

# FCC Report

**Application Purpose** : Original grant  
**Applicant Name:** : Wavetec FZCO  
**FCC ID** : 2AGQF-WT-CDU  
**Equipment Type** : CDU  
**Model Name** : WT-CDU-01 GPC(Grey, Central power)  
**Report Number** : FCC15093190  
**Standard(S)** : FCC Part 15 Subpart B  
**Date Of Receipt** : December 12, 2015  
**Date Of Issue** : December 22, 2015

**Test By** : Fall Ma  
(Fall Ma)

**Reviewed By** : Robie Chen  
(Robie Chen)

**Authorized by** : Michal Ling  
(Michal Ling)

**Prepared by** : **Shenzhen WSCT Testing Technology Co., Ltd.**  
1F, No.9 Building, TGK Science & Technology Park Yangtian  
Rd., NO.72 Bao'an Dist., Guangdong, China  
(Registration Number: 939433)

**REPORT REVISE RECORD**

| Report Version | Revise Time | Issued Date       | Valid Version | Notes           |
|----------------|-------------|-------------------|---------------|-----------------|
| V1.0           | /           | December 22, 2015 | Valid         | Original Report |

| <b>Table of Contents</b>                          | <b>Page</b> |
|---------------------------------------------------|-------------|
| <b>1. GENERAL INFORMATION</b>                     | <b>4</b>    |
| <b>2. TEST DESCRIPTION</b>                        | <b>6</b>    |
| 2.1 MEASUREMENT UNCERTAINTY                       | 6           |
| 2.2 DESCRIPTION OF TEST MODES                     | 7           |
| 2.3 CONFIGURATION OF SYSTEM UNDER TEST            | 8           |
| 2.4 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE) | 8           |
| <b>3. SUMMARY OF TEST RESULTS</b>                 | <b>9</b>    |
| <b>4. MEASUREMENT INSTRUMENTS</b>                 | <b>10</b>   |
| <b>5. EMC EMISSION TEST</b>                       | <b>11</b>   |
| 5.1 CONDUCTED EMISSION MEASUREMENT                | 11          |
| 5.1.1 POWER LINE CONDUCTED EMISSION LIMITS        | 11          |
| 5.1.2 TEST PROCEDURE                              | 12          |
| 5.1.3 DEVIATION FROM TEST STANDARD                | 12          |
| 5.1.4 TEST SETUP                                  | 12          |
| 5.1.5 EUT OPERATING CONDITIONS                    | 12          |
| 5.1.6 TEST RESULTS                                | 13          |
| 5.2 RADIATED EMISSION MEASUREMENT                 | 15          |
| 5.2.1 RADIATED EMISSION LIMITS                    | 15          |
| 5.2.2 TEST PROCEDURE                              | 16          |
| 5.2.3 DEVIATION FROM TEST STANDARD                | 16          |
| 5.2.4 TEST SETUP                                  | 17          |
| 5.2.5 EUT OPERATING CONDITIONS                    | 17          |
| 5.2.5.1 TEST RESULTS (BETWEEN 30M – 1000 MHZ)     | 18          |
| 5.2.5.2 TEST RESULTS(1GHZ TO 6GHZ)                | 20          |
| <b>12. EUT TEST PHOTO</b>                         | <b>21</b>   |
| <b>13. PHOTOGRAPHS OF EUT</b>                     | <b>23</b>   |

**1. GENERAL INFORMATION**

|                          |                                                                                                                                                                                                     |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Model               | WT-CDU-01 GPC(Grey, Central power)                                                                                                                                                                  |
| Derivative Model Name    | WT-CDU-01 BPC(Black, Central power),<br>CDU White-01 BPC(Black, Central power),<br>CDU-01 GPA(Grey, Power Adapter)                                                                                  |
| Model difference         | All models are identical in circuitry and electrical, mechanical and physical construction, only different on model name and color. All tests are carried out on WT-CDU-01 GPC(Grey, Central power) |
| Applicant                | Wavetec FZCO                                                                                                                                                                                        |
| Address                  | Light Industrial Unit#9 Dubai Silicon Oasis P.O.Box 341133<br>Dubai,United Arab Emirates                                                                                                            |
| Manufacturer             | Wavetec FZCO                                                                                                                                                                                        |
| Address                  | Light Industrial Unit#9 Dubai Silicon Oasis P.O.Box 341133<br>Dubai,United Arab Emirates                                                                                                            |
| Equipment Type           | CDU                                                                                                                                                                                                 |
| Brand Name               | N/A                                                                                                                                                                                                 |
| Hardware                 | N/A                                                                                                                                                                                                 |
| Software                 | N/A                                                                                                                                                                                                 |
| Battery information:     | N/A                                                                                                                                                                                                 |
| Adapter Information:     | Input: 100-240VAC 0.7A<br>Output: DC5.0V 4.00A 20W MAX                                                                                                                                              |
| Data of receipt          | December 12, 2015                                                                                                                                                                                   |
| Date of test             | December 12, 2015 to December 22, 2015                                                                                                                                                              |
| Deviation                | None                                                                                                                                                                                                |
| Condition of Test Sample | Normal                                                                                                                                                                                              |

**We hereby certify that:**

All measurement facilities used to collect the measurement data are located at

1F, No.9 Building, TGK Science & Technology Park Yangtian Rd., NO.72 Bao'an Dist., Guangdong, China

The data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C 63.4:2009. The sample tested as described in this report is in compliance with the FCC Rules Part 15 Subpart B.

The test results of this report relate only to the tested sample identified in this report.

