



NVLAP LAB CODE 200707-0



## FCC PART 15.231

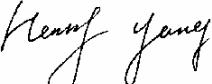
### MEASUREMENT AND TEST REPORT

For

**Prominent Industrial (Guangzhou) Company Limited**

Complex 6, Shenlan Industrial District, Huijiang Village, Dashi, Panyu,  
Guangzhou, Guangdong, China.

**FCC ID: VLBSPEED-E-CART02**

|   |  |
|---|--|
| <b>This Report Concerns:</b>                        | <b>Equipment Type:</b>   |
| <input checked="" type="checkbox"/> Original Report | E-cart   |
| <b>Test Engineer:</b>                               | Henry Yang   |
| <b>Report No.:</b>                                  | RSZ07052102  |
| <b>Test Date:</b>                                   | 2007-08-15   |
| <b>Report Date:</b>                                 | 2007-08-28   |
| <b>Reviewed By:</b>                                 | EMC Manager: Boni Baniqued    |
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**Note:** This test report is for the customer shown above and their specific product only. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratory Corp. (Shenzhen). This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the Federal Government.

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## GENERAL INFORMATION

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

The *Prominent Industrial (Guangzhou) Company Limited* 's product, model: *Speed E-Cart02(Tx)* or the "EUT" as referred to in this report is a *E-cart* which measures approximately 14.5 cm L x 4.5 cm W x 1.8 cm H, rated input voltage: DC 3V battery.

*\* The test data gathered are from production sample, serial number: 0705014, provided by the manufacturer, we receive the EUT on 2007-05-21.*

### Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203,15.205,15.209 and 15.231 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 Laboratory 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).



NVLAP 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).

### EUT Exercise Software

N/A.

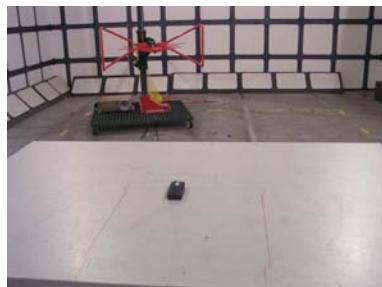
### Special Accessories

The special accessories were supplied by Bay Area Compliance Laboratory Corp. (Shenzhen).

