

## FCC Test Report

**Report No.:** RF160112C17-10

**FCC ID:** NM82PS6200

**Test Model:** 2PS6200

**Received Date:** Dec. 21, 2015

**Test Date:** Feb. 03, 2016 ~ Feb. 23, 2016

**Issued Date:** Feb. 25, 2016

**Applicant:** HTC Corporation

**Address:** 1F, 6-3 Baoqiang Road, Xindian District, New Taipei City, Taiwan 231

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan  
( R.O.C )

**Test Location (1):** No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan  
Hsien 333, Taiwan, R.O.C.

**Test Location (2):** No.215, Sec. 3, Beixin Rd., Xindian Dist., New Taipei City 231, Taiwan,  
R.O.C



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. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

## Table of Contents

|                                                                  |           |
|------------------------------------------------------------------|-----------|
| <b>Release Control Record .....</b>                              | <b>3</b>  |
| <b>1 Certificate of Conformity .....</b>                         | <b>4</b>  |
| <b>2 Summary of Test Results.....</b>                            | <b>5</b>  |
| 2.1 Measurement Uncertainty.....                                 | 5         |
| 2.2 Modification Record .....                                    | 5         |
| <b>3 General Information .....</b>                               | <b>6</b>  |
| 3.1 General Description of EUT .....                             | 6         |
| 3.2 Description of Test Modes.....                               | 7         |
| 3.2.1 Test Mode Applicability and Tested Channel Detail.....     | 8         |
| 3.3 Description of Support Units .....                           | 9         |
| 3.3.1 Configuration of System under Test .....                   | 9         |
| 3.4 General Description of Applied Standards.....                | 9         |
| <b>4 Test Types and Results .....</b>                            | <b>10</b> |
| 4.1 Radiated Emission and Bandedge Measurement .....             | 10        |
| 4.1.1 Limits of Radiated Emission and Bandedge Measurement ..... | 10        |
| 4.1.2 Test Instruments .....                                     | 11        |
| 4.1.3 Test Procedures.....                                       | 12        |
| 4.1.4 Deviation from Test Standard .....                         | 12        |
| 4.1.5 Test Set Up .....                                          | 13        |
| 4.1.6 EUT Operating Conditions.....                              | 13        |
| 4.1.7 Test Results .....                                         | 14        |
| 4.2 Conducted Emission Measurement.....                          | 19        |
| 4.2.1 Limits of Conducted Emission Measurement .....             | 19        |
| 4.2.2 Test Instruments .....                                     | 19        |
| 4.2.3 Test Procedures.....                                       | 19        |
| 4.2.4 Deviation from Test Standard .....                         | 20        |
| 4.2.5 Test Setup.....                                            | 20        |
| 4.2.6 EUT Operating Conditions.....                              | 20        |
| 4.2.7 Test Results .....                                         | 21        |
| <b>5 Pictures of Test Arrangements.....</b>                      | <b>23</b> |
| <b>Appendix – Information on the Testing Laboratories .....</b>  | <b>24</b> |



A D T

### Release Control Record

| Issue No.      | Description      | Date Issued   |
|----------------|------------------|---------------|
| RF160112C17-10 | Original Release | Feb. 25, 2016 |

## 1 Certificate of Conformity

**Product:** Smartphone

**Brand:** HTC

**Test Model:** 2PS6200

**Sample Status:** Production Unit

**Applicant:** HTC Corporation

**Test Date:** Feb. 03, 2016 ~ Feb. 23, 2016

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.249)  
ANSI C63.10: 2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by :**

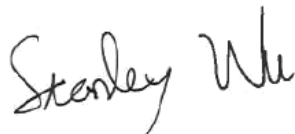


**Date:**

Feb. 25, 2016

Ivonne Wu / Supervisor

**Approved by :**



**Date:**

Feb. 25, 2016

Stanley Wu / Assistant Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (SECTION 15.249) |                                                                                                                                                                    |        |                                                                                       |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                                                                                                                                          | Result | Remarks                                                                               |
| 15.207                                         | AC Power Conducted Emission                                                                                                                                        | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -19.56 dB at 0.58255 MHz. |
| 15.209<br>15.249<br>15.249 (d)                 | Radiated Emission Test<br>Band Edge Measurement<br>Limit: 50dB less than the peak value of fundamental frequency or meet radiated emission limit in section 15.209 | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -1.94 dB at 2441.00 MHz.  |

