



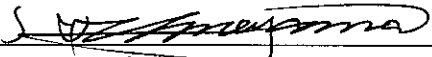
EMI TEST REPORT

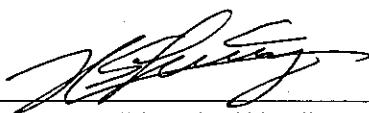
Test Report No. : 23JE0045-HO-1

Applicant : Sony EMCS Corp. Saitama TEC
Type of Equipment : CLIE Car Cradle
Model No. : PEGA-CC5
Test standard : FCC Part 15 Subpart C
Section15.239
FCC ID : AK8PEGACC5
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.
5. This test report does not constitute an endorsement by NIST/NVLAP or U.S. Government.

Date of test : June 24, 2003

Tested by : 
Hiroka Umeyama
EMC Section

Approved by : 
Hironobu Shimoji
Group Leader of EMC Section

UL Apex Co., Ltd.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

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SECTION 1: Client information

Company name : Sony EMCS Corp. Saitama TEC
Brand name : Sony
Address : Shinagawa INTERCITY C Tower 2-15-3 Konan Minatoku, Tokyo 108-6201 Japan
Telephone Number : +81 3 5769 5650
Facsimile Number : +81 3 5769 5962
Contact Person : Shigeo Chiba

SECTION 2: Equipment under test (E.U.T.)**2.1 Identification of E.U.T.**

Type of Equipment : CLIE Car Cradle
Model No. : PEGA-CC5
Serial No. : No.5
Rating : DC12V
Country of Manufacture : JAPAN
Receipt Date of Sample : June 24, 2003
Condition of EUT : Production prototype

2.2 Product Description

Sony EMCS Corp. Saitama TEC, Model: PEGA-CC5 (referred to as the EUT in this report) is the CLIE Car Cradle, the Audio player by using FM transmitter.

Simple Car Navigation system with GPS, e-mail reader by text to voice, MP3 player which can be heard by using FM transmitter or cassette adaptor pack.

Equipment Type : Transmitter
Frequency band : 95.9MHz – 101.9 MHz
Frequency Operation : 92.2MHz
Other clock frequency : 11.52MHz
Type of Modulation : F8E

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Antenna Type : Internal film antenna

Mode of operation : Simplex

Method of Frequency Generation : Synthesizer

***FCC 15.31(e)**

The host device PEGA-CC5 provide the stable power supply DC12V from Car Battery. The host device PEGA-CC5 was tested using a fully charged battery.

***FCC15.203**

Since the CLIE Car Cradle uses a transmitting antenna that is an integral part of the equipment, it is impossible for end users to replace the antenna without use of a special tool. Therefore, the equipment complies with the requirement of 15.203.

SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part 15 Subpart C
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.239 Operation in the band 88-108 MHz

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Deviation	Worst margin	Results
1	200kHz Band Width	FCC Part2 Section 2.1049	Section 15.239(a)	N/A	29.0kHz 101.9MHz Horizontal	Complied
2	Emissions from the Intentional radiators	FCC Part2 Section 2.1046	Section 15.239(b)	N/A	17.4dB 95.93MHz Vertical	Complied
3	Spurious Emissions	FCC Part2 Section 2.1053	Section 15.239 (c)	N/A	7.3dB 529.90MHz Vertical	Complied
4	A custom built telemetry Intentional radiator	-	Section 15.239(d)	N/A *1)	N/A	N/A
5	26dB Bandwidth	ANSI C63.4:2001	-	N/A	N/A	N/A

*1) This test is not applicable since this EUT is not the ordered and produced equipment for the remote measurement used in the educational organization.

Note: UL Apex's EMI Work Procedures No. QPM05

*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Confirmation

UL Apex Co., Ltd. hereby confirms that E.U.T. , in the configuration tested, complies with the specifications FCC Part15 Subpart C Section 15.239.

3.4 Uncertainty

Radiated Emission Test

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is $\pm 4.5\text{dB}$.

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is $\pm 5.2\text{dB}$.

The measurement uncertainty (with a 95% confidence level) for this test using Horn Antenna is $\pm 6.6\text{dB}$.

☐ The result is within Head Office EMC lab's uncertainty.

☒ The data listed in this test report has enough margin.

UL Apex Co., Ltd.

Head Office EMC Lab.