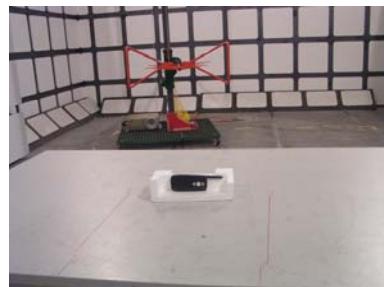
### Equipment Modifications

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

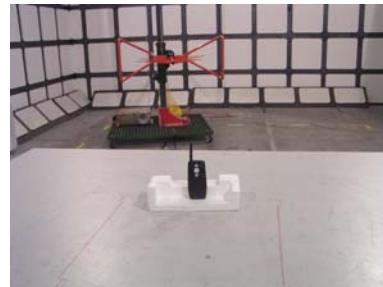
## Configuration of Test Setup



Lie

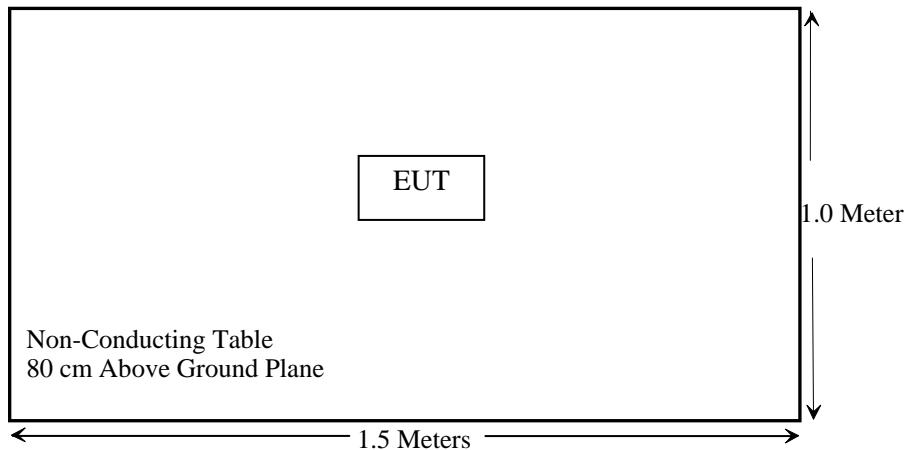


Side



Stand

## Block Diagram of Test Setup



**SUMMARY OF TEST RESULTS**

| Rules          | Description of test     | Result    |
|----------------|-------------------------|-----------|
| §15.203        | Antenna Requirement     | Compliant |
| §15.205        | Restricted Band         | Compliant |
| §15.209        | General Requirement     | Compliant |
| §15.231 (b)    | Radiated Emissions      | Compliant |
| §15.231 (c)    | 20dB Band Width Testing | Compliant |
| §15.231 (a)(1) | Deactivation Testing    | Compliant |
| §15.231        | Duty Cycle              | /         |

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## §15.203 - ANTENNA REQUIREMENT

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### Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

The antenna of the EUT was integrated to the PCB board which is not allowed to replace, please refer to the EUT photos.

**Result:** Compliant.

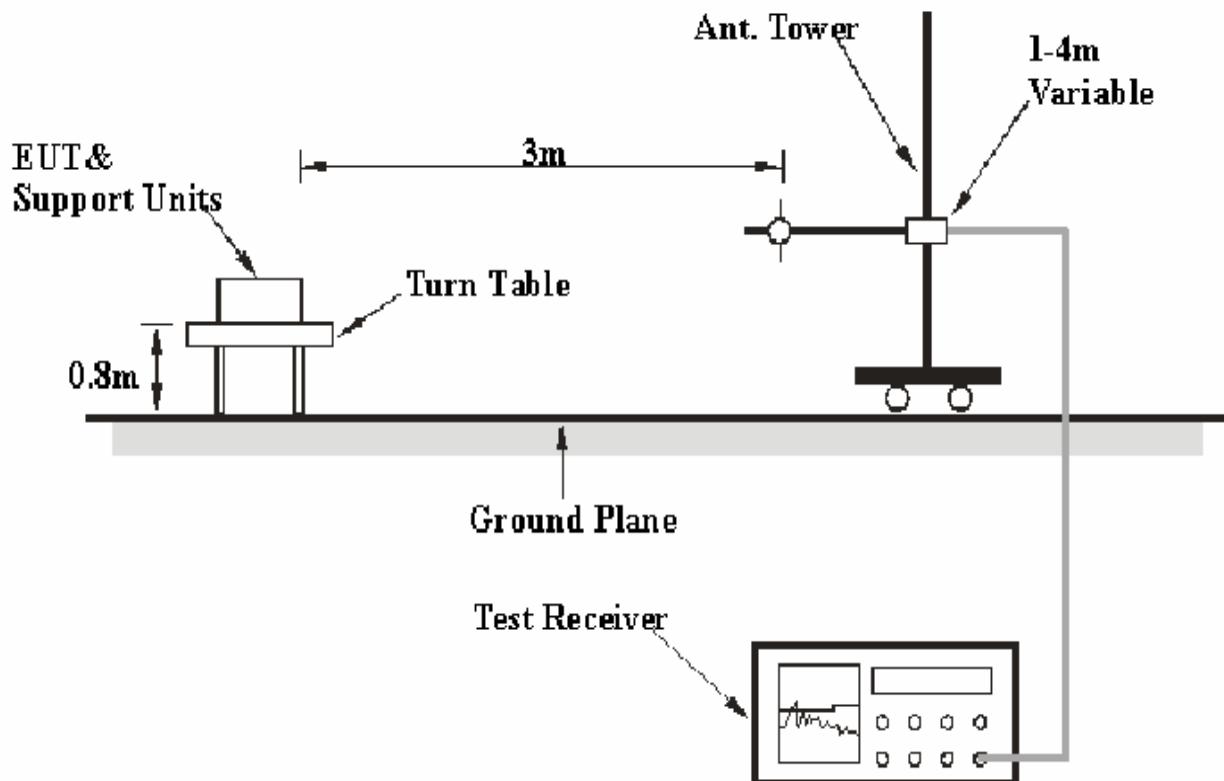
## §15.205, §15.209, §15.231 (b) - RADIATED EMISSIONS

### 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 Laboratory 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 15 § 15.209 and 15.231.

## EMI Test Receiver Setup

The system was investigated from 30 MHz to 5 GHz.

