



RADIO TEST REPORT

Test Report No.: 28GE0098-YK-01-C-R1

Applicant : Sony Corporation
Type of Equipment : Contactless IC Card Reader/Writer
Model No. : RC-S493B
FCC ID : AK8RCS493B
Test regulation : FCC Part15 Subpart C: 2008
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.
5. Original test report number of this report is 28GE0098-YK-01-C.

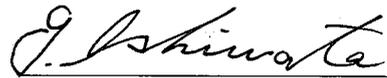
Date of test: April 2 and 7, 2008

Tested by:



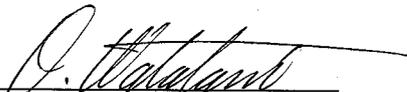
Akira Sato

&



Go Ishiwata

Approved by:



Osamu Watatani
Manager of Yamakita EMC Lab.

UL Japan, Inc.

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1 Applicant information

Company Name : Sony Corporation
Address : 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan
Telephone Number : +81-263-72-5696
Facsimile Number : +81-263-72-9755
Contact Person : Michio Kobayashi

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

2.1 Identification of E.U.T.

Type of Equipment : Contactless IC Card Reader/Writer
Model No. : RC-S493B
Serial No. : 08031005
Rating : DC5V, DC12V
Country of Mass-production : Japan
Receipt Date of Sample : April 2, 2008
Condition of EUT : Production 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: RC-S493B (referred to as the EUT in this report) is a Contactless IC Card Reader/Writer.

Equipment type : Transceiver
Frequency of operation : 13.56MHz
Clock frequency : 13.56MHz
Type of modulation : ASK
Antenna type : Loop antenna
Antenna connector type : Crimp style
ITU code : K1D
Operation temperature range : -10 ~ +40 deg.C.

*FCC Part15.31 (e)

The equipment provides the RFID module with stable power supply, therefore, the equipment complies power supply regulation.

*FCC Part15.203

It is impossible for end users to replace the antenna, because the antenna has a unique coupling connector. 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: 2008, final revised on March 24, 2008
 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 15.215: Additional provisions to the general radiated emission limitations
 Section 15.225: Operation within the band 13.110-14.010MHz

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	26.0dB (0.1500MHz, QP)	Complied
Electric Field Strength of Fundamental Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.225 (a)	Radiated	N/A	63.2dB (Horizontal)	Complied
Electric Field Strength of Outside the Allocated bands	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC 15.225 (b) (c)	Radiated	N/A	43.00dB (13.553MHz, Horizontal)	Complied
Electric Field Strength of Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC15.209, FCC 15.225 (d)	Radiated	N/A	1.5dB (40.70MHz, Vertical)	Complied
20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC15.215(c)	Radiated	N/A	-	Complied
Frequency Tolerance	ANSI C63.4:2003 13. Measurement of intentional radiators	FCC15.225 (e)	Radiated	N/A	-	Complied

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

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	Radiated	-	Complied

* 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.

	No.1 open site (±)	No.2 open site (±)	No.1 anechoic chamber (±)
Conducted emission			
150kHz-30MHz	2.8 dB	2.8 dB	2.8 dB
Radiated emission (3m)			
<30MHz	2.3 dB	2.3 dB	2.2 dB
30-300MHz	4.5 dB	4.4 dB	4.5 dB
300-1000MHz	4.3 dB	4.3 dB	4.3 dB

Frequency tolerance	(±)
	0.000014MHz

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.

3.5 Test location

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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 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 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		

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

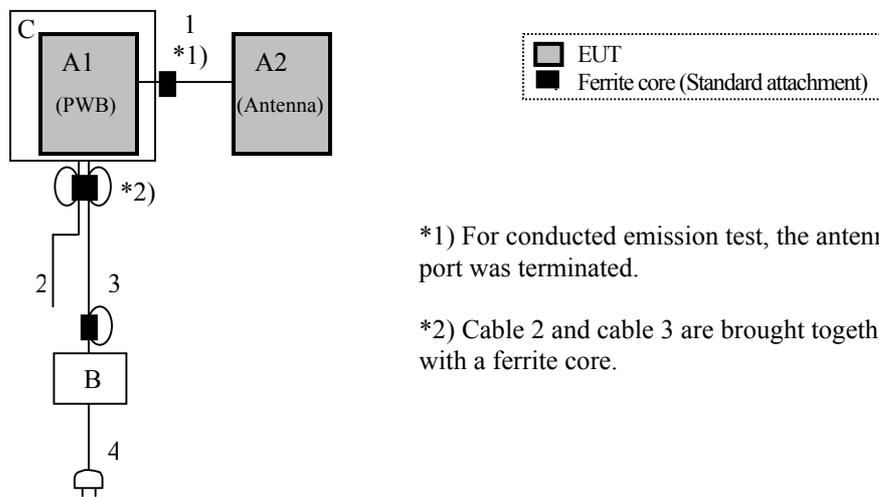
4.1 Operation mode

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

Operation: Transmitting (13.56MHz)
 ASK continuous transmitting

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

4.2 Configuration of tested system



*1) For conducted emission test, the antenna port was terminated.

*2) Cable 2 and cable 3 are brought together with a ferrite core.

