

# Test Report of FCC Part 15 C for FCC Certificate

On Behalf of

## China Industries Ltd T/A Wow! Stuff

**FCC ID:** YCR-TX-1008H

**Product Description:** Cyber Dactyl

**Model No.:** TX-1008

**Supplementary Model No.:** N/A

**Brand Name:** TX-Juice

**Prepared for:** China Industries Ltd T/A Wow! Stuff

Creative Industries Centre, Wolverhampton Science Park,  
Wolverhampton, WV10 9TG, UK.

**Prepared by:** Bontek Compliance Testing Laboratory Co., Ltd.

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**Report No.:** BCT14GR274E

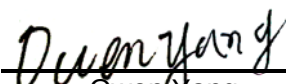
**Issue Date:** July 8~15, 2014

**Test Date:** July 15, 2014

**Tested by:**

  
Jiankuai.Li

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**Approved by:**

  
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# 1. GENERAL INFORMATION

## 1.1 Client Information

Applicant: **China Industries Ltd T/A Wow! Stuff**  
Address of applicant: Creative Industries Centre, Wolverhampton Science Park,  
Wolverhampton, WV10 9TG, UK.  
Manufacturer: **Huatong Metals & Plastic Products Co. Ltd.**  
Address of manufacturer: Yongfeng Industrial District, Henglan Town, Zhongshan,  
Guangdong

## General Description of E.U.T

| Items                    | Description           |
|--------------------------|-----------------------|
| EUT Description:         | Cyber Dactyl          |
| Trade Name:              | TX-Juice              |
| Model No.:               | TX-1008               |
| Supplementary Model No.: | N/A                   |
| Frequency Band:          | 2420.875MHz ~ 2472MHz |
| Type of modulation       | GFSK                  |
| Antenna Gain             | 0dBi                  |
| Antenna Type:            | Integral Antenna      |
| Rated Voltage:           | 6.0 V DC from battery |

*Remark\* The test data gathered are from the production sample provided by the manufacturer.*

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

This submittal(s) 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 Section 15.107 and 15.109 under the FCC Rules Part 15 Subpart B and Section 15.207, 15.209, 15.249 under the FCC Rules Part 15 Subpart C.

## **1.3 Test Methodology**

Both conducted and radiated testing were performed according to the procedures in 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. Radiated testing was performed at an antenna to EUT distance 3 meters.

## **1.4 Test Facility**

All measurement required was performed at laboratory of Bontek Compliance Testing Laboratory Co., Ltd at 1/F, Block East H-3, OCT Eastern Ind. Zone, Qiaocheng East Road, Nanshan, Shenzhen, China.

The test facility is recognized, certified, or accredited by the following organizations:

### **IC Registration No.: 7631A**

The 3m alternate test site of Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 7631A on January, 2011. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

### **CNAS – Registration No.: L3923**

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. To ISO/IEC 17025:25 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. The acceptance letter from the CNAS is maintained in our files: Registration: L3923, March, 2012.

### **TUV – Registration No.: 50242657-0001**

Shenzhen Bontek Compliance Testing Laboratory Co., Ltd. An assessment of the laboratory was conducted according to the "Procedures and Conditions for EMC Test Laboratories" with reference to EN ISO/IEC 17025 by a TUV Rheinland auditor. Audit Report NO. 17010783-003

## **2. SYSTEM TEST CONFIGURATION**

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and FCC CFR 47 Part 15 Subpart C.

### **2.1 EUT Configuration**

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner that intends to maximize its emission characteristics in a continuous transmitting application.

### **2.2 EUT Exercise**

The calibrated antennas used to sample the radiated field strength are mounted on a non-conductive, motorized antenna mast 3 or 10 meters from the leading edge of the turntable.

### **2.3 General Test Procedures**

**Conducted Emissions** The EUT is placed on the turntable, which is 0.8 m above ground plane. According to the requirements in Section 7.1 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak detector mode. But the EUT is powered by DC 1.5V of battery, this test is not applicable.

**Radiated Emissions** The EUT is placed on a turntable, which is 0.8 m above ground plane. The turntable shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the maximum emissions, exploratory radiated emission measurements were made according to the requirements in Section 13.1.4.1 of ANSI C63.4-2003.

## 2.4 List of Measuring Equipments

| No. | Instrument no. | Equipment                     | Manufacturer    | Model No. | S/N        | Last Calculator | Due Calculator |
|-----|----------------|-------------------------------|-----------------|-----------|------------|-----------------|----------------|
| 1   | BCT-EMC001     | EMI Test Receiver             | R&S             | ESCI      | 100687     | 2014-4-16       | 2015-4-15      |
| 2   | BCT-EMC002     | EMI Test Receiver             | R&S             | ESPI      | 100097     | 2013-11-1       | 2014-10-31     |
| 3   | BCT-EMC003     | Amplifier                     | HP              | 8447D     | 1937A02492 | 2014-4-16       | 2015-4-15      |
| 4   | BCT-EMC004     | Single Power Conductor Module | R&S             | NNBM 8124 | 242        | 2014-4-16       | 2015-4-15      |
| 5   | BCT-EMC005     | Single Power Conductor Module | R&S             | NNBM 8124 | 243        | 2014-4-16       | 2015-4-15      |
| 6   | BCT-EMC018     | TRILOG Broadband Test-Antenna | SCHWARZBECK     | VULB9163  | 9163-324   | 2014-5-19       | 2015-5-18      |
| 7   | BCT-EMC019     | Horn Antenna                  | SCHWARZBECK     | BBHA9120A | 0499       | 2013-11-28      | 2014-11-27     |
| 8   | BCT-EMC021     | Triple-Loop Antenna           | EVERFINE        | LLA-2     | 711002     | 2013-11-15      | 2014-11-14     |
| 9   | BCT-EMC026     | RF POWER AMPLIFIER            | FRANKONIA       | FLL-75    | 1020A1109  | 2014-4-16       | 2015-4-15      |
| 10  | BCT-EMC027     | CDN                           | FRANKONIA       | CDN M2+M3 | A3027019   | 2014-4-16       | 2015-4-15      |
| 11  | BCT-EMC029     | 6DB Attenuator                | FRANKONIA       | N/A       | 1001698    | 2014-4-16       | 2015-4-15      |
| 12  | BCT-EMC032     | 10dB attenuator               | ELECTRO-METRICS | EM-7600   | 836        | 2014-4-16       | 2015-4-15      |
| 13  | BCT-EMC036     | Spectrum Analyzer             | R&S             | FSP       | 100397     | 2013-11-1       | 2014-10-31     |
| 14  | BCT-EMC037     | Broadband preamplifier        | SCHWARZBECK     | BBV9718   | 9718-182   | 2014-4-16       | 2015-4-15      |

### 3. SUMMARY OF TEST RESULTS

| EUT Fundamental Frequency | FCC Rules | Description of Test                        | Result                |
|---------------------------|-----------|--------------------------------------------|-----------------------|
| 2420.875~<br>2472MHz      | 15.207    | Disturbance Voltage at The Mains Terminals | N/A , without AC main |
|                           | 15.215    | 20 dB Bandwidth                            | Pass                  |
|                           | 15.249    | Band Edges Measurement                     | Pass                  |
|                           | 15.249    | Spurious Emission                          | Pass                  |
|                           | 15.203    | Antenna Requirement                        | Pass                  |

