

APPENDIX 2: Data of EMI test

Conducted Emission

DATA OF CONDUCTED EMISSION TEST

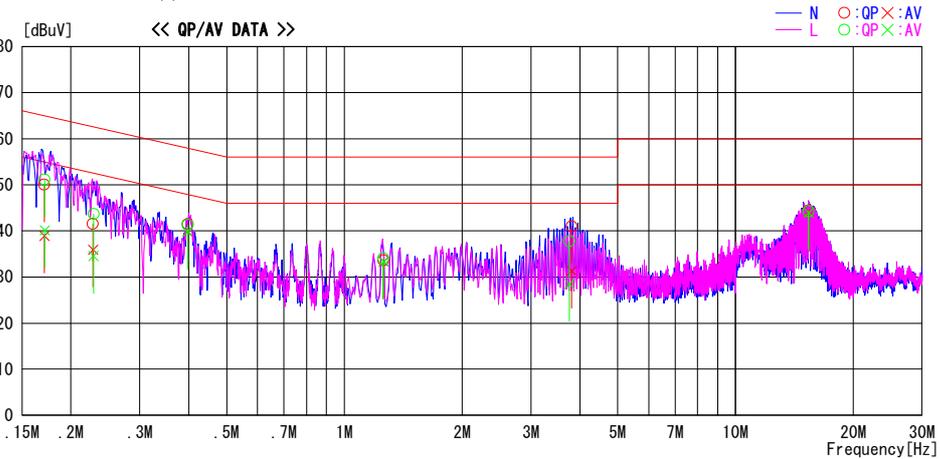
UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2010/11/09

Report No. : 31CE0252-HO-01

Temp./Humi. : 22deg. C. / 43%
Engineer : Takumi Shimada

Mode / Remarks : USB Communication Mode

LIMIT : FCC15.107(a) QP
FCC15.107(a) 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]		
0.17089	36.9	25.7	13.2	50.1	38.9	64.9	54.9	14.8	16.0	N	
0.22770	28.3	22.6	13.3	41.6	35.9	62.5	52.5	21.0	16.6	N	
0.39747	28.2	26.6	13.3	41.5	39.9	57.9	47.9	16.4	8.0	N	
1.25891	20.3	20.0	13.3	33.6	33.3	56.0	46.0	22.4	12.7	N	
3.81335	27.5	17.8	13.5	41.0	31.3	56.0	46.0	15.0	14.7	N	
15.37325	29.9	29.5	14.6	44.5	44.1	60.0	50.0	15.5	5.9	N	
0.17132	38.0	26.9	13.2	51.2	40.1	64.9	54.9	13.7	14.8	L	
0.22840	30.4	21.2	13.3	43.7	34.5	62.5	52.5	18.8	18.0	L	
0.39771	28.0	26.5	13.3	41.3	39.8	57.9	47.9	16.6	8.1	L	
1.25921	20.8	20.0	13.3	34.1	33.3	56.0	46.0	21.9	12.7	L	
3.76308	24.2	15.0	13.5	37.7	28.5	56.0	46.0	18.3	17.5	L	
15.37470	29.7	29.3	14.6	44.3	43.9	60.0	50.0	15.7	6.1	L	

CHART: WITH FACTOR, Peak hold data. CALCULATION: RESULT [dBuV] = READING [dBuV] + C. F [dB] (LISN LOSS + 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

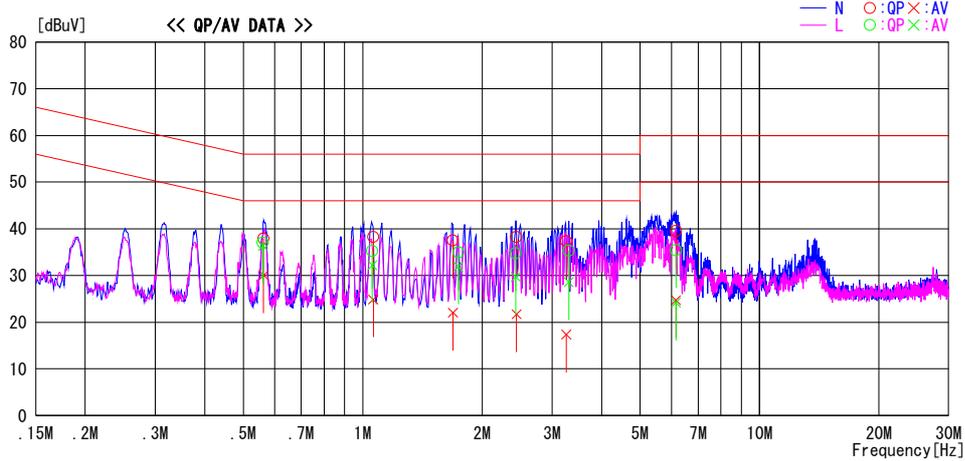
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2010/11/09

