



NVLAP LAB CODE 200707-0



# FCC PART 15B MEASUREMENT AND TEST REPORT

For  
**ZTE Corporation**

ZTE Plaza, Hi-Tech, Industrial Park, Nanshan District,  
Shenzhen, Guangdong, P.R.of China

**FCC ID: Q78-ZXDSL831**

|  |  |
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| <b>Report Type:</b><br>Original Report | <b>Product Type:</b><br>ADSL CPE   |
| <b>Test Engineer:</b> Jack Wang        | <i>Jack Wang</i>   |
| <b>Report Number:</b> RSZ09092802      |  |
| <b>Report Date:</b> 2009-10-22         |  |
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\* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "\*" (Rev.2)

**TABLE OF CONTENTS**

**GENERAL INFORMATION.....3**  
PRODUCT DESCRIPTION FOR EQUIPMENT UNDER TEST (EUT) .....3  
OBJECTIVE .....3  
RELATED SUBMITTAL(S)/GRANT(S).....3  
TEST METHODOLOGY .....3  
TEST FACILITY .....4

**SYSTEM TEST CONFIGURATION.....5**  
JUSTIFICATION .....5  
EUT EXERCISE SOFTWARE .....5  
EQUIPMENT MODIFICATIONS .....5  
HOST SYSTEM CONFIGURATION LIST AND DETAILS .....5  
LOCAL SUPPORT EQUIPMENT LIST AND DETAILS .....5  
EXTERNAL CABLE LIST AND DETAILS .....6  
CONFIGURATION OF TEST SETUP .....7  
BLOCK DIAGRAM OF TEST SETUP .....7

**SUMMARY OF TEST RESULTS .....8**

**CFR47 §15.107 - CONDUCTED EMISSIONS .....9**  
MEASUREMENT UNCERTAINTY .....9  
EUT SETUP .....9  
EMI TEST RECEIVER SETUP.....10  
TEST EQUIPMENT LIST AND DETAILS.....10  
TEST PROCEDURE .....10  
TEST RESULTS SUMMARY .....10  
TEST DATA .....11  
PLOT(S) OF TEST DATA .....11

**CFR47 §15.109 - RADIATED EMISSIONS .....13**  
MEASUREMENT UNCERTAINTY .....13  
EUT SETUP .....13  
EMI TEST RECEIVER SETUP.....14  
TEST EQUIPMENT LIST AND DETAILS.....14  
TEST PROCEDURE .....14  
CORRECTED AMPLITUDE & MARGIN CALCULATION .....14  
TEST RESULTS SUMMARY .....14  
TEST DATA .....15

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## GENERAL INFORMATION

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### Product Description for Equipment under Test (EUT)

The *ZTE Corporation* 's product, model number: *ZXDSL 831 II* (FCC ID: *Q78-ZXDSL831*) or the "EUT" as referred to in this report is a *ADSL CPE*, which measures approximately: 13.0 cm L x 10.6 cm W x 3.6 cm H, input voltage: DC 12V adapter.

Adapter information:

Manufacture: RUIDE;

Model: STC-A22O12C55-5;

Input: AC 100-240V, 50/60Hz 250mA;

Output: DC 12V 500mA.

\*Note: The serial product model *ZXDSL 831 Series* (*ZXDSL 831 II/ZXDSL 831/ZXDSL 831B/ZXDSL 831B II*), we select *ZXDSL 831 II* to test, and all of the models are electrically identical, only their differences are their model names and the software, which was explained in the attached declaration letter.

\*All measurement and test data in this report was gathered from production sample serial number: 0909048 (Assigned by *BACL, Shenzhen*). The EUT was received on 2009-09-28.

### Objective

This Type approval report is prepared on behalf of *ZTE Corporation* in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15 Class B.

### Related Submittal(s)/Grant(s)

N/A.

### Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

## Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

## SYSTEM TEST CONFIGURATION

### Justification

The system was configured for testing in a manufacturer testing fashion.

### EUT Exercise Software

N/A.

### Equipment Modifications

No modification was made to the unit tested.

