

APPENDIX 2: Data of EMI test

Conducted Emission

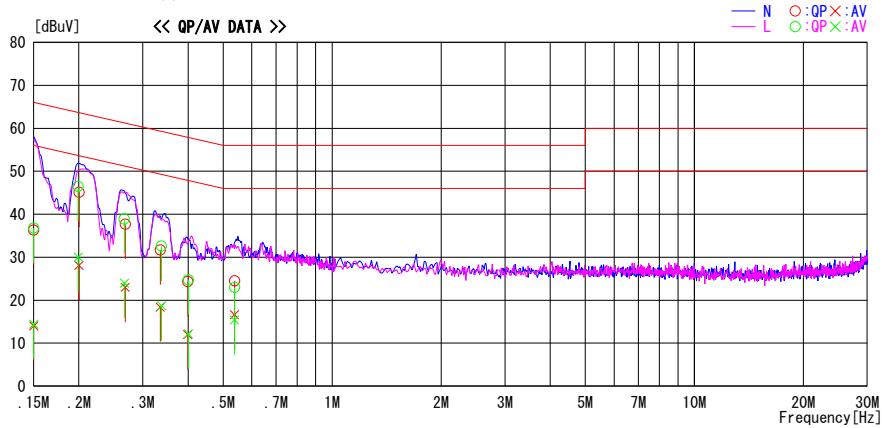
DATA OF CONDUCTED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2010/07/05

Report No. : 30KE0073-HO
 Temp./Humi. : 22deg. C / 67%
 Engineer : Keisuke Kawamura

Mode / Remarks : Battery Charge mode

LIMIT : FCC15.107(a) QP
 FCC15.107(a) AV



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase	Comment
	QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dB]	AV [dB]		
0.15001	23.0	0.7	13.3	36.3	14.0	66.0	56.0	29.7	42.0	N	
0.20015	31.8	14.8	13.3	45.1	28.1	63.6	53.6	18.5	25.5	N	
0.26845	24.4	9.7	13.3	37.7	23.0	61.2	51.2	23.5	28.2	N	
0.33547	18.4	5.1	13.3	31.7	18.4	59.3	49.3	27.6	30.9	N	
0.39940	11.0	-1.3	13.3	24.3	12.0	57.9	47.9	33.6	35.9	N	
0.53755	11.2	3.3	13.3	24.5	16.6	56.0	46.0	31.5	29.4	N	
0.15001	23.5	1.1	13.3	36.8	14.4	66.0	56.0	29.2	41.6	L	
0.19892	33.2	16.7	13.3	46.5	30.0	63.7	53.7	17.2	23.7	L	
0.26684	25.6	10.7	13.3	38.9	24.0	61.2	51.2	22.3	27.2	L	
0.33784	19.3	5.4	13.3	32.6	18.7	59.3	49.3	26.7	30.6	L	
0.40111	11.4	-1.1	13.3	24.7	12.2	57.8	47.8	33.1	35.6	L	
0.53755	9.7	2.1	13.3	23.0	15.4	56.0	46.0	33.0	30.6	L	

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

Radiated Emission

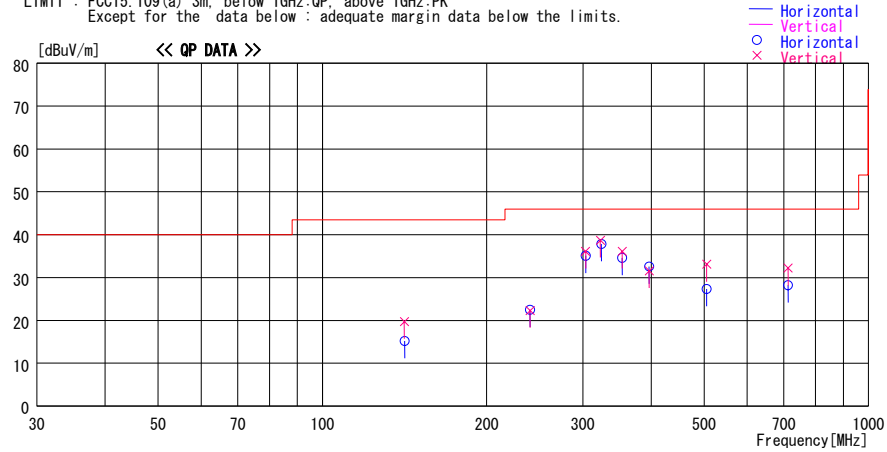
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2010/06/11

