

APPENDIX 2: Data of EMI test

Conducted emission
Transmitting mode (with Tag) / Not Antenna terminated

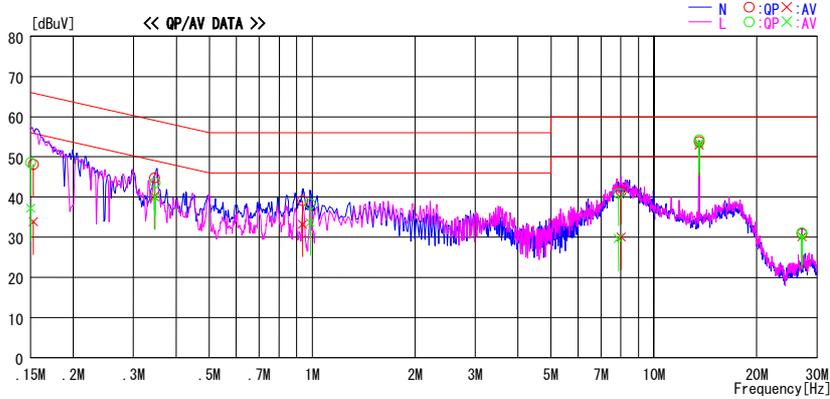
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
 Date : 2008/06/30

Company : Sony Corporation
 Kind of EUT : Hard Disk Drive
 Model No. : VGP-UHDM25
 Serial No. : 28267310 1000054
 Report No. : 28JE0212-HO-02
 Power : AC120V/60Hz (DC 5.0V)
 Temp./Humi. : 22deg. C. / 64%
 Operator : Takahiro Hatakeda

Mode / Remarks : Transmitting Mode 13.56MHz (with Tag) + HDD R/W

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level		Corr. Factor [dB]	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15271	47.9	33.6	0.2	48.1	33.8	65.9	55.9	17.8	22.1	N	
0.34569	44.4	39.7	0.4	44.8	40.1	59.1	49.1	14.3	9.0	N	
0.93637	38.6	32.7	0.5	39.1	33.2	56.0	46.0	16.9	12.8	N	
8.01791	39.2	27.8	2.2	41.4	30.0	60.0	50.0	18.6	20.0	N	
13.56000	50.3	49.4	3.5	53.8	52.9	60.0	50.0	6.2	-2.9	N	Reference data
27.12000	24.6	23.8	6.3	30.9	30.1	60.0	50.0	29.1	19.9	N	
0.15001	48.4	37.0	0.2	48.6	37.2	66.0	56.0	17.4	18.8	L	
0.34694	43.2	39.5	0.4	43.6	39.9	59.0	49.0	15.4	9.1	L	
0.98650	37.7	33.1	0.5	38.2	33.6	56.0	46.0	17.8	12.4	L	
7.86836	38.8	27.5	2.1	40.9	29.6	60.0	50.0	19.1	20.4	L	
13.56000	50.7	49.9	3.5	54.2	53.4	60.0	50.0	5.8	-3.4	L	Reference data
27.12000	24.8	23.9	6.3	31.1	30.2	60.0	50.0	28.9	19.8	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuA] = READING [dBuV] + C. F [dB] (Probe factor + CABLE LOSS)
 Except for the above table: adequate margin data below the limits.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Conducted emission
Transmitting mode (with Tag) / Antenna terminated

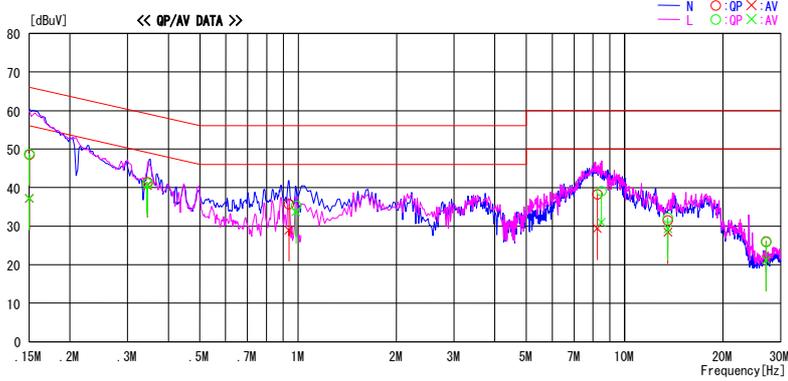
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
 Date : 2008/07/18

