

DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.3 Shielded Room
Date : 2010/10/23

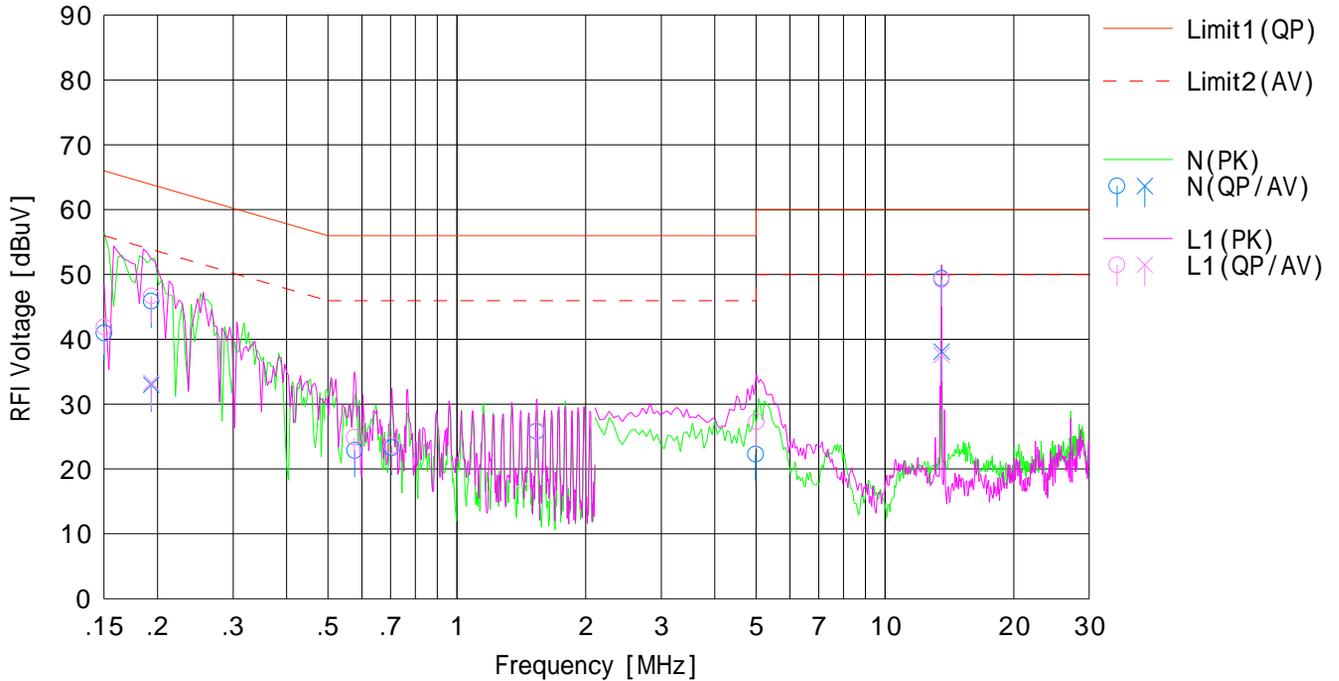
Company : Sony Corporation
Kind of E.U.T. : Contactless IC Card Reader/Writer
Model No. : RC-S360/S
Serial No. : D200001

Mode : Transmitting (13.56MHz)
Report No. : 31AE0016-SH-01-E
Power : DC5V (AC adaptor:120V/60Hz)
Temp./Humi. : 24deg.C./41%

Remarks : -

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

Engineer : Tatsuya Arai



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	0.15000	28.4	---	12.6	41.0	---	66.0	56.0	25.0	---	N	
2	0.19320	33.3	20.4	12.6	45.9	33.0	63.8	53.8	17.9	20.8	N	
3	0.57700	10.3	---	12.6	22.9	---	56.0	46.0	33.1	---	N	
4	0.70400	10.7	---	12.6	23.3	---	56.0	46.0	32.7	---	N	
5	1.53500	13.2	---	12.6	25.8	---	56.0	46.0	30.2	---	N	
6	4.99000	9.5	---	12.8	22.3	---	56.0	46.0	33.7	---	N	
7	13.56192	36.3	25.0	13.1	49.4	38.1	60.0	50.0	10.6	11.9	N	
8	0.15000	29.3	---	12.6	41.9	---	66.0	56.0	24.1	---	L1	
9	0.19320	34.1	20.7	12.6	46.7	33.3	63.8	53.8	17.1	20.5	L1	
10	0.57600	12.3	---	12.6	24.9	---	56.0	46.0	31.1	---	L1	
11	0.70491	11.0	---	12.6	23.6	---	56.0	46.0	32.4	---	L1	
12	1.53400	13.3	---	12.6	25.9	---	56.0	46.0	30.1	---	L1	
13	5.00741	14.4	---	12.9	27.3	---	60.0	50.0	32.7	---	L1	
14	13.56000	36.1	24.5	13.1	49.2	37.6	60.0	50.0	10.8	12.4	L1	

