



RADIO TEST REPORT

Test Report No.: 32KE0078-SH-01-A

Applicant : Sony Corporation
Type of Equipment : Contactless IC Card Reader / Writer
Model No. : RC-S634/UA
FCC ID : AK8RCS634UA
Test regulation : FCC Part15 Subpart C: 2012
Test result : Complied

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Date of test: June 28 to July 8, 2012

Tested by: *H. Shirasawa*

Hikaru Shirasawa
Engineer of WiSE Japan,
UL Verification Service

Approved by : *T. Imamura*

Toyokazu Imamura
Leader of EMC Service,
UL Verification Service

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13-EM-F0429

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SECTION 1: Customer information

Company Name : Sony EMCS Corporation Kisarazu Site
Brand Name : SONY
Address : 8-4 Shiomi Kisarazu-shi, Chiba, 292-0834 Japan
Telephone Number : +81-438-37-3982
Facsimile Number : +81-438-37-4705
Contact Person : Yuuki Fujiwara

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

2.1 Identification of E.U.T.

Type of Equipment : Contactless IC Card Reader / Writer
Model Number : RC-S634/UA
Serial Number : Refer to clause 4.2
Rating : DC4.75 to 5.25V
Country of Mass-production : Japan
Condition of EUT : Production prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample : June 27, 2012
Modification of EUT : No modification by the test lab.

2.2 Product description

Model: RC-S634/UA (referred to as the EUT in this report) is a Contactless IC Card Reader / Writer.

Clock frequency(ies) in the system : 27.12MHz, 16.00MHz

<Radio part>

Equipment type : Transceiver
Frequency of operation : 13.56MHz
Type of modulation : ASK
Antenna type : Loop
Antenna connector type : FPC connector
ITU code : A1D
Operation temperature range : 0 to +60 deg.C.

FCC 15.31 (e)

The RFID transmitter has a regulator which regulates the supplied voltage of DC 5V to DC 3.3V. Therefore, the equipment complies with power supply regulation.

FCC Part 15.203

This module has a unique antenna coupler, FPC connector. This modular transmitter will always be used in the configuration in which it was authorized.

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SECTION 3: Test specification, procedures & results

3.1 Test specification

Test specification : Test specification: FCC Part 15 Subpart C: 2012, final revised on May 17, 2012 and effective June 18, 2012

Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators
Section 15.207 Conducted limits
Section 15.225 : Operation within the band 13.110-14.010MHz

The EUT complies with FCC Part 15 Subpart B. Refer to the test report: 32KE0078-SH-01-C.

3.2 Procedures & Results

Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
Conducted emission	ANSI C63.4:2009 7. AC powerline conducted emission measurements	FCC 15.207	-	N/A	15.4dB Freq: 27.12MHz Detector: Average Phase: N	Complied
Electric field strength of Fundamental emission	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (a)	Radiated	N/A	62.6dB Polarization: Vertical	Complied
Electric field strength of Outside the allocated bands	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (b)(c)	Radiated	N/A	39.6dB Freq: 13.349MHz Polarization: Vertical	Complied
Electric field strength of Spurious emission	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.209 FCC 15.225 (d)	Radiated	N/A	3.3dB Freq: 54.24MHz Polarization: Vertical	Complied
20dB bandwidth	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.215 (c)	Radiated	N/A	-	-
Frequency tolerance	ANSI C63.4:2009 13. Measurement of intentional radiators	FCC 15.225 (e)	Radiated	*1)	-	Complied

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

*1) The temperature variation for testing was set to -30 to +60 deg.C, according to the customer's request.

3.3 Addition to standard

Item	Test Procedure	Specification	Remarks	Worst Margin	Results
Occupied Bandwidth (99%)	ANSI C63.4:2009 13. Measurement of intentional radiators, RSS-Gen 4.6.1	RSS-Gen 4.6.1	Conducted	-	-

Note: UL Japan's Work Procedures No. 13-EM-W0420 and 13-EM-W0422

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

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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.

Item	Frequency range	No.1 SAC ^{*1} /SR ^{*2} (±)	No.2 SAC/SR (±)	No.3 SAC/SR (±)
Conducted emission (AC Mains) AMN/LISN	150kHz-30MHz	3.6 dB	3.6 dB	3.6 dB
Radiated emission (Measurement distance: 3m)	9kHz-30MHz	3.7 dB	3.7 dB	3.6 dB
	30MHz-300MHz	4.9 dB	5.1 dB	4.9 dB
	300MHz-1GHz	5.0 dB	5.2 dB	4.9 dB

*1: SAC=Semi-Anechoic Chamber

*2: SR= Shielded Room is applied besides radiated emission

Conducted emission test

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

Radiated emission test

The data listed in this report meets the limits unless the uncertainty is taken into consideration.

