHz, AV, Vertical, Tx 2480MHz (3DH5K))

*1) The test is not applicable since the EUT has no AC mains. In addition, the EUT is not connected with the port during iPod charging because the port is for USB transfer adaptor (Charging/Data transfer).

The measurements also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

* Other than mentioned in 3.3, no addition, exclusion nor deviation has been made from the standard.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2003 13. Measurement of intentional radiators RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted -		Complied

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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.

	No.1 open site	No.2 open site	No.1 anechoic chamber
Radiated emission (3m)			
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB
1GHz<	5.7 dB	5.7 dB	5.7 dB

Antenna port conducted test	
Below 1GHz	±0.4dB
1GHz and above	±0.7dB

Spurious emission test (Radiated)

The data listed in this test report has enough margin, more than site margin.

3.5 Test Location

UL Japan, Inc. Yamakita EMC Lab.

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Telephone number : +81 465 77 1011

Facsimile number : +81 465 77 2112

NVLAP Lab. code : 200441-0

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on August 26, 2005 (Registration No.: 95486).

IC Registration No. : 2973B-1

No. 2 test site has been fully described in a report submitted to FCC office, and accepted on April 4, 2005 (Registration No.: 466226).

IC Registration No. : 2973B-3

No. 1 anechoic chamber has been fully described in a report submitted to FCC office, and accepted on November 2, 2005 (Registration No.: 95967).

IC Registration No. : 2973B-2

Test room	Width x Depth x Height (m)	Test room	Width x Depth x Height (m)
No.1 shielded room	8.0 x 5.0 x 2.5	No.1 Semi-anechoic chamber	10.0 x 7.5 x 5.7
No.2 shielded room	5.0 x 4.0 x 2.5		
No.3 shielded room	4.0 x 5.0 x 2.7		

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4 System Test Configuration

4.1 Justification

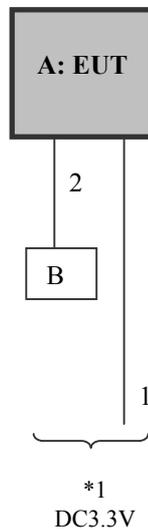
The system was configured in typical fashion (as a customer would normally use it) for testing.

Test mode: Transmitting
 - Low channel : 2402MHz
 - Middle channel : 2441MHz
 - High channel : 2480MHz
 - Hopping
 - Inquiry

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 due to the overlap of the bandwidth.

4.2 Configuration of Tested System



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID (Remark)
A	Portable Stereo Transmitter	TMR-BT8iP	177	SONY	AK8TMRBT8IP (EUT)
B	USB transfer jig	-	-	-	(Jig to occur test signals)

*1) DC power supply (Model No.: PAN35-10A) was used for DC 3.3V input.

List of cables used *2)

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	DC cable (+, -)	1.7	Unshielded	Unshielded	-
2	Signal cable	0.2	Unshielded	Unshielded	-

*2) All cables used for the measurement are exclusive use or marketed.

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5 Carrier Frequency Separation

Test Procedure

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

Summary of the test results: Pass

Date: July 26, 2007

Test engineer : Makoto Hosaka

6 20dB Bandwidth & Occupied Bandwidth (99%)

Test Procedure

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

Summary of the test results: Pass

The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Date: July 26 and August 27, 2007

Test engineer : Makoto Hosaka

7 Number of Hopping Frequency

Test Procedure

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

Summary of the test results: Pass

Date: July 26, 2007

Test engineer : Makoto Hosaka

8 Dwell time

Test Procedure

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

Measurement was performed with the packet type of DH1, DH3, DH5, 3DH1, 3DH3 and 3DH5.

Summary of the test results: Pass

Date: July 26, 2007

Test engineer : Makoto Hosaka

9 Maximum Peak Output Power

Test Procedure

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Summary of the test results: Pass

Date: July 26, 2007

Test engineer : Makoto Hosaka

10 Out of Band Emissions (Antenna Port Conducted)

Test Procedure

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

Summary of the test results: Pass

Date: July 26, 2007

Test engineer : Makoto Hosaka

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11 Out of Band Emissions (Radiated)

11.1 Operating environment

The test was carried out in No.1 anechoic chamber.

11.2 Test configuration

EUT was placed on a urethane platform of nominal size, 0.5m by 0.5m, raised 80cm above the conducting ground plane. A drawing of the set up is shown in the photos of Appendix 1.

11.3 Test conditions

Frequency range : 30MHz - 26GHz
 Test distance : 3m
 EUT operation mode : Transmitting

11.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m and 1m. The measuring antenna height was 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.

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.

Measurements were performed with QP, PK, and AV detector.

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

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

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz	PK: RBW: 1MHz/VBW: 1MHz, AV: RBW: 1MHz/VBW: 10Hz
Measuring antenna	Biconical (30-300MHz) Logperiodic (300MHz-1GHz)	Horn

The equipment was previously checked at each position of three axes X, Y and Z. The position in which the maximum noise occurred was chosen to put into measurement. See the table below and photographs in page 11. With the position, the noise levels of all the frequencies were measured.

	Below 1GHz	Above 1GHz
Horizontal	X	X
Vertical	X	Y

11.5 Band edge

Band edge level at 2400MHz is less than 20dB of peak point of the carrier. Refer to the data of Out of Band Emissions (Antenna Port Conducted).

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

11.6 Results

Summary of the test results : Pass
 No noise was detected above the 5th order harmonics.

Date: July 26 and August 6, 2007 Test engineer : Ichiro Isozaki, Go Ishiwata and Yasumasa Owaki

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APPENDIX 1: Photographs of test setup

Page 10	:	Radiated emission
Page 11	:	Pre-check of the worst position

APPENDIX 2: Test Data

Page 12	:	Carrier Frequency Separation
Page 13 - 15	:	20dB Bandwidth
Page 16 - 20	:	Number of Hopping Frequency
Page 21 - 34	:	Dwell time
Page 35	:	Maximum Peak Output Power
Page 36 - 53	:	Out of Band Emissions (Antenna Port Conducted)
Page 54 - 71	:	Out of Band Emissions (Radiated)
Page 72 - 74	:	Occupied Bandwidth

APPENDIX 3: Test instruments

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