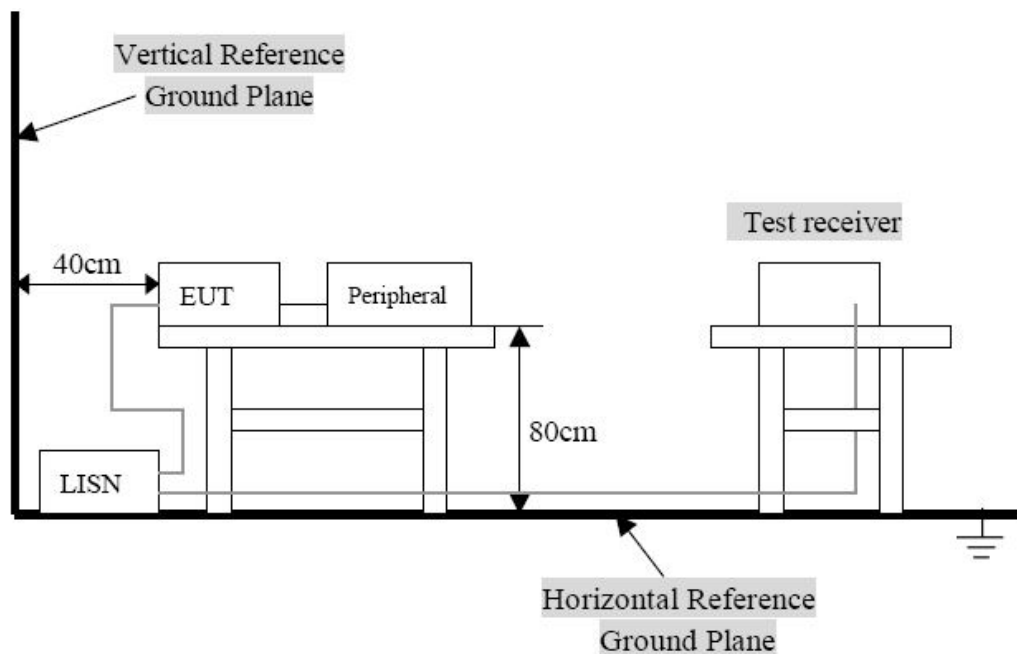
## 4. TEST OF CONDUCTED EMISSION

### 4.1 Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

| Frequency Range (MHz) | Limits ( dBuV) |         |
|-----------------------|----------------|---------|
|                       | Quasi-Peak     | Average |
| 0.150~0.500           | 66~56          | 56~46   |
| 0.500~5.000           | 56             | 46      |
| 5.000~30.00           | 60             | 50      |

### 4.2 Test Setup Diagram



Remark: 1. The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC 15.207 limits.

2. The EUT was charged on the base, and the base was connected to a 120 VAC/ 60Hz power source.

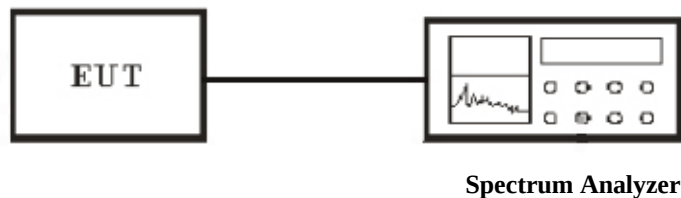
**Notes:** The EUT is powered by DC 6V from battery without AC mains, this test is unapplicable.

## 5. Test of Hopping Channel Bandwidth

### 5.1 Applicable Standard

Section 15.215(c): Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

### 5.2 EUT Setup



### 5.3 Test Equipment List and Details

See section 2.4.

### 5.4 Test Procedure

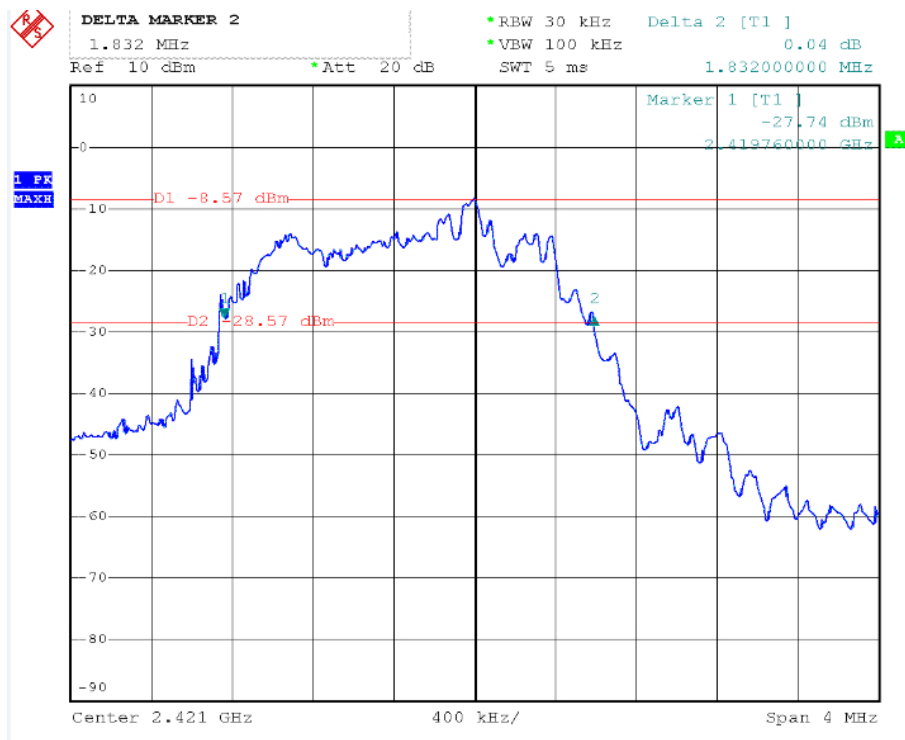
1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Use the following spectrum analyzer settings:  
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel  
RBW  $\geq$  1% of the 20 dB bandwidth, VBW  $\geq$  RBW  
Sweep = auto  
Detector function = peak  
Trace = max hold
3. The spectrum width with level higher than 20dB below the peak level.
4. Repeat above 1~3 points for the middle and highest channel of the EUT.

### 5.5 Test Result

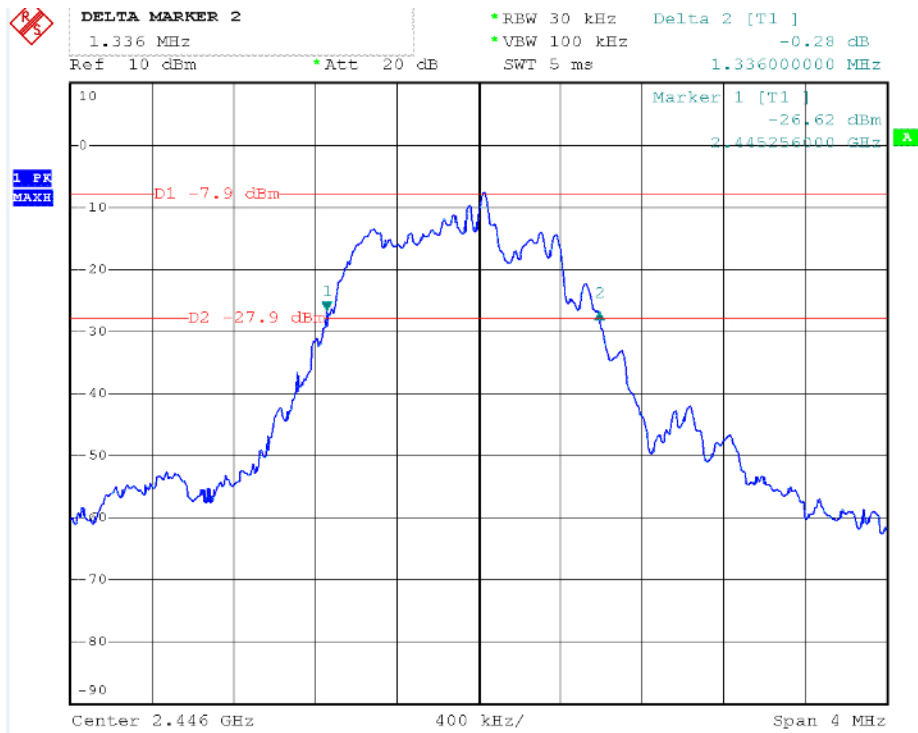
|                                         |                                              |
|-----------------------------------------|----------------------------------------------|
| Temperature ( °C ) : 22~23              | EUT: Cyber Dactyl                            |
| Humidity (%RH ) : 50~54                 | M/N: TX-1008                                 |
| Barometric Pressure ( mbar ) : 950~1000 | Operation Condition: Continuous transmitting |

| Modulation Type | Channel No. | Frequency (MHz) | 20dB Bandwidth (kHz) |
|-----------------|-------------|-----------------|----------------------|
| GFSK            | Low         | 2420.875        | 1.832                |
| GFSK            | Middle      | 2446.00         | 1.336                |
| GFSK            | High        | 2472.00         | 1.504                |