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3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone: +81 596 24 8116 Facsimile: +81 596 24 8124
This site has been fully described in a report submitted to FCC office, and listed on June 05, 2002
(Registration number: 846015).
Industry Canada number: IC4247-2

*NVLAP Lab. code: 200572-0

3.6 Test setup, Data of EMI and Test instruments

Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

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

The operating mode/system was as follows:

- Operation mode : Transmitting (95.9 MHz/101.9MHz)
(1) Playing audio player. Working only Car Cradle main Body and CLIE
*Audio Signal 1kHz modulation was used.
- Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	FCC ID
A	CLIE Car Cradle	PEGA-CC5	No.5	Sony EMCS Corp. Saitama TEC	AK8PEGACC5
A'	CLIE	PEG-TG50/U	3025776	Sony EMCS Corp. Saitama TEC	AK8PEGTG50
B	CARD REMOTE CONTROLLER	RM-X136	No.5	Sony EMCS Corp. Saitama TEC	-
C	CIGAR ADAPTOR	XA-DC5	No.16	Sony EMCS Corp. Saitama TEC	-
D	GPS ANTENNA	VCA-36	19530001	Sony EMCS Corp. Saitama TEC	-
H	Battery	B19L	1610C1C	Panasonic	-

List of cables used

No.	Cables	Length (m)	Shield	Backshell materials
1	Power cable	1.6	N	Polyvinyl chloride
2	GPS cable	3.0	Y	Polyvinyl chloride
8	Power cable	0.3	N	Polyvinyl chloride

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SECTION 5: 200kHz Band Width and 26dB Band Width

5.1 Operating environment

The test was carried out in No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.

Temperature : See data
Humidity : See data

5.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of EUT and its peripherals was aligned and flushed with rear of table top. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and was hanged 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.

A drawing of the set up is shown in the photos of APPENDIX 1.

5.3 Test conditions

Test distance : 3m
EUT position : Tabletop
EUT operation mode : Transmitting

5.4 Test procedure

The 200kHz Band Width and 26dB Band Width was measured with a spectrum analyzer.

5.5 Results

Summary of the test results: Pass

Date: June 24, 2003

Tested by: Hiroka Umeyama

SECTION 6: Emission from the intentional radiator and Spurious Emissions

6.1 Operating environment

The test was carried out in No.2 semi anechoic chamber, 7.5 x 5.8 x 5.2m.

Temperature : See data
Humidity : See data

6.2 Test configuration

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of EUT and its peripherals was aligned and flushed with rear of table top. I/O cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and was hanged 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.

A drawing of the set up is shown in the photos of APPENDIX 1.

6.3 Test conditions

Frequency range : 30MHz-1000MHz
Test distance : 3m
EUT position : Tabletop
EUT operation mode : Transmitting

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured on No.2 semi anechoic chamber with a ground plane and at a distance of 3m.

The measuring antenna height was varied between 1 to 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 detector function of the test receiver.

	Emissions from intentional radiator	Spurious emissions
Detector Type	Average/Peak	Quasi-Peak
IF Bandwidth	9kHz	120kHz

6.5 Results

Summary of the test results: Pass

Date: June 24, 2003

Tested by: Hiroka Umeyama

UL Apex Co., Ltd.

Head Office EMC Lab.

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Contents of Appendixes

APPENDIX 1: Photographs of test setup

Page 13 : Radiated emission

APPENDIX 2: Test instruments

Page 14 : Test instruments

APPENDIX 3: Data of EMI test

Page 15 : 200kHz Band Width

Page 16 : 26dB Band Width

Page 17 : Emissions from the Intentional radiators

Page 18-20 : Spurious Emissions

APPENDIX 1: Photographs of test setup

Radiated emission



Appendix 2: Test Instruments

Test Report No : 23JE0045-HO

APPENDIX 3 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2003/04/11 * 12
MTR-02	Test Receiver	Rohde & Schwarz	ESCS30	RE	2003/01/31 * 12
SA-07	Spectrum Analyzer	Advantest	R3273	RE	2002/12/10 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2002/12/24 * 12
MBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2003/04/28 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2003/04/28 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	MCC-12-01(8D-2W15m),MCC-12-02(5D-2W-0.7),MCC-12-03(5D-2W-0.8),MCC-12-04(5D-2W-1m),MCC-12-05(RF SW),MCC-12-06(RF SW), ※ MCC-12-07(5D-2W-0.4m)5/8追加	RE	2003/05/08 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2003/03/13 * 12

All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.
Test Item:

RE: Radiated emission.

