

**FCC PART 15.247**  
**EMI MEASUREMENT AND TEST REPORT**  
For  
**Audex Telecom Industrial Co., Ltd.**

4/F., Chuangye Center, Kangle Rd., Zhongshan Torch Hi-Tech Industrial Zone, Zhongshan China

**FCC ID: P68DSF24811288**

December 9, 2005

|   |   |
|---|---|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report   | <b>Equipment Type:</b><br>Bluetooth Transmitter |
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| <b>Report No.:</b> RSZ05111603  |   |
| <b>Test Date:</b> November 30- December 1, 2005   |   |
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## GENERAL INFORMATION

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

The *Audex Telecom Industrial Co., Ltd.*'s product, model number: DSF-2481 or the "EUT" as referred to in this report is a Transmitter, and product name is Telephone Base Station, which measures approximately 12.5 cm L x 10.5cmW x 6.0cmH, rated input voltage: 120 VAC/60 Hz.

Adapter: Manufacturer: Audex Telecom Industrial Co., Ltd.

Model: DU120020D

Input: 120 VAC/ 60 Hz 15W

Output: 12 VDC 200mA

*\* The test data gathered are from production sample, serial number: Audex-0004 provided by the manufacturer, we receive the EUT on 2005-11-16.*

### Objective

This Type approval report is prepared on behalf of *Audex Telecom Industrial Co., Ltd.* in accordance with Part 2, Subpart J, Part 15, Subparts A, B and C of the Federal Communication Commissions rules.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203,15.205,15.207,15.209 and 15.247 rules.

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

No related submittal(s).

### 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 Lab 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 Lab 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 518038, P.R.China.

Test site at Bay Area Compliance Lab 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 04, 2004. 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 and Industrial Canada registration test site No.: 5500A. 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 Lab 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/ts/htdocs/210/214/scopes/2007070.htm>

### Local Support Equipment List and Details

| Manufacturer | Description         | Model                  | Serial Number | FCC ID |
|--------------|---------------------|------------------------|---------------|--------|
| Kewang       | Telephone Exchanger | TC-104L                | N/A           | DoC    |
| GuoWei       | Telephone           | HCD1698 (28)<br>TDL B1 | N/A           | N/A    |

### External I/O Cable

| Cable Description                     | Length (m) | From/Port | To                  |
|---------------------------------------|------------|-----------|---------------------|
| Unshielded Detachable Telephone Cable | 1.0        | EUT       | Telephone           |
| Unshielded Detachable Telephone Cable | 1.5        | RJ11      | Telephone Exchanger |

## SYSTEM TEST CONFIGURATION

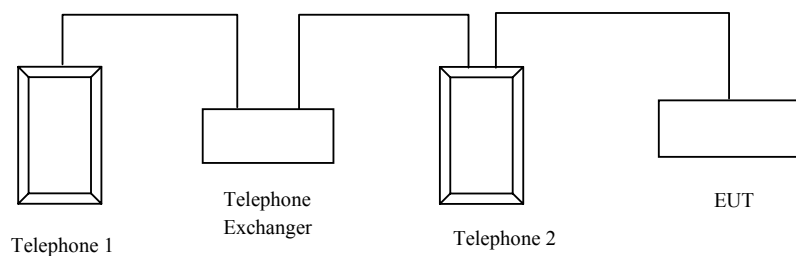
### Description of Test Configuration

The system was configured for testing in a typical fashion (as normally used by a typical user).

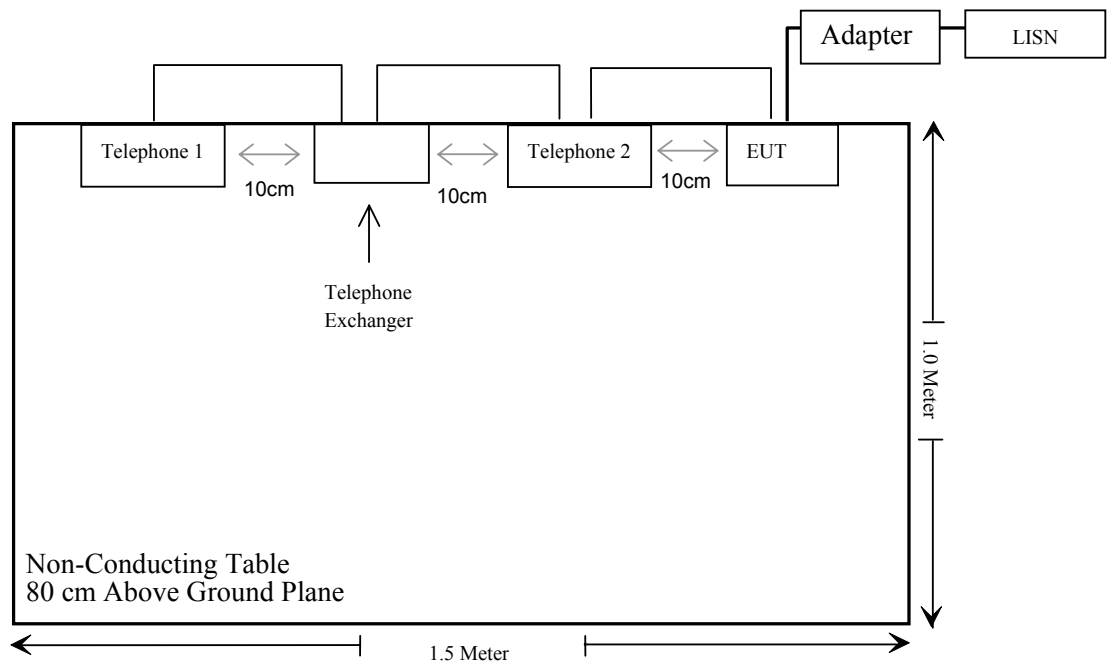
### Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

### Configuration of Test Setup



### Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| FCC RULES                       | DESCRIPTION OF TEST              | RESULT      |
|---------------------------------|----------------------------------|-------------|
| §15.203                         | Antenna Requirement              | Compliant   |
| §15.205                         | Restricted Band                  | Compliant   |
| §15.207 (a)                     | Conducted Emission               | Compliant   |
| §15.205, §15.209,<br>§15.247(d) | Radiated Emission                | Compliant * |
| §15.247 (a)(1)                  | 20 dB Bandwidth                  | Compliant   |
| §15.247(a)(1)                   | Channel Separation Test          | Compliant   |
| §15.247(a)(1)(iii)              | Time of occupancy (Dwell Time)   | Compliant   |
| §15.247(a)(1)(iii)              | Quantity of hopping channel Test | Compliant   |
| §15.247(b)(1)                   | Peak Output Power Measurement    | Compliant   |
| §15.247(d)                      | Band edges testing               | Compliant   |

\* Within the measurement uncertainty.

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## **§15.203 - ANTENNA REQUIREMENT**

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### **Applicable Standard**

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to § 15.247 (b) (4), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The antenna for this device is an integral antenna with gain of 2 dBi.



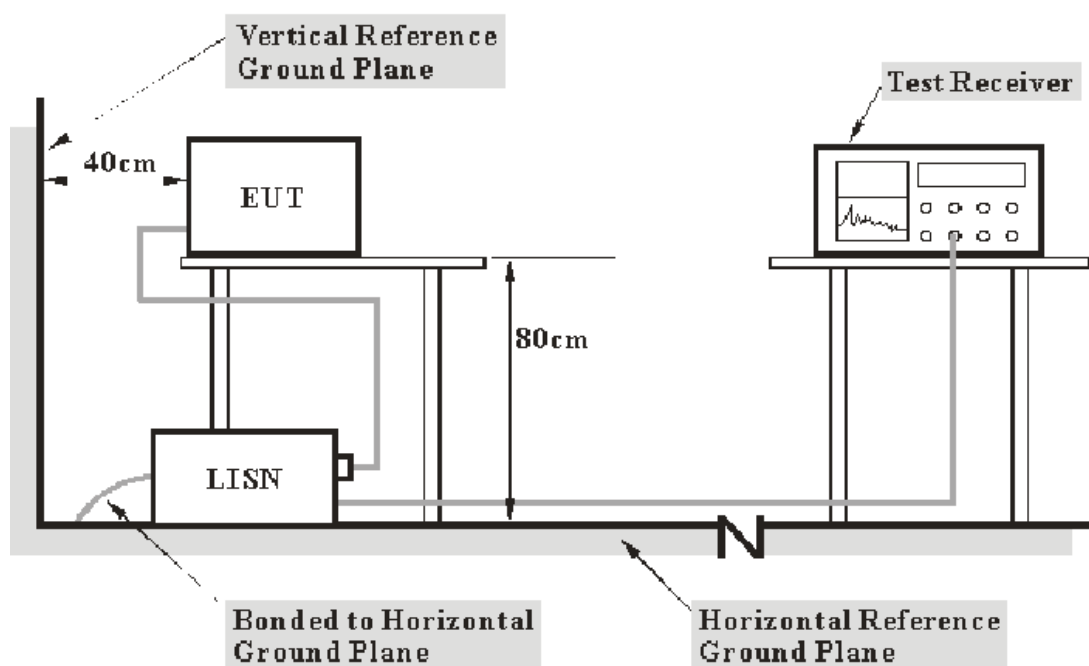
## §15.207 (a)- CONDUCTED EMISSION

### 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 Lab 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 80 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 15.207 (a) limits.

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:

| <u>Frequency Range</u> | <u>IFBW</u> |
|------------------------|-------------|
| 150 kHz – 30 MHz       | 9 kHz       |

**Test Equipment List and Details**

| Manufacturer    | Description       | Model   | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|---------|---------------|------------------|----------------------|
| Com-Power       | L.I.S.N.          | LI-200  | 12005         | N/A              | N/A                  |
| Com-Power       | L.I.S.N.          | LI-200  | 12008         | N/A              | N/A                  |
| Rohde & Schwarz | EMI Test Receiver | ESCS30  | 830245/006    | 2005-1-26        | 2006-1-26            |
| Rohde & Schwarz | L.I.S.N.          | ESH2-Z5 | 892107/021    | 2005-2-28        | 2006-2-28            |

\* Com-Power's LISN were used as the supporting equipment.

\* **Statement of Traceability:** Bay Area Compliance Lab 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 power cord was connected to the outlet of the LISN.

Maximizing procedure were 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 15.207, with the worst margin reading of:

**-12.98 dB at 0.45 MHz in the Line conductor mode.**

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

|                    |          |
|--------------------|----------|
| Temperature:       | 25 ° C   |
| Relative Humidity: | 53%      |
| ATM Pressure:      | 1009mbar |

The testing was performed by Davis Ma on 2005-12-6.

Test Mode: Transmitting

| LINE CONDUCTED EMISSIONS |                         |                   |                       | FCC Part 15.207     |              |
|--------------------------|-------------------------|-------------------|-----------------------|---------------------|--------------|
| Frequency<br>MHz         | Amplitude<br>dB $\mu$ V | Detector<br>QP/AV | Phase<br>Line/Neutral | Limit<br>dB $\mu$ V | Margin<br>dB |
| 0.450                    | 43.9                    | QP                | Line                  | 56.88               | -12.98       |
| 0.450                    | 41.5                    | QP                | Neutral               | 56.88               | -15.38       |
| 19.775                   | 43.5                    | QP                | Neutral               | 60.00               | -16.50       |
| 19.725                   | 43.0                    | QP                | Line                  | 60.00               | -17.00       |
| 0.275                    | 42.9                    | QP                | Line                  | 60.97               | -18.07       |
| 0.245                    | 41.5                    | QP                | Neutral               | 61.92               | -20.42       |
| 0.165                    | 43.5                    | QP                | Line                  | 65.21               | -21.71       |
| 25.580                   | 38.0                    | QP                | Neutral               | 60.00               | -22.00       |
| 0.175                    | 42.1                    | QP                | Neutral               | 64.72               | -22.62       |
| 1.205                    | 31.7                    | QP                | Neutral               | 56.00               | -24.30       |
| 25.580                   | 25.6                    | AV                | Neutral               | 50.00               | -24.40       |
| 1.185                    | 30.9                    | QP                | Line                  | 56.00               | -25.10       |
| 19.775                   | 22.2                    | AV                | Neutral               | 50.00               | -27.80       |
| 19.725                   | 21.9                    | AV                | Line                  | 50.00               | -28.10       |
| 4.050                    | 25.9                    | QP                | Line                  | 56.00               | -30.10       |
| 1.205                    | 15.7                    | AV                | Neutral               | 46.00               | -30.30       |
| 1.185                    | 14.4                    | AV                | Line                  | 46.00               | -31.60       |
| 4.050                    | 12.2                    | AV                | Line                  | 46.00               | -33.80       |
| 0.450                    | 12.2                    | AV                | Neutral               | 46.88               | -34.68       |
| 0.175                    | 18.4                    | AV                | Neutral               | 54.72               | -36.32       |
| 0.450                    | 10.4                    | AV                | Line                  | 46.88               | -36.48       |
| 0.245                    | 14.5                    | AV                | Neutral               | 51.92               | -37.42       |
| 0.275                    | 13.5                    | AV                | Line                  | 50.97               | -37.47       |
| 0.165                    | 16.8                    | AV                | Line                  | 55.21               | -38.41       |