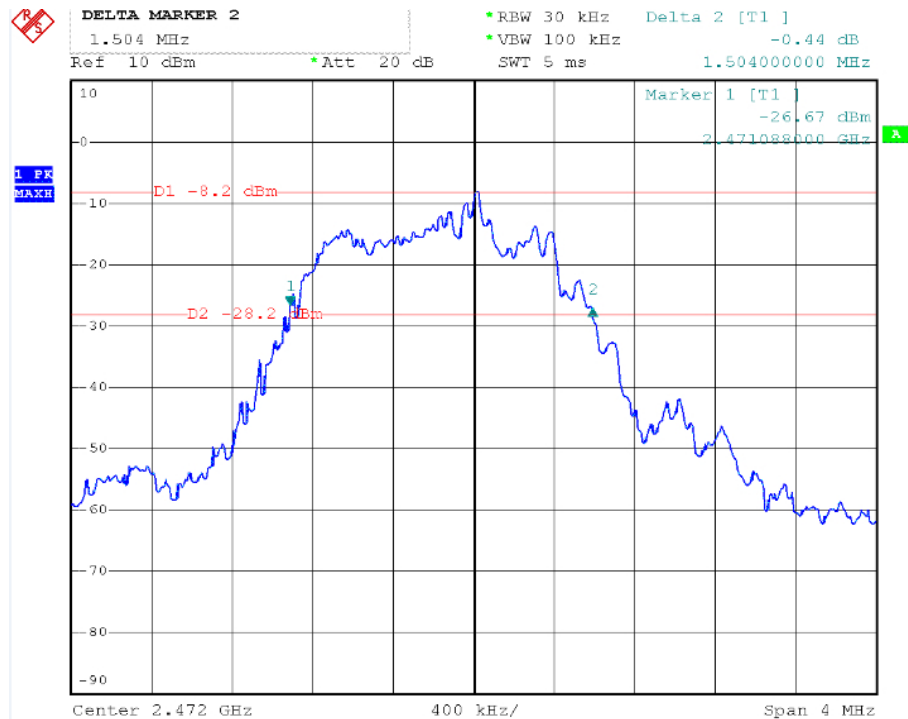
### Channel Low



## Channel Mid



## Channel High



## 6. BAND EDGES MEASUREMENT

### 6.1 Limit of Band Edges Measurement

1. In the above emission table, the tighter limit applies at the band edges.
2. As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits in paragraphs (a) and (b) of this section are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For point-to-point operation under paragraph (b) of this section, the peak field strength shall not exceed 2500 millivolts/meter at 3 meters along the antenna azimuth.

| Frequency (MHz) | Field Strength ( $\mu\text{V/m}$ at 3-meter) | Field Strength ( $\text{dB}\mu\text{V/m}$ at 3-meter) |
|-----------------|----------------------------------------------|-------------------------------------------------------|
| 30-88           | 100                                          | 40                                                    |
| 88-216          | 150                                          | 43.5                                                  |
| 216-960         | 200                                          | 46                                                    |
| Above 960       | 500                                          | 54                                                    |

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

- (2) The emission limits shown in the above table are based on measurement employing a CISPR quasi-peak detector and above 1000MHz are based on measurements employing an average detector.

### 6.2 Radiate EUT Setup

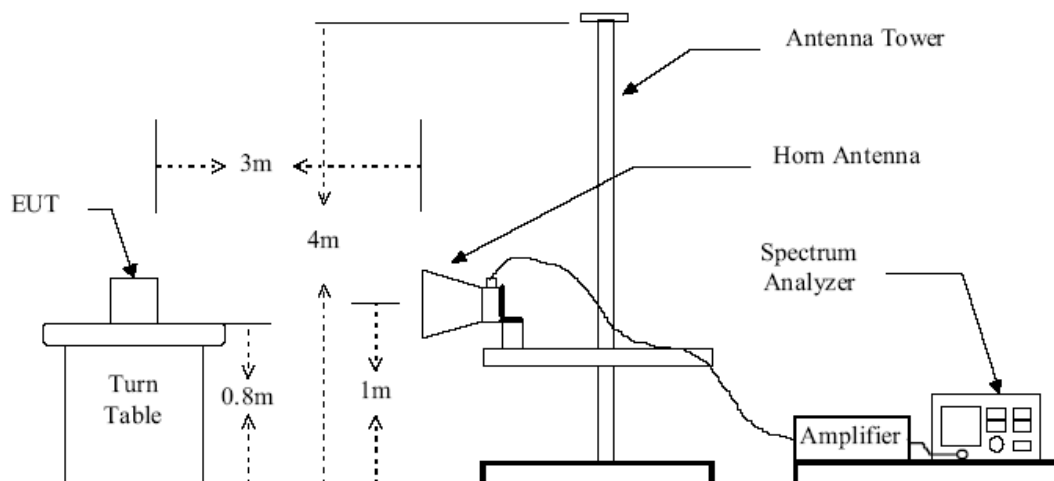


Figure 2 : Frequencies measured above 1 GHz configuration

### 6.3 Test Procedure

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

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

### 6.4 Test Result

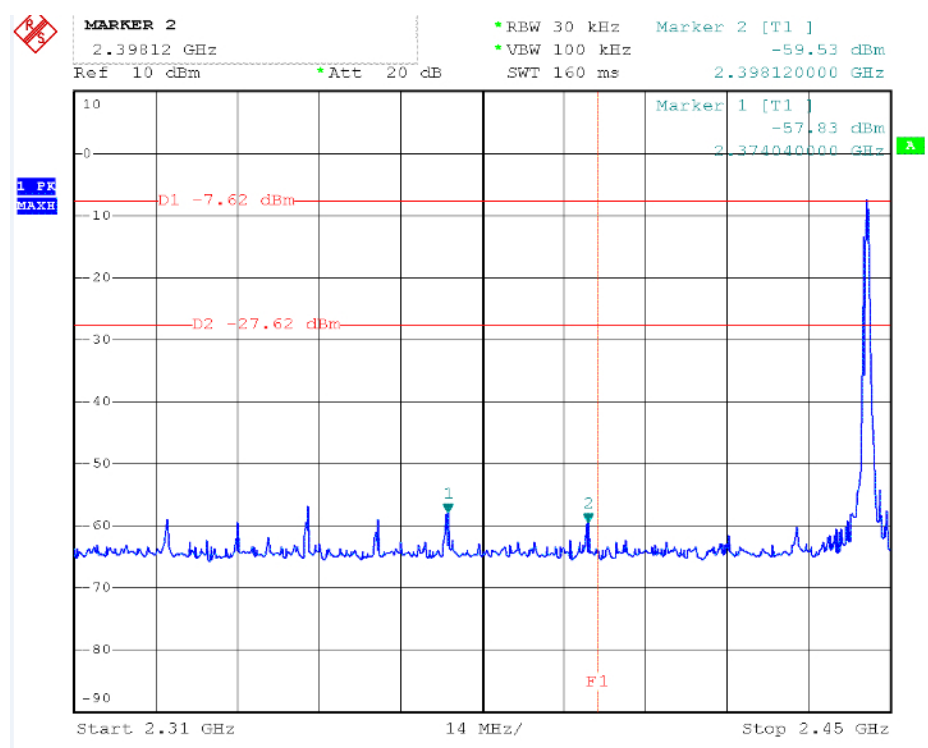
|                                         |                                              |
|-----------------------------------------|----------------------------------------------|
| Temperature ( °C ) : 22~23              | EUT: Cyber Dactyl                            |
| Humidity (%RH) : 50~54                  | M/N: TX-1008                                 |
| Barometric Pressure ( mbar ) : 950~1000 | Operation Condition: Continuous transmitting |

