

**APPENDIX 2: Data of EMI test**

**Radiated Emission**

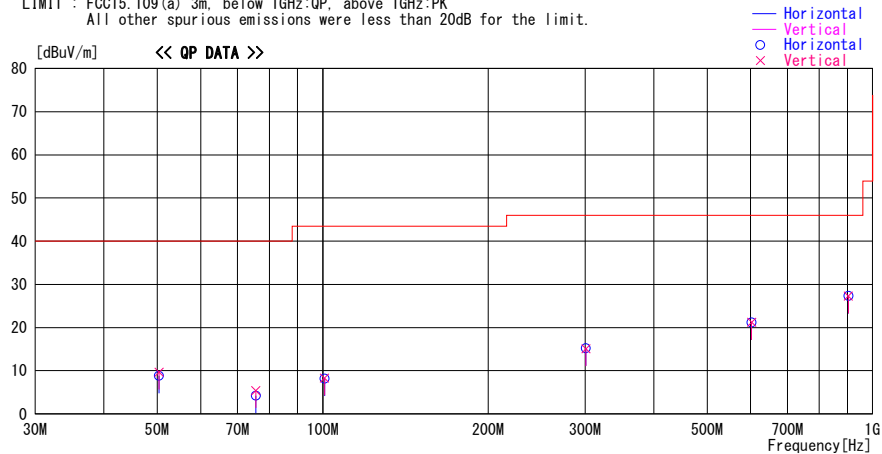
**DATA OF RADIATED EMISSION TEST**

UL Japan, Inc. Head Office EMC Lab. No.4 Semi Anechoic Chamber  
Date : 2011/01/31

Report No. : 31FE0145-HO-01  
Temp./Humi. : 20deg. C / 30%  
Engineer : Keisuke Kawamura

Mode / Remarks : Rx 312.10MHz Worst-axis(Hori:X / Vert:X)

LIMIT : FCC15.109(a) 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 [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB]	Gain [dB]							
50.400	22.4	QP	11.0	-24.6	8.8	0	300	Hori.	40.0	31.2	
50.400	23.3	QP	11.0	-24.6	9.7	0	100	Vert.	40.0	30.3	
75.600	23.2	QP	6.6	-24.4	5.4	0	100	Vert.	40.0	34.6	
75.600	22.0	QP	6.6	-24.4	4.2	0	300	Hori.	40.0	35.8	
100.800	21.8	QP	10.4	-24.0	8.2	0	300	Hori.	43.5	35.3	
100.800	21.9	QP	10.4	-24.0	8.3	0	100	Vert.	43.5	35.2	
301.200	21.5	QP	15.8	-22.2	15.1	0	100	Vert.	46.0	30.9	
301.200	21.6	QP	15.8	-22.2	15.2	0	100	Hori.	46.0	30.8	
602.400	21.7	QP	20.1	-20.6	21.2	0	100	Hori.	46.0	24.8	
602.400	21.7	QP	20.1	-20.6	21.2	0	100	Vert.	46.0	24.8	
903.600	21.5	QP	24.2	-18.4	27.3	0	100	Vert.	46.0	18.7	
903.600	21.5	QP	24.2	-18.4	27.3	0	100	Hori.	46.0	18.7	

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)

\*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

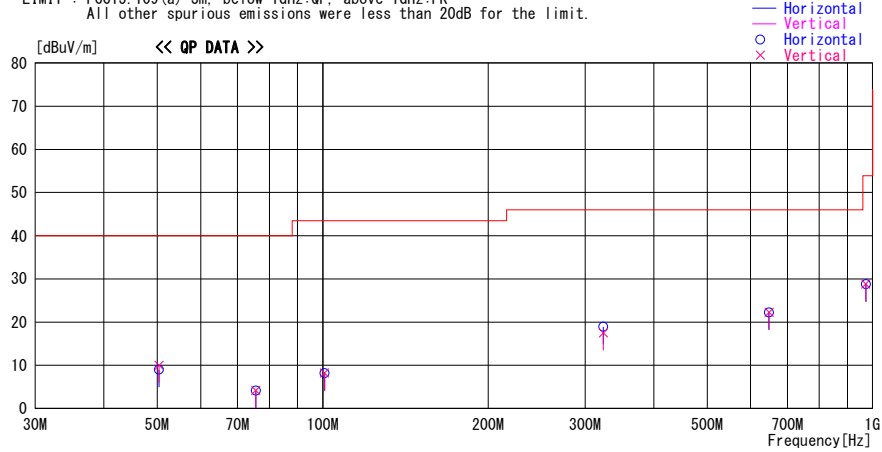
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All other spurious emissions were less than 20dB for the limit.



