



RADIO TEST REPORT

Test Report No.: 29KE0233-YK-01-A

Applicant : Sony EMCS Corporation Kisarazu TEC
Type of Equipment : AV Center
Model No. : XAV-70BT
FCC ID : AK8XAV70BT
Test regulation : FCC Part15 Subpart C: 2009
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 limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.

Date of test: September 11, 14, 16 and 18, 2009

Tested by: 
Akira Sato

Tested by:  Minoru Nakatake &  Yasumasa Owaki

Approved by: 
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MF060b (06.08.09)

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1 Applicant information

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

2.1 Identification of E.U.T.

Type of Equipment : AV Center
Model No. : XAV-70BT
Serial No. : 46
Rating : DC12V
Country of Mass-production : Thailand
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.
Receipt Date of Sample : September 11, 2009

2.2 Product description

Model: XAV-70BT (referred to as the EUT in this report) is a AV Center.
Clock frequencies: 32.768kHz, 4MHz, 6MHz, 12MHz, 24MHz, 27MHz, 33MHz

Bluetooth specification:

Equipment type : Transceiver
Frequency of operation : 2402-2480MHz
Bandwidth & channel spacing : 79MHz & 1MHz
Type of modulation : FHSS
Antenna type : SMD
Antenna connector type : Coaxial
Antenna gain with cable loss : -5.8dBi
ITU code : F1D, G1D
Operation temperature range : -20 to +60 deg.C.

FCC Part15.31 (e)

The equipment provides the Bluetooth transmitter with stable power supply (DC 3.3 V), therefore, the equipment complies power supply regulation.

FCC Part15.203 Antenna requirement

The equipment and its antenna comply with this requirement since this antenna is built in the equipment and it cannot be replaced by end users.

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3 Test specification, procedures and results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2009, final revised on February 27, 2009
 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

The EUT complies with FCC Part 15 Subpart B: 2009, final revised on February 27, 2009. Refer to the test report 29KE0233-YK-01-B.

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 Section 15.207	-	N/A *1)	N/A	N/A	
Carrier frequency separation	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A	*See data.	Complied	
20dB bandwidth	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)	Conducted	N/A		Complied	
Number of hopping frequency	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied	
Dwell time	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (a)(1)(iii)	Conducted	N/A		Complied	
Maximum peak output power	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (b)(1)	Conducted	N/A		Complied	
Band edge compliance & Spurious emission	FCC Public Notice DA 00-705 & ANSI C63.4:2003 13. Measurement of intentional radiators	FCC Section15.247 (d) Section15.209	Conducted/ Radiated	N/A		8.0dB (1652.72MHz, Horizontal, Tx 2480MHz, 3DH5)	Complied

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

*1) The test is not applicable since the EUT has no AC mains.

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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

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

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)			
<30MHz	2.4 dB	2.4 dB	2.7 dB
30-300MHz	4.3 dB	4.3 dB	4.6 dB
300-1000MHz	4.3 dB	4.3 dB	4.5 dB
1GHz<	5.7 dB	5.8 dB	5.7 dB

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

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

3.5 Test location

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JAB Accreditation No. : RTL02610

No. 1 test site has been fully described in a report submitted to FCC office, and accepted on July 23, 2008 (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 February 27, 2008 (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 October 22, 2008 (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		

Open test site	Maximum measurement distance
No.1 open test site	30m
No.2 open test site	10m

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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 item	Operating mode	Tested frequency
Carrier frequency separation	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
20dB bandwidth	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9	2402MHz, 2441MHz, 2480MHz
Number of hopping frequency	Transmitting Hopping ON (DH5/3DH5)/Inquiry, Payload: PRBS9	-
Dwell time	Transmitting (Hopping ON) -DH1, -DH3, -DH5 -3DH1, -3DH3, -3DH5 -Inquiry	-
Maximum peak output power	Transmitting Hopping OFF (DH5/3DH5)/Inquiry, Payload: PRBS9 -DH5 -2DH5 -3DH5	2402MHz, 2441MHz, 2480MHz
Band edge compliance & Spurious emission (Conducted)	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON/Inquiry -Hopping OFF	Band edge compliance: 2402MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	Spurious emission: 2402MHz, 2441MHz, 2480MHz
99% occupied bandwidth	Transmitting (DH5/3DH5), Payload: PRBS9 -Hopping ON -Hopping OFF	2402MHz, 2441MHz, 2480MHz

*As a result of preliminary test, the formal test was performed with the above modes, which had the maximum payload (except Dwell time test)