#### Radio test result

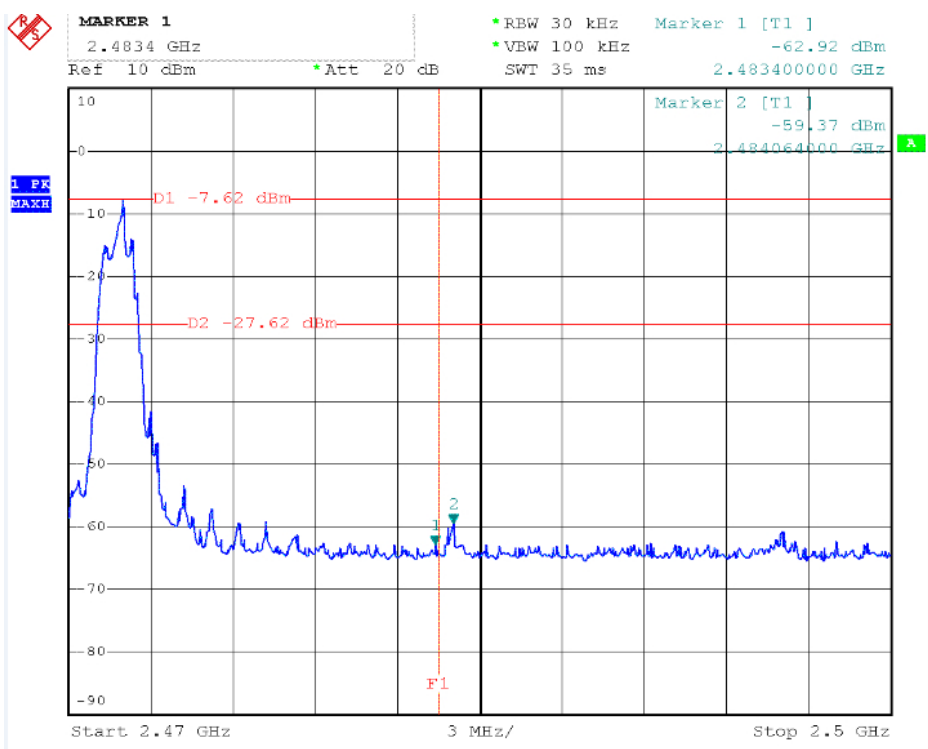
| Frequency (MHz) | Antenna Polarization | Emission Read Value (dB $\mu$ V/m) | Limits (dB $\mu$ V/m) |
|-----------------|----------------------|------------------------------------|-----------------------|
| 2396.48         | H                    | 41.33                              | 54                    |
| 2495.86         | H                    | 40.65                              | 54                    |

| Frequency (MHz) | Antenna Polarization | Emission Read Value (dB $\mu$ V/m) | Limits (dB $\mu$ V/m) |
|-----------------|----------------------|------------------------------------|-----------------------|
| 2396.48         | V                    | 42.36                              | 54                    |
| 2495.86         | V                    | 39.68                              | 54                    |

Conducted test result  
CH Low



CH High



## 7. SPURIOUS EMISSIONS

### 7.1 Limit of Spurious Emissions

1. In the section 15.249(a): Except as provided in paragraph (b) of this section, the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:
2. Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Fundamental Frequency (MHz) | Field Strength of Fundamental Field Strength (mV/m) | Field Strength of Harmonics (µV/m) |
|-----------------------------|-----------------------------------------------------|------------------------------------|
| 902-928 MHz                 | 50                                                  | 500                                |
| 2400 - 2483.5 MHz           | 50                                                  | 500                                |
| 5725 - 5875 MHz             | 50                                                  | 500                                |
| 24.0 - 24.25 GHz            | 250                                                 | 2500                               |

| Frequency (MHz) | Field Strength (µV/m) | Measurement Distance (m) |
|-----------------|-----------------------|--------------------------|
| 30-88           | 100*                  | 3                        |
| 88-216          | 150*                  | 3                        |
| 216-960         | 200*                  | 3                        |
| Above 960       | 500                   | 3                        |

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

3. In the above emission table, the tighter limit applies at the band edges.

| Frequency (MHz) | Field Strength (µV/m at 3-meter) | Field Strength (dBµV/m at 3-meter) |
|-----------------|----------------------------------|------------------------------------|
| 30-88           | 100                              | 40                                 |
| 88-216          | 150                              | 43.5                               |
| 216-960         | 200                              | 46                                 |
| Above 960       | 500                              | 54                                 |