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]	
50.400	22.6	QP	11.0	-24.6	9.0	0	300	Hori.	40.0	31.0	
50.400	23.6	QP	11.0	-24.6	10.0	0	100	Vert.	40.0	30.0	
75.600	22.0	QP	6.6	-24.4	4.2	0	100	Vert.	40.0	35.8	
75.600	21.9	QP	6.6	-24.4	4.1	0	300	Hori.	40.0	35.9	
100.800	21.8	QP	10.4	-24.0	8.2	0	300	Hori.	43.5	35.3	
100.800	21.8	QP	10.4	-24.0	8.2	0	100	Vert.	43.5	35.3	
324.000	23.4	QP	16.2	-22.1	17.5	204	100	Vert.	46.0	28.5	
324.000	24.8	QP	16.2	-22.1	18.9	171	100	Hori.	46.0	27.1	
648.000	21.7	QP	21.0	-20.5	22.2	0	100	Hori.	46.0	23.8	
648.000	21.8	QP	21.0	-20.5	22.3	0	100	Vert.	46.0	23.7	
972.000	20.7	QP	26.0	-17.9	28.8	0	100	Vert.	53.9	25.1	
972.000	20.7	QP	26.0	-17.9	28.8	0	100	Hori.	53.9	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)

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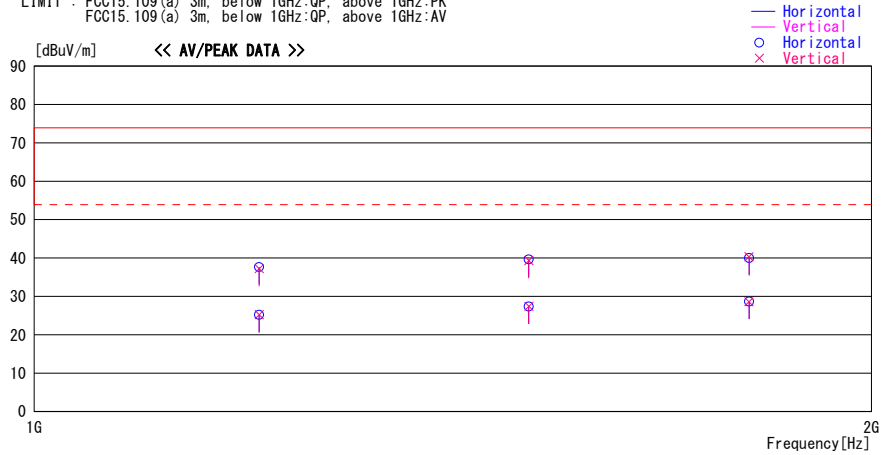
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LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK  
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]	Comment
			Factor [dB/m]	Loss& Gain [dB]							
1204.800	44.9	PK	24.6	-31.8	37.7	0	100	Hori.	73.9	36.2	
1204.800	44.4	PK	24.6	-31.8	37.2	0	100	Vert.	73.9	36.7	
1204.800	32.4	AV	24.6	-31.8	25.2	0	100	Hori.	53.9	28.7	
1204.800	32.4	AV	24.6	-31.8	25.2	0	100	Vert.	53.9	28.7	
1506.000	44.3	PK	25.8	-30.8	39.3	0	100	Vert.	73.9	34.6	
1506.000	44.7	PK	25.8	-30.8	39.7	0	100	Hori.	73.9	34.2	
1506.000	32.4	AV	25.8	-30.8	27.4	0	100	Vert.	53.9	26.5	
1506.000	32.4	AV	25.8	-30.8	27.4	0	100	Hori.	53.9	26.5	
1807.200	43.4	PK	26.7	-30.0	40.1	0	100	Hori.	73.9	33.9	
1807.200	43.6	PK	26.7	-30.0	40.3	0	100	Vert.	73.9	33.6	
1807.200	31.9	AV	26.7	-30.0	28.6	0	100	Hori.	53.9	25.3	
1807.200	31.9	AV	26.7	-30.0	28.6	0	100	Vert.	53.9	25.3	

