



# FCC 47 CFR PART 15 SUBPART B TEST REPORT

for

**32" LCD TV; LCD Monitor; LED LCD TV**

**MODEL: 32LV2400XXX**

**(" X " may be any alphanumeric character or blank)**

**FCC ID: MDZ32LV2400UA**

Test Report Number:

T110803006-D

Issued for

**Amtran Technology Co., Ltd.**

**17F., No. 268, Liancheng Rd., Jhonghe District New Taipei City 23553, Taiwan, R.O.C.**

Issued By:

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**Revision History**

| Rev. | Issue Date     | Revisions     | Effect Page | Revised By |
|------|----------------|---------------|-------------|------------|
| 00   | August 5, 2011 | Initial Issue | All         | Kosame Lin |
|      |                |               |             |            |
|      |                |               |             |            |
|      |                |               |             |            |



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# 1 TEST RESULT CERTIFICATION

|                      |  |
|----------------------|--|
| <b>Product:</b>      | 32" LCD TV; LCD Monitor; LED LCD TV  |
| <b>Model:</b>        | 32LV2400XXX (" X " may be any alphanumeric character or blank)   |
| <b>Brand:</b>        | LG   |
| <b>Applicant:</b>    | <b>Amtran Technology Co., Ltd.</b><br>17F., No. 268, Liancheng Rd., Jhonghe District New Taipei City 23553, Taiwan, R.O.C.   |
| <b>Manufacturer:</b> | <b>1. Amtran Electronic Co., Ltd.</b><br>No. 225, Jinfeng Road, Suzhou New District, Suzhou, Jiangsu PRC.<br><b>2. SuZhou Raken Technology Co., Ltd.</b><br>No. 278, Mayun Rd., New District Su Zhou, China<br><b>3. SuZhou Raken Technology Co., Ltd. Jinfeng Branch</b><br>No. 225, Jinfeng Road, Suzhou New District, Suzhou, Jiangsu PRC |
| <b>Tested:</b>       | August 3 ~ 4, 2011   |
| <b>Test Voltage:</b> | 120VAC, 60Hz   |

| EMISSION  |                       |        |                    |
|---|-----------------------|--------|--------------------|
| Standard  | Item                  | Result | Remarks            |
| FCC 47 CFR Part 15 Subpart B (October 1, 2009),<br>ICES-003 Issue 4 (2004)<br>ANSI C63.4-2003 | Conducted (Main Port) | PASS   | Meet Class B limit |
|   | Radiated              | PASS   | Meet Class B limit |

Note: 1. The statements of test result on the above are decided by the request of test standard only; the measurement uncertainties are not factored into this compliance determination.  
2. The information of measurement uncertainty is available upon the customer's request.

| Deviation from Applicable Standard |
|------------------------------------|
| None                               |

The above equipment has been tested by Compliance Certification Services Inc., and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

**Approved by:**

**Reviewed by:**

  
\_\_\_\_\_  
Bill Cheng  
Section Manager

  
\_\_\_\_\_  
Jill Shiao  
Section Manager



## 2 EUT DESCRIPTION

|                                 |  |              |                 |
|---------------------------------|--|--------------|-----------------|
| <b>Product</b>                  | 32" LCD TV; LCD Monitor; LED LCD TV                            |              |                 |
| <b>Brand Name</b>               | LG   |              |                 |
| <b>Model</b>                    | 32LV2400XXX (" X " may be any alphanumeric character or blank) |              |                 |
| <b>Applicant</b>                | Amtran Technology Co., Ltd.                                    |              |                 |
| <b>Serial Number</b>            | T110803006   |              |                 |
| <b>Received Date</b>            | August 3, 2011   |              |                 |
| <b>EUT Power Rating</b>         | 100-240VAC, 50/60Hz  |              |                 |
| <b>AC Power Cord Type</b>       | Unshielded, 1.8m (Detachable)                                  |              |                 |
| <b>LCD Panel Manufacturer</b>   | LG Display or Suzhou Raken                                     | <b>Model</b> | LC320EXG        |
| <b>Power Board Manufacturer</b> | Liteon   | <b>Model</b> | PA-1091-01AM-LF |

### I/O Port

| I/O PORT TYPES                  | Q'TY  | TESTED WITH |
|---------------------------------|-------|-------------|
| 1. D-SUB Port (for PC)          | 1     | 1           |
| 2. HDMI Port                    | 1     | 1           |
| 3. USB Port                     | 1     | 1           |
| 4. Component Port (Y/Pb/Pr/R/L) | 1 Set | 1 Set       |
| 5. Audio Out Port               | 1     | 1           |
| 6. Audio Port (for PC)          | 1     | 1           |
| 7. Optical Port                 | 1     | 1           |
| 8. Coaxial Port                 | 1     | 1           |

**Note:**

1. The means of "X" (X = 0 ~ 9, A ~ Z or blank) on model number are identical, just for marketing purpose only.
2. The EUT include one Remote Control for sale only.
3. Client consigns only one model sample (Model number: 32LV2400) to test. Therefore testing Lab. just guarantees the units, which have been tested.



### 3 TEST METHODOLOGY

#### 3.1. DECISION OF FINAL TEST MODE

1. The following test mode(s) were scanned during the preliminary test:

| Mode | D-SUB             | Power Board               | LCD Panel                                 |
|------|-------------------|---------------------------|---|
| 1    | 1366 x 768 / 60Hz | Liteon<br>PA-1091-01AM-LF | LG Display or<br>Suzhou Raken<br>LC320EXG |
| 2    | 1024 x 768 / 60Hz |                           |   |
| 3    | 800 x 600 / 60Hz  |                           |   |

2. After the preliminary scan, the following test mode was found to produce the highest emission level.

| Final Test Mode |                    |               |
|-----------------|--------------------|---------------|
| Emission        | Conducted Emission | <b>Mode 1</b> |
|                 | Radiated Emission  | <b>Mode 1</b> |

Then, the above highest emission mode of the configuration of the EUT and cable was chosen for all final test items.