## 7.2 EUT Setup

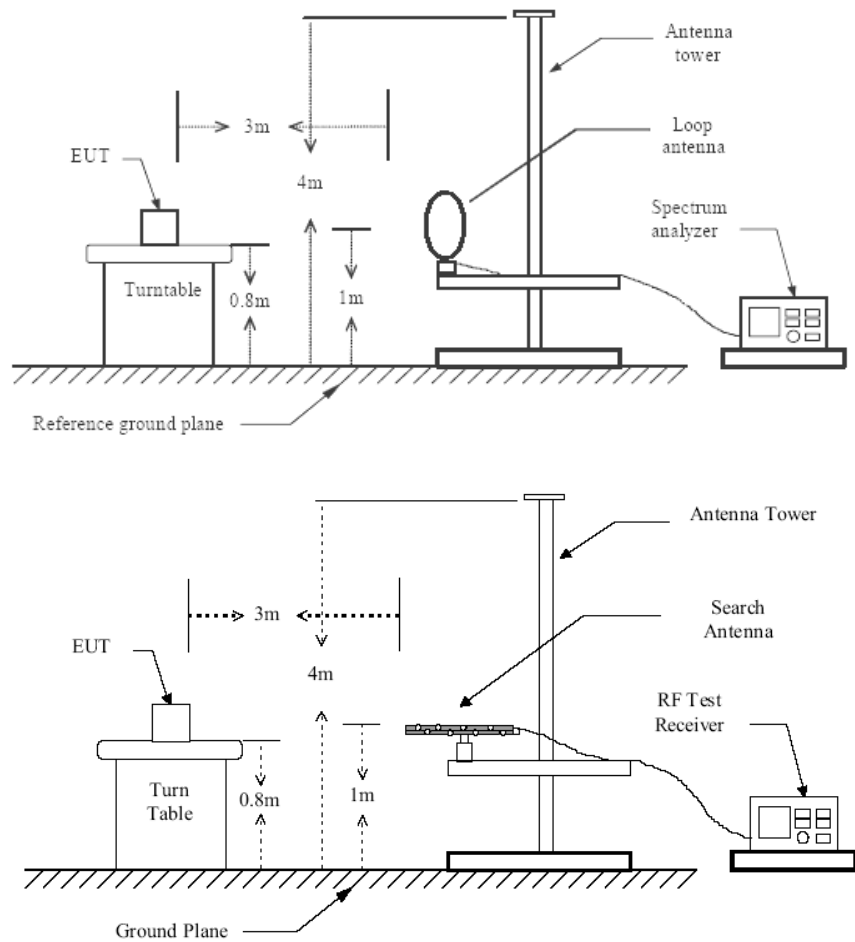


Figure 1 : Frequencies measured below 1 GHz configuration

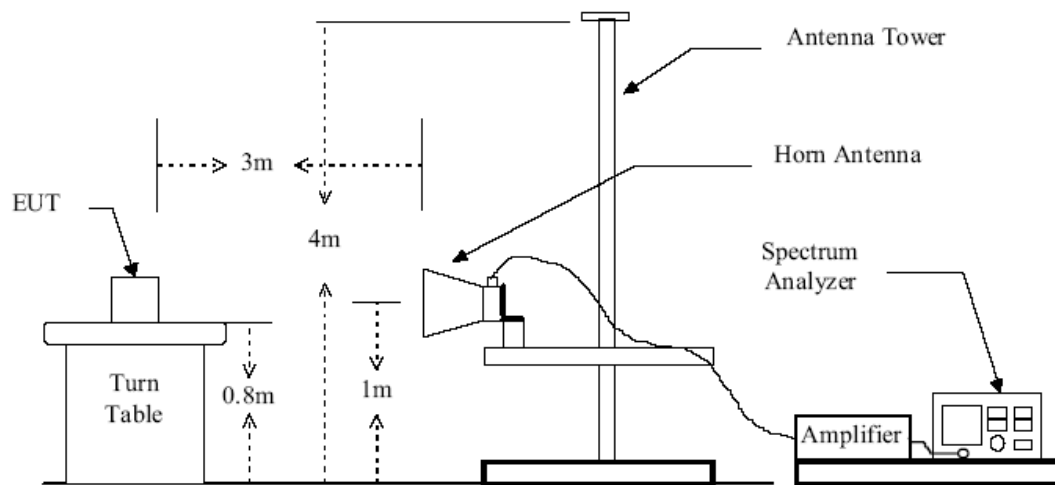


Figure 2 : Frequencies measured above 1 GHz configuration

### 7.3 Test Procedure

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

- 1). Configure the EUT according to ANSI C63.4:2003.
- 2). The EUT was placed on the top of the turntable 0.8 meter above ground.
- 3). The receiving antenna was placed 3 meters far away from the turntable.
- 4). The turntable was rotated by 360 degrees to determine the position of the highest radiation.
- 5). The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization. For each suspected emission, the antenna tower was scanned (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.

## 7.4 Spurious Emissions Test Result

|                                         |                                              |
|-----------------------------------------|----------------------------------------------|
| Temperature ( °C ) : 22~23              | EUT: Cyber Dactyl                            |
| Humidity (%RH ) : 50~54                 | M/N: SK-078AG                                |
| Barometric Pressure ( mbar ) : 950~1000 | Operation Condition: Continuous transmitting |

Note: In this testing, the EUT was respectively tested in three different orientations. That is:

1. EUT was lie vertically, and then its Antenna oriented upward
2. EUT was lie vertically, and then its Antenna oriented downward
3. EUT was lie flatwise, and then its Antenna oriented to the receiving antenna

The worst test data see following pages

When the EUT was lie flatwise, and its Antenna oriented to the receiving antenna, the worst test data was got as following table.

### WORST-CASE RADIATED EMISSION BELOW 30 MHz

Normal operating Mode:

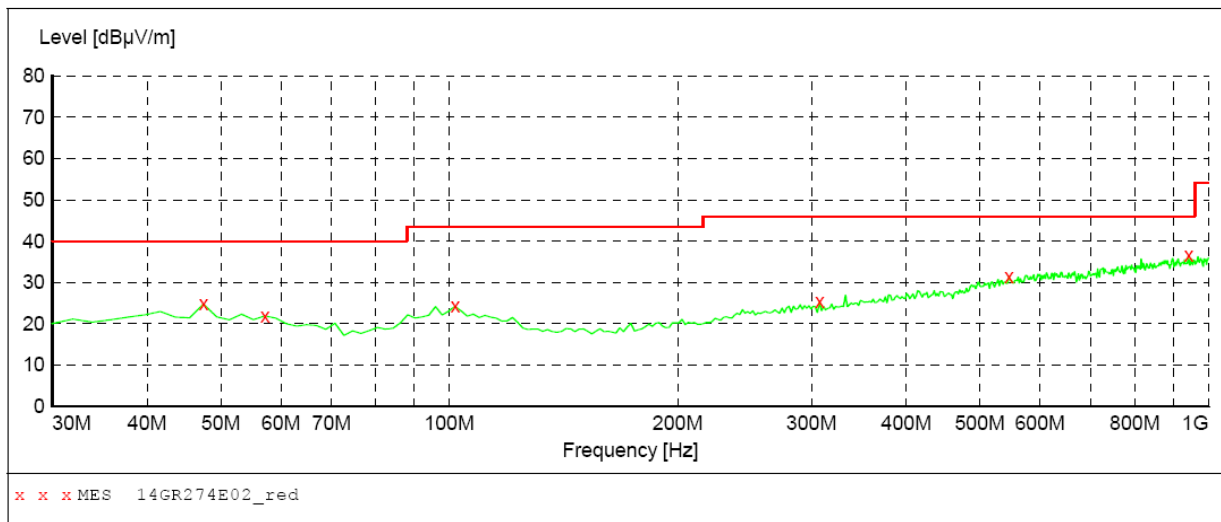
| Frequency | Meter Reading | Antenna Factor | Cable Loss | Emission Levels | Limits   | Margin | Detector Mode |
|-----------|---------------|----------------|------------|-----------------|----------|--------|---------------|
| (MHz)     | (dBμV)        | (dB/M)         | (dB)       | (dBμV/M)        | (dBμV/M) | (dB)   | PK/QP         |
| 2.11      | 24.57         | 8.25           | 1.01       | 31.81           | 67       | -35.19 | QP            |
| 18.82     | 23.77         | 7.57           | 1.2        | 30.14           | 49.5     | -19.36 | QP            |
| 23.68     | 24.61         | 8.64           | 1.05       | 32.2            | 49.5     | -17.3  | QP            |
| 27.91     | 24.76         | 7.22           | 1.69       | 30.29           | 49.5     | -19.21 | QP            |

## The worst Spurious Emission Data Below 1GHz Channel Low:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Horizontal  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Short Description: |           | Field Strength |         |         |              |
|--------------------|-----------|----------------|---------|---------|--------------|
| Start              | Stop      | Detector       | Meas.   | IF      | Transducer   |
| Frequency          | Frequency |                | Time    | Bandw.  |              |
| 30.0 MHz           | 1.0 GHz   | MaxPeak        | Coupled | 100 kHz | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E02\_red"***

7/8/2014 14:19

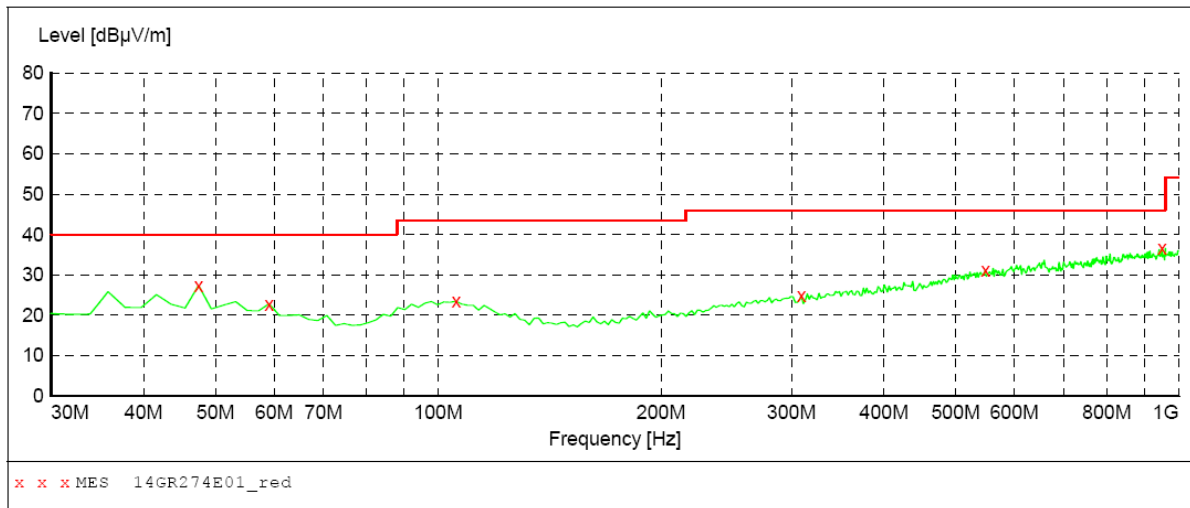
| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 24.80           | 15.8         | 40.0            | 15.2         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 57.160000        | 21.90           | 15.1         | 40.0            | 18.1         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 101.780000       | 24.20           | 17.3         | 43.5            | 19.3         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 307.420000       | 25.30           | 18.9         | 46.0            | 20.7         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 546.040000       | 31.50           | 24.9         | 46.0            | 14.5         | QP   | 300.0        | 0.00           | HORIZONTAL   |
| 941.800000       | 36.50           | 29.5         | 46.0            | 9.5          | QP   | 100.0        | 0.00           | HORIZONTAL   |