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

| <u>Frequency Range</u> | <u>RBW</u> | <u>VBW</u> |
|------------------------|------------|------------|
| 30 – 1000 MHz          | 100 kHz    | 300 kHz    |
| 1000 MHz – 5 GHz       | 1 MHz      | 3 MHz      |

## 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           |
| HP              | Amplifier         | 8449B   | 3008A00277    | 2006-09-29       | 2007-09-29           |
| Sunol Sciences  | Horn Antenna      | DRH-118 | A052604       | 2007-07-20       | 2008-07-20           |
| 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     | 2007-08-14       | 2008-08-14           |

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

## Test Procedure

ANSI C63.4-2003, 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 and Average detection mode.

## Standard Applicable

According to §15.231(b), the field strength of emissions from intentional radiators operated under this section shall not exceed the following:

| Fundamental frequency (MHz) | Field Strength of Fundamental (Microvolts /meter) | Field Strength of spurious emissions (Microvolts /meter) |
|-----------------------------|---|--|
| 40.66-40.70                 | 2,250   | 225  |
| 70-130                      | 1,250   | 125  |
| 130-174                     | 1,250 to 3,370                                    | 125 to 375   |
| 174-260                     | 3,750   | 375  |
| 260-470                     | 3,750 to 12,500                                   | 375 to 1,250   |
| Above 470                   | 12,500  | 1,250  |

**Note:** Linear interpolations for frequency range 130 - 174 MHz and 260 - 470 MHz. The above field strength limits are specified at a distance of 3-meters the tighter limits apply at the band edges.

## 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:

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

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 5.8dB means the emission is 5.8dB below the limit. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Cord. Amp.}$$

## Test Data

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 ° C    |
| Relative Humidity: | 56%       |
| ATM Pressure:      | 100.2 kPa |

The testing was performed by Henry Yang on 2007-08-15.

| Frequency (MHz) | Meter Reading (dBuV) | Detector PK/AV | Direction Degree | Antenna    |               |               | Cable Loss (dB) | Duty Cycle dB | Pre-Amp. (dB) | Cord. Amp. (dB uV/m) | FCC Part 15.231/209 |             |          |
|-----------------|----------------------|----------------|------------------|------------|---------------|---------------|-----------------|---------------|---------------|----------------------|---------------------|-------------|----------|
|                 |                      |                |                  | Height (m) | Polar (H / V) | Factor (dB/m) |                 |               |               |                      | Limit (dBuV/m)      | Margin (dB) | Remarks  |
| 30 – 1000 MHz   |                      |                |                  |            |               |               |                 |               |               |                      |                     |             |          |
| 433.91          | 93.45                | *              | 0                | 1.2        | V             | 16.8          | 3.12            | -16.64        | 27.36         | 69.37                | 80.8                | 11.43       | Fund.    |
| 433.91          | 93.45                | PK             | 0                | 1.2        | V             | 16.8          | 3.12            | 0             | 27.36         | 86.01                | 100.8               | 14.79       | Fund.    |
| 433.91          | 82.85                | *              | 0                | 1.2        | H             | 16.8          | 3.12            | -16.64        | 27.36         | 58.77                | 80.8                | 22.03       | Fund.    |
| 433.91          | 82.85                | PK             | 0                | 1.2        | H             | 16.8          | 3.12            | 0             | 27.36         | 75.41                | 100.8               | 25.39       | Fund.    |
| 867.82          | 46.77                | *              | 0                | 1.2        | V             | 22.2          | 3.93            | -16.64        | 26.67         | 29.59                | 60.8                | 31.21       | Harmonic |
| 867.82          | 46.77                | PK             | 0                | 1.2        | V             | 22.2          | 3.93            | 0             | 26.67         | 46.23                | 80.8                | 34.57       | Harmonic |
| 867.82          | 41.06                | *              | 0                | 1.2        | H             | 22.2          | 3.93            | -16.64        | 26.67         | 23.88                | 60.8                | 36.92       | Harmonic |
| 867.82          | 41.06                | PK             | 0                | 1.2        | H             | 22.2          | 3.93            | 0             | 26.67         | 40.52                | 80.8                | 40.28       | Harmonic |
| Above 1 GHz     |                      |                |                  |            |               |               |                 |               |               |                      |                     |             |          |
| 2169.55         | 42.31                | *              | 0                | 1          | H             | 27.3          | 3.62            | -16.64        | 35            | 28.59                | 60.8                | 32.21       | Harmonic |
| 1735.64         | 48.18                | *              | 0                | 1          | V             | 27.1          | 2.82            | -16.64        | 35            | 26.46                | 60.8                | 34.34       | Harmonic |
| 2169.55         | 49.31                | PK             | 0                | 1          | H             | 27.3          | 3.62            | 0             | 35            | 45.23                | 80.8                | 35.57       | Harmonic |
| 1735.64         | 46.55                | *              | 0                | 1          | H             | 27.1          | 2.82            | -16.64        | 35            | 24.83                | 60.8                | 35.97       | Harmonic |
| 2169.55         | 44.37                | *              | 0                | 1          | V             | 27.3          | 3.62            | -16.64        | 35            | 23.65                | 60.8                | 37.15       | Harmonic |
| 1735.64         | 48.18                | PK             | 0                | 1          | V             | 27.1          | 2.82            | 0             | 35            | 43.10                | 80.8                | 37.70       | Harmonic |
| 1735.64         | 46.55                | PK             | 0                | 1          | H             | 27.1          | 2.82            | 0             | 35            | 41.47                | 80.8                | 39.33       | Harmonic |
| 2169.55         | 44.37                | PK             | 0                | 1          | V             | 27.3          | 3.62            | 0             | 35            | 40.29                | 80.8                | 40.51       | Harmonic |