**Plot(s) of Test Data**

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

# Disturbance voltage test FCC Part15

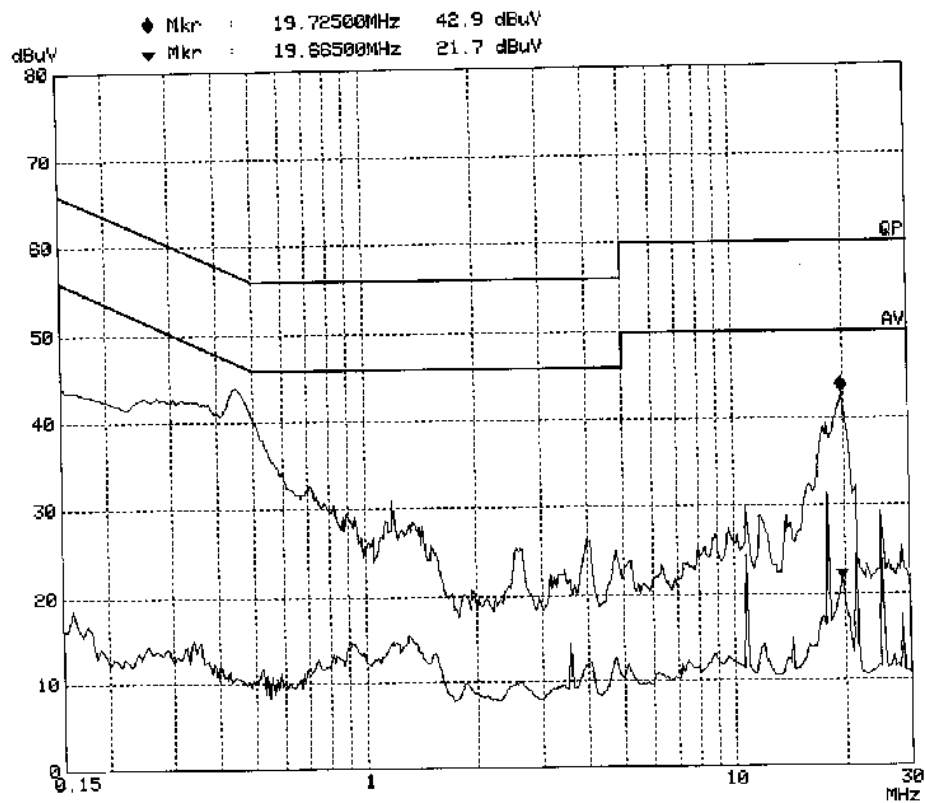
EUT: Telephone Base Station M/N:DSF-2481  
Manuf: Audex  
Op Cond: Transmitting/Receiving  
Operator: Davis  
Test Spec: AC 120V/60Hz L  
Comment: Temp:25  
Humi:55%  
Date: 06. Dec 05 16:57

## Scan Settings (1 Range)

| Frequencies |      |      | Receiver Settings |          |           |              |
|-------------|------|------|-------------------|----------|-----------|--------------|
| Start       | Stop | Step | IF BW             | Detector | M-Time    | Atten Preamp |
| 150k        | 30M  | 5k   | 9k                | PR+AV    | 20ms AUTO | LN OFF       |

| Transducer No. | Start | Stop | Name   |
|----------------|-------|------|--------|
| 1              | 9k    | 30M  | FACTOR |

Final Measurement: x QP / + AV  
Meas Time: 1 s  
Subranges: 25  
Acc Margin: 6dB



\* \* Disturbance voltage test  
FCC Part 15

EUT: Telephone Base Station M/N:DSF-2481  
Manuf: Audex  
Op Cond: Transmitting/Receiving  
Operator: Davis  
Test Spec: AC 120V/60Hz N  
Comment: Temp:25  
Humi:55%  
Date: 06. Dec 05 16:40

## Scan Settings (1 Range)

| ----- Frequencies ----- |      |      | ----- Receiver Settings ----- |          |        |              |
|-------------------------|------|------|-------------------------------|----------|--------|--------------|
| Start                   | Stop | Step | IF BW                         | Detector | M-Time | Atten Preamp |
| 150k                    | 30M  | 5k   | 9k                            | PK+AV    | 20ms   | AUTO LN OFF  |

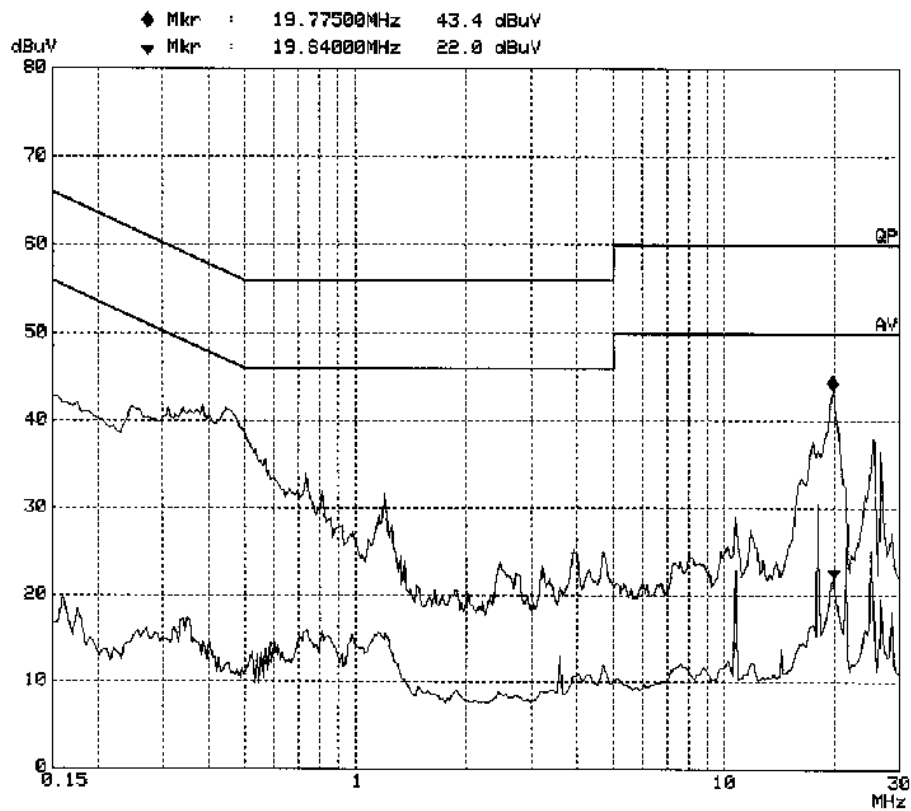
| Transducer No. | Start | Stop | Name   |
|----------------|-------|------|--------|
| 1              | 9k    | 30M  | FACTOR |

Final Measurement: x QP / + AV

Meas Time: 1 s

Subranges: 25

Acc Margin: 6dB



## §15.205, §15.209, §15.247 - RADIATED EMISSION

### Applicable Standard

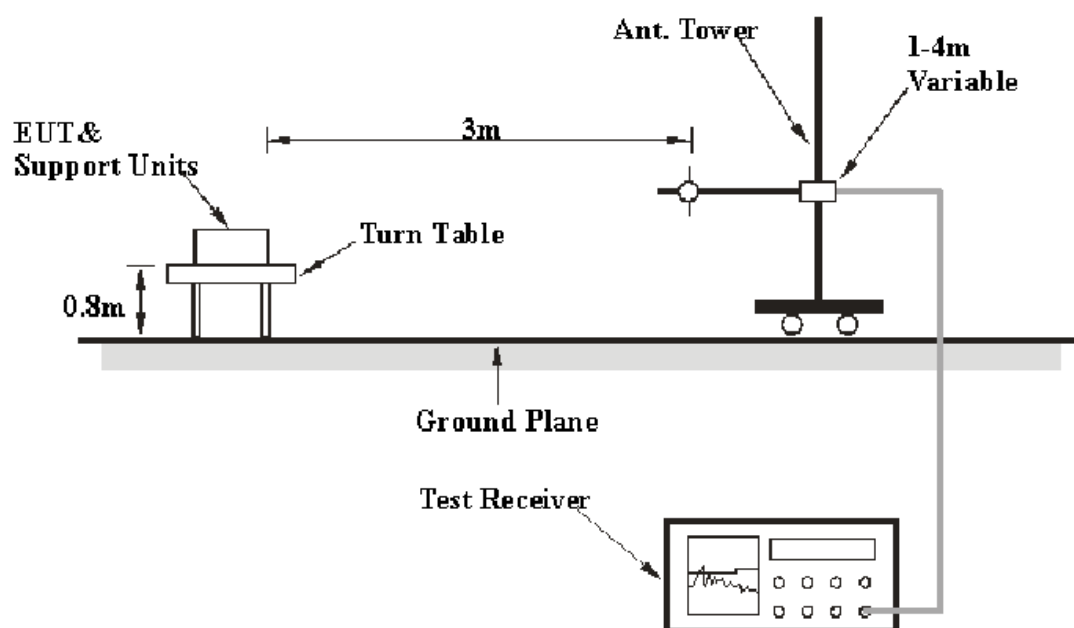
According to FCC §15.247 (d)

### 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 Lab Corp. (ShenZhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission tests were performed in the 3-meter Chamber, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.247 limits.

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

## EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

| <i>Frequency Range</i> | <i>RBW</i> | <i>Video B/W</i> |
|------------------------|------------|------------------|
| 30MHz – 1000 MHz       | 100 kHz    | 300 kHz          |
| 1000 MHz – 25 GHz      | 1 MHz      | 3 MHz            |

## Test Equipment List and Details

| Manufacturer    | Description       | Model       | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------------|---------------|------------------|----------------------|
| A.H. System     | Horn Antenna      | SAS-200/571 | 135           | 2005-4-28        | 2006-4-28            |
| HP              | Amplifier         | HP8447D     | 2944A09795    | 2005-8-17        | 2006-8-17            |
| HP              | Preamplifier      | 8449B       | 3008A00277    | 2005-8-17        | 2006-8-17            |
| Rohde & Schwarz | Spectrum Analyzer | FSEM30      | 849720/019    | 2005-11-10       | 2006-11-10           |
| Rohde&Schwarz   | EMI Test Receiver | ESCI        | 100035        | 2005-8-17        | 2006-8-17            |
| Sunol Sciences  | Broadband Antenna | JB1         | A040904-1     | 2005-4-28        | 2006-4-28            |

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

## Test Procedure

For the radiated emissions test, the Adapter power cords 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 PK&AV 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 Amplitude reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

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 maximum limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Standard Limit}$$

## Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209, and 15.247, with the worst margin reading of:

**-3.5 dB at 9608 MHz** in the **Vertical** polarization, Low Channel

**-2.6 dB at 9764 MHz** in the **Horizontal** polarization, Middle Channel

**-3.0 dB at 9920 MHz** in the **Horizontal** polarization, High Channel

**-3.9 dB at 31.29 MHz** in the **Horizontal** polarization, Unintentional Emission

## Test Data

### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 25 ° C   |
| Relative Humidity: | 53%      |
| ATM Pressure:      | 1009mbar |