Company : Sony Corporation
 Kind of EUT : Hard Disk Drive
 Model No. : VGP-UHDM25
 Serial No. : 28267310 10000054
 Report No. : 28JE0212-HO-02
 Power : AC120V/60Hz (DC 5.0V)
 Temp./Humi. : 25deg. C. / 73%
 Engineer : Takumi Shimada

Mode / Remarks : Transmitting Mode 13.56 (with Tag) + HDD R/W

LIMIT : FCC15.207 QP
 FCC15.207 AV



Frequency [MHz]	Reading Level [dBuV]		Corr. Factor [dB]	Results [dBuV]		Limit [dBuV]		Margin [dB]		Phase
	QP	AV		QP	AV	QP	AV	QP	AV	
0.15020	48.3	36.9	0.3	48.6	37.2	66.0	56.0	17.5	18.9	N
0.34511	41.0	40.1	0.4	41.4	40.5	59.1	49.1	17.7	8.6	N
0.93670	35.1	28.5	0.5	35.6	29.0	56.0	46.0	20.4	17.0	N
8.24807	36.2	27.3	2.1	38.3	29.4	60.0	50.0	21.7	20.6	N
13.56000	28.2	25.0	3.4	31.6	28.4	60.0	50.0	28.5	21.6	N
27.12000	19.9	15.2	6.1	26.0	21.3	60.0	50.0	34.0	28.7	N
0.15009	48.5	36.9	0.3	48.8	37.2	66.0	56.0	17.3	18.8	L
0.34500	40.7	40.3	0.4	41.1	40.7	59.1	49.1	18.0	8.4	L
0.98420	34.9	33.1	0.5	35.4	33.6	56.0	46.0	20.6	12.4	L
8.48001	37.0	28.9	2.1	39.1	31.0	60.0	50.0	20.9	19.0	L
13.56000	28.8	25.8	3.4	32.2	29.2	60.0	50.0	27.8	20.8	L
27.12000	19.8	15.1	6.1	25.9	21.2	60.0	50.0	34.1	28.8	L

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT[dBuA]=READING[dBuV]+C.F.[dB] (Probe factor+CABLE LOSS)
 Except for the above table: adequate margin data below the limits.

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Radiated emission(Fundamental emission and Spectrum Mask)

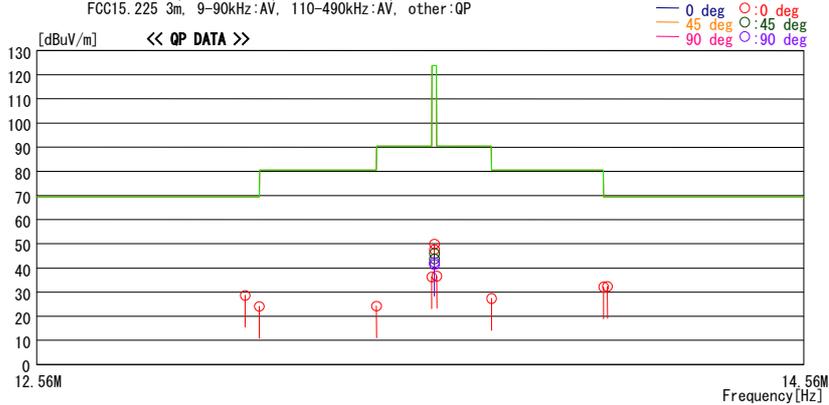
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
 Date : 2008/06/30

Company : Sony Corporation
 Kind of EUT : Hard Disk Drive
 Model No. : VGP-UHDW25
 Serial No. : 28267310 1000054
 Report No. : 28JE0212-HO-02
 Power : AC120V/60Hz (DC 5.0V)
 Temp. / Humi. : 22deg. C / 64%
 Operator : Takahiro Hatakeda