#### 3.2. EUT SYSTEM OPERATION

|   |   |
|---|---|
| 1 | EMI test program was loaded and executed in "Windows XP" mode.  |
| 2 | Operates the Wireless LAN function of EUT.  |
| 3 | Data was sent to EUT filling the screen with upper case of "H" patterns.  |
| 4 | Test program sequentially exercised all related I/O's of Host PC and sent "H" patterns to all applicable output ports of Host PC. |
| 5 | Repeat 2 to 3.  |

**Note:** Test program is self-repeating throughout the test.



## 4 SETUP OF EQUIPMENT UNDER TEST

### 4.1. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

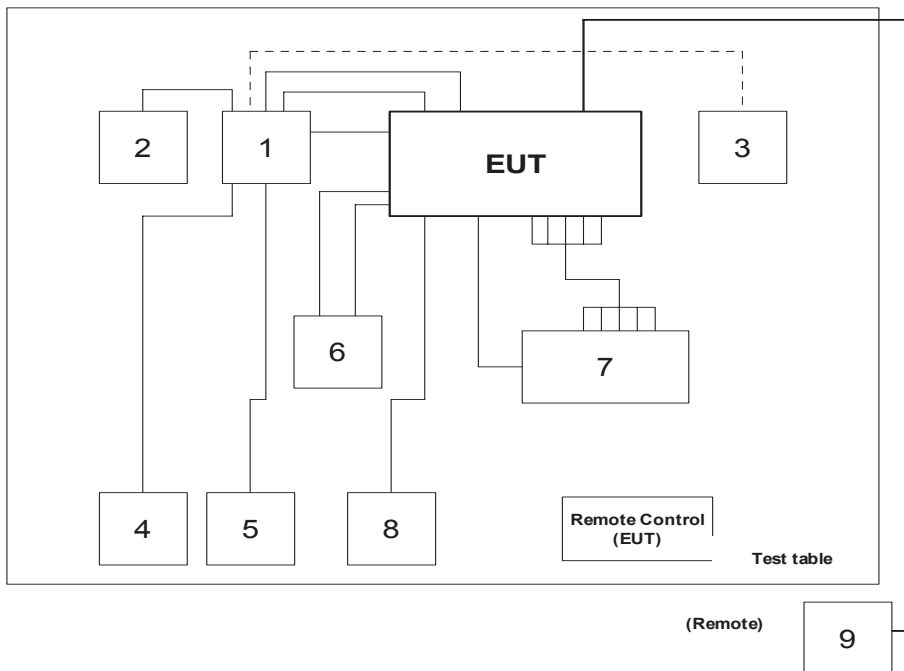
| No. | Equipment                           | Model No.   | Serial No.  | FCC ID     | Trade Name       | Data Cable  | Power Cord       |
|-----|-------------------------------------|-------------|-------------|------------|------------------|---|------------------|
| 1   | PC                                  | PRO 2000    | SGH008RRNH  | FCC DoC    | HP               | D-SUB Cable:<br>Shielded, 1.8m<br>with two cores<br>HDMI Cable:<br>Unshielded, 1.8m<br>Audio Cable:<br>Unshielded, 1.8m | Unshielded, 1.8m |
| 2   | Modem                               | DM-1414     | 304012265   | IFAXDM1414 | ACEEX            | Unshielded, 1.5m  | Unshielded, 1.5m |
| 3   | Printer                             | STYLUS C60  | DR3K043129  | FCC DoC    | EPSON            | Unshielded, 1.8m  | Unshielded, 1.8m |
| 4   | PS/2 Keyboard                       | Y-SJ17      | SY528UK     | FCC DoC    | Logitech         | Unshielded, 1.8m  | N/A              |
| 5   | PS/2 Mouse                          | M-S34       | HCA25200078 | DZL211029  | Logitech         | Unshielded, 1.8m  | N/A              |
| 6   | 5.1 Amplifier                       | Z-5400      | S-0180B     | FCC DoC    | Logitech         | Optical Cable:<br>Unshielded, 1.8m<br>Audio Cable:<br>Unshielded, 1.8m  | Unshielded, 1.8m |
| 7   | DVD Player                          | DVP-NS90V   | 2020663     | FCC DoC    | SONY             | HDMI Cable:<br>Unshielded, 1.8m<br>Component Cable:<br>Unshielded, 1.8m x 3<br>Audio Cable:<br>Unshielded, 1.8m x 2     | Unshielded, 1.8m |
| 8   | Traveling Disk                      | LuxMini 720 | N/A         | FCC DoC    | SILICON<br>POWER | USB Cable:<br>Unshielded, 1.0m  | N/A              |
| 9   | TV S.G<br>(Remote)<br>(For Analog)  | DT5820      | DMT350003   | FCC DoC    | PHILIPS          | Coxail Cable:<br>Unshielded, 10m  | Unshielded, 1.8m |
|     | TV S.G<br>(Remote)<br>(For Digital) | DSG300A     | CA06204385  | FCC DoC    | DiTV             | Coxail Cable:<br>Unshielded, 10m  | Unshielded, 1.8m |

**Note:** Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.



## 4.2. CONFIGURATION OF SYSTEM UNDER TEST

|                  |                   |                  |
|------------------|-------------------|------------------|
| 1. PC            | 2. Modem          | 3. Printer       |
| 4. PS/2 Keyboard | 5. PS/2 Mouse     | 6. 5.1 Amplifier |
| 7. DVD Player    | 8. Traveling Disk | 9. TV S.G.       |







## 5 FACILITIES AND ACCREDITATIONS

### 5.1. FACILITIES

All measurement facilities used to collect the measurement data are located at No.81-1, Lane 210, Bade 2nd Rd., Lujhu Township, Taoyuan County 33841, Taiwan, R.O.C.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR 16-1-1, CISPR 16-1-2, CISPR 16-1-3, CISPR 16-1-4, CISPR 16-1-5 and CISPR 16-2-3.

### 5.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025.

|               |      |
|---------------|------|
| <b>Taiwan</b> | TAF  |
| <b>USA</b>    | A2LA |

The measuring facility of laboratories has been authorized or registered by the following approval agencies.

|               |                 |
|---------------|-----------------|
| <b>Canada</b> | Industry Canada |
| <b>Norway</b> | Nemko           |
| <b>Japan</b>  | VCCI            |
| <b>Taiwan</b> | BSMI            |
| <b>USA</b>    | FCC             |

Copies of granted accreditation certificates are available for downloading from our web site, <http://www.ccsrf.com>



### 5.3. 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:

| Measurement         | Frequency   | Uncertainty |
|---------------------|-------------|-------------|
| Conducted emissions | 9kHz~30MHz  | ± 2.0878    |
| Radiated emissions  | 30~200MHz   | ± 3.8881    |
|                     | 200~1000MHz | ± 3.8724    |

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

*Consistent with industry standard (e.g. CISPR 22: 2006, clause 11, Measurement Uncertainty) determining compliance with the limits shall be base on the results of the compliance measurement. Consequently the measure emissions being less than the maximum allowed emission result in this be a compliant test or passing test.*

*The acceptable measurement uncertainty value without requiring revision of the compliance statement is base on conducted and radiated emissions being less than  $U_{CISPR}$  which is 3.6dB and 5.2dB respectively. CCS values (called  $U_{Lab}$  in CISPR 16-4-2) is less than  $U_{CISPR}$  as shown in the table above. Therefore, MU need not be considered for compliance.*



