



A D T

FCC TEST REPORT

REPORT NO.: RF980421H01

MODEL NO.: M-R0009

RECEIVED: Apr. 21, 2009

TESTED: Apr. 22 to 28, 2009

ISSUED: May 11, 2009

APPLICANT: LOGITECH FAR EAST LTD.

ADDRESS: #2 Creation Rd. 4, Science-Based Ind. Park
Hsinchu Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services
(H.K.) Ltd., Taoyuan Branch

TEST LOCATION: No. 81-1, Lu Liao Keng, 9th Ling,Wu Lung
Tsuen, Chiung Lin Hsiang, Hsin Chu Hsien 307,
Taiwan

This test report consists of 21 pages in total. It may be duplicated completely for legal use with the approval of the applicant. It should not be reproduced, except in full, without the written approval of our laboratory. The client should not use it to claim product endorsement by TAF or any government agencies.





Table of Contents

| | | |
|-------|---|----|
| 1 | CERTIFICATION | 3 |
| 2 | SUMMARY OF TEST RESULTS | 4 |
| 2.1 | MEASUREMENT UNCERTAINTY | 4 |
| 3 | GENERAL INFORMATION | 5 |
| 3.1 | GENERAL DESCRIPTION OF EUT | 5 |
| 3.2 | DESCRIPTION OF TEST MODES | 6 |
| 3.3 | GENERAL DESCRIPTION OF APPLIED STANDARDS | 6 |
| 3.4 | DESCRIPTION OF SUPPORT UNITS | 7 |
| 3.5 | CONFIGURATION OF SYSTEM UNDER TEST | 7 |
| 4 | TEST PROCEDURES AND RESULTS | 8 |
| 4.1 | RADIATED EMISSION MEASUREMENT | 8 |
| 4.1.1 | LIMITS OF RADIATED EMISSION MEASUREMENT | 8 |
| 4.1.2 | TEST INSTRUMENTS | 9 |
| 4.1.3 | TEST PROCEDURES | 10 |
| 4.1.4 | DEVIATION FROM TEST STANDARD | 10 |
| 4.1.5 | TEST SETUP | 11 |
| 4.1.6 | EUT OPERATING CONDITIONS | 11 |
| 4.1.7 | TEST RESULTS | 12 |
| 4.2 | CONDUCTED - OUT BAND MEASUREMENT | 18 |
| 4.2.1 | LIMITS OF CONDUCTED - OUT BAND MEASUREMENT | 18 |
| 4.2.2 | TEST INSTRUMENTS | 18 |
| 4.2.3 | TEST PROCEDURE | 18 |
| 4.2.4 | DEVIATION FROM TEST STANDARD | 18 |
| 4.2.5 | EUT OPERATING CONDITION | 18 |
| 4.2.6 | TEST RESULTS | 19 |
| 5 | INFORMATION ON THE TESTING LABORATORIES | 20 |
| 6 | APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB | 21 |



A D T

1 CERTIFICATION

PRODUCT : 2.4GHz Cordless Mouse
BRAND NAME : Logitech
MODEL NO. : M-R0009
TESTED : Apr. 22 to 28, 2009
TEST SAMPLE : MASS-PRODUCTION
APPLICANT : LOGITECH FAR EAST LTD.
STANDARDS : 47 CFR Part 15, Subpart C (Section 15.249),
ANSI C63.4-2003

The above equipment (Model: M-R0009) has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

PREPARED BY : *Sunny Wen* , **DATE:** May 11, 2009
(Sunny Wen, Specialist)

TECHNICAL ACCEPTANCE : *Hank Chung* , **DATE:** May 11, 2009
Responsible for RF (Hank Chung, Deputy Manager)

APPROVED BY : *May Chen* , **DATE:** May 11, 2009
(May Chen, Deputy Manager)

2 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: 47 CFR Part 15, Subpart C | | | |
|---|----------------------------------|--------|---|
| Standard Paragraph | Test Type | Result | Remark |
| 15.207 | Conducted Emission Test | NA | Power supply is DC 1.5V from batteries |
| 15.249 | Radiated Emission Test | PASS | Minimum passing margin is -8.27dB at 2399.00MHz |
| 15.249 | Conducted - Out Band Measurement | PASS | Meet the requirement of limit |

2.1 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

| Measurement | Value |
|-----------------------------------|---------|
| Radiated emissions (30MHz-1GHz) | 3.94 dB |
| Radiated emissions (1GHz -18GHz) | 2.49 dB |
| Radiated emissions (18GHz -40GHz) | 2.70 dB |

3 GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

| | |
|--|--|
| PRODUCT | 2.4GHz Cordless Mouse |
| MODEL NO. | M-R0009 |
| FCC ID | JNZMR0009 |
| POWER SUPPLY | DC 1.5V from batteries |
| MODULATION TYPE | GFSK |
| CARRIER FREQUENCY OF EACH CHANNEL | 2405MHz ~ 2474MHz |
| NUMBER OF CHANNEL | 12 |
| ANTENNA TYPE | PCB printed quarter wave antenna with 0.57dBi antenna gain |
| DATA CABLE | NA |
| I/O PORTS | NA |
| ASSOCIATED DEVICES | NA |

NOTE:

1. The above EUT information was declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.



3.2 DESCRIPTION OF TEST MODES

Twelve channels are provided in this EUT.