## 2. TEST DESCRIPTION

### 2.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement  $y \pm U$ , where expended uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately **95 %**.

| No. | Item                          | Uncertainty               |
|-----|-------------------------------|---------------------------|
| 1   | Conducted Emission Test       | $\pm 3.2\text{dB}$        |
| 2   | RF power, conducted           | $\pm 0.16\text{dB}$       |
| 3   | Spurious emissions, conducted | $\pm 0.21\text{dB}$       |
| 4   | All emissions, radiated(<1G)  | $\pm 4.7\text{dB}$        |
| 5   | All emissions, radiated(>1G)  | $\pm 4.7\text{dB}$        |
| 6   | Temperature                   | $\pm 0.5^{\circ}\text{C}$ |
| 7   | Humidity                      | $\pm 2\%$                 |

## 2.2 DESCRIPTION OF TEST MODES

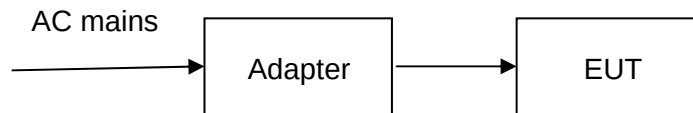
To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description |
|--------------|-------------|
| Mode 1       | Working     |

| For Conducted Emission |             |
|------------------------|-------------|
| Final Test Mode        | Description |
| Mode 1                 | Working     |

| For Radiated Emission |             |
|-----------------------|-------------|
| Final Test Mode       | Description |
| Mode 1                | Working     |

## 2.3 CONFIGURATION OF SYSTEM UNDER TEST



(EUT: CDU)

## 2.4 DESCRIPTION OF SUPPORT UNITS (CONDUCTED MODE)

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.

| Item | Equipment | Mfr/Brand | Model/Type No. | Series No. | Note |
|------|-----------|-----------|----------------|------------|------|
| /    | /         | /         | /              | /          | /    |

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



### 3. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

| FCC Part15 , Subpart B |                    |          |        |
|------------------------|--------------------|----------|--------|
| Standard Section       | Test Item          | Judgment | Remark |
| 15.107                 | CONDUCTED EMISSION | PASS     | /      |
| 15.109                 | RADIATED EMISSION  | PASS     | /      |

NOTE:

(1) "N/A" denotes test is not applicable in this test report.

**4. MEASUREMENT INSTRUMENTS**

| Kind of Equipment  | Manufacturer | Type No.    | Serial No.  | Last Calibrated | Calibrated until |
|--------------------|--------------|-------------|-------------|-----------------|------------------|
| ESPI Test Receiver | R&S          | ESPI        | 100379      | 08/19/2015      | 08/18/2016       |
| ESCI Test Receiver | R&S          | ESCI        | 100005      | 08/19/2015      | 08/18/2016       |
| LISN               | AFJ          | LS16        | 16010222119 | 08/19/2015      | 08/18/2016       |
| LISN(EUT)          | Mestec       | AN3016      | 04/10040    | 08/19/2015      | 08/18/2016       |
| pre-amplifier      | CDSI         | PAP-1G18-38 | --          | 08/19/2015      | 08/18/2016       |
| System Controller  | CT           | SC100       | -           | 08/19/2015      | 08/18/2016       |
| Bi-log Antenna     | Chase        | CBL6111C    | 2576        | 08/19/2015      | 08/18/2016       |
| Spectrum analyzer  | R&S          | FSU26       | 200409      | 08/19/2015      | 08/18/2016       |
| Horn Antenna       | SCHWARZBECK  | 9120D       | 1141        | 08/19/2015      | 08/18/2016       |
| Bi-log Antenna     | Schwarebeck  | VULB9163    | 9163/340    | 08/19/2015      | 08/18/2016       |
| Pre Amplifier      | H.P.         | HP8447E     | 2945A02715  | 10/13/2015      | 10/12/2016       |
| 9*6*6 Anechoic     | --           | --          | --          | 08/21/2015      | 08/20/2016       |

## 5. EMC EMISSION TEST

### 5.1 CONDUCTED EMISSION MEASUREMENT

#### 5.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| FREQUENCY (MHz) | Class A (dBuV) |         | Class B (dBuV) |           | Standard |
|-----------------|----------------|---------|----------------|-----------|----------|
|                 | Quasi-peak     | Average | Quasi-peak     | Average   |          |
| 0.15 -0.5       | 79.00          | 66.00   | 66 - 56 *      | 56 - 46 * | FCC      |
| 0.50 -5.0       | 73.00          | 60.00   | 56.00          | 46.00     | FCC      |
| 5.0 -30.0       | 73.00          | 60.00   | 60.00          | 50.00     | FCC      |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

| Receiver Parameters | Setting  |
|---------------------|----------|
| Attenuation         | 10 dB    |
| Start Frequency     | 0.15 MHz |
| Stop Frequency      | 30 MHz   |
| IF Bandwidth        | 9 kHz    |