### NOTE:

\*Calculate Average value based on Duty Cycle correction factor:  
 $\text{Average Result} = \text{Peak Result} - 20 \log(\text{Duty Cycle})$ .

## §15.231(c) - 20dB BANDWIDTH TESTING

### Requirement

Per 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70 MHz and below 900 MHz. Bandwidth is determined at the points 20 dB down from the modulated carrier.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| 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     | 2007-08-14       | 2008-08-14           |

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

### Test Procedure

With the EUT's antenna attached, the EUT's 20dB Bandwidth power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

### Test Data

#### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 °C     |
| Relative Humidity: | 50%       |
| ATM Pressure:      | 100.2 kPa |

The testing was performed by Henry Yang on 2007-08-09.

Test Mode: Transmitting

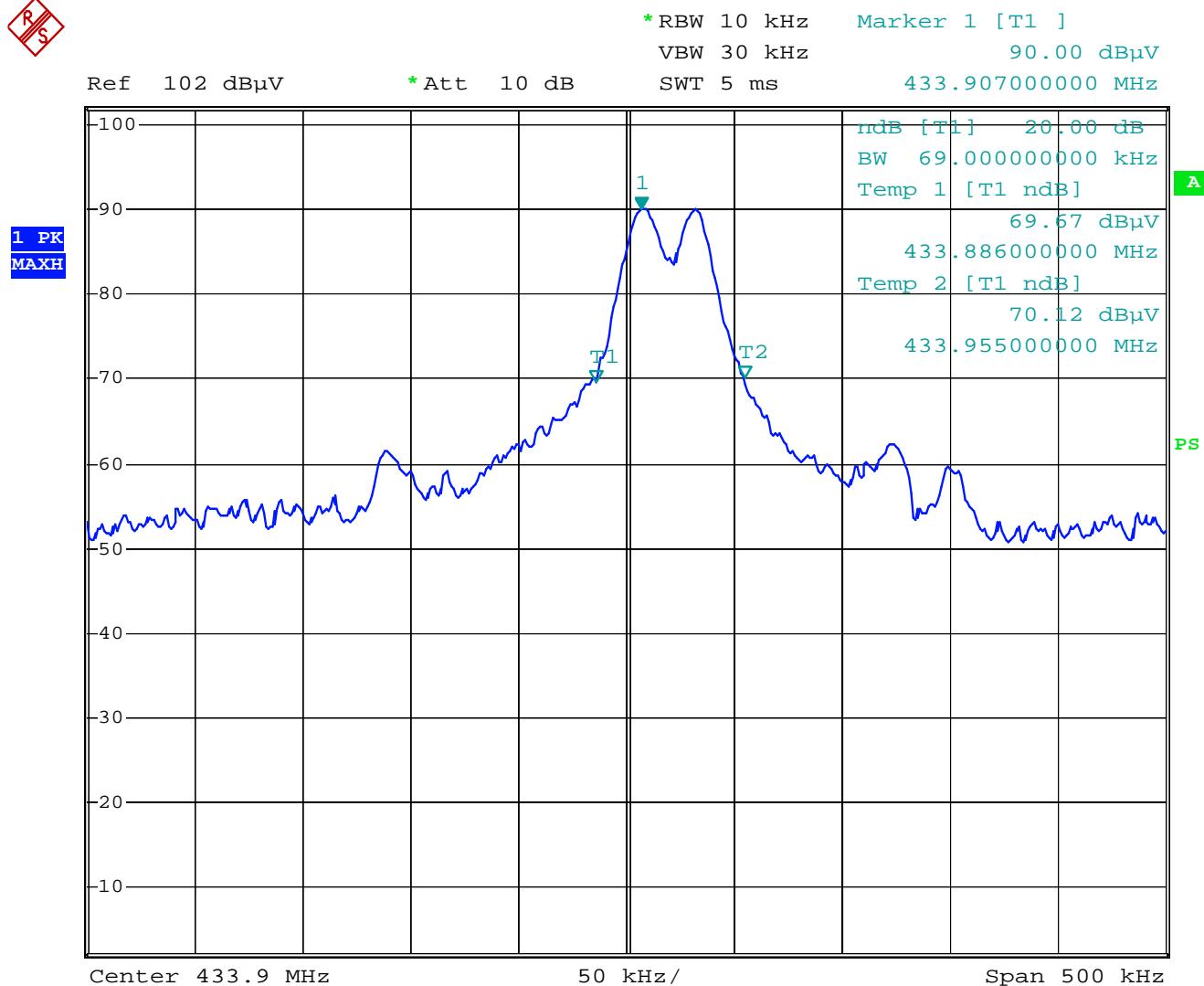
20 dB BW Limit = 0.25% \* Center Frequency = 0.25% \* 433.92 (MHz) = 1.0848 (MHz) = 1084.8 kHz