*The testing was performed by Simon Mo on 2005-11-30.*



## Test Mode: Transmitting

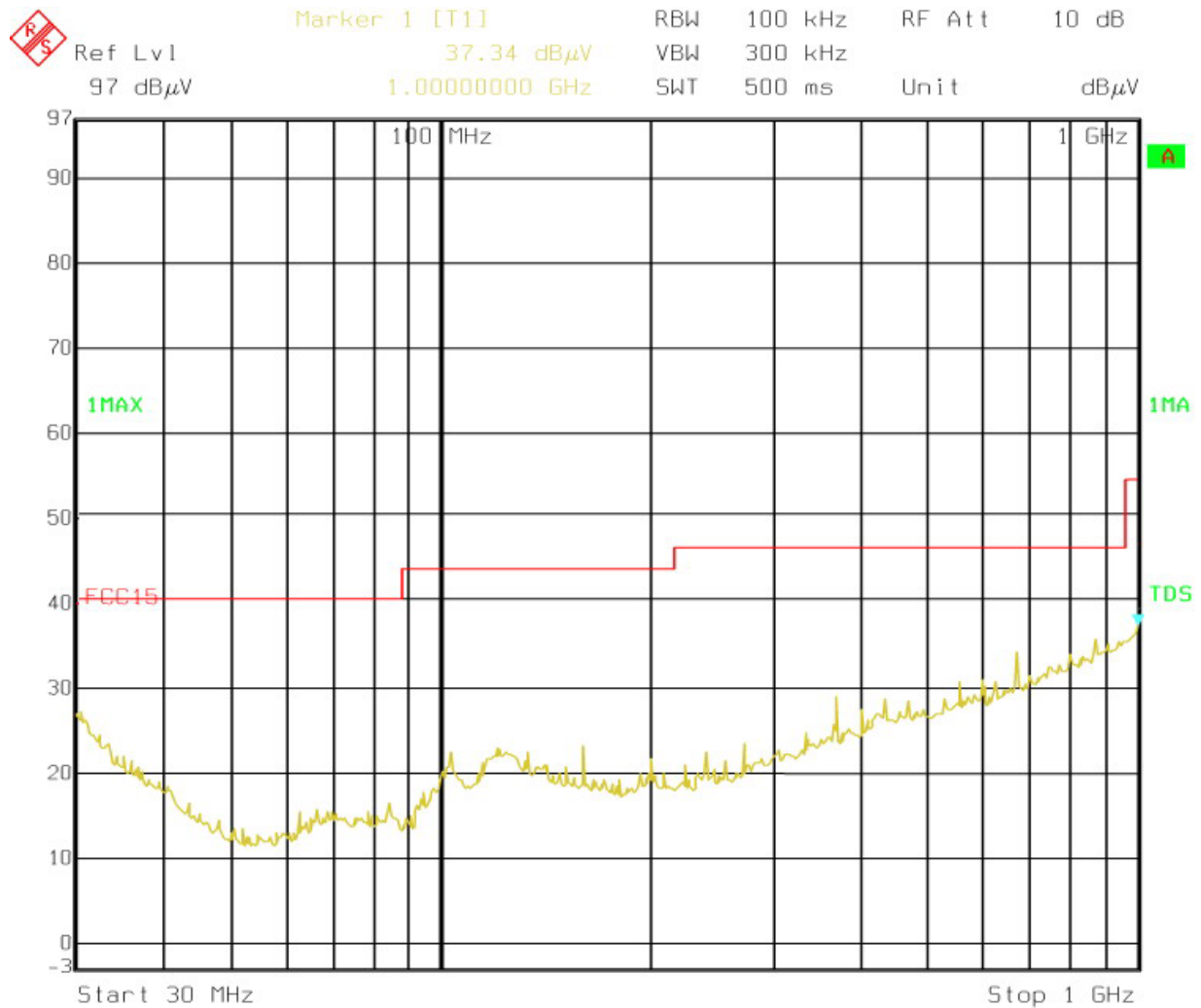
| INDICATED                  |               |                  | TABLE  | ANTENNA |       | CORRECTION FACTOR |            |           | CORRECTED AMPLITUDE | FCC 15 SUBPART C |        |
|----------------------------|---------------|------------------|--------|---------|-------|-------------------|------------|-----------|---------------------|------------------|--------|
| Frequency                  | Meter Reading | Comments         | Angle  | Height  | Polar | Antenna Loss      | Cable Loss | Amp. Gain | Corr. Ampl.         | Limit            | Margin |
| MHz                        | dBμV/m        |                  | Degree | Meter   | H/ V  | dB                | dB         | dB        | dBμV/m              | dBμV/m           | dB     |
| Low Channel, 1GHz-25GHz    |               |                  |        |         |       |                   |            |           |                     |                  |        |
| 2402                       | 81.52         | PK(fundamental)  | 45     | 1.0     | H     | 28.1              | 3.7        | 35.16     | 78.2                |                  |        |
| 2402                       | 76.45         | AV(fundamental)  | 180    | 1.2     | H     | 28.1              | 3.7        | 35.16     | 73.1                |                  |        |
| 2402                       | 78.77         | PK(fundamental)  | 45     | 1.0     | V     | 28.1              | 3.7        | 35.16     | 75.4                |                  |        |
| 2402                       | 76.21         | AV(fundamental)  | 180    | 1.2     | V     | 28.1              | 3.7        | 35.16     | 72.9                |                  |        |
| 9608                       | 40.21         | AV(harmonic)     | 60     | 1.0     | V     | 38.0              | 7          | 34.72     | 50.5                | 54               | -3.5*  |
| 9608                       | 38.14         | AV(harmonic)     | 60     | 1.0     | H     | 38.0              | 7          | 34.72     | 48.4                | 54               | -5.6   |
| 7206                       | 39.25         | AV(harmonic)     | 180    | 1.2     | H     | 35.8              | 6          | 34.11     | 46.9                | 54               | -7.1   |
| 7206                       | 38.58         | AV(harmonic)     | 180    | 1.2     | V     | 35.8              | 6          | 34.11     | 46.3                | 54               | -7.7   |
| 4804                       | 39.14         | AV(harmonic)     | 60     | 1.0     | V     | 33.8              | 5.2        | 33.00     | 45.1                | 54               | -8.9   |
| 4804                       | 38.47         | AV (harmonic)    | 60     | 1.0     | H     | 33.8              | 5.2        | 33.00     | 44.5                | 54               | -9.5   |
| 9608                       | 41.53         | PK(harmonic)     | 45     | 1.2     | V     | 38.0              | 7          | 34.72     | 51.8                | 74               | -22.2  |
| 9608                       | 41.28         | PK(harmonic)     | 45     | 1.2     | H     | 38.0              | 7          | 34.72     | 51.6                | 74               | -22.4  |
| 7206                       | 40.97         | PK(harmonic)     | 45     | 1.2     | H     | 35.8              | 6          | 34.11     | 48.7                | 74               | -25.3  |
| 4804                       | 42.06         | PK(harmonic)     | 45     | 1.0     | V     | 33.8              | 5.2        | 33.00     | 48.1                | 74               | -25.9  |
| 7206                       | 40.36         | PK(harmonic)     | 45     | 1.2     | V     | 35.8              | 6          | 34.11     | 48.1                | 74               | -26.0  |
| 4804                       | 41.53         | PK (harmonic)    | 45     | 1.0     | H     | 33.8              | 5.2        | 33.00     | 47.5                | 74               | -26.5  |
| Middle Channel, 1GHz-25GHz |               |                  |        |         |       |                   |            |           |                     |                  |        |
| 2441                       | 79.70         | PK (fundamental) | 45     | 1.0     | H     | 28.1              | 3.7        | 35.16     | 76.3                |                  |        |
| 2441                       | 74.35         | AV(fundamental)  | 180    | 1.2     | H     | 28.1              | 3.7        | 35.16     | 71.0                |                  |        |
| 2441                       | 77.37         | PK(fundamental)  | 45     | 1.0     | V     | 28.1              | 3.7        | 35.16     | 74.0                |                  |        |
| 2441                       | 74.63         | AV(fundamental)  | 60     | 1.0     | V     | 28.1              | 3.7        | 35.16     | 71.3                |                  |        |
| 9764                       | 41.19         | AV(harmonic)     | 60     | 1.0     | H     | 37.6              | 7.3        | 34.72     | 51.4                | 54               | -2.6*  |
| 9764                       | 39.98         | AV(harmonic)     | 180    | 1.2     | V     | 37.6              | 7.3        | 34.72     | 50.2                | 54               | -3.8*  |
| 7323                       | 39.24         | AV(harmonic)     | 180    | 1.2     | H     | 35.8              | 6.1        | 34.11     | 47.0                | 54               | -7.0   |
| 7323                       | 39.05         | AV(harmonic)     | 60     | 1.0     | V     | 35.8              | 6.1        | 34.11     | 46.8                | 54               | -7.2   |
| 4882                       | 40.25         | AV (harmonic)    | 60     | 1.0     | H     | 33.8              | 5.2        | 33.00     | 46.3                | 54               | -7.8   |
| 4882                       | 39.68         | AV(harmonic)     | 180    | 1.2     | V     | 33.8              | 5.2        | 33.00     | 45.7                | 54               | -8.3   |
| 9764                       | 42.97         | PK(harmonic)     | 45     | 1.2     | V     | 37.6              | 7.3        | 34.72     | 53.2                | 74               | -20.9  |
| 9764                       | 42.83         | PK(harmonic)     | 45     | 1.2     | H     | 37.6              | 7.3        | 34.72     | 53.0                | 74               | -21.0  |
| 7323                       | 41.06         | PK(harmonic)     | 45     | 1.2     | V     | 35.8              | 6.1        | 34.11     | 48.9                | 74               | -25.2  |
| 7323                       | 40.86         | PK(harmonic)     | 45     | 1.2     | H     | 35.8              | 6.1        | 34.11     | 48.7                | 74               | -25.4  |
| 4882                       | 42.37         | PK (harmonic)    | 45     | 1.0     | H     | 33.8              | 5.2        | 33.00     | 48.4                | 74               | -25.6  |
| 4882                       | 41.11         | PK(harmonic)     | 45     | 1.2     | V     | 33.8              | 5.2        | 33.00     | 47.1                | 74               | -26.9  |

| INDICATED                |                            |                  | TABLE           | ANTENNA         |               | CORRECTION FACTOR     |                     |                    | CORRECTED AMPLITUDE   | FCC 15 SUBPART C |              |
|--------------------------|----------------------------|------------------|-----------------|-----------------|---------------|-----------------------|---------------------|--------------------|-----------------------|------------------|--------------|
| Frequency<br>MHz         | Meter<br>Reading<br>dBμV/m | Comments         | Angle<br>Degree | Height<br>Meter | Polar<br>H/ V | Antenna<br>Loss<br>dB | Cable<br>Loss<br>dB | Amp.<br>Gain<br>dB | Corr. Ampl.<br>dBμV/m | Limit<br>dBμV/m  | Margin<br>dB |
| High Channel, 1GHz-25GHz |                            |                  |                 |                 |               |                       |                     |                    |                       |                  |              |
| 2480                     | 80.03                      | PK (fundamental) | 45              | 1.0             | H             | 28.1                  | 3.7                 | 35.16              | 76.7                  |                  |              |
| 2480                     | 76.24                      | AV(fundamental)  | 180             | 1.2             | H             | 28.1                  | 3.7                 | 35.16              | 72.9                  |                  |              |
| 2480                     | 76.62                      | PK(fundamental)  | 45              | 1.0             | V             | 28.1                  | 3.7                 | 35.16              | 73.3                  |                  |              |
| 2480                     | 74.11                      | AV(fundamental)  | 60              | 1.0             | V             | 28.1                  | 3.7                 | 35.16              | 70.8                  |                  |              |
| 9920                     | 40.78                      | AV(harmonic)     | 60              | 1.0             | H             | 37.6                  | 7.3                 | 34.72              | 51.0                  | 54               | -3.0*        |
| 9920                     | 39.97                      | AV(harmonic)     | 180             | 1.2             | V             | 37.6                  | 7.3                 | 34.72              | 50.2                  | 54               | -3.9*        |
| 4960                     | 41.58                      | AV (harmonic)    | 60              | 1.0             | H             | 33.8                  | 5.2                 | 33.00              | 47.6                  | 54               | -6.4         |
| 7440                     | 38.65                      | AV(harmonic)     | 180             | 1.2             | H             | 35.8                  | 6.1                 | 34.11              | 46.4                  | 54               | -7.6         |
| 4960                     | 40.05                      | AV(harmonic)     | 180             | 1.2             | V             | 33.8                  | 5.2                 | 33.00              | 46.1                  | 54               | -8.0         |
| 7440                     | 38.26                      | AV(harmonic)     | 60              | 1.0             | V             | 35.8                  | 6.1                 | 34.11              | 46.1                  | 54               | -8.0         |
| 9920                     | 42.92                      | PK(harmonic)     | 45              | 1.2             | H             | 37.6                  | 7.3                 | 34.72              | 53.1                  | 74               | -20.9        |
| 9920                     | 41.57                      | PK(harmonic)     | 45              | 1.2             | V             | 37.6                  | 7.3                 | 34.72              | 51.8                  | 74               | -22.3        |
| 4960                     | 43.37                      | PK (harmonic)    | 45              | 1.0             | H             | 33.8                  | 5.2                 | 33.00              | 49.4                  | 74               | -24.6        |
| 7440                     | 40.15                      | PK(harmonic)     | 45              | 1.2             | H             | 35.8                  | 6.1                 | 34.11              | 47.9                  | 74               | -26.1        |
| 7440                     | 40.00                      | PK(harmonic)     | 45              | 1.2             | V             | 35.8                  | 6.1                 | 34.11              | 47.8                  | 74               | -26.2        |
| 4960                     | 41.24                      | PK(harmonic)     | 45              | 1.2             | V             | 33.8                  | 5.2                 | 33.00              | 47.2                  | 74               | -26.8        |