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| 1 | 2405 | 4 | 2417 | 7 | 2441 | 10 | 2465 |
| 2 | 2408 | 5 | 2432 | 8 | 2444 | 11 | 2471 |
| 3 | 2414 | 6 | 2435 | 9 | 2462 | 12 | 2474 |

NOTE:

- 1. Below 1 GHz, the channel 1, 8, and 12 were pre-tested in chamber. The channel 1, worst case one, was chosen for final test.
- 2. Above 1 GHz, the channel 1, 8, and 12 were tested individually.

3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a 2.4GHz Cordless Mouse. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C (Section 15.249)

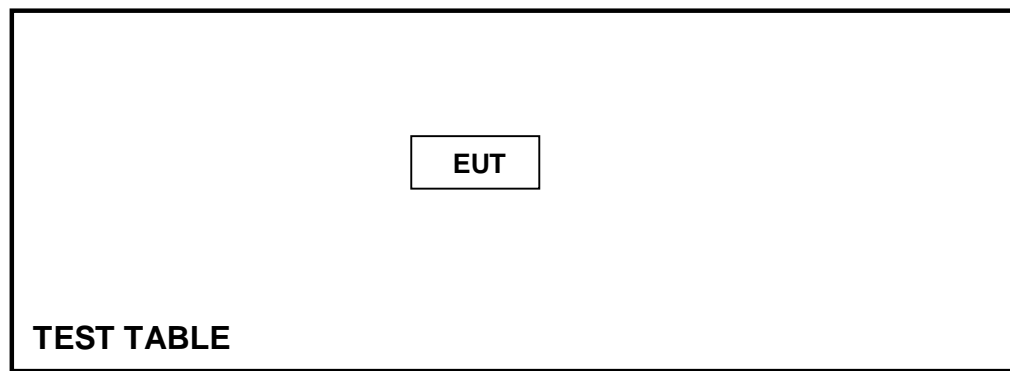
ANSI C63.4: 2003

All tests have been performed and recorded as per the above standards.

3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit.

3.5 CONFIGURATION OF SYSTEM UNDER TEST



4 TEST PROCEDURES AND RESULTS

4.1 RADIATED EMISSION MEASUREMENT

4.1.1 LIMITS OF RADIATED EMISSION MEASUREMENT

According to 15.249 the field strength of emissions from intentional radiators operated under these frequencies bands shall not exceed the following:

| Fundamental Frequency (MHz) | Field Strength of Fundamental (dBuV/m) | |
|-----------------------------|--|---------|
| | Peak | Average |
| 2400 ~ 2483.5 | 114 | 94 |
| | Field Strength of Harmonics (dBuV/m) | |
| | 74 | 54 |

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| Frequencies (MHz) | Field strength (microvolts/meter) | Measurement distance (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009-0.490 | 2400/F(kHz) | 300 |
| 0.490-1.705 | 24000/F(kHz) | 30 |
| 1.705-30.0 | 30 | 30 |
| 30-88 | 100 | 3 |
| 88-216 | 150 | 3 |
| 216-960 | 200 | 3 |
| Above 960 | 500 | 3 |

As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.



4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|--------------------------------------|--------------------------|-----------------|-----------------|------------------|
| ROHDE & SCHWARZ Spectrum Analyzer | FSP40 | 100036 | Dec. 09, 2008 | Dec. 08, 2009 |
| HP Pre_Amplifier | 8449B | 3008A01923 | Nov. 10, 2008 | Nov. 09, 2009 |
| ROHDE & SCHWARZ Test Receiver | ESCS30 | 847124/029 | Sep. 09, 2008 | Sep. 08, 2009 |
| SCHWARZBECK TRILOG Broadband Antenna | VULB 9168 | 138 | April 30, 2008 | April 29, 2009 |
| Schwarzbeck Horn_Antenna | BBHA9120 | D124 | Dec. 09, 2008 | Dec. 08, 2009 |
| Schwarzbeck Horn_Antenna | BBHA 9170 | BBHA9170153 | Jan. 22, 2009 | Jan. 21, 2010 |
| RF Switches | EMH-011 | 08009 | Oct. 07, 2008 | Oct. 06, 2009 |
| RF CABLE (Chaintek) | Sucoflex 106 | 28077 | Aug. 15, 2008 | Aug. 14, 2009 |
| RF Cable | 8DFB | STCCAB-30M-1GHz | Oct. 07, 2008 | Oct. 06, 2009 |
| Software | ADT_Radiated_V7.6.15.9.2 | NA | NA | NA |
| CT Antenna Tower & Turn Table | NA | NA | NA | NA |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

2. The horn antenna, HP preamplifier (model: 8449B) and Spectrum Analyzer (model: FSP40) are used only for the measurement of emission frequency above 1GHz if tested.