Report No. : 30KE0073-H0
 Temp./Humi. : 23deg. C / 51%
 Engineer : Katsunori Okai

Mode / Remarks : Bluetooth I/F continuous Printing mode, Worst-axis Hor:X, Ver:X

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]	
141.309	28.6	QP	14.6	-23.5	19.7	149	100	Vert.	43.5	23.8	
141.442	24.1	QP	14.6	-23.5	15.2	228	300	Hori.	43.5	28.3	
240.042	27.9	QP	17.3	-22.7	22.5	275	300	Hori.	46.0	23.5	
240.043	27.7	QP	17.3	-22.7	22.3	352	100	Vert.	46.0	23.7	
303.474	43.9	QP	14.4	-22.2	36.1	209	166	Vert.	46.0	9.9	
303.478	42.9	QP	14.4	-22.2	35.1	246	100	Hori.	46.0	10.9	
323.041	45.7	QP	15.1	-22.1	38.7	310	165	Vert.	46.0	7.3	
324.478	44.8	QP	15.1	-22.1	37.8	265	100	Hori.	46.0	8.2	
354.049	40.4	QP	16.1	-21.9	34.6	272	100	Hori.	46.0	11.4	
354.054	41.9	QP	16.1	-21.9	36.1	186	125	Vert.	46.0	9.9	
396.730	35.9	QP	17.3	-21.6	31.6	0	170	Vert.	46.0	14.4	
396.730	36.9	QP	17.3	-21.6	32.6	123	100	Hori.	46.0	13.4	
505.789	35.9	QP	18.2	-21.0	33.1	175	100	Vert.	46.0	12.9	
505.789	30.1	QP	18.2	-21.0	27.3	99	100	Hori.	46.0	18.7	
712.847	27.8	QP	20.6	-20.2	28.2	253	100	Hori.	46.0	17.8	
712.847	31.8	QP	20.6	-20.2	32.2	71	100	Vert.	46.0	13.8	

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)

Radiated Emission

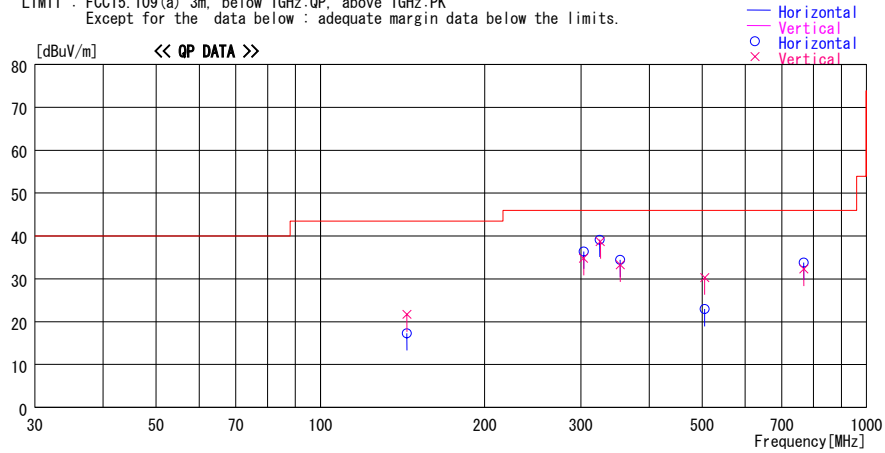
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber
 Date : 2010/06/11

Report No. : 30KE0073-H0
 Temp./Humi. : 23deg. C / 51%
 Engineer : Katsunori Okai

Mode / Remarks : IrDA I/F continuous Printing mode, Worst-axis Hor:X, Ver:X

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]	
144.022	30.5	QP	14.7	-23.5	21.7	170	100	Vert.	43.5	21.8	
144.025	26.1	QP	14.7	-23.5	17.3	325	300	Hori.	43.5	26.2	
303.472	42.6	QP	14.4	-22.2	34.8	208	156	Vert.	46.0	11.2	
303.478	44.2	QP	14.4	-22.2	36.4	258	100	Hori.	46.0	9.6	
324.899	46.1	QP	15.1	-22.1	39.1	278	100	Hori.	46.0	6.9	
325.599	45.6	QP	15.2	-22.1	38.7	215	126	Vert.	46.0	7.3	
354.045	40.2	QP	16.1	-21.9	34.4	274	100	Hori.	46.0	11.6	
354.051	39.1	QP	16.1	-21.9	33.3	190	100	Vert.	46.0	12.7	
505.783	25.8	QP	18.2	-21.0	23.0	251	100	Hori.	46.0	23.0	
505.789	33.1	QP	18.2	-21.0	30.3	181	100	Vert.	46.0	15.7	
768.109	32.1	QP	21.3	-19.6	33.8	242	113	Hori.	46.0	12.2	
768.125	30.6	QP	21.3	-19.6	32.3	196	100	Vert.	46.0	13.7	