## The worst Spurious Emission Data Below 1GHz Channel Low:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Vertical  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Start     | Stop      | Detector | Meas.   | IF      | Transducer   |
|-----------|-----------|----------|---------|---------|--------------|
| Frequency | Frequency |          | Time    | Bandw.  |              |
| 30.0 MHz  | 1.0 GHz   | MaxPeak  | Coupled | 100 kHz | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E01\_red"***

7/8/2014 14:17

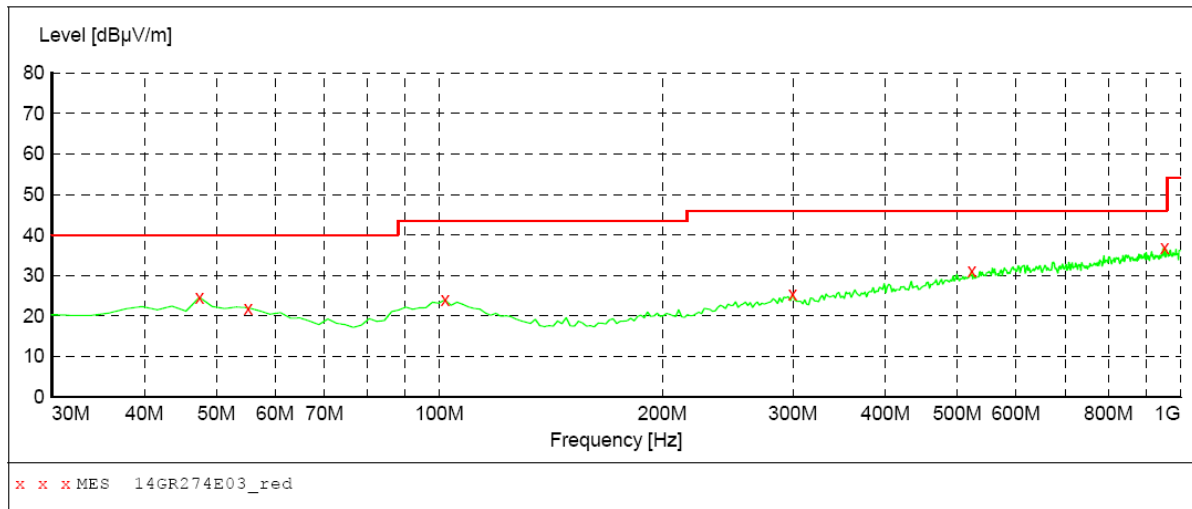
| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 27.40           | 15.8         | 40.0            | 12.6         | QP   | 100.0        | 0.00           | VERTICAL     |
| 59.100000        | 22.80           | 14.6         | 40.0            | 17.2         | QP   | 100.0        | 0.00           | VERTICAL     |
| 105.660000       | 23.50           | 16.9         | 43.5            | 20.0         | QP   | 100.0        | 0.00           | VERTICAL     |
| 309.360000       | 24.90           | 18.9         | 46.0            | 21.1         | QP   | 100.0        | 0.00           | VERTICAL     |
| 547.980000       | 31.10           | 24.9         | 46.0            | 14.9         | QP   | 100.0        | 0.00           | VERTICAL     |
| 949.560000       | 36.70           | 29.6         | 46.0            | 9.3          | QP   | 100.0        | 0.00           | VERTICAL     |

## The worst Spurious Emission Data Below 1GHz Channel Middle:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Horizontal  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Short Description: |           | Field Strength |            |           |              |
|--------------------|-----------|----------------|------------|-----------|--------------|
| Start              | Stop      | Detector       | Meas. Time | IF Bandw. | Transducer   |
| Frequency          | Frequency |                |            |           |              |
| 30.0 MHz           | 1.0 GHz   | MaxPeak        | Coupled    | 100 kHz   | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E03\_red"***

7/8/2014 14:20

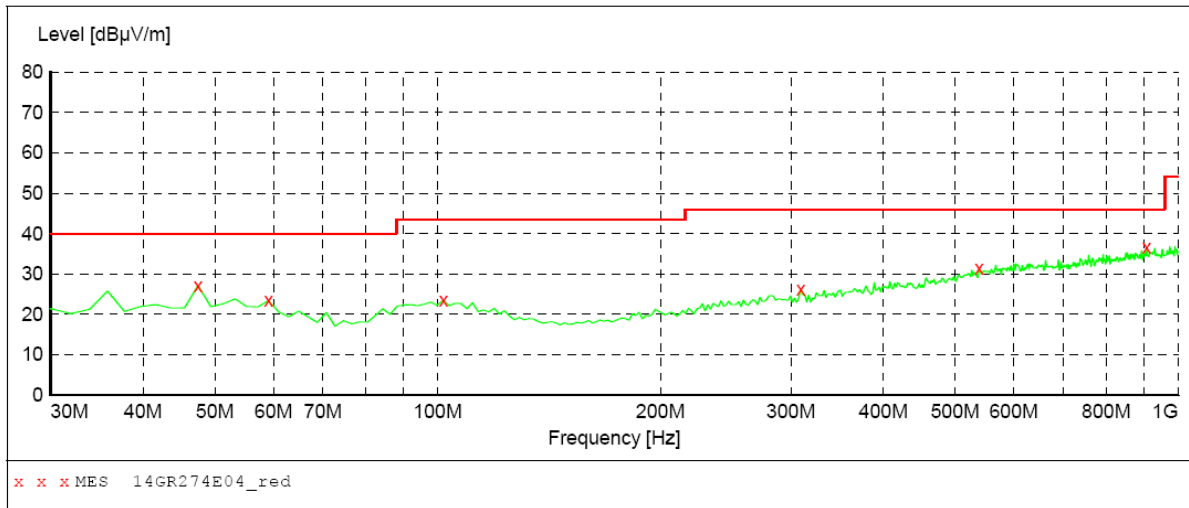
| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 24.60           | 15.8         | 40.0            | 15.4         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 55.220000        | 22.00           | 15.6         | 40.0            | 18.0         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 101.780000       | 24.00           | 17.3         | 43.5            | 19.5         | QP   | 300.0        | 0.00           | HORIZONTAL   |
| 299.660000       | 25.40           | 18.7         | 46.0            | 20.6         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 522.760000       | 31.20           | 24.4         | 46.0            | 14.8         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 951.500000       | 36.80           | 29.6         | 46.0            | 9.2          | QP   | 100.0        | 0.00           | HORIZONTAL   |