### 2.1 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         | Expended Uncertainty (k=2) (±) |
|------------------------------------|-------------------|--------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz  | 2.44 dB                        |
| Radiated Emissions up to 1 GHz     | 30 MHz ~ 200 MHz  | 2.0153 dB                      |
|                                    | 200 MHz ~1000 MHz | 2.0224 dB                      |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz    | 1.0121 dB                      |
|                                    | 18 GHz ~ 40 GHz   | 1.1508 dB                      |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                            |                                                                  |
|----------------------------|------------------------------------------------------------------|
| <b>Product</b>             | Smartphone                                                       |
| <b>Brand</b>               | HTC                                                              |
| <b>Test Model</b>          | 2PS6200                                                          |
| <b>Status of EUT</b>       | Production Unit                                                  |
| <b>Power Supply Rating</b> | 5.0 Vdc (adapter or host equipment)<br>3.85 Vdc (Li-ion battery) |
| <b>Modulation Type</b>     | GFSK                                                             |
| <b>Operating Frequency</b> | 2403 ~ 2480 MHz                                                  |
| <b>Number of Channel</b>   | 78                                                               |
| <b>Antenna Type</b>        | PIFA antenna with -2 dBi gain                                    |
| <b>Antenna Connector</b>   | N/A                                                              |
| <b>Accessory Device</b>    | Refer to Note as below                                           |
| <b>Data Cable Supplied</b> | Refer to Note as below                                           |

Note:

1. The EUT's accessories list refers to Ext. Pho.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

### 3.2 Description of Test Modes

78 channels are provided to this EUT:

| Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) | Channel | Freq. (MHz) |
|---------|-------------|---------|-------------|---------|-------------|---------|-------------|
| 1       | 2403        | 21      | 2423        | 41      | 2443        | 61      | 2463        |
| 2       | 2404        | 22      | 2424        | 42      | 2444        | 62      | 2464        |
| 3       | 2405        | 23      | 2425        | 43      | 2445        | 63      | 2465        |
| 4       | 2406        | 24      | 2426        | 44      | 2446        | 64      | 2466        |
| 5       | 2407        | 25      | 2427        | 45      | 2447        | 65      | 2467        |
| 6       | 2408        | 26      | 2428        | 46      | 2448        | 66      | 2468        |
| 7       | 2409        | 27      | 2429        | 47      | 2449        | 67      | 2469        |
| 8       | 2410        | 28      | 2430        | 48      | 2450        | 68      | 2470        |
| 9       | 2411        | 29      | 2431        | 49      | 2451        | 69      | 2471        |
| 10      | 2412        | 30      | 2432        | 50      | 2452        | 70      | 2472        |
| 11      | 2413        | 31      | 2433        | 51      | 2453        | 71      | 2473        |
| 12      | 2414        | 32      | 2434        | 52      | 2454        | 72      | 2474        |
| 13      | 2415        | 33      | 2435        | 53      | 2455        | 73      | 2475        |
| 14      | 2416        | 34      | 2436        | 54      | 2456        | 74      | 2476        |
| 15      | 2417        | 35      | 2437        | 55      | 2457        | 75      | 2477        |
| 16      | 2418        | 36      | 2438        | 56      | 2458        | 76      | 2478        |
| 17      | 2419        | 37      | 2439        | 57      | 2459        | 77      | 2479        |
| 18      | 2420        | 38      | 2440        | 58      | 2460        | 78      | 2480        |
| 19      | 2421        | 39      | 2441        | 59      | 2461        |         |             |
| 20      | 2422        | 40      | 2442        | 60      | 2462        |         |             |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To |       |     | Description |
|--------------------|---------------|-------|-----|-------------|
|                    | RE $\geq$ 1G  | RE<1G | PLC |             |
| -                  | √             | √     | √   | -           |

Where  
**RE $\geq$ 1G:** Radiated Emission above 1 GHz & Bandedge Measurement  
**PLC:** Power Line Conducted Emission

**RE<1G:** Radiated Emission below 1 GHz

**NOTE:** The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Y-plane**.

#### **Radiated Emission Test (Above 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Available Channel | Tested Channel | Modulation Type |
|--------------------|-------------------|----------------|-----------------|
| -                  | 1 to 78           | 1, 39, 78      | GFSK            |