Calculation: Result [dBuV] = Reading [dBuV] + C.Fac (LISN+Cable+Att) [dB]

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

UL Japan, Inc.
Shonan No1 Semi-Anechoic Chamber

Company : Sony Corporation	Report No. : 31AE0016-SH-01-E
Equipment : Contactless IC Card Reader/Writer	Regulation : FCC Part15 SupartC 15.225
Model : RC-S360/S	Test Distance : 3m
Sample No. : D200001	Date : 2010/10/19
Power : DC5V	Temperature : 22deg.C
Mode : Transmitting (13.56MHz)	Humidity : 52%
Remarks : Vertical polarization (antenna angle) of the worst case: 0deg	

ENGINEER : Shinichi Takano

Field strength

No.	FREQ [MHz]	T/R Reading		ANT 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	57.6	68.7	20.1	6.5	31.8	52.4	63.5	123.9	71.5	60.4

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) = 84dBuV/m + 40log 30m/3m
= 124dBuV/m (FCC15.225(a))

Outside Field strength

No.	FREQ [MHz]	T/R Reading		ANT 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	29.3	29.3	20.1	6.5	31.8	24.1	24.1	69.5	45.4	45.4
2	13.410	29.6	36.8	20.1	6.5	31.8	24.4	31.6	80.5	56.1	48.9
3	13.553	42.3	54.0	20.1	6.5	31.8	37.1	48.8	90.5	53.4	41.7
4	13.567	39.0	50.5	20.1	6.5	31.8	33.8	45.3	90.5	56.7	45.2
5	13.710	29.6	34.2	20.1	6.5	31.8	24.4	29.0	80.5	56.1	51.5
6	14.010	29.2	29.3	20.0	6.5	31.8	23.9	24.0	69.5	45.6	45.5

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 : $50.5\text{dBuV/m} + 40\log 30\text{m}/3\text{m} = 90.5\text{dBuV/m}$ (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)

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2010/10/19

Company : Sony Corporation
Kind of E.U.T. : Contactless IC Card Reader/Writer
Model No. : RC-S360/S
Serial No. : D200001

Mode : Transmitting (13.56MHz)
Report No. : 31AE0016-SH-01-E
Power : DC5V
Temp./Humi. : 22deg.C./52%

Remarks : EUT:Z-axis , Vert:0deg

Limit1 : FCC15.225 3m, 9-90kHz:AV, 110-490kHz:AV, other:QP

Tested by : Shinichi Takano

<< QP DATA >>

No.	Freq. [MHz]	Reading <QP>		Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result <QP>		Limit <QP>		Margin <QP>	Antenna	Table [deg]	Comment
		[dBuV]	[dB/m]				[dBuV/m]	[dBuV/m]	[dB]	[dB]				
1	27.12000	39.2	19.7	6.8	31.8	33.9	69.5	35.6	Vertical	218				
2	27.12000	32.1	19.7	6.8	31.8	26.8	69.5	42.7	Horizontal	236				

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

DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Shonan EMC Lab. No.1 Semi-Anechoic Chamber
Date : 2010/10/18