3. The test was performed in Open Site No. C.

4. The FCC Site Registration No. is 656396.

5. The VCCI Site Registration No. is R-1626.

6. The CANADA Site Registration No. is IC 7450G-3.

4.1.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 10 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna is a broadband antenna, and its height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10 dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10 dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

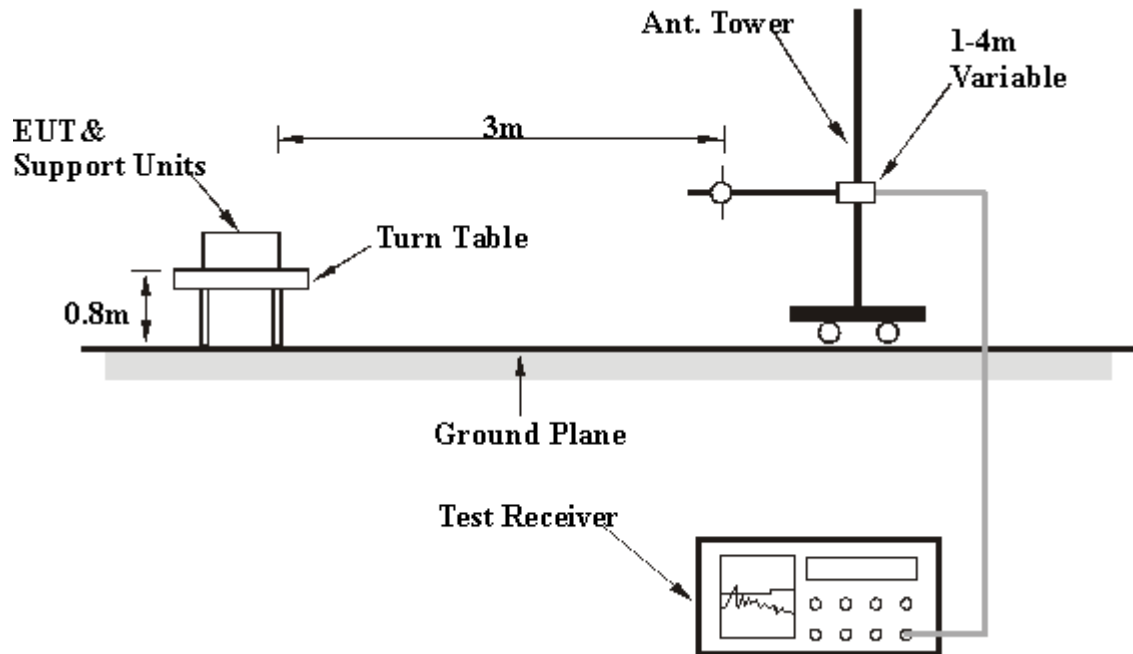
NOTE:

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth is 1MHz and video bandwidth of test receiver/spectrum analyzer is 3MHz for Peak detection at frequency above 1GHz. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz for Average detection (AV) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz for Average detection (AV) at frequency above 1GHz.

4.1.4 DEVIATION FROM TEST STANDARD

No deviation

4.1.5 TEST SETUP



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

4.1.6 EUT OPERATING CONDITIONS

Set the EUT under transmission / receiver condition continuously at specific channel frequency.