Report No. : 31CE0252-H0-01
Temp./Humi. : 22deg. C. / 43%
Engineer : Takumi Shimada

Mode / Remarks : Charging Mode

LIMIT : FCC15.107(a) QP
FCC15.107(a) 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]		
0.56277	24.5	16.6	13.4	37.9	30.0	56.0	46.0	18.1	16.0	N	
1.06366	24.9	11.6	13.3	38.2	24.9	56.0	46.0	17.8	21.1	N	
1.68949	24.1	8.6	13.4	37.5	22.0	56.0	46.0	18.5	24.0	N	
2.44212	24.7	8.2	13.5	38.2	21.7	56.0	46.0	17.8	24.3	N	
3.25805	23.7	3.6	13.7	37.4	17.3	56.0	46.0	18.6	28.7	N	
6.15769	25.2	10.4	14.3	39.5	24.7	60.0	50.0	20.5	25.3	N	
0.56025	23.6	22.9	13.4	37.0	36.3	56.0	46.0	19.0	9.7	L	
1.05828	22.0	18.9	13.3	35.3	32.2	56.0	46.0	20.7	13.8	L	
1.74440	21.5	18.5	13.4	34.9	31.9	56.0	46.0	21.1	14.1	L	
2.43108	21.2	16.2	13.5	34.7	29.7	56.0	46.0	21.3	16.3	L	
3.30520	21.6	14.9	13.7	35.3	28.6	56.0	46.0	20.7	17.4	L	
6.15745	21.1	9.9	14.3	35.4	24.2	60.0	50.0	24.6	25.8	L	

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

Radiated Emission

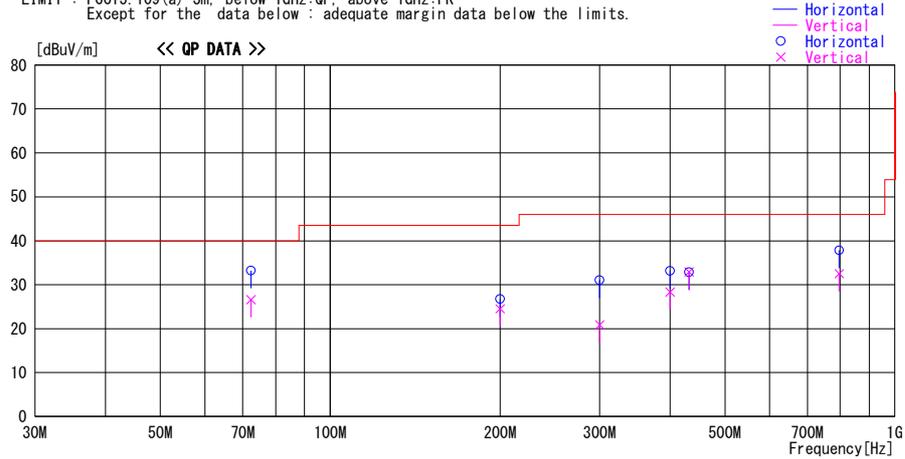
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
Date : 2010/11/08

Report No. : 31CE0252-HO-01
Temp. / Humi. : 21deg. C / 52%
Engineer : Hisayoshi Sato