Frequency tolerance

Frequency (Normal condition) Measurement uncertainty for this test was: (±) 7.9×10^{-8} .

Frequency (Extreme condition) Measurement uncertainty for this test was: (±) 7.9×10^{-8} .

3.5 Test location

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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
<input type="checkbox"/> No.1 Semi-anechoic chamber	697847	2973D-1	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input type="checkbox"/> No.2 Semi-anechoic chamber	697847	2973D-2	20.6 x 11.3 x 7.65	20.6 x 11.3	10m
<input checked="" type="checkbox"/> No.3 Semi-anechoic chamber	697847	2973D-3	12.7 x 7.7 x 5.35	12.7 x 7.7	5m
<input type="checkbox"/> No.4 Full-anechoic chamber	-	-	8.1 x 5.1 x 3.55	8.1 x 5.1	-
<input type="checkbox"/> No.1 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input type="checkbox"/> No.2 shielded room	-	-	6.8 x 4.1 x 2.7	6.8 x 4.1	-
<input checked="" type="checkbox"/> No.3 shielded room	-	-	6.3 x 4.7 x 2.7	6.3 x 4.7	-
<input type="checkbox"/> No.4 shielded room	-	-	4.4 x 4.7 x 2.7	4.4 x 4.7	-
<input checked="" type="checkbox"/> No.5 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-
<input type="checkbox"/> No.6 shielded room	-	-	7.8 x 6.4 x 2.7	7.8 x 6.4	-

3.6 Test setup, Data of EMI & Test instruments

Refer to APPENDIX 1 to 3.

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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
All items except for Frequency tolerances	Transmitting ISO/IEC 14443-3 Type A Request & Anticollision loop <ul style="list-style-type: none">• Modulation ASK100%• Bit coding Modified mirror• Data transfer rate 106kbps	13.56MHz
Frequency tolerances	Transmitting (Unmodulated)	13.56MHz

*EUT has the power settings by the software as follows;

Power settings: Setting is controlled by the firmware and cannot be changed.

Software: NFCPort-100Poll.exe version 0.6.5.0

- Parameter file(Modulated): Polling Type A.bat

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

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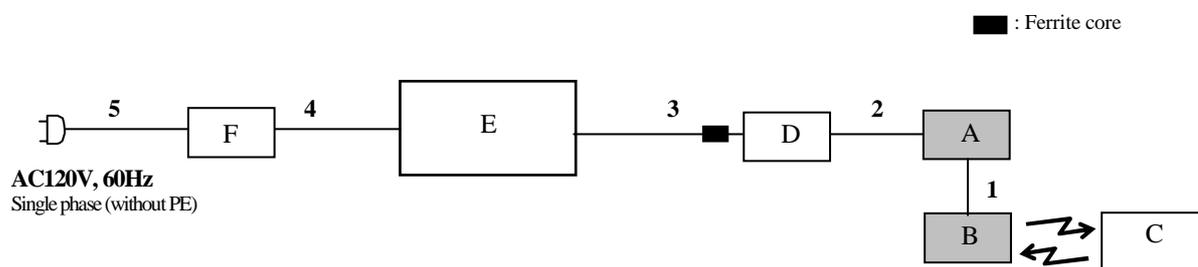
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4.2 Configuration and peripherals



* Test data was taken under worse case conditions.

Description of EUT and support equipment

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	Contactless IC Card Reader / Writer	RC-S634/UA	0000318	Sony	EUT
B	Antenna	RC-S634/UA	0000318	Sony	EUT
C	IC Card	-	-	-	-
D	Jig	-	-	Sony	-
E	Laptop PC	NE576PA#ABJ	CNU8505G0D	HP	All test items except for CE
E'	Laptop PC	VGN-G1	28248610 1000006	Sony	CE test only
F	AC Adapter	493092-002	F1-08101794990A	HP	All test items except for CE
F'	AC Adapter	VGP-AC16V6	147774951 0248745	Sony	CE test only

List of cables used *1)

No.	Item	Length(m)	Shield		Remarks
			Cable	Connector	
1	Antenna	0.03	Unshielded	Unshielded	-
2	Flat Cable	0.1	Shielded	Shielded	-
3	USB	0.1	Shielded	Shielded	-
4	DC	1.4	Unshielded	Unshielded	All test items except for CE
4'	DC	1.8	Unshielded	Unshielded	CE test only
5	AC	1.7	Unshielded	Unshielded	All test items except for CE
5'	AC	0.7	Unshielded	Unshielded	CE test only

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

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SECTION 5: Conducted emission

5.1 Operating environment

The test was carried out in No.3 shielded room.

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 table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity.

The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT was aligned and was flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface.

EUT was located 80cm from LISN. 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.