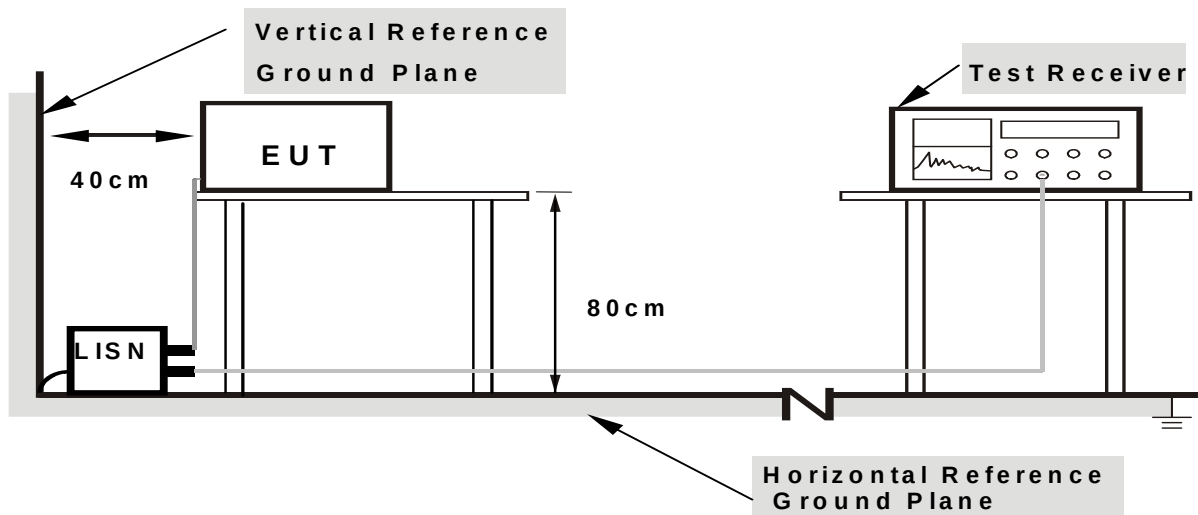
### 5.1.2 TEST PROCEDURE

- The EUT was placed 0.4 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

### 5.1.3 DEVIATION FROM TEST STANDARD

No deviation

### 5.1.4 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

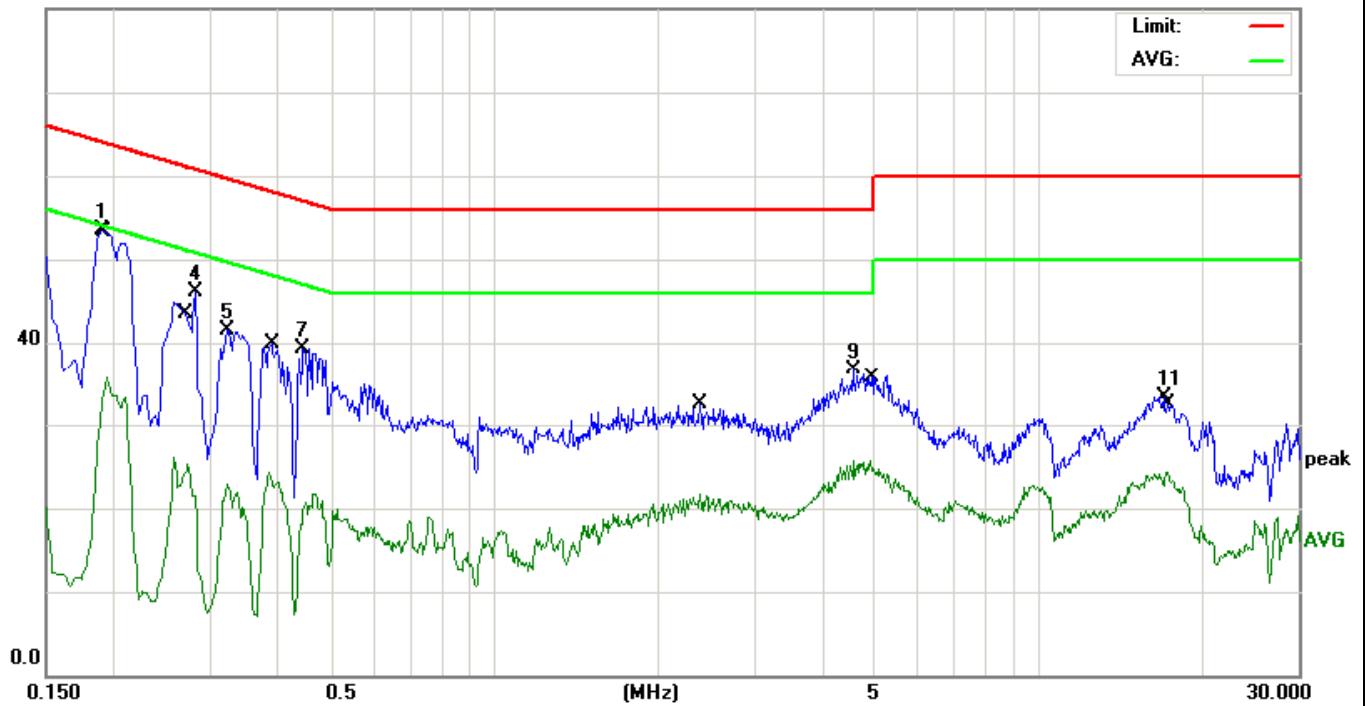
### 5.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



|             |                   |                   |                                       |
|-------------|-------------------|-------------------|---------------------------------------|
| EUT         | CDU               | Model Name        | WT-CDU-01<br>GPC(Grey, Central power) |
| Temperature | 26 °C             | Relative Humidity | 54%                                   |
| Pressure    | 1010hPa           | Phase             | N                                     |
| Test Date   | December 14, 2015 | Test Mode         | Mode 1                                |

