



BUREAU  
VERITAS

Test Report No.: FC111222N023

## TEST REPORT

|          |   |
|----------|---|
| To:      | Current Cost Ltd.   |
| Address: | Anglesey Lodge, Farnborough Road, Aldershot, Hampshire GU11 3BJ, UK |

|                                      |   |  |
|--------------------------------------|---|--|
| Manufacturer or Supplier             | Current Cost Ltd.   |  |
| Address                              | Anglesey Lodge, Farnborough Road, Aldershot, Hampshire GU11 3BJ, UK |  |
| Product:                             | 15A US IAM  |  |
| Brand Name:                          | N/A   |  |
| Model:                               | 15A US IAM  |  |
| Additional Model & Model Difference: | N/A   |  |
| Date of tests:                       | Dec. 23, 2011~ Apr. 11, 2012  |  |

the tests have been carried out according to the requirements of the following standards:

FCC Part 15, Subpart C (Section 15.231e)

### CONCLUSION: The submitted sample was found to COMPLY with the test requirement

|  |  |
|--|--|
| Prepared by Glyn He<br>Project Engineer / EMC Department | Approved by Sam Tung<br>Manager / EMC Department |
|  |  |

Date: Apr.11, 2012

This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



BUREAU  
VERITAS

Test Report No.: FC111222N023

## TABLE OF CONTENTS

|   |          |
|---|----------|
| <b>RELEASE CONTROL RECORD .....</b>                 | <b>4</b> |
| <b>1 SUMMARY OF TEST RESULTS .....</b>              | <b>5</b> |
| <b>2 MEASUREMENT UNCERTAINTY .....</b>              | <b>5</b> |
| <b>3 GENERAL INFORMATION.....</b>                   | <b>6</b> |
| 3.1 GENERAL DESCRIPTION OF EUT .....                | 6        |
| 3.2 DESCRIPTION OF TEST MODES .....                 | 6        |
| 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS.....   | 7        |
| 3.4 DESCRIPTION OF SUPPORT UNITS.....               | 7        |
| <b>4. TEST TYPES AND RESULTS .....</b>              | <b>8</b> |
| 4.1 CONDUCTED EMISSION MEASUREMENT .....            | 8        |
| 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT..... | 8        |
| 4.1.2 TEST INSTRUMENTS.....                         | 8        |
| 4.1.3 TEST PROCEDURES .....                         | 9        |
| 4.1.4 DEVIATION FROM TEST STANDARD .....            | 9        |
| 4.1.5 TEST SETUP.....                               | 10       |
| 4.1.6 EUT OPERATING CONDITIONS .....                | 10       |
| 4.1.7 TEST RESULTS .....                            | 11       |
| 4.2 DUTY CYCLE TEST .....                           | 13       |
| 4.2.1 STANDARD APPLICABLE .....                     | 13       |
| 4.2.2 TEST INSTRUMENTS.....                         | 13       |
| 4.2.3 TEST PROCEDURES .....                         | 13       |
| 4.2.4 DEVIATION FROM TEST STANDARD .....            | 13       |
| 4.2.5 TEST SETUP.....                               | 14       |
| 4.2.6 EUT OPERATING CONDITIONS .....                | 14       |
| 4.2.7 TEST RESULTS .....                            | 14       |
| 4.3 RADIATED EMISSION MEASUREMENT .....             | 17       |
| 4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT.....  | 17       |
| 4.3.2 TEST INSTRUMENTS.....                         | 18       |
| 4.3.3 TEST PROCEDURES .....                         | 19       |
| 4.3.4 DEVIATION FROM TEST STANDARD .....            | 19       |
| 4.3.5 TEST SETUP.....                               | 20       |
| 4.3.6 EUT OPERATING CONDITIONS .....                | 20       |
| 4.3.7 TEST RESULTS .....                            | 21       |
| 4.4 20dB BANDWIDTH MEASUREMENT .....                | 23       |



BUREAU  
VERITAS

## Test Report No.: FC111222N023

|       |   |    |
|-------|---|----|
| 4.4.1 | LIMITS OF 20dB BANDWIDTH MEASUREMENT .....  | 23 |
| 4.4.2 | TEST INSTRUMENTS.....   | 23 |
| 4.4.3 | TEST PROCEDURE.....   | 23 |
| 4.4.4 | DEVIATION FROM TEST STANDARD .....  | 23 |
| 4.4.5 | TEST SETUP.....   | 24 |
| 4.4.6 | EUT OPERATING CONDITIONS .....  | 24 |
| 4.4.7 | TEST RESULTS .....  | 25 |
| 4.5   | DEACTIVATION TEST.....  | 26 |
| 4.5.1 | LIMITS OF DEACTIVATION TEST .....   | 26 |
| 4.5.2 | TEST INSTRUMENTS.....   | 26 |
| 4.5.3 | TEST PROCEDURE.....   | 26 |
| 4.5.4 | DEVIATION FROM TEST STANDARD .....  | 26 |
| 4.5.5 | TEST SETUP.....   | 27 |
| 4.5.6 | EUT OPERATING CONDITIONS .....  | 27 |
| 4.5.7 | TEST RESULTS .....  | 28 |
| 5     | PHOTOGRAPHS OF THE TEST CONFIGURATION.....  | 29 |
| 6     | APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO<br>THE EUT BY THE LAB ..... | 30 |



**BUREAU  
VERITAS** Test Report No.: FC111222N023

## RELEASE CONTROL RECORD

| ISSUE NO.        | REASON FOR CHANGE | DATE ISSUED   |
|------------------|-------------------|---------------|
| Original release | N/A               | Apr. 11, 2012 |



BUREAU  
VERITAS

Test Report No.: FC111222N023

## 1 SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.231) |                      |        |           |
|---|----------------------|--------|-----------|
| STANDARD SECTION  | TEST TYPE AND LIMIT  | RESULT | REMARK    |
| §15.203   | Antenna Requirement  | PASS   | Compliant |
| §15.207 (a)   | Conducted Emission   | PASS   | Compliant |
| §15.231(b)<br>§15.35                                      | Duty Cycle           | PASS   | Compliant |
| §15.209<br>§15.231(e)                                     | Radiated Emission    | PASS   | Compliant |
| §15.231 (e)   | Deactivation Testing | PASS   | Compliant |
| §15.231(c)  | 20dB Bandwidth Test  | PASS   | Compliant |

## 2 MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| MEASUREMENT         | FREQUENCY       | UNCERTAINTY |
|---------------------|-----------------|-------------|
| Conducted emissions | 9kHz~30MHz      | 2.44dB      |
| Radiated emissions  | 30MHz ~ 200MHz  | 3.19dB      |
|                     | 200MHz ~1000MHz | 3.21dB      |
|                     | 1GHz ~ 18GHz    | 2.26dB      |
|                     | 18GHz ~ 40GHz   | 1.94dB      |

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of  $k = 2$ .