#### **Radiated Emission Test (Below 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Tested Channel | Modulation Technology | Modulation Type |
|--------------------|----------------|-----------------------|-----------------|
| -                  | 1 to 78        | 39                    | GFSK            |

#### **Power Line Conducted Emission Test:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Tested Channel | Modulation Technology | Modulation Type |
|--------------------|----------------|-----------------------|-----------------|
| -                  | 1 to 78        | 39                    | GFSK            |

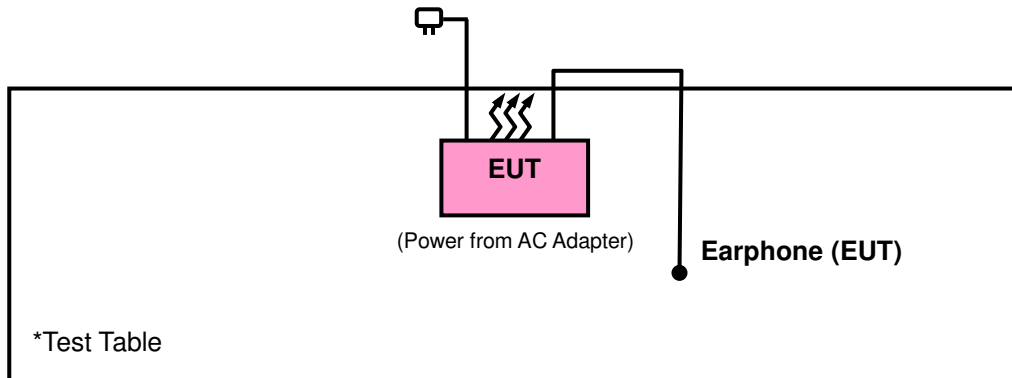
#### **Test Condition:**

| Applicable To                | Environmental Conditions | Input Power    | Tested By     |
|------------------------------|--------------------------|----------------|---------------|
| <b>RE<math>\geq</math>1G</b> | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Charles Hsiao |
| <b>RE&lt;1G</b>              | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Charles Hsiao |
| <b>PLC</b>                   | 25 deg. C, 68 % RH       | 120 Vac, 60 Hz | Toby Tian     |

### 3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

#### 3.3.1 Configuration of System under Test



### 3.4 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 (15.249)

ANSI C63.10-2013

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

**NOTE:** The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).  
The test report has been issued separately.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following

| Fundamental Frequency | Field Strength of Fundamental (millivolts/meter) | Field Strength of Harmonics (microvolts/meter) |
|-----------------------|--------------------------------------------------|------------------------------------------------|
| 902 ~ 928 MHz         | 50                                               | 500                                            |
| 2400 ~ 2483.5 MHz     | 50                                               | 500                                            |
| 5725 ~ 5875 MHz       | 50                                               | 500                                            |
| 24 ~ 24.25 GHz        | 250                                              | 2500                                           |

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

| 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                             |

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, 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.

## 4.1.2 Test Instruments

| Description & Manufacturer                     | Model No.       | Serial No.                                                        | Date of Calibration | Due Date of Calibration |
|------------------------------------------------|-----------------|-------------------------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent Technologies          | N9038A          | MY52260177                                                        | May 19, 2015        | May 18, 2016            |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43           | 101261                                                            | Dec. 17, 2015       | Dec. 16, 2016           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168        | 9168-472                                                          | Jan. 07, 2016       | Jan. 06, 2017           |
| HORN Antenna<br>ETS-Lindgren                   | 3117            | 00143293                                                          | Jan. 04, 2016       | Jan. 03, 2017           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170       | 9170-480                                                          | Jan. 04, 2016       | Jan. 03, 2017           |
| Bluetooth Tester                               | CBT             | 100980                                                            | Apr. 27, 2015       | Apr. 26, 2017           |
| Agilent Communications<br>Tester-Wireless      | 8960 Series 10  | MY53201073                                                        | Jul. 03, 2015       | Jul. 02, 2017           |
| Preamplifier<br>Agilent                        | 310N            | 187226                                                            | Jun. 29, 2015       | Jun. 28, 2016           |
| Preamplifier<br>Agilent                        | 83017A          | MY39501357                                                        | Jun. 29, 2015       | Jun. 28, 2016           |
| Power Meter<br>Anritsu                         | ML2495A         | 1232002                                                           | Sep. 21, 2015       | Sep. 20, 2016           |
| Power Sensor<br>Anritsu                        | MA2411B         | 1207325                                                           | Sep. 21, 2015       | Sep. 20, 2016           |
| RF signal cable<br>ETS-LINDGREN                | 5D-FB           | Cable-CH1-01(R<br>FC-SMS-100-SM<br>S-120+RFC-SMS<br>-100-SMS-400) | Jun. 27, 2015       | Jun. 26, 2016           |
| RF signal cable<br>ETS-LINDGREN                | 8D-FB           | Cable-CH1-02(R<br>FC-SMS-100-SM<br>S-24)                          | Jun. 27, 2015       | Jun. 26, 2016           |
| Software<br>BV ADT                             | E3<br>8.130425b | NA                                                                | NA                  | NA                      |
| Antenna Tower<br>MF                            | NA              | NA                                                                | NA                  | NA                      |
| Turn Table<br>MF                               | NA              | NA                                                                | NA                  | NA                      |
| Antenna Tower & Turn<br>Table Controller<br>MF | MF-7802         | NA                                                                | NA                  | NA                      |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in HsinTien Chamber 1.
3. The horn antenna and preamplifier (model: 83017A) are used only for the measurement of emission frequency above 1GHz if tested.
4. The FCC Site Registration No. is 149147.
5. The IC Site Registration No. is IC7450I-1.