Mode / Remarks: Transmitting Mode 13.56MHz + HDD R/W

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



Freq	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
13.07495	39.4	QP	20.2	1.2	32.1	28.7	69.5	40.8	0deg	199	
13.11000	34.7	QP	20.2	1.2	32.1	24.0	69.5	45.5	0deg	189	
13.41000	34.9	QP	20.2	1.2	32.1	24.2	80.5	56.3	0deg	189	
13.55300	46.9	QP	20.2	1.2	32.1	36.2	90.4	54.2	0deg	201	
13.56000	54.5	QP	20.2	1.2	32.1	43.8	123.9	80.1	45deg	351	without Tag
13.56000	52.1	QP	20.2	1.2	32.1	41.4	123.9	82.5	90deg	270	without Tag
13.56000	60.6	QP	20.2	1.2	32.1	49.9	123.9	74.0	0deg	189	with Tag Worst
13.56000	56.7	QP	20.2	1.2	32.1	46.0	123.9	77.9	45deg	350	with Tag
13.56000	53.0	QP	20.2	1.2	32.1	42.3	123.9	81.6	90deg	273	with Tag
13.56000	58.3	QP	20.2	1.2	32.1	47.6	123.9	76.3	0deg	191	without Tag
13.56700	47.2	QP	20.2	1.2	32.1	36.5	90.4	53.9	0deg	132	
13.71000	38.0	QP	20.2	1.2	32.1	27.3	80.5	53.2	0deg	201	
14.01000	42.7	QP	20.3	1.2	32.1	32.1	69.5	37.4	0deg	189	
14.02000	42.9	QP	20.3	1.2	32.1	32.3	69.5	37.2	0deg	291	

CHART : WITH FACTOR, ANT TYPE : LOOP, Except for the data below : adequate margin data below the limits.
 CALCULATION : READING + ANT FACTOR + LOSS (CABLE -AMP.)

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Radiated emission (Spurious emission: below 30MHz)

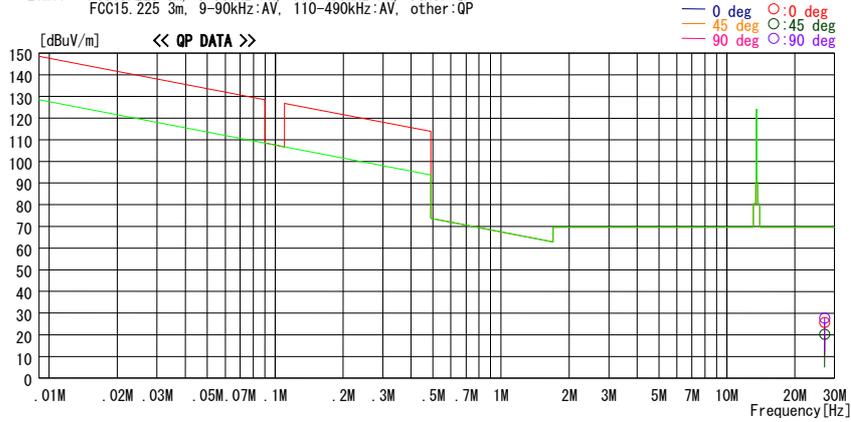
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
 Date : 2008/06/30

Company : Sony Corporation
 Kind of EUT : Hard Disk Drive
 Model No. : VGP-UHDM25
 Serial No. : 28267310 1000054
 Report No. : 28JE0212-HO-02
 Power : AC120V/60Hz (DC 5.0V)
 Temp./ Humi. : 22deg.C / 64%
 Operator : Takahiro Hatakeda

Mode / Remarks : Transmitting Mode 13.56MHz + HDD R/W

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



Freq.	Reading	DET	Ant. Fac	Loss	Gain	Result	Limit	Margin	Antenna	Table	Comment
[MHz]	[dBuV]		[dB/m]	[dB]	[dB]	[dBuV/m]	[dBuV/m]	[dB]	[deg]	[deg]	
27.12000	30.0	QP	20.6	1.8	32.1	20.3	69.5	49.2	45deg	267	
27.12000	37.5	QP	20.6	1.8	32.1	27.8	69.5	41.7	90deg	252	
27.12000	35.5	QP	20.6	1.8	32.1	25.8	69.5	43.7	0deg	183	

CHART : WITH FACTOR , ANT TYPE : LOOP , Except for the data below : adequate margin data below the limits.
 CALCULATION : READING + ANT FACTOR + LOSS(CABLE -AMP.)

*The test result is rounded off to one or two decimal places, so some differences might be observed.