Each EUT current-carrying power lead was individually connected through a LISN to the input power source.

Photographs of the set up are shown in Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT position : Table top
EUT operation mode : Refer to SECTION 4.1

5.4 Test procedure

The AC Mains Terminal Continuous disturbance Voltage had been measured with the EUT via Laptop PC within a Shielded room. The EUT was connected to a Line Impedance Stabilization Network (LISN).

An overview sweep with peak detection has been performed.

The measurements had been performed with a quasi-peak detector and if required, an average detector.

The conducted emission measurements were made with the following detection of the test receiver.

Detection Type : Quasi-Peak/ Average
IF Bandwidth : 9kHz

5.5 Results

Summary of the test results : Pass

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SECTION 6: Radiated emission (Fundamental, spurious and outside the allocated bands)

6.1 Operating environment

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

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

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 table is made of Styrofoam and covered with polyvinyl chloride. That has very low permittivity. 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.

6.3 Test conditions

Frequency range : 9kHz - 1GHz
Test distance : 3m
EUT position : Table top
EUT operation mode : Refer to SECTION 4.1

6.4 Test procedure

The Radiated Electric Field Strength intensity has been measured with a ground plane and at a distance of 3m (Refer to Figure 1).

Frequency: From 9kHz to 30MHz at distance 3m

The EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity. The measurements were performed for vertical polarization (antenna angle: 0deg.to 360deg.) and horizontal polarization. Drawing of the antenna direction is shown in Figure 2.

Frequency: From 30MHz to 1GHz at distance 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.

	9kHz to 90kHz & 110kHz to 150kHz	90kHz to 110kHz	150kHz to 490kHz	490kHz to 30MHz	30MHz to 1GHz
Detector Type	PK/AV	QP	PK/AV	QP	QP
IF Bandwidth	200Hz	200Hz	9kHz	9kHz	120kHz
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

* FCC Part 15 Section 15.31 (f)(2) (9kHz-30MHz)

9kHz – 490kHz [Limit at 3m]= [Limit at 300m]-40log (3[m]/300[m])

490kHz – 30MHz [Limit at 3m]= [Limit at 30m]-40log (3[m]/30[m])

The carrier level and noise levels were confirmed with and without IC card, and the test was made with IC card that was worse condition.

The Contactless IC Card Reader / Writer and antenna were fixed each position by the customer's specification.

The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise. (Worst axis: Refer to the data)

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6.5 Results

Summary of the test results : Pass
Refer to APPENDIX

Figure 1. Antenna angle

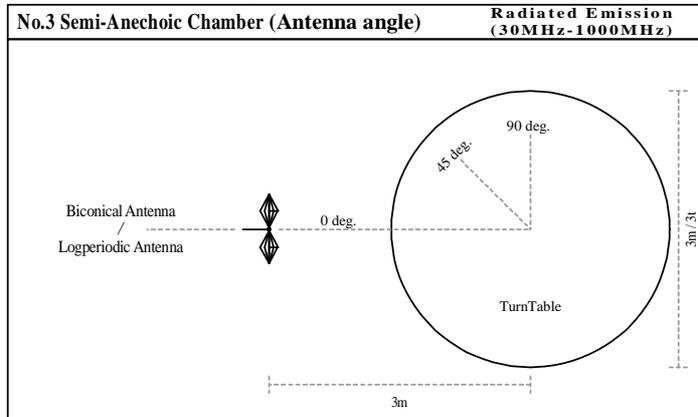
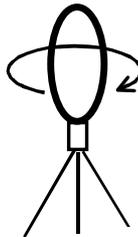
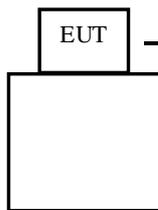


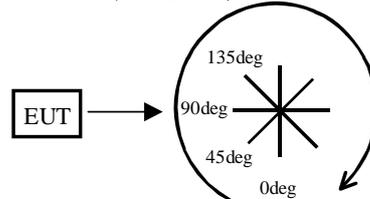
Figure 2. Direction of the Loop Antenna

Side View (Vertical)

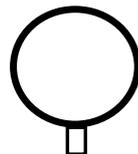
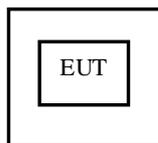


Front side: 0 deg.
Forward direction: clockwise

Side View (Horizontal)



Top View (Horizontal)



Antenna was not rotated.

SECTION 7: 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The test was measured with a spectrum analyzer using a test fixture.

Summary of the test results: Pass

SECTION 8: Frequency tolerances

Test procedure

The test was measured with a spectrum analyzer using a test fixture.

The temperature test was started after the temperature stabilization time of 30 minutes.

The test was begun from 60 deg.C and the temperature was lowered each 10 deg.C.