BUREAU  
VERITAS

Test Report No.: FC111222N023

### 3 GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                     |                  |
|---------------------|------------------|
| PRODUCT             | 15A US IAM       |
| MODEL NO.           | 15A US IAM       |
| FCC ID              | WW9-US-IAM       |
| NOMINAL VOLTAGE     | AC 100-120V/60Hz |
| MODULATION TYPE     | FSK              |
| OPERATING FREQUENCY | 433.9MHz         |
| NUMBER OF CHANNEL   | 1                |
| ANTENNA TYPE        | Integral Antenna |
| I/O PORTS           | AC Output        |
| DATA CABLE SUPPLIED | N/A              |

#### NOTE:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
2. The EUT was powered by the following adapters:

| ADAPTER  |     |
|----------|-----|
| BRAND:   | N/A |
| MODEL:   | N/A |
| INPUT:   | N/A |
| OUTPUT:  | N/A |
| DC LINE: | N/A |

#### 3.2 DESCRIPTION OF TEST MODES

The EUT was tested under the following modes' the final worst mode were marked in boldface and recorded in this report.

| FREQUENCY | TEST MODES   |
|-----------|--------------|
| 433.9MHz  | Transmitting |



BUREAU  
VERITAS

Test Report No.: FC111222N023

### 3.3 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

**FCC Part 15, Subpart C (15.231e)**

**ANSI C63.4-2009**

All test items have been performed and recorded as per the above standards.

### 3.4 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

| NO. | PRODUCT | BRAND | MODEL NO. | SERIAL NO. | FCC ID |
|-----|---------|-------|-----------|------------|--------|
| 1   | N/A     |       |           |            |        |
|     |         |       |           |            |        |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|---|
| 1   | N/A   |
|     |   |



BUREAU  
VERITAS

Test Report No.: FC111222N023

## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT

| FREQUENCY OF EMISSION (MHz) | CONDUCTED LIMIT (dB $\mu$ V) |          |
|-----------------------------|------------------------------|----------|
|                             | Quasi-peak                   | Average  |
| 0.15 ~ 0.5                  | 66 to 56                     | 56 to 46 |
| 0.5 ~ 5                     | 56                           | 46       |
| 5 ~ 30                      | 60                           | 50       |

**NOTE:** 1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.
3. All emanations from a class A/B digital device or system, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strengths specified above.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                  | MODEL NO.       | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|---|-----------------|------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ            | ESCS30          | 100199     | May 25,11           | May 25,12               |
| Test software                               | ADT_Cond_V7.3.7 | N/A        | N/A                 | N/A                     |
| Artificial Mains Network<br>ROHDE & SCHWARZ | ENV216          | 101173     | May 25,11           | May 25,12               |
| RF Cable<br>FUJIKURA                        | 3D-2W           | 844 Cable  | May 02,11           | May 02,12               |
| ISN<br>TESEQ                                | ISN T800        | 27957      | Oct 16,11           | Oct 16,12               |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA  
2. The test was performed in Dongguan Shielded Room 553.



BUREAU  
VERITAS

Test Report No.: FC111222N023

#### 4.1.3 TEST PROCEDURES

- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

**NOTE:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 DEVIATION FROM TEST STANDARD

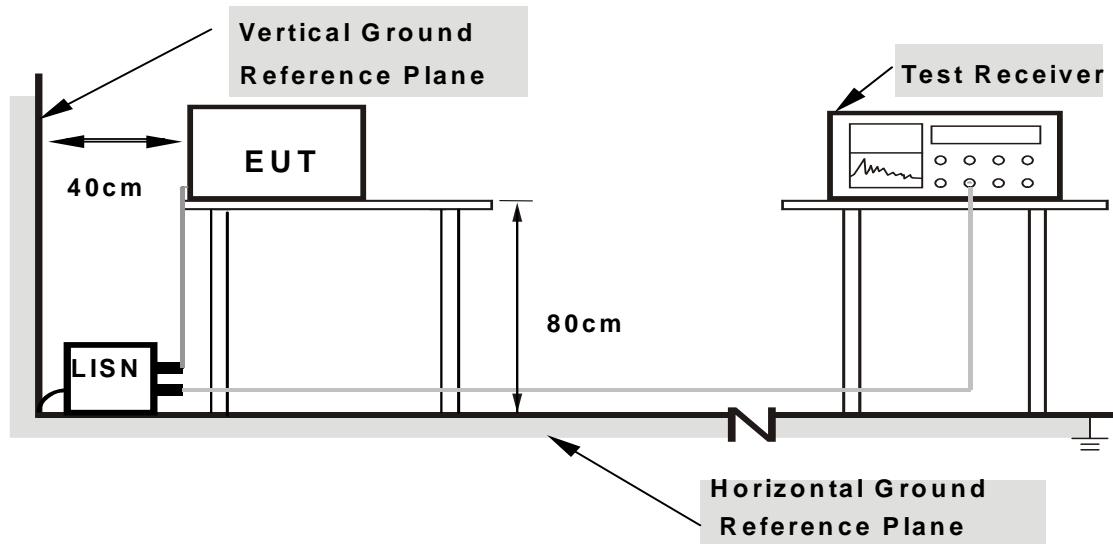
No deviation.



BUREAU  
VERITAS

Test Report No.: FC111222N023

#### 4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT OPERATING CONDITIONS

- a. Turned on the power of all equipment.
- b. EUT was operated according to the type used was description in manufacturer's specifications or the User's Manual.