*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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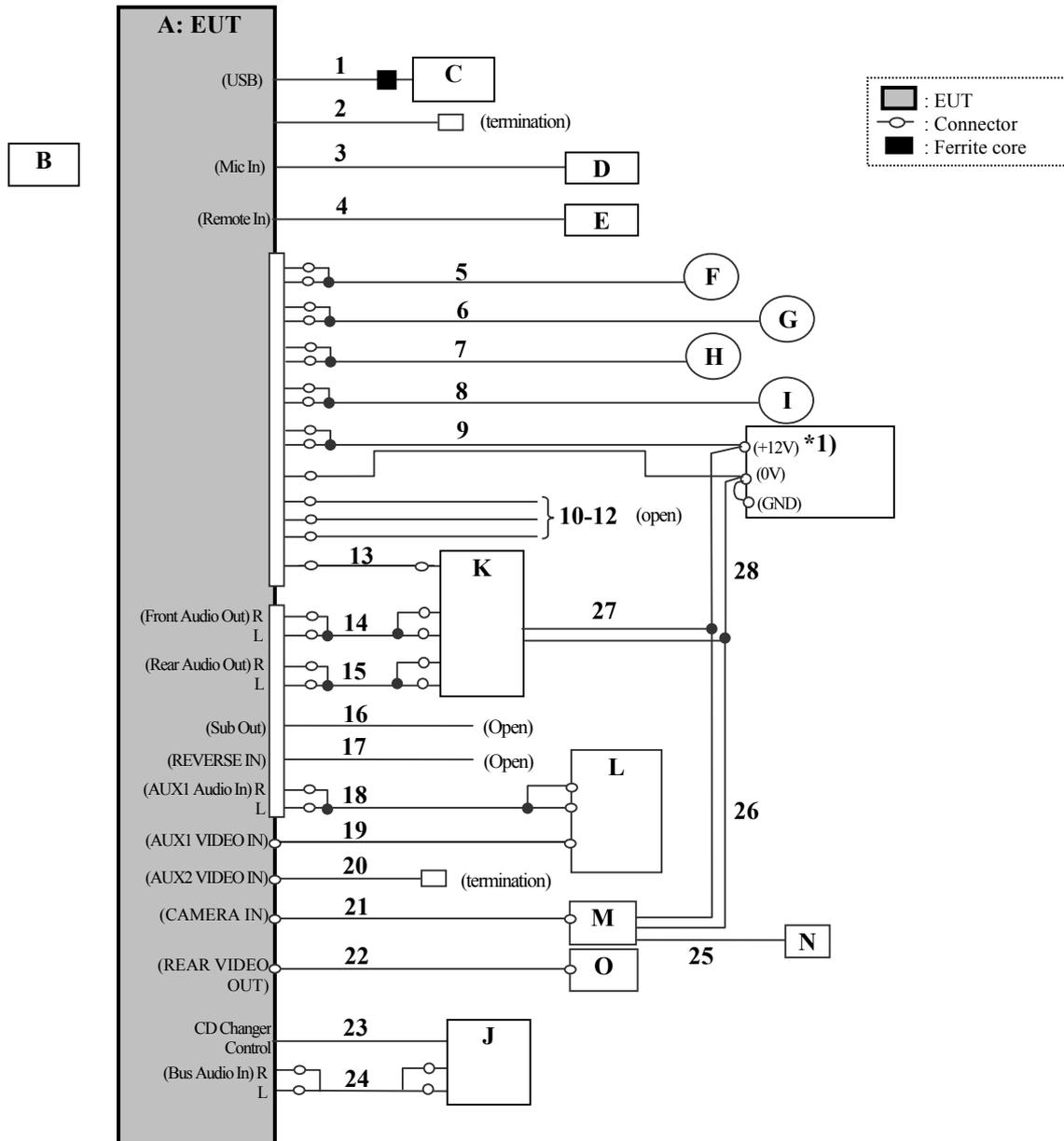
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

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Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	AV Center	XAV-70BT	46	Sony	EUT
B	Remote Controller	RM-X170	-	Sony	-
C	Digital Music Player	NW-E015	5155002	Sony	-
D	Microphone	XA-MC10	-	Sony	-
E	Wired Remote Controller	RM-X4S	-	Sony	-
F	Speaker 1	XS-F1611	-	Sony	-
G	Speaker 2	XS-F1611	-	Sony	-
H	Speaker 3	1-544-814-31	-	AIWA	-
I	Speaker 4	1-544-814-31	-	AIWA	-
J	CD Changer	CDX-T67	22634	Sony	-
K	Stereo Power Amplifier	XM-423SL	0020316	Sony	-
L	Digital Video Cassette Recorder	GV-D900	30729	Sony	-
M	Rear View CCD Camera	HCE-C100	W80316932	ALPINE	-
N	Rear View CCD Camera	HCE-C100	W80316932	ALPINE	-
O	Mobile Monitor	XVM-B62	3504390	Sony	-

*1) DC power supply (Model No.: PAN35-10A) was used for DC 12V input.