Summary of the test results: Pass

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Conducted emission
Radiated emission
Frequency tolerance
Bandwidth

APPENDIX 2: Test instruments

Test instruments

APPENDIX 3: Photographs of test setup

Conducted emission
Radiated emission

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DATA OF CONDUCTED EMISSION TEST

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Date : 2012/07/08

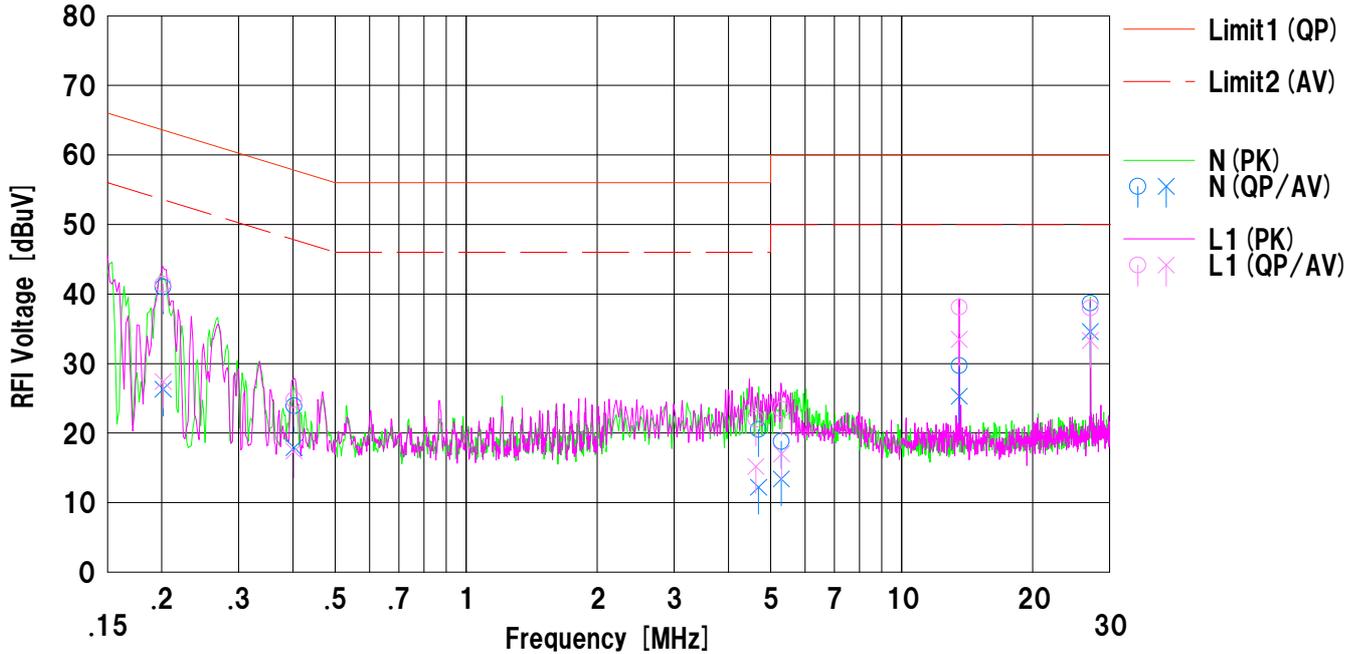
Company : Sony Corporation
Kind of EUT : Contactless IC Card Reader/Writer
Model No. : RC-S634/UA
Serial No. : 0000318

Mode : Transmitting (13.56MHz)
Report No. : 32KE0078-SH-01-A
Power : DC5.0V (USB) ,AC120V/60Hz (LaptopPC)
Temp./Humi. : 26deg.C / 66%RH

Remarks : Type A,

Limit1 : FCC 15C (15.207) QP
Limit2 : FCC 15C (15.207) AV

Engineer : Kenichi Adachi



No.	Freq. [MHz]	Reading		C.Fac [dB]	Results		Limit		Margin		Phase	Comment
		<QP> [dBuV]	<AV> [dBuV]		<QP> [dBuV]	<AV> [dBuV]	<QP> [dBuV]	<AV> [dBuV]	<QP> [dB]	<AV> [dB]		
1	0.20146	28.3	13.6	12.7	41.0	26.3	63.5	53.5	22.5	27.2	N	
2	0.40246	11.2	5.2	12.7	23.9	17.9	57.8	47.8	33.9	29.9	N	
3	4.69251	7.5	-0.8	13.0	20.5	12.2	56.0	46.0	35.5	33.8	N	
4	5.29540	5.8	0.4	13.0	18.8	13.4	60.0	50.0	41.2	36.6	N	
5	13.56000	16.4	12.0	13.3	29.7	25.3	60.0	50.0	30.3	24.7	N	
6	27.12000	24.8	20.7	13.9	38.7	34.6	60.0	50.0	21.3	15.4	N	
7	0.20142	28.7	14.7	12.7	41.4	27.4	63.5	53.5	22.1	26.1	L1	
8	0.40246	12.1	4.7	12.7	24.8	17.4	57.8	47.8	33.0	30.4	L1	
9	4.62613	9.1	2.3	12.9	22.0	15.2	56.0	46.0	34.0	30.8	L1	
10	5.29604	10.4	4.0	13.0	23.4	17.0	60.0	50.0	36.6	33.0	L1	
11	13.56000	24.8	20.2	13.3	38.1	33.5	60.0	50.0	21.9	16.5	L1	
12	27.12000	24.1	19.4	13.9	38.0	33.3	60.0	50.0	22.0	16.7	L1	