### Host System Configuration List and Details

| Manufacturer | Description | Model No.         | Serial No.               | FCC ID |
|--------------|-------------|-------------------|--------------------------|--------|
| DELL         | Motherboard | OWC297            | CN-OWC297-70821-564-00NI | DoC    |
| DELL         | Power       | NPS-250KB D       | CN-0H2678-17972-56E-80BM | DoC    |
| Seagate      | Hard Disk   | ST340014A         | 5JXK3GXE                 | DoC    |
| DELL         | 3.5' Floppy | N/A               | CN-0N8893-69802-54Q-02P0 | DoC    |
| Lite-ON      | CD-Rom      | LTN-489S          | N/A                      | DoC    |
| ProMOS       | Memory      | V826632K24SATG-C0 | 0525-K1933700            | N/A    |
| Intel        | CPU         | Celeron D-2533    | N/A                      | N/A    |
| Intel        | Ethernet    | PRO 10/100 VE     | N/A                      | DoC    |

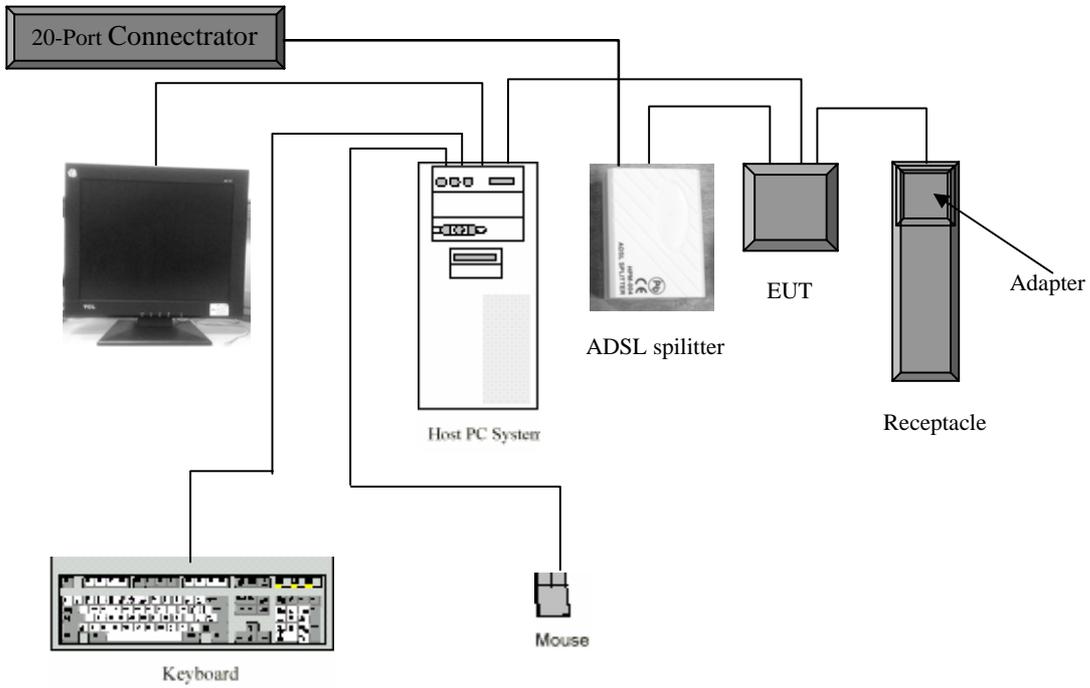
### Local Support Equipment List and Details

| Manufacturer | Description          | Model No. | Serial No.               | FCC ID |
|--------------|----------------------|-----------|--------------------------|--------|
| DELL         | PC                   | DELL 170L | CN-0TC670-70821-560-F4Q6 | DoC    |
| DELL         | Keyboard             | L100      | CNORH656658907BL05DC     | DoC    |
| DELL         | Mouse                | MOC5UO    | G1B0096D                 | DoC    |
| DELL         | LCD Monitor          | E178WFPC  | CN-OWY564-64180-7C4-2SQH | DoC    |
| ARESCOM      | 20-Port connectrator | CDS6020   | N/A                      | N/A    |
| N/A          | ADSL splitter        | HPM-004   | N/A                      | N/A    |