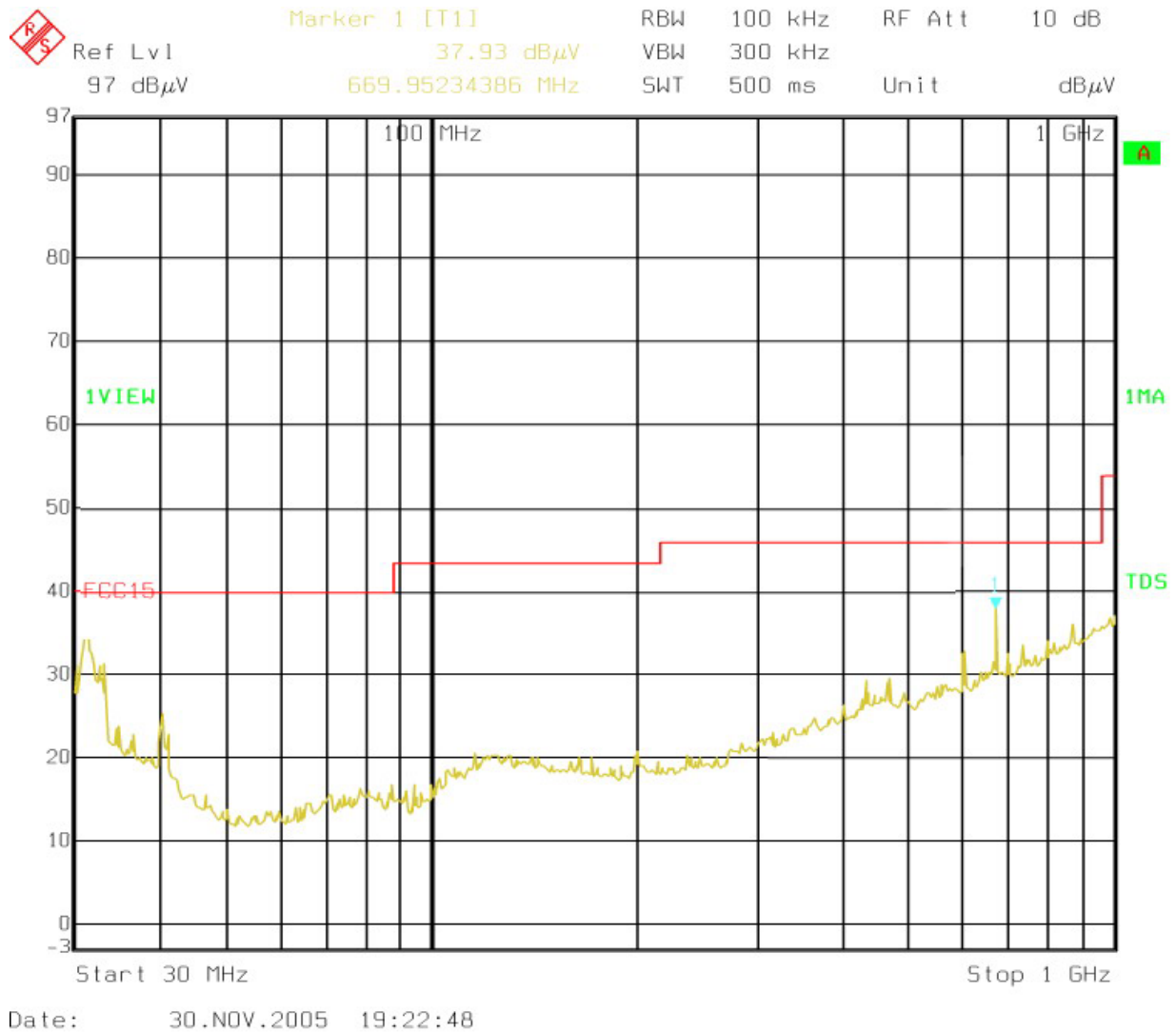
## 30MHz – 1GHz

| Indicated        |                            |          |                     | TABLE           | Antenna      |                       | Correction Factor   |                    |                          | FCC Part 15.209 |              |
|------------------|----------------------------|----------|---------------------|-----------------|--------------|-----------------------|---------------------|--------------------|--------------------------|-----------------|--------------|
| Frequency<br>MHz | Meter<br>Reading<br>dBμV/m | Comments | Direction<br>Degree | Height<br>Meter | Polar<br>H/V | Antenna<br>Loss<br>dB | Cable<br>Loss<br>dB | Amp.<br>Gain<br>dB | Corr.<br>Ampl.<br>dBμV/m | Limit<br>dBμV/m | Margin<br>dB |
| 31.29            | 37.6                       | PK       | 45                  | 1.0             | V            | 24.1                  | 1.2                 | 26.8               | 36.1                     | 40              | -3.9*        |
| 669.95           | 39.3                       | PK       | 90                  | 1.2             | V            | 20.3                  | 5.4                 | 27.1               | 37.9                     | 46              | -8.1         |
| 669.95           | 35.5                       | PK       | 180                 | 1.2             | H            | 20.3                  | 5.4                 | 27.1               | 34.1                     | 46              | -11.9        |
| 40.29            | 36.3                       | PK       | 60                  | 1.2             | V            | 14.3                  | 1.3                 | 26.8               | 25.1                     | 40              | -14.9        |
| 33.56            | 25.3                       | PK       | 289                 | 1.0             | H            | 24.1                  | 1.2                 | 26.8               | 23.8                     | 40              | -16.2        |
| 1000             | 32.5                       | PK       | 45                  | 1.0             | H            | 23.8                  | 7.0                 | 26                 | 37.3                     | 54              | -16.7        |
| 433.33           | 34.7                       | PK       | 45                  | 1.2             | V            | 16.8                  | 4.1                 | 26.5               | 29.1                     | 46              | -16.9        |
| 159.75           | 34.8                       | PK       | 45                  | 1.2             | H            | 12.8                  | 2.1                 | 26.6               | 23.1                     | 43.5            | -20.4        |
| 103.33           | 37.3                       | PK       | 60                  | 1.0             | H            | 9.6                   | 2.0                 | 26.6               | 22.3                     | 43.5            | -21.2        |
| 200.04           | 31.5                       | PK       | 35                  | 3.8             | V            | 12.6                  | 2.6                 | 26                 | 20.6                     | 43.5            | -22.9        |
| 115.63           | 31.5                       | PK       | 35                  | 3.8             | V            | 13.3                  | 2.1                 | 26.6               | 20.3                     | 43.5            | -23.2        |
| 62.74            | 32.5                       | PK       | 289                 | 1.0             | H            | 8.1                   | 1.6                 | 26.8               | 15.4                     | 40              | -24.6        |

\* Within the measurement uncertainty.



Date: 30.NOV.2005 19:15:57



## §15.247(a)(1)-CHANNEL SEPARATION TEST

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater provided the systems operate with an output power no greater than 125 mW.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100028        | 2005-8-17        | 2006-8-17            |

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

### Test Procedure

1. Set the EUT in transmitting mode, spectrum Bandwidth was set at 100 kHz, maxhold the channel.
2. Set the adjacent channel of the EUT maxhold another truce
3. Measure the channel separation.

Limit

FCC Part 15, Subpart C Section 15.247(a)(1). Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB Bandwidth of the hopping channel, whichever is greater.

| FREQUENCY RANGE (MHz) | Limit (kHz) |
|-----------------------|-------------|
| 902-928               | >25kHz      |
| 2400-2483.5           | >25kHz      |
| 5725-5850             | >25kHz      |

### Test Data

#### Environmental Conditions

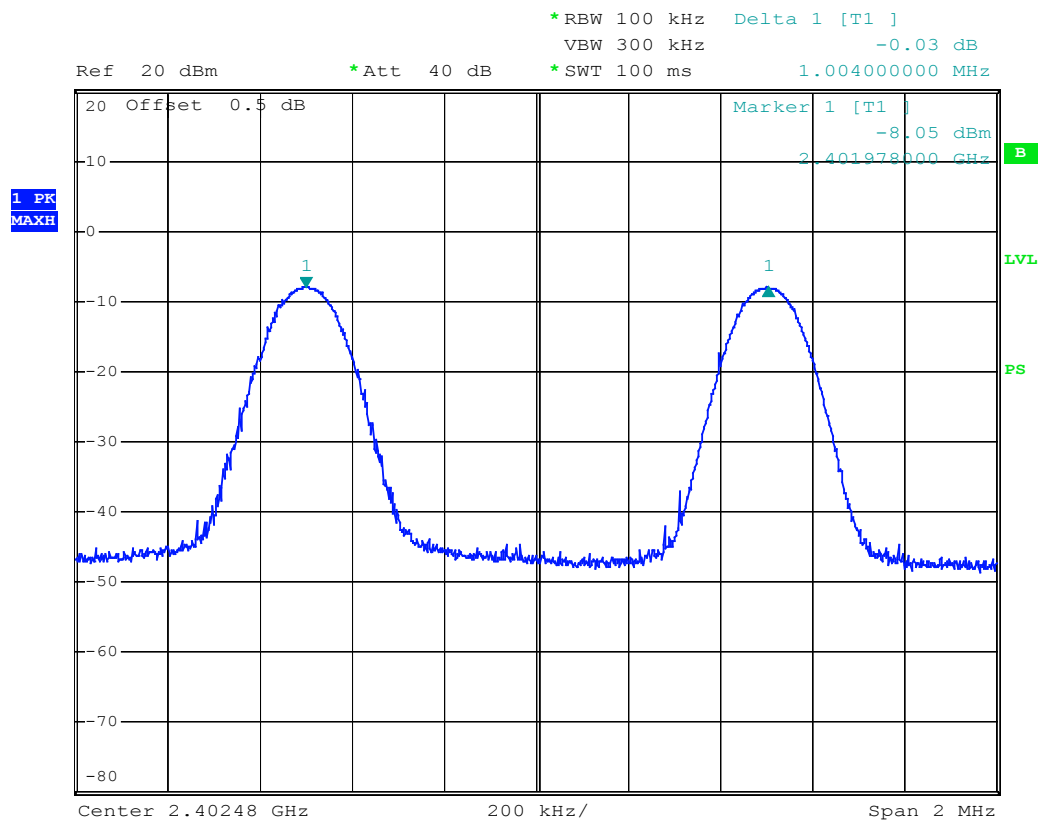
|                    |           |
|--------------------|-----------|
| Temperature:       | 27 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 1009 mbar |

The testing was performed by Jandy Su on 2005-12-1.

Test Result: Pass

Test mode: Transmitting

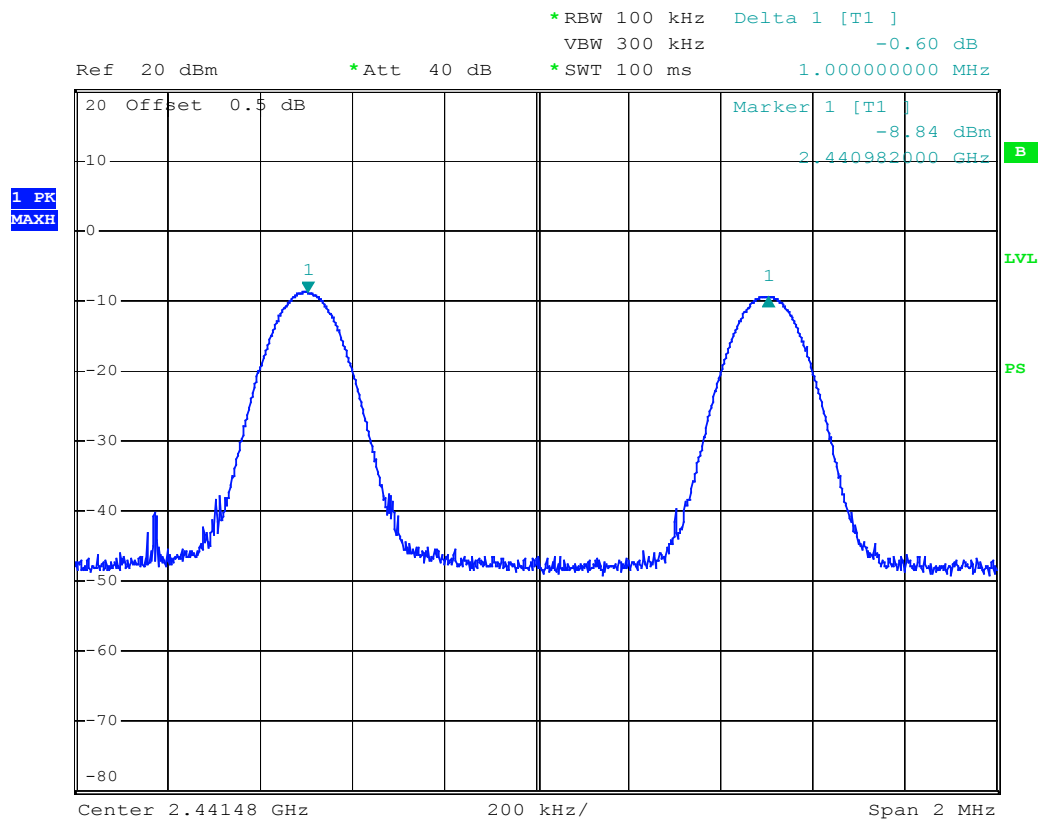
| CHANNEL           | CHANNEL<br>FREQUENCY<br>(MHz) | SEPARATION<br>READ VALUE (kHz) | SEPARATION<br>LIMIT<br>(kHz) |
|-------------------|-------------------------------|--------------------------------|------------------------------|
| Low Channel       | 2402                          | 1000                           | 182.67                       |
| Adjacency Channel | 2403                          |                                |                              |
| Middle Channel    | 2441                          | 1000                           | 186.67                       |
| Adjacency Channel | 2442                          |                                |                              |
| High Channel      | 2479                          | 1000                           | 182.00                       |
| Adjacency Channel | 2480                          |                                |                              |



