



NVLAP LAB CODE 200707-0



# FCC PART 15.249 EMI MEASUREMENT AND TEST REPORT

For

**Vson Technology Co., Ltd.**

5 Floor, A Building, Weixinda Xichen Industrial Park, Xixiang Town, Baoan District, Shenzhen, China

**FCC ID: T2DV820**

|                                                                                                                                                                                                                                                |                                              |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <b>This Report Concerns:</b><br><input checked="" type="checkbox"/> Original Report                                                                                                                                                            | <b>Equipment Type:</b><br>Wireless Presenter |
| <b>Test Engineer:</b> Hansen Hu <i>Hansen Hu</i>                                                                                                                                                                                               |                                              |
| <b>Report No.:</b> RSZ06121301                                                                                                                                                                                                                 |                                              |
| <b>Test Date:</b> 2007-01-02                                                                                                                                                                                                                   |                                              |
| <b>Report Date:</b> 2007-01-05                                                                                                                                                                                                                 |                                              |
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## GENERAL INFORMATION

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

The Vson Technology Co., Ltd.'s product, model number: V-820 or the "EUT" as referred to in this report is a *Wireless Presenter*. The EUT is measured approximately 13.0 cm L x 5.0 cm W x 4.8 cm H, rated input voltage: DC 3V battery.

*\* The test data gathered are from production sample, serial number: 0612014 provided by the manufacturer, we received EUT on 2006-12-13.*

### Objective

This Type approval report is prepared on behalf of Vson Technology Co., Ltd. in accordance with Part 2, Subpart J, and 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 15.249 rules.

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

No Related Submittals.

### 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 radiated and conducted emissions measurement was performed at 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 Laboratory 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 Laboratory 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. 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 Laboratory 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>

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## SYSTEM TEST CONFIGURATION

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### **Justification**

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

### **Equipment Modifications**

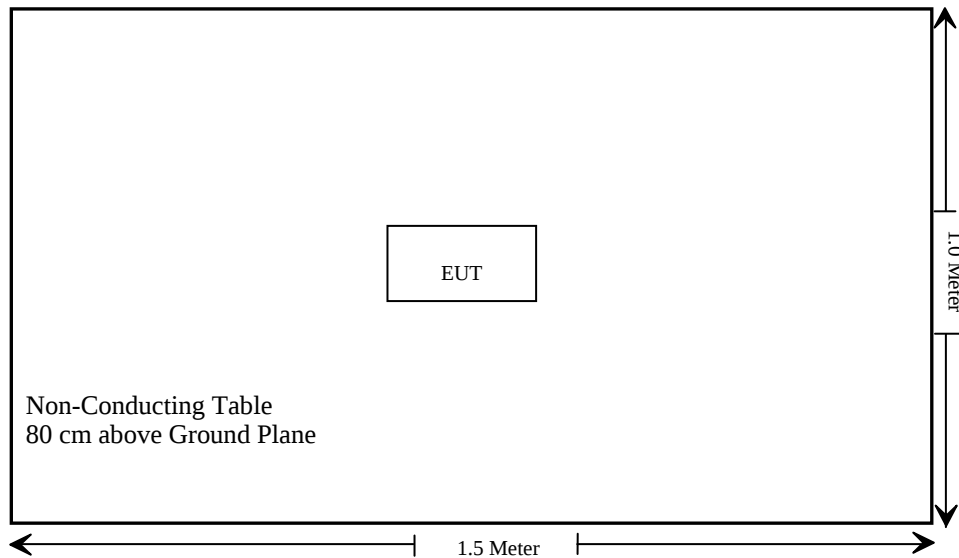
Bay Area Compliance Laboratory Corp. (Shenzhen) has not done any modification on the EUT.

## Configuration of Test Setup



EUT

## Block Diagram of Test Setup



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**SUMMARY OF TEST RESULTS**

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| FCC RULES                          | DESCRIPTION OF TEST  | RESULT     |
|------------------------------------|----------------------|------------|
| §15.203                            | Antenna Requirement  | Compliant  |
| §15.207(a)                         | Conduction Emission  | N/A        |
| §15.205(a), §15.209(a), §15.249(a) | Radiated Emission    | Compliant* |
| §15.249(d)                         | Out of band emission | Compliant  |

\* Within measurement uncertainty.

**§15.203 - ANTENNA REQUIREMENT**

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**Standard Applicable**

For intentional device, 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.

**Antenna Connector Construction**

The EUT antenna is a permanently attached antenna, which in accordance to section 15.203, is considered sufficient to comply with the provisions of this section.