APPENDIX 1: Data of Radio tests

Data of Field Strength and Outside Filed Strength: FCC15.225(a)(b)(c)

UL Japan, Inc.
Shonan EMC Lab., No.3 Semi-Anechoic Chamber

Company:	Sony Corporation	Regulation:	FCC Part15 SupartC 15.225
Equipment:	Contactless IC Card Reader / Writer	Test Distance:	3m
Model:	RC-S634/UA	Date:	July 3, 2012
Sample No.:	0000318	Temperature:	24deg.C
Power:	DC5.0V(USB), AC120V/60Hz(Laptop PC)	Humidity:	68% RH
Mode:	Transmitting 13.56MHz	ENGINEER:	Hikaru Shirasawa

Remarks: Type A(Axis:Hor_Z/Ver_Z) , Vertical polarization (antenna angle) of the worst case: 0deg

Field strength

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]				Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.560	58.3	68.2	19.0	6.3	32.2	51.4	61.3	123.9	72.5	62.6

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]

Field strength of 13.553MHz to 13.567MHz Limit(3m) = 83.9dBuV/m + 40log 30m/3m
= 123.9dBuV/m (FCC15.225(a))

Outside Field strength

No.	FREQ [MHz]	Test Receiver Reading		Antenna Factor [dB/m]	LOSS [dB]	AMP GAIN [dB]	RESULT		LIMIT (3m) [dBuV/m]	MARGIN	
		Hor [dBuV]	Ver [dBuV]				Hor [dBuV/m]	Ver [dBuV/m]		Hor [dB]	Ver [dB]
1	13.110	30.4	30.3	19.1	6.3	32.2	23.6	23.5	69.5	45.9	46.0
2	13.135	31.0	38.5	19.0	6.3	32.2	24.1	31.6	80.5	56.4	48.9
3	13.349	37.9	47.8	19.0	6.3	32.2	31.0	40.9	80.5	49.5	39.6
4	13.410	30.9	37.2	19.0	6.3	32.2	24.0	30.3	80.5	56.5	50.2
5	13.457	33.5	42.8	19.0	6.3	32.2	26.6	35.9	90.4	63.8	54.5
6	13.553	43.0	52.7	19.0	6.3	32.2	36.1	45.8	90.4	54.3	44.6
7	13.567	44.9	54.6	19.0	6.3	32.2	38.0	47.7	90.4	52.4	42.7
8	13.664	32.8	42.0	19.0	6.3	32.2	25.9	35.1	90.4	64.5	55.3
9	13.710	30.8	36.5	19.0	6.3	32.2	23.9	29.6	80.5	56.6	50.9
10	13.773	36.9	46.3	19.0	6.3	32.2	30.0	39.4	80.5	50.5	41.1
11	13.985	30.6	35.2	19.0	6.3	32.2	23.7	28.3	80.5	56.8	52.2
12	14.010	30.5	30.5	18.9	6.3	32.2	23.5	23.5	69.5	46.0	46.0

Calculation:Result[dBuV/m]=Reading[dBuV]+Ant.Fac[dB/m]+Loss(Cable+ATT)[dB]-Gain(AMP)[dB]

Outside filed strength frequencies

- filed strength band $F_c \pm 7\text{kHz}$:13.553MHz to 13.567MHz
 - Outside filde strength $F_c \pm 150\text{kHz}$:13.410MHz to 13.710MHz
 - Outside filde strength $F_c \pm 450\text{kHz}$:13.110MHz to 14.010MHz
- $F_c = 13.56\text{MHz}$

Limits (3m)

- 13.410MHz to 13.553MHz and 13.567MHz to 13.710MHz : 50.5dBuV/m + 40log30m/3m = 90.5dBuV/m (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz : 40.5dBuV/m + 40log30m/3m = 80.5dBuV/m (15.225(c))
- Below 13.110MHz and Above 14.010MHz : 29.5dBuV/m + 40log30m/3m = 69.5dBuV/m (FCC15.225(d)and FCC15.209)

UL Japan, Inc.