**RESULT:** 69 kHz, Compliant.

Refer to the attached plots.

## Plot of 20 dB Bandwidth

RS



20db bandwidth

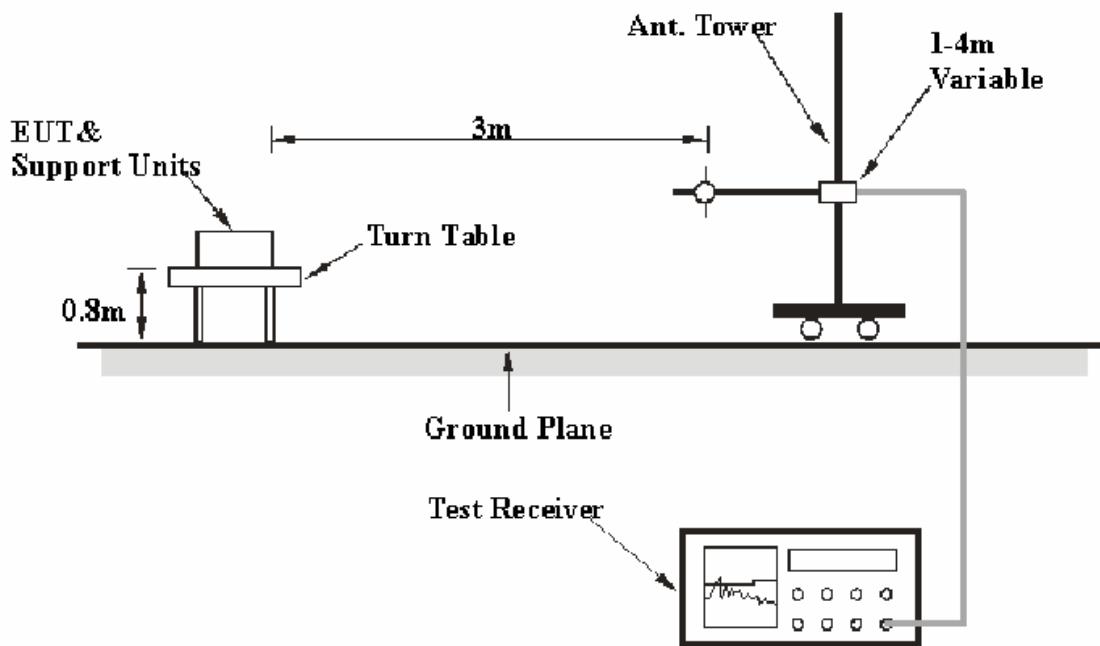
Date: 9.AUG.2007 16:23:21

## §15.231(a) - DEACTIVATION TESTING

### Requirement

Per 15.231(a) (1), a manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released.

### EUT Setup



The deactivation test was 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 15.231(a) limits.