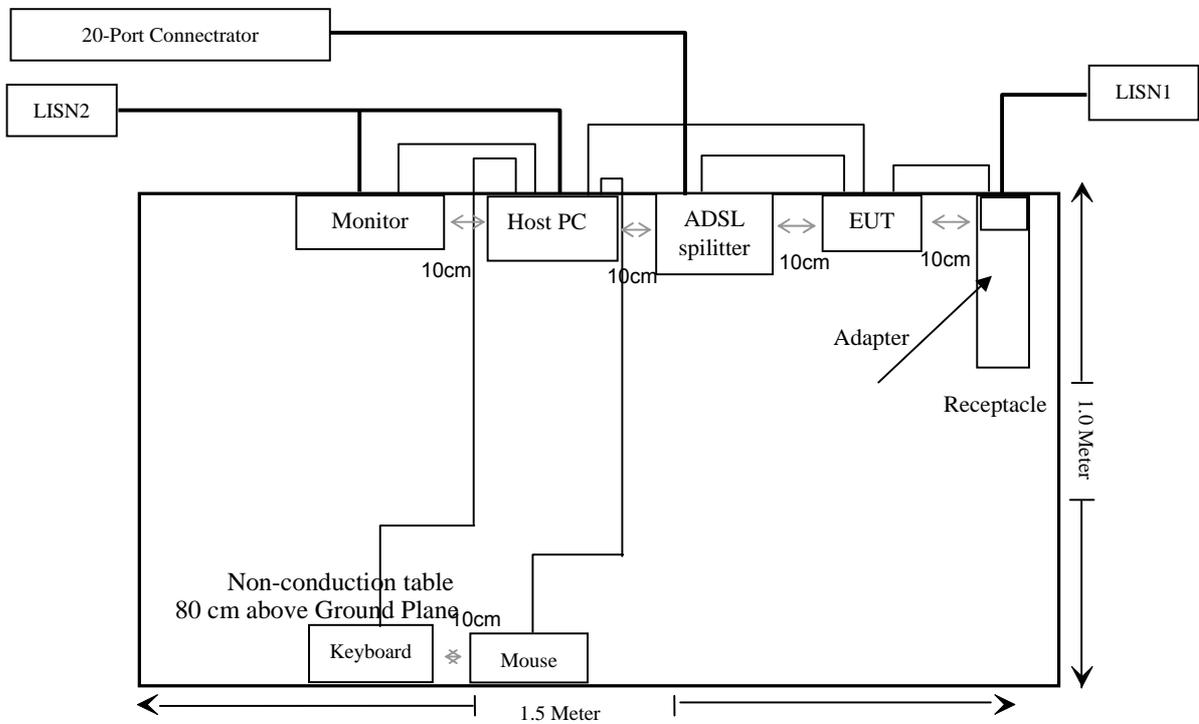
**External Cable List and Details**

| <b>Cable Description</b>           | <b>Length (m)</b> | <b>From/Port</b>  | <b>To</b>     |
|------------------------------------|-------------------|-------------------|---------------|
| Shielded Detachable K/B Cable      | 1.50              | K/B port / Host   | K/B           |
| Shielded Detachable Mouse Cable    | 1.50              | Mouse port / Host | Mouse         |
| Shielded Detachable VGA Cable      | 1.50              | VGA port / Host   | Monitor       |
| Unshielded Undetachable RJ45 Cable | 3.00              | EUT               | PC system     |
| Unshielded Undetachable RJ11 Cable | 3.00              | EUT               | ADSL splitter |
| Unshielded Undetachable DC Cable   | 1.50              | EUT               | Adapter       |

### Configuration of Test Setup



### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC Rules | Description of Test | Results    |
|-----------|---------------------|------------|
| §15.107   | Conducted Emissions | Compliant  |
| §15.109   | Radiated Emissions  | Compliant* |

\*Within measurement uncertainty.