80.0 dBuV



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|
| 1   | *   | 0.1900       | 43.20                    | 10.33                   | 53.53                    | 64.03         | -10.50     | peak     |
| 2   |     | 0.1940       | 25.47                    | 10.32                   | 35.79                    | 53.86         | -18.07     | AVG      |
| 3   |     | 0.2740       | 14.64                    | 10.56                   | 25.20                    | 50.99         | -25.79     | AVG      |
| 4   |     | 0.2819       | 35.43                    | 10.59                   | 46.02                    | 60.76         | -14.74     | peak     |
| 5   |     | 0.3234       | 30.88                    | 10.61                   | 41.49                    | 59.62         | -18.13     | peak     |
| 6   |     | 0.3860       | 13.68                    | 10.52                   | 24.20                    | 48.15         | -23.95     | AVG      |
| 7   |     | 0.4460       | 28.82                    | 10.45                   | 39.27                    | 56.95         | -17.68     | peak     |
| 8   |     | 2.3940       | 10.90                    | 10.70                   | 21.60                    | 46.00         | -24.40     | AVG      |
| 9   |     | 4.5620       | 26.07                    | 10.62                   | 36.69                    | 56.00         | -19.31     | peak     |
| 10  |     | 4.9220       | 15.14                    | 10.60                   | 25.74                    | 46.00         | -20.26     | AVG      |
| 11  |     | 16.9860      | 22.83                    | 10.47                   | 33.30                    | 60.00         | -26.70     | peak     |
| 12  |     | 17.1660      | 13.88                    | 10.47                   | 24.35                    | 50.00         | -25.65     | AVG      |

## 5.2 RADIATED EMISSION MEASUREMENT

### 5.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

20dBc in any 100 kHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

| Frequencies (MHz) | Field Strength (micorvolts/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                             |

#### LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

| FREQUENCY (MHz) | Limit (dBuV/m) (at 3M) |         |
|-----------------|------------------------|---------|
|                 | PEAK                   | AVERAGE |
| Above 1000      | 74                     | 54      |

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

| Spectrum Parameter                    | Setting                                          |
|---------------------------------------|--------------------------------------------------|
| Attenuation                           | Auto                                             |
| Start Frequency                       | 1000 MHz                                         |
| Stop Frequency                        | 10th carrier harmonic                            |
| RB / VB (emission in restricted band) | 1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average |

| Receiver Parameter     | Setting                          |
|------------------------|----------------------------------|
| Attenuation            | Auto                             |
| Start ~ Stop Frequency | 9kHz~150kHz / RB 200Hz for QP    |
| Start ~ Stop Frequency | 150kHz~30MHz / RB 9kHz for QP    |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

**5.2.2 TEST PROCEDURE**

- a. The measuring distance of at 3 m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item –EUT Test Photos.

Note:

***Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported***

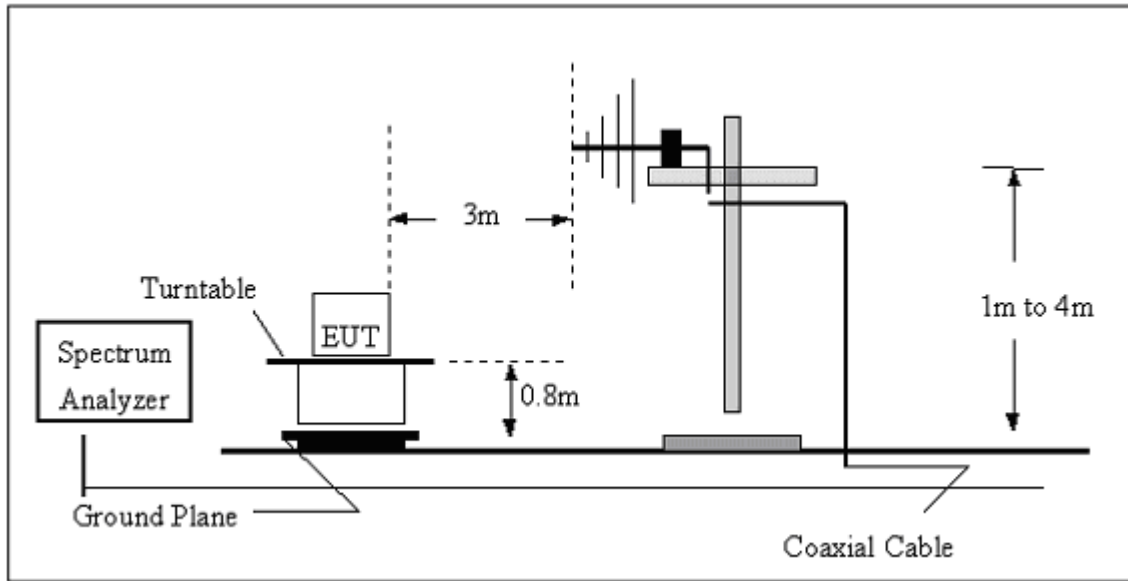
**5.2.3 DEVIATION FROM TEST STANDARD**

No deviation

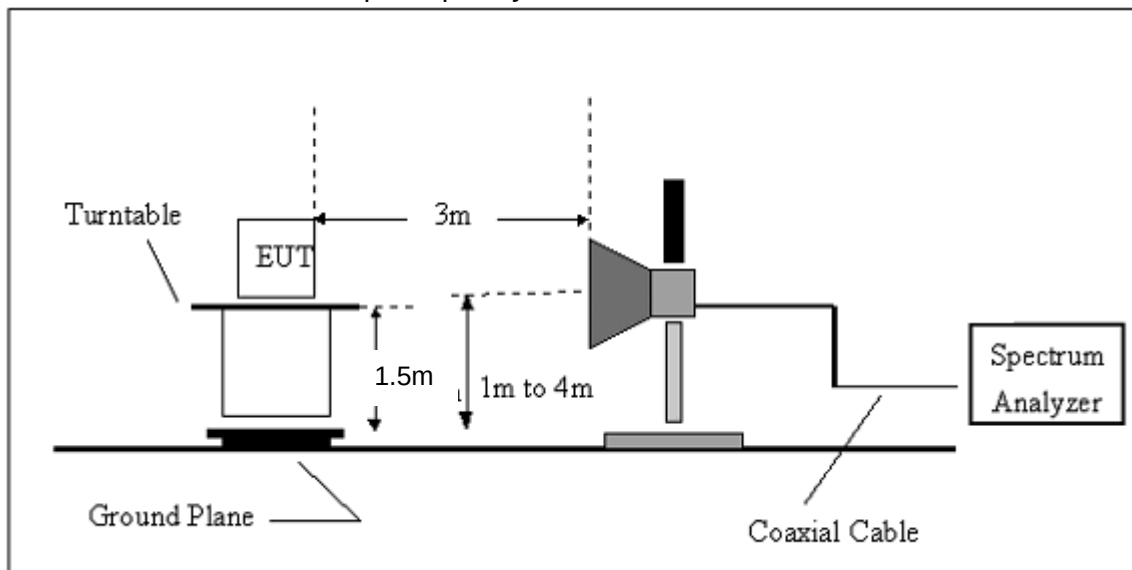


### 5.2.4 TEST SETUP

#### (A) Radiated Emission Test-Up Frequency 30MHz~1GHz



#### (B) Radiated Emission Test-Up Frequency Above 1GHz

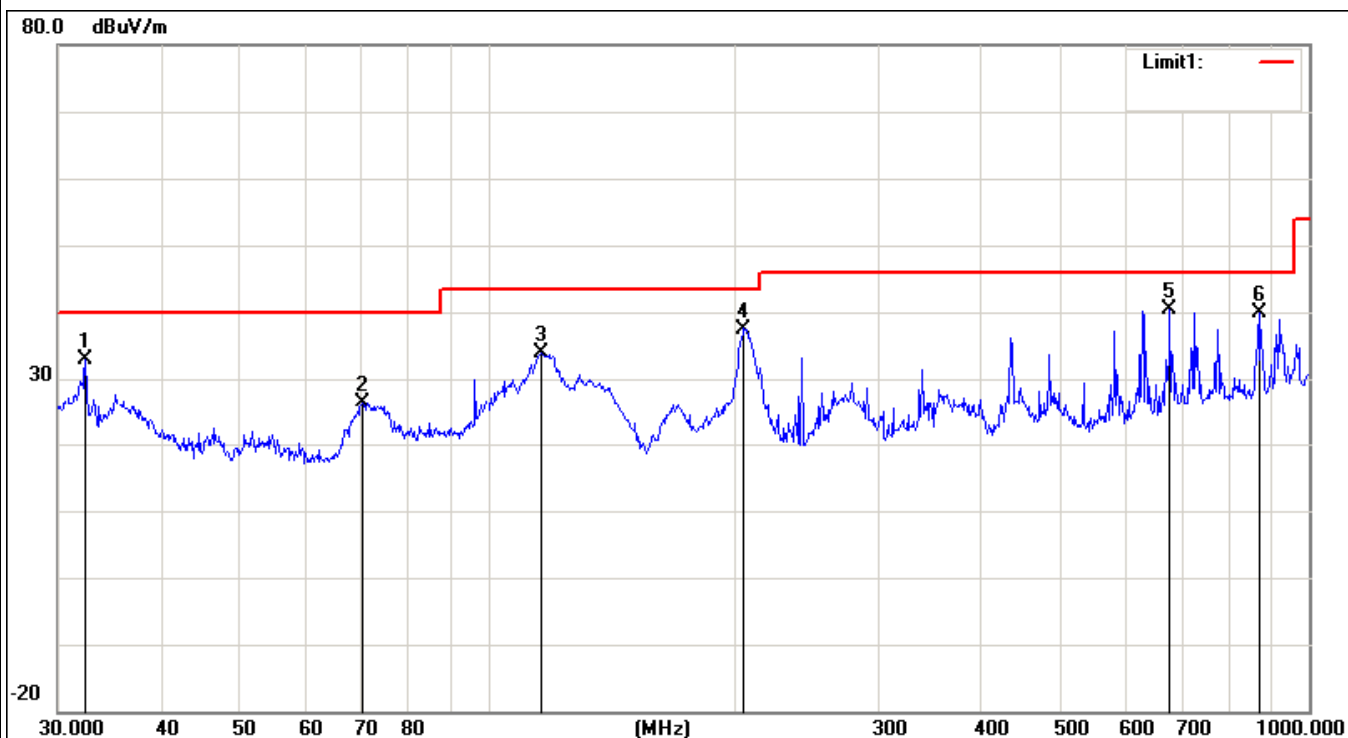


### 5.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

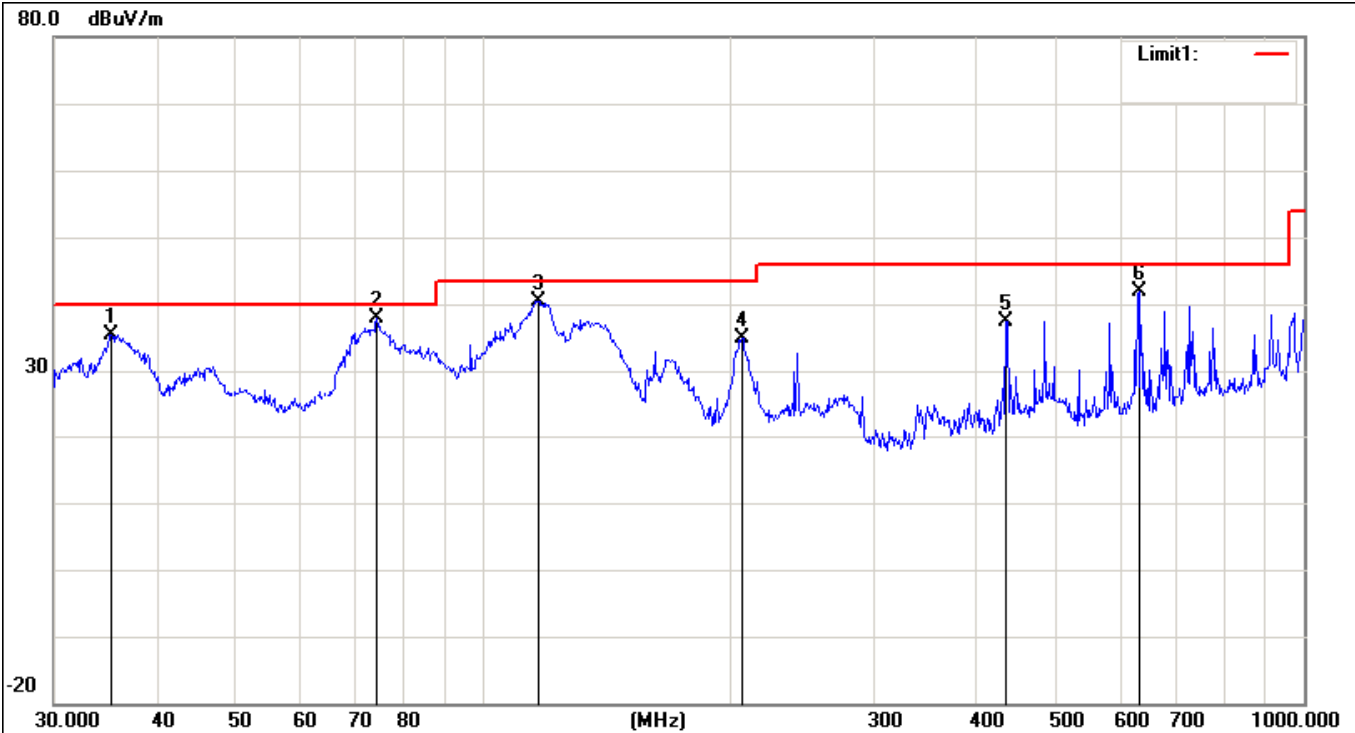
## 5.2.5.1 TEST RESULTS (BETWEEN 30M – 1000 MHZ)

|             |          |                   |                                       |
|-------------|----------|-------------------|---------------------------------------|
| EUT         | CDU      | Model Name        | WT-CDU-01<br>GPC(Grey, Central power) |
| Temperature | 20 °C    | Relative Humidity | 48%                                   |
| Pressure    | 1010 hPa | Polarization :    | Horizontal                            |
| Test Mode   | Mode 1   | Test Date         | December 14, 2015                     |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 32.4059      | 31.05                    | 1.87                    | 32.92                      | 40.00           | -7.08      | peak     |
| 2   |     | 70.3365      | 34.22                    | -7.80                   | 26.42                      | 40.00           | -13.58     | peak     |
| 3   |     | 116.1321     | 36.49                    | -2.67                   | 33.82                      | 43.50           | -9.68      | peak     |
| 4   |     | 205.6751     | 42.53                    | -5.03                   | 37.50                      | 43.50           | -6.00      | peak     |
| 5   | *   | 677.5798     | 38.34                    | 1.95                    | 40.29                      | 46.00           | -5.71      | peak     |