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| 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     | 2007-08-14       | 2008-08-14           |

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

### Test Procedure

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

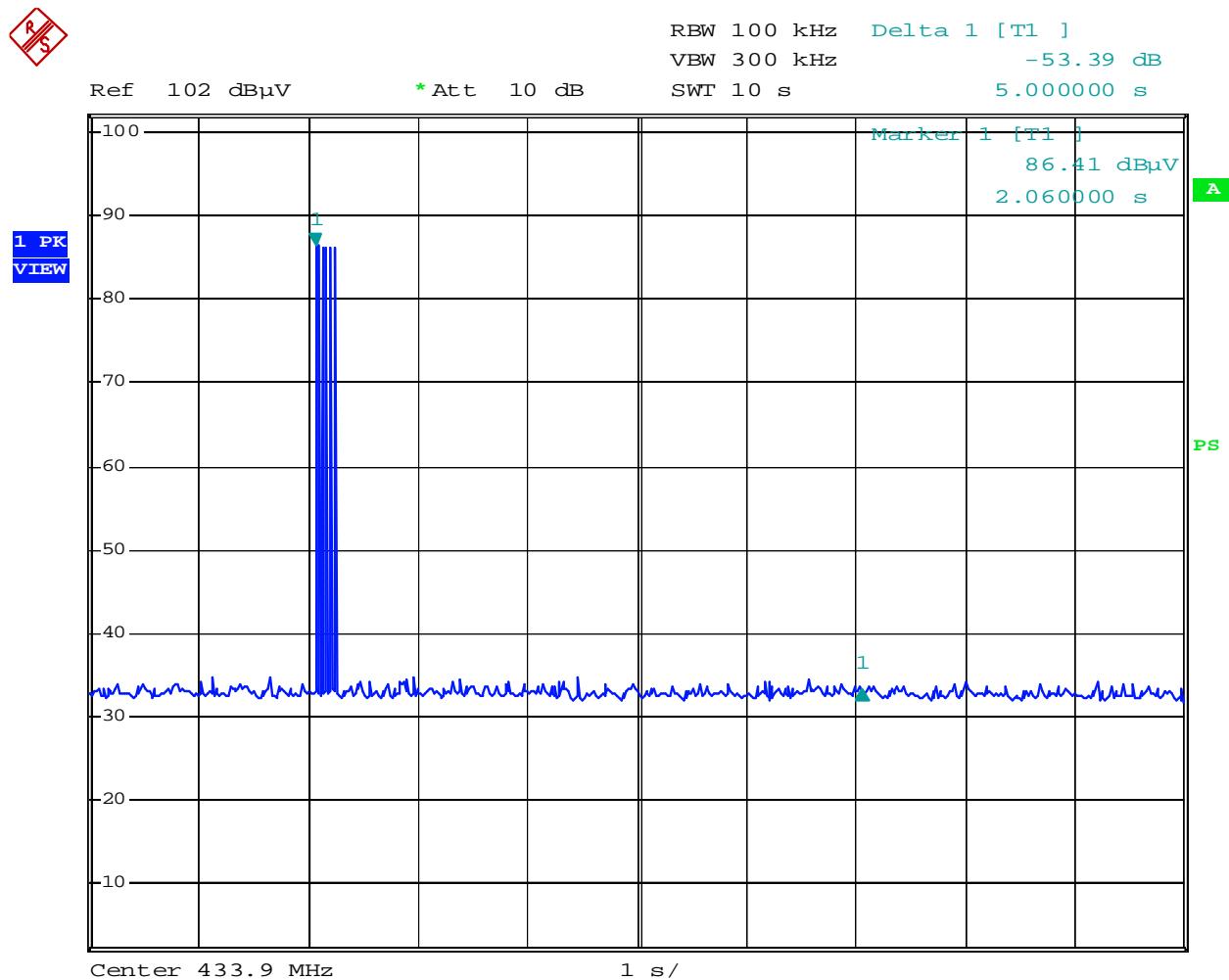
## Test Data

### Environmental Conditions

|                    |           |
|--------------------|-----------|
| Temperature:       | 25 ° C    |
| Relative Humidity: | 50%       |
| ATM Pressure:      | 100.2 kPa |

The testing was performed by Henry Yang on 2007-08-09.

**Result:** < 5 seconds. Refer to the attached plots.



deactivation time

Date: 9.AUG.2007 16:27:29

## §15.231- DUTY CYCLE

### Limit

Nil (No dedicated limit specified in the Rules).