Audex Telephone base station M/N:DSF-2481 CH separation low c

h

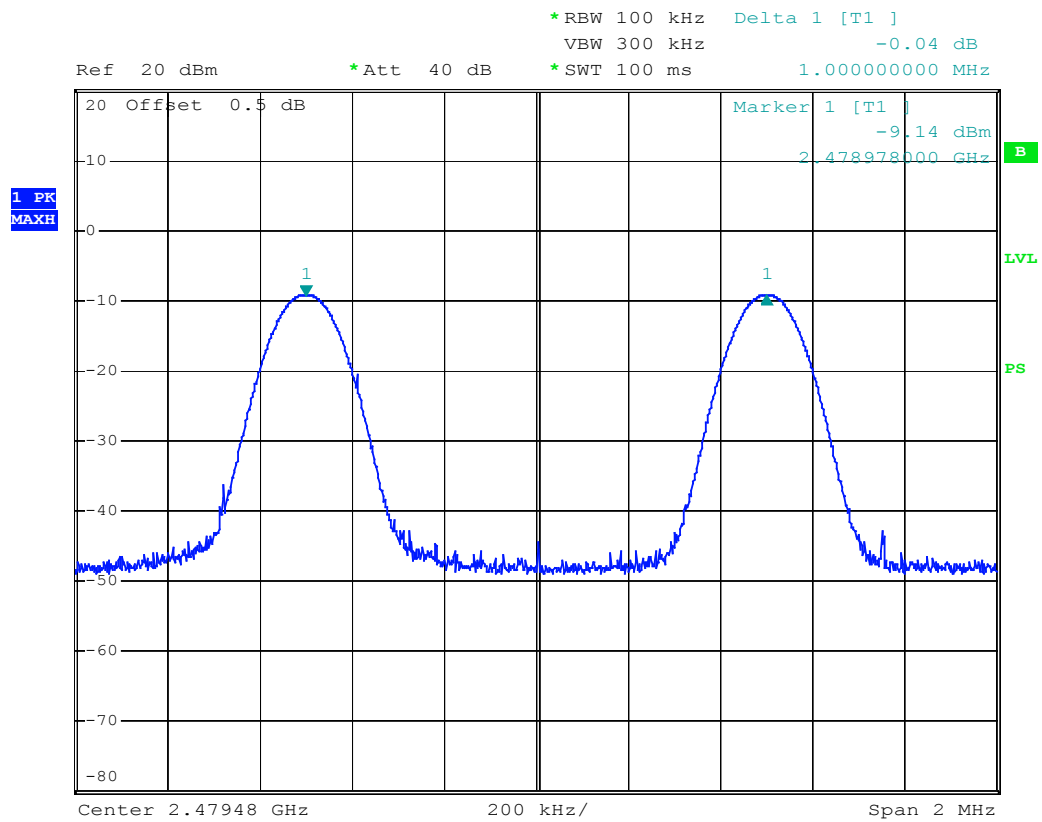
Date: 1.DEC.2005 10:12:53



Audex Telephone base station M/N:DSF-2481 CH separation mid c

h

Date: 1.DEC.2005 10:14:47



Audex Telephone base station M/N:DSF-2481 CH separation high

ch

Date: 1.DEC.2005 10:17:20



## §15.247(a)(1) –20dB BANDWIDTH TESTING

### Applicable Standard

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB Bandwidth of the hopping channel, whichever is greater.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100035        | 2005-8-17        | 2006-8-17            |

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

### Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 20 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

### Test Data

#### Environmental Conditions

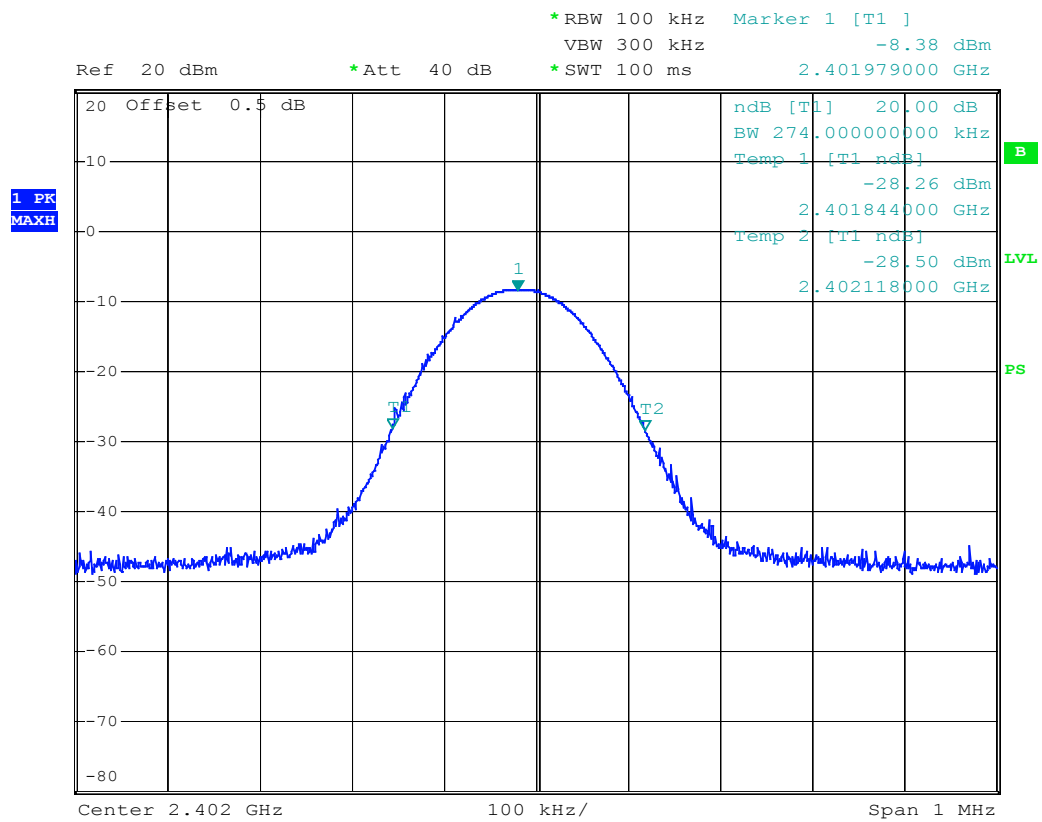
|                    |          |
|--------------------|----------|
| Temperature:       | 25 ° C   |
| Relative Humidity: | 53%      |
| ATM Pressure:      | 1009mbar |

*The testing was performed by Jandy Su on 2005-12-1.*

Test Result: Pass

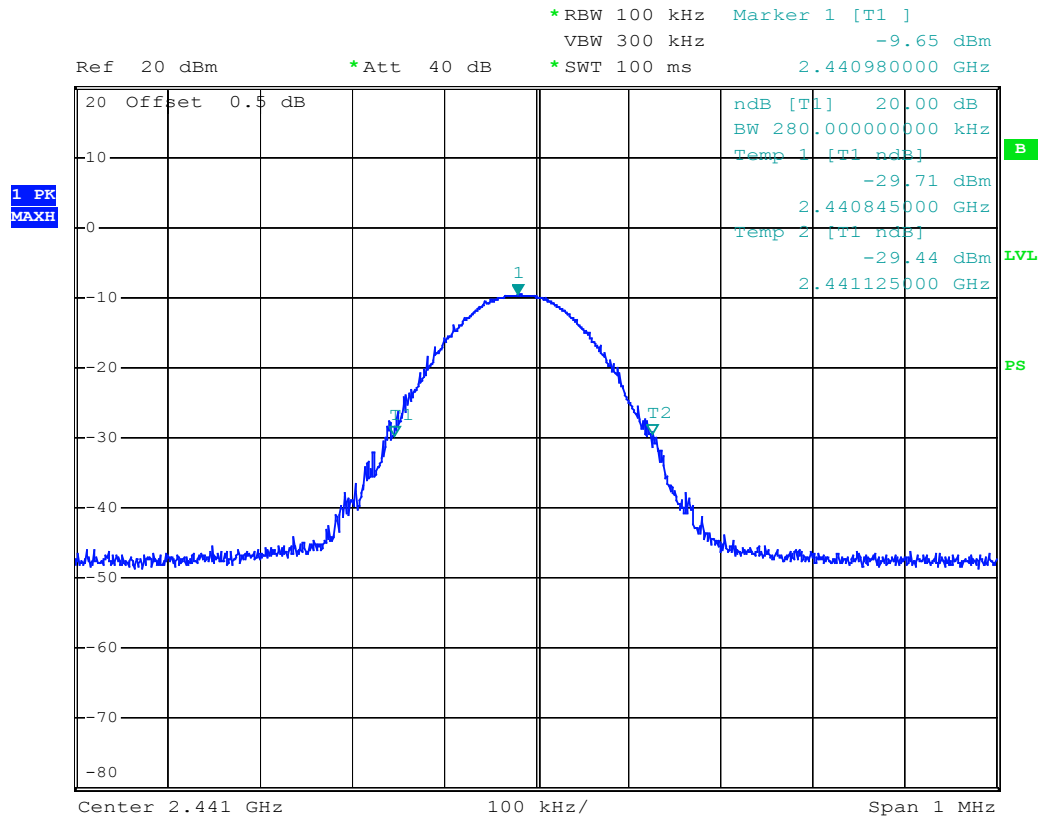
*Test Mode: Transmitting*

| Channel        | Channel frequency (MHz) | 20dB Bandwidth (kHz) |
|----------------|-------------------------|----------------------|
| Low Channel    | 2402                    | 274                  |
| Middle Channel | 2441                    | 280                  |
| High Channel   | 2480                    | 273                  |



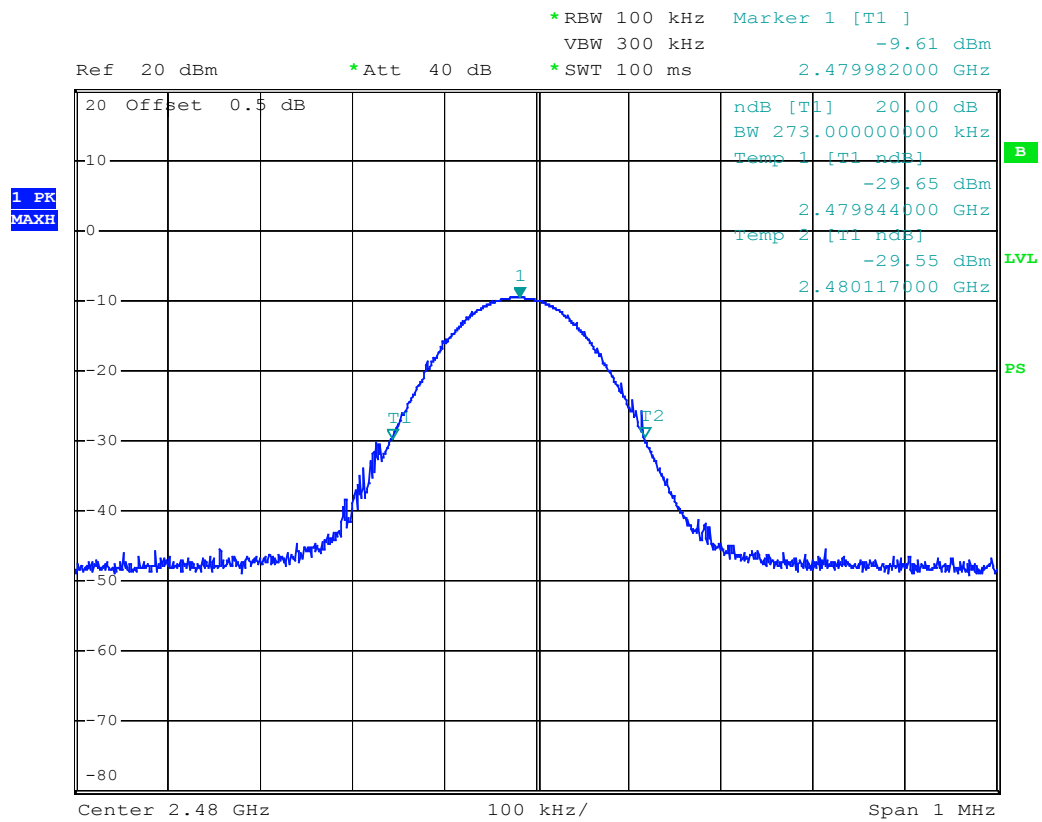
Audex Telephone base station M/N:DSF-2481 20dB BW low ch

Date: 1.DEC.2005 10:06:37



Audex Telephone base station M/N:DSF-2481 20dB BW mid ch

Date: 1.DEC.2005 10:05:57



Audex Telephone base station M/N:DSF-2481 20dB BW high ch

Date: 1.DEC.2005 10:00:49

## §15.247(a)(1)(iii)-QUANTITY OF HOPPING CHANNEL TEST

### Applicable Standard

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100035        | 2005-8-17        | 2006-8-17            |

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

### Test Procedure

1. Check the calibration of the measuring instrument (SA) using either an internal calibrator or a known signal from an external generator.
2. Set the EUT in transmitting mode from first channel to last.
3. By using the Max-Hold function record the Quantity of the channel.