4.1.7 TEST RESULTS

BELOW 1GHz WORST-CASE DATA

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|---------------------------|--------------------|---------------|
| CHANNEL | Channel 1 | FREQUENCY RANGE | Below 1000MHz |
| INPUT POWER | DC 1.5V from batteries | DETECTOR FUNCTION | Quasi-Peak |
| ENVIRONMENTAL CONDITIONS | 20deg. C, 70%RH 965hPa | TESTED BY | Eric Lee |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 110.69 | 26.41 QP | 43.50 | -17.09 | 1.02 H | 236 | 14.15 | 12.26 |
| 2 | 163.30 | 28.60 QP | 43.50 | -14.90 | 1.04 H | 193 | 12.86 | 15.74 |
| 3 | 200.17 | 29.85 QP | 43.50 | -13.65 | 1.24 H | 53 | 16.86 | 12.99 |
| 4 | 305.27 | 30.14 QP | 46.00 | -15.86 | 1.64 H | 96 | 12.90 | 17.24 |
| 5 | 500.00 | 33.85 QP | 46.00 | -12.15 | 1.02 H | 253 | 11.19 | 22.66 |
| 6 | 858.24 | 31.30 QP | 46.00 | -14.70 | 1.65 H | 63 | 0.77 | 30.53 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 112.23 | 27.12 QP | 43.50 | -16.38 | 1.02 V | 21 | 0.74 | 26.38 |
| 2 | 145.29 | 30.21 QP | 43.50 | -13.29 | 1.08 V | 96 | 3.64 | 26.57 |
| 3 | 268.23 | 34.23 QP | 46.00 | -11.77 | 1.10 V | 82 | 6.89 | 27.34 |
| 4 | 300.00 | 30.14 QP | 46.00 | -15.86 | 1.21 V | 45 | 2.54 | 27.60 |
| 5 | 530.20 | 33.40 QP | 46.00 | -12.60 | 1.40 V | 193 | 4.32 | 29.08 |
| 6 | 858.61 | 35.90 QP | 46.00 | -10.10 | 1.68 V | 96 | 5.81 | 30.09 |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.



ABOVE 1GHz DATA

| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL | Channel 1 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER | DC 1.5V from batteries | DETECTOR FUNCTION | Peak (PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 20deg. C, 70%RH 965hPa | TESTED BY | Eric Lee |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2399.00 | 65.73 PK | 74.00 | -8.27 | 1.42 H | 0 | 35.41 | 30.32 |
| 2 | 2399.00 | 30.36 AV | 54.00 | -23.64 | 1.42 H | 0 | 0.04 | 30.32 |
| 3 | *2405.00 | 95.44 PK | 114.00 | -18.56 | 1.42 H | 0 | 65.10 | 30.34 |
| 4 | *2405.00 | 60.07 AV | 94.00 | -33.93 | 1.42 H | 0 | 29.73 | 30.34 |
| 5 | 4810.00 | 47.56 PK | 74.00 | -26.44 | 1.15 H | 135 | 10.81 | 36.75 |
| 6 | 4810.00 | 12.19 AV | 54.00 | -41.81 | 1.15 H | 135 | -24.56 | 36.75 |
| 7 | 7215.00 | 53.80 PK | 74.00 | -20.20 | 1.69 H | 3 | 10.66 | 43.14 |
| 8 | 7215.00 | 18.43 AV | 54.00 | -35.57 | 1.69 H | 3 | -24.71 | 43.14 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 2399.00 | 64.07 PK | 74.00 | -9.93 | 1.00 V | 20 | 33.75 | 30.32 |
| 2 | 2399.00 | 28.70 AV | 54.00 | -25.30 | 1.00 V | 20 | -1.62 | 30.32 |
| 3 | *2405.00 | 92.99 PK | 114.00 | -21.01 | 1.00 V | 20 | 62.65 | 30.34 |
| 4 | *2405.00 | 57.62 AV | 94.00 | -36.38 | 1.00 V | 20 | 27.28 | 30.34 |
| 5 | 4810.00 | 48.67 PK | 74.00 | -25.33 | 1.19 V | 5 | 11.92 | 36.75 |
| 6 | 4810.00 | 13.30 AV | 54.00 | -40.70 | 1.19 V | 5 | -23.45 | 36.75 |
| 7 | 7215.00 | 53.48 PK | 74.00 | -20.52 | 1.59 V | 181 | 10.34 | 43.14 |
| 8 | 7215.00 | 18.11 AV | 54.00 | -35.89 | 1.59 V | 181 | -25.03 | 43.14 |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.14 \text{ ms} / 8.22 \text{ ms}) = -35.37 \text{ dB}$
Please see page 4 for plotted duty.



| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL | Channel 8 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER | DC 1.5V from batteries | DETECTOR FUNCTION | Peak (PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 20deg. C, 70%RH 965hPa | TESTED BY | Eric Lee |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2444.00 | 95.52 PK | 114.00 | -18.48 | 1.45 H | 1 | 65.04 | 30.48 |
| 2 | *2444.00 | 60.15 AV | 94.00 | -33.85 | 1.45 H | 1 | 29.67 | 30.48 |
| 3 | 4888.00 | 47.94 PK | 74.00 | -26.06 | 1.14 H | 133 | 10.98 | 36.96 |
| 4 | 4888.00 | 12.57 AV | 54.00 | -41.43 | 1.14 H | 133 | -24.39 | 36.96 |
| 5 | 7332.00 | 53.72 PK | 74.00 | -20.28 | 1.70 H | 2 | 10.59 | 43.13 |
| 6 | 7332.00 | 18.35 AV | 54.00 | -35.65 | 1.70 H | 2 | -24.78 | 43.13 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2444.00 | 94.29 PK | 114.00 | -19.71 | 1.01 V | 18 | 63.81 | 30.48 |
| 2 | *2444.00 | 58.92 AV | 94.00 | -35.08 | 1.01 V | 18 | 28.44 | 30.48 |
| 3 | 4888.00 | 49.50 PK | 74.00 | -24.50 | 1.20 V | 359 | 12.54 | 36.96 |
| 4 | 4888.00 | 14.13 AV | 54.00 | -39.87 | 1.20 V | 359 | -22.83 | 36.96 |
| 5 | 7332.00 | 53.68 PK | 74.00 | -20.32 | 1.65 V | 192 | 10.55 | 43.13 |
| 6 | 7332.00 | 18.31 AV | 54.00 | -35.69 | 1.65 V | 192 | -24.82 | 43.13 |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.14 \text{ ms} / 8.22 \text{ ms}) = -35.37 \text{ dB}$
Please see page 4 for plotted duty.