Radiated emission (Spurious emission: above 30MHz)

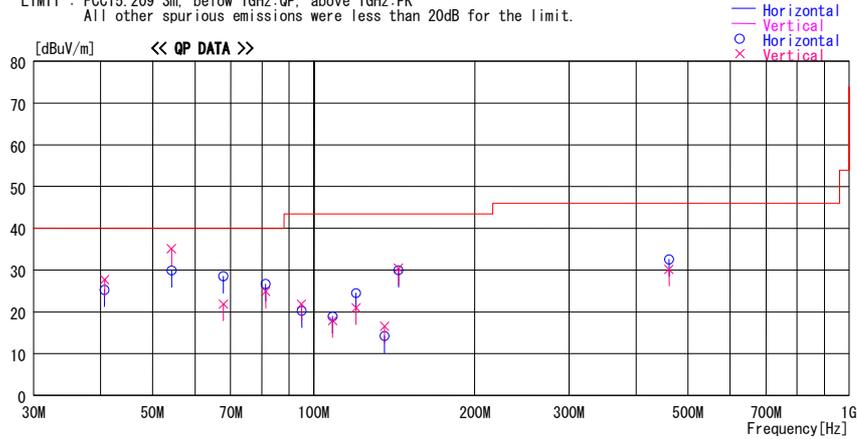
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber
Date : 2008/06/30

Company : Sony Corporation
Kind of EUT : Hard Disk Drive
Model No. : VGP-UHDM25
Serial No. : 28267310 1000054
Report No. : 28JE0212-HO-02
Power : AC120V/60Hz (DC 5.0V)
Temp./Humi. : 22deg.C / 64%
Operator : Takahiro Hatakeda

Mode / Remarks : Transmitting Mode 13.56MHz + HDD R/W

LIMIT : FCC15.209 3m, below 1GHz:QP, above 1GHz:PK
All other spurious emissions were less than 20dB for the limit.



Frequency [MHz]	Reading [dBuV]	DET	Antenna Factor [dB/m]	Loss& Gain [dB]	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
									[dBuV/m]	[dB]
40.666	36.8	QP	13.3	-24.8	25.3	269	262	Hori.	40.0	14.7
40.674	39.3	QP	13.3	-24.8	27.8	191	100	Vert.	40.0	12.2
54.240	45.3	QP	9.1	-24.5	29.9	124	296	Hori.	40.0	10.1
54.240	50.6	QP	9.1	-24.5	35.2	316	100	Vert.	40.0	4.8
67.787	46.0	QP	6.9	-24.3	28.6	227	238	Hori.	40.0	11.4
67.797	39.3	QP	6.9	-24.3	21.9	8	100	Vert.	40.0	18.1
81.360	42.4	QP	6.6	-24.1	24.9	225	100	Vert.	40.0	15.1
81.360	44.2	QP	6.6	-24.1	26.7	268	230	Hori.	40.0	13.4
94.920	36.9	QP	9.0	-24.0	21.9	264	102	Vert.	43.5	21.6
94.888	35.3	QP	9.0	-24.0	20.3	279	202	Hori.	43.5	23.2
108.480	30.6	QP	11.1	-23.8	17.9	225	100	Vert.	43.5	25.6
108.458	31.6	QP	11.1	-23.8	18.9	339	168	Hori.	43.5	24.6
119.989	32.1	QP	12.6	-23.7	21.0	329	100	Vert.	43.5	22.5
119.982	35.6	QP	12.6	-23.7	24.5	149	259	Hori.	43.5	19.0
135.600	23.7	QP	14.0	-23.5	14.2	359	100	Hori.	43.5	29.3
135.600	26.0	QP	14.0	-23.5	16.5	233	100	Vert.	43.5	27.0
143.988	39.2	QP	14.6	-23.4	30.4	271	100	Vert.	43.5	13.1
143.992	38.8	QP	14.6	-23.4	30.0	279	214	Hori.	43.5	13.5
461.024	35.9	QP	17.8	-21.1	32.6	266	100	Hori.	46.0	13.4
461.024	33.5	QP	17.8	-21.1	30.2	286	212	Vert.	46.0	15.8

CHART: WITH FACTOR ANT TYPE : -30MHz LOOP, 30-300MHz BICONICAL, 300MHz-1000MHz LOGPERIODIC, 1000MHz- HORN
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

*The test result is rounded off to one or two decimal places, so some differences might be observed.