## 6 CONDUCTED EMISSION MEASUREMENT

### 6.1. LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY (MHz) | Class A (dBuV) |         | Class B (dBuV) |         |
|-----------------|----------------|---------|----------------|---------|
|                 | Quasi-peak     | Average | Quasi-peak     | Average |
| 0.15 - 0.5      | 79             | 66      | 66 - 56        | 56 - 46 |
| 0.50 - 5.0      | 73             | 60      | 56             | 46      |
| 5.0 - 30.0      | 73             | 60      | 60             | 50      |

**NOTE:**

- (1) The lower limit shall apply at the transition frequencies.
- (2) The limit decreases in line with the logarithm of the frequency in the range 0.15 to 0.50 MHz.
- (3) All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

### 6.2. TEST INSTRUMENTS

| Conducted Emission Room # 3 |              |                             |               |                 |
|-----------------------------|--------------|-----------------------------|---------------|-----------------|
| Name of Equipment           | Manufacturer | Model                       | Serial Number | Calibration Due |
| EMI Test Receiver           | R&S          | ESCS30                      | 845552/030    | 05/31/2012      |
| LISN                        | R&S          | ENV216                      | 100069        | 06/20/2012      |
| LISN                        | FCC          | FCC-LISN-50/250<br>-16-2-07 | 06013         | 11/21/2011      |
| ISN                         | FCC          | FCC-TLISN-T2-02             | 20587         | 06/21/2012      |
| ISN                         | FCC          | FCC-TLISN-T8-02             | 20148         | 05/12/2012      |
| Current Probe               | FCC          | F-35                        | 506           | 07/05/2012      |
| ISN                         | FCC          | FCC-TLISN-T4-02             | 20396         | 06/23/2012      |
| Test S/W                    | EZ-EMC       |                             |               |                 |

- 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. N.C.R = No Calibration Request.



### **6.3. TEST PROCEDURES** (please refer to measurement standard or CCS SOP PA-031)

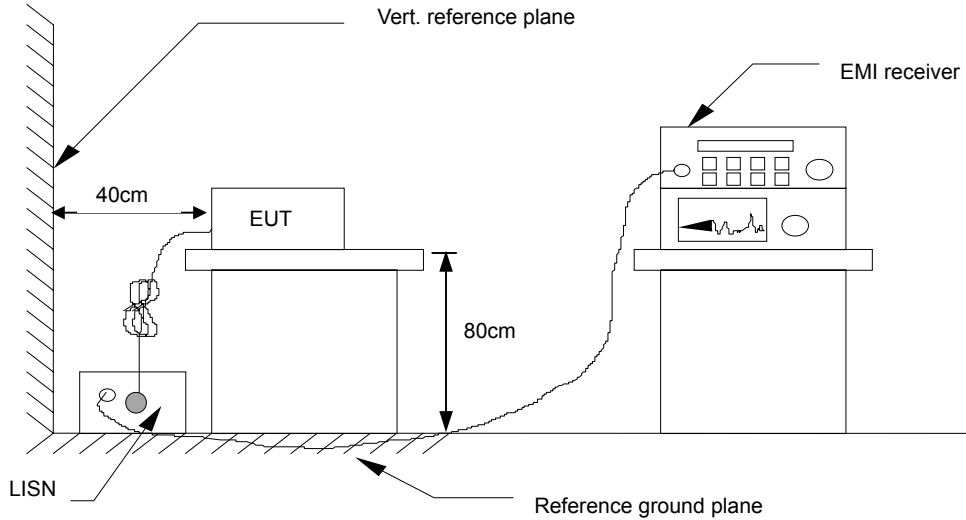
#### **Procedure of Preliminary Test**

- The EUT and support equipment, if needed, were set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.4 (see Test Facility for the dimensions of the ground plane used). When the EUT is a floor standing equipment, it is placed on the ground plane, which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- All I/O cables were positioned to simulate typical actual usage as per ANSI C63.4.
- The test equipment EUT installed by AC 120VAC/60Hz main power, through a Line Impedance Stabilization Network (LISN), which was supplied power source and was grounded to the ground plane.
- All support equipment power by from a second LISN.
- The test program of the EUT was started. Emissions were measured on each current carrying line of the EUT using an EMI Test Receiver connected to the LISN powering the EUT.
- The Receiver scanned from 150kHz to 30MHz for emissions in each of the test modes.
- During the above scans, the emissions were maximized by cable manipulation.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test.
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

#### **Procedure of Final Test**

- EUT and support equipment were set up on the test bench as per the configuration with highest emission level in the preliminary test.
- A scan was taken on both power lines, Line 1 and Line 2, recording at least the six highest emissions. Emission frequency and amplitude were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit.
- The test data of the worst-case condition(s) was recorded.

**6.4. TEST SETUP**



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

**6.5. DATA SAMPLE:**

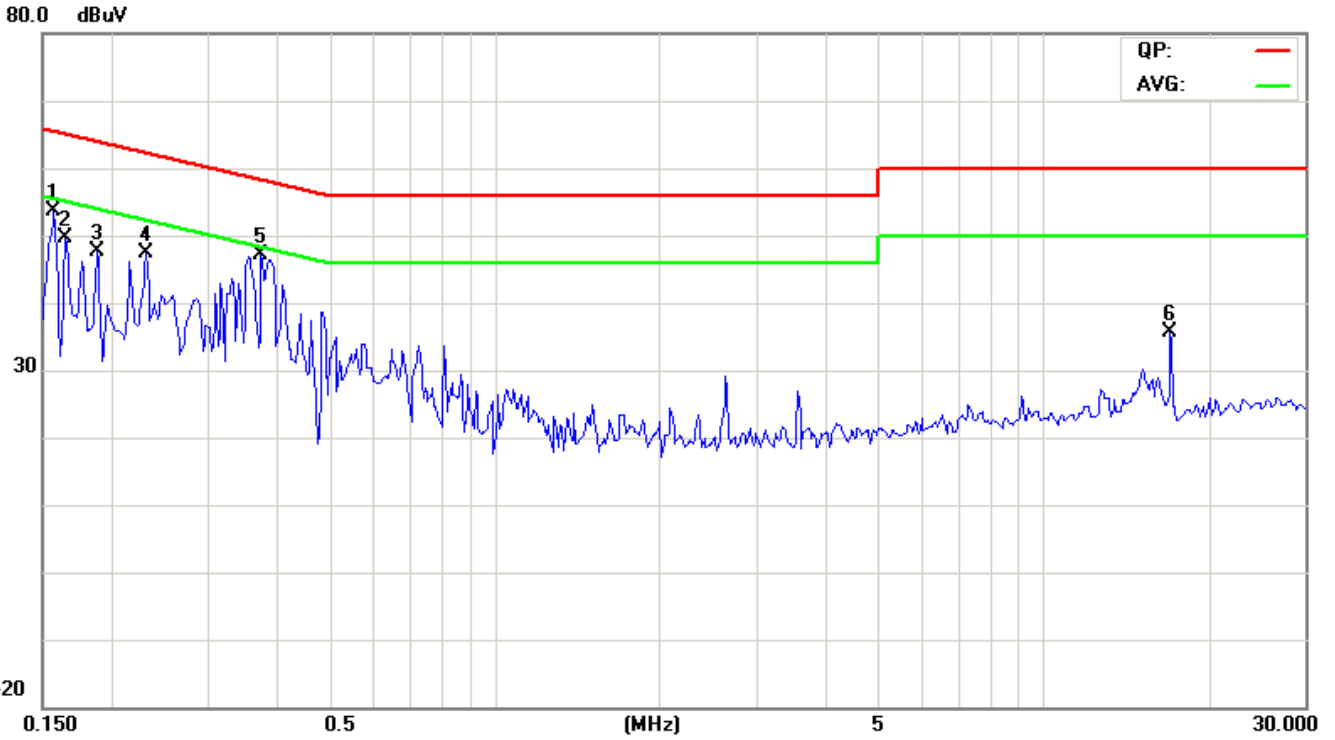
| Frequency (MHz) | QuasiPeak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | QuasiPeak result (dBuV) | Average result (dBuV) | QuasiPeak limit (dBuV) | Average limit (dBuV) | QuasiPeak margin (dB) | Average margin (dB) | Remark |
|-----------------|--------------------------|------------------------|------------------------|-------------------------|-----------------------|------------------------|----------------------|-----------------------|---------------------|--------|
| x.xx            | 43.95                    | 33.00                  | 10.00                  | 53.95                   | 43.00                 | 56.00                  | 46.00                | -2.05                 | -3.00               | Pass   |