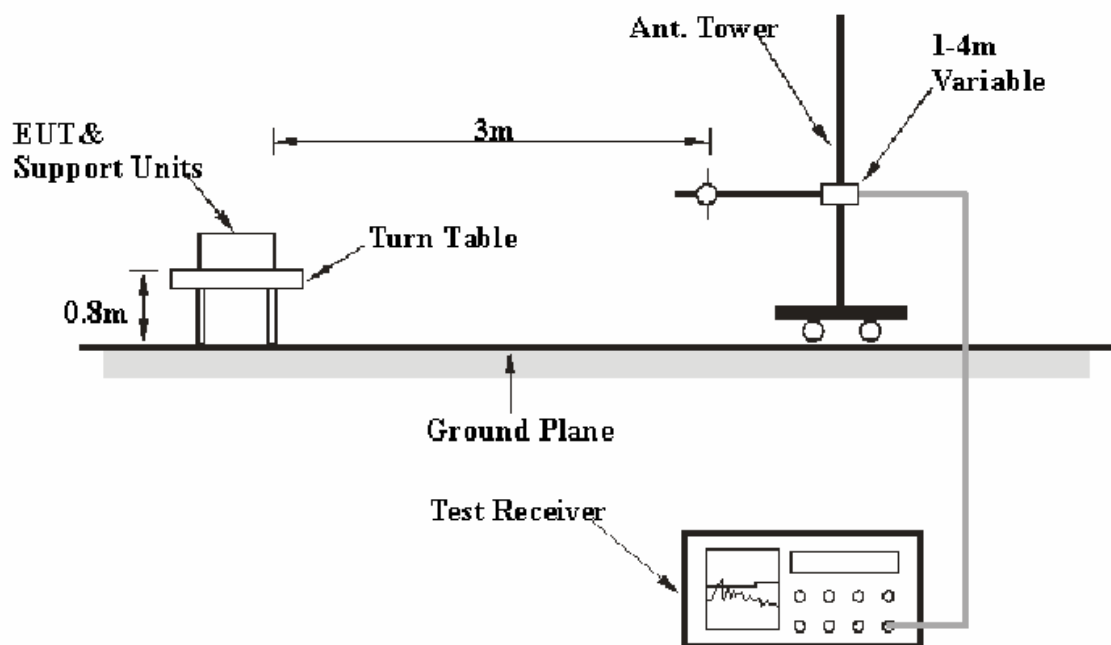
## §15.205 §15.209(a) §15.249(a) - RADIATED EMISSION

### Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, 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 Laboratory Corp. (Shenzhen) is  $\pm 4.0$  dB.

### EUT Setup



The radiated emission and out of band emission tests were performed in the 3 meters chamber B, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 and FCC 15.249 limits.

The EUT is powered by DC 3V battery.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 25000 MHz.

During the radiated emission and out of band emission test, the test receiver was set with the following configurations:

| <b><i>Frequency Range</i></b> | <b><i>RBW</i></b> | <b><i>Video B/W</i></b> |
|-------------------------------|-------------------|-------------------------|
| 30 – 1000 MHz                 | 100 kHz           | 300 kHz                 |
| 1000 MHz – 25000 MHz          | 1MHz              | 3 MHz                   |

## Test Equipment List and Details

| <b>Manufacturer</b> | <b>Description</b> | <b>Model</b> | <b>Serial Number</b> | <b>Calibration Date</b> | <b>Calibration Due Date</b> |
|---------------------|--------------------|--------------|----------------------|-------------------------|-----------------------------|
| Rohde & Schwarz     | EMI Test Receiver  | ESCI         | 100035               | 2006-09-29              | 2007-09-29                  |
| HP                  | Amplifier          | 8447E        | 1937A01046           | 2006-11-15              | 2007-11-15                  |
| Sunol Sciences      | Bilog Antenna      | JB1          | A040904-2            | 2006-08-14              | 2007-08-14                  |
| Agilent             | Spectrum Analyzer  | 8564E        | 3943A01781           | 2006-11-22              | 2007-11-22                  |
| HP                  | Amplifier          | 8449B        | 3008A00277           | 2006-09-29              | 2007-09-29                  |
| Sunol Sciences      | Horn Antenna       | DRH-118      | A052604              | 2006-07-20              | 2007-07-20                  |

**\* 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

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

All data was recorded in the peak, average and 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:

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

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 limit. The equation for margin calculation is as follows:

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

## Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.249, with the worst margin reading of:

**30-1000MHz: 19.9 dB at 30.001875 MHz in the **Horizontal** polarization.**  
**Above 1GHz: 3.83 dB at 2453.0 MHz in the **Horizontal** polarization.**

