

APPENDIX 2: Data of EMI test

**Radiated Emission
Rx 312.1MHz**

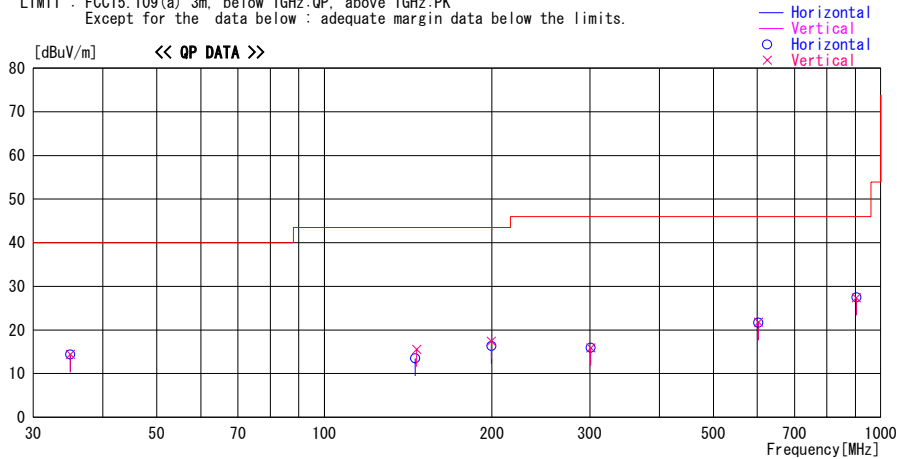
DATA OF RADIATED EMISSION TEST

UL Japan, Inc. Head Office EMC Lab. No. 4 Semi Anechoic Chamber
Date : 2010/04/23

Report No. : 30HE0225-HO-01
Temp./Humi. : 22deg.C. / 53%
Engineer : Norihisa Hashimoto

Mode / Remarks : Rx 312.1MHz / Worst axis: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 |
|--------------------|-------------------|-----|---------|-------|----------|-------|--------|--------|----------|--------|
| | | | Factor | Gain | | | | | | |
| | | | [dB/m] | [dB] | [dBuV/m] | [Deg] | [cm] | | [dBuV/m] | [dB] |
| 34.952 | 22.7 | QP | 16.6 | -24.9 | 14.4 | 29 | 100 | Hori. | 40.0 | 25.6 |
| 34.985 | 22.7 | QP | 16.6 | -24.9 | 14.4 | 303 | 100 | Vert. | 40.0 | 25.6 |
| 145.651 | 22.2 | QP | 14.8 | -23.5 | 13.5 | 41 | 124 | Hori. | 43.5 | 30.0 |
| 146.551 | 24.3 | QP | 14.8 | -23.5 | 15.6 | 8 | 100 | Vert. | 43.5 | 27.9 |
| 199.649 | 22.5 | QP | 16.8 | -23.0 | 16.3 | 177 | 151 | Hori. | 43.5 | 27.2 |
| 199.648 | 23.6 | QP | 16.8 | -23.0 | 17.4 | 235 | 100 | Vert. | 43.5 | 26.1 |
| 301.200 | 22.1 | QP | 16.0 | -22.2 | 15.9 | 356 | 395 | Hori. | 46.0 | 30.1 |
| 301.200 | 22.1 | QP | 16.0 | -22.2 | 15.9 | 176 | 100 | Vert. | 46.0 | 30.1 |
| 602.400 | 22.4 | QP | 20.0 | -20.6 | 21.8 | 226 | 100 | Vert. | 46.0 | 24.2 |
| 602.400 | 22.3 | QP | 20.0 | -20.6 | 21.7 | 221 | 167 | Hori. | 46.0 | 24.3 |
| 903.600 | 22.1 | QP | 23.8 | -18.4 | 27.5 | 273 | 301 | Hori. | 46.0 | 18.5 |
| 903.600 | 22.0 | QP | 23.8 | -18.4 | 27.4 | 0 | 100 | Vert. | 46.0 | 18.6 |