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)

Radiated Emission

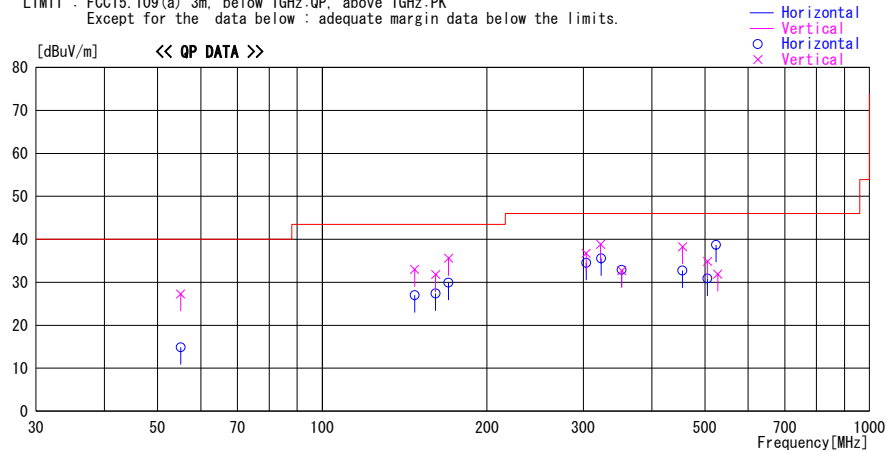
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2010/07/05

Report No. : 30KE0073-HO
 Temp./Humi. : 22deg.C / 67%
 Engineer : Keisuke Kawamura

Mode / Remarks : USB I/F continuous Printing mode, Worst-axis(Hor:X, Ver:X)

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		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
55.123	39.2	QP	9.7	-21.6	27.3	287	100	Vert.	40.0	12.7	
55.123	26.8	QP	9.7	-21.6	14.9	196	400	Hori.	40.0	25.1	
147.479	32.0	QP	15.5	-20.5	27.0	340	226	Hori.	43.5	16.5	
147.479	38.0	QP	15.5	-20.5	33.0	346	100	Vert.	43.5	10.5	
161.152	31.6	QP	16.1	-20.3	27.4	279	139	Hori.	43.5	16.1	
161.152	36.0	QP	16.1	-20.3	31.8	159	100	Vert.	43.5	11.7	
170.149	33.8	QP	16.4	-20.3	29.9	68	184	Hori.	43.5	13.6	
170.149	39.5	QP	16.4	-20.3	35.6	163	100	Vert.	43.5	7.9	
303.474	38.8	QP	14.7	-19.0	34.5	223	100	Hori.	46.0	11.5	
303.474	41.0	QP	14.7	-19.0	36.7	326	204	Vert.	46.0	9.3	
322.466	42.4	QP	15.3	-18.9	38.8	315	177	Vert.	46.0	7.2	
323.166	39.2	QP	15.3	-18.9	35.6	266	117	Hori.	46.0	10.4	
352.471	35.5	QP	16.2	-19.0	32.7	324	157	Vert.	46.0	13.3	
352.479	35.7	QP	16.2	-19.0	32.9	277	100	Hori.	46.0	13.1	
455.207	33.7	QP	18.0	-19.0	32.7	217	100	Hori.	46.0	13.3	
455.211	39.3	QP	18.0	-19.0	38.3	207	100	Vert.	46.0	7.7	
505.781	31.4	QP	18.5	-19.0	30.9	207	100	Hori.	46.0	15.1	
505.786	35.4	QP	18.5	-19.0	34.9	181	100	Vert.	46.0	11.1	
524.548	38.9	QP	18.7	-18.9	38.7	320	100	Hori.	46.0	7.3	
527.919	32.0	QP	18.8	-18.9	31.9	345	100	Vert.	46.0	14.1	

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)