Frequency (MHz) = Emission frequency in MHz  
 Reading (dBuV) = Uncorrected Analyzer/Receiver reading + Insertion loss of LISN, if it > 0.5 dB  
 Correction Factor (dB) = LISN Factor + Cable Loss  
 Result (dBuV) = Raw reading converted to dBuV and CF added  
 Limit (dBuV) = Limit stated in standard  
 Margin (dB) = Result (dBuV) – Limit (dBuV)



6.6. TEST RESULTS

|                                 |              |                      |        |
|---------------------------------|--------------|----------------------|--------|
| <b>Model No.</b>                | 32LV2400     | <b>6dB Bandwidth</b> | 9 kHz  |
| <b>Environmental Conditions</b> | 25°C, 57% RH | <b>Test Mode</b>     | Mode 1 |
| <b>Tested by</b>                | Tony Tsai    | <b>Line</b>          | L1     |

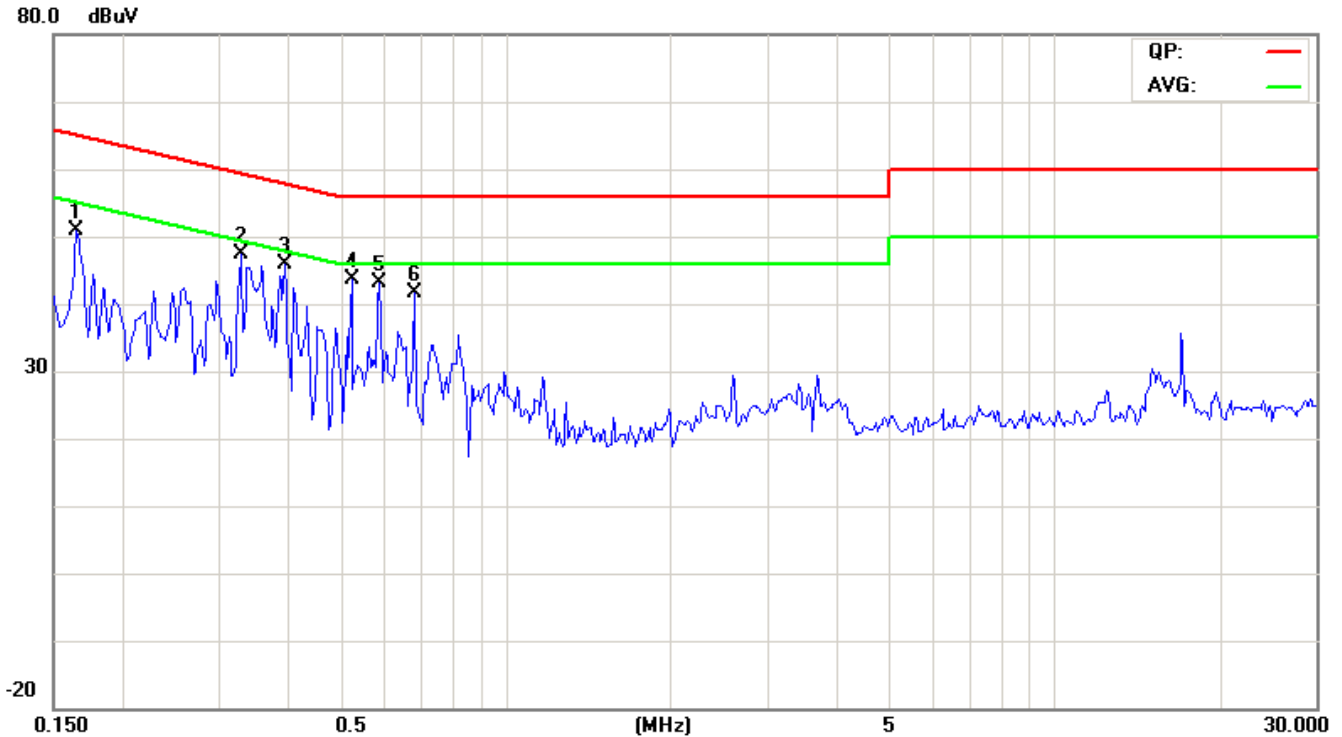


| NO. | Frequency (MHz) | QuasiPeak reading (dBuV) | Average reading (dBuV) | Correction factor (dB) | QuasiPeak result (dBuV) | Average result (dBuV) | QuasiPeak limit (dBuV) | Average limit (dBuV) | QuasiPeak margin (dB) | Average margin (dB) | Remark |
|-----|-----------------|--------------------------|------------------------|------------------------|-------------------------|-----------------------|------------------------|----------------------|-----------------------|---------------------|--------|
| 1   | 0.1578          | 49.99                    | 28.89                  | 9.71                   | 59.70                   | 38.60                 | 65.58                  | 55.58                | -5.88                 | -16.98              | Pass   |
| 2*  | 0.1656          | 50.69                    | 31.59                  | 9.71                   | 60.40                   | 41.30                 | 65.18                  | 55.18                | -4.78                 | -13.88              | Pass   |
| 3   | 0.1891          | 37.50                    | 30.40                  | 9.70                   | 47.20                   | 40.10                 | 64.08                  | 54.08                | -16.88                | -13.98              | Pass   |
| 4   | 0.2320          | 32.70                    | 24.00                  | 9.70                   | 42.40                   | 33.70                 | 62.38                  | 52.38                | -19.98                | -18.68              | Pass   |
| 5   | 0.3766          | 39.80                    | 24.20                  | 9.70                   | 49.50                   | 33.90                 | 58.35                  | 48.35                | -8.85                 | -14.45              | Pass   |
| 6   | 17.0875         | 23.88                    | 17.68                  | 10.42                  | 34.30                   | 28.10                 | 60.00                  | 50.00                | -25.70                | -21.90              | Pass   |