BUREAU  
VERITAS

Test Report No.: FC111222N023

## 4.1.7 TEST RESULTS

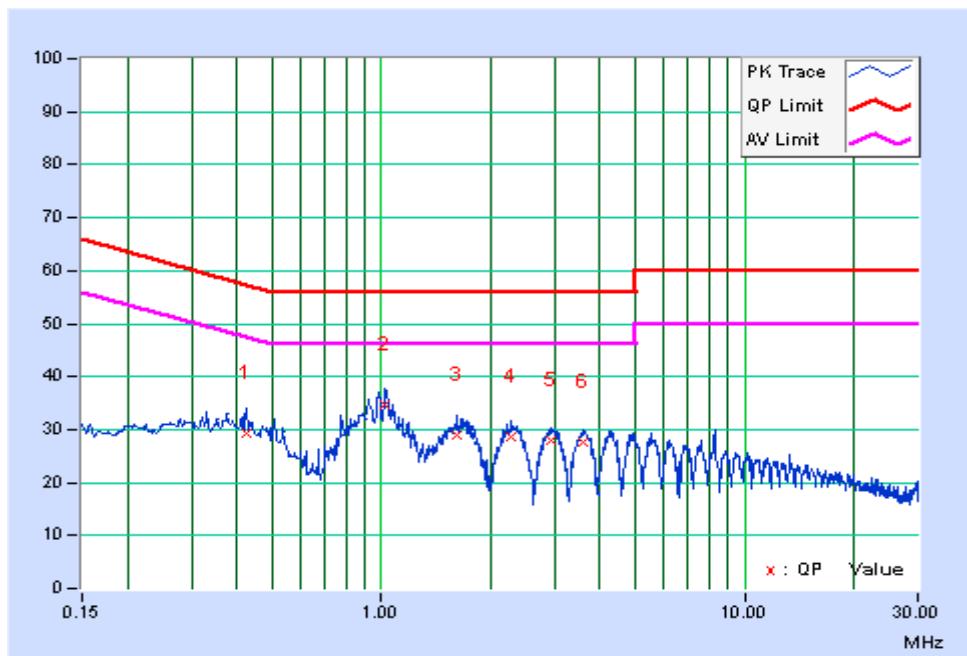
## CONDUCTED WORST-CASE DATA

|                          |                             |               |       |
|--------------------------|-----------------------------|---------------|-------|
| INPUT POWER              | AC 120V/60Hz                | 6dB BANDWIDTH | 9 kHz |
| ENVIRONMENTAL CONDITIONS | 20 deg. C, 46% RH, 1008 hPa | PHASE         | Line  |
| TESTED BY                | Glyn                        |               |       |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |              | Emission Level<br>[dB (uV)] |              | Limit<br>[dB (uV)] |              | Margin<br>(dB) |               |
|----|----------------|-------------------------|----------------------------|--------------|-----------------------------|--------------|--------------------|--------------|----------------|---------------|
|    |                |                         | Q.P.                       | AV.          | Q.P.                        | AV.          | Q.P.               | AV.          | Q.P.           | AV.           |
| 1  | 0.4237         | 9.76                    | 19.37                      | 15.98        | 29.13                       | 25.74        | 57.38              | 47.38        | -28.25         | -21.64        |
| 2  | <b>1.02193</b> | <b>9.79</b>             | <b>25.01</b>               | <b>20.39</b> | <b>34.80</b>                | <b>30.18</b> | <b>56.00</b>       | <b>46.00</b> | <b>-21.20</b>  | <b>-15.82</b> |
| 3  | 1.60843        | 9.80                    | 19.18                      | 16.57        | 28.98                       | 26.37        | 56.00              | 46.00        | -27.02         | -19.63        |
| 4  | 2.27704        | 9.82                    | 18.68                      | 16.21        | 28.50                       | 26.03        | 56.00              | 46.00        | -27.50         | -19.97        |
| 5  | 2.91828        | 9.83                    | 18.01                      | 15.49        | 27.84                       | 25.32        | 56.00              | 46.00        | -28.16         | -20.68        |
| 6  | 3.61035        | 9.84                    | 17.71                      | 15.25        | 27.55                       | 25.09        | 56.00              | 46.00        | -28.45         | -20.91        |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.



BUREAU  
VERITAS

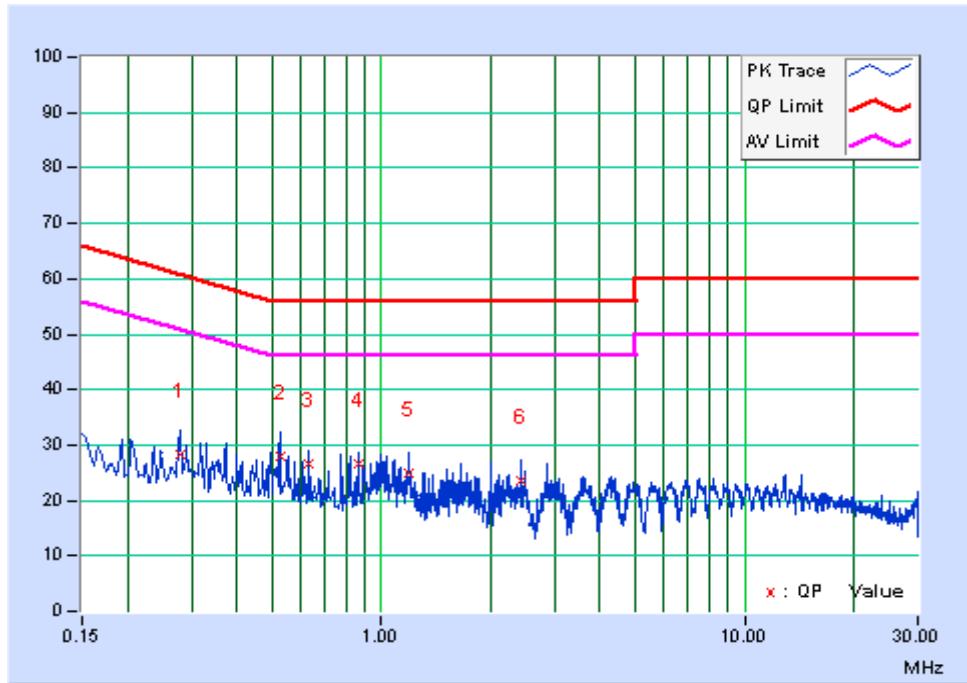
Test Report No.: FC111222N023

|                             |                                |                  |         |
|-----------------------------|--------------------------------|------------------|---------|
| INPUT POWER                 | AC 120V/60Hz                   | 6dB<br>BANDWIDTH | 9 kHz   |
| ENVIRONMENTAL<br>CONDITIONS | 20 deg. C, 46% RH,<br>1008 hPa | PHASE            | Neutral |
| TESTED BY                   | Glyn                           |                  |         |

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |      | Emission Level<br>[dB (uV)] |       | Limit<br>[dB (uV)] |       | Margin<br>(dB) |        |
|----|----------------|-------------------------|----------------------------|------|-----------------------------|-------|--------------------|-------|----------------|--------|
|    |                |                         | Q.P.                       | AV.  | Q.P.                        | AV.   | Q.P.               | AV.   | Q.P.           | AV.    |
| 1  | 0.27903        | 9.77                    | 18.46                      | 9.56 | 28.23                       | 19.33 | 60.84              | 50.84 | -32.61         | -31.51 |
| 2  | 0.52536        | 9.78                    | 18.13                      | 9.36 | 27.91                       | 19.14 | 56.00              | 46.00 | -28.09         | -26.86 |
| 3  | 0.63093        | 9.79                    | 16.81                      | 6.39 | 26.60                       | 16.18 | 56.00              | 46.00 | -29.40         | -29.82 |
| 4  | 0.86553        | 9.77                    | 16.97                      | 7.19 | 26.74                       | 16.96 | 56.00              | 46.00 | -29.26         | -29.04 |
| 5  | 1.19397        | 9.77                    | 15.30                      | 7.51 | 25.07                       | 17.28 | 56.00              | 46.00 | -30.93         | -28.72 |
| 6  | 2.41389        | 9.82                    | 13.76                      | 6.30 | 23.58                       | 16.12 | 56.00              | 46.00 | -32.42         | -29.88 |

**REMARKS:** 1. Q.P. and AV. are abbreviations of quasi-peak and average individually.

2. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. The emission levels of other frequencies were very low against the limit.
4. Margin value = Emission level - Limit value
5. Correction factor = Insertion loss + Cable loss
6. Emission Level = Correction Factor + Reading Value.