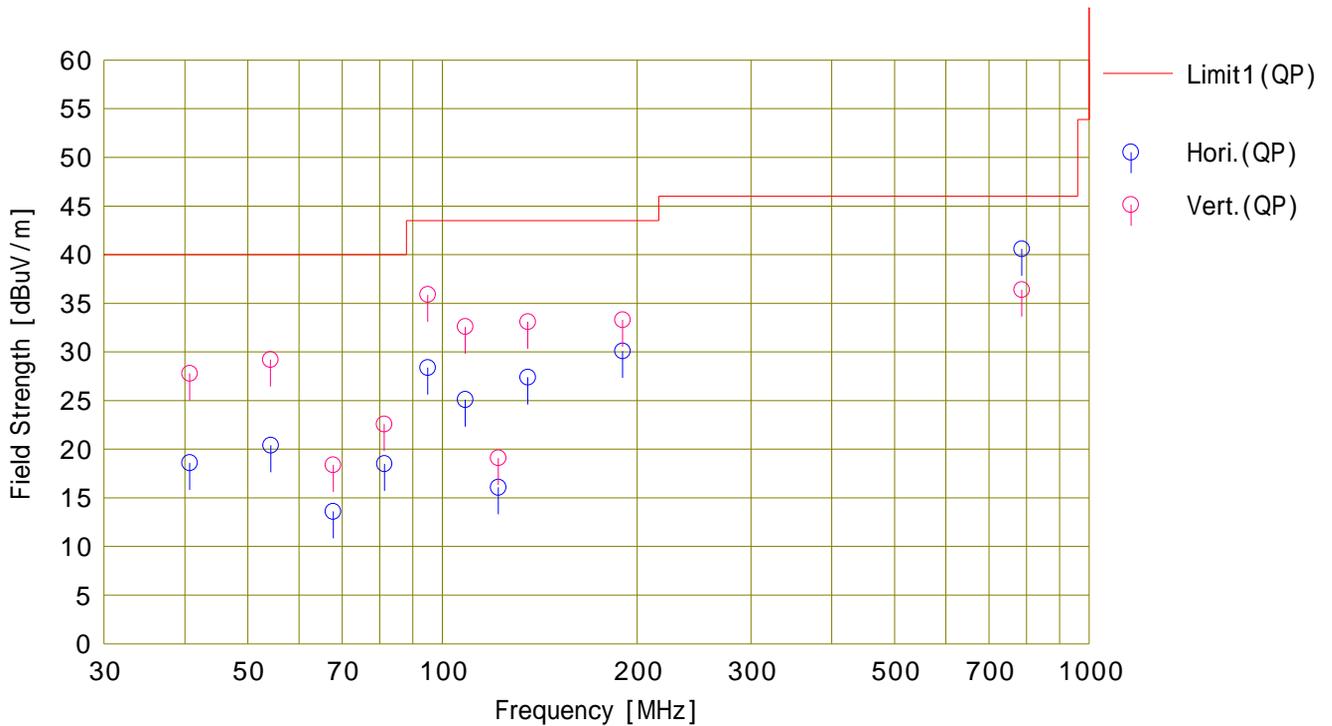
Company : Sony Corporation
Kind of E.U.T. : Contactless IC Card Reader/Writer
Model No. : RC-S360/S
Serial No. : D200001

Mode : Transmitting (13.56MHz)
Report No. : 31AE0016-SH-01-E
Power : DC5V
Temp./Humi. : 22deg.C./52%

Remarks : Axis Hor:X, Ver:Z

Limit1 : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK

Engineer : Tatsuya Arai



No.	Freq. [MHz]	Reading	Ant.Fac [dB/m]	Loss [dB]	Gain [dB]	Result	Limit	Margin	Pola. [H/V]	Height [cm]	Angle [deg]	Ant. Type	Comment
		<QP> [dBuV]				<QP> [dBuV/m]	<QP> [dB]						
1	40.680	29.1	14.2	7.1	31.8	18.6	40.0	21.4	Hori.	199	338	BC	
2	54.300	35.1	9.8	7.3	31.8	20.4	40.0	19.6	Hori.	188	7	BC	
3	67.800	30.9	7.1	7.4	31.8	13.6	40.0	26.4	Hori.	253	261	BC	
4	81.360	35.9	6.8	7.6	31.8	18.5	40.0	21.5	Hori.	212	237	BC	
5	94.920	42.8	9.6	7.8	31.8	28.4	43.5	15.1	Hori.	186	53	BC	
6	108.480	37.2	11.8	7.9	31.8	25.1	43.5	18.4	Hori.	157	58	BC	
7	122.040	26.4	13.4	8.1	31.8	16.1	43.5	27.4	Hori.	153	119	BC	
8	135.600	36.8	14.2	8.2	31.8	27.4	43.5	16.1	Hori.	231	258	BC	
9	189.840	36.6	16.6	8.7	31.8	30.1	43.5	13.4	Hori.	178	263	BC	
10	786.480	42.3	20.9	9.3	31.9	40.6	46.0	5.4	Hori.	200	167	LP	
11	40.680	38.3	14.2	7.1	31.8	27.8	40.0	12.2	Vert.	100	303	BC	
12	54.240	43.9	9.8	7.3	31.8	29.2	40.0	10.8	Vert.	100	136	BC	
13	67.800	35.7	7.1	7.4	31.8	18.4	40.0	21.6	Vert.	100	308	BC	
14	81.300	40.0	6.8	7.6	31.8	22.6	40.0	17.4	Vert.	100	347	BC	
15	94.920	50.3	9.6	7.8	31.8	35.9	43.5	7.6	Vert.	100	101	BC	
16	108.480	44.7	11.8	7.9	31.8	32.6	43.5	10.9	Vert.	100	203	BC	
17	122.040	29.4	13.4	8.1	31.8	19.1	43.5	24.4	Vert.	100	138	BC	
18	135.600	42.5	14.2	8.2	31.8	33.1	43.5	10.4	Vert.	100	40	BC	
19	189.840	39.8	16.6	8.7	31.8	33.3	43.5	10.2	Vert.	100	185	BC	
20	786.480	38.1	20.9	9.3	31.9	36.4	46.0	9.6	Vert.	142	93	LP	