Mode / Remarks : USB Communication Mode Hori: X-axis, Ver: X-axis

LIMIT : FCC15.109(a) 3m. below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
72.405	50.9	QP	6.7	-24.4	33.2	273	239	Hori.	40.0	6.8	
72.405	44.3	QP	6.7	-24.4	26.6	233	100	Vert.	40.0	13.4	
199.999	33.0	QP	16.7	-23.0	26.7	0	300	Hori.	43.5	16.8	
199.999	30.8	QP	16.7	-23.0	24.5	126	100	Vert.	43.5	19.0	
300.011	37.5	QP	15.7	-22.2	31.0	16	100	Hori.	46.0	15.0	
300.011	27.3	QP	15.7	-22.2	20.8	219	214	Vert.	46.0	25.2	
399.995	37.2	QP	17.5	-21.6	33.1	16	117	Hori.	46.0	12.9	
399.995	32.4	QP	17.5	-21.6	28.3	11	189	Vert.	46.0	17.7	
432.004	36.1	QP	18.1	-21.4	32.8	32	103	Hori.	46.0	13.2	
432.004	36.2	QP	18.1	-21.4	32.9	76	100	Vert.	46.0	13.1	
796.836	28.9	QP	23.0	-19.4	32.5	239	230	Vert.	46.0	13.5	
796.836	34.2	QP	23.0	-19.4	37.8	263	152	Hori.	46.0	8.2	

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

Radiated Emission

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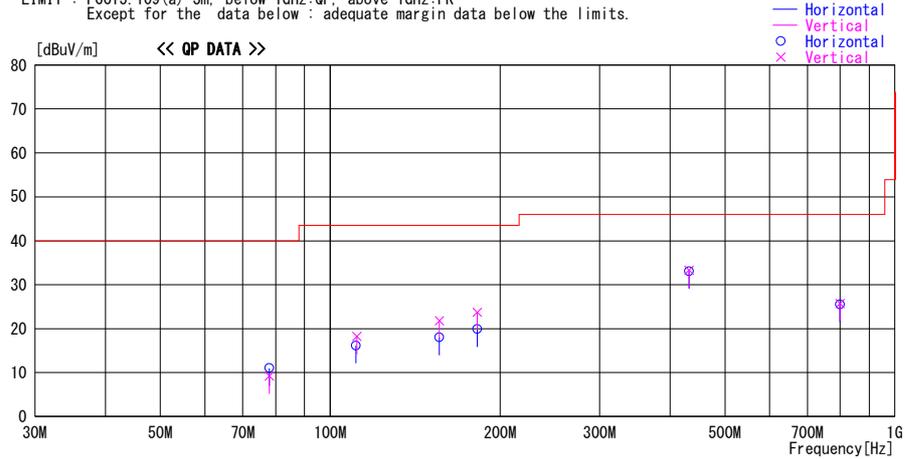
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LIMIT : FCC15.109(a) 3m. below 1GHz:QP, above 1GHz:PK
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
78.000	28.8	QP	6.6	-24.4	11.0	265	230	Hori.	40.0	29.0	
78.000	27.0	QP	6.6	-24.4	9.2	273	100	Vert.	40.0	30.8	
111.000	28.1	QP	11.9	-23.9	16.1	269	100	Hori.	43.5	27.4	
111.450	30.2	QP	11.9	-23.9	18.2	128	100	Vert.	43.5	25.3	
155.999	26.1	QP	15.3	-23.4	18.0	143	100	Hori.	43.5	25.5	
156.001	29.9	QP	15.3	-23.4	21.8	183	100	Vert.	43.5	21.7	
181.999	30.6	QP	16.2	-23.1	23.7	182	100	Vert.	43.5	19.8	
182.001	26.8	QP	16.2	-23.1	19.9	180	100	Hori.	43.5	23.6	
432.004	36.6	QP	18.1	-21.4	33.3	94	140	Vert.	46.0	12.7	
432.012	36.4	QP	18.1	-21.4	33.1	32	103	Hori.	46.0	12.9	
800.000	22.0	QP	23.0	-19.3	25.7	66	100	Vert.	46.0	20.3	
800.000	21.8	QP	23.0	-19.3	25.5	341	100	Hori.	46.0	20.5	

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)