DATA OF 200kHz BAND WIDTH

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Head Office EMC Lab. No.2 Semi Anechoic Chamber

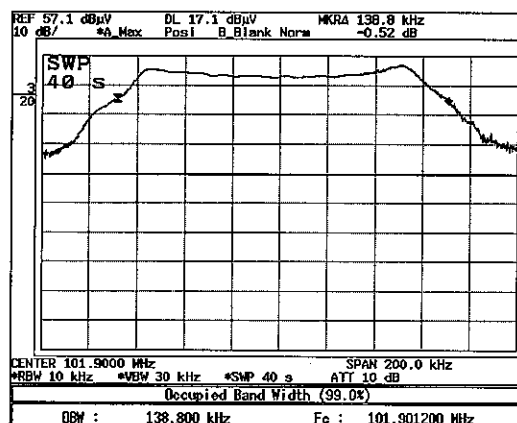
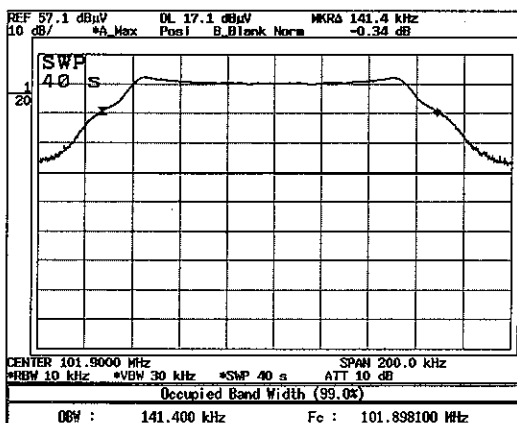
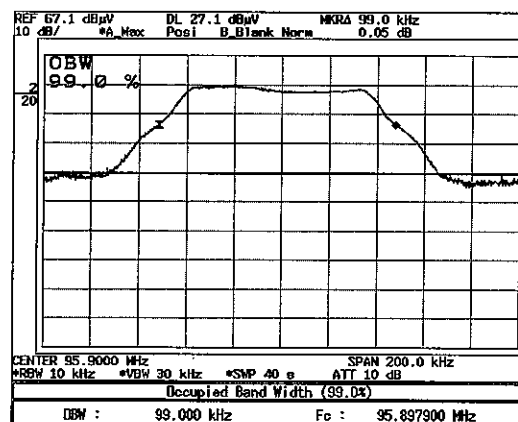
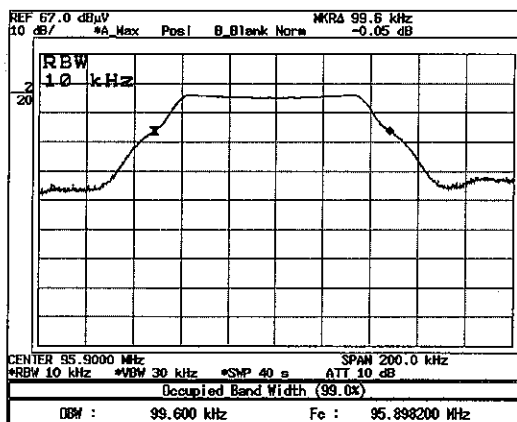
Company : Sony EMCS Corp. Saitama TEC
Equipment : CLIE Car Cradle
Model : PEGA-CC5
Sample No. : No5
Power : DC12V
Mode : Transmitting (Low:95.9MHz and High:101.9MHz)
FCC ID : AK8PEGACC5

REPORT NO : 23JE0045-HO - 1
REGULATION : Fcc Part15 Subpart C Section 15.239(a)
PROCEDURE : Fcc Part2 Section 2.1049
TEST DISTANCE : 3 m
DATE : 06/24/2003
TEMPERATURE : 25 deg.C
HUMIDITY : 60 %

Hiroka Umeyama

ENGINEER : Hiroka Umeyama

No.	FREQ [MHz]	RESULT		Limit [kHz]	MARGIN	
		HOR [kHz]	VER [kHz]		HOR [kHz]	VER [kHz]
1	95.9	99.6	99.0	200.0	100.4	101.0
2	101.9	141.4	138.8	200.0	58.6	61.2



DATA OF 26dB BAND WIDTH

UL Apex Co., Ltd.