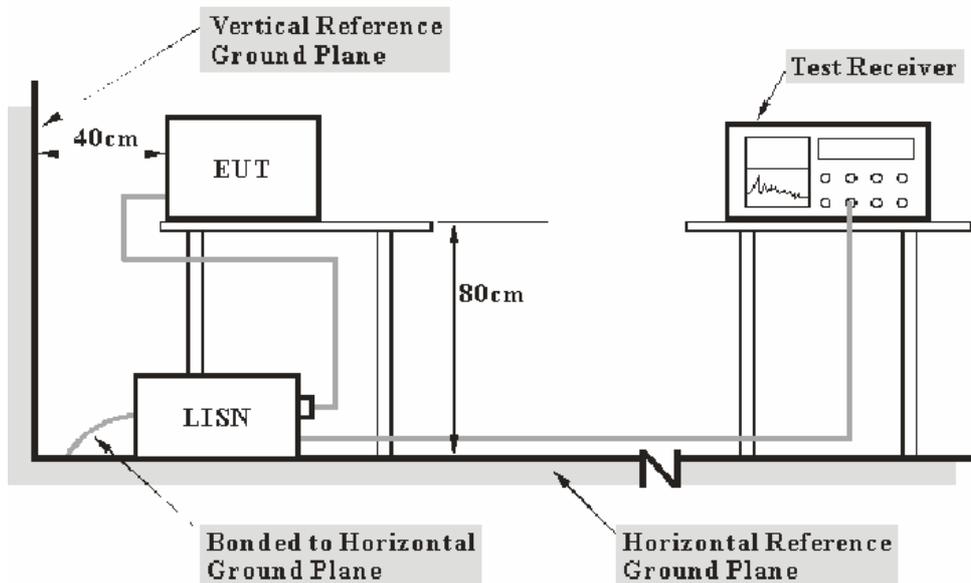
## CFR47 §15.107 - CONDUCTED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 2.4$  dB.

### EUT Setup



- Note:**
1. Support units were connected to second LISN.
  2. Both of LISNs (AMN) 80 cm from EUT and at the least 30 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15.107 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

| <i>Frequency Range</i> | <i>IF B/W</i> |
|------------------------|---------------|
| 150 kHz – 30 MHz       | 9 kHz         |

## Test Equipment List and Details

| Manufacturer    | Description       | Model   | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCS30  | 830245/006    | 2009-04-28       | 2010-04-27           |
| Rohde & Schwarz | L.I.S.N.          | ESH2-Z5 | 892107/021    | 2009-04-28       | 2010-04-27           |

\* **Statement of Traceability:** Bay Area Compliance Laboratory Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN, the host PC and monitor were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15.107, with the worst margin reading of:

**3.50 dB at 1.1800 MHz in the Neutral conductor mode**

**Test Data****Environmental Conditions**

|                           |           |
|---------------------------|-----------|
| <b>Temperature:</b>       | 25 ° C    |
| <b>Relative Humidity:</b> | 50 %      |
| <b>ATM Pressure:</b>      | 100.0 kPa |

The testing was performed by Jack Wang on 2009-10-19.