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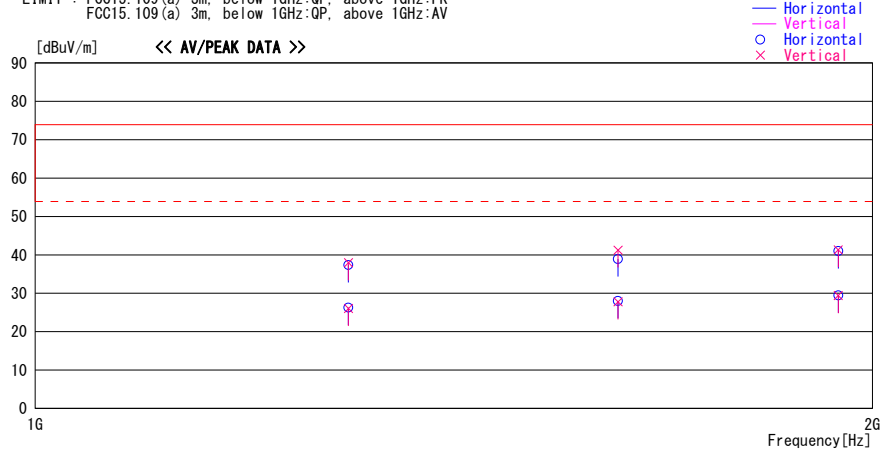
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FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



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]							
1296.000	43.8	PK	25.0	-31.4	37.4	0	100	Hori.	73.9	36.5	
1296.000	44.3	PK	25.0	-31.4	37.9	0	100	Vert.	73.9	36.0	
1296.000	32.7	AV	25.0	-31.4	26.3	0	100	Hori.	53.9	27.6	
1296.000	32.4	AV	25.0	-31.4	26.0	0	100	Vert.	53.9	27.9	
1620.000	45.5	PK	26.2	-30.5	41.2	0	100	Vert.	73.9	32.7	
1620.000	32.4	AV	26.2	-30.5	28.1	0	100	Hori.	53.9	25.9	
1620.000	32.1	AV	26.2	-30.5	27.8	0	100	Vert.	53.9	26.1	
1620.000	43.2	PK	26.2	-30.5	38.9	0	100	Hori.	73.9	35.0	
1944.000	32.0	AV	27.1	-29.6	29.5	0	100	Hori.	53.9	24.5	
1944.000	31.9	AV	27.1	-29.6	29.4	0	100	Vert.	53.9	24.5	
1944.000	43.5	PK	27.1	-29.6	41.0	0	100	Hori.	73.9	32.9	
1944.000	43.9	PK	27.1	-29.6	41.4	0	100	Vert.	73.9	32.5	

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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### **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	2010/02/02 * 12
MOS-15	Thermo-Hygrometer	Custom	CTH-180	-	RE	2010/02/09 * 12
MJM-07	Measure	PROMART	SEN1955	-	RE	-
COTS-MEMI	EMI measurement program	TSJ	TEPTO-DV	-	RE	-
MSA-05	Spectrum Analyzer	Advantest	R3273	160400285	RE	2010/11/18 * 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	2011/01/14 * 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	267195/4(0.6m) / 292411(5m)	RE	2010/11/26 * 12
MPA-12	MicroWave System Amplifier	Agilent	83017A	MY39500780	RE	2010/03/16 * 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: Radiated emission**

**UL Japan, Inc.**

**Head Office EMC Lab.**

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