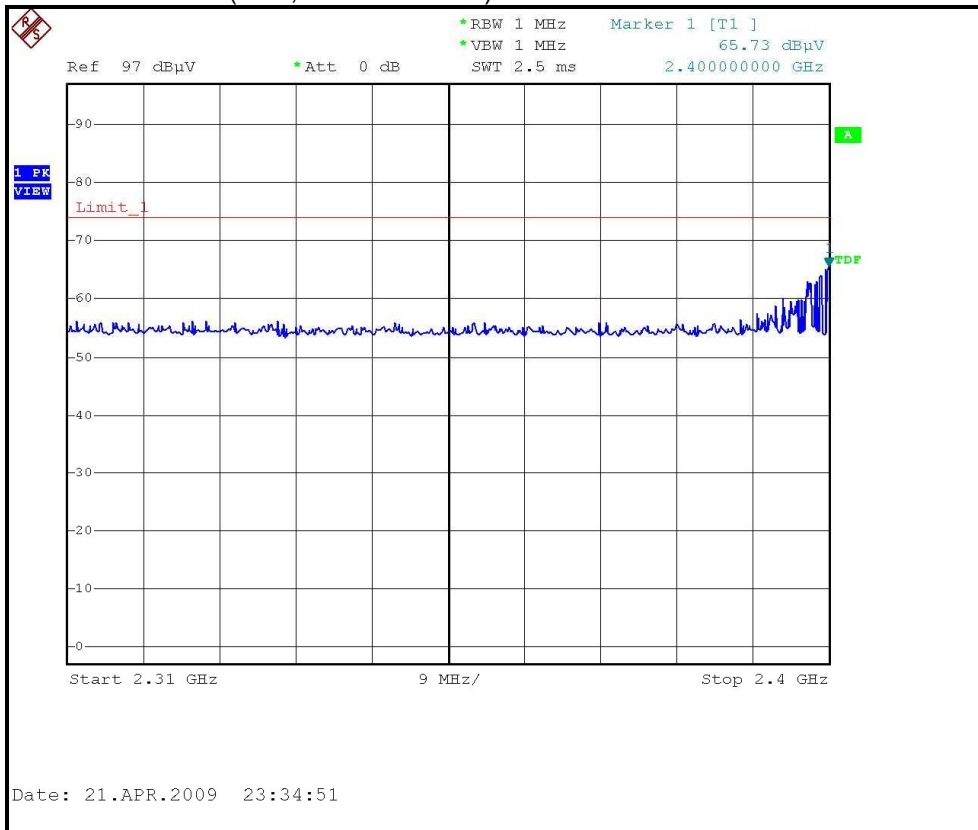
| EUT TEST CONDITION | | MEASUREMENT DETAIL | |
|--------------------------|---------------------------|--------------------|---------------------------|
| CHANNEL | Channel 12 | FREQUENCY RANGE | 1 ~ 25GHz |
| INPUT POWER | DC 1.5V from batteries | DETECTOR FUNCTION | Peak (PK) Average (AV) |
| ENVIRONMENTAL CONDITIONS | 20deg. C, 70%RH 965hPa | TESTED BY | Eric Lee |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2474.00 | 95.93 PK | 114.00 | -18.07 | 1.34 H | 13 | 65.34 | 30.59 |
| 2 | *2474.00 | 60.56 AV | 94.00 | -33.44 | 1.34 H | 13 | 29.97 | 30.59 |
| 3 | 2483.50 | 63.65 PK | 74.00 | -10.35 | 1.34 H | 13 | 33.02 | 30.63 |
| 4 | 2483.50 | 28.28 AV | 54.00 | -25.72 | 1.34 H | 13 | -2.35 | 30.63 |
| 5 | 4948.00 | 47.55 PK | 74.00 | -26.45 | 1.13 H | 127 | 10.43 | 37.12 |
| 6 | 4948.00 | 12.18 AV | 54.00 | -41.82 | 1.13 H | 127 | -24.94 | 37.12 |
| 7 | 7422.00 | 53.64 PK | 74.00 | -20.36 | 1.67 H | 359 | 10.51 | 43.13 |
| 8 | 7422.00 | 18.27 AV | 54.00 | -35.73 | 1.67 H | 359 | -24.86 | 43.13 |