AC120V/60Hz

* 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-S493B	08031005	SONY	EUT
B	Regulated DC Power Supply	718-5D	2967050	Leader Electronics	-
C	Interface board	-	-	SONY	-

List of cables used

No.	Name	Length (m)	Shield		Remark
			Connector	Cable	
1	Antenna cable	0.1	Unshielded	Unshielded	-
2	Serial cable	1.5	Unshielded	Unshielded	* Connected to host controller
3	DC cable	1.5	Unshielded	Unshielded	-
4	AC cable	1.8	Unshielded	Unshielded	-

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5 Conducted emissions

5.1 Operating environment

The test was carried out in No.2 shielded room.

5.2 Test configuration

EUT was placed on a wooden platform of nominal size, 1m by 1.8m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals 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 and excess AC cable was bundled in center. A drawing of the set up is shown in the photos of Appendix 1.

5.3 Test conditions

Frequency range : 0.15 - 30MHz
EUT operation mode : Transmitting

5.4 Test procedure

The EUT was connected to a LISN (AMN). An overview sweep with peak detection has been performed. The Conducted emission measurements were made with the following detector function of the test receiver.

Detector: QP/AV
IF Bandwidth: 10kHz

5.5 Results

Summary of the test results : Pass

Date : April 2, 2008 Test engineer : Akira Sato

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6 Radiated emissions (Fundamental, Spurious and Outside the Allocated bands)

6.1 Operating environment

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

6.2 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.

6.3 Test conditions

Frequency range : 9kHz - 1GHz
 Test distance : 3m
 EUT operation mode : Transmitting

6.4 Test procedure

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

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 each antenna angle 0deg., 45deg. and 90deg.

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	10kHz	9kHz	120kHz
Measuring antenna	Loop antenna				Biconical (30-299.99MHz) Logperiodic (300MHz-1GHz)

* 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 Module and the antenna were 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 13.
 With the position, the noise levels of all the frequencies were measured.

Equipment	Worst position	
Module	Horizontal: X	Vertical: Y
Antenna	Horizontal: Z	Vertical: Z

6.6 Results

Summary of the test results : Pass *No noise was detected above the 5th order harmonics.
 Date : April 2, 2008 Test engineer : Akira Sato

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7 20dB bandwidth & Occupied bandwidth (99%)

Test procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.

Summary of the test results: Pass

Date : April 2, 2008 Test engineer : Akira Sato

8 Frequency tolerance

Test procedure

The measurement was performed in the antenna height to gain the maximum of Electric field strength.
The temperature test was started after the temperature stabilization time of 30 minutes.

Summary of the test results: Pass

Date : April 7, 2008 Test engineer : Go Ishiwata

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APPENDIX 1: Photographs of test setup

Page 11	:	Conducted emission
Page 12	:	Radiated emission
Page 13	:	Pre-check of the worst position

APPENDIX 2: Test data

Page 14 - 16	:	Conducted emission
Page 17 - 19	:	Radiated emission
17	:	Fundamental and Outside the Allocated bands
18-19	:	Spurious emission
Page 20	:	Bandwidth
Page 21 - 25	:	Frequency tolerance

APPENDIX 3: Test instruments

Page 26	:	Test instruments
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DATA OF CONDUCTION TEST

UL Japan, Inc.
YAMAKITA No.2 SHIELD ROOM
Report No. : 28GE0098-YK-01-C-R1

Applicant : Sony Corporation
 Kind of Equipment : Contactless IC Card Reader/Writer
 Model No. : RC-S493B
 Serial No. : 08031005
 Power : DC5V&DC12V, Test Line:AC120V/60Hz (DC Power Supply)
 Mode : Transmitting (13.56MHz)
 Remarks :
 Date : 4/2/2008
 Phase : Single Phase
 Temperature : 25 °C
 Humidity : 32 %
 Regulation : FCC Part15C § 15.207. (CISPR Pub.22)

Engineer : Akira Sato

No.	FREQ. [MHz]	READING(N)		READING(L1)		LISN FACTOR [dB]	CABLE LOSS [dB]	ATTEN. [dB]	RESULT		LIMITS		MARGIN	
		QP [dB μ V]	AV	QP [dB μ V]	AV				QP [dB]	AV [dB μ V]	QP [dB μ V]	AV [dB μ V]	QP [dB]	AV [dB]
1.	0.1500	39.8	-	39.5	-	0.1	0.1	0.0	40.0	-	66.0	56.0	26.0	-
2.	0.1998	32.8	-	32.4	-	0.1	0.1	0.0	33.0	-	63.6	53.6	30.6	-
3.	0.2500	27.9	-	27.7	-	0.1	0.1	0.0	28.1	-	61.8	51.8	33.7	-
4.	0.3871	21.8	-	21.3	-	0.1	0.1	0.0	22.0	-	58.1	48.1	36.1	-
5.	13.5596	29.8	-	28.4	-	0.6	0.6	0.0	31.0	-	60.0	50.0	29.0	-
6.	27.1192	21.4	-	21.3	-	0.8	0.8	0.0	23.0	-	60.0	50.0	37.0	-