Shonan EMC Lab.

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Radiated Emission

UL Japan, Inc.
Shonan EMC Lab., No.3 Semi-Anechoic Chamber

Company: Sony Corporation
Equipment: Contactless IC Card Reader / Writer
Model: RC-S634/UA
Sample No.: 0000318
Power: DC5.0V(USB), AC120V/60Hz(Laptop PC)
Mode: Transmitting 13.56MHz
EUT axis: See Remarks
Remarks: Type A

Regulation: FCC Part15 SupartC 15.225
Test Distance: 3m
Date: July 3, 2012 July 6, 2012
Temperature: 24deg.C 26deg.C
Humidity: 68% RH 61% RH
ENGINEER: Hikaru Shirasawa Hikaru Shirasawa

Polarity	Frequency [MHz]	Detector	Reading [dBuV]	Ant.Fac. [dB/m]	Loss [dB]	Gain [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Height [cm]	Angle [deg.]	Remark
Hori.	27.12	QP	41.2	19.3	6.5	32.2	34.8	69.5	34.7	100	359	X-Axis
Hori.	40.68	QP	31.9	13.9	6.6	32.2	20.2	40.0	19.8	218	133	X-Axis
Hori.	54.24	QP	44.5	9.9	6.7	32.2	28.9	40.0	11.1	387	175	X-Axis
Hori.	67.80	QP	41.3	7.0	6.5	32.2	22.6	40.0	17.4	283	358	X-Axis
Hori.	81.36	QP	42.6	6.3	7.5	32.2	24.2	40.0	15.8	224	1	X-Axis
Hori.	94.92	QP	38.7	8.7	7.4	32.2	22.6	43.5	20.9	198	147	X-Axis
Hori.	108.48	QP	44.4	11.0	7.2	32.1	30.5	43.5	13.0	301	165	X-Axis
Hori.	122.04	QP	32.8	12.9	7.2	32.1	20.8	43.5	22.7	153	181	X-Axis
Hori.	135.60	QP	39.2	14.0	7.4	32.1	28.5	43.5	15.0	236	334	X-Axis
Hori.	144.00	QP	36.3	14.5	7.7	32.1	26.4	43.5	17.1	236	181	X-Axis
Hori.	351.79	QP	41.4	15.2	8.8	31.9	33.5	46.0	12.5	100	34	X-Axis
Hori.	575.69	QP	37.6	18.7	9.7	32.0	34.0	46.0	12.0	182	26	X-Axis
Hori.	638.60	QP	38.8	19.6	9.9	32.0	36.3	46.0	9.7	155	97	X-Axis
Vert.	27.12	QP	53.7	19.3	6.5	32.2	47.3	69.5	22.2	100	359	X-Axis(Antenna:90deg.+)
Vert.	40.68	QP	39.7	13.9	6.6	32.2	28.0	40.0	12.0	100	3	Z-Axis
Vert.	54.24	QP	52.3	9.9	6.7	32.2	36.7	40.0	3.3	100	304	Z-Axis
Vert.	67.80	QP	40.1	7.0	6.5	32.2	21.4	40.0	18.6	100	354	Z-Axis
Vert.	81.36	QP	40.2	6.3	7.5	32.2	21.8	40.0	18.2	100	356	Z-Axis
Vert.	94.92	QP	38.4	8.7	7.4	32.2	22.3	43.5	21.2	100	0	Z-Axis
Vert.	108.48	QP	39.5	11.0	7.2	32.1	25.6	43.5	17.9	100	15	Z-Axis
Vert.	122.04	QP	29.9	12.9	7.2	32.1	17.9	43.5	25.6	100	174	Z-Axis
Vert.	135.60	QP	33.3	14.0	7.4	32.1	22.6	43.5	20.9	100	263	Z-Axis
Vert.	638.60	QP	36.8	19.6	9.9	32.0	34.3	46.0	11.7	100	170	Z-Axis

Result = Reading + Ant Factor + Loss (Cable+Attenuator) - Gain(Amprifier)

*Other frequency noises omitted in this report were not seen or have enough margin (more than 20dB)

Data of Frequency Tolerance: FCC 15.225(e) (1/3)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company: Sony Corporation
Equipment: Contactless IC Card Reader / Writer
Model: RC-S634/UA
Sample No.: 0000318
Power: DC5.0V(USB), AC120V/60Hz(Laptop PC)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SupartC 15.225
Date: June 28, 2012
Temperature: 25deg.C
Humidity: 49%RH
ENGINEER: Shinichi Takano