BUREAU  
VERITAS

Test Report No.: FC111222N023

## 4.2 DUTY CYCLE TEST

### 4.2.1 STANDARD APPLICABLE

According to FCC 15.231 (b)(2) and 15.35 (c), For pulse operation transmitter, the averaging pulsed emissions are calculated by peak value of measured emission plus duty cycle factor.

### 4.2.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER   | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|------------------------------|-----------|------------|---------------------|-------------------------|
| Spectrum Analyzer<br>Agilent | E7405A    | MY45118807 | May 25,11           | May 25,12               |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.  
2. The test was performed in Dongguan Chamber RF

### 4.2.3 TEST PROCEDURES

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.9MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

### 4.2.4 DEVIATION FROM TEST STANDARD

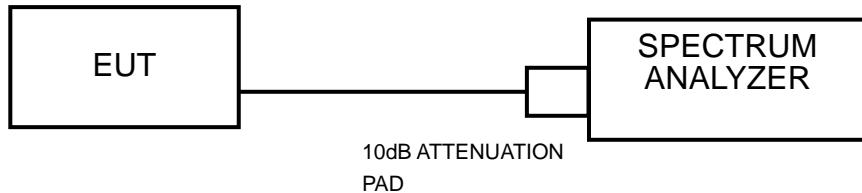
No deviation



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VERITAS

Test Report No.: FC111222N023

#### 4.2.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.2.6 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- With the EUT's antenna attached, which was connected to the spectrum analyzer set to the EUT's operation frequencies.

#### 4.2.7 TEST RESULTS

$$Tp = 45\text{ms}$$

$$Ton = Ton1 * Number + Ton2 * Number = 512.5 * 10 + 300 * 37 = 16.225\text{ms}$$

$$\text{Duty Cycle} = Ton / Tp * 100\% = 36.06\%$$

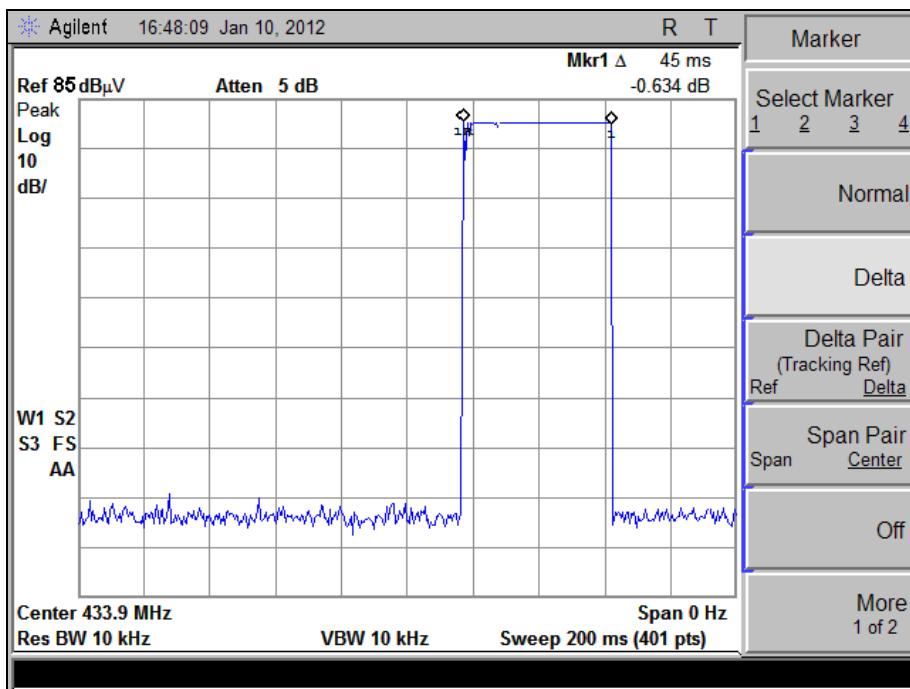
$$\text{Factor} = 20 * \text{Log} (Ton/Tp) = -8.86$$



BUREAU  
VERITAS

Test Report No.: FC111222N023

*Tp*

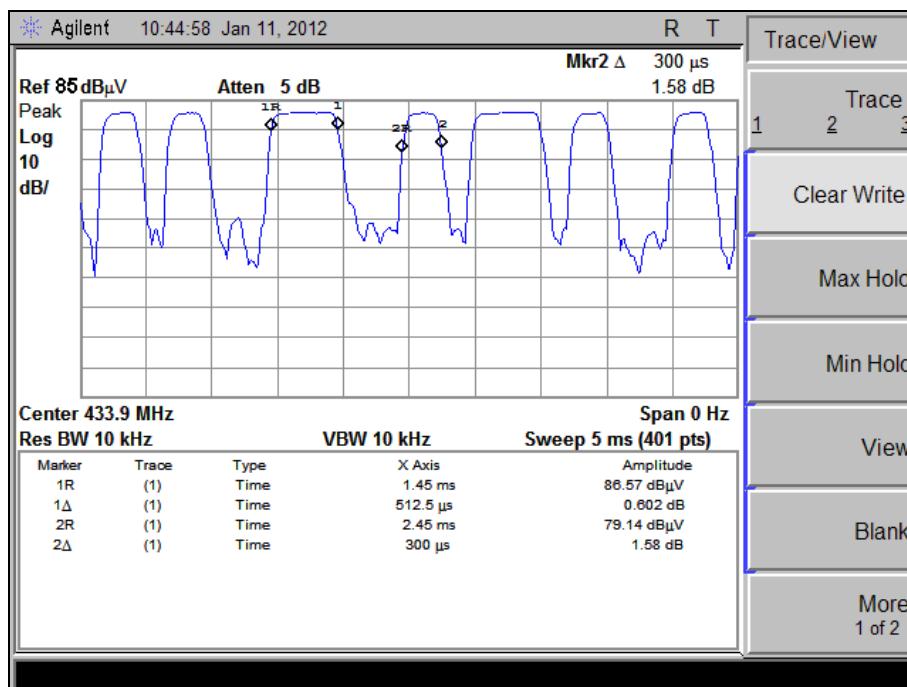
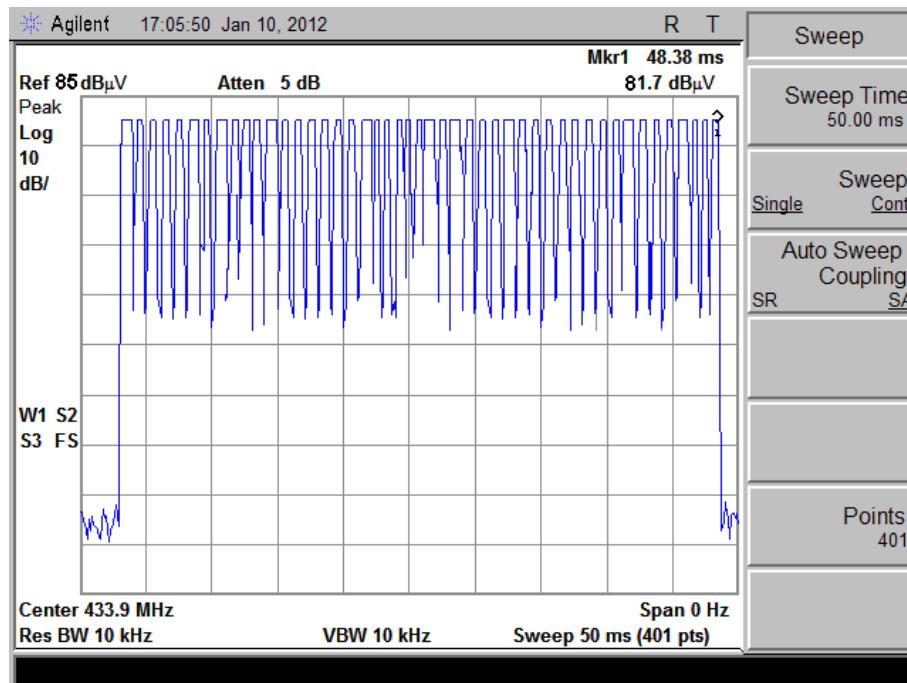