REMARKS: L1 = Line One (Live Line)



|                                 |              |                      |        |
|---------------------------------|--------------|----------------------|--------|
| <b>Model No.</b>                | 32LV2400     | <b>6dB Bandwidth</b> | 9 kHz  |
| <b>Environmental Conditions</b> | 25°C, 57% RH | <b>Test Mode</b>     | Mode 1 |
| <b>Tested by</b>                | Tony Tsai    | <b>Line</b>          | L2     |



| NO. | Frequency<br>(MHz) | QuasiPeak         |                              | Correction<br>factor<br>(dB) | Average          |                  | QuasiPeak<br>limit<br>(dBuV) | Average         |                 | QuasiPeak<br>margin<br>(dB) | Average<br>margin<br>(dB) | Remark<br>(Pass/Fail) |
|-----|--------------------|-------------------|------------------------------|------------------------------|------------------|------------------|------------------------------|-----------------|-----------------|-----------------------------|---------------------------|-----------------------|
|     |                    | reading<br>(dBuV) | Average<br>reading<br>(dBuV) |                              | result<br>(dBuV) | result<br>(dBuV) |                              | limit<br>(dBuV) | limit<br>(dBuV) |                             |                           |                       |
| 1*  | 0.1656             | 50.60             | 32.20                        | 9.70                         | 60.30            | 41.90            | 65.18                        | 55.18           | -4.88           | -13.28                      | Pass                      |                       |
| 2   | 0.3297             | 44.69             | 21.59                        | 9.71                         | 54.40            | 31.30            | 59.46                        | 49.46           | -5.06           | -18.16                      | Pass                      |                       |
| 3   | 0.3961             | 34.09             | 13.29                        | 9.71                         | 43.80            | 23.00            | 57.93                        | 47.93           | -14.13          | -24.93                      | Pass                      |                       |
| 4   | 0.5238             | 32.49             | 15.09                        | 9.61                         | 42.10            | 24.70            | 56.00                        | 46.00           | -13.90          | -21.30                      | Pass                      |                       |
| 5   | 0.5885             | 37.79             | 15.39                        | 9.61                         | 47.40            | 25.00            | 56.00                        | 46.00           | -8.60           | -21.00                      | Pass                      |                       |
| 6   | 0.6852             | 19.89             | 14.89                        | 9.61                         | 29.50            | 24.50            | 56.00                        | 46.00           | -26.50          | -21.50                      | Pass                      |                       |

**REMARKS:** L2 = Line Two (Neutral Line)



## 7 RADIATED EMISSION MEASUREMENT

### 7.1. LIMITS OF RADIATED EMISSION MEASUREMENT

#### For 10 Limits

| FREQUENCY (MHz) | dBuV/m (At 10m) |         |
|-----------------|-----------------|---------|
|                 | Class A         | Class B |
| 30 ~ 230        | 40              | 30      |
| 230 ~ 1000      | 47              | 37      |

NOTE: (1) The lower limit shall apply at the transition frequencies.  
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

#### For 3 Limits

| Frequency (MHZ) | Distance (m) | Maximum Field Strength Limit (dBuV/m/Q.P.) |
|-----------------|--------------|--|
| 30 - 88         | 3            | 40   |
| 88 - 216        | 3            | 43.5                                       |
| 216 – 960       | 3            | 46   |
| Above 960       | 3            | 54   |

| Frequency (MHZ) | Class A (dBuV/m) (At 3m) |      | Class B (dBuV/m) (At 3m) |      |
|-----------------|--------------------------|------|--------------------------|------|
|                 | Average                  | Peak | Average                  | Peak |
| Above 1000      | 60                       | 80   | 54                       | 74   |

NOTE: (1) The lower limit shall apply at the transition frequencies.  
 (2) Emission level (dBuV/m) = 20 log Emission level (uV/m).

According to FCC Part 15.33 (b), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

| Highest frequency generated or used in the device or in which the device operated or tunes (MHz) | Upper frequency of measurement range (MHz)                                     |
|--|--|
| Below 1.75   | 30   |
| 1.75-108   | 1000   |
| 108-500  | 2000   |
| 500-1000   | 5000   |
| Above 1000   | 5 <sup>th</sup> harmonic of the highest frequency or 40GHz, whichever is lower |





**7.2. TEST INSTRUMENTS**

| Open Area Test Site # 2 |                                    |           |               |                 |
|-------------------------|------------------------------------|-----------|---------------|-----------------|
| Name of Equipment       | Manufacturer                       | Model     | Serial Number | Calibration Due |
| Spectrum Analyzer       | Agilent                            | E4446A    | MY48250064    | 12/29/2011      |
| EMI Test Receiver       | R&S                                | ESCS30    | 847793/012    | 05/17/2012      |
| Pre-Amplifier           | Agilent                            | 8449B     | 3008A01738    | 04/16/2012      |
| Bilog Antenna           | CHASE                              | CBL6112A  | 2307          | 03/31/2012      |
| Turn Table              | Chance Most                        | CM-T003-1 | T807-6        | N.C.R           |
| Antenna Tower           | Chance Most                        | CM-A003-1 | A807-6        | N.C.R           |
| Controller              | CCS                                | CC-C-1F   | N/A           | N.C.R           |
| RF Switch               | Anritsu                            | MP59B     | 10953         | N.C.R           |
| Test S/W                | LabVIEW 6.1 (CCS OATS EMI SW V2.7) |           |               |                 |

| 3 Meter Chamber          |              |                         |               |                 |
|--------------------------|--------------|-------------------------|---------------|-----------------|
| Name of Equipment        | Manufacturer | Model                   | Serial Number | Calibration Due |
| Spectrum Analyzer        | Agilent      | E4446A                  | MY48250064    | 12/29/2011      |
| Pre-Amplifier            | HP           | 8449B                   | 3008A00965    | 04/17/2012      |
| Pre-Amplifier            | MITEQ        | AMF-6F-260400-4<br>0-8P | 985646        | 05/23/2012      |
| Horn Antenna             | EMCO         | 3115                    | 9602-4659     | 05/09/2012      |
| Horn Antenna             | EMCO         | 3116                    | 00026370      | 10/12/2011      |
| Low Loss Cable           | Huber+Suhner | 104PEA                  | 24815/4PEA    | 08/13/2011      |
| Low Loss Cable           | Huber+Suhner | 104PEA                  | 30956/4PEA    | 04/17/2012      |
| Turn Table               | CCS          | CC-T-1F                 | N/A           | N.C.R           |
| Antenna Tower            | CCS          | CC-A-1F                 | N/A           | N.C.R           |
| Controller               | CCS          | CC-C-1F                 | N/A           | N.C.R           |
| Bore-Sight Antenna Tower | CCS          | CCS-BORESIGHT           | 001           | N.C.R           |
| Test S/W                 | CCS-3A1RE    |                         |               |                 |

