

**APPENDIX 2: Data of EMI test**

**Radiated Emission below 30MHz (Fundamental and Spurious Emission)**

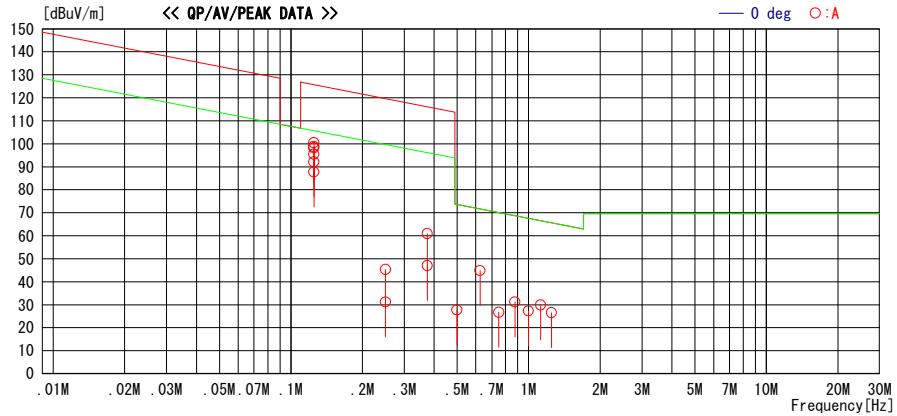
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No 3 Semi Anechoic Chamber  
Date : 2011/05/30

Report No. : 31BE0219-HO-15  
Temp. / Humi. : 22deg. C. / 32% RH  
Engineer : Tomotaka Sasagawa

Mode / Remarks : Tx 125KHz, Worst-axis(ECU:X, ANT:X)

LIMIT : FCC15.209(a) 3m, 9-90kHz:PK, 110-490kHz:PK, other:QP  
FCC15.209(a) 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]	
0.12500	106.7	PEAK	19.9	6.0	32.2	100.4	125.7	25.3	0	A	348
0.12500	94.1	AV	19.9	6.0	32.2	87.8	105.7	17.9	0	A	348
0.12500	104.5	PEAK	19.9	6.0	32.2	98.2	125.7	27.5	45	A	11
0.12500	101.8	PEAK	19.9	6.0	32.2	95.5	125.7	30.2	90	A	32
0.12500	105.1	PEAK	19.9	6.0	32.2	98.8	125.7	26.9	135	A	75
0.12500	98.5	PEAK	19.9	6.0	32.2	92.2	125.7	33.5	0	A	112 HOR
0.25000	19.5	PEAK	19.7	6.1	0.0	45.3	119.7	74.4	0	A	338
0.25000	5.5	AV	19.7	6.1	0.0	31.3	99.7	68.4	0	A	338
0.37500	35.2	PEAK	19.6	6.1	0.0	60.9	116.1	55.2	0	A	16
0.37500	21.3	AV	19.6	6.1	0.0	47.0	96.1	49.1	0	A	16
0.50000	2.2	QP	19.5	6.1	0.0	27.8	73.6	45.8	0	A	51
0.62500	19.2	QP	19.5	6.1	0.0	44.8	71.7	26.9	0	A	9
0.75000	1.2	QP	19.4	6.1	0.0	26.7	70.1	43.4	0	A	227
0.87500	5.8	QP	19.4	6.1	0.0	31.3	68.7	37.4	0	A	355
1.00000	1.8	QP	19.4	6.1	0.0	27.3	67.6	40.3	0	A	275
1.12500	4.3	QP	19.4	6.1	0.0	29.8	66.5	36.7	0	A	84
1.25000	1.1	QP	19.4	6.1	0.0	26.6	65.6	39.0	0	A	178

CHART: WITH FACTOR, ANT TYPE: LOOP, Except for the data below: adequate margin data below the limits.  
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.

**Radiated Emission above 30MHz (Spurious Emission)**

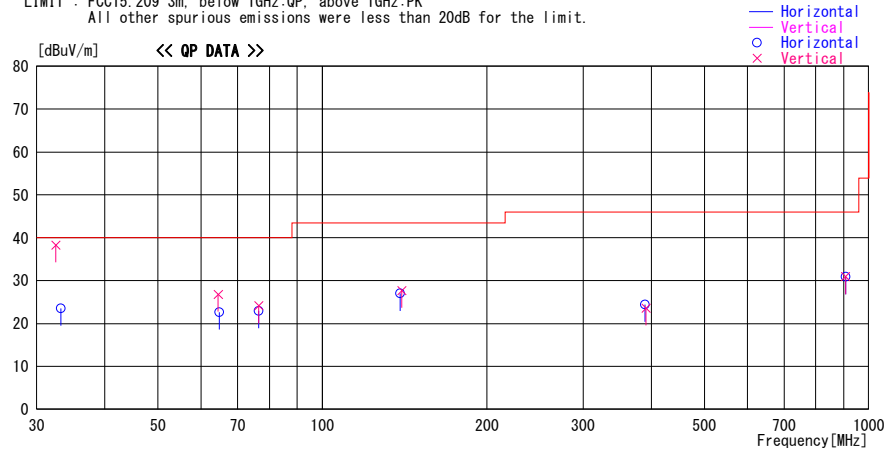
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2011/05/29