#### 4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. 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 quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

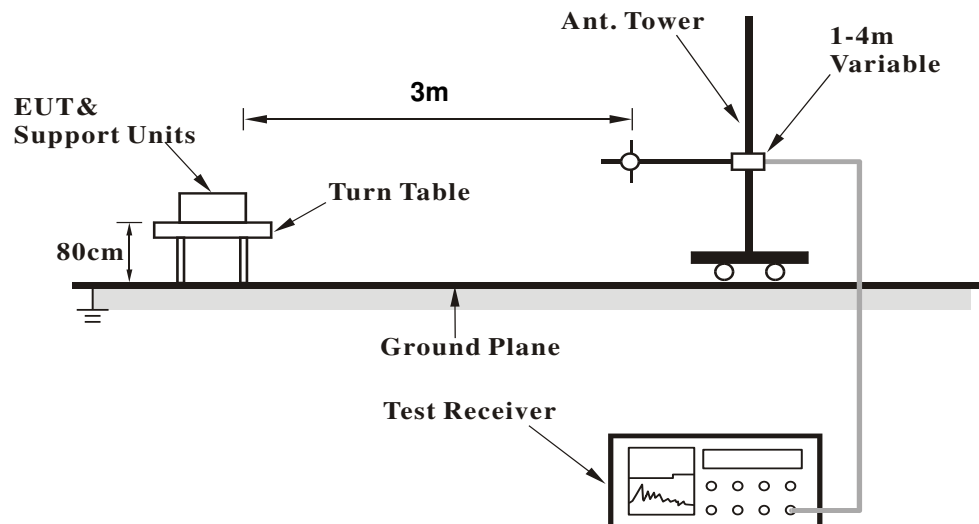
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for RMS Average (Duty cycle < 98 %) for Average detection (AV) at frequency above 1 GHz, then the measurement results was added to a correction factor ( $10 \log(1/\text{duty cycle})$ ).
4. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 10 Hz (Duty cycle  $\geq 98$  %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

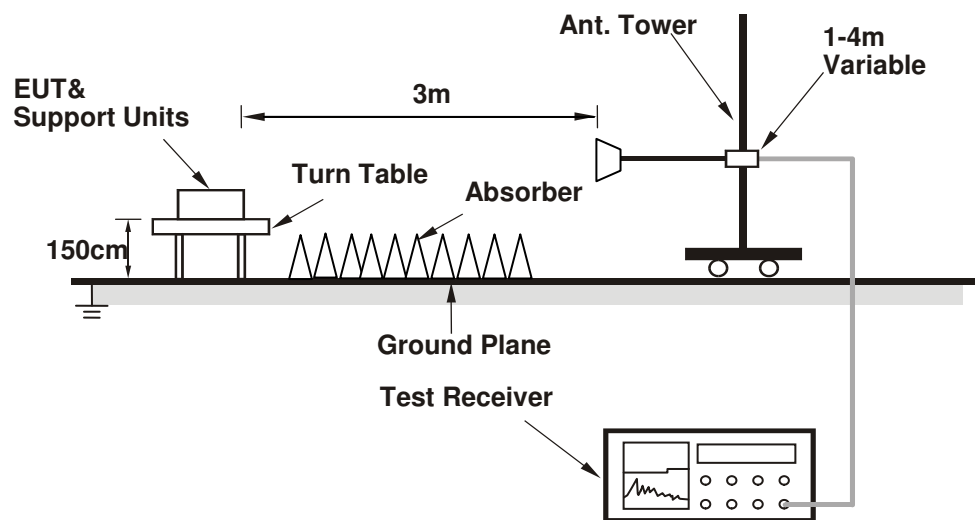
No deviation.