## Test Data

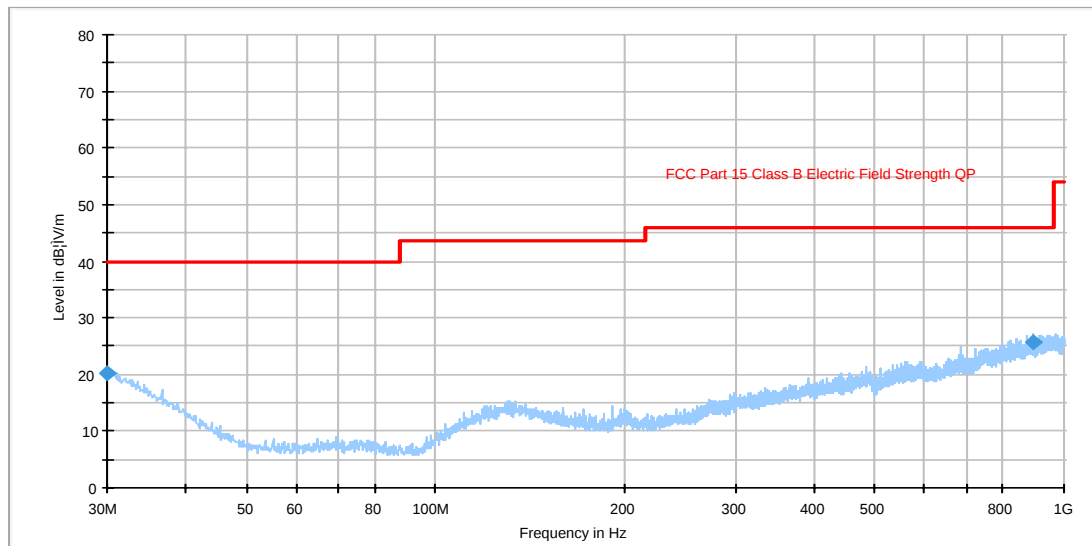
### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 25 ° C   |
| Relative Humidity: | 53%      |
| ATM Pressure:      | 1000mbar |

The testing was performed by Hansen Hu on 2007-01-02.

Test Mode: Transmitting

### 30-1000MHz:



| Frequency (MHz) | Quasi Peak (dBμV/m) | Antenna Height (cm) | Polarity | Turntable Position (deg) | Corr. (dB) | Limit (dBμV/m) | Margin (dB) |
|-----------------|---------------------|---------------------|----------|--------------------------|------------|----------------|-------------|
| 30.001875       | 20.1                | 298.0               | H        | 88.0                     | -4.8       | 40.0           | 19.9        |
| 890.327775      | 25.8                | 101.0               | H        | 115.0                    | -0.3       | 46.0           | 20.2        |