Calculation:Result [dBuV/m]=Reading [dBuV]+Ant.Fac [dB/m]+Loss (Cable+ATT) [dB] - Gain (AMP) [dB]
Ant.Type=BC:Biconical Antenna, LP:Logperiodic Antenna, SHA **:Horn Antenna

20dB bandwidth & Occupied bandwidth (99%): FCC 15.215(c)

COMPANY : Sony Corporation

Equipment : Contactless IC Card Reader/Writer

MODEL NUMBER: RC-S360/S

SERIAL NUMBER: D200001

POWER : DC5V

UL Japan, Inc. Shonan No1 Shield room

REPORT No. : 31AE0016-SH-01-E

REGULATION : FCC Part 15 Subpart C 15.215(c)

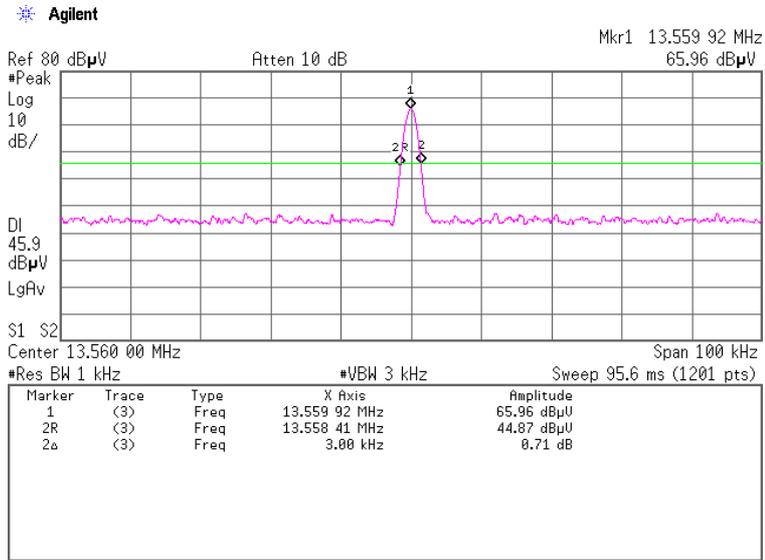
DATE : 2010/10/19

TEMP./HUMI : 27°C/41%

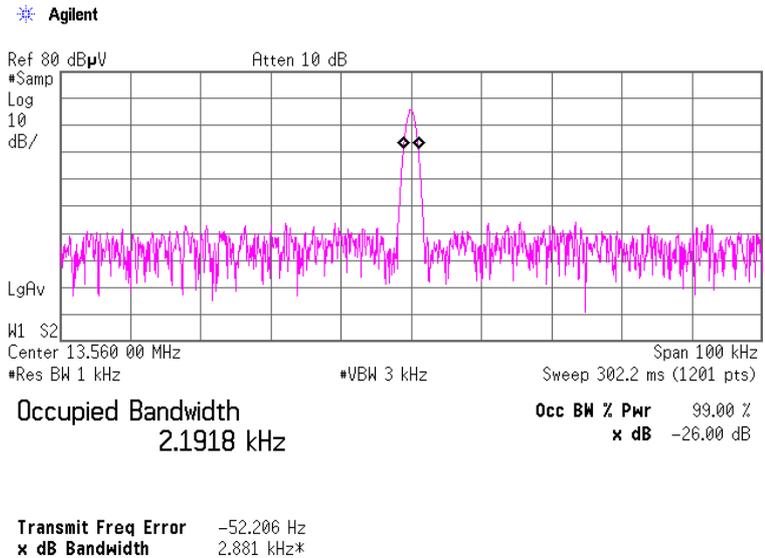
TEST MODE : Transmitting(13.56MHz)

