

**APPENDIX 2: Data of EMI test**

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

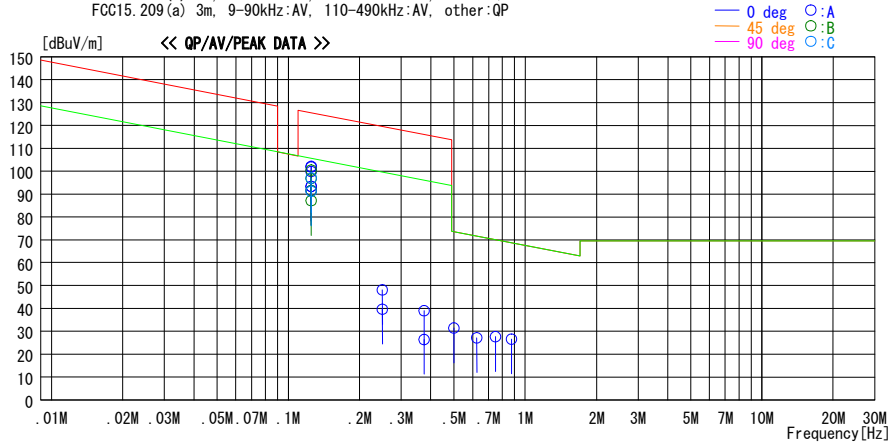
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2010/11/29

Report No. : 31DE0073-HO-01  
Temp./Humi. : 26deg. C. / 29%  
Engineer : Keisuke Kawamura

Mode / Remarks : Tx 125kHz, Modulation ON , Worst-Axis (ANT:X , EGU: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	76.4	PEAK	19.9	5.9	0.0	102.2	125.6	23.4	0	A	92 Worst
0.12500	74.7	PEAK	19.9	5.9	0.0	100.5	125.6	25.1	45	B	53
0.12500	71.2	PEAK	19.9	5.9	0.0	97.0	125.6	28.6	90	C	83
0.12500	65.5	AV	19.9	5.9	0.0	91.3	105.7	14.4	90	C	83
0.12500	67.5	AV	19.9	5.9	0.0	93.3	105.7	12.4	0	A	92 Worst
0.12500	74.1	PEAK	19.9	5.9	0.0	99.9	125.6	25.7	135	A	107
0.12500	65.8	AV	19.9	5.9	0.0	91.6	105.7	14.1	135	A	107
0.12500	65.7	AV	19.9	5.9	0.0	91.5	105.7	14.2	45	B	53
0.12500	71.1	PEAK	19.9	5.9	0.0	96.9	125.6	28.7	0	B	83
0.12500	61.3	AV	19.9	5.9	0.0	87.1	105.7	18.6	0	B	83
0.12500	76.0	PEAK	19.9	5.9	0.0	101.8	125.6	23.8	180	A	83
0.12500	67.5	AV	19.9	5.9	0.0	93.3	105.7	12.4	180	A	83
0.25000	22.3	PEAK	19.7	6.0	0.0	48.0	119.6	71.6	0	A	359
0.25000	13.8	AV	19.7	6.0	0.0	39.5	99.6	60.1	0	A	359
0.37500	13.4	PEAK	19.6	6.0	0.0	39.0	116.1	77.1	0	A	359
0.37500	0.8	AV	19.6	6.0	0.0	26.4	96.1	69.7	0	A	359
0.50000	5.9	QP	19.5	6.0	0.0	31.4	73.6	42.2	0	A	359
0.62500	1.6	QP	19.5	6.0	0.0	27.1	71.7	44.6	0	A	359
0.75000	2.2	QP	19.4	6.0	0.0	27.6	70.1	42.5	0	A	359
0.87500	1.2	QP	19.4	6.0	0.0	26.6	68.7	42.1	0	A	359

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. )

\*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

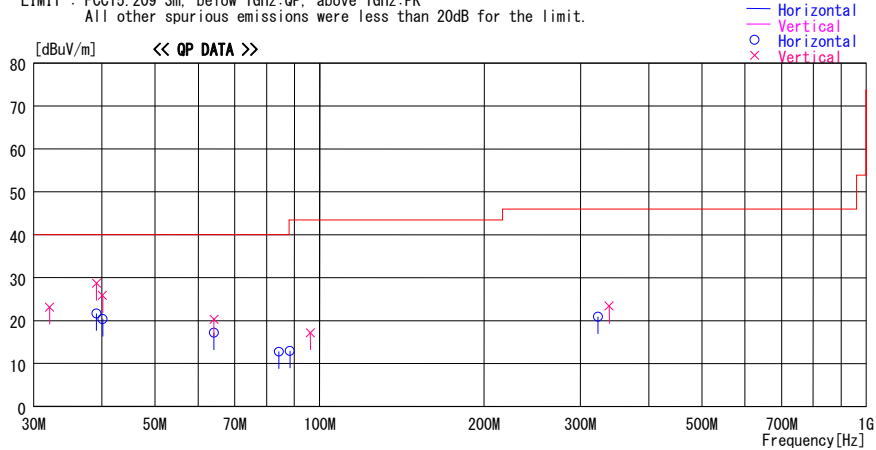
UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber  
 Date : 2010/11/29