| 6   |     | 869.1302     | 34.90                    | 4.89                    | 39.79                      | 46.00           | -6.21      | peak     |

|             |          |                   |                                       |
|-------------|----------|-------------------|---------------------------------------|
| EUT         | CDU      | Model Name        | WT-CDU-01<br>GPC(Grey, Central power) |
| Temperature | 20 °C    | Relative Humidity | 48%                                   |
| Pressure    | 1010 hPa | Polarization :    | Vertical                              |
| Test Mode   | Mode 1   | Test Date         | December 14, 2015                     |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV/m | Limit<br>dBuV/m | Over<br>dB | Detector |
|-----|-----|--------------|--------------------------|-------------------------|----------------------------|-----------------|------------|----------|
| 1   |     | 35.2512      | 35.56                    | -0.06                   | 35.50                      | 40.00           | -4.50      | peak     |
| 2   | *   | 74.1351      | 45.35                    | -7.58                   | 37.77                      | 40.00           | -2.23      | peak     |
| 3   |     | 116.5401     | 43.08                    | -2.64                   | 40.44                      | 43.50           | -3.06      | peak     |
| 4   |     | 207.1226     | 40.05                    | -5.08                   | 34.97                      | 43.50           | -8.53      | peak     |
| 5   |     | 434.0651     | 39.89                    | -2.39                   | 37.50                      | 46.00           | -8.50      | peak     |
| 6   |     | 629.4772     | 40.51                    | 1.30                    | 41.81                      | 46.00           | -4.19      | peak     |