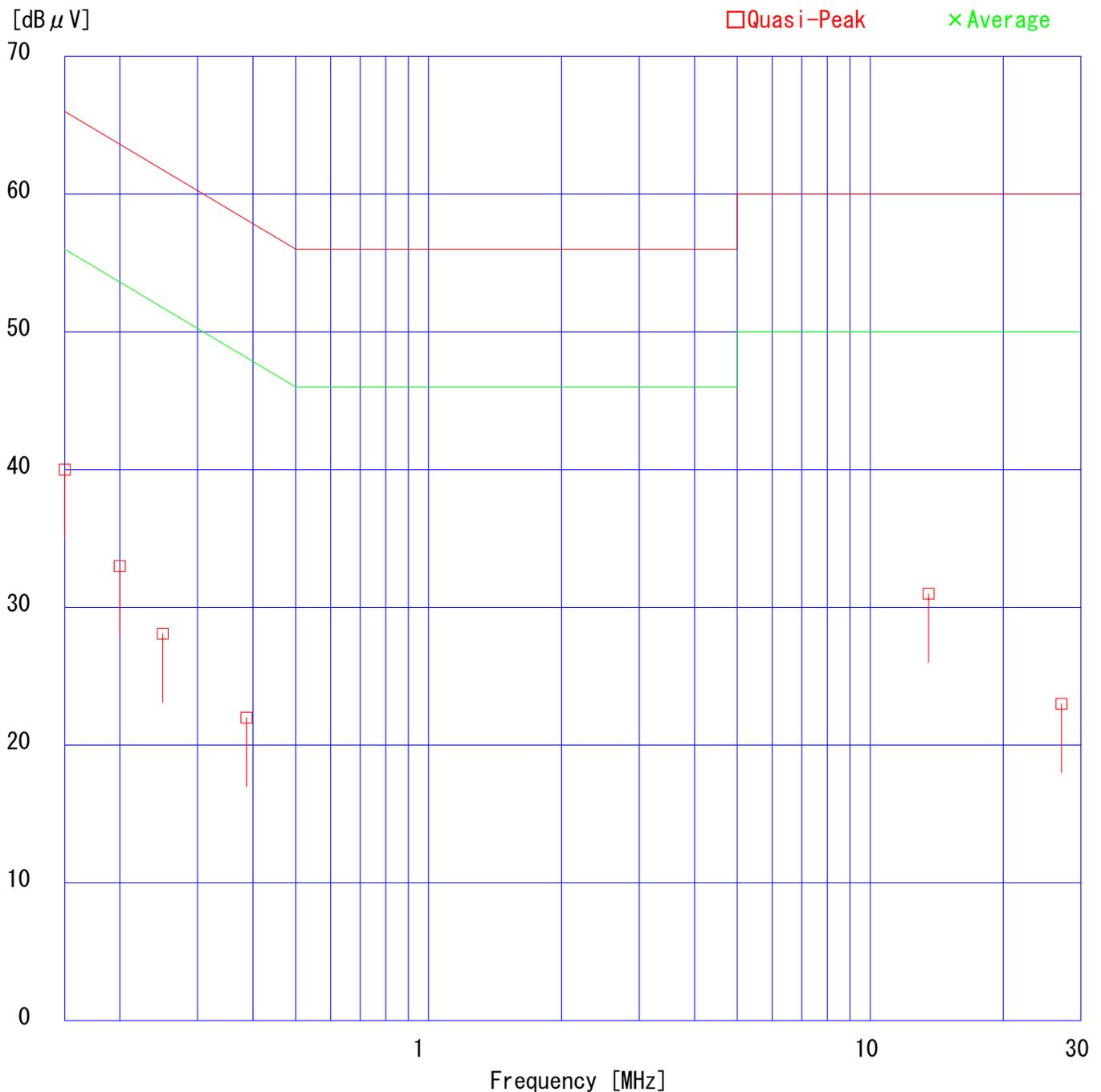
CALCULATION: READING + LISN FACTOR + CABLE LOSS + ATTEN.

■ LISN :KLS-01 (NSLK8126) ■ COAXIAL CABLE:KCC-33/34
 ■ EMI RECEIVER:KTR-03 (ESHS10)