ENGINEER : Shinichi Takano

20dB Bandwidth: 3.00kHz



OBW(99%): 2.19kHz



Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan No5 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S360/S
Sample No. : D200001
Power : DC5V
Mode : Transmitting (13.56MHz)

Report No. : 31AE0016-SH-01-E
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2010/10/19
Temperature : 26deg.C
Humidity : 39%

ENGINEER : Makoto Hosaka

Temperature Variation: -30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560219	0.0002190	0.00162	0.01
after 2minutes	13.56	13.560249	0.0002490	0.00184	0.01
after 5minutes	13.56	13.560244	0.0002440	0.00180	0.01
after 10minutes	13.56	13.560240	0.0002400	0.00177	0.01

Temperature Variation: -20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560245	0.0002450	0.00181	0.01
after 2minutes	13.56	13.560227	0.0002270	0.00167	0.01
after 5minutes	13.56	13.560212	0.0002120	0.00156	0.01
after 10minutes	13.56	13.560207	0.0002070	0.00153	0.01

Temperature Variation: -10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560247	0.0002470	0.00182	0.01
after 2minutes	13.56	13.560185	0.0001850	0.00136	0.01
after 5minutes	13.56	13.560164	0.0001640	0.00121	0.01
after 10minutes	13.56	13.560159	0.0001590	0.00117	0.01

Temperature Variation: 0deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560232	0.0002320	0.00171	0.01
after 2minutes	13.56	13.560132	0.0001320	0.00097	0.01
after 5minutes	13.56	13.560110	0.0001100	0.00081	0.01
after 10minutes	13.56	13.560103	0.0001030	0.00076	0.01

Temperature Variation: 10deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560182	0.0001820	0.00134	0.01
after 2minutes	13.56	13.560074	0.0000740	0.00055	0.01
after 5minutes	13.56	13.560051	0.0000510	0.00038	0.01
after 10minutes	13.56	13.560045	0.0000450	0.00033	0.01

Temperature Variation: 20deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560131	0.0001310	0.00097	0.01
after 2minutes	13.56	13.560112	0.0001120	0.00083	0.01
after 5minutes	13.56	13.560116	0.0001160	0.00086	0.01
after 10minutes	13.56	13.560146	0.0001460	0.00108	0.01

Temperature Variation: 30deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560021	0.0000210	0.00015	0.01
after 2minutes	13.56	13.559965	-0.0000350	-0.00026	0.01
after 5minutes	13.56	13.559951	-0.0000490	-0.00036	0.01
after 10minutes	13.56	13.559954	-0.0000460	-0.00034	0.01

Temperature Variation: 40deg.C

Test Conditions	Original Frequency (MHz)	Measure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.560014	0.0000140	0.00010	0.01
after 2minutes	13.56	13.559940	-0.0000600	-0.00044	0.01
after 5minutes	13.56	13.559931	-0.0000690	-0.00051	0.01
after 10minutes	13.56	13.559929	-0.0000710	-0.00052	0.01

Temperature Variation: 50deg.C

Test Conditions	Original Frequency (MHz)	Mesure Frequency (MHz)	Frequency Error (MHz)	Frequency tolerance (%)	Limit (%)
startup	13.56	13.559963	-0.0000370	-0.00027	0.01
after 2minutes	13.56	13.559926	-0.0000740	-0.00055	0.01
after 5minutes	13.56	13.559927	-0.0000730	-0.00054	0.01
after 10minutes	13.56	13.559929	-0.0000710	-0.00052	0.01

Data of Frequency Tolerance: FCC 15.225(e)