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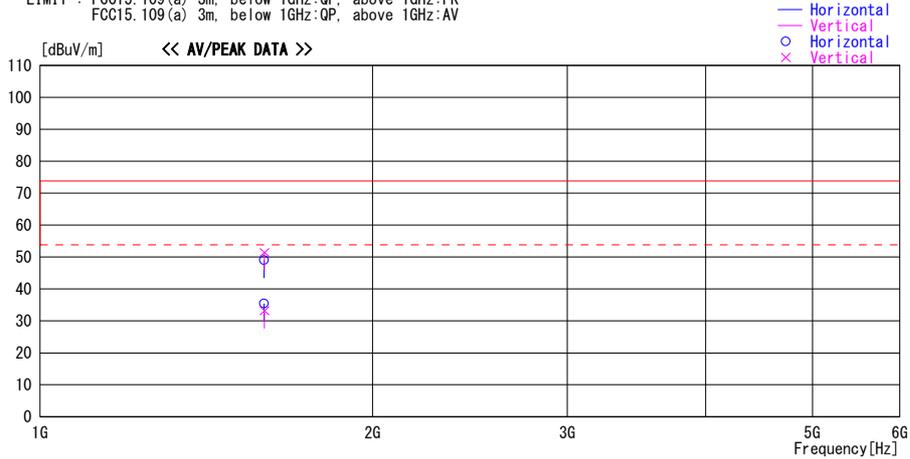
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LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Gain [dB]							
1595.390	53.5	PK	26.1	-30.6	49.0	254	100	Hori.	73.9	24.9	
1596.649	56.0	PK	26.1	-30.6	51.5	52	100	Vert.	73.9	22.5	
1596.649	37.7	AV	26.1	-30.6	33.2	52	100	Vert.	53.9	20.7	
1595.390	40.0	AV	26.1	-30.6	35.5	254	100	Hori.	53.9	18.5	

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)

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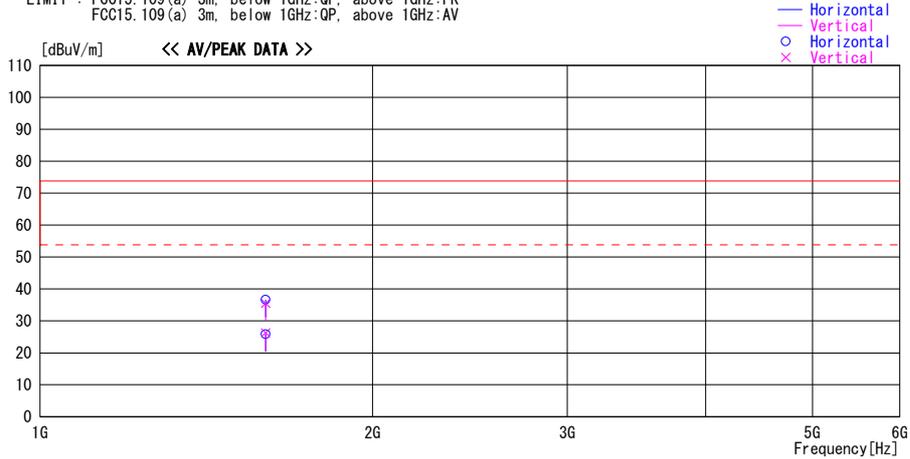
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FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency	Reading	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
1600.000	40.0	PK	26.1	-30.6	35.5	0	100	Vert.	73.9	38.4	
1600.000	30.8	AV	26.1	-30.6	26.3	0	100	Vert.	53.9	27.6	
1600.000	41.2	PK	26.1	-30.6	36.7	0	100	Hori.	73.9	37.2	
1600.000	30.4	AV	26.1	-30.6	25.9	0	100	Hori.	53.9	28.0	

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 limit is rounded down to one decimal place.

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APPENDIX 3: Test instruments

EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE/CE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE/CE	2010/02/09 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE/CE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE/CE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2010/02/03 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2010/10/27 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/10/11 * 12
MLA-08	Logperiodic Antenna	Schwarzbeck	UKLP9140-A	N/A	RE	2010/10/11 * 12
MCC-50	Coaxial cable	UL Japan	-	-	RE	2010/03/18 * 12
MAT-51	Attenuator(6dB)	Weinschel	2	AS3557	RE	2010/01/20 * 12
MPA-14	Pre Amplifier	SONOMA INSTRUMENT	310	260833	RE	2010/03/05 * 12
MHA-21	Horn Antenna 1-18GHz	Schwarzbeck	BBHA9120D	9120D-557	RE	2010/08/08 * 12
MCC-57	Microwave Cable	Suhner	SUCOFLEX104	246769(1m) / 292411(5m)	RE	2009/11/17 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2010/03/16 * 12
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	CE	2009/12/15 * 12
MLS-06	LISN(AMN)	Schwarzbeck	NSLK8127	8127363	CE(EUT)	2010/02/04 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(AE)	2010/02/05 * 12
MTA-31	Terminator	TME	CT-01	-	CE	2010/01/20 * 12
MAT-67	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2010/02/04 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	CE	2010/07/21 * 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.

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

UL Japan, Inc.

Head Office EMC Lab.

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