DATA OF CONDUCTION TEST

UL Japan, Inc.
YAMAKITA No.2 SHIELD ROOM
Report No. : 28GE0098-YK-01-C-R1

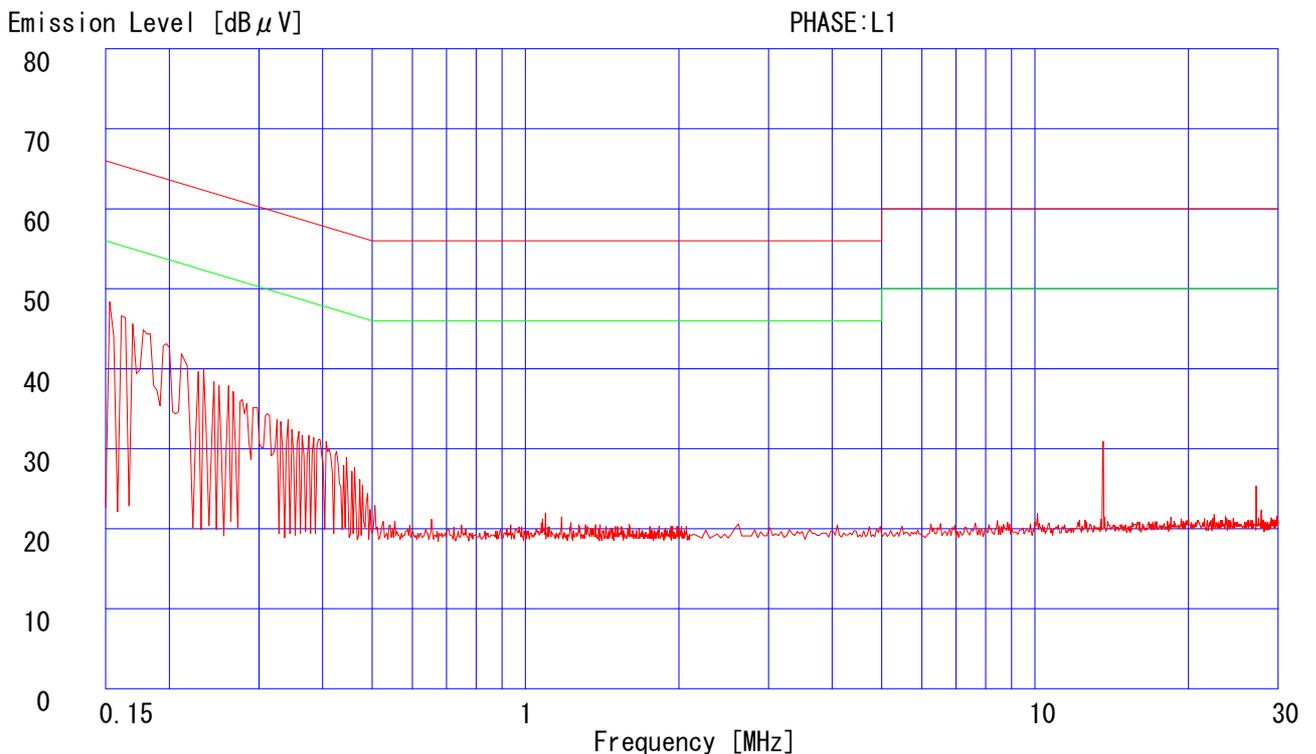
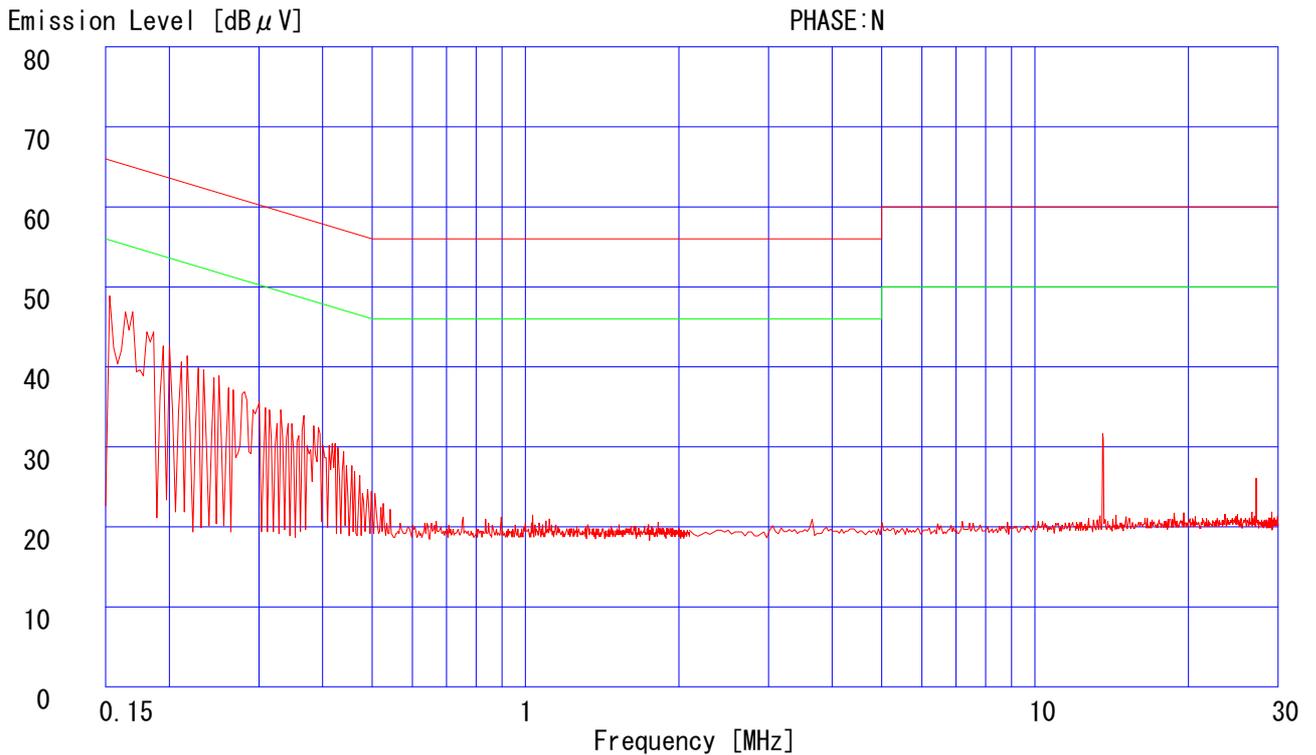
Applicant : Sony Corporation
Kind of Equipment : Contactless IC Card Reader/Writer
Model No. : RC-S493B
Serial No. : 08031005
Power : DC5V&DC12V, Test Line:AC120V/60Hz (DC Power Supply)
Mode : Transmitting (13.56MHz)
Remarks :
Date : 4/2/2008
Phase : Single Phase
Temperature : 25 °C Engineer : Akira Sato
Humidity : 32 %
Regulation : FCC Part15C § 15.207. (CISPR Pub.22)