#### 4.1.5 Test Set Up

##### <Frequency Range below 1 GHz>



##### <Frequency Range above 1 GHz>



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

#### 4.1.6 EUT Operating Conditions

Set the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1 GHz WORST-CASE DATA:

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 1          | Frequency Range    | 1 GHz ~ 25 GHz            |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Charles Hsiao             |

| Antennal Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|------------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2388                                                 | 45.18                   | 43.47             | 54             | -8.82       | 31.8                  | 5.4             | 35.49              | 266                 | 306                  | Average |
| 2388                                                 | 56.3                    | 54.59             | 74             | -17.7       | 31.8                  | 5.4             | 35.49              | 266                 | 306                  | Peak    |
| 2403                                                 | 89.91                   | 88.17             | 94             | -4.09       | 31.81                 | 5.4             | 35.47              | 266                 | 306                  | Average |
| 2403                                                 | 100.03                  | 98.29             | 114            | -13.97      | 31.81                 | 5.4             | 35.47              | 266                 | 306                  | Peak    |
| 2500                                                 | 46.07                   | 44.05             | 54             | -7.93       | 31.9                  | 5.53            | 35.41              | 266                 | 306                  | Average |
| 2500                                                 | 56.19                   | 54.17             | 74             | -17.81      | 31.9                  | 5.53            | 35.41              | 266                 | 306                  | Peak    |
| Antennal Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2382                                                 | 46.16                   | 44.47             | 54             | -7.84       | 31.78                 | 5.4             | 35.49              | 120                 | 263                  | Average |
| 2382                                                 | 56.28                   | 54.59             | 74             | -17.72      | 31.78                 | 5.4             | 35.49              | 120                 | 263                  | Peak    |
| 2403                                                 | 86.89                   | 85.15             | 94             | -7.11       | 31.81                 | 5.4             | 35.47              | 120                 | 263                  | Average |
| 2403                                                 | 97.01                   | 95.27             | 114            | -16.99      | 31.81                 | 5.4             | 35.47              | 120                 | 263                  | Peak    |
| 2498                                                 | 45.57                   | 43.55             | 54             | -8.43       | 31.9                  | 5.53            | 35.41              | 120                 | 263                  | Average |
| 2498                                                 | 55.69                   | 53.67             | 74             | -18.31      | 31.9                  | 5.53            | 35.41              | 120                 | 263                  | Peak    |

#### Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:  

$$20 \log (\text{Duty cycle}) = 20 \log (0.39 \text{ ms} / 0.08 \text{ ms}) = -10.12 \text{ dB}$$
Please refer to the plotted duty

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 39         | Frequency Range    | 1 GHz ~ 25 GHz            |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Charles Hsiao             |

| Antennal Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|------------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2348                                                 | 45.93                   | 44.36             | 54             | -8.07       | 31.74                 | 5.33            | 35.5               | 287                 | 306                  | Average |
| 2348                                                 | 56.05                   | 54.48             | 74             | -17.95      | 31.74                 | 5.33            | 35.5               | 287                 | 306                  | Peak    |
| 2441                                                 | 92.06                   | 90.19             | 94             | -1.94       | 31.85                 | 5.46            | 35.44              | 287                 | 306                  | Average |
| 2441                                                 | 102.18                  | 100.31            | 114            | -11.82      | 31.85                 | 5.46            | 35.44              | 287                 | 306                  | Peak    |
| 2498                                                 | 45.52                   | 43.5              | 54             | -8.48       | 31.9                  | 5.53            | 35.41              | 287                 | 306                  | Average |
| 2498                                                 | 55.64                   | 53.62             | 74             | -18.36      | 31.9                  | 5.53            | 35.41              | 287                 | 306                  | Peak    |
| Antennal Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2384                                                 | 45.15                   | 43.46             | 54             | -8.85       | 31.78                 | 5.4             | 35.49              | 103                 | 263                  | Average |
| 2384                                                 | 55.27                   | 53.58             | 74             | -18.73      | 31.78                 | 5.4             | 35.49              | 103                 | 263                  | Peak    |
| 2441                                                 | 89.66                   | 87.79             | 94             | -4.34       | 31.85                 | 5.46            | 35.44              | 103                 | 263                  | Average |
| 2441                                                 | 99.78                   | 97.91             | 114            | -14.22      | 31.85                 | 5.46            | 35.44              | 103                 | 263                  | Peak    |
| 2496                                                 | 45.58                   | 43.56             | 54             | -8.42       | 31.9                  | 5.53            | 35.41              | 103                 | 263                  | Average |
| 2496                                                 | 55.7                    | 53.68             | 74             | -18.3       | 31.9                  | 5.53            | 35.41              | 103                 | 263                  | Peak    |

#### Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:  

$$20 \log (\text{Duty cycle}) = 20 \log (0.39 \text{ ms} / 0.08 \text{ ms}) = -10.12 \text{ dB}$$
Please refer to the plotted duty

| EUT Test Condition       |                    | Measurement Detail |                           |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel                  | Channel 78         | Frequency Range    | 1 GHz ~ 25 GHz            |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Charles Hsiao             |

| Antennal Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|------------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2364                                                 | 46.65                   | 45.02             | 54             | -7.35       | 31.76                 | 5.37            | 35.5               | 278                 | 306                  | Average |
| 2364                                                 | 56.77                   | 55.14             | 74             | -17.23      | 31.76                 | 5.37            | 35.5               | 278                 | 306                  | Peak    |
| 2480                                                 | 90.16                   | 88.2              | 94             | -3.84       | 31.88                 | 5.5             | 35.42              | 278                 | 306                  | Average |
| 2480                                                 | 100.28                  | 98.32             | 114            | -13.72      | 31.88                 | 5.5             | 35.42              | 278                 | 306                  | Peak    |
| 2484                                                 | 45.96                   | 44                | 54             | -8.04       | 31.88                 | 5.5             | 35.42              | 278                 | 306                  | Average |
| 2484                                                 | 56.08                   | 54.12             | 74             | -17.92      | 31.88                 | 5.5             | 35.42              | 278                 | 306                  | Peak    |
| Antennal Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark  |
| 2322                                                 | 46.46                   | 44.95             | 54             | -7.54       | 31.73                 | 5.3             | 35.52              | 101                 | 263                  | Average |
| 2322                                                 | 56.58                   | 55.07             | 74             | -17.42      | 31.73                 | 5.3             | 35.52              | 101                 | 263                  | Peak    |
| 2480                                                 | 87.22                   | 85.26             | 94             | -6.78       | 31.88                 | 5.5             | 35.42              | 101                 | 263                  | Average |
| 2480                                                 | 97.34                   | 95.38             | 114            | -16.66      | 31.88                 | 5.5             | 35.42              | 101                 | 263                  | Peak    |
| 2500                                                 | 45.57                   | 43.55             | 54             | -8.43       | 31.9                  | 5.53            | 35.41              | 101                 | 263                  | Average |
| 2500                                                 | 55.69                   | 53.67             | 74             | -18.31      | 31.9                  | 5.53            | 35.41              | 101                 | 263                  | Peak    |

#### Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:  

$$20 \log (\text{Duty cycle}) = 20 \log (0.39 \text{ ms} / 0.08 \text{ ms}) = -10.12 \text{ dB}$$
Please refer to the plotted duty

### Below 1 GHz WORST-CASE DATA:

| EUT Test Condition       |                    | Measurement Detail |                              |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel                  | Channel 39         | Frequency Range    | 30 MHz ~ 1 GHz               |
| Input Power              | 120 Vac, 60 Hz     | Detector Function  | Peak (PK)<br>Quasi-peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By          | Charles Hsiao                |