BUREAU  
VERITAS

Test Report No.: FC111222N023

$$T_{on} = 512.5 * 10 + 300 * 37 = 16.225ms$$





BUREAU  
VERITAS

Test Report No.: FC111222N023

## 4.3 RADIATED EMISSION MEASUREMENT

### 4.3.1 LIMITS OF RADIATED EMISSION MEASUREMENT

Emissions radiated outside of the specified bands, shall be according to the general radiated limits in 15.209 as following:

| FREQUENCIES (MHz) | FIELD STRENGTH (microvolts/meter) | MEASUREMENT DISTANCE (meters) |
|-------------------|-----------------------------------|-------------------------------|
| 0.009 ~ 0.490     | 2400/F(kHz)                       | 300                           |
| 0.490 ~ 1.705     | 24000/F(kHz)                      | 30                            |
| 1.705 ~ 30.0      | 30                                | 30                            |
| 30 ~ 88           | 100                               | 3                             |
| 88 ~ 216          | 150                               | 3                             |
| 216 ~ 960         | 200                               | 3                             |
| Above 960         | 500                               | 3                             |

According to §15.231(e), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

| Fundamental frequency (MHz) | Field strength of fundamental (microvolts/meter) | Field strength of spurious emission (microvolts/meter) |
|-----------------------------|--|--|
| 40.66–40.70                 | 1,000  | 100  |
| 70–130                      | 500  | 50   |
| 130–174                     | 500 to 1,500 <sup>1</sup>                        | 50 to 150 <sup>1</sup>                                 |
| 174–260                     | 1,500  | 150  |
| 260–470                     | 1,500 to 5,000 <sup>1</sup>                      | 150 to 500 <sup>1</sup>                                |
| Above 470                   | 5,000  | 500  |

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dB<sub>B</sub>V/m) = 20 log Emission level (uV/m).
3. As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

BUREAU  
VERITAS**Test Report No.: FC111222N023**

#### 4.3.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER             | MODEL NO.            | SERIAL NO.      | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|--|----------------------|-----------------|---------------------|-------------------------|
| Spectrum Analyzer Agilent              | E4446A               | MY46180622      | Apr. 25, 11         | Apr. 25, 12             |
| Spectrum Analyzer Agilent              | E7405A               | MY45118807      | May 25,11           | May 25,12               |
| Test Receiver ROHDE & SCHWARZ          | ESVD                 | 847398/003      | May 25,11           | May 25,12               |
| Bilog Antenna TESEQ                    | CBL 6111D            | 27089           | Jul 24,11           | Jul 24,12               |
| Horn Antenna EMC                       | 3117                 | 00062558        | Nov.07,11           | Nov.07,12               |
| 10m Semi-anechoic Chamber ETS-LINDGREN | 21.4m*12.1m*8.8m     | NSEMC006        | May 02,11           | May 02,12               |
| RF Cable IMRO                          | IMRO-400             | 10m Cable 1#10m | May 02,11           | May 02,12               |
| RF Cable IMRO                          | IMRO-400             | 10m Cable 2#3m  | May 02,11           | May 02,12               |
| Signal Amplifier EMC                   | EMC330               | 980095          | Nov 07,11           | Nov 07,12               |
| Signal Amplifier EMC                   | EMC0140045           | 980102          | Nov 07,11           | Nov 07,12               |
| Spectrum Analyzer HP                   | 8593E                | 3448U00806      | May 25,11           | May 25,12               |
| RF Cable DRAKA                         | M06/25-RG102         | 10m Cable 2#    | May 02,11           | May 02,12               |
| Test software                          | ADT_Radiated_V7.6.15 | N/A             | N/A                 | N/A                     |

**NOTE:**

1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA.
2. The test was performed in Dongguan Chamber 10m.
3. The horn antenna are used only for the measurement of emission frequency above 1GHz if tested.



BUREAU  
VERITAS

Test Report No.: FC111222N023

#### 4.3.3 TEST PROCEDURES

The basic test procedure was in accordance with ANSI C63.4 (section 12).

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meters Semi-anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, For battery operated equipment, the equipment tests shall be perform using new battery. The turntable was rotated to maximize the emission level.

#### NOTE:

1. The resolution bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) at frequency below 1GHz.
2. Emission level(dBuV/m)=Raw Value(dBuV) + Correction Factor(dB/m)
3. Correction Factor(dB/m) = Antenna Factor (dB/m) + Cable Factor (dB)
4. Margin value = Emission level – Limit value.
5. Fundamental AV value =PK Emission +20\*log(duty cycle)