DATA OF CONDUCTION TEST CHART

UL Japan, Inc.
YAMAKITA No.2 SHIELD ROOM
Report No. : 28GE0098-YK-01-C-R1

Applicant : Sony Corporation
Kind of Equipment : Contactless IC Card Reader/Writer
Model No. : RC-S493B
Serial No. : 08031005
Power : DC5V&DC12V, Test Line:AC120V/60Hz (DC Power Supply)
Mode : Transmitting (13.56MHz)
Remarks :
Date : 4/2/2008
Phase : Single Phase
Temperature : 25 °C
Humidity : 32 %
Regulation 1 : FCC Part15C § 15.207. (CISPR Pub.22)
Regulation 2 : None
Engineer : Akira Sato



Data of Field Strength and Outside Filed Strength: FCC15.225

UL Japan, Inc.
YAMAKITA No1 Anechoic Chamber

Company : Sony Corporation	Report No. : 28GE0098-YK-01-C-R1
Equipment : Contactless IC Card Reader/Writer	Regulation : FCC Part15 SupartC 15.225
Model : RC-S493B	Test Distance : 3m
Sample No. : 08031005	Date : 2008/04/02
Power : DC5V&DC12V (DC Power Supply: AC120V/60Hz)	Temperature : 21deg.C
Mode : Transmitting (13.56MHz)	Humidity : 31%

ENGINEER : Akira Sato

Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE 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	63.4	59.7	19.2	6.0	0.6	28.4	60.8	57.1	124.0	63.2	66.9

Field strength of 13.553MHz to 13.567MHz Limit(3m) = 84dBuV/m + 40log 30m/3m
= 124dBuV/m (FCC15.225(a))

Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT Factor [dB]	ATTEN [dB]	CABLE 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	26.0	25.9	19.2	6.0	0.6	28.4	23.4	23.3	69.5	46.10	46.20
2	13.410	34.0	31.3	19.2	6.0	0.6	28.4	31.4	28.7	80.5	49.10	51.80
3	13.553	50.1	46.4	19.2	6.0	0.6	28.4	47.5	43.8	90.5	43.00	46.70
4	13.567	46.2	42.5	19.2	6.0	0.6	28.4	43.6	39.9	90.5	46.90	50.60
5	13.710	35.7	33.3	19.2	6.0	0.6	28.4	33.1	30.7	80.5	47.40	49.80
6	14.010	26.1	26.0	19.2	6.0	0.6	28.5	23.4	23.3	69.5	46.10	46.20

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 : $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$ (FCC15.225(b))
- 13.110MHz to 14.010MHz and 13.710MHz to 14.010MHz : $40.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 80.5\text{dBuV/m}$ (15.225(c))
- Below 13.110MHz and Above 14.010MHz : $29.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 69.5\text{dBuV/m}$ (FCC15.225(d)and FCC15.209)

Antenna: KLP-01(HFH2-Z2) 0.009-30MHz

KCC-A2/A3(RE)

AMP: KAF-05(8447D)

Receiver: KTR-03

DATA OF RADIATION TEST

UL Japan, Inc.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 28GE0098-YK-01-C-R1

Applicant : Sony Corporation
Kind of Equipment : Contactless IC Card Reader/Writer
Model No. : RC-S493B
Serial No. : 08031005
Power : DC5V&DC12V (DC Power Supply:AC120V/60Hz)
Mode : Transmitting (13.56MHz)
Remarks : ANT:HOR, VER:Z, Module:HOR:X, VER:Z
Date : 4/2/2008
Test Distance : 3 m
Temperature : 21 °C Engineer : Akira Sato
Humidity : 31 %
Regulation : FCC Part15C § 15.209 9KHz-30MHz (3m)

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.	27.12	BB	39.5	43.3	20.4	28.5	0.8	6.0	38.2	42.0	69.5	31.3	27.5

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

■ ANTENNA: KLP-01 (HFH2-Z2) 9kHz-30MHz

■ CABLE: KCC-A2/A3/ ■ PREAMP: KAF-05 (8447D) ■ EMI RECEIVER: KTR-03 (ESHS10)