## The worst Spurious Emission Data Below 1GHz Channel Middle:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Vertical  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Short Description: |           | Field Strength |         |         |              |
|--------------------|-----------|----------------|---------|---------|--------------|
| Start              | Stop      | Detector       | Meas.   | IF      | Transducer   |
| Frequency          | Frequency |                | Time    | Bandw.  |              |
| 30.0 MHz           | 1.0 GHz   | MaxPeak        | Coupled | 100 kHz | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E04\_red"***

7/8/2014 14:22

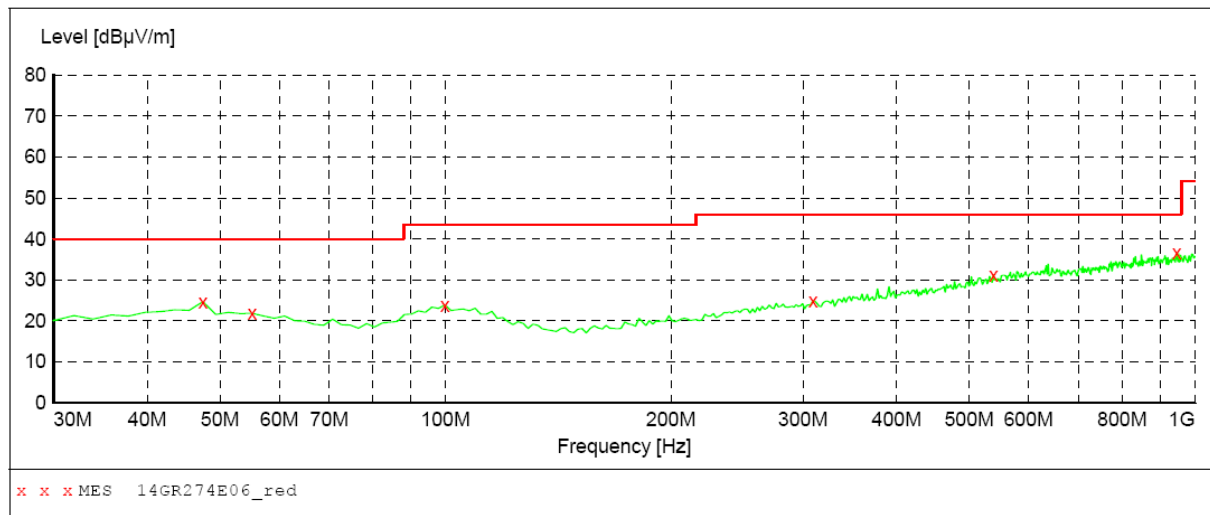
| Frequency<br>MHz | Level<br>dBµV/m | Transd<br>dB | Limit<br>dBµV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 27.10           | 15.8         | 40.0            | 12.9         | QP   | 100.0        | 0.00           | VERTICAL     |
| 59.100000        | 23.40           | 14.6         | 40.0            | 16.6         | QP   | 100.0        | 0.00           | VERTICAL     |
| 101.780000       | 23.50           | 17.3         | 43.5            | 20.0         | QP   | 100.0        | 0.00           | VERTICAL     |
| 309.360000       | 26.20           | 18.9         | 46.0            | 19.8         | QP   | 100.0        | 0.00           | VERTICAL     |
| 538.280000       | 31.40           | 24.7         | 46.0            | 14.6         | QP   | 100.0        | 0.00           | VERTICAL     |
| 906.880000       | 36.50           | 29.2         | 46.0            | 9.5          | QP   | 100.0        | 0.00           | VERTICAL     |

## The worst Spurious Emission Data Below 1GHz Channel High:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Horizontal  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Short Description: |           | Field Strength |         |         |              |
|--------------------|-----------|----------------|---------|---------|--------------|
| Start              | Stop      | Detector       | Meas.   | IF      | Transducer   |
| Frequency          | Frequency |                | Time    | Bandw.  |              |
| 30.0 MHz           | 1.0 GHz   | MaxPeak        | Coupled | 100 kHz | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E06\_red"***

7/8/2014 14:25

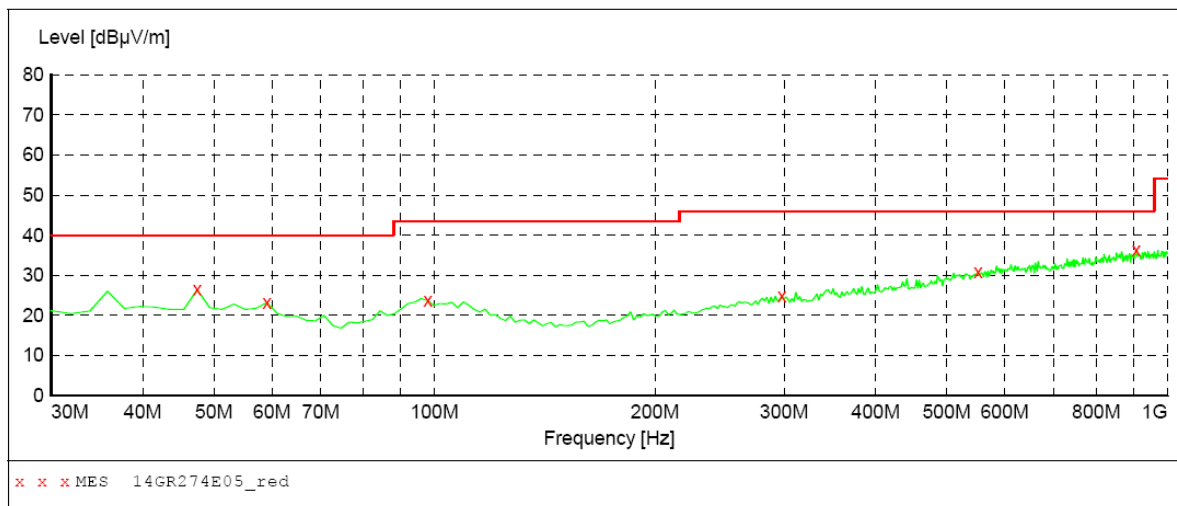
| Frequency<br>MHz | Level<br>dBµV/m | Transd<br>dB | Limit<br>dBµV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 24.70           | 15.8         | 40.0            | 15.3         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 55.220000        | 21.90           | 15.6         | 40.0            | 18.1         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 99.840000        | 23.90           | 17.5         | 43.5            | 19.6         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 309.360000       | 24.90           | 18.9         | 46.0            | 21.1         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 538.280000       | 31.20           | 24.7         | 46.0            | 14.8         | QP   | 100.0        | 0.00           | HORIZONTAL   |
| 945.680000       | 36.50           | 29.5         | 46.0            | 9.5          | QP   | 100.0        | 0.00           | HORIZONTAL   |

## The worst Spurious Emission Data Below 1GHz Channel High:

EUT: Cyber Dactyl  
M/N: TX-1008  
Operating Condition: Continuous transmitting  
Test Site: 3m CHAMBER  
Operator: Chen  
Test Specification: DC 6.0V From battery  
Comment: Polarization: Vertical  
Tem:25°C Hum:50%

### ***SWEEP TABLE: "test (30M-1G)"***

| Short Description: |           | Field Strength |            |           |              |
|--------------------|-----------|----------------|------------|-----------|--------------|
| Start              | Stop      | Detector       | Meas. Time | IF Bandw. | Transducer   |
| Frequency          | Frequency |                |            |           |              |
| 30.0 MHz           | 1.0 GHz   | MaxPeak        | Coupled    | 100 kHz   | VULB9163 NEW |