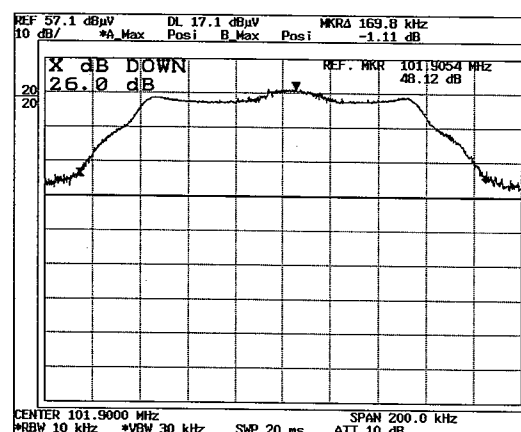
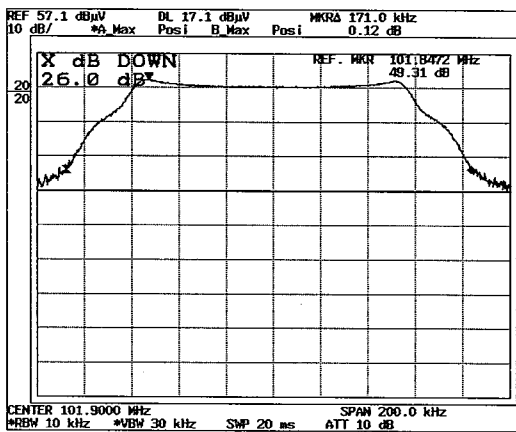
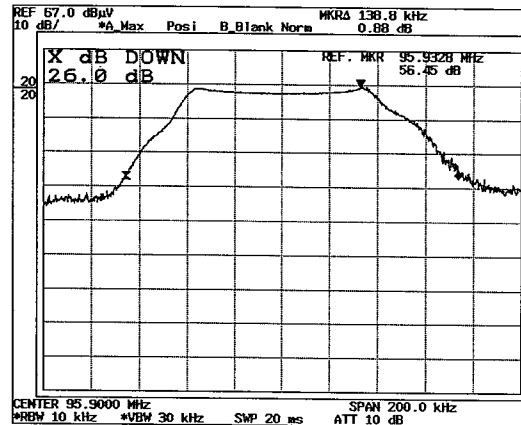
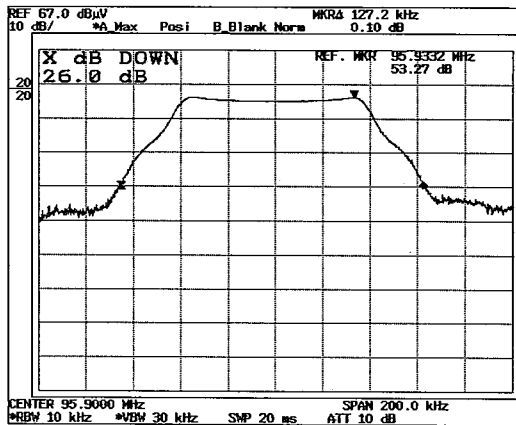
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company : Sony EMCS Corp. Saitama TEC
Equipment : CLIE Car Cradle
Model : PEGA-CC5
Sample No. : No5
Power : DC12V
Mode : Transmitting (Low:95.9MHz and High:101.9MHz)
FCC ID : AK8PEGACC5

REPORT NO : 23JE0045-HO-1
REGULATION : FCC Part15 Subpart C
PROCEDURE : -
TEST DISTANCE : 3 m
DATE : 06/24/2003
TEMPERATURE : 25 deg.C
HUMIDITY : 60 %

ENGINEER : Hiroka Umeyama

No.	FREQ [MHz]	RESULT		Limit [kHz]	MARGIN	
		HOR [kHz]	VER [kHz]		HOR [kHz]	VER [kHz]
1	95.9	127.2	138.8	200.0	72.8	61.2
2	101.9	171.0	169.8	200.0	29.0	30.2



DATA OF EMISSIONS FROM INTENTIONAL RADIATOR

UL Apex Co., Ltd.

Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company : Sony EMCS Corp. Saitama TEC
 Equipment : CLIE Car Cradle
 Model : PEGA-CC5
 Sample No. : No5
 Power : DC12V
 Mode : Transmitting (Low:95.9MHz and High:101.9MHz)
 FCC ID : AK8PEGACC5

REPORT NO : 23JE0045-HO - **1**
 REGULATION : Fcc Part15 Subpart C Section 15.239(b)
 PROCEDURE : Fcc Part2 Section 2.1046
 TEST DISTANCE : 3 m
 DATE : 06/24/2003
 TEMPERATURE : 25 deg.C
 HUMIDITY : 60 %


 ENGINEER : Hiroka Umeyama

AV DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMIT AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]						[dBuV/m]			[dB]	[dB]
1	95.93	40.0	42.4	7.7	26.9	1.2	6.1	28.1	30.5	47.9	19.8	17.4
2	101.90	34.2	38.1	8.9	26.5	1.2	6.0	23.8	27.7	47.9	24.1	20.2

PK DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMIT AV [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]						[dBuV/m]			[dB]	[dB]
1	95.93	52.0	54.2	7.7	26.9	1.2	6.1	40.1	42.3	67.9	27.8	25.6
2	101.90	47.0	51.5	8.9	26.5	1.2	6.0	36.6	41.1	67.9	31.3	26.8

RESULT=READING + ANT Factor - AMP GAIN + CABLE LOSS + ATTEN.

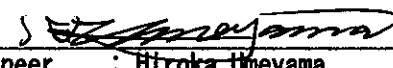
Reference data : QP DETECT

No.	FREQ [MHz]	T/R READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMIT [dBuV/m]	MARGIN	
		HOR	VER					HOR	VER		HOR	VER
		[dBuV/m]						[dBuV/m]			[dB]	[dB]
1	95.93	52.4	54.8	7.7	26.9	1.2	6.1	40.5	42.9	-	-	-
2	101.90	48.5	52.9	8.9	26.5	1.2	6.0	38.1	42.5	-	-	-

DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23JE0045-H0- 1

Applicant : Sony EMCS Corp. Saitama TEC
Kind of Equipment : CLIE Car Cradle
Model No. : PEGA-CC5 FCC ID AK8PEGACC5
Serial No. : No5
Power : DC12V
Mode : Transmitting(95.9MHz)
Remarks : Playing audio player. Working only Car Cradle main Body and CLIE
Date : 6/24/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 60 %
Regulation : FCC Part15C s 15.209(a)

Engineer :  Hiroka Uneyama

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	92.16	BB	33.0	47.6	7.0	27.1	1.1	6.1	20.1	34.7	43.5	23.4	8.8
2.	184.32	BB	31.2	36.2	16.2	27.1	1.8	6.0	28.1	33.1	43.5	15.4	10.4
3.	192.00	BB	26.3	31.2	16.2	26.9	1.9	6.0	23.5	28.4	43.5	20.0	15.1
4.	287.70	BB	19.0	19.1	19.0	26.6	2.3	6.0	19.7	19.8	46.0	26.3	26.2
5.	368.63	BB	32.7	32.7	16.4	27.2	2.6	6.1	30.6	30.6	46.0	15.4	15.4
6.	383.60	BB	20.9	20.6	16.8	27.2	2.6	6.2	19.3	19.0	46.0	26.7	27.0
7.	479.50	BB	19.8	19.8	18.0	28.1	3.0	6.2	18.9	18.9	46.0	27.1	27.1
8.	529.93	BB	25.1	36.3	18.6	28.2	3.2	6.1	24.8	36.0	46.0	21.2	10.0
9.	575.40	BB	19.7	19.7	19.3	28.5	3.4	6.1	20.0	20.0	46.0	26.0	26.0
10.	671.30	BB	20.4	20.4	20.4	28.7	3.8	6.1	22.0	22.0	46.0	24.0	24.0
11.	767.20	BB	20.1	20.1	21.2	28.8	3.9	6.1	22.5	22.5	46.0	23.5	23.5
12.	863.10	BB	20.4	20.5	21.3	28.5	4.4	6.1	23.7	23.8	46.0	22.3	22.2
13.	921.58	BB	29.0	31.0	21.8	28.6	4.6	6.1	32.9	34.9	46.0	13.1	11.1
14.	959.00	BB	20.0	20.0	22.7	28.4	4.7	6.1	25.1	25.1	46.0	20.9	20.9

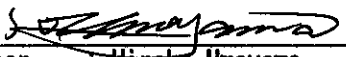
CALCULATION: READING + ANT.FACTOR + CABLE LOSS - AMP.GAIN + ATTEN.