Radiated Emission

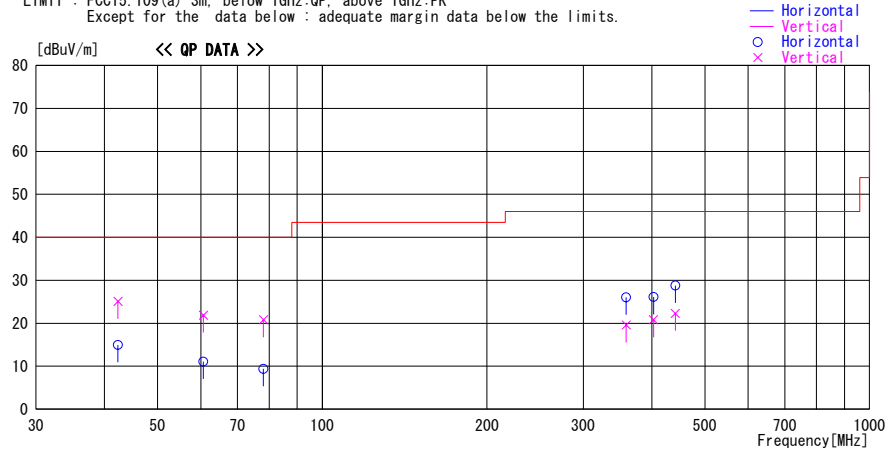
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No.2 Semi Anechoic Chamber
Date : 2010/07/05

Report No. : 30KE0073-H0
 Temp./Humi. : 22deg. C / 67%
 Engineer : Keisuke Kawamura

Mode / Remarks : Battery Charge mode, Worst-axis(Hor:X , Ver:X)

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]					
42.356	32.8	QP	14.1	-21.8	25.1	210	100	Vert.	40.0	14.9	
42.356	22.7	QP	14.1	-21.8	15.0	0	300	Hori.	40.0	25.0	
60.653	24.4	QP	8.2	-21.5	11.1	139	387	Hori.	40.0	28.9	
60.653	35.2	QP	8.2	-21.5	21.9	359	100	Vert.	40.0	18.1	
78.124	35.0	QP	7.0	-21.2	20.8	188	100	Vert.	40.0	19.2	
78.124	23.6	QP	7.0	-21.2	9.4	118	204	Hori.	40.0	30.6	
359.422	28.5	QP	16.4	-18.9	26.0	139	100	Hori.	46.0	20.0	
359.422	22.1	QP	16.4	-18.9	19.6	0	100	Vert.	46.0	26.4	
402.825	27.5	QP	17.5	-18.9	26.1	145	100	Hori.	46.0	19.9	
402.825	22.2	QP	17.5	-18.9	20.8	0	100	Vert.	46.0	25.2	
441.682	23.4	QP	17.9	-19.0	22.3	0	100	Vert.	46.0	23.7	
441.682	29.9	QP	17.9	-19.0	28.8	164	100	Hori.	46.0	17.2	

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)

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-05	Spectrum Analyzer	Advantest	R3273	160400285	RE/CE	2009/12/15 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE/CE	2009/10/23 * 12
MBA-05	Biconical Antenna	Schwarzbeck	BBA9106	1302	RE	2010/03/22 * 12
MLA-03	Logperiodic Antenna	Schwarzbeck	USLP9143	174	RE	2010/01/23 * 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
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	8127384	CE	2009/07/16 * 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	2009/07/01 * 12
MAEC-02	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-06902	RE/CE	2009/08/17 * 12
MOS-22	Thermo-Hygrometer	Custom	CTH-201	0003	RE/CE	2010/02/09 * 12
MJM-05	Measure	PROMART	SEN1955	-	RE/CE	-
MSA-03	Spectrum Analyzer	Agilent	E4448A	MY44020357	RE/CE	2009/11/20 * 12
MTR-03	Test Receiver	Rohde & Schwarz	ESCI	100300	RE/CE	2010/04/19 * 12
MLS-07	LISN(AMN)	Schwarzbeck	NSLK8127	8127364	CE(EUT)	2010/02/05 * 12
MCC-13	Coaxial Cable	Fujikura	3D-2W(12m)/5D-2W(5m)/5D-2W(0.8m)/5D-2W(1m)	-	CE	2010/02/22 * 12
MAT-65	Attenuator(13dB)	JFW Industries, Inc.	50FP-013H2 N	-	CE	2010/02/04 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	VHA91032008	RE	2009/10/05 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	201	RE	2010/06/12 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	-	RE	2010/02/22 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	BK7970	RE	2009/11/12 * 12
MPA-09	Pre Amplifier	Agilent	8447D	2944A10845	RE	2009/09/02 * 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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