**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. N.C.R = No Calibration Request.



### **7.3. TEST PROCEDURES** (please refer to measurement standard or CCS SOP PA-031)

#### **Procedure of Preliminary Test**

- The equipment was set up as per the test configuration to simulate typical usage per the user's manual. When the EUT is a tabletop system, a wooden turntable with a height of 0.8 meters is used which is placed on the ground plane. When the EUT is a floor standing equipment, it is placed on the ground plane which has a 3-12 mm non-conductive covering to insulate the EUT from the ground plane.
- Support equipment, if needed, was placed as per ANSI C63.4.
- All I/O cables were positioned to simulate typical usage as per ANSI C63.4.
- The EUT received AC 120VAC/60Hz power source from the outlet socket under the turntable. All support equipment power received from another socket under the turntable.
- The antenna was placed at 3 or 10 meter away from the EUT as stated in ANSI C63.4. The antenna connected to the Spectrum Analyzer via a cable and at times a pre-amplifier would be used.
- The Analyzer / Receiver quickly scanned from 30MHz to 40GHz. The EUT test program was started. Emissions were scanned and measured rotating the EUT to 360 degrees and positioning the antenna 1 to 4 meters (For Below 1GHz) or 1 meter (For Above 1GHz) above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- The test mode(s) described in Item 3.1 were scanned during the preliminary test:
- After the preliminary scan, we found the test mode described in Item 3.1 producing the highest emission level.
- The worst configuration of EUT and cable of the above highest emission level were recorded for reference of the final test.

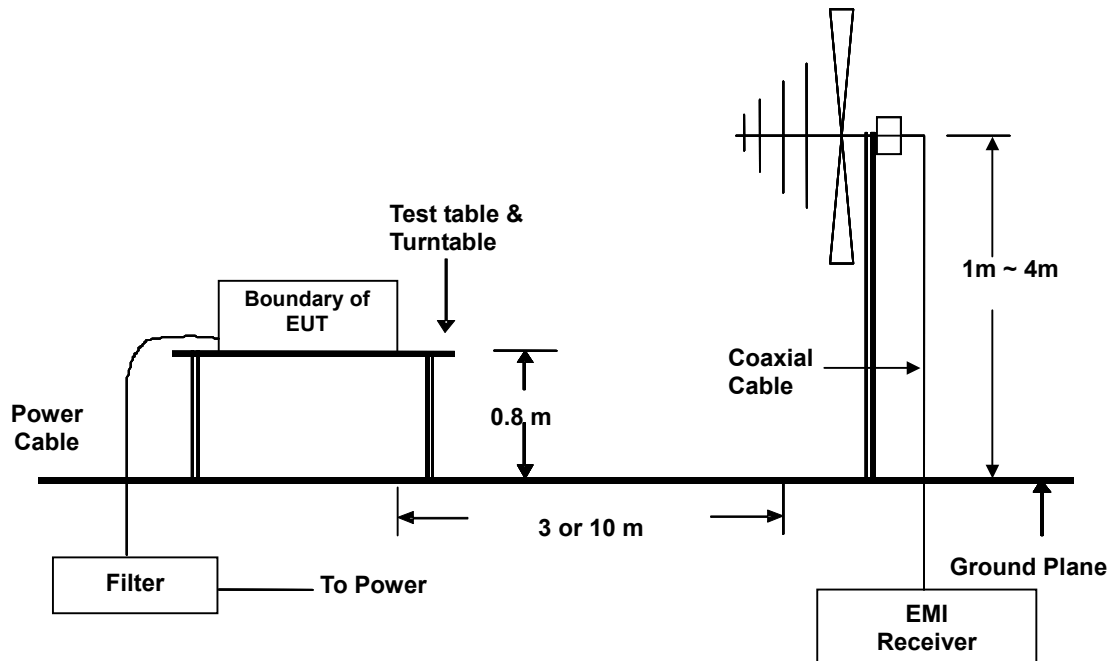
#### **Procedure of Final Test**

- EUT and support equipment were set up on the turntable as per the configuration with highest emission level in the preliminary test.
- The Analyzer / Receiver scanned from 30MHz to 40GHz. Emissions were scanned and measured rotating the EUT to 360 degrees, varying cable placement and positioning the antenna 1 or 1 to 4 meters above the ground plane, in both the vertical and the horizontal polarization, to maximize the emission reading level.
- Recording at least the six highest emissions. Emission frequency, amplitude, antenna position, polarization and turntable position were recorded into a computer in which correction factors were used to calculate the emission level and compare reading to the applicable limit and Q.P. (For Below 1GHz) or Peak/Average (For Above 1GHz) reading is presented.
- The test data of the worst-case condition(s) was recorded.

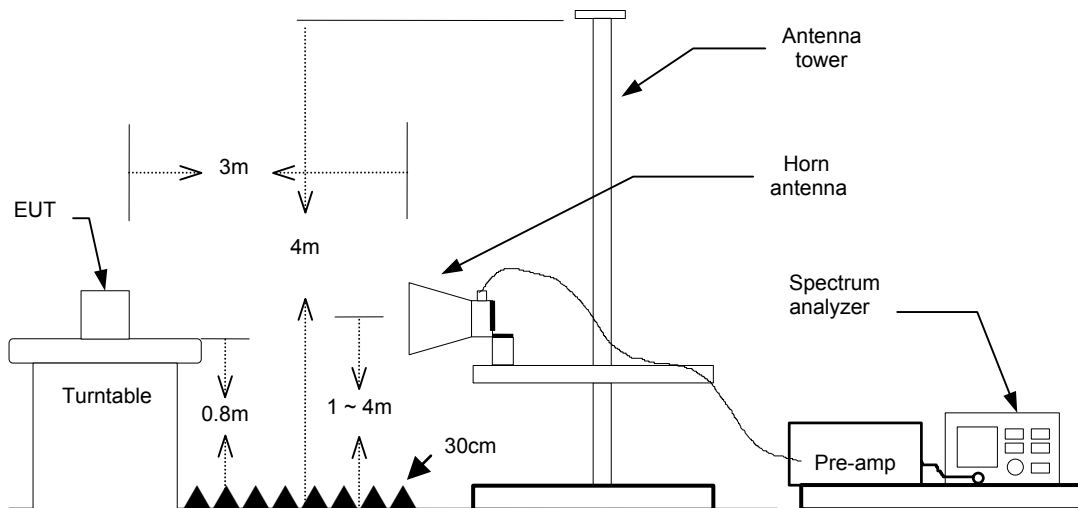


## 7.4. TEST SETUP

Below 1GHz



Above 1GHz



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



7.5. DATA SAMPLE:

Below 1GHz

| Frequency (MHz) | Reading (dBuV) | Correction Factor (dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree ( ° ) | Height (cm) | Remark |
|-----------------|----------------|--------------------------|-----------------|----------------|-------------|--------------|-------------|--------|
| xx.xx           | 16.49          | 9.86                     | 26.35           | 30.00          | -3.65       | 116.00       | 101.00      | QP     |