DATA OF RADIATION TEST

UL Japan, Inc.
YAMAKITA No.1 ANECHOIC CHAMBER
Report No. : 28GE0098-YK-01-C-R1

Applicant : Sony Corporation
 Kind of Equipment : Contactless IC Card Reader/Writer
 Model No. : RC-S493B
 Serial No. : 08031005
 Power : DC5V&DC12V (DC Power Supply:AC120V/60Hz)
 Mode : Transmitting (13.56MHz)
 Remarks : ANT:HOR:Z, VER:Y Module:HOR:X, VER:Z
 Date : 4/2/2008
 Test Distance : 3 m
 Temperature : 21 °C Engineer : Akira Sato
 Humidity : 31 %
 Regulation : FCC Part15C § 15.209

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					HOR [dB μ V/m]	VER		HOR [dB]	VER
1.	40.70	BB	38.8	46.7	13.5	28.8	1.1	6.0	30.6	38.5	40.0	9.4	1.5
2.	54.25	BB	37.2	46.1	9.3	28.6	1.3	6.0	25.2	34.1	40.0	14.8	5.9
3.	67.82	BB	32.6	49.6	6.7	28.5	1.4	6.0	18.2	35.2	40.0	21.8	4.8
4.	81.39	BB	32.6	44.2	6.6	28.6	1.6	6.0	18.2	29.8	40.0	21.8	10.2
5.	94.94	BB	26.5	36.5	9.2	28.6	1.7	6.0	14.8	24.8	43.5	28.7	18.7
6.	108.49	BB	29.0	30.2	11.3	28.4	1.9	6.0	19.8	21.0	43.5	23.7	22.5
7.	122.05	BB	29.3	27.8	13.0	28.4	2.0	6.0	21.9	20.4	43.5	21.6	23.1
8.	135.61	BB	24.9	31.4	13.9	28.4	2.1	6.0	18.5	25.0	43.5	25.0	18.5
9.	149.17	BB	31.1	27.2	14.7	28.3	2.2	6.0	25.7	21.8	43.5	17.8	21.7
10.	162.73	BB	25.5	25.0	15.4	28.2	2.3	6.0	21.0	20.5	43.5	22.5	23.0
11.	176.29	BB	31.2	27.8	16.1	28.1	2.4	6.0	27.6	24.2	43.5	15.9	19.3
12.	189.86	BB	23.3	29.8	16.5	28.1	2.5	6.0	20.2	26.7	43.5	23.3	16.8
13.	203.43	BB	30.0	32.3	16.9	27.9	2.6	6.0	27.6	29.9	43.5	15.9	13.6
14.	311.90	BB	33.3	38.3	14.9	27.5	3.4	6.0	30.1	35.1	46.0	15.9	10.9

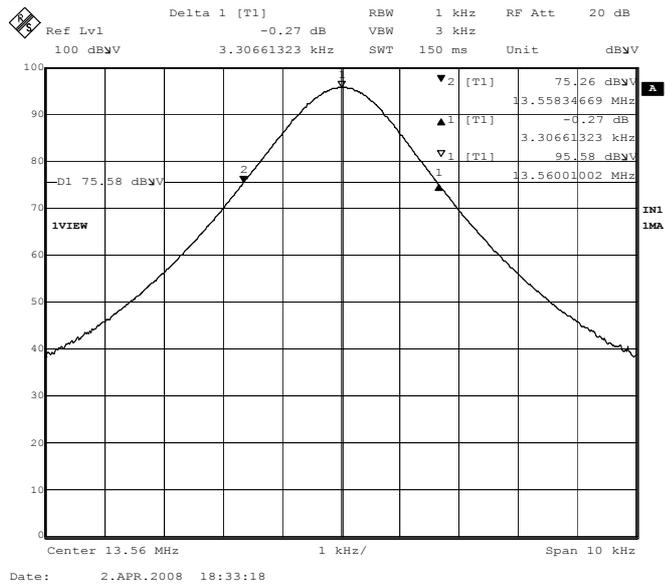
CALCULATION: READING + ANT. FACTOR + CABLE LOSS - AMP. GAIN + ATTEN.

■ ANTENNA : KBA-03 (BBA9106) 30-299. 99MHz/KLA-03 (USLP9143) 300-1000MHz
 ■ CABLE : KCC-A2/A3/ ■ PREAMP : KAF-05 (8447D) ■ EMI RECEIVER : KTR-04 (ESVS10)

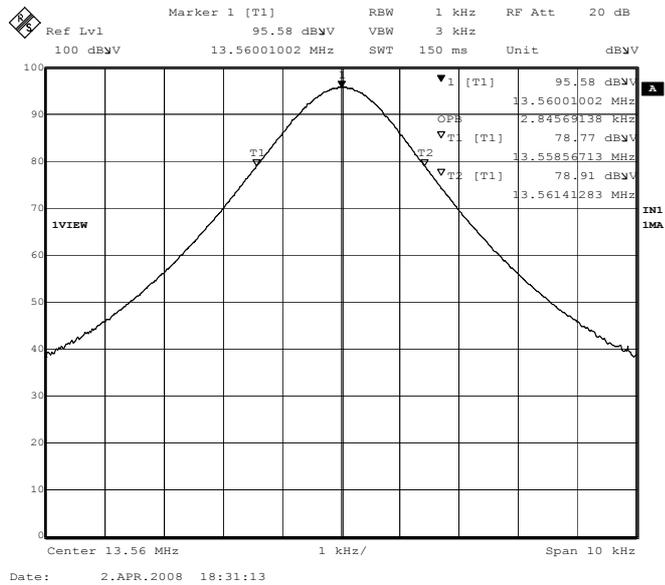
Bandwidth: FCC 15.215(c)