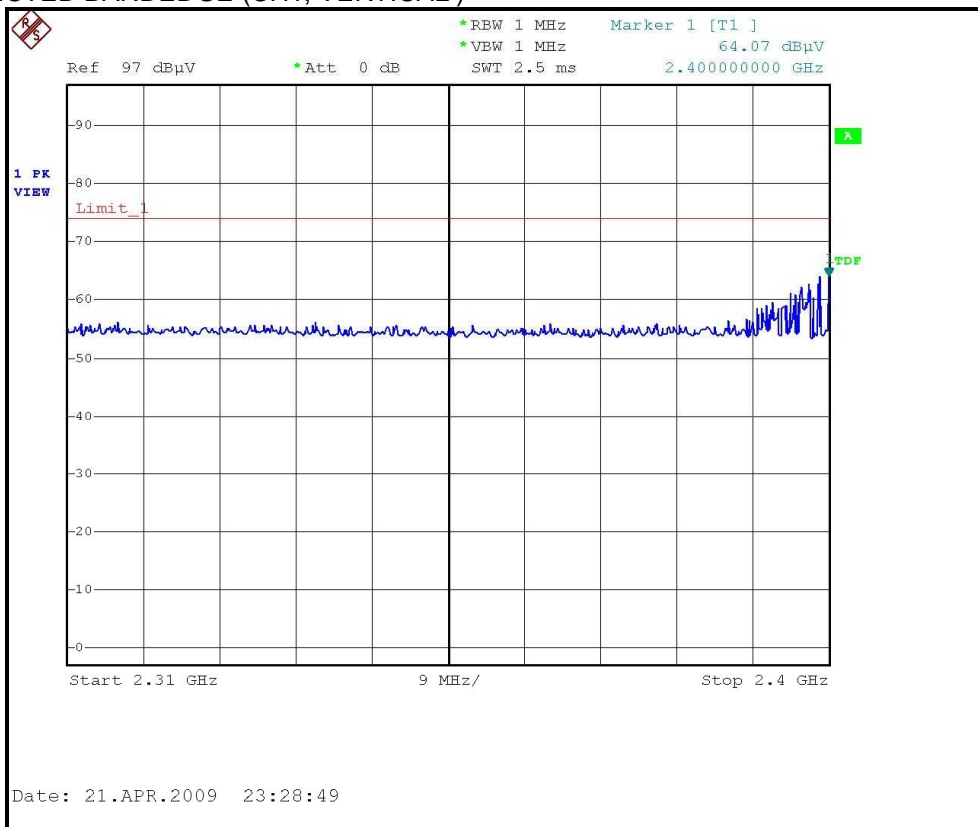
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *2474.00 | 95.37 PK | 114.00 | -18.63 | 1.00 V | 22 | 64.78 | 30.59 |
| 2 | *2474.00 | 60.00 AV | 94.00 | -34.00 | 1.00 V | 22 | 29.41 | 30.59 |
| 3 | 2483.50 | 61.96 PK | 74.00 | -12.04 | 1.00 V | 22 | 31.33 | 30.63 |
| 4 | 2483.50 | 26.59 AV | 54.00 | -27.41 | 1.00 V | 22 | -4.04 | 30.63 |
| 5 | 4948.00 | 49.23 PK | 74.00 | -24.77 | 1.16 V | 360 | 12.11 | 37.12 |
| 6 | 4948.00 | 13.86 AV | 54.00 | -40.14 | 1.16 V | 360 | -23.26 | 37.12 |
| 7 | 7422.00 | 53.54 PK | 74.00 | -20.46 | 1.68 V | 184 | 10.41 | 43.13 |
| 8 | 7422.00 | 18.17 AV | 54.00 | -35.83 | 1.68 V | 184 | -24.96 | 43.13 |

- REMARKS:**
1. Emission level (dBuV/m) = Raw Value (dBuV) + Correction Factor (dB/m).
 2. Correction Factor (dB/m) = Antenna Factor (dB/m) + Cable Factor (dB).
 3. The other emission levels were very low against the limit.
 4. Margin value = Emission level – Limit value.
 5. “ * “ : Fundamental frequency
 6. The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:
 $20 \log (\text{Duty cycle}) = 20 \log (0.14 \text{ ms} / 8.22 \text{ ms}) = -35.37 \text{ dB}$
Please see page 4 for plotted duty.