Report No. : 31DE0073-H0-01

Temp./Humi. : 26deg. C / 29%  
 Engineer : Keisuke Kawamura

Mode / Remarks : Tx 125kHz, Modulation ON , Worst-Axis(Hori:ANT:X, ECU:X / Vert:ANT:X, ECU:X)

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 [dB/m]	Gain [dB]							
32.069	31.0	QP	17.3	-25.1	23.2	279	100	Vert.	40.0	16.8	
39.085	38.7	QP	14.9	-24.9	28.7	276	100	Vert.	40.0	11.3	
39.085	31.7	QP	14.9	-24.9	21.7	359	351	Hori.	40.0	18.3	
40.087	36.3	QP	14.5	-24.9	25.9	276	100	Vert.	40.0	14.1	
40.087	30.8	QP	14.5	-24.9	20.4	186	342	Hori.	40.0	19.6	
64.145	37.1	QP	7.7	-24.5	20.3	282	100	Vert.	40.0	19.7	
64.145	34.0	QP	7.7	-24.5	17.2	189	305	Hori.	40.0	22.8	
84.187	29.7	QP	7.4	-24.3	12.8	192	225	Hori.	40.0	27.2	
88.198	29.1	QP	8.1	-24.3	12.9	183	218	Hori.	43.5	30.6	
96.212	31.7	QP	9.6	-24.1	17.2	85	100	Vert.	43.5	26.3	
338.723	28.9	QP	16.5	-22.0	23.4	252	100	Vert.	46.0	22.6	
322.687	26.8	QP	16.2	-22.1	20.9	315	146	Hori.	46.0	25.1	

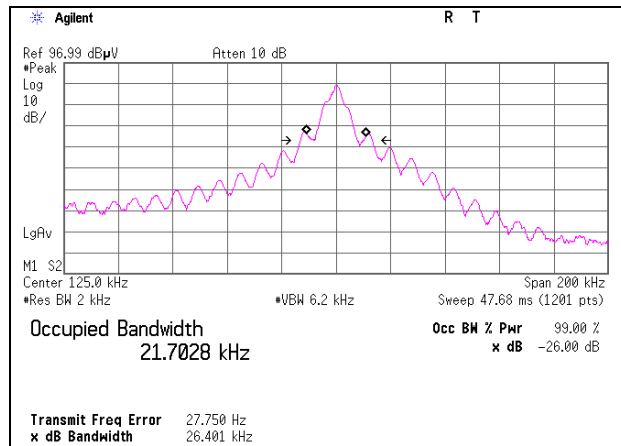
CHART: WITH FACTOR ANT TYPE: -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
 CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

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

### -26dB Bandwidth and 99% Occupied Bandwidth

Test place	Head Office EMC Lab. No.4 Semi Anechoic Chamber
Report No.	31DE0073-HO-01
Date	11/29/2010
Temperature/ Humidity	26 deg.C./ 29%
Engineer	Keisuke Kawamura
Mode	Tx 125kHz

FREQ	-26dB Bandwidth	99% Occupied Bandwidth
[kHz]	[kHz]	[kHz]
125	26.401	21.703



### **APPENDIX 3: Test instruments**

#### **EMI test equipment**

<b>Control No.</b>	<b>Instrument</b>	<b>Manufacturer</b>	<b>Model No</b>	<b>Serial No</b>	<b>Test Item</b>	<b>Calibration Date * Interval(month)</b>
MAEC-04	Semi Anechoic Chamber(NSA)	TDK	Semi Anechoic Chamber 3m	DA-10005	RE	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-09	Measure	KDS	E19-55	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-10	Spectrum Analyzer	Agilent	E4448A	MY46180655	RE	2010/02/03 * 12
MTR-07	Test Receiver	Rohde & Schwarz	ESCI	100635	RE	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
MLPA-01	Loop Antenna	Rohde & Schwarz	HFH2-Z2	100017	RE	2010/10/15 * 12
MCC-113	Coaxial cable	Fujikura/Suhner/TSJ	5D-2W(10m)/SFM141(5m)/421-010(1m)/sucoform141-PE(1m)/RFM-E121(Switcher)	-/04178	RE	2010/07/21 * 12
MCC-30	Coaxial cable	UL Japan	-	-	RE	2010/07/20 * 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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