COMPANY	: Sony Corporation	UL Japan, Inc. Yamakita No1 Anechoic chamber	
Equipment	: Contactless IC Card Reader/Writer	REPORT No.	: 28GE0098-YK-01-C-R1
MODEL NUMBER	: RC-S463B	REGULATION	: FCC Part15SubpartC 215(c)
SERIAL NUMBER	: 08031005	DATE	: 2008/04/02
POWER	: DC5V&DC12V(PC: AC120V/60Hz)	TEMP./HUMI	: 21°C/31%
		TEST MODE	: Transmitting
		ENGINEER	: Akira Sato

20dB Bandwidth: 3.306kHz



OBW(99%): 2.845kHz



Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
YAMAKITA No.4 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S493B
Sample No. : 08031005
Power : DC12V
Mode : Transmitting (13.56MHz)

Report No. : 28GE0098-YK-01-C-R1
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2008/4/7
Temperature : 22deg.C
Humidity : 46%

ENGINEER : Go Ishiwata

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560150	0.000150	0.00111	0.01
after 2minutes	13.56	13.560180	0.000180	0.00133	0.01
after 5minutes	13.56	13.560185	0.000185	0.00136	0.01
after 10minutes	13.56	13.560185	0.000185	0.00136	0.01

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560183	0.000183	0.00135	0.01
after 2minutes	13.56	13.560188	0.000188	0.00139	0.01
after 5minutes	13.56	13.560185	0.000185	0.00136	0.01
after 10minutes	13.56	13.560184	0.000184	0.00136	0.01

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560186	0.000186	0.00137	0.01
after 2minutes	13.56	13.560170	0.000170	0.00125	0.01
after 5minutes	13.56	13.560163	0.000163	0.00120	0.01
after 10minutes	13.56	13.56016	0.000160	0.00118	0.01

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560165	0.000165	0.00122	0.01
after 2minutes	13.56	13.560135	0.000135	0.00100	0.01
after 5minutes	13.56	13.560123	0.000123	0.00091	0.01
after 10minutes	13.56	13.560118	0.000118	0.00087	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
YAMAKITA No.4 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S493B
Sample No. : 08031005
Power : DC12V
Mode : Transmitting (13.56MHz)

Report No. : 28GE0098-YK-01-C-R1
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2008/4/7
Temperature : 22deg.C
Humidity : 46%

ENGINEER : Go Ishiwata

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560128	0.000128	0.00094	0.01
after 2minutes	13.56	13.560088	0.000088	0.00065	0.01
after 5minutes	13.56	13.560076	0.000076	0.00056	0.01
after 10minutes	13.56	13.56007	0.000070	0.00052	0.01

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560080	0.000080	0.00059	0.01
after 2minutes	13.56	13.560038	0.000038	0.00028	0.01
after 5minutes	13.56	13.560026	0.000026	0.00019	0.01
after 10minutes	13.56	13.560021	0.000021	0.00015	0.01

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560033	0.000033	0.00024	0.01
after 2minutes	13.56	13.559996	-0.000004	-0.00003	0.01
after 5minutes	13.56	13.559985	-0.000015	-0.00011	0.01
after 10minutes	13.56	13.559979	-0.000021	-0.00015	0.01

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559983	-0.000017	-0.00013	0.01
after 2minutes	13.56	13.559960	-0.000040	-0.00029	0.01
after 5minutes	13.56	13.559954	-0.000046	-0.00034	0.01
after 10minutes	13.56	13.559953	-0.000047	-0.00035	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
YAMAKITA No.4 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S493B
Sample No. : 08031005
Power : DC12V
Mode : Transmitting (13.56MHz)

Report No. : 28GE0098-YK-01-C-R1
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2008/4/7
Temperature : 22deg.C
Humidity : 46%

ENGINEER : Go Ishiwata

Input Voltage:DC11.5V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560130	0.000130	0.00096	0.01
after 2minutes	13.56	13.560093	0.000093	0.00069	0.01
after 5minutes	13.56	13.560079	0.000079	0.00058	0.01
after 10minutes	13.56	13.560074	0.000074	0.00055	0.01

Input Voltage:DC13.8V(115%)

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560112	0.000112	0.00083	0.01
after 2minutes	13.56	13.560080	0.000080	0.00059	0.01
after 5minutes	13.56	13.560070	0.000070	0.00052	0.01
after 10minutes	13.56	13.560067	0.000067	0.00049	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
YAMAKITA No.4 Shield room

Company : Sony Corporation	Report No. : 28GE0098-YK-01-C-R1
Equipment : Contactless IC Card Reader/Writer	Regulation : FCC Part15 SupartC 15.225 (e)
Model : RC-S493B	
Sample No. : 08031005	Date : 2008/4/7
Power : DC12V, DC5V	Temperature : 22deg.C
Mode : Transmitting (13.56MHz)	Humidity : 46%

