RADIO TEST REPORT

Test Report No.: 31BE0252-SH-02-A

Applicant	:	**Sony EMCS Corporation Kisarazu TEC**
Type of Equipment	:	**AV Center**
Model No.	:	**XAV-62BT**
FCC ID	:	**AK8XAV62BT**
Test regulation	:	**FCC Part15 Subpart C: 2010**
Test result	:	**Complied**

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Date of test: November 1, 3, 4 and 5, 2010

Representative test engineer:

Tatsuya Arai
Engineer of EMC Services

Approved by :

Go Ishiwata
Assistant Manager of EMC Service

☐ The testing in which "Non-accreditation" is displayed is outside the accreditation scopes in UL Japan.
☒ There is no testing item of "Non-accreditation".

JAB Testing RTL02610

Contents

SECTION 1: Customer information

Company Name	:	Sony EMCS Corporation Kisarazu TEC
Address	:	8-4 Shiomi Kisarazu-shi, Chiba, 292-0834 Japan
Telephone Number	:	+81-438-37-4704
Facsimile Number	:	+81-438-37-4705
Contact Person	:	Kengo Nakamura

Sony EMCS Corporation Kisarazu TEC is on behalf of the applicant: Sony corporation.

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

2.1 Identification of E.U.T.

Type of Equipment	:	AV Center
Model Number	:	XAV-62BT
Serial Number	:	13
Rating	:	DC12V
Country of Mass-production	:	Thailand
Condition of EUT	:	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	:	October 29, 2010
Modification of EUT	:	No modification by the test lab.

2.2 Product description

Model: XAV-62BT (referred to as the EUT in this report) is an AV Center.

Clock frequencies: 32.768kHz, 4MHz, 6MHz, 12MHz, 24MHz, 27MHz, 33MHz

<Radio part>

Equipment type	:	Transceiver
Frequency of operation	:	2402-2480MHz
Bandwidth / Channel spacing	:	79MHz & 1MHz
Type of modulation	:	FHSS
Antenna type	:	MITSUBISHI AMD0302-ST01 SMD
Antenna connector type	:	I-PEX MHF (20314-001E-01)
Antenna gain	:	-4.2dBi
ITU code	:	F1D, G1D
Operation temperature range	:	-20 to +60 deg.C.

There are 2-types of the model. The difference is as follows:

Destination	Tuner	Sony Buss circuit	Remarks
North America	FM 87.5-107.9MHz, AM 530-1710kHz	Yes	Tested model
General	FM 87.5-107.9MHz, AM 530-1710kHz	No	-

FCC 15.31 (e)
The equipment provides the Bluetooth transmitter with stable power supply (DC3.3V), therefore, the equipment complies with the requirement.

FCC Part 15.203
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.

SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : FCC Part 15 Subpart C: 2010, final revised on October 13, 2010
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: 2010. Refer to the test report: 31BE0252-SH-02-C.

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	8.6dB Freq.: 173.282MHz Detector: QP Polarization: Horizontal Mode: Tx 2480MHz (DH5)	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.						

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

* 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.

Item	Frequency range	No.1 SAC*1/SR*2 (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.4 dB	2.7 dB	3.4 dB
	30MHz-300MHz	4.6 dB	4.5 dB	4.9 dB
	300MHz-1GHz	4.5 dB	4.6 dB	5.1 dB
	1GHz-13GHz	3.9 dB	3.9 dB	4.0 dB
Radiated emission (Measurement distance: 1m)	13GHz-18GHz	4.8 dB	4.8 dB	4.8 dB
	18GHz-40GHz	4.2 dB	4.2 dB	4.2 dB

*1: SAC=Semi-Anechoic Chamber
*2: SR= Shielded Room is applied besides radiated emission

Radiated emission test

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

Antenna port conducted test

Power Measurement uncertainty above 1GHz for this test was: (±) 0.8dB
Conducted emissions Measurement (below 1GHz) uncertainty for this test was: (±) 1.1dB
Conducted emissions Measurement (1G-3GHz) uncertainty for this test was: (±) 1.2dB
Conducted emissions Measurement (3G-18GHz) uncertainty for this test was: (±) 2.9dB
Conducted emissions Measurement (18G-26.5GHz) uncertainty for this test was: (±) 3.4dB
Bandwidth Measurement uncertainty for this test was: (±) 5.4%

3.5 Test location

UL Japan, Inc. Shonan EMC Lab.
1-22-3, Megumigaoka, Hiratsuka-shi, Kanagawa-ken 259-1220 JAPAN
Telephone number : +81 463 50 6400
Facsimile number : +81 463 50 6401
JAB Accreditation No. : RTL02610

	FCC Registration No.	IC Registration No.	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Maximum measurement distance
☒ No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☐ No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
☒ No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
☐ No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
☐ No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
☐ No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
☐ No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
☒ No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
☐ No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Test data & Test instruments

Refer to Appendix 1 to 3.