Limit

FCC Part 15, Subpart C Section 15.247

| FREQUENCY RANGE (MHz) | Limit (Quantity of Hopping Channel) |                          |                        |                        |
|-----------------------|-------------------------------------|--------------------------|------------------------|------------------------|
|                       | 20 dB bandwidth <250 kHz            | 20 dB bandwidth >250 kHz | 20 dB bandwidth <1 MHz | 20 dB bandwidth >1 MHz |
| 902-928               | 50                                  | 25                       | N/A                    | N/A                    |
| 2400-2483.5           | N/A                                 | N/A                      | 15                     | 15                     |
| 5725-5850             | N/A                                 | N/A                      | 75                     | N/A                    |

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 27 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 1009 mbar |

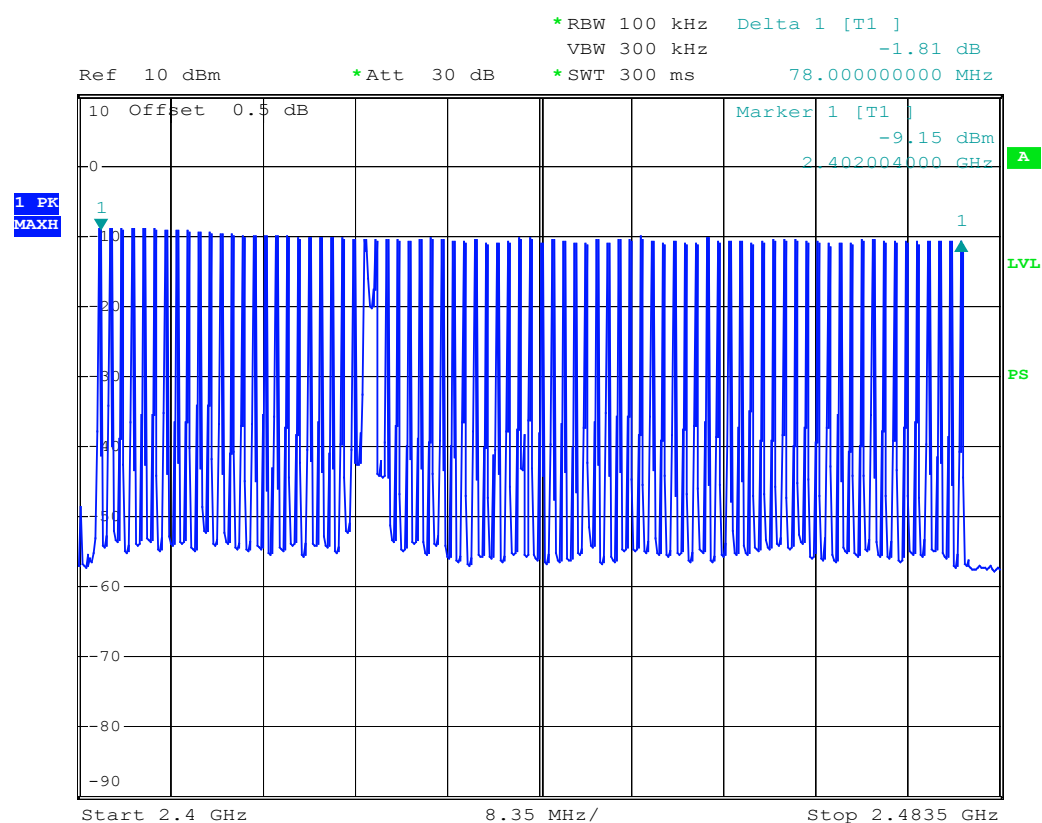
The testing was performed by Jandy Su on 2005-12-2

Test Result: Pass

Test mode: Transmitting

The frequency hopping systems operating in 2.402~2.480 GHz band employ 79 nonoverlapping channels.

| Hopping Channel Frequency Range (MHz) | Quantity OF hopping Channel Read Value (Channel) | Quantity Of Hopping channel limit (Channel) |
|---------------------------------------|--|---|
| 2402.0 ~ 2480.0                       | 79   | >15   |



Audex M/N:DSF-2481 NO. of CHs

Date: 2.DEC.2005 07:54:52

**§15.247(a)(1)(iii) - TIME OF OCCUPANCY (DWELL TIME)****Applicable Standard**

Frequency hopping systems in the 2400-2483.5 MHz shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

**Test Equipment List and Details**

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100035        | 2005-8-17        | 2006-8-17            |

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

**Test Procedure**

The EUT was worked in channel hopping; Spectrum SPAN was set as 0. Sweep was set as 0.4 X channel no.(s), The quantity of False was get from single sweep. In addition, the time of single Pluses was tested.

Limit

FCC Part 15, Subpart C Section 15.247.

| FREQUENCY RANGE (MHz) | LIMIT (ms)                          |                                     |                                    |
|-----------------------|-------------------------------------|-------------------------------------|------------------------------------|
|                       | 20dB bandwidth <250kHz (50 Channel) | 20dB bandwidth >250kHz (50 Channel) | 20dB bandwidth <1 MHz (79 Channel) |
| 902-928               | 400(20s)                            | 400(10s)                            | N/A                                |
| 2400-2483.5           | N/A                                 | N/A                                 | 400(31.6s)                         |
| 5725-5850             | N/A                                 | N/A                                 | 400(30s)                           |

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

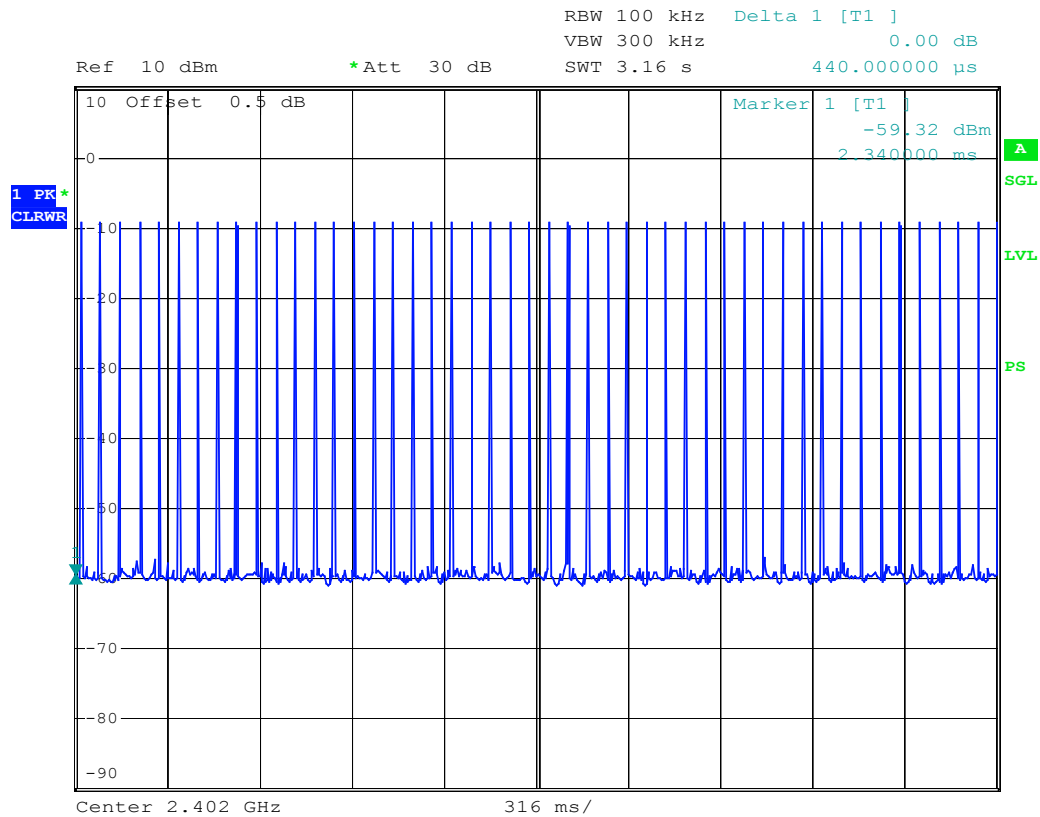
|                    |           |
|--------------------|-----------|
| Temperature:       | 27 °C     |
| Relative Humidity: | 50 %      |
| ATM Pressure:      | 1009 mbar |

*The testing was performed by Jandy Su on 2005-12-2.*

Test Result: Pass

*Test mode: Transmitting*

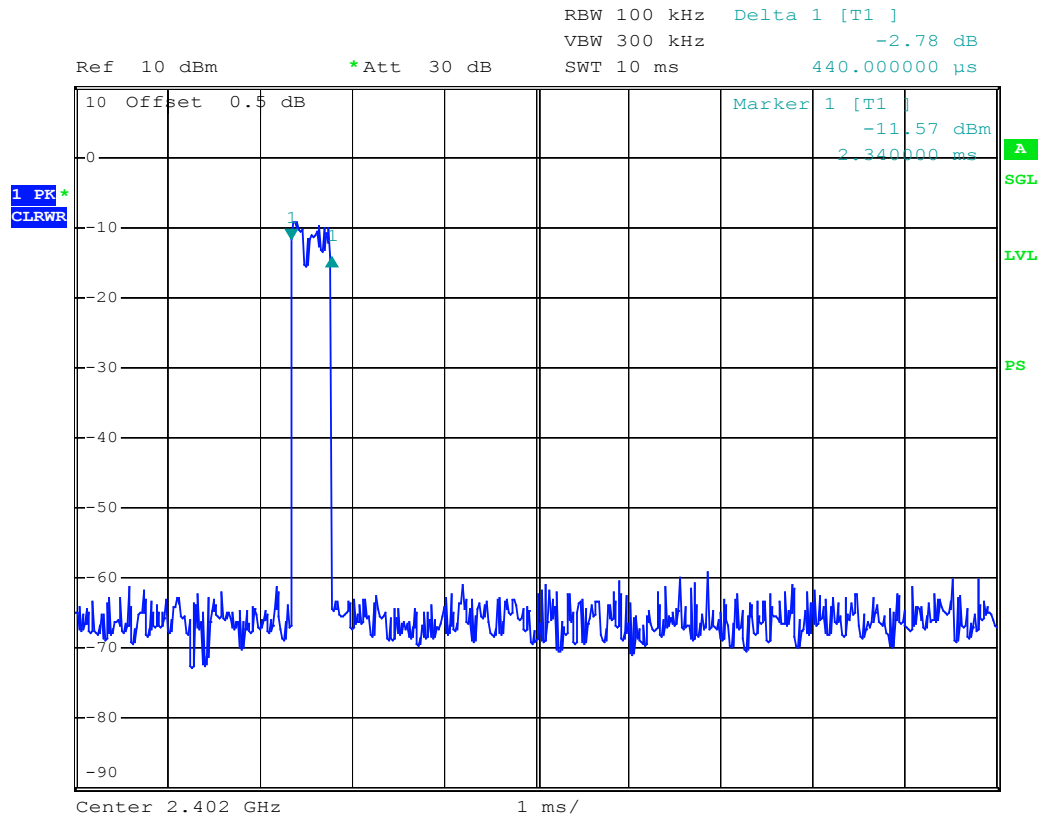
| Channel        | Frequency MHz | Pulse Wide m Sec | Quantity Pulse per 31.6 Sec | Dwell Time Sec | Limit Sec |
|----------------|---------------|------------------|-----------------------------|----------------|-----------|
| Low channel    | 2402          | 0.44             | 470                         | 0.21           | 0.4       |
| Middle channel | 2441          | 0.44             | 470                         | 0.21           | 0.4       |
| High channel   | 2480          | 0.46             | 470                         | 0.21           | 0.4       |