Temperature Variation: 60deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560155	0.000155	0.00114	0.01
after 2minutes	13.56	13.560149	0.000149	0.00110	0.01
after 5minutes	13.56	13.560150	0.000150	0.00111	0.01
after 10minutes	13.56	13.560150	0.000150	0.00111	0.01

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560180	0.000180	0.00133	0.01
after 2minutes	13.56	13.560158	0.000158	0.00117	0.01
after 5minutes	13.56	13.560156	0.000156	0.00115	0.01
after 10minutes	13.56	13.560156	0.000156	0.00115	0.01

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560216	0.000216	0.00159	0.01
after 2minutes	13.56	13.560187	0.000187	0.00138	0.01
after 5minutes	13.56	13.560186	0.000186	0.00137	0.01
after 10minutes	13.56	13.560185	0.000185	0.00136	0.01

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560246	0.000246	0.00181	0.01
after 2minutes	13.56	13.560224	0.000224	0.00165	0.01
after 5minutes	13.56	13.560222	0.000222	0.00164	0.01
after 10minutes	13.56	13.560222	0.000222	0.00164	0.01

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560260	0.000260	0.00192	0.01
after 2minutes	13.56	13.560251	0.000251	0.00185	0.01
after 5minutes	13.56	13.560250	0.000250	0.00184	0.01
after 10minutes	13.56	13.560251	0.000251	0.00185	0.01

Data of Frequency Tolerance: FCC 15.225(e) (2/3)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company: Sony Corporation
Equipment: Contactless IC Card Reader / Writer
Model: RC-S634/UA
Sample No.: 0000318
Power: DC5.0V(USB), AC120V/60Hz(Laptop PC)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SupartC 15.225
Date: June 28, 2012
Temperature: 25deg.C
Humidity: 49%RH
ENGINEER: Shinichi Takano

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560265	0.000265	0.00195	0.01
after 2minutes	13.56	13.560262	0.000262	0.00193	0.01
after 5minutes	13.56	13.560262	0.000262	0.00193	0.01
after 10minutes	13.56	13.560262	0.000262	0.00193	0.01

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560272	0.000272	0.00201	0.01
after 2minutes	13.56	13.560268	0.000268	0.00198	0.01
after 5minutes	13.56	13.560268	0.000268	0.00198	0.01
after 10minutes	13.56	13.560268	0.000268	0.00198	0.01

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560270	0.000270	0.00199	0.01
after 2minutes	13.56	13.560273	0.000273	0.00201	0.01
after 5minutes	13.56	13.560274	0.000274	0.00202	0.01
after 10minutes	13.56	13.560273	0.000273	0.00201	0.01

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560242	0.000242	0.00178	0.01
after 2minutes	13.56	13.560262	0.000262	0.00193	0.01
after 5minutes	13.56	13.560262	0.000262	0.00193	0.01
after 10minutes	13.56	13.560261	0.000261	0.00192	0.01

Temperature Variation: -30deg.C

Test Conditions	Original Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560178	0.000178	0.00131	0.01
after 2minutes	13.56	13.560216	0.000216	0.00159	0.01
after 5minutes	13.56	13.560218	0.000218	0.00161	0.01
after 10minutes	13.56	13.560217	0.000217	0.00160	0.01

Data of Frequency Tolerance: FCC 15.225(e) (3/3)

UL Japan, Inc.
Shonan EMC Lab. No.5 Shielded room

Company: Sony Corporation
Equipment: Contactless IC Card Reader / Writer
Model: RC-S634/UA
Sample No.: 0000318
Power: DC5.0V(USB), AC120V/60Hz(Laptop PC)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 SupartC 15.225
Date: June 28, 2012
Temperature: 25deg.C
Humidity: 49%RH
ENGINEER: Shinichi Takano

Input Voltage:DC4.25V (85%)

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560259	0.000259	0.00191	0.01
after 2minutes	13.56	13.560251	0.000251	0.00185	0.01
after 5minutes	13.56	13.560250	0.000250	0.00184	0.01
after 10minutes	13.56	13.560251	0.000251	0.00185	0.01

Input Voltage:DC5.75V (115%)

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency Tolerance (%)	Limit (%)
startup	13.56	13.560262	0.000262	0.00193	0.01
after 2minutes	13.56	13.560253	0.000253	0.00187	0.01
after 5minutes	13.56	13.560251	0.000251	0.00185	0.01
after 10minutes	13.56	13.560250	0.000250	0.00184	0.01