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

4.1 Operating mode

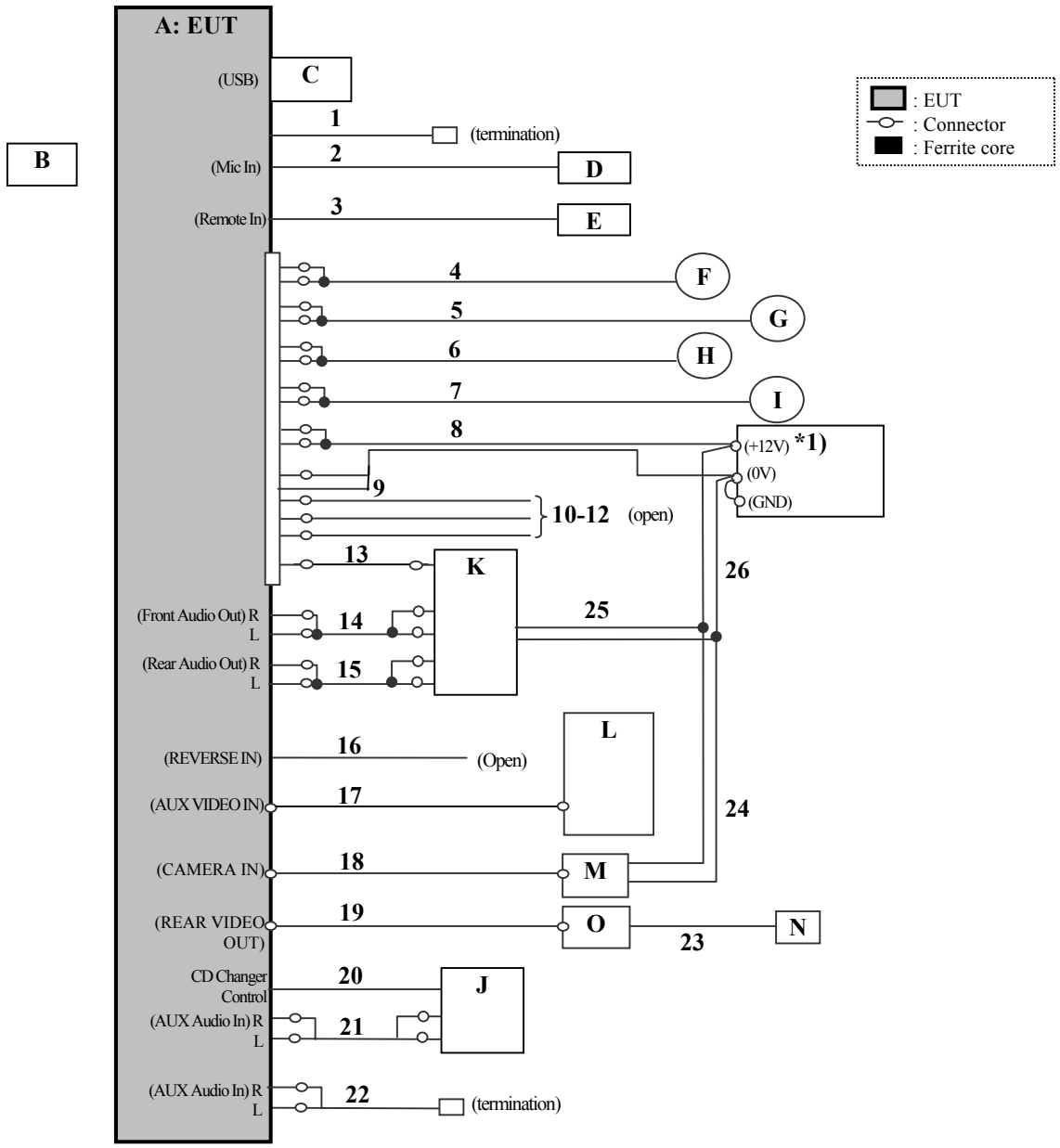
The EUT exercise program used during testing was designed to exercise the various system components in a manner similar to typical use.

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 Spurious emission: 2402MHz, 2441MHz, 2480MHz
(Radiated)	Transmitting (DH5/3DH5), Payload: PRBS9	
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 125mWof AFH mode was used for the test.