**5.2.5.2 TEST RESULTS(1GHZ TO 6GHZ)**

|             |                   |                   |         |
|-------------|-------------------|-------------------|---------|
| EUT         | Controller        | Model Name        | EQ-GEN2 |
| Temperature | 20 °C             | Relative Humidity | 48%     |
| Pressure    | 1010 hPa          | Test Mode         | Mode 1  |
| Test Date   | November 25, 2015 |                   |         |

| Freq.<br>(MHz) | Ant. Pol.  | Emission<br>Level(dBuV) |       | Limit<br>3m(dBuV/m) |    | Over(dB) |        |
|----------------|------------|-------------------------|-------|---------------------|----|----------|--------|
|                |            | PK                      | AV    | PK                  | AV | PK       | AV     |
| 1216.08        | Horizontal | 57.24                   | 36.35 | 70                  | 50 | -12.76   | -13.65 |
| 2057.28        | Horizontal | 60.80                   | 35.28 | 70                  | 50 | -9.20    | -14.72 |
| 4174.02        | Horizontal | 69.30                   | 46.33 | 74                  | 54 | -4.70    | -7.67  |
| 1772.88        | Vertical   | 63.44                   | 41.08 | 70                  | 50 | -6.56    | -8.92  |
| 2394.50        | Vertical   | 58.13                   | 40.94 | 70                  | 50 | -11.87   | -9.06  |
| 4718.35        | Vertical   | 71.37                   | 42.44 | 74                  | 54 | -2.63    | -11.56 |

**Remark:**

All emissions not reported were more than 20dB below the specified limit or in the noise floor.

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

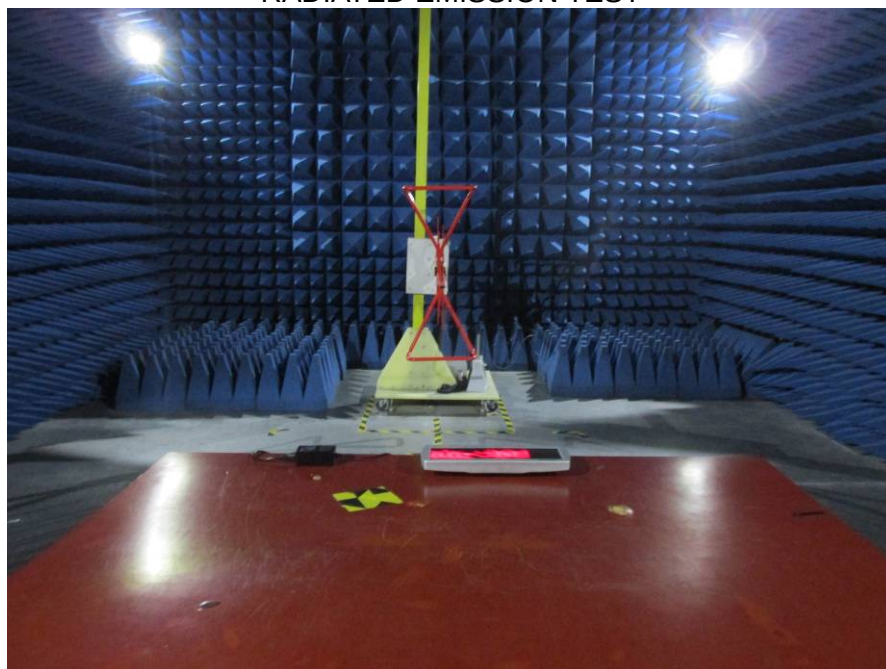
All the x/y/z orientation has been investigated, and only worst case is presented in this report.

## 6. EUT TEST PHOTO

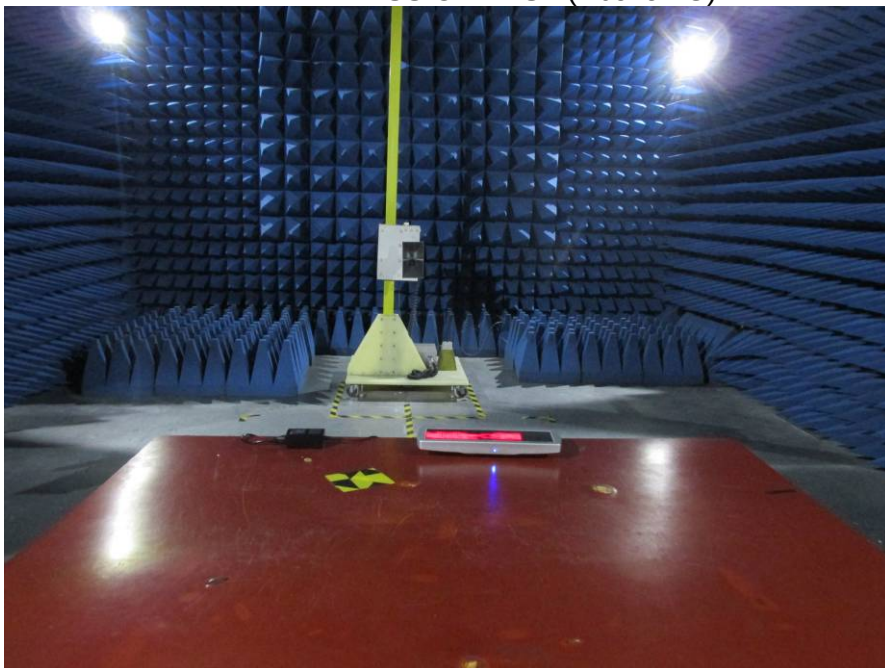
CONDUCTED EMISSION TEST



RADIATED EMISSION TEST



RADIATED EMISSION TEST (Above 1G)