### ***MEASUREMENT RESULT: "14GR274E05\_red"***

7/8/2014 14:23

| Frequency<br>MHz | Level<br>dBμV/m | Transd<br>dB | Limit<br>dBμV/m | Margin<br>dB | Det. | Height<br>cm | Azimuth<br>deg | Polarization |
|------------------|-----------------|--------------|-----------------|--------------|------|--------------|----------------|--------------|
| 47.460000        | 26.40           | 15.8         | 40.0            | 13.6         | QP   | 100.0        | 0.00           | VERTICAL     |
| 59.100000        | 23.20           | 14.6         | 40.0            | 16.8         | QP   | 100.0        | 0.00           | VERTICAL     |
| 97.900000        | 23.70           | 17.4         | 43.5            | 19.8         | QP   | 100.0        | 0.00           | VERTICAL     |
| 297.720000       | 24.90           | 18.7         | 46.0            | 21.1         | QP   | 100.0        | 0.00           | VERTICAL     |
| 551.860000       | 30.80           | 25.0         | 46.0            | 15.2         | QP   | 100.0        | 0.00           | VERTICAL     |
| 906.880000       | 36.40           | 29.2         | 46.0            | 9.6          | QP   | 100.0        | 0.00           | VERTICAL     |

### The worst Spurious Emission Data above 1GHz Channel Low

| Channel Low (2420.875MHz) |                    |            |              |        |               |                |                 |              |
|---------------------------|--------------------|------------|--------------|--------|---------------|----------------|-----------------|--------------|
| Maximum Frequency (MHz)   | Polarity and Level |            |              |        |               | Limit (dBμV/m) | Margin (dBμV/m) | Mark (P/Q/A) |
|                           | Polarity           | Height (m) | Reading dBμV | Transd | Result dBμV/m |                |                 |              |
| 2420.875                  | H                  | 1          | 83.13        | -7.15  | 75.98         | 114            | -38.02          | P            |
|                           |                    |            | 70.15        | -7.15  | 63            | 94             | -31             | A            |
| 2420.875                  | V                  | 1          | 85.31        | -7.15  | 78.16         | 114            | -35.84          | P            |
|                           |                    |            | 71.32        | -7.15  | 64.17         | 94             | -29.83          | A            |
| 4841.75                   | H                  | 1          | 40.31        | 1.07   | 41.38         | 74             | -32.62          | P            |
|                           |                    |            | 29.4         | 1.07   | 30.47         | 54             | -23.53          | A            |
| 4841.75                   | V                  | 1          | 41.44        | 1.07   | 42.51         | 74             | -31.49          | P            |
|                           |                    |            | 29.62        | 1.07   | 30.69         | 54             | -23.31          | A            |
| 7262.625                  | H                  | 1          | 40.4         | 7.38   | 47.78         | 74             | -26.22          | P            |
|                           |                    |            | 30.1         | 7.38   | 37.48         | 54             | -16.52          | A            |
| 7262.625                  | V                  | 1          | 41.66        | 7.38   | 49.04         | 74             | -24.96          | P            |
|                           |                    |            | 30.51        | 7.38   | 37.89         | 54             | -16.11          | A            |
| 9683.5                    | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                           |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 9683.5                    | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                           |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12021.67                  | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                           |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12021.67                  | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                           |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 25380.37                  | ----               | ----       | ----         | ----   | ----          | ----           | ----            | ----         |

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

### The worst Spurious Emission Data above 1GHz Channel Middle

| Channel Low (2446MHz)   |                    |            |              |        |               |                |                 |              |
|-------------------------|--------------------|------------|--------------|--------|---------------|----------------|-----------------|--------------|
| Maximum Frequency (MHz) | Polarity and Level |            |              |        |               | Limit (dBμV/m) | Margin (dBμV/m) | Mark (P/Q/A) |
|                         | Polarity           | Height (m) | Reading dBμV | Transd | Result dBμV/m |                |                 |              |
| 2446                    | H                  | 1          | 81.33        | -6.37  | 74.96         | 114            | -39.04          | P            |
|                         |                    |            | 69.45        | -6.37  | 63.08         | 94             | -30.92          | A            |
| 2446                    | V                  | 1          | 83.51        | -6.37  | 77.14         | 114            | -36.86          | P            |
|                         |                    |            | 70.42        | -6.37  | 64.05         | 94             | -29.95          | A            |
| 4892                    | H                  | 1          | 39.15        | 1.07   | 40.22         | 74             | -33.78          | P            |
|                         |                    |            | 30.27        | 1.07   | 31.34         | 54             | -22.66          | A            |
| 4892                    | V                  | 1          | 40.36        | 1.07   | 41.43         | 74             | -32.57          | P            |
|                         |                    |            | 29.85        | 1.07   | 30.92         | 54             | -23.08          | A            |
| 7338                    | H                  | 1          | 39.36        | 7.49   | 46.85         | 74             | -27.15          | P            |
|                         |                    |            | 29.15        | 7.49   | 36.64         | 54             | -17.36          | A            |
| 7338                    | V                  | 1          | 40.36        | 7.49   | 47.85         | 74             | -26.15          | P            |
|                         |                    |            | 30.15        | 7.49   | 37.64         | 54             | -16.36          | A            |
| 9784                    | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 9784                    | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12191.67                | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12191.67                | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 25380.37                | ----               | ----       | ----         | ----   | ----          | ----           | ----            | ----         |

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

### The worst Spurious Emission Data above 1GHz Channel High

| Channel Low (2472MHz)   |                    |            |              |        |               |                |                 |              |
|-------------------------|--------------------|------------|--------------|--------|---------------|----------------|-----------------|--------------|
| Maximum Frequency (MHz) | Polarity and Level |            |              |        |               | Limit (dBμV/m) | Margin (dBμV/m) | Mark (P/Q/A) |
|                         | Polarity           | Height (m) | Reading dBμV | Transd | Result dBμV/m |                |                 |              |
| 2472                    | H                  | 1          | 82.13        | -6.05  | 76.08         | 114            | -37.92          | P            |
|                         |                    |            | 69.82        | -6.05  | 63.77         | 94             | -30.23          | A            |
| 2472                    | V                  | 1          | 84.52        | -6.05  | 78.47         | 114            | -35.53          | P            |
|                         |                    |            | 71.09        | -6.05  | 65.04         | 94             | -28.96          | A            |
| 4944                    | H                  | 1          | 39.35        | 1.07   | 40.42         | 74             | -33.58          | P            |
|                         |                    |            | 29.13        | 1.07   | 30.2          | 54             | -23.8           | A            |
| 4944                    | V                  | 1          | 40.12        | 1.07   | 41.19         | 74             | -32.81          | P            |
|                         |                    |            | 31.44        | 1.07   | 32.51         | 54             | -21.49          | A            |
| 7416                    | H                  | 1          | 40.31        | 7.61   | 47.92         | 74             | -26.08          | P            |
|                         |                    |            | 29.4         | 7.61   | 37.01         | 54             | -16.99          | A            |
| 7416                    | V                  | 1          | 41.13        | 7.61   | 48.74         | 74             | -25.26          | P            |
|                         |                    |            | 31.51        | 7.61   | 39.12         | 54             | -14.88          | A            |
| 9888                    | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 9888                    | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12361.67                | H                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 12361.67                | V                  | 1          | ----         | ----   | ----          | ----           | ----            | P            |
|                         |                    |            | ----         | ----   | ----          | ----           | ----            | A            |
| 25380.37                | ----               | ----       | ----         | ----   | ----          | ----           | ----            | ----         |

Remark: 1. Transd.=Antenna Factor+Cable Loss-Pre-amplifier

Margin = Level-Limit

Mark: P means Peak Value, Q means Quasi Peak Value, A means Average Value

2. Data of measurement within this frequency range shown " - " in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

3. Spectrum analyzer setting P(Peak): RBW=1MHz, VBW=1MHz, A(Average): RBW=1MHz, VBW=10Hz.

4. The test limit distance is 3m limit

## **8. ANTENNA REQUIREMENT**

### **8.1 Standard Applicable**

Section 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. 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 manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

### **8.2 Antenna Connected Construction**

The antenna is designed with permanent attachment and no consideration of replacement.