**Above 1GHz:**

| Frequency (MHz) | Meter Reading (dBuV/m) | Detector PK/ AV | Direction Degree | Height (m) | Polar H / V | Antenna Factor dB/m | Cable loss (dB) | Amplifier Gain (dB) | Corr. Ampl. (dBuV/m) | FCC Part 15.209 & 15.249 |             |             |
|-----------------|------------------------|-----------------|------------------|------------|-------------|---------------------|-----------------|---------------------|----------------------|--------------------------|-------------|-------------|
|                 |                        |                 |                  |            |             |                     |                 |                     |                      | Limit (dBuV/m)           | Margin (dB) | Comment     |
| 2453.0          | 92.96                  | AV              | 180              | 1.0        | H           | 27.8                | 3.61            | 34.2                | 90.17                | 94                       | 3.83*       | Fundamental |
| 2453.0          | 91.87                  | AV              | 180              | 1.0        | V           | 27.8                | 3.61            | 34.2                | 89.08                | 94                       | 4.92        | Fundamental |
| 14718.9         | 35.6                   | AV              | 180              | 1.2        | V           | 38.3                | 6.74            | 34.1                | 46.54                | 54                       | 7.46        | Harmonic    |
| 8487.4          | 40.1                   | AV              | 270              | 1.1        | V           | 35.5                | 5.22            | 34.3                | 46.52                | 54                       | 7.48        | Harmonic    |
| 12265.3         | 36.9                   | AV              | 90               | 1.0        | V           | 37.2                | 6.08            | 34.1                | 46.08                | 54                       | 7.92        | Harmonic    |
| 9812.6          | 36.1                   | AV              | 90               | 1.0        | V           | 38.2                | 5.77            | 34.1                | 45.97                | 54                       | 8.03        | Harmonic    |
| 14718.9         | 34.8                   | AV              | 180              | 1.2        | H           | 38.3                | 6.74            | 34.1                | 45.74                | 54                       | 8.26        | Harmonic    |
| 8786.4          | 38.3                   | AV              | 90               | 1.3        | H           | 35.6                | 5.22            | 34.3                | 44.82                | 54                       | 9.18        | Harmonic    |
| 9812.6          | 34.8                   | AV              | 90               | 1.0        | H           | 38.2                | 5.77            | 34.1                | 44.67                | 54                       | 9.33        | Harmonic    |
| 12265.3         | 35.1                   | AV              | 90               | 1.0        | H           | 37.2                | 6.08            | 34.1                | 44.28                | 54                       | 9.72        | Harmonic    |
| 7359.3          | 37.8                   | AV              | 180              | 1.2        | V           | 35.3                | 4.75            | 33.7                | 44.15                | 54                       | 9.85        | Harmonic    |
| 4906.2          | 40.1                   | AV              | 45               | 1.2        | V           | 31.6                | 4.55            | 33.4                | 42.85                | 54                       | 11.15       | Harmonic    |
| 7359.3          | 35.4                   | AV              | 45               | 1.0        | H           | 35.3                | 4.75            | 33.7                | 41.75                | 54                       | 12.25       | Harmonic    |
| 4906.2          | 38.4                   | AV              | 180              | 1.0        | H           | 31.6                | 4.55            | 33.4                | 41.15                | 54                       | 12.85       | Harmonic    |
| 8487.4          | 47.3                   | PK              | 360              | 1.3        | V           | 35.5                | 5.22            | 34.3                | 53.72                | 74                       | 20.28       | Harmonic    |
| 9812.6          | 42.5                   | PK              | 180              | 1.0        | V           | 38.2                | 5.77            | 34.1                | 52.37                | 74                       | 21.63       | Harmonic    |
| 7359.3          | 45.7                   | PK              | 90               | 1.2        | V           | 35.3                | 4.75            | 33.7                | 52.05                | 74                       | 21.95       | Harmonic    |
| 14718.9         | 41.1                   | PK              | 180              | 1.0        | V           | 38.3                | 6.74            | 34.1                | 52.04                | 74                       | 21.96       | Harmonic    |
| 8786.4          | 45.2                   | PK              | 270              | 1.5        | H           | 35.6                | 5.22            | 34.3                | 51.72                | 74                       | 22.28       | Harmonic    |
| 2453.0          | 94.36                  | PK              | 180              | 1.0        | H           | 27.8                | 3.61            | 34.2                | 91.57                | 114                      | 22.43       | Fundamental |
| 4906.2          | 48.7                   | PK              | 45               | 1.2        | V           | 31.6                | 4.55            | 33.4                | 51.45                | 74                       | 22.55       | Harmonic    |
| 9812.6          | 40.4                   | PK              | 180              | 1.0        | H           | 38.2                | 5.77            | 34.1                | 50.27                | 74                       | 23.73       | Harmonic    |
| 14718.9         | 39.2                   | PK              | 90               | 1.2        | H           | 38.3                | 6.74            | 34.1                | 50.14                | 74                       | 23.86       | Harmonic    |
| 12265.3         | 40.7                   | PK              | 180              | 1.0        | V           | 37.2                | 6.08            | 34.1                | 49.88                | 74                       | 24.12       | Harmonic    |
| 2453.0          | 92.60                  | PK              | 180              | 1.0        | V           | 27.8                | 3.61            | 34.2                | 89.81                | 114                      | 24.19       | Fundamental |
| 7359.3          | 42.6                   | PK              | 90               | 1.2        | H           | 35.3                | 4.75            | 33.7                | 48.95                | 74                       | 25.05       | Harmonic    |
| 12265.3         | 39.7                   | PK              | 90               | 1.2        | H           | 37.2                | 6.08            | 34.1                | 48.88                | 74                       | 25.12       | Harmonic    |
| 4906.2          | 45.1                   | PK              | 90               | 1.2        | H           | 31.6                | 4.55            | 33.4                | 47.85                | 74                       | 26.15       | Harmonic    |

\* Within measurement uncertainty.

## §15.249(d) – OUT OF BAND EMISSION

### Standard Applicable

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

### 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 Equipment List and Details

| Manufacturer | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|--------------|-------------------|-------|---------------|------------------|----------------------|
| Agilent      | Spectrum Analyzer | 8564E | 3943A01781    | 2006-11-22       | 2007-11-22           |

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

### Test Data

#### Environmental Conditions

|                    |          |
|--------------------|----------|
| Temperature:       | 25 °C    |
| Relative Humidity: | 55%      |
| ATM Pressure:      | 1016mbar |

The testing was performed by Hansen Hu on 2007-01-02.

Test Mode: Transmitting

| Frequency (MHz) | Meter Reading (dBuV/m) | Antenna Factor (dB/m) | Cable loss (dB) | Amplifier (dB) | Correct Amplitude (dBuV/m) | Limit | Margin |
|-----------------|------------------------|-----------------------|-----------------|----------------|----------------------------|-------|--------|
| 2483.6          | 51.49                  | 27.4                  | 3.61            | 35.0           | 47.5                       | 54    | 6.5    |
| 2399.9          | 46.56                  | 27.4                  | 3.61            | 35.0           | 42.57                      | 54    | 11.43  |

**Test Result:** Pass