All other spurious emissions were less than 20dB for the limit.
ANT.TYPE:30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF RADIATION TEST

UL Apex Co., Ltd. Head Office EMC Lab.
No.2 Semi Anechoic Chamber
Report No. : 23JE0045-H0 - 1

Applicant : Sony EMCS Corp. Saitama TEC
Kind of Equipment : CLIE Car Cradle
Model No. : PEGA-CC5 FCC ID AK8PEGACC5
Serial No. : No5
Power : DC12V
Mode : Transmitting(101.9MHz)
Remarks : Playing audio player. Working only Car Cradle main Body and CLIE
Date : 6/24/2003
Test Distance : 3 m
Temperature : 25 °C
Humidity : 60 %
Regulation : FCC Part15C § 15.209(a)


Engineer : Hiroka Umeyama

No.	FREQ. [MHz]	ANT TYPE	READING		ANT FACTOR [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS [dB μ V/m]	MARGIN	
			HOR [dB μ V]	VER [dB μ V]					HOR [dB μ V/m]	VER [dB μ V/m]		HOR [dB]	VER [dB]
1.	92.16	BB	34.5	48.0	7.0	27.1	1.1	6.1	21.6	35.1	43.5	21.9	8.4
2.	184.31	BB	30.7	36.5	16.2	27.1	1.8	6.0	27.6	33.4	43.5	15.9	10.1
3.	203.80	BB	19.2	20.0	16.3	26.8	1.9	6.0	16.6	17.4	43.5	26.9	26.1
4.	305.70	BB	22.1	23.8	14.6	26.7	2.4	6.0	18.4	20.1	46.0	27.6	25.9
5.	391.67	BB	35.7	30.9	17.1	27.2	2.7	6.2	34.5	29.7	46.0	11.5	16.3
6.	407.60	BB	20.0	20.1	17.4	27.2	2.7	6.2	19.1	19.2	46.0	26.9	26.8
7.	509.50	BB	20.1	19.8	18.3	28.3	3.1	6.2	19.4	19.1	46.0	26.6	26.9
8.	529.90	BB	30.0	39.0	18.6	28.2	3.2	6.1	29.7	38.7	46.0	16.3	7.3
9.	611.40	BB	20.6	20.5	19.7	28.6	3.3	6.1	21.1	21.0	46.0	24.9	25.0
10.	713.30	BB	20.3	20.3	20.8	28.8	3.9	6.1	22.3	22.3	46.0	23.7	23.7
11.	815.20	BB	20.0	20.1	21.4	28.4	4.2	6.1	23.3	23.4	46.0	22.7	22.6
12.	917.10	BB	20.3	20.2	21.6	28.6	4.5	6.1	23.9	23.8	46.0	22.1	22.2
13.	921.59	BB	28.9	32.1	21.8	28.6	4.6	6.1	32.8	36.0	46.0	13.2	10.0

CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

All other spurious emissions were less than 20dB for the limit.
ANT. TYPE: 30-300MHz Biconical, 300-1000MHz Logperiodic

DATA OF SPURIOUS EMISSIONS(Band Edge)

UL Apex Co., Ltd.

Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company : Sony EMCS Corp. Saitama TEC
 Equipment : CLIE Car Cradle
 Model : PEGA-CC5
 Sample No. : No5
 Power : DC12V
 Mode : Transmitting (Low:95.9MHz and High:101.9MHz)
 FCC ID : AK8PEGACC5

REPORT NO : 23JE0045-HO-1
 REGULATION : Fcc Part15 Subpart C Section 15.239(c)
 PROCEDURE : Fcc Part2 Section 2.1053
 TEST DISTANCE : 3 m
 DATE : 06/24/2003
 TEMPERATURE : 25 deg.C
 HUMIDITY : 60 %


 ENGINEER : Hiroka Umeyama

QP DETECT

No.	FREQ [MHz]	T/R READING(QP) HOR VER [dBuV/m]		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT HOR VER [dBuV/m]		LIMIT QP [dBuV/m]	MARGIN HOR VER [dB]	
1	95.8	45.7	48.7	7.6	26.9	1.2	6.1	33.7	36.7	43.5	9.8	6.8
2	96.0	46.0	50.2	7.7	26.9	1.2	6.1	34.1	38.3	43.5	9.4	5.2
3	101.8	45.2	49.6	8.8	26.5	1.2	6.0	34.7	39.1	43.5	8.8	4.4
4	102.0	45.4	48.7	8.9	26.5	1.2	6.0	35.0	38.3	43.5	8.5	5.2

RESULT=READING + ANT Factor - AMP GAIN + CABLE LOSS + ATTEN.