Audex M/N:DSF-2481 NO. of pluses low ch

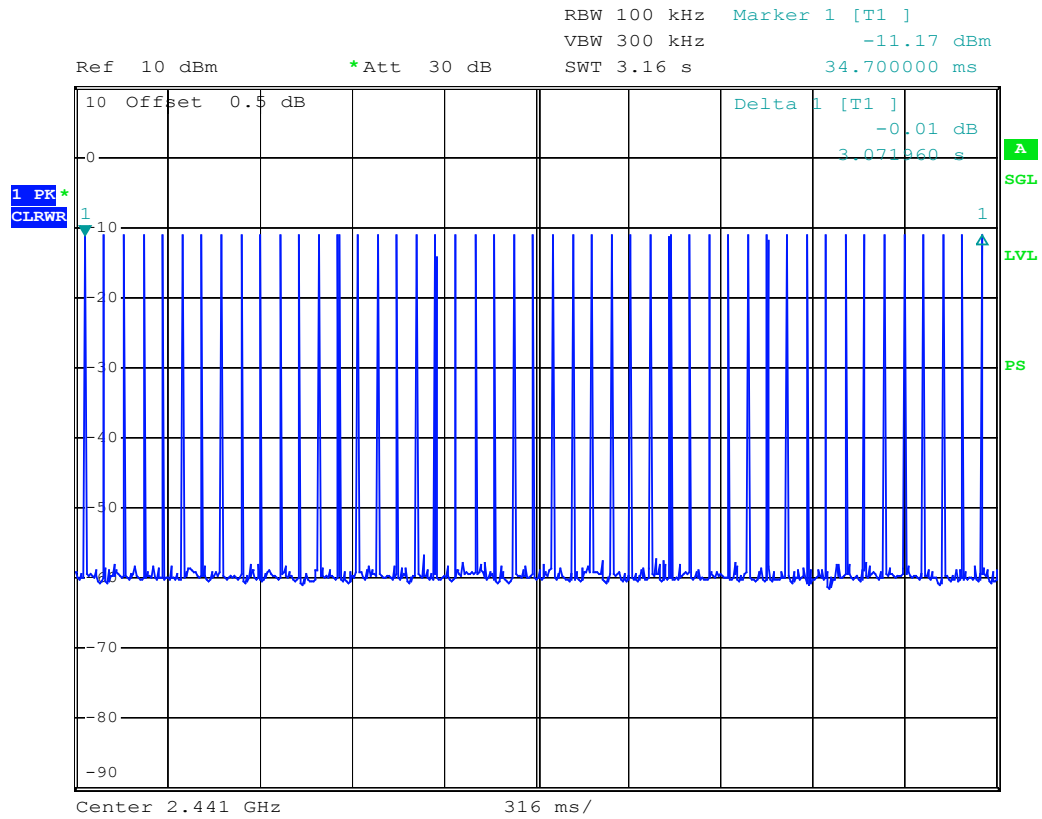
Date: 2.DEC.2005 09:07:46





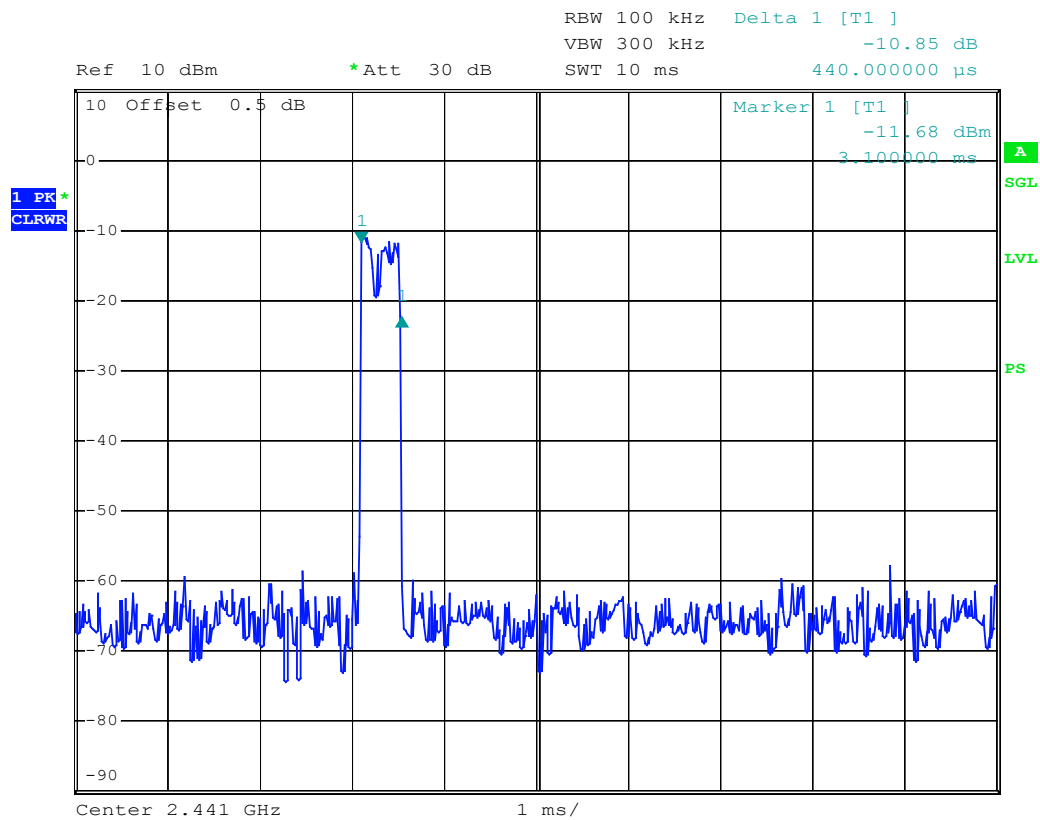
Audex M/N:DSF-2481 pluses low ch

Date: 2.DEC.2005 09:05:57



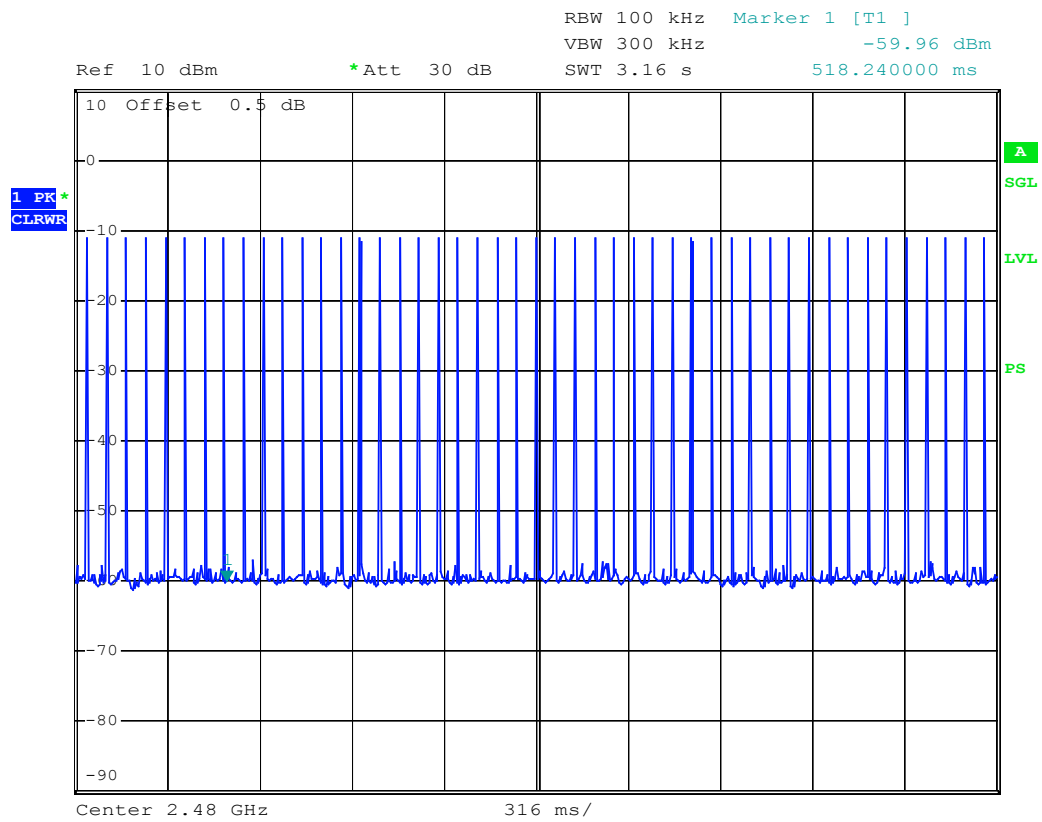
Audex M/N:DSF-2481 NO. ofpluses mid ch

Date: 2.DEC.2005 09:03:13



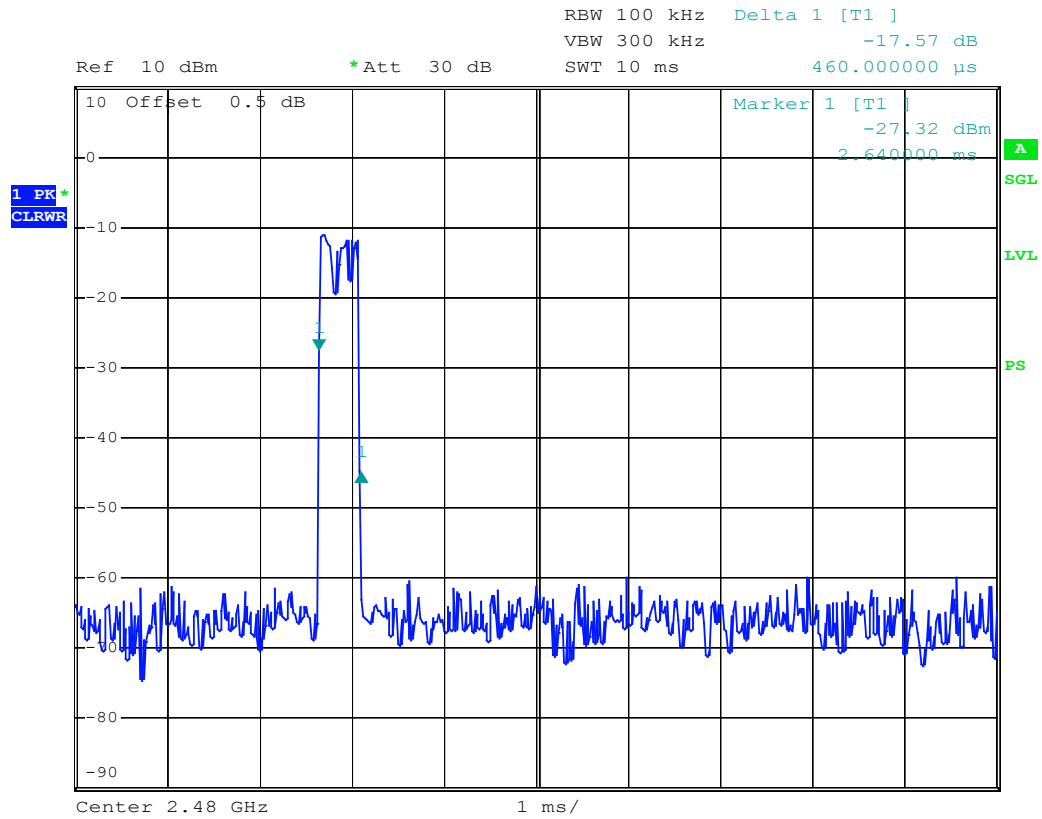
Audex M/N:DSF-2481 pluses width mid ch

Date: 2.DEC.2005 09:01:21



Audex M/N:DSF-2481 NO. of pluses high ch

Date: 2.DEC.2005 08:57:49



Audex M/N:DSF-2481 pluses width high ch

Date: 2.DEC.2005 09:00:07

## §15.247(b)(1) - PEAK OUTPUT POWER MEASUREMENT

### Applicable Standard

According to §15.247(b) (1), for frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

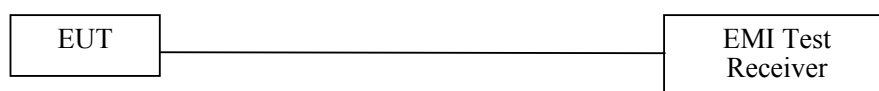
### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100035        | 2005-8-17        | 2006-8-17            |

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

### Test Procedure

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to a EMI Test Receiver.
3. Add a correction factor to the display.



### Test Data

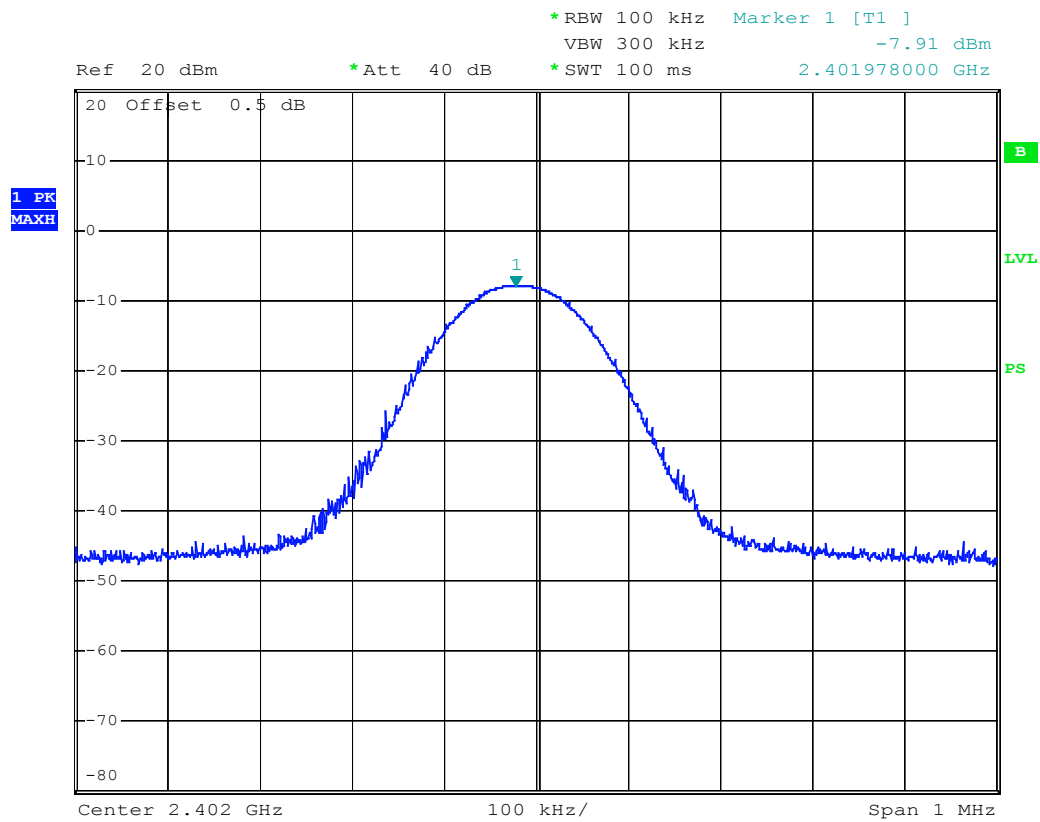
#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 25 ° C   |
| Relative Humidity: | 53%      |
| ATM Pressure:      | 1009mbar |

The testing was performed by Jandy Su on 2005-12-1.