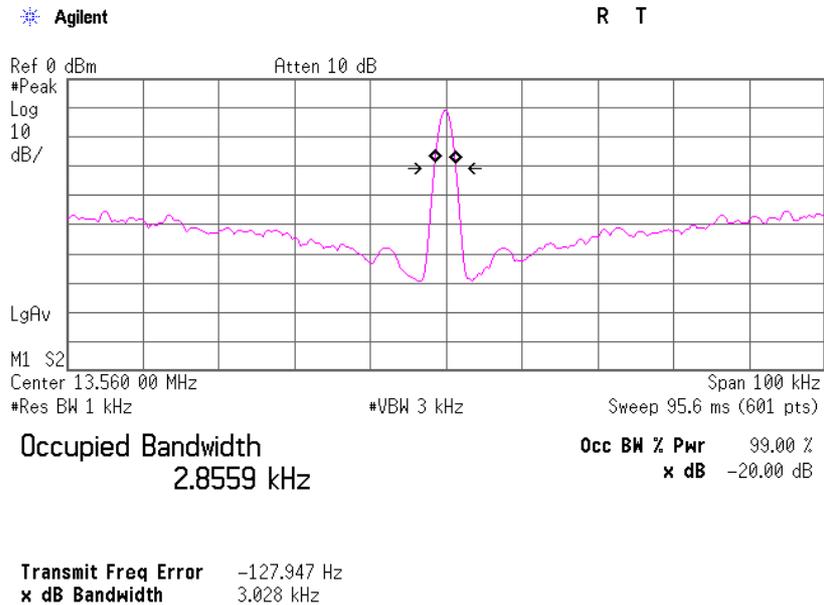
20dB Bandwidth

UL Japan, Inc.
 Head Office EMC Lab. No.11 Measurement room

COMPANY : Sony Corporation
 EQUIPMENT : Hard Disk Drive
 MODEL : VGP-UHDM25
 S/N : 28267310 1000054
 POWER : AC120V/60Hz (DC 5.0V)
 MODE : Tx 13.56MHz

REPORT NO : 28JE0212-HO-02
 REGULATION : FCC 15.215(c)-
 TEST DISTANCE : -
 DATE : 07/07/2008
 TEMPERATURE : 24 deg.C.
 HUMIDITY : 55 %
 ENGINEER : Takahiro Hatakeda

FREQ [MHz]	20dB Bandwidth [kHz]
13.56	3.03



UL Japan, Inc.
Head Office EMC Lab.
 4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
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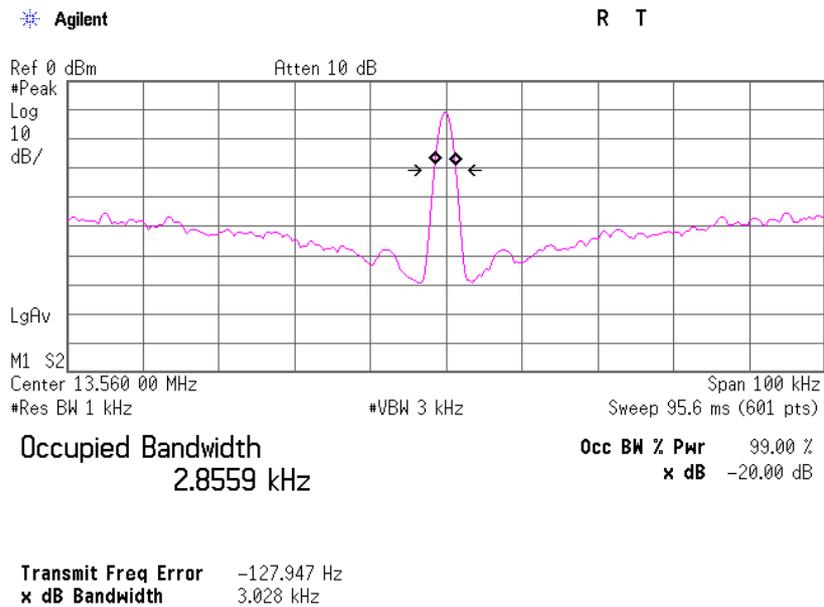
99% Occupied Bandwidth