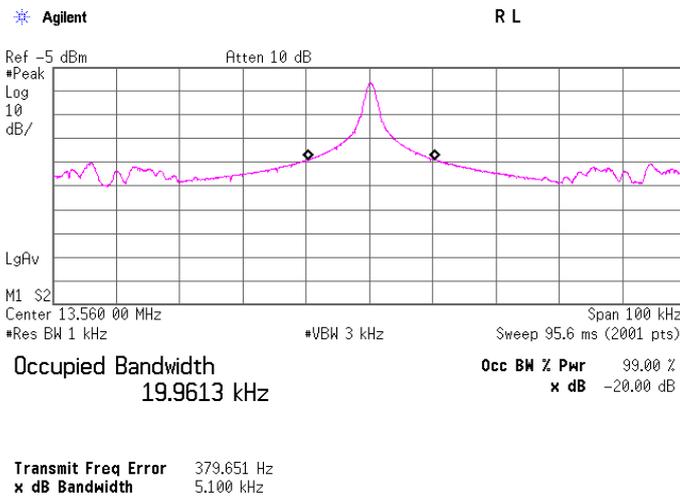
20dB bandwidth & 99% Occupied bandwidth: FCC 15.215 / RSS-Gen

UL Japan, Inc.
Shonan EMC Lab. No.3 Shielded room

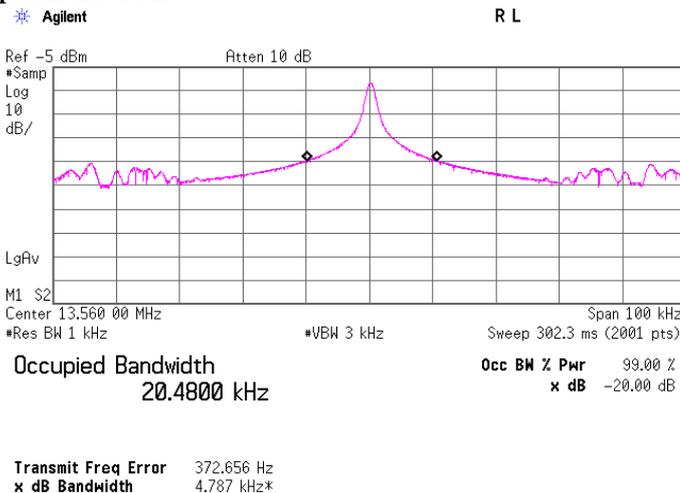
Company: Sony Corporation
Equipment: Contactless IC Card Reader / Writer
Model: RC-S634/UA
Sample No.: 0000318
Power: DC5.0V(USB), AC120V/60Hz(Laptop PC)
Mode: Transmitting 13.56MHz

Regulation: FCC Part15 Subpart C 15.215
Test Distance: -
Date: June 7, 2012
Temperature: 25deg.C
Humidity: 57%RH
ENGINEER: Shinichi Takano

20dB Bandwidth: 5.100 kHz



99% Occupied Bandwidth: 20.480 kHz



Test Report No : 32KE0078-SH-01-A

APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SFC-01	Microwave Counter	Agilent	53151A	US40511493	FT	2012/03/21 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	FT	2012/04/04 * 12
SOS-09	Humidity Indicator	A&D	AD-5681	4061484	FT	2012/03/26 * 12
SSP-01	Search Probe	Nisshin Electric	NSP-01	-	FT,BW	-
SAF-03	Pre Amplifier	SONOMA	310N	290213	RE	2012/02/10 * 12
SAT6-03	Attenuator	JFW	50HF-006N	-	RE	2012/02/10 * 12
SBA-03	Biconical Antenna	Schwarzbeck	BBA9106	91032666	RE	2011/10/23 * 12
SCC-C1/C2/C3/C4/C5/C10/SRSE-03	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-271 (RF Selector)	RE	2012/04/10 * 12
SLA-03	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A 0901	RE	2011/10/23 * 12
SOS-05	Humidity Indicator	A&D	AD-5681	4062518	RE	2012/02/06 * 12
STR-06	Test Receiver	Rohde & Schwarz	ESCI	101259	RE, CE	2012/02/07 * 12
SJM-10	Measure	PROMART	SEN1935	-	RE, CE	-
SAEC-03(NSA)	Semi-Anechoic Chamber	TDK	SAEC-03(NSA)	3	RE	2011/09/23 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV(RE,CE, RFLMF)	-	RE, CE	-
SLP-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100218	RE	2011/10/19 * 12
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	BW	2012/03/16 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	BW, CE	2012/03/26 * 12
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/N S4906	-/0901-271 (RF Selector)	CE	2012/04/10 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2012/02/23 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2012/02/17 * 12

The expiration date of the calibration is the end of the expired month .
As for some calibrations performed after the tested dates , those test equipment have been controlled by means of an unbroken chains of calibrations .

All equipment is calibrated with valid calibrations . Each measurement data is traceable to the national or international standards .

Test Item :

- CE: Conducted emission ,
- RE: Radiated emission ,
- FT: Frequency tolerance ,
- BW:-20dB Bandwidth or 99% Occupied Bandwidth