Above 1GHz

| Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|-----------------|------------------|--------------------|-----------------|----------------|-------------|-------------|--------------|--------|
| XX              | 54.08            | -11.80             | 42.28           | 70.00          | -27.72      | 100         | 185          | peak   |
| XX              | 34.80            | -11.80             | 23.00           | 50.00          | -27.00      | 100         | 185          | AVG    |

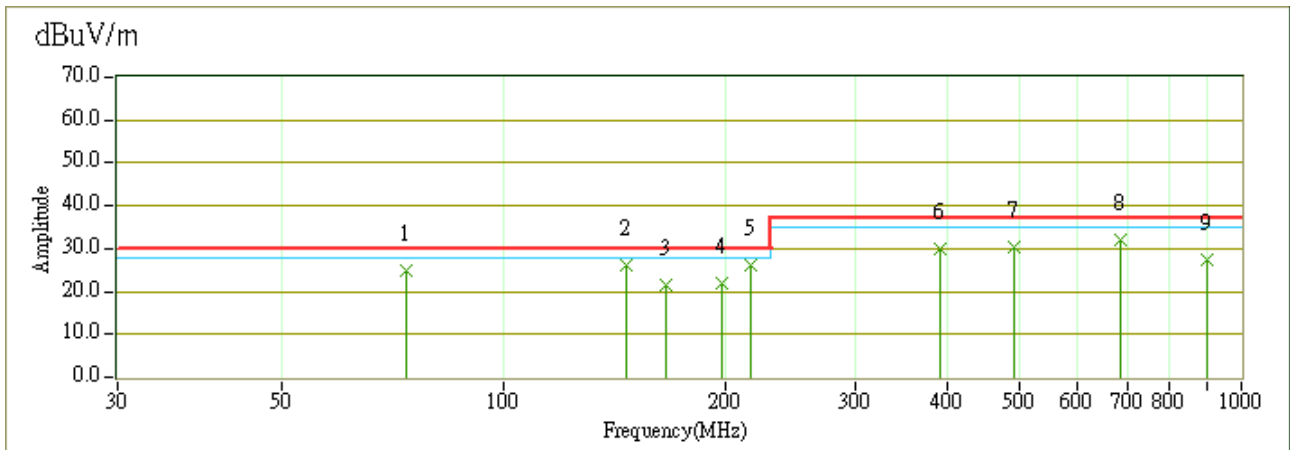
- Frequency (MHz) = Emission frequency in MHz
- Reading (dBuV) = Uncorrected Analyzer / Receiver reading
- Correction Factor (dB/m) = Antenna factor + Cable loss – Amplifier gain
- Result (dBuV/m) = Reading (dBuV) + Corr. Factor (dB/m)
- Limit (dBuV/m) = Limit stated in standard
- Margin (dB) = Result (dBuV/m) – Limit (dBuV/m)
- Q.P. = Quasi-Peak



### 7.6. TEST RESULTS

Below 1GHz

|                                 |              |                         |           |
|---------------------------------|--------------|-------------------------|-----------|
| <b>Model No.</b>                | 32LV2400     | <b>Test Mode</b>        | Mode 1    |
| <b>Environmental Conditions</b> | 25°C, 56% RH | <b>6dB Bandwidth</b>    | 120 kHz   |
| <b>Antenna Pole</b>             | Vertical     | <b>Antenna Distance</b> | 10m       |
| <b>Detector Function:</b>       | Quasi-peak.  | <b>Tested by</b>        | Tony Tsai |

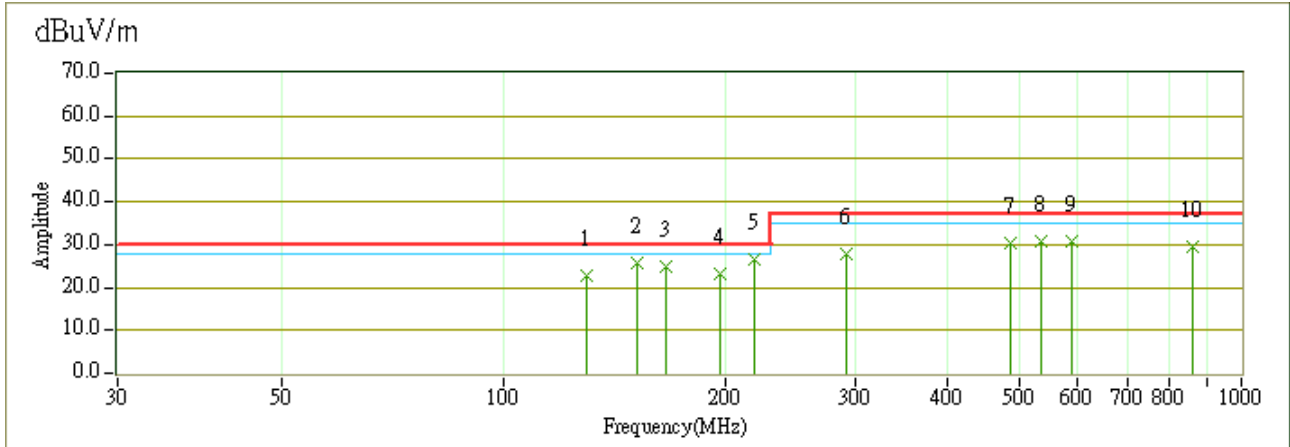


| No. | Frequency (MHz) | Reading (dBuV) | Correction Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 73.72           | 43.41          | -18.46                  | 24.95           | 30.00          | -5.05       | 134.20     | 100.00      | QP     |
| 2   | 146.62          | 39.43          | -13.43                  | 26.00           | 30.00          | -4.00       | 325.60     | 100.00      | QP     |
| 3   | 165.84          | 35.79          | -14.26                  | 21.54           | 30.00          | -8.46       | 359.80     | 100.00      | QP     |
| 4   | 197.36          | 36.49          | -14.43                  | 22.06           | 30.00          | -7.94       | 247.40     | 100.00      | QP     |
| 5   | 216.74          | 40.48          | -14.28                  | 26.20           | 30.00          | -3.80       | 25.90      | 100.00      | QP     |
| 6   | 391.37          | 37.05          | -7.25                   | 29.80           | 37.00          | -7.20       | 129.90     | 333.60      | QP     |
| 7   | 493.21          | 35.53          | -5.03                   | 30.50           | 37.00          | -6.50       | 145.10     | 306.70      | QP     |
| 8   | 687.25          | 35.01          | -2.83                   | 32.19           | 37.00          | -4.81       | 236.50     | 141.50      | QP     |
| 9   | 897.91          | 27.19          | 0.36                    | 27.55           | 37.00          | -9.45       | 98.40      | 100.00      | QP     |