UL Japan, Inc.
 Head Office EMC Lab. No.11 Measurement room

COMPANY : Sony Corporation
 EQUIPMENT : Hard Disk Drive
 MODEL : VGP-UHDM25
 S/ N : 28267310 1000054
 POWER : AC120V/60Hz (DC 5.0V)
 MODE : Tx 13.56MHz

REPORT NO : 28JE0212-HO-02
 REGULATION : RSS-Gen 4.6.1
 TEST DISTANCE : -
 DATE : 07/07/2008
 TEMPERATURE : 24 deg.C.
 HUMIDITY : 55 %
 ENGINEER : Takahiro Hatakeda

FREQ [MHz]	99% Occupied Bandwidth [kHz]
13.56	2.86



Frequency Tolerance

Company Sony Corporation
Equipment Hard Disk Drive
Model VGP-UHDM25
S/N 28267310 1000054
Power AC120V/60Hz (DC 5.0V)
Mode Tx 13.56MHz

UL Japan, Inc.
Head Office EMC Lab. No.11 Measurement room
Regulation FCC15.225 (e) / RSS-210 A2.6
Test Distance -
Date 07/07/2008
Temperature 24 deg.C.
Humidity 55%
Engineer Takahiro Hatakeda

Test Condition	Test Timing	Measured freq [MHz]	Freq error [MHz]	Result [ppm]	Limit (+/- 0.01%) [ppm]	Margin [ppm]
T nom 20deg C Vmax AC138V (115%)	Power on	13.55995721	-0.00004279	-3.16	100.00	96.84
	on 2min.	13.55995162	-0.00004838	-3.57	100.00	96.43
	on 5min.	13.55994685	-0.00005315	-3.92	100.00	96.08
	on 10min.	13.55994224	-0.00005776	-4.26	100.00	95.74
T nom 20deg C Vnom AC120V (100%)	Power on	13.55997075	-0.00002925	-2.16	100.00	97.84
	on 2min.	13.55996558	-0.00003442	-2.54	100.00	97.46
	on 5min.	13.55996121	-0.00003879	-2.86	100.00	97.14
	on 10min.	13.55995590	-0.00004410	-3.25	100.00	96.75
T nom 20deg C Vmin AC102V (85%)	Power on	13.55994701	-0.00005299	-3.91	100.00	96.09
	on 2min.	13.55994203	-0.00005798	-4.28	100.00	95.72
	on 5min.	13.55993864	-0.00006136	-4.53	100.00	95.47
	on 10min.	13.55993447	-0.00006553	-4.83	100.00	95.17
T max 50deg C. Vnom AC120V (100%)	Power on	13.55987008	-0.00012992	-9.58	100.00	90.42
	on 2min.	13.55985971	-0.00014029	-10.35	100.00	89.65
	on 5min.	13.55985468	-0.00014532	-10.72	100.00	89.28
	on 10min.	13.55985089	-0.00014911	-11.00	100.00	89.00
40deg C. Vnom AC120V (100%)	Power on	13.55990163	-0.00009837	-7.25	100.00	92.75
	on 2min.	13.55988714	-0.00011286	-8.32	100.00	91.68
	on 5min.	13.55988113	-0.00011887	-8.77	100.00	91.23
	on 10min.	13.55987540	-0.00012460	-9.19	100.00	90.81
30deg C. Vnom AC120V (100%)	Power on	13.55993504	-0.00006496	-4.79	100.00	95.21
	on 2min.	13.55992209	-0.00007791	-5.75	100.00	94.25
	on 5min.	13.55991330	-0.00008670	-6.39	100.00	93.61
	on 10min.	13.55990526	-0.00009474	-6.99	100.00	93.01
20deg C. Vnom AC120V (100%)	Power on	13.55997075	-0.00002925	-2.16	100.00	97.84
	on 2min.	13.55996558	-0.00003442	-2.54	100.00	97.46
	on 5min.	13.55996121	-0.00003879	-2.86	100.00	97.14
	on 10min.	13.55995590	-0.00004410	-3.25	100.00	96.75
10deg C. Vnom AC120V (100%)	Power on	13.55998260	-0.00001740	-1.28	100.00	98.72
	on 2min.	13.55998182	-0.00001818	-1.34	100.00	98.66
	on 5min.	13.55998012	-0.00001988	-1.47	100.00	98.53
	on 10min.	13.55997686	-0.00002314	-1.71	100.00	98.29
0deg C. Vnom AC120V (100%)	Power on	13.55997991	-0.00002009	-1.48	100.00	98.52
	on 2min.	13.55998376	-0.00001624	-1.20	100.00	98.80
	on 5min.	13.55998506	-0.00001494	-1.10	100.00	98.90
	on 10min.	13.55998595	-0.00001405	-1.04	100.00	98.96
-10deg C. Vnom AC120V (100%)	Power on	13.55995282	-0.00004718	-3.48	100.00	96.52
	on 2min.	13.55996244	-0.00003756	-2.77	100.00	97.23
	on 5min.	13.55997244	-0.00002756	-2.03	100.00	97.97
	on 10min.	13.55997805	-0.00002195	-1.62	100.00	98.38
-20deg C Vnom AC120V (100%)	Power on	13.55991800	-0.00008200	-6.05	100.00	93.95
	on 2min.	13.55992908	-0.00007092	-5.23	100.00	94.77
	on 5min.	13.55993916	-0.00006084	-4.49	100.00	95.51
	on 10min.	13.55994810	-0.00005190	-3.83	100.00	96.17
-30deg C. Vnom AC120V (100%)	Power on	13.55992103	-0.00007897	-5.82	100.00	94.18
	on 2min.	13.55992849	-0.00007151	-5.27	100.00	94.73
	on 5min.	13.55992965	-0.00007035	-5.19	100.00	94.81
	on 10min.	13.55992941	-0.00007059	-5.21	100.00	94.79