Report No. : 31BE0219-HO-15  
Temp. / Humi. : 26deg. C / 32% RH  
Engineer : Tomotaka Sasagawa

Mode / Remarks : Tx 125KHz

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	Loss&	Level	Angle	Height	Polar.	Limit	Margin	Comment
			Factor	Gain							
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]	
32.524	54.8	QP	17.2	-33.7	38.3	203	179	Vert.	40.0	1.7	
33.246	40.3	QP	17.0	-33.7	23.6	61	300	Hori.	40.0	16.5	
64.746	48.6	QP	7.0	-33.0	22.6	1	300	Hori.	40.0	17.4	
64.518	52.8	QP	7.0	-33.0	26.8	157	179	Vert.	40.0	13.2	
76.533	49.2	QP	6.6	-32.8	23.0	156	300	Hori.	40.0	17.0	
76.533	50.3	QP	6.6	-32.8	24.1	350	179	Vert.	40.0	15.9	
138.758	45.1	QP	13.7	-31.8	27.0	225	300	Hori.	43.5	16.5	
139.840	45.8	QP	13.7	-31.8	27.7	288	179	Vert.	43.5	15.8	
389.779	36.2	QP	17.6	-29.4	24.4	225	200	Hori.	46.0	21.6	
391.182	35.3	QP	17.7	-29.4	23.6	357	100	Vert.	46.0	22.4	
907.422	34.5	QP	22.5	-26.1	30.9	74	100	Hori.	46.0	15.1	
907.422	34.5	QP	22.5	-26.1	30.9	263	100	Vert.	46.0	15.1	

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)

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

### -26dB Bandwidth

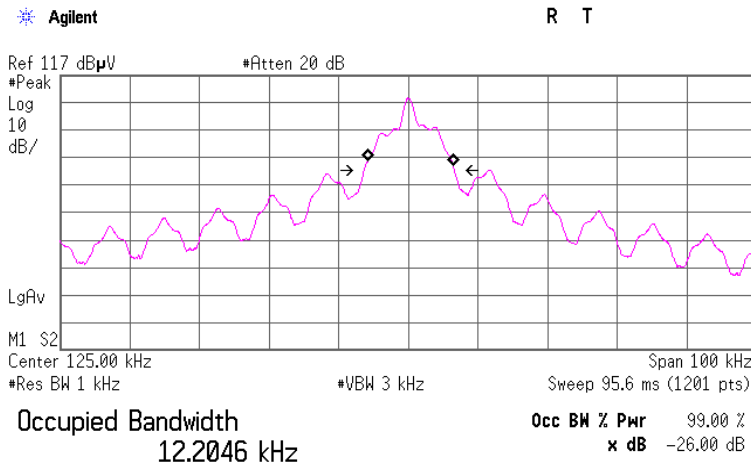
UL Japan, Inc.  
Head Office EMC Lab. No.3 Semi Anechoic Chamber

REPORT NO : 31BE0219-HO-15

TEST DISTANCE : 3m  
DATE : 05/30/2011  
TEMPERATURE : 21 deg.C  
HUMIDITY : 31 % RH  
Engineer : Tomotaka Sasagawa

MODE : Tx

FREQ	-26dB Bandwidth
[kHz]	[kHz]
125.0	12.929



Transmit Freq Error 350.060 Hz  
x dB Bandwidth 12.929 kHz

### APPENDIX 3: Test instruments

#### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Serial No	Test Item	Calibration Date * Interval(month)
MAEC-01	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 10m	DA-06881	RE	2010/07/02 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	MOS01	RE	2011/02/23 * 12
MJM-01	Measure	KDS	ES19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	100084	RE	2010/12/07 * 12
KBA-05	Biconical Antenna	Schwarzbeck	BBA9106	2513	RE	2010/10/15 * 12
KLA-04	Logperiodic Antenna	Schwarzbeck	USLP9143	361	RE	2010/10/16 * 12
MAT-08	Attenuator(6dB)	Weinschel Corp	2	BK7971	RE	2010/11/05 * 12
MCC-01	Coaxial Cable 0.1-3000MHz	Suhner/storm/Agilent/TSJ	-	-	RE	2010/10/14 * 12
MPA-20	Pre Amplifier	Elena	EPA-4020YA	030801	RE	2011/03/27 * 12
MAEC-03	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2011/02/22 * 12
MOS-13	Thermo-Hygrometer	Custom	CTH-180	-	RE	2011/02/23 * 12
MJM-06	Measure	PROMART	SEN1955	-	RE	-
MSA-0	Spectrum Analyzer	Advantest	R3131A	101000368	RE	Pre Check
MTR-08	Test Receiver	Rohde & Schwarz	ESCI	100767	RE	2010/08/23 * 12
MLPA-02	Loop Antenna	Rohde & Schwarz	HFH2-Z2	836553/009	RE	2010/12/08 * 12
MCC-112	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(3m)/sucoform141-PE(1m)/421-010(1.5m)/RFM-E321(Switcher)	-/00640	RE	2010/07/23 * 12
MCC-31	Coaxial cable	UL Japan	-	-	RE	2010/07/20 * 12
MPA-13	Pre Amplifier	SONOMA INSTRUMENT	310	260834	RE	2011/03/04 * 12
MAT-09	Attenuator(6dB)	Weinschel Corp	2	BK7973	RE	2010/11/05 * 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:

RE: Spurious emission

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