Test Mode: Running

| Line Conducted Emissions |                        |                  |                          | FCC Part 15.107    |             |
|--------------------------|------------------------|------------------|--------------------------|--------------------|-------------|
| Frequency (MHz)          | Amplitude (dB $\mu$ V) | Detector (QP/AV) | Conductor (Line/Neutral) | Limit (dB $\mu$ V) | Margin (dB) |
| 1.1800                   | 52.50                  | QP               | Neutral                  | 56.00              | 3.50        |
| 2.1200                   | 52.30                  | QP               | Neutral                  | 56.00              | 3.70        |
| 1.5750                   | 51.60                  | QP               | Neutral                  | 56.00              | 4.40        |
| 0.3350                   | 52.30                  | QP               | Neutral                  | 59.30              | 7.00        |
| 0.6250                   | 49.00                  | QP               | Neutral                  | 56.00              | 7.00        |
| 0.8350                   | 48.20                  | QP               | Neutral                  | 56.00              | 7.80        |
| 1.1750                   | 47.90                  | QP               | Line                     | 56.00              | 8.10        |
| 1.5200                   | 47.90                  | QP               | Line                     | 56.00              | 8.10        |
| 2.0750                   | 46.90                  | QP               | Line                     | 56.00              | 9.10        |
| 1.5750                   | 36.90                  | AV               | Neutral                  | 46.00              | 9.10        |
| 2.1200                   | 36.70                  | AV               | Neutral                  | 46.00              | 9.30        |
| 0.3450                   | 49.70                  | QP               | Line                     | 59.10              | 9.40        |
| 1.1850                   | 36.60                  | AV               | Neutral                  | 46.00              | 9.40        |
| 0.3350                   | 39.80                  | AV               | Neutral                  | 49.30              | 9.50        |
| 3.4800                   | 45.80                  | QP               | Line                     | 56.00              | 10.20       |
| 1.1750                   | 33.70                  | AV               | Line                     | 46.00              | 12.30       |
| 0.8300                   | 33.00                  | AV               | Neutral                  | 46.00              | 13.00       |
| 0.1950                   | 50.70                  | QP               | Line                     | 63.80              | 13.10       |
| 1.5200                   | 32.60                  | AV               | Line                     | 46.00              | 13.40       |
| 2.0750                   | 32.10                  | AV               | Line                     | 46.00              | 13.90       |
| 0.6200                   | 32.00                  | AV               | Neutral                  | 46.00              | 14.00       |
| 0.1950                   | 38.30                  | AV               | Line                     | 53.80              | 15.50       |
| 0.3450                   | 33.50                  | AV               | Line                     | 49.10              | 15.60       |
| 3.4700                   | 28.20                  | AV               | Line                     | 46.00              | 17.80       |

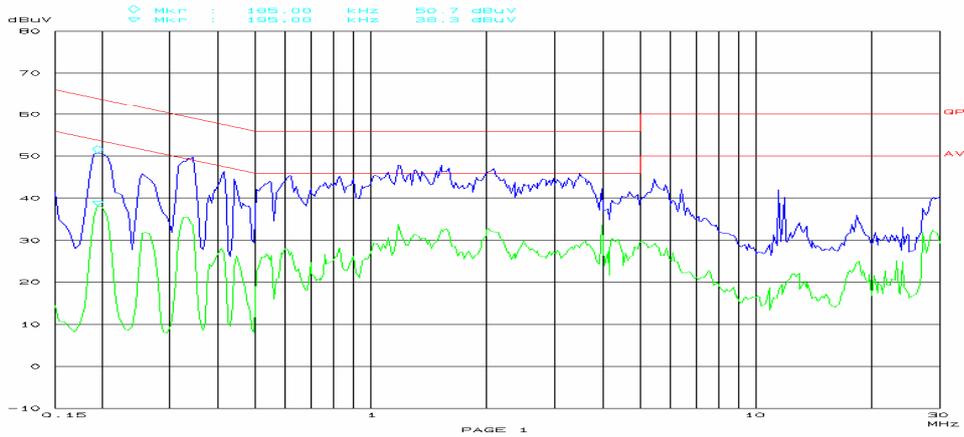
**Plot(s) of Test Data**

Plot(s) of Test Data is presented hereinafter as reference.

Line:

Conducted Emission  
FCC Part 15  
EUT: ADSL CPE M/N: ZXDSL831 II  
Manuf: ZTE Corporation  
Op Cond: Running  
Operator: Jack  
Test Spec: AC120V/60Hz L  
Comment: Temp: 25 Hum: 50%  
SACL

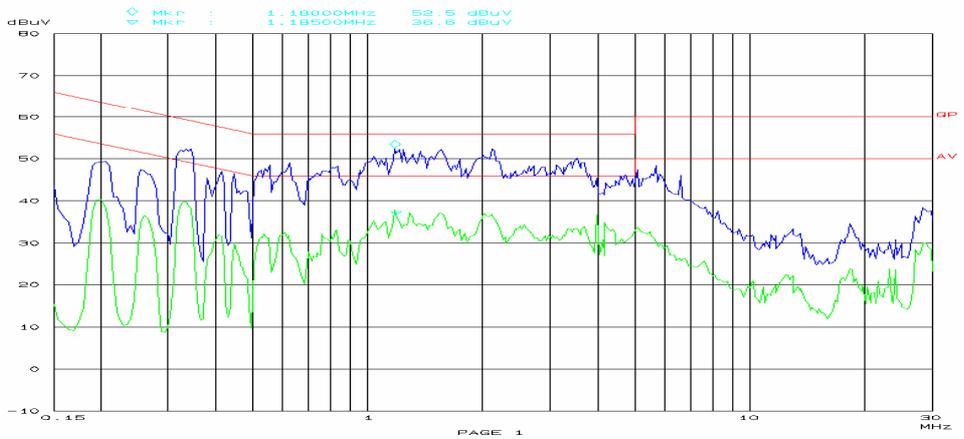
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Neutral:

Conducted Emission  
FCC Part 15  
EUT: ADSL CPE M/N: ZXDSL831 II  
Manuf: ZTE Corporation  
Op Cond: Running  
Operator: Jack  
Test Spec: AC120V/60Hz N  
Comment: Temp: 25 Hum: 50%  
SACL

19. Oct 09 10:32



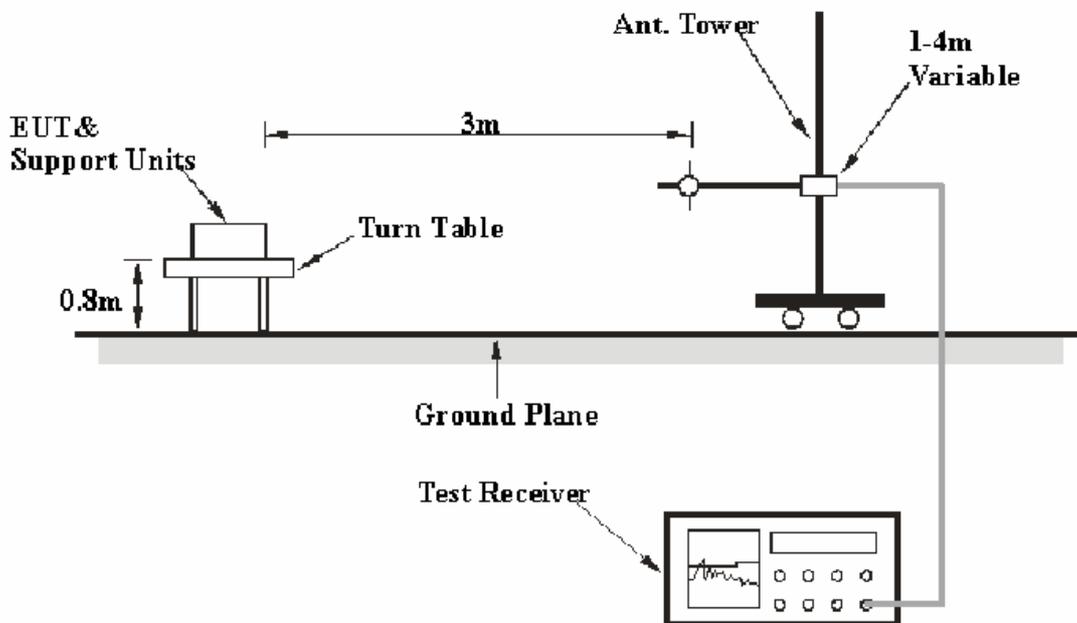
## CFR47 §15.109 - RADIATED EMISSIONS

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15.109 limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz power source.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

| <i>Frequency</i> | <i>RB/W</i> | <i>VB/W</i> | <i>IF B/W</i> |
|------------------|-------------|-------------|---------------|
| 30 MHz-1 GHz     | 100 kHz     | 300 kHz     | 120 kHz       |
| above 1GHz       |             |             |               |

## Test Equipment List and Details

| Manufacturer    | Description       | Model   | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| HP              | Amplifier         | HP8447E | 1937A01046    | 2008-11-15       | 2009-11-15           |
| Rohde & Schwarz | EMI Test Receiver | ESCI    | 100035        | 2008-11-07       | 2009-11-06           |
| Sunol Sciences  | Broadband Antenna | JB1     | A040904-1     | 2009-03-11       | 2010-03-11           |
| HP              | Amplifier         | 8449B   | 3008A00277    | 2009-09-12       | 2010-09-11           |
| Sunol Sciences  | Horn Antenna      | DRH-118 | A052604       | 2009-09-25       | 2010-09-25           |
| Rohde & Schwarz | Spectrum Analyzer | FSEM30  | 849720/019    | 2009-07-08       | 2010-07-08           |

\* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

## Test Procedure

During the radiated emissions test, the adapter and other equipments were connected to the AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

## Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.109, with the worst margin reading of:

**1.6 dB at 60.213750 MHz in the Vertical polarization**

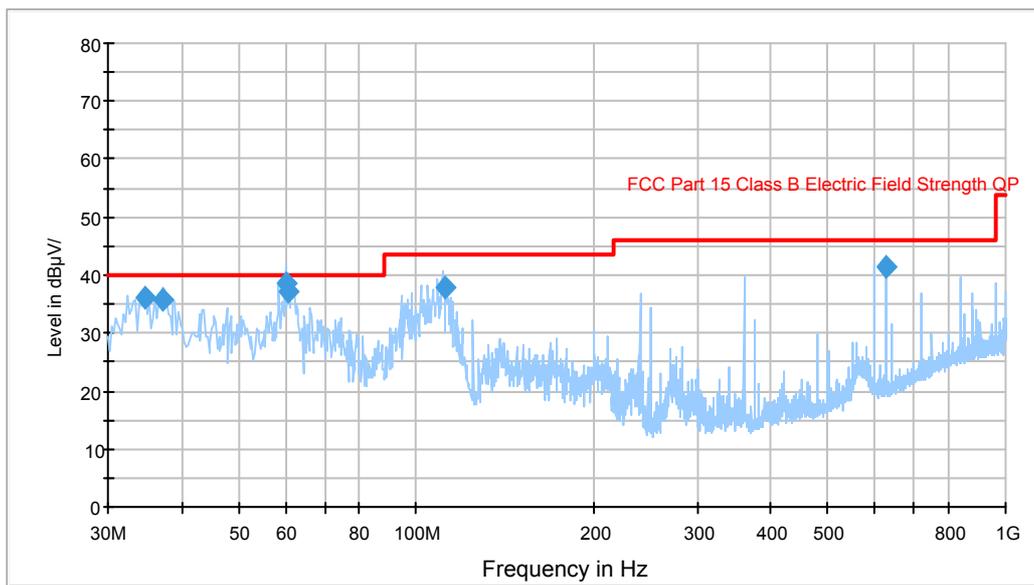
**Test Data**

**Environmental Conditions**

|                           |          |
|---------------------------|----------|
| <b>Temperature:</b>       | 25 °C    |
| <b>Relative Humidity:</b> | 56 %     |
| <b>ATM Pressure:</b>      | 100.0kPa |

The testing was performed by Jack Wang on 2009-10-20.

Test Mode: Running (worst case)



| Frequency (MHz) | Corrected Amplitude (dBµV/m) | Ant. Height (cm) | Ant. Polarity (H/V) | Turntable Position (deg) | Correction Factor (dB) | Limit (dBµV/m) | Margin (dB) |
|-----------------|------------------------------|------------------|---------------------|--------------------------|------------------------|----------------|-------------|
| 60.213750       | 38.4                         | 286.0            | V                   | 6.0                      | -19.9                  | 40.0           | 1.6*        |
| 60.838000       | 37.1                         | 287.0            | V                   | 6.0                      | -19.9                  | 40.0           | 2.9*        |
| 34.647750       | 36.2                         | 101.0            | V                   | 67.0                     | -9.6                   | 40.0           | 3.8*        |
| 37.133750       | 35.7                         | 185.0            | V                   | 107.0                    | -11.4                  | 40.0           | 4.3         |
| 624.996250      | 41.5                         | 101.0            | H                   | 35.0                     | -7.4                   | 46.0           | 4.5         |
| 111.578750      | 37.8                         | 101.0            | V                   | 303.0                    | -14.6                  | 43.5           | 5.7         |

\*Within measurement uncertainty.

**\*\*\*\*\* END OF REPORT \*\*\*\*\***