ENGINEER : Go Ishiwata

Input Voltage:DC12V, DC4.75V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency toerance (%)	Limit (%)
startup	13.56	13.560027	0.000027	0.00020	0.01
after 2minutes	13.56	13.560021	0.000021	0.00015	0.01
after 5minutes	13.56	13.560023	0.000023	0.00017	0.01
after 10minutes	13.56	13.560021	0.000021	0.00015	0.01

Input Voltage:DC12V, DC5.25V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency toerance (%)	Limit (%)
startup	13.56	13.560050	0.000050	0.00037	0.01
after 2minutes	13.56	13.560035	0.000035	0.00026	0.01
after 5minutes	13.56	13.560030	0.000030	0.00022	0.01
after 10minutes	13.56	13.560030	0.000030	0.00022	0.01

Input Voltage:DC11.5V, DC5V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency toerance (%)	Limit (%)
startup	13.56	13.560034	0.000034	0.00025	0.01
after 2minutes	13.56	13.560020	0.000020	0.00015	0.01
after 5minutes	13.56	13.560017	0.000017	0.00013	0.01
after 10minutes	13.56	13.560016	0.000016	0.00012	0.01

Input Voltage:DC13.8V, DC5V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency toerance (%)	Limit (%)
startup	13.56	13.560102	0.000102	0.00075	0.01
after 2minutes	13.56	13.560042	0.000042	0.00031	0.01
after 5minutes	13.56	13.560035	0.000035	0.00026	0.01
after 10minutes	13.56	13.560025	0.000025	0.00018	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
YAMAKITA No.4 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S493B
Sample No. : 08031005
Power : DC12V, DC5V
Mode : Transmitting (13.56MHz)

Report No. : 28GE0098-YK-01-C-R1
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2008/4/7
Temperature : 22deg.C
Humidity : 46%

ENGINEER : Go Ishiwata

Input Voltage:DC11.5V, DC4.75V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560015	0.000015	0.00011	0.01
after 2minutes	13.56	13.560013	0.000013	0.00010	0.01
after 5minutes	13.56	13.560012	0.000012	0.00009	0.01
after 10minutes	13.56	13.560011	0.000011	0.00008	0.01

Input Voltage:DC13.8V, DC5.25V

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (kHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560055	0.000055	0.00041	0.01
after 2minutes	13.56	13.560030	0.000030	0.00022	0.01
after 5minutes	13.56	13.560026	0.000026	0.00019	0.01
after 10minutes	13.56	13.560021	0.000021	0.00015	0.01

APPENDIX 3
Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
YA-CE	Conducted emission(software)	UL Japan	CE(Ver.1.6)	CE	-
YA-RE	Radiated emission(software)	UL Japan	RE(Ver.1.5)	RE	-
KAEC-01(NSA)	Anechoic Chamber	JSE	Semi 3m	RE	2007/08/26 * 12
KAF-05	Pre Amplifier	Agilent	8447D	RE	2008/04/08 * 12
KAT6-01	Attenuator	INMET	18N-6dB	RE	2008/03/17 * 12
KBA-03	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/12/27 * 12
KCC-33/34/KRM-03	Coaxial Cable/RF Relay Matrix	Fujikura/Suhner/TSJ	5D-2W/S04272B/RFM-E421	CE/RE	2007/11/01 * 12
KLS-01	LISN(AMN)	Schwarzbeck	NSLK8126	CE	2008/04/07 * 12
KSA-04	Spectrum Analyzer	Advantest	R3271A	CE/RE	2007/09/25 * 12
KTR-03	Test Receiver	Rohde & Schwarz	ESHS10	CE/RE	2008/02/18 * 12
KTR-04	Test Receiver	Rohde & Schwarz	ESVS10	RE	2007/10/30 * 12
KOS-01	Humidity Indicator	Custom	CTH-190	CE	2006/07/14 * 24
KOS-02	Humidity Indicator	Custom	CTH-190	RE	2006/07/10 * 24
KJM-07	Measure	KOMELON	KMC-36	CE/RE	-
KLP-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2007/06/11 * 12
KCC-A2/A3	Coaxial Cable	Fujikura	5D-2W	RE	2007/05/15 * 12
KCC-A1/A3	Coaxial Cable	Fujikura	5D-2W	RE	2007/05/15 * 12
KFC-01	Microwave Counter	Advantest	R5373	FT	2007/04/04 * 12
KCH-01	Temperature and Humidity Chamber	Tabai Espec	PL-1KT	FT	2007/12/26 * 12
KSCA-01	Search coil	TSJ	SC01	BW/FT	Pre Check
KCC-A7	Coaxial Cable	Fujikura	5D-2W	BW/FT	2007/11/01 * 12

The expiration date of the calibration is the end of the expired month .

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

Test Item :

- CE: Conducted emission,
- RE: Radiated emission,
- BW: Bandwidth,
- FT: Frequency tolerance

*Some calibrations were performed after the tested dates , however those EMI test equipment have been controlled by means of an unbroken chains of calibrations .