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 Rx 314.35MHz

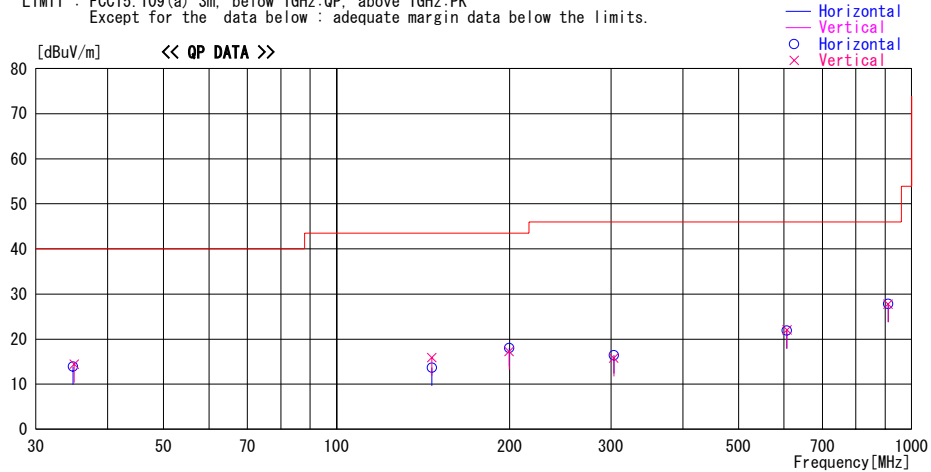
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Report No. : 30HE0225-HO-01
Temp./Humi. : 22deg. C. / 53%
Engineer : Norihisa Hashimoto

Mode / Remarks : Rx 314.35MHz / Worst axis: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] |
|--------------------|-------------------|-----|------------------|-----------------------|-------------------|----------------|----------------|--------|-------------------|----------------|
| | | | Factor [dB/m] | Loss& Gain [dB] | | | | | | |
| 34.806 | 22.3 | QP | 16.6 | -25.0 | 13.9 | 253 | 186 | Hori. | 40.0 | 26.1 |
| 34.975 | 22.7 | QP | 16.6 | -24.9 | 14.4 | 72 | 106 | Vert. | 40.0 | 25.6 |
| 146.550 | 22.4 | QP | 14.8 | -23.5 | 13.7 | 192 | 214 | Hori. | 43.5 | 29.8 |
| 146.450 | 24.6 | QP | 14.8 | -23.5 | 15.9 | 26 | 100 | Vert. | 43.5 | 27.6 |
| 199.649 | 24.2 | QP | 16.8 | -23.0 | 18.0 | 158 | 299 | Hori. | 43.5 | 25.5 |
| 199.649 | 23.5 | QP | 16.8 | -23.0 | 17.3 | 88 | 100 | Vert. | 43.5 | 26.2 |
| 303.450 | 22.0 | QP | 16.0 | -22.2 | 15.8 | 351 | 102 | Vert. | 46.0 | 30.2 |
| 303.450 | 22.6 | QP | 16.0 | -22.2 | 16.4 | 158 | 145 | Hori. | 46.0 | 29.6 |
| 606.900 | 22.4 | QP | 20.2 | -20.6 | 22.0 | 82 | 100 | Vert. | 46.0 | 24.0 |
| 606.900 | 22.3 | QP | 20.2 | -20.6 | 21.9 | 294 | 227 | Hori. | 46.0 | 24.1 |
| 910.350 | 22.2 | QP | 24.0 | -18.4 | 27.8 | 213 | 100 | Vert. | 46.0 | 18.2 |
| 910.350 | 22.2 | QP | 24.0 | -18.4 | 27.8 | 80 | 174 | Hori. | 46.0 | 18.2 |

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)

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Radiated Emission
Rx 312.1MHz

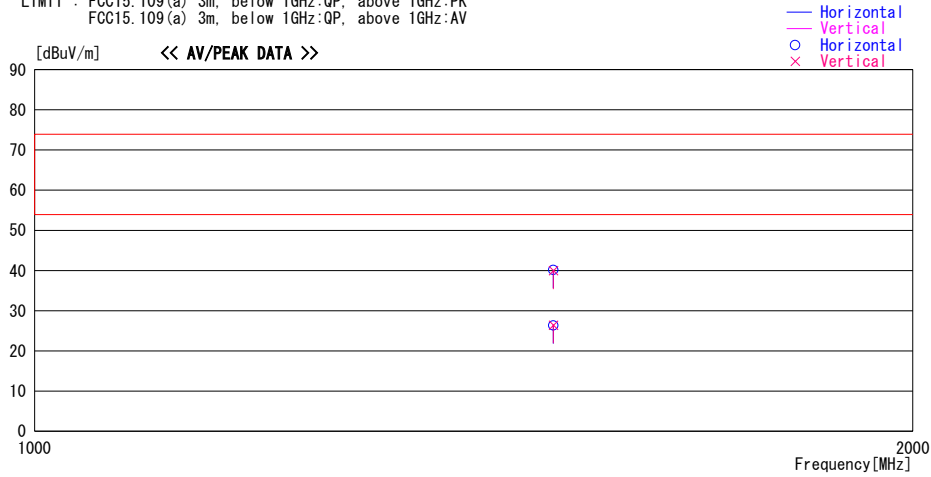
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Engineer : Norihisa Hashimoto