#### 4.3.4 DEVIATION FROM TEST STANDARD

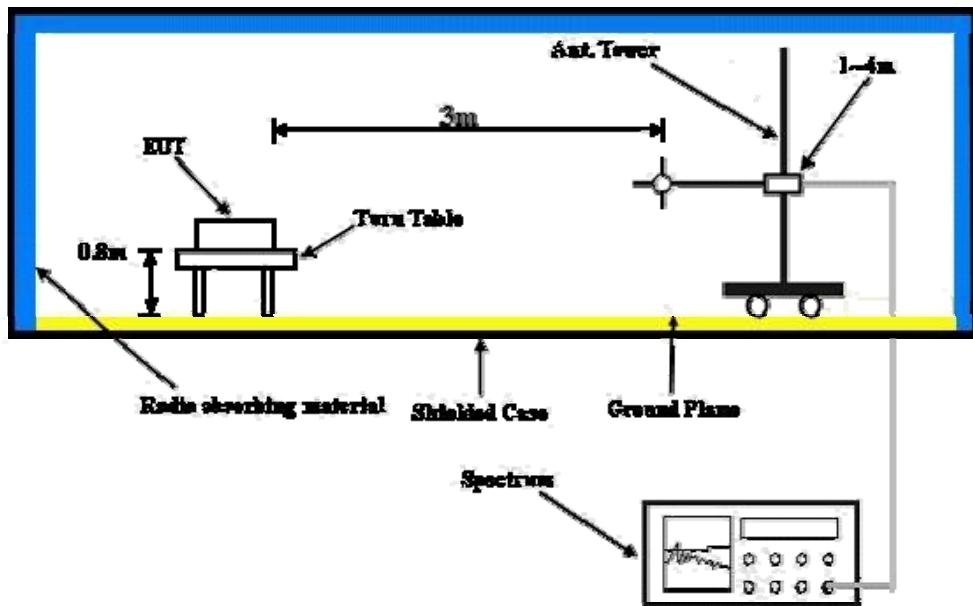
No deviation



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Test Report No.: FC111222N023

#### 4.3.5 TEST SETUP



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.3.6 EUT OPERATING CONDITIONS

- Placed the EUT on the testing table.
- Enable EUT under transmission condition continuously at specific channel frequency.



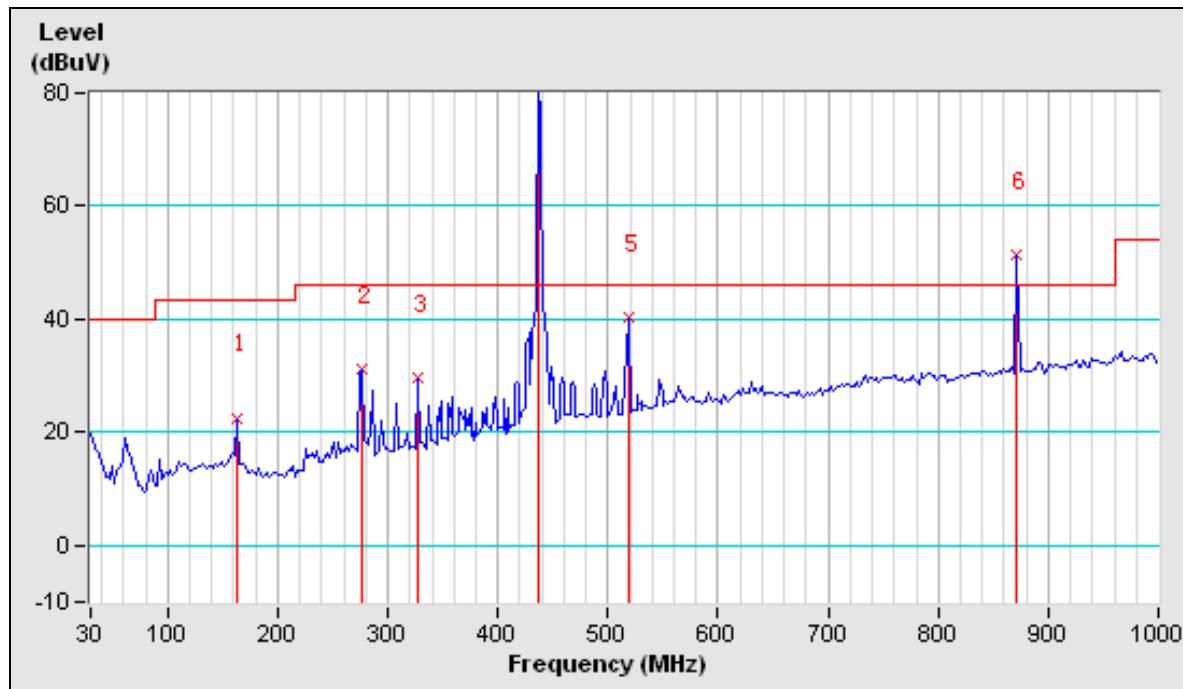
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Test Report No.: FC111222N023

#### 4.3.7 TEST RESULTS

##### BELOW 1GHz WORST-CASE DATA: Transmitting

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3M |                  |                          |                  |                         |                |              |                     |                      |
|--|------------------|--------------------------|------------------|-------------------------|----------------|--------------|---------------------|----------------------|
| No.  | Freq. (MHz)      | Correction Factor (dB/m) | Raw Value (dBuV) | Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (dB)  | Antenna Height (cm) | Table Angle (Degree) |
| 1  | 163.04 PK        | 11.91                    | 10.66            | 22.57                   | 43.50          | -20.93       | 322                 | 301                  |
| 2  | 276.73 PK        | 15.47                    | 15.60            | 31.07                   | 46.00          | -14.93       | 360                 | 247                  |
| 3  | 327.53 PK        | 16.52                    | 13.02            | 29.54                   | 46.00          | -16.46       | 346                 | 134                  |
| 4  | 433.90 PK        | 20.67                    | 57.71            | 78.38                   | 92.87          | -14.49       | 375                 | 266                  |
|  | <b>433.90 AV</b> | <b>-8.86</b>             | /                | <b>69.52</b>            | <b>72.87</b>   | <b>-3.35</b> | <b>375</b>          | <b>266</b>           |
| 5  | 518.63 PK        | 22.19                    | 18.19            | 40.38                   | 46.00          | -5.62        | 216                 | 100                  |
| 6  | 871.80 PK        | 29.56                    | 21.80            | 51.36                   | 72.87          | -21.51       | 350                 | 149                  |
|  | 871.80 AV        | -8.86                    | /                | 42.50                   | 52.87          | -10.37       | 350                 | 149                  |