### Test Equipment List and Details

| Manufacturer    | Description       | Model | Serial Number | Calibration Date | Calibration Due Date |
|-----------------|-------------------|-------|---------------|------------------|----------------------|
| Rohde & Schwarz | EMI Test Receiver | ESCI  | 100224        | 2006-09-29       | 2007-09-29           |

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

### Test Procedure

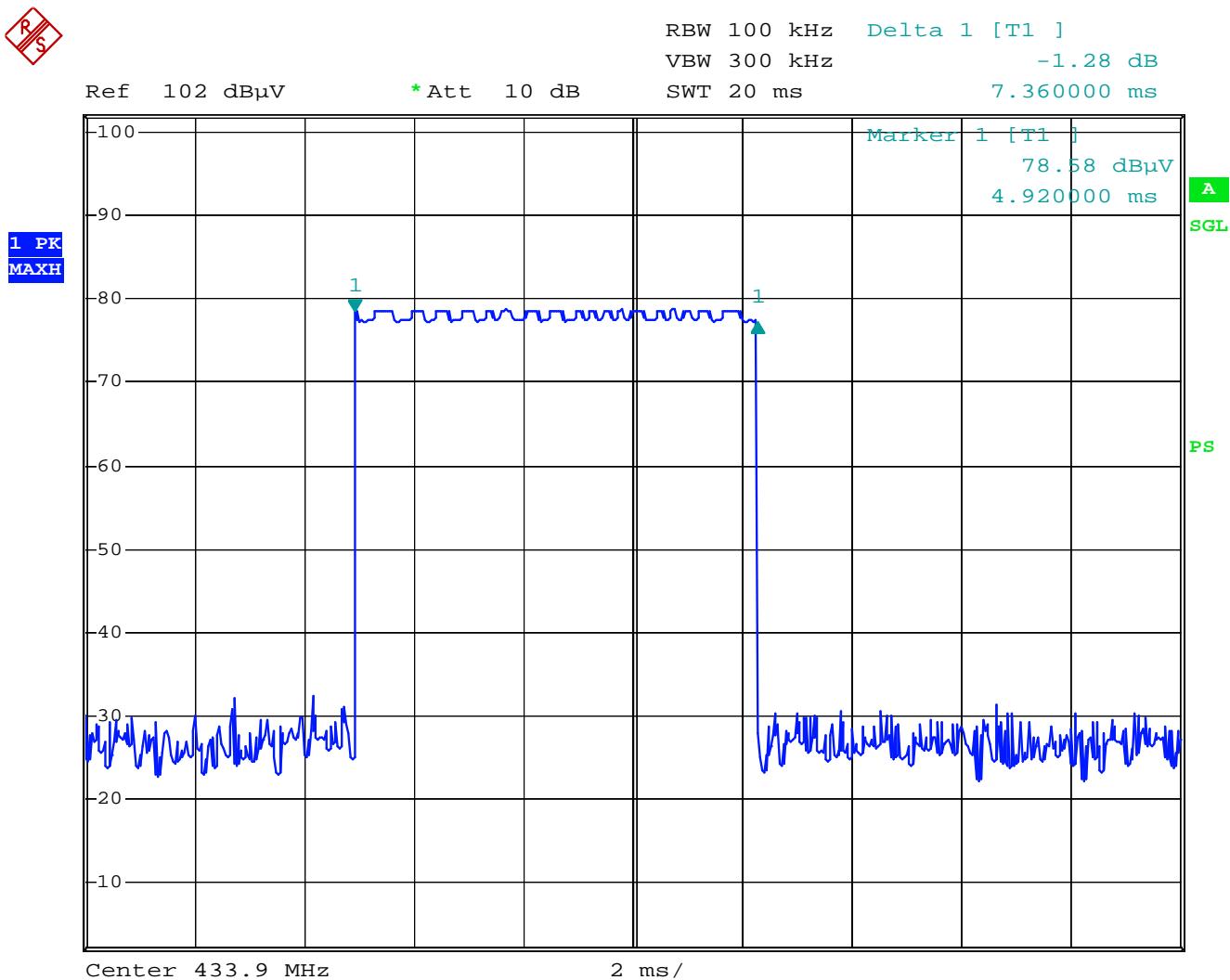
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer=operating frequency.
4. Set the spectrum analyzer as RBW, VBW=100KHz, Span=0Hz, Adjust Sweep=100ms.
5. Repeat above procedures until all frequency measured was complete.