UL Japan, Inc.
Shonan No5 Shield room

Company : Sony Corporation
Equipment : Contactless IC Card Reader/Writer
Model : RC-S360/S
Sample No. : D200001
Power : DC5V
Mode : Transmitting (13.56MHz)

Report No. : 31AE0016-SH-01-E
Regulation : FCC Part15 SupartC 15.225 (e)
Date : 2010/10/19
Temperature : 26deg.C
Humidity : 39%

ENGINEER : Makoto Hosaka

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	13.560138	0.0001380	0.00102	0.01
after 2minutes	13.56	13.560171	0.0001710	0.00126	0.01
after 5minutes	13.56	13.560200	0.0002000	0.00147	0.01
after 10minutes	13.56	13.560235	0.0002350	0.00173	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	13.560140	0.0001400	0.00103	0.01
after 2minutes	13.56	13.560118	0.0001180	0.00087	0.01
after 5minutes	13.56	13.560136	0.0001360	0.00100	0.01
after 10minutes	13.56	13.560108	0.0001080	0.00080	0.01

APPENDIX 3 Test Instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
SAF-01	Pre Amplifier	SONOMA	310N	290211	RE	2010/02/06 * 12
SAT6-01	Attenuator	JFW	50HF-006N	-	RE	2010/02/06 * 12
SAT3-04	Attenuator	JFW	50HF-003N	-	RE	2010/02/06 * 12
SBA-01	Biconical Antenna	Schwarzbeck	BBA9106	91032664	RE	2010/10/11 * 12
SCC-A1/A3/A5/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2010/04/02 * 12
SCC-A2/A4/A6/A7/A8/A13/SRSE-01	Coaxial Cable&RF Selector	Fujikura/Fujikura/Suhner/Suhner/Suhner/TOYO	8D2W/12DSFA/141PE/141PE/141PE/141PE/NS4906	-/0901-269(RF Selector)	RE	2010/04/02 * 12
SLA-01	Logperiodic Antenna	Schwarzbeck	UHALP9108A	UHALP 9108-A0888	RE	2010/10/11 * 12
SOS-01	Humidity Indicator	A&D	AD-5681	4062555	RE	2010/02/09 * 12
SSA-01	Spectrum Analyzer	Agilent	N9010A-526	MY48031482	RE	2010/04/05 * 12
STR-04	Test Receiver	Rohde & Schwarz	ESVS30	826638/003	RE	2009/11/13 * 12
STR-05	Test Receiver	Rohde & Schwarz	ESHS20	827129/007	RE	2009/11/13 * 12
SJM-07	Measure	PROMART	SEN1935	-	RE	-
SAEC-01(NSA)	Semi-Anechoic Chamber	TDK	SAEC-01(NSA)	1	RE	2010/09/11 * 12
COTS-SEMI-1	EMI Software	TSJ	TEPTO-DV	-	RE	-
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	RE	2009/11/19 * 12
SFC-01	Microwave Counter	Agilent	53151A	US40511493	FT	2010/02/18 * 12
SCH-01	Temperature and Humidity Chamber	Espec	PL-1KT	14020837	FT	2010/04/24 * 12
SSCA-01	Search coil	LANGER	RF-R 400-1	02-0634	FT	Pre Check
SDPS-02	Power Supply(DC)	Kikusui	PAN35-10A	NA000955	FT	Pre Check
SCC-C9/C10/SRSE-03	Coaxial Cable&RF Selector	Suhner/Suhner/TOYO	RG223U/141PE/NS4906	-/0901-271(RF Selector)	CE	2010/04/02 * 12
SLS-05	LISN	Rohde & Schwarz	ENV216	100516	CE	2010/02/19 * 12
SAT3-06	Attenuator	JFW	50HF-003N	-	CE	2010/02/06 * 12
SOS-06	Humidity Indicator	A&D	AD-5681	4062118	CE	2010/02/17 * 12
STR-03	Test Receiver	Rohde & Schwarz	ES140	100054/040	CE	2010/07/21 * 12
SJM-10	Measure	PROMART	SEN1935	-	CE	-
SSA-02	Spectrum Analyzer	Agilent	E4448A	MY48250106	BW	2010/06/22 * 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 traceable calibrations . Each calibration is traceable to the national or international standards .

Test Item :

CE: Conducted emission,

RE: Radiated emission,

FT: Frequency Tolerance

BW: Bandwidth