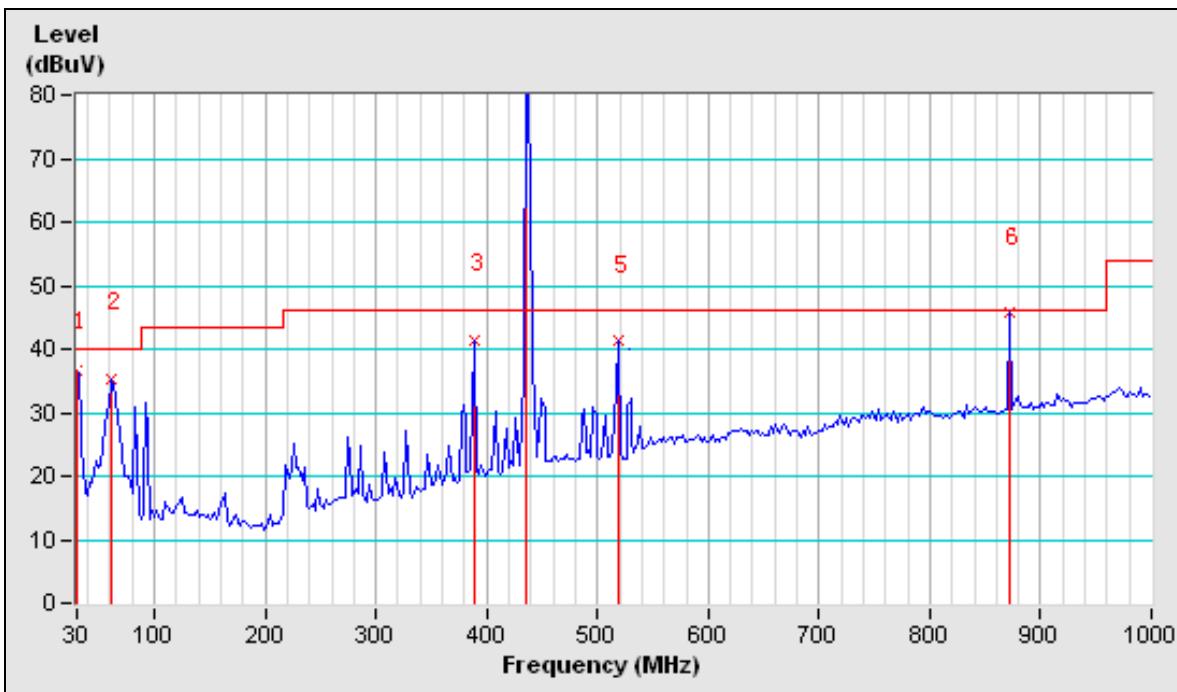




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Test Report No.: FC111222N023

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3M |                |                                |                        |                               |                   |                |                           |                            |
|--|----------------|--------------------------------|------------------------|-------------------------------|-------------------|----------------|---------------------------|----------------------------|
| No.  | Freq.<br>(MHz) | Correction<br>Factor<br>(dB/m) | Raw<br>Value<br>(dBuV) | Emission<br>Level<br>(dBuV/m) | Limit<br>(dBuV/m) | Margin<br>(dB) | Antenna<br>Height<br>(cm) | Table<br>Angle<br>(Degree) |
| 1  | 30.00 PK       | 19.75                          | 17.00                  | 36.75                         | 40.00             | -3.25          | 150                       | 44                         |
| 2  | 61.45 PK       | 7.79                           | 27.44                  | 35.23                         | 40.00             | -4.77          | 150                       | 63                         |
| 3  | 388.00 PK      | 18.93                          | 22.36                  | 41.29                         | 46.00             | -4.71          | 150                       | 22                         |
| 4  | 433.90 PK      | 20.67                          | 51.69                  | 72.36                         | 92.87             | -20.51         | 100                       | 11                         |
|  | 433.90 AV      | -8.86                          | /                      | 63.5                          | 72.87             | -9.37          | 100                       | 11                         |
| 5  | 518.63 PK      | 22.19                          | 19.05                  | 41.24                         | 46.00             | -4.76          | 100                       | 112                        |
| 6  | 871.80 PK      | 29.56                          | 16.11                  | 45.67                         | 72.87             | -27.2          | 100                       | 219                        |
|  | 871.80 AV      | -8.86                          | /                      | 36.81                         | 52.87             | -16.06         | 100                       | 220                        |



#### ABOVE 1GHz WORST-CASE DATA: Transmitting

Emissions attenuated more than 20 dB below the permissible value are not reported.



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Test Report No.: FC111222N023

#### 4.4 20dB BANDWIDTH MEASUREMENT

##### 4.4.1 LIMITS OF 20dB BANDWIDTH MEASUREMENT

According to FCC 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.

$$\text{Limit} = \text{Fundamental Frequency} \times 0.25\% = 433.9 \times 0.25\% = 1084.75 \text{kHz}$$

##### 4.4.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER   | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|------------------------------|-----------|------------|---------------------|-------------------------|
| Spectrum Analyzer<br>Agilent | E7405A    | MY45118807 | May 25,11           | May 25,12               |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA  
2. The test was performed in Dongguan Chamber RF

##### 4.4.3 TEST PROCEDURE

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 100kHz RBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

##### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation.

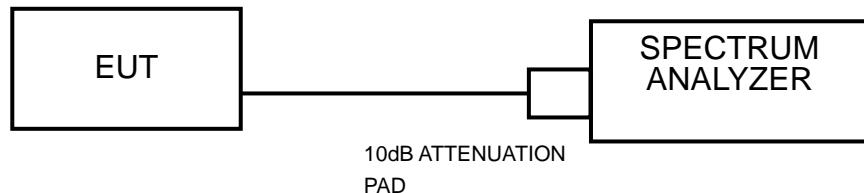


1828

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Test Report No.: FC111222N023

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. With the EUT's antenna attached, which was connected to the spectrum analyzer set to the EUT's operation frequencies.



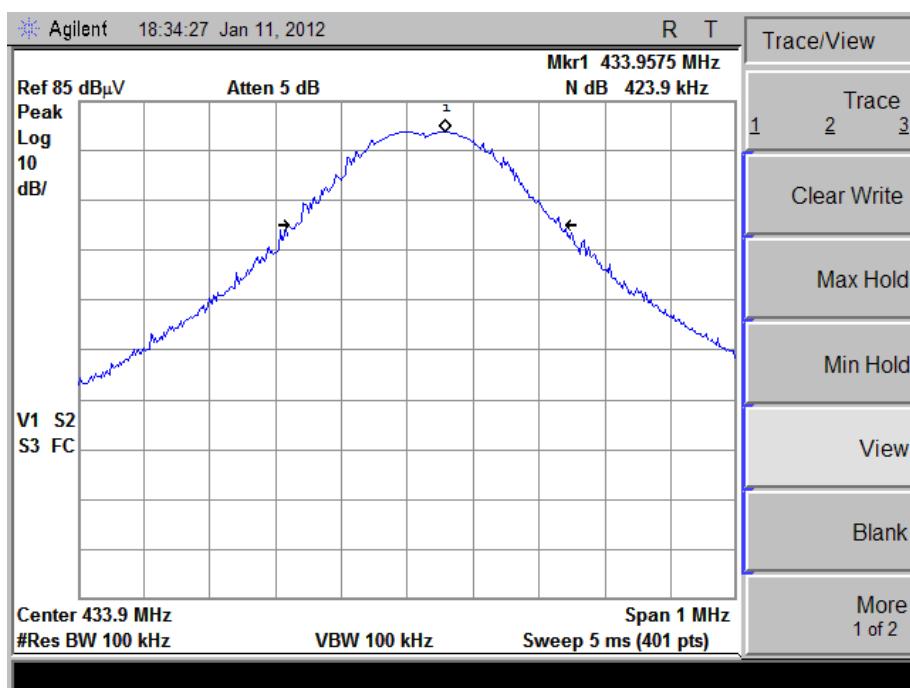
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Test Report No.: FC111222N023

#### 4.4.7 TEST RESULTS

| CHANNEL FREQUENCY<br>(MHz) | 20dB BANDWIDTH<br>(KHz) | LIMIT (KHz) |
|----------------------------|-------------------------|-------------|
| 433.9                      | 423.9                   | 1084.75     |

#### Test Data:





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Test Report No.: FC111222N023

## 4.5 DEACTIVATION TEST

### 4.5.1 LIMITS OF DEACTIVATION TEST

According to FCC 15.231(e), In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds.