### Test Data

Ton=2\*7.36=14.72ms

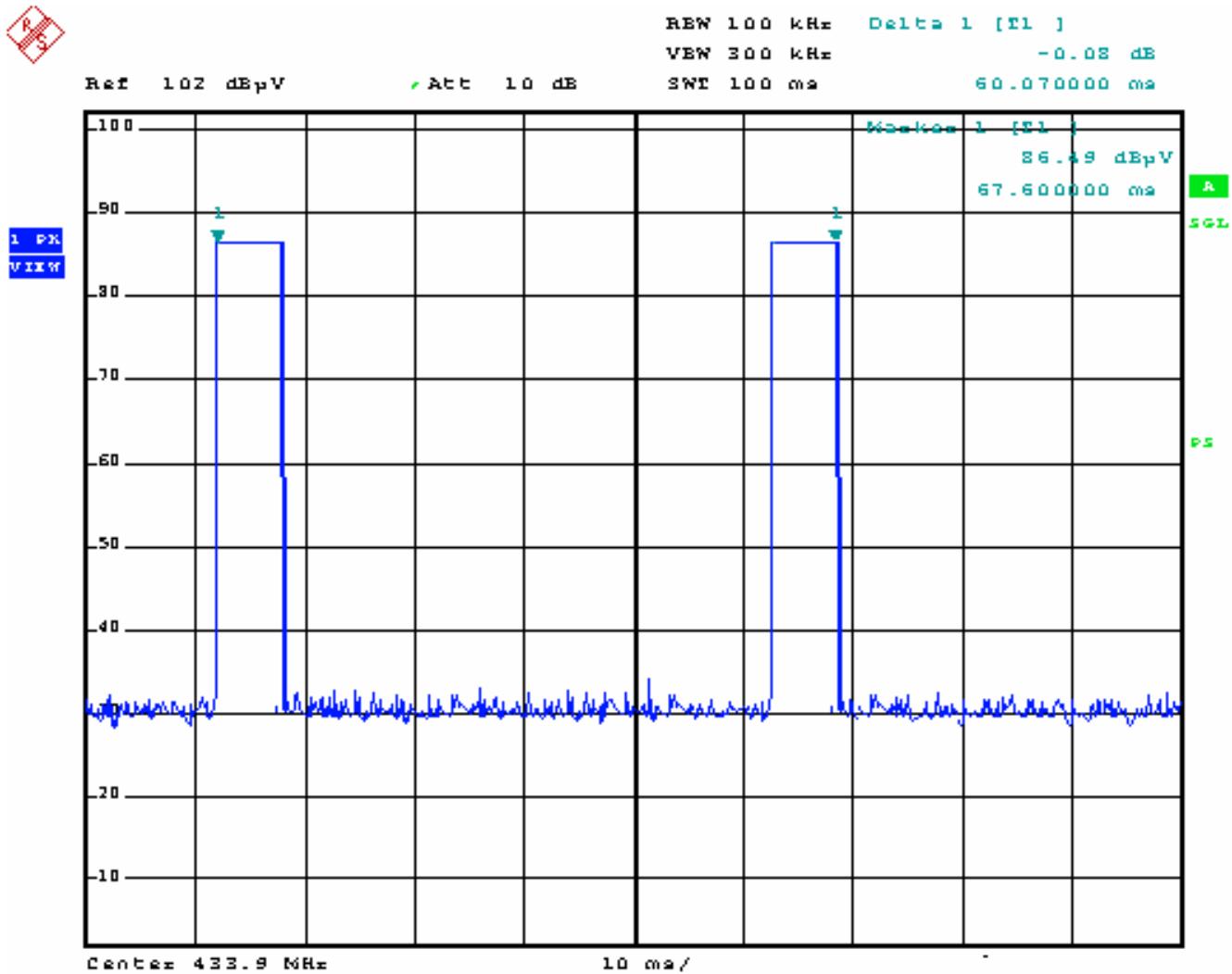
Duty cycle factor =20Log(ton/tp)=20\*log(14.72/100)= -16.64 dB.

This factor will apply and correct the radiated emission test result.



duty cycle (Ton)

Date: 9.AUG.2007 16:43:42



duty cycle (Tp)

Date: 9.AUG.2007 16:31:49

## **END OF REPORT**