**REMARKS:** The other emission levels were very low against the limit.



|                                 |              |                         |           |
|---------------------------------|--------------|-------------------------|-----------|
| <b>Model No.</b>                | 32LV2400     | <b>Test Mode</b>        | Mode 1    |
| <b>Environmental Conditions</b> | 25°C, 56% RH | <b>6dB Bandwidth</b>    | 120 kHz   |
| <b>Antenna Pole</b>             | Horizontal   | <b>Antenna Distance</b> | 10m       |
| <b>Detector Function:</b>       | Quasi-peak.  | <b>Tested by</b>        | Tony Tsai |



| No. | Frequency (MHz) | Reading (dBuV) | Correction Factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Degree (°) | Height (cm) | Remark |
|-----|-----------------|----------------|-------------------------|-----------------|----------------|-------------|------------|-------------|--------|
| 1   | 129.70          | 35.57          | -12.72                  | 22.85           | 30.00          | -7.15       | 281.50     | 400.00      | QP     |
| 2   | 151.51          | 39.31          | -13.70                  | 25.61           | 30.00          | -4.39       | 360.00     | 400.00      | QP     |
| 3   | 165.83          | 39.16          | -14.26                  | 24.91           | 30.00          | -5.09       | 93.50      | 400.00      | QP     |
| 4   | 197.01          | 37.71          | -14.43                  | 23.28           | 30.00          | -6.72       | 161.30     | 400.00      | QP     |
| 5   | 219.18          | 40.96          | -14.26                  | 26.70           | 30.00          | -3.30       | 332.60     | 400.00      | QP     |
| 6   | 291.80          | 37.26          | -9.56                   | 27.70           | 37.00          | -9.30       | 5.30       | 400.00      | QP     |
| 7   | 487.32          | 35.67          | -5.18                   | 30.49           | 37.00          | -6.51       | 360.00     | 307.70      | QP     |
| 8   | 536.36          | 34.57          | -3.80                   | 30.77           | 37.00          | -6.23       | 345.00     | 266.40      | QP     |
| 9   | 588.06          | 34.25          | -3.43                   | 30.82           | 37.00          | -6.18       | 187.10     | 129.60      | QP     |
| 10  | 859.18          | 29.40          | -0.04                   | 29.36           | 37.00          | -7.64       | 0.00       | 100.00      | QP     |

**REMARKS:** The other emission levels were very low against the limit.



Above 1GHz

|                                 |              |                             |                   |
|---------------------------------|--------------|-----------------------------|-------------------|
| <b>Model No.</b>                | 32LV2400     | <b>Test Mode</b>            | Mode 1            |
| <b>Environmental Conditions</b> | 18°C, 60% RH | <b>Test Frequency Range</b> | 1000MHz ~ 3000MHz |
| <b>Antenna Pole</b>             | Vertical     | <b>Antenna Distance</b>     | 3m                |
| <b>Detector Function:</b>       | Peak/Average | <b>Tested By</b>            | Tony Tsai         |

| No. | Frequency (MHz) | Reading (dBuV/m) | Correct Factor(dB) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Height (cm) | Degree ( ° ) | Remark |
|-----|-----------------|------------------|--------------------|-----------------|----------------|-------------|-------------|--------------|--------|
| 1   | 1575.000        | 58.99            | -8.44              | 50.55           | 74.00          | -23.45      | 141         | 351          | peak   |
| 2   | 2437.500        | 55.29            | -4.96              | 50.33           | 74.00          | -23.67      | 102         | 214          | peak   |
| 3   | 2737.500        | 54.92            | -3.83              | 51.09           | 74.00          | -22.91      | 124         | 123          | peak   |
| 4   | 3137.500        | 52.70            | -2.42              | 50.28           | 74.00          | -23.72      | 136         | 185          | peak   |
| 5   | 3225.000        | 52.66            | -2.18              | 50.48           | 74.00          | -23.52      | 128         | 146          | peak   |
| 6   | 3437.500        | 53.25            | -1.64              | 51.61           | 74.00          | -22.39      | 117         | 187          | peak   |

- REMARKS:**
1. The other emission levels were very low against the limit.
  2. "--", means the average measurement was not performed when the measured peak data under the limit of average detection.



|                                 |              |                             |                   |
|---------------------------------|--------------|-----------------------------|-------------------|
| <b>Model No.</b>                | 32LV2400     | <b>Test Mode</b>            | Mode 1            |
| <b>Environmental Conditions</b> | 18°C, 60% RH | <b>Test Frequency Range</b> | 1000MHz ~ 3000MHz |
| <b>Antenna Pole</b>             | Horizontal   | <b>Antenna Distance</b>     | 3m                |
| <b>Detector Function:</b>       | Peak/Average | <b>Tested By</b>            | Tony Tsai         |

| No. | Frequency<br>(MHz) | Reading<br>(dBuV/m) | Correct<br>Factor(dB) | Result<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Height<br>(cm) | Degree<br>( ° ) | Remark |
|-----|--------------------|---------------------|-----------------------|--------------------|-------------------|----------------|----------------|-----------------|--------|
| 1   | 1575.000           | 59.08               | -8.44                 | 50.64              | 74.00             | -23.36         | 132            | 324             | peak   |
| 2   | 2050.000           | 56.77               | -5.99                 | 50.78              | 74.00             | -23.22         | 141            | 128             | peak   |
| 3   | 2250.000           | 56.34               | -5.46                 | 50.88              | 74.00             | -23.12         | 120            | 146             | peak   |
| 4   | 2450.000           | 56.37               | -4.92                 | 51.45              | 74.00             | -22.55         | 108            | 282             | peak   |
| 5   | 2737.500           | 54.91               | -3.83                 | 51.08              | 74.00             | -22.92         | 115            | 146             | peak   |
| 6   | 4025.000           | 49.47               | 1.06                  | 50.53              | 74.00             | -23.47         | 132            | 287             | peak   |

- REMARKS:**
1. The other emission levels were very low against the limit.
  2. "--", means the average measurement was not performed when the measured peak data under the limit of average detection.





**APPENDIX 1: PHOTOGRAPHS OF EUT**

**Refer to T110803006 External Photographs.**