### 4.5.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER   | MODEL NO. | SERIAL NO. | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|------------------------------|-----------|------------|---------------------|-------------------------|
| Spectrum Analyzer<br>Agilent | E7405A    | MY45118807 | May 25,11           | May 25,12               |

**NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to CEPREI/CHINA and NIM/CHINA  
2. The test was performed in Dongguan Chamber RF

### 4.5.3 TEST PROCEDURE

With the EUT's antenna attached, the EUT's output signal was received by the test antenna, which was connected to the spectrum analyzer. Set the center frequency to 433.9MHz, than set the spectrum analyzer to Zero Span for the release time reading. During the testing, the switch was released then the EUT automatically deactivated.

### 4.5.4 DEVIATION FROM TEST STANDARD

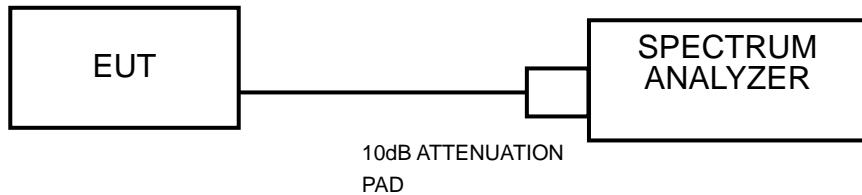
No deviation.



1828

**BUREAU  
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#### 4.5.5 TEST SETUP



#### 4.5.6 EUT OPERATING CONDITIONS

- a. Placed the EUT on the testing table.
- b. With the EUT's antenna attached, which was connected to the spectrum analyzer set to the EUT's operation frequencies.

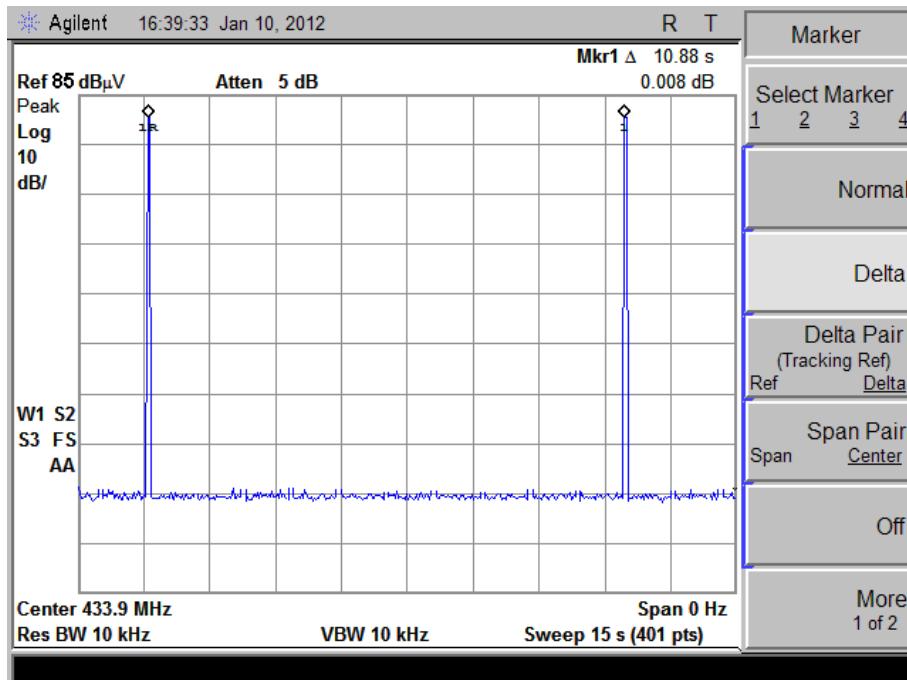
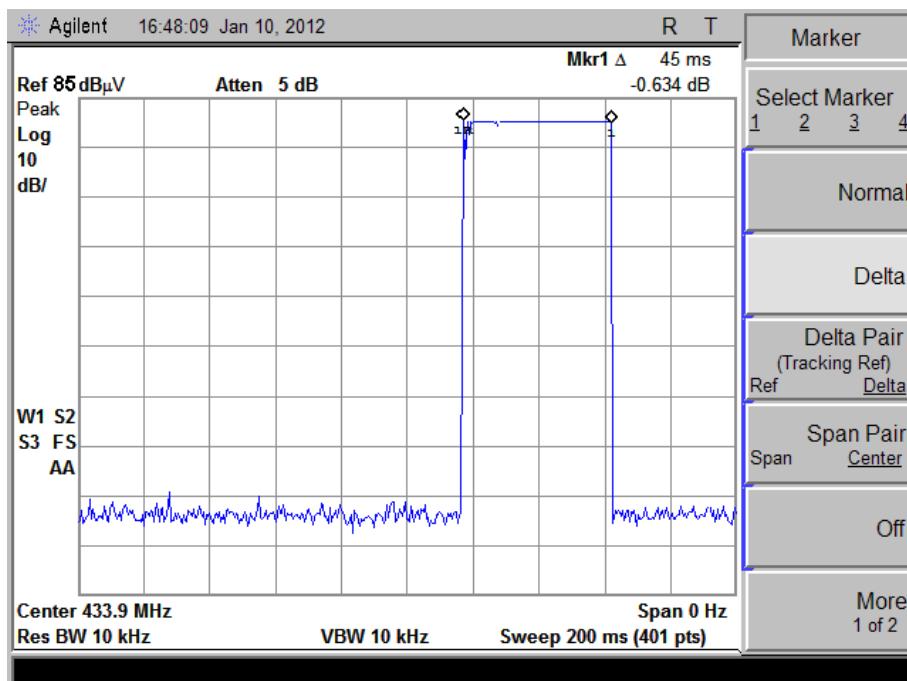


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Test Report No.: FC111222N023

#### 4.5.7 TEST RESULTS

**Test Data:** Duration=45ms<1 second





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Test Report No.: FC111222N023

## 5 PHOTOGRAPHS OF THE TEST CONFIGURATION

Please refer to the attached file (Test Setup Photo).



1

**Test Report No.: FC111222N023**

## **6 APPENDIX A - MODIFICATIONS RECORDERS FOR ENGINEERING CHANGES TO THE EUT BY THE LAB**

No any modifications are made to the EUT by the lab during the test.

**---END---**