*EUT has the power settings by the software as follows;
Power settings: BDR: Ext.=255, Int.=44
EDR: Ext.=255, Int.=48
Software: CSR BlueSuite BlueTest Version 1.24
CSR BlueSuite BtCliCtrl Version 1.24 (Inquiry mode only)

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 *2)	Remarks
A	AV Center	XAV-62BT	13	Sony	EUT
B	Remote Controller	RM-X170	-	Sony	-
C	USB Memory	USM64D	B05019AB	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.
*2) "SONY" means Sony Corporation or Sony EMCS Corporation.

List of cables used

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

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

SECTION 5: Radiated emission

5.1 Operating environment

The test was carried out in No.1 / No.3 semi-anechoic chamber.

Temperature : See test data (APPENDIX 2)
Humidity : See test data (APPENDIX 2)

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 2.0m, raised 80cm above the conducting ground plane.
The table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.
The rear of EUT, including its peripherals was aligned and flushed with rear of tabletop. I/O cables that were connected to the peripherals were bundled in center. They were folded back and for the forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.
Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The measurement antenna was varied in height above the conducting ground plane to obtain the maximum signal strength.
Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range	:	30MHz to 26GHz
Test distance	:	3m(below 13GHz) / 1m(above 13GHz)
EUT position	:	Table top
EUT operation mode	:	Refer to SECTION 4.1

5.4 Test procedure

The radiated electric field strength intensity has been measured on a semi-anechoic chamber with a ground plane and at a distance of 3m(below 13GHz) / 1m(above 13GHz) (Refer to Figure 1). Measurements were performed with quasi-peak, peak and average detector. 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.
The radiated emission measurements were made with the following detection of the test receiver.

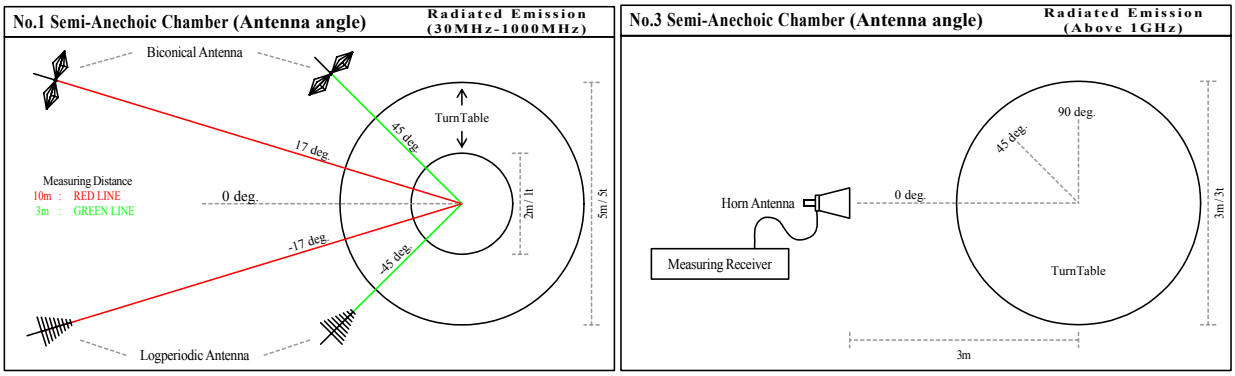
Frequency	:	30-1000MHz	1000-26000MHz	
Detection Type	:	Quasi-Peak	Peak	* Average
IF Bandwidth	:	120kHz	RBW:1MHz/VBW:1MHz	RBW:1MHz/VBW:10Hz RBW:1MHz/VBW:300Hz *1)

*1) Used for the band edge of the carrier and the harmonics that can be measured. The VBW is based on the inverse of the duty cycle (Refer to the data).

* 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.

Figure 1. Antenna angle



5.5 Band edge

Band edge level at 2390MHz, 2400MHz and 2483.5MHz is below the limits of FCC 15.209. Refer to the data of Radiated emission.

5.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
Refer to APPENDIX 2

SECTION 6: 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 radiated measurement.

Summary of the test results: Pass
Refer to APPENDIX 2

SECTION 7: 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
Refer to APPENDIX 2

SECTION 8: 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
Refer to APPENDIX 2

SECTION 9: 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
Refer to APPENDIX 2

SECTION 10: Dwell time

Test procedure
The dwell time was measured with a spectrum analyzer connected to the antenna port.

Summary of the test results: Pass
Refer to APPENDIX 2

SECTION 11: 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
Refer to APPENDIX 2

Contents of appendixes

APPENDIX 1: Photographs of test setup

APPENDIX 2: Test data

APPENDIX 3: Test instruments