## 7. PHOTOGRAPHS OF EUT

Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT





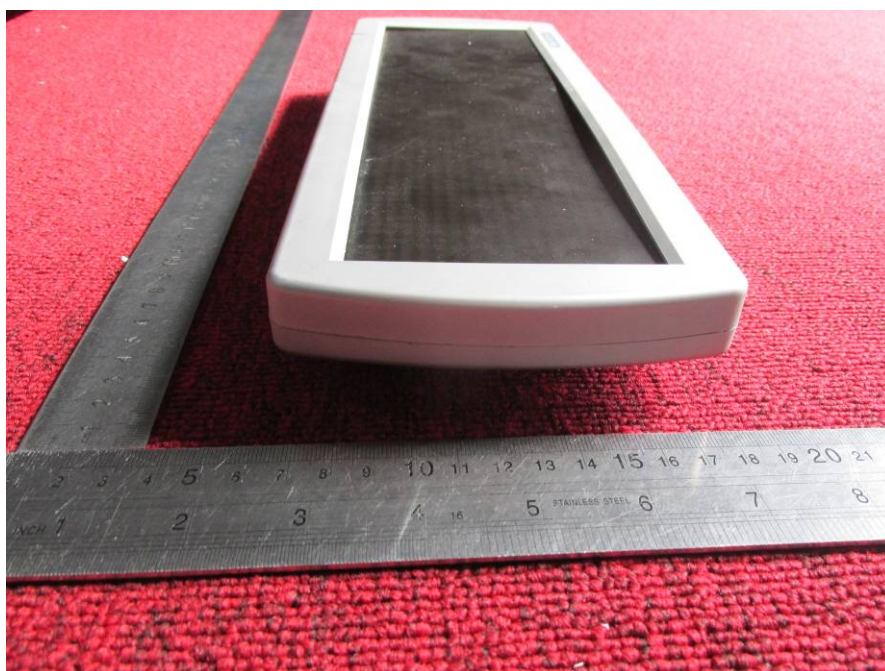
Appearance photograph of EUT



Appearance photograph of EUT



Appearance photograph of EUT

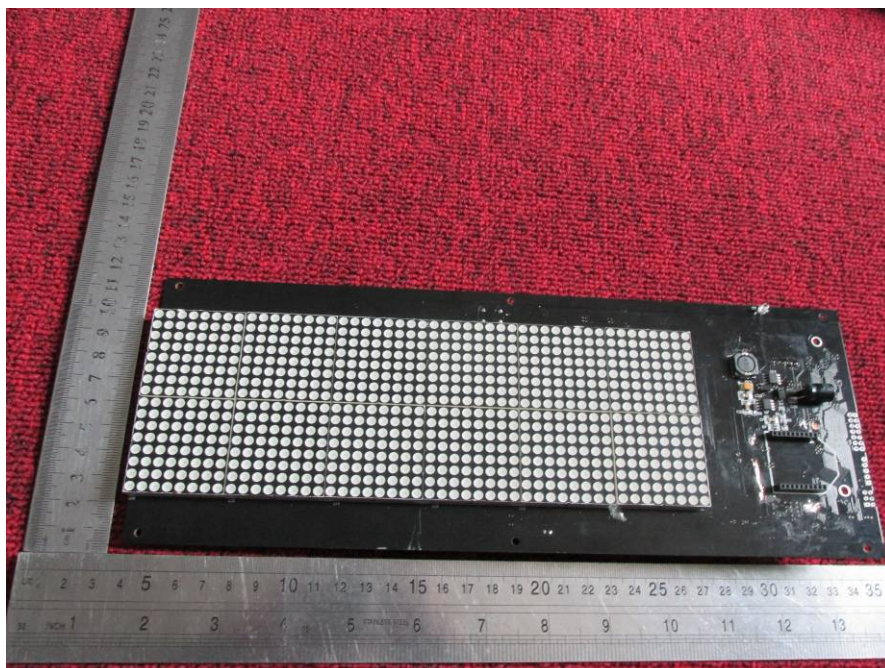


Internal photograph of EUT

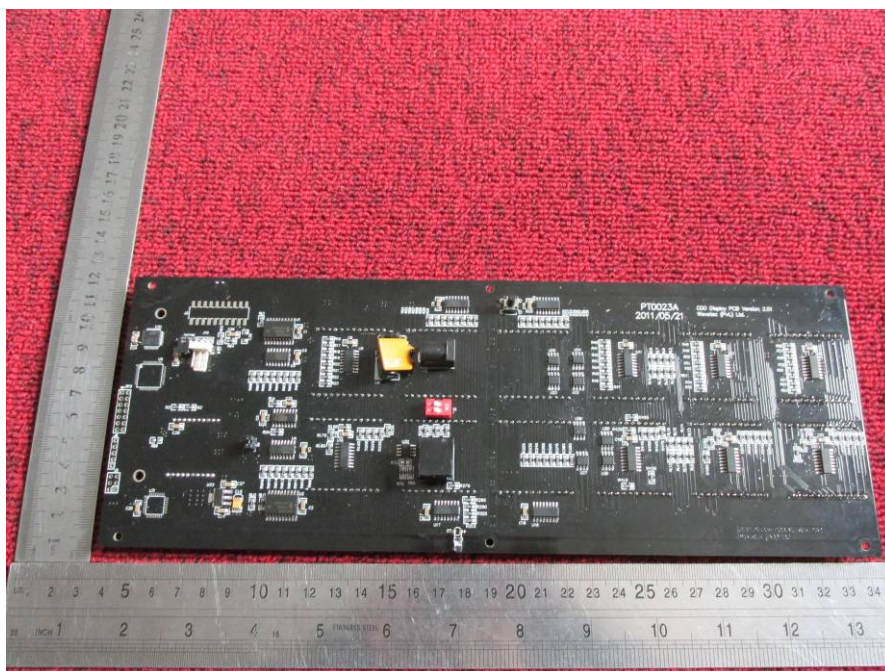




Internal photograph of EUT



Internal photograph of EUT



—END OF REPORT—