List of cables used

No.	Cable	Length (m)	Shield-Cable	Shield-Connector	Remarks
1	USB Cable	1.4	Shielded	Shielded	-
2	FM antenna Cable	1.0	Shielded	Shielded	-
3	External Microphone Cable	0.25+4.0	Unshielded	Unshielded	-
4	REMOTE IN Cable	1.9	Unshielded	Unshielded	-
5	Speaker Cable (1)	0.25+2.0	Unshielded	Unshielded	-
6	Speaker Cable (2)	0.25+2.0	Unshielded	Unshielded	-
7	Speaker Cable (3)	0.25+2.0	Unshielded	Unshielded	-
8	Speaker Cable (4)	0.25+2.0	Unshielded	Unshielded	-
9	DC Power Cable	0.1+1.5	Unshielded	Unshielded	-
10	Illumination cable	0.25	Unshielded	Unshielded	-
11	ANT Control Cable	0.25	Unshielded	Unshielded	-
12	Car telephone Cable	0.25	Unshielded	Unshielded	-
13	Amp Remote Cable	0.25+0.45	Unshielded	Unshielded	-
14	Audio Cable (Front Audio Out)	5.5	Unshielded	Shielded	-
15	Audio Cable (Rear Audio Out)	5.5	Unshielded	Shielded	-
16	SUB OUT Cable	0.25+3.6	Unshielded	Shielded	-
17	REVERSE IN Cable	5.0	Unshielded	Unshielded	-
18	AUX1 Audio In Cable	0.25+1.5	Shielded	Shielded	-
19	AUX1 VIDEO IN Cable	1.5	Shielded	Shielded	-
20	AUX2 VIDEO IN Cable	1.8	Shielded	Shielded	-
21	CAMERA IN Cable	5.0	Unshielded	Shielded	-
22	REAR VIDEO OUT Cable	5.0	Shielded	Shielded	-
23	Bus Control Cable	5.5	Shielded	Shielded	-
24	AUX2 Audio In Cable	5.5	Unshielded	Shielded	-
25	CAMERA Cable	3.0	Unshielded	Unshielded	-
26	DC Power Cable	1.0	Unshielded	Unshielded	-
27	DC Power Cable	0.7+0.7	Unshielded	Unshielded	-
28	DC Power Cable	1.0	Unshielded	Unshielded	-
29	AC Power Cable	2.7	Unshielded	Unshielded	-

* 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

6 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The bandwidth was measured with a spectrum analyzer connected to the antenna port.
The channel separation in Hopping mode and Inquiry mode was separated by 25kHz and 2/3 of the 20dB bandwidth.

Summary of the test results: Pass

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

8 Dwell time

Test procedure

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

Summary of the test results: Pass

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

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.

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 conducted measurement.

Summary of the test results: Pass

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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, 0.9m by 1.8m, raised 80cm above the conducting ground plane to prevent the reflection influence. The configuration was set in accordance with ANSI C63.4: 2003. Photographs of the set up are shown in Appendix 1.

11.3 Test conditions

Frequency range : 30MHz - 26GHz
Test distance : 3m

11.4 Test procedure

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

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

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

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

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

The EUT was tested in the direction normally used.

11.5 Band edge

Band edge level at 2390MHz and 2483.5MHz is below the limits of FCC 15.209 and band edge level at 2400MHz is below the 20dBc. Refer to the data.

11.6 Results

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

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APPENDIX 1: Photographs of test setup

Page 12 : Radiated emission

APPENDIX 2: Test Data

Page 13 : Carrier frequency separation
Page 14 - 16 : 20dB bandwidth
Page 17 - 21 : Number of hopping frequency
Page 22 - 35 : Dwell time
Page 36 : Maximum peak output power
Page 37 - 54 : Out of band emissions (Antenna Port Conducted)
Page 55 - 72 : Out of band emissions (Radiated)
Page 73 : Duty cycle
Page 74 - 76 : Occupied bandwidth

APPENDIX 3: Test instruments

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