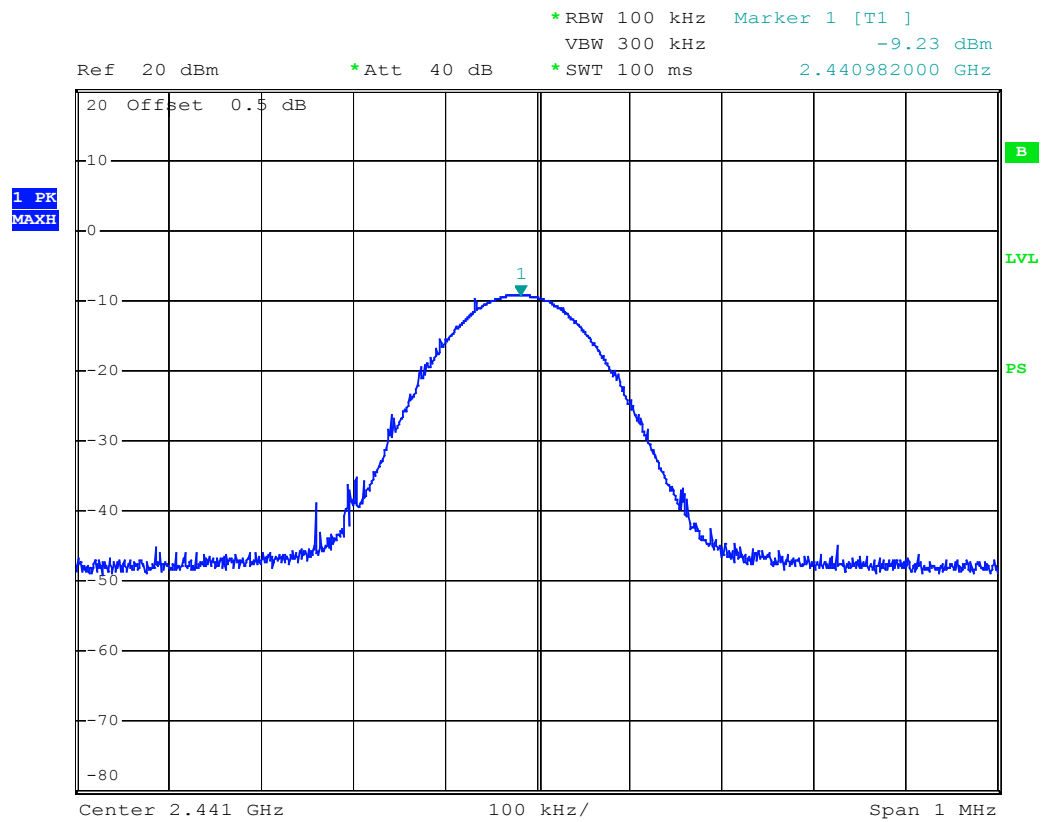
Please refer to the following plots.

| Channel        | Frequency (MHz) | Peak output power(dBm) | Peak Output Power (mW) | Limit (W) |
|----------------|-----------------|------------------------|------------------------|-----------|
| Low Channel    | 2402            | -9.61                  | 0.12                   | 1         |
| Middle Channel | 2441            | -9.23                  | 0.12                   | 1         |
| High Channel   | 2480            | -9.56                  | 0.11                   | 1         |



Audex Telephone base station M/N:DSF-2481 low ch

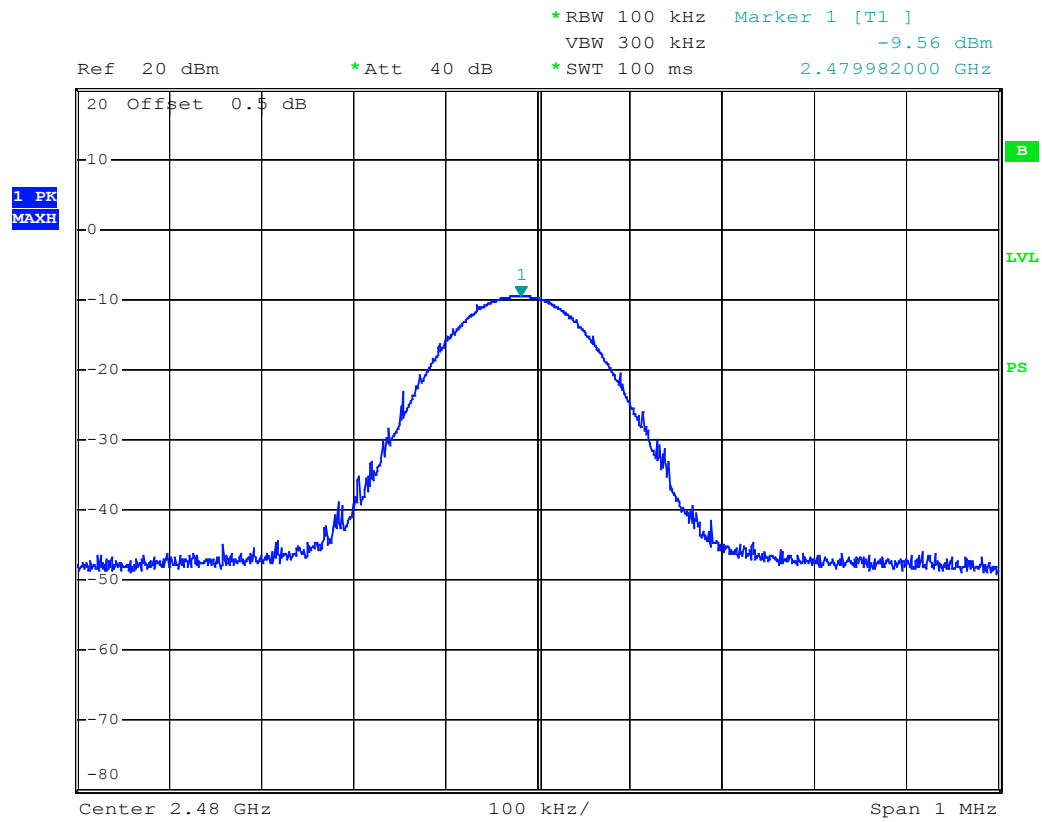
Date: 1.DEC.2005 09:56:48



Audex Telephone base station M/N:DSF-2481 mid ch

Date: 1.DEC.2005 09:57:29





Audex Telephone base station M/N:DSF-2481 high ch

Date: 1.DEC.2005 09:59:26

## **§15.247(d) - 100 KHZ BANDWIDTH OF BAND EDGES**

### **Applicable Standard**

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

### **Test Equipment List and Details**

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100035        | 2005-8-17        | 2006-8-17            |

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

### **Test Procedure**

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

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

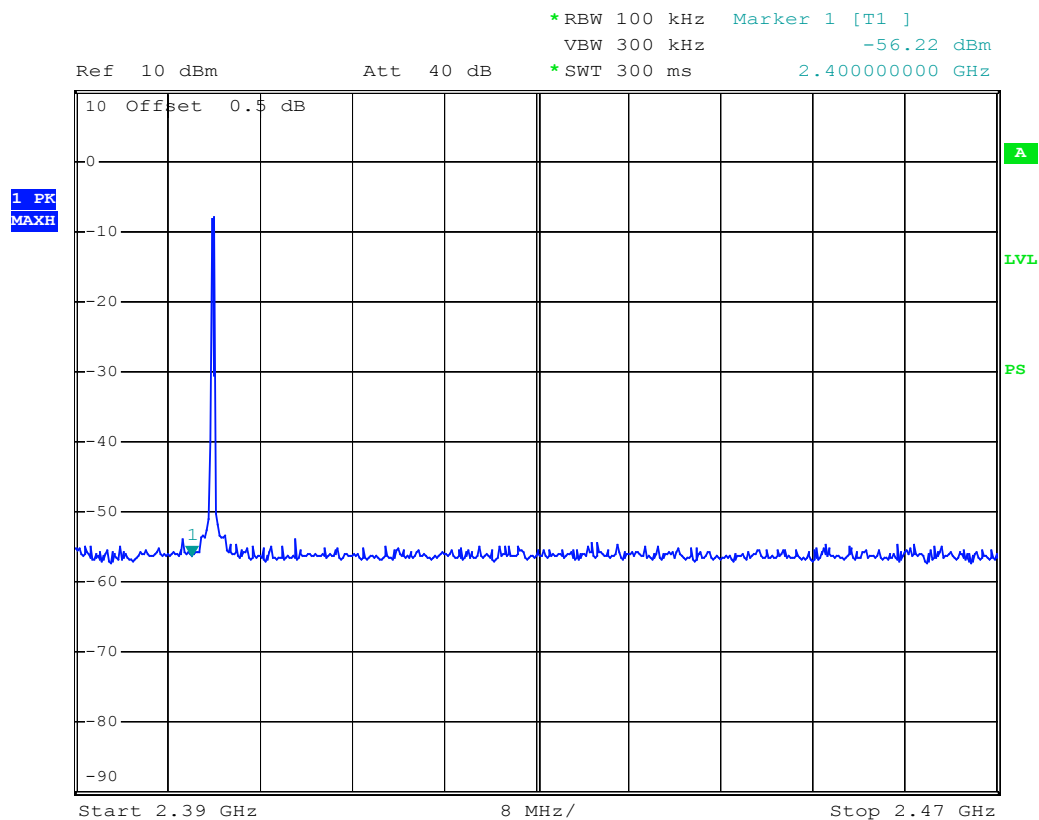
|                    |          |
|--------------------|----------|
| Temperature:       | 18 °C    |
| Relative Humidity: | 53 %     |
| ATM Pressure:      | 1009mbar |

The testing was performed by Jandy Su on 2005-12-1.

Test Result: Pass

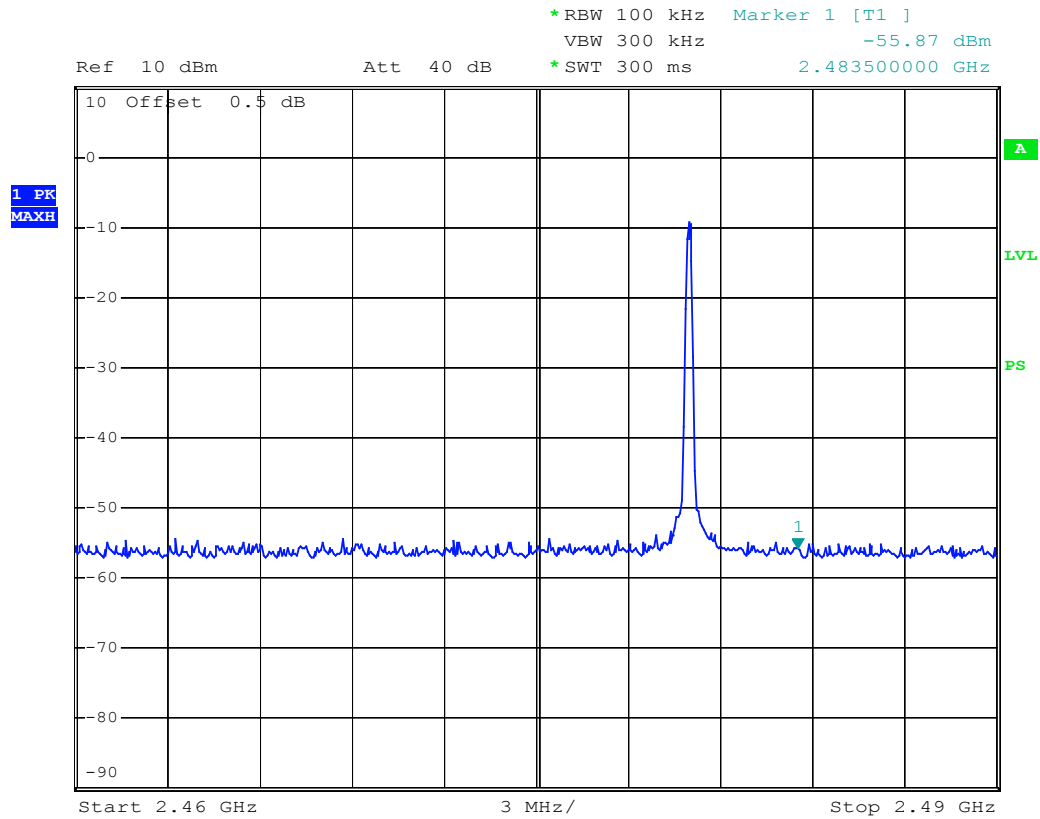
Test Mode: Transmitting

| Frequency<br>MHz | Delta of Peak to Edge Point<br>dB | Limit<br>dB |
|------------------|-----------------------------------|-------------|
| 2400.00          | 48                                | ≥20         |
| 2483.50          | 46                                | ≥20         |



Audex Telephone base station M/N:DSF-2481 Bandedge low ch

Date: 1.DEC.2005 14:38:23



Audex Telephone base station M/N:DSF-2481 Bandedge high ch

Date: 1.DEC.2005 14:40:09