Mode / Remarks : Rx 312.1MHz / Worst axis:X

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 | Angle | Height | Polar. | Limit | Margin |
|--------------------|-------------------|-----|---------|-------|----------|-------|--------|--------|----------|--------|
| | | | Factor | Gain | | | | | [dBuV/m] | [dB] |
| | | | [dB/m] | [dB] | [dBuV/m] | [Deg] | [cm] | | [dBuV/m] | [dB] |
| 1506.000 | 45.8 | PK | 25.3 | -30.9 | 40.2 | 199 | 100 | Hori. | 73.9 | 33.7 |
| 1506.000 | 45.6 | PK | 25.3 | -30.9 | 40.0 | 350 | 113 | Vert. | 73.9 | 34.0 |
| 1506.000 | 32.0 | AV | 25.3 | -30.9 | 26.4 | 350 | 113 | Vert. | 53.9 | 27.5 |
| 1506.000 | 32.0 | AV | 25.3 | -30.9 | 26.4 | 199 | 100 | Hori. | 53.9 | 27.5 |

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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Radiated Emission
Rx 314.35MHz

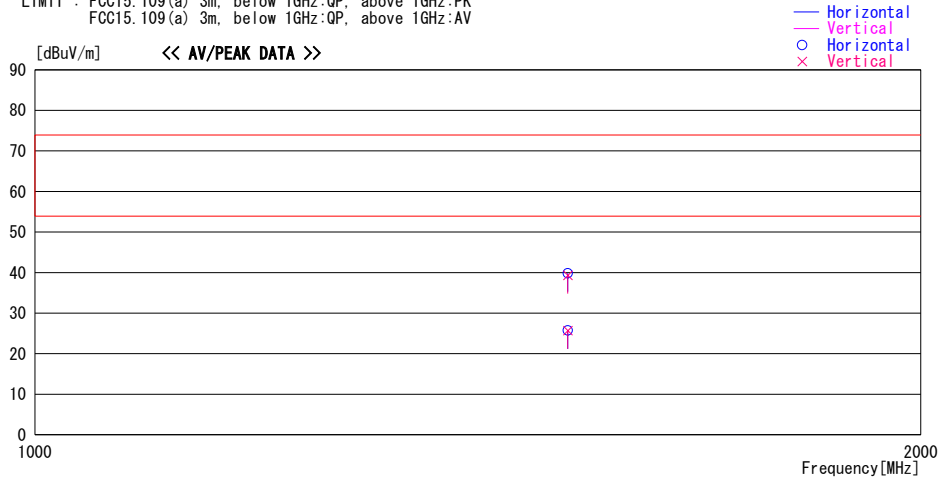
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LIMIT : FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:PK
FCC15.109(a) 3m, below 1GHz:QP, above 1GHz:AV



| Frequency [MHz] | Reading [dBuV] | DET | Antenna | | Level [dBuV/m] | Angle [Deg] | Height [cm] | Polar. | Limit | |
|--------------------|-------------------|-----|------------------|-----------------------|-------------------|----------------|----------------|--------|----------|------|
| | | | Factor [dB/m] | Loss& Gain [dB] | | | | | [dBuV/m] | [dB] |
| 1517.250 | 45.5 | PK | 25.3 | -30.9 | 39.9 | 82 | 100 | Hori. | 73.9 | 34.0 |
| 1517.250 | 45.0 | PK | 25.3 | -30.9 | 39.4 | 269 | 100 | Vert. | 73.9 | 34.5 |
| 1517.250 | 31.3 | AV | 25.3 | -30.9 | 25.7 | 269 | 100 | Vert. | 53.9 | 28.2 |
| 1517.250 | 31.3 | AV | 25.3 | -30.9 | 25.7 | 82 | 100 | Hori. | 53.9 | 28.2 |

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)

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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-04 | Spectrum Analyzer | Agilent | E4448A | US44300523 | RE | 2009/08/25 * 12 |
| MTR-07 | Test Receiver | Rohde & Schwarz | ESCI | 100635 | RE | 2009/10/23 * 12 |
| MBA-05 | Biconical Antenna | Schwarzbeck | BBA9106 | 1302 | RE | 2010/03/22 * 12 |
| MLA-08 | Logperiodic Antenna | Schwarzbeck | UKLP9140-A | N/A | 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 |
| MHA-21 | Horn Antenna 1-18GHz | Schwarzbeck | BBHA9120D | 9120D-557 | RE | 2009/08/10 * 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 |

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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