* for IC application(RSS-Gen 4.7 requirement)

Limit : 13.56 MHz +/-0.01 % (+/- 100ppm) = +/- 0.001356 MHz

APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MOS-19	Thermo-Hygrometer	Custom	CTH-201	FT	2007/12/05 * 12
MUC-01	Universal Counter	Agilent	53132A	FT	2008/06/09 * 12
MPSU-13	Power Supply	NF	ES1000S	FT	Pre Check
MCH-05	Temperature and Humidity Chamber	Espec	PL-1KP	FT	2008/05/30 * 12
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE, CE	2007/11/23 * 12
MBA-01	Biconical Antenna	Schwarzbeck	BBA9106	RE	2007/10/21 * 12
MLA-09	Logperiodic Antenna	Schwarzbeck	USLP9143B	RE	2008/01/12 * 12
MAT-06	Attenuator(6dB)	Weinschel Corp	2	RE	2007/11/14 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	RE	2008/02/29 * 12
MPA-04	Pre Amplifier	Agilent	8447D	RE	2007/07/11 * 12
MTR-01	Test Receiver	Rohde & Schwarz	ES140	RE, CE	2007/10/19 * 12
MSTW-14	EMI measurement program	TSJ	TEPTO-DV	RE, CE	-
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE, CE	2007/11/12 * 12
MJM-01	Measure	KDS	ES19-55	RE, CE	-
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	RE	2008/03/06 * 12
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE(AE)	2008/06/27 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2008/02/19 * 12
MTA-06	Terminator	MCL	BTRM-50	CE	2008/02/04 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agilent/TSJ	-	RE, CE	2007/12/27 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	RE	2007/12/12 * 12
MCC-31	Coaxial cable	UL Japan	-	RE	2008/06/20 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	CE	2008/04/17 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	CE (AE)	2008/02/20 * 12
MTA-03	Terminator	TME	CT-03NP	CE	2008/02/04 * 12
MCC-13	Coaxial Cable	Fujikura/Agilent	-	CE	2008/02/15 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	CE	2008/04/02 * 12
MRENT-62	Spectrum Analyzer	Agilent	E4448A	CE	2007/11/27 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	CE	2007/12/27 * 12
MJM-05	Measure	PROMART	SEN1955	CE	-

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.

As for some calibrations performed after the tested dates, those test equipment have been controlled by means of an unbroken chains of calibrations.

Test Item: CE: Conducted Emission, RE: Radiated Emission, FT: Frequency Tolerance

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