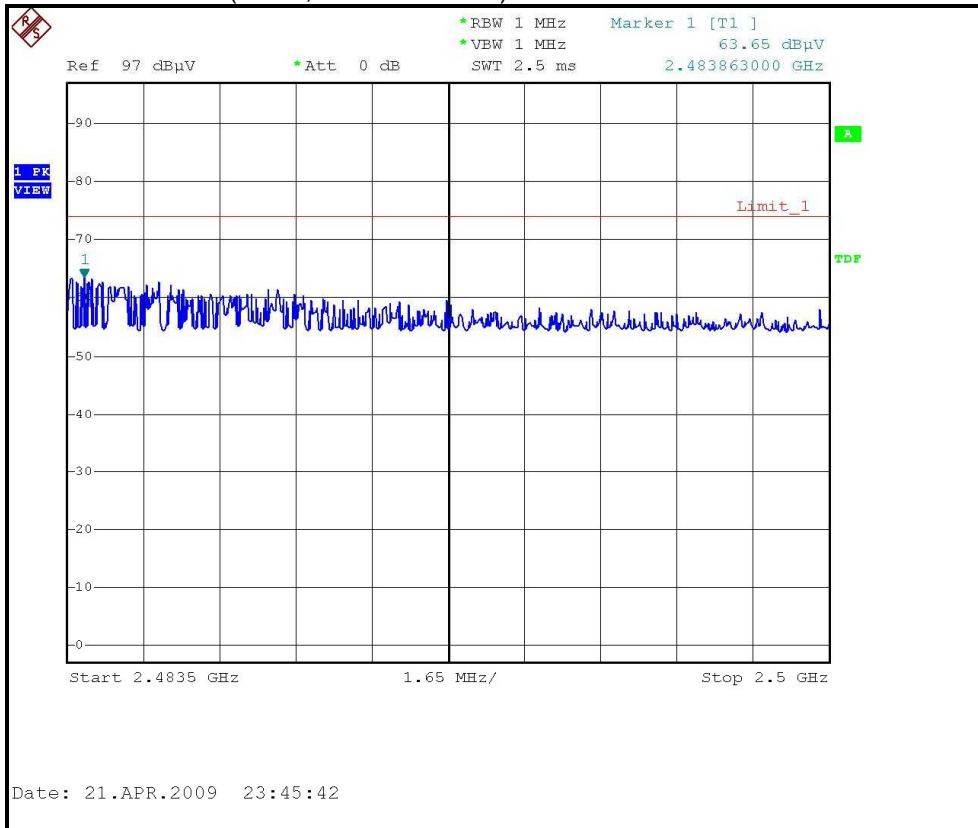
RESTRICTED BANDEDGE (CH1, HORIZONTAL)



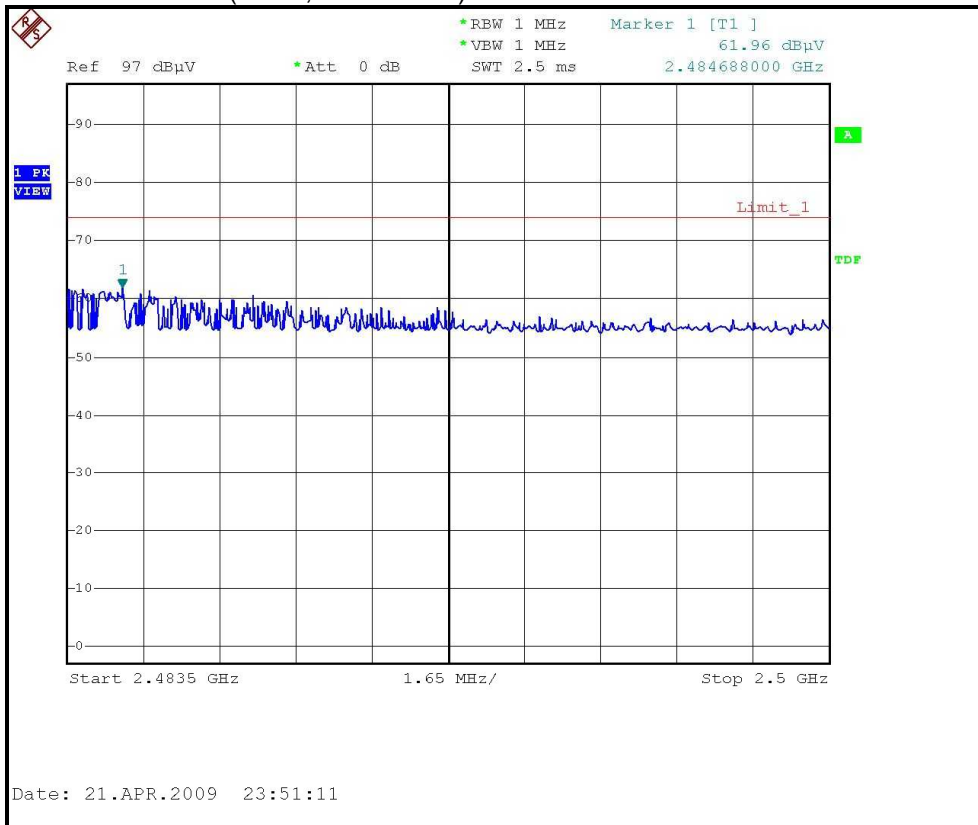
RESTRICTED BANDEDGE (CH1, VERTICAL)



RESTRICTED BANDEDGE (CH12, HORIZONTAL)



RESTRICTED BANDEDGE (CH12, VERTICAL)





4.2 CONDUCTED - OUT BAND MEASUREMENT

4.2.1 LIMITS OF CONDUCTED - OUT BAND MEASUREMENT

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| R&S SPECTRUM ANALYZER | FSP40 | 100037 | Aug. 09, 2008 | Aug. 08, 2009 |

NOTE:

- 1.The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.

4.2.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer via a low lose cable. Set both RBW and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 300 MHz bandwidth from band edge. The band edges was measured and recorded.

4.2.4 DEVIATION FROM TEST STANDARD

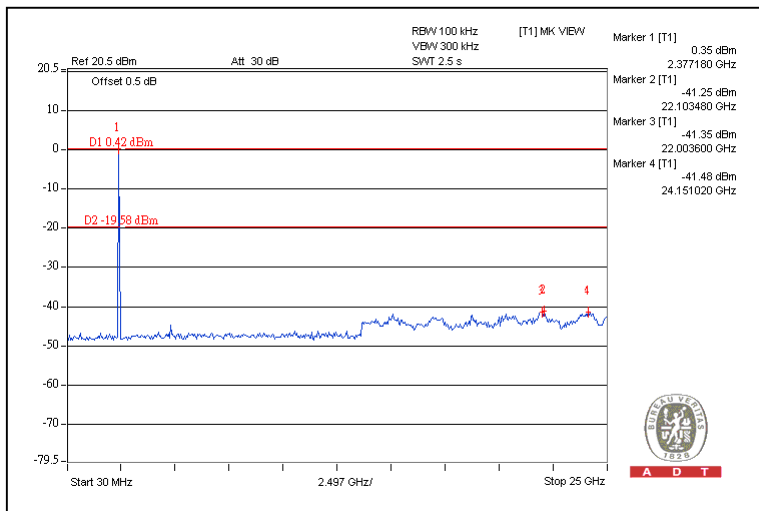
No deviation

4.2.5 EUT OPERATING CONDITION

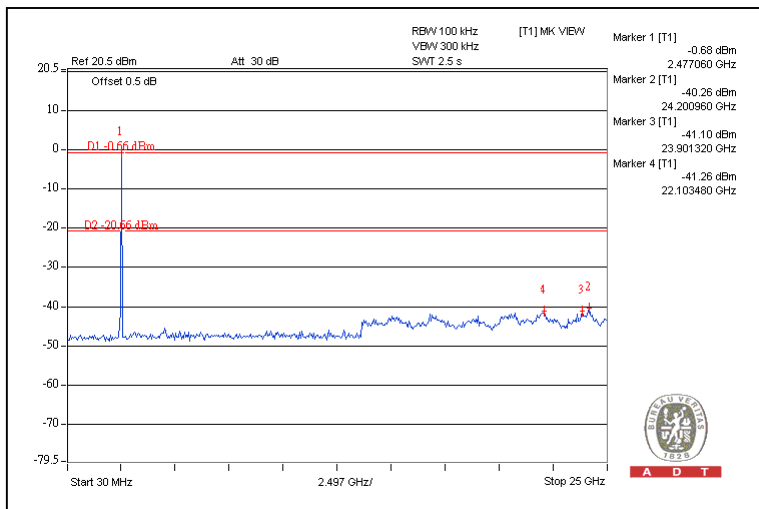
The software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel frequencies individually.

4.2.6 TEST RESULTS

Emissions radiated outside of the specified frequency bands, please refer pages form 13 to 15 for met the requirement of the general radiated emission limits in § 15.209. CH1



CH12





5 INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

| | |
|--------------------|----------------------|
| USA | FCC, NVLAP |
| Germany | TUV Rheinland |
| Japan | VCCI |
| Norway | NEMKO |
| Canada | INDUSTRY CANADA, CSA |
| R.O.C. | TAF, BSMI, NCC |
| Netherlands | Telefication |
| Singapore | GOST-ASIA (MOU) |
| Russia | CERTIS (MOU) |

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5/phtml.
If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Email: service@adt.com.tw
Web Site: www.adt.com.tw

The address and road map of all our labs can be found in our web site also.



A D T

6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB

No any modifications are made to the EUT by the lab during the test.

--- END ---