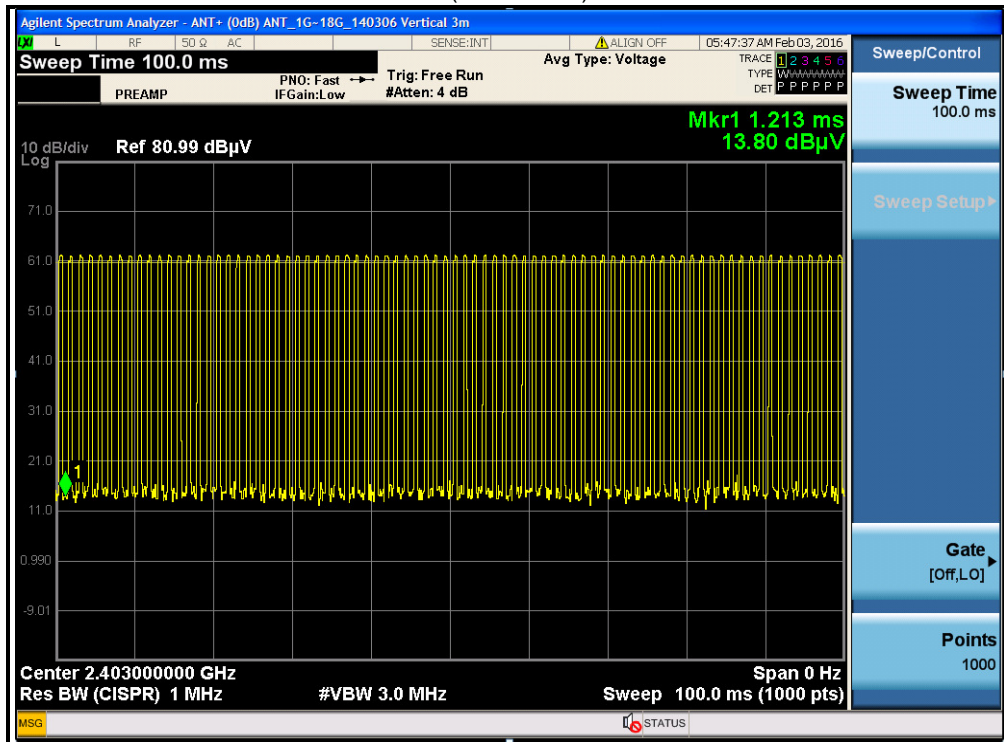
| Antennal Polarity & Test Distance: Horizontal at 3 m |                         |                   |                |             |                       |                 |                    |                     |                      |        |
|------------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 97.77                                                | 30.07                   | 51.44             | 43.5           | -13.43      | 9.5                   | 1.28            | 32.15              | 161                 | 302                  | Peak   |
| 149.07                                               | 37.16                   | 57.87             | 43.5           | -6.34       | 10.04                 | 1.52            | 32.27              | 180                 | 149                  | Peak   |
| 191.19                                               | 35.33                   | 55.52             | 43.5           | -8.17       | 10.46                 | 1.61            | 32.26              | 190                 | 350                  | Peak   |
| 511.4                                                | 21.66                   | 31.32             | 46             | -24.34      | 19.76                 | 2.7             | 32.12              | 105                 | 97                   | Peak   |
| 637.4                                                | 23.32                   | 30.45             | 46             | -22.68      | 22.1                  | 2.93            | 32.16              | 164                 | 233                  | Peak   |
| 834.8                                                | 25.9                    | 30.74             | 46             | -20.1       | 23.65                 | 3.38            | 31.87              | 144                 | 259                  | Peak   |
| Antennal Polarity & Test Distance: Vertical at 3 m   |                         |                   |                |             |                       |                 |                    |                     |                      |        |
| Frequency (MHz)                                      | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 34.59                                                | 36.21                   | 53.1              | 40             | -3.79       | 14.61                 | 0.74            | 32.24              | 134                 | 259                  | Peak   |
| 143.4                                                | 30.84                   | 52.12             | 43.5           | -12.66      | 9.61                  | 1.38            | 32.27              | 180                 | 130                  | Peak   |
| 197.13                                               | 28.51                   | 48.45             | 43.5           | -14.99      | 10.73                 | 1.61            | 32.28              | 197                 | 13                   | Peak   |
| 552                                                  | 20.43                   | 29.6              | 46             | -25.57      | 20.27                 | 2.76            | 32.2               | 155                 | 244                  | Peak   |
| 685                                                  | 24.04                   | 29.83             | 46             | -21.96      | 23.27                 | 3.05            | 32.11              | 111                 | 304                  | Peak   |
| 836.2                                                | 25.89                   | 30.73             | 46             | -20.11      | 23.65                 | 3.38            | 31.87              | 125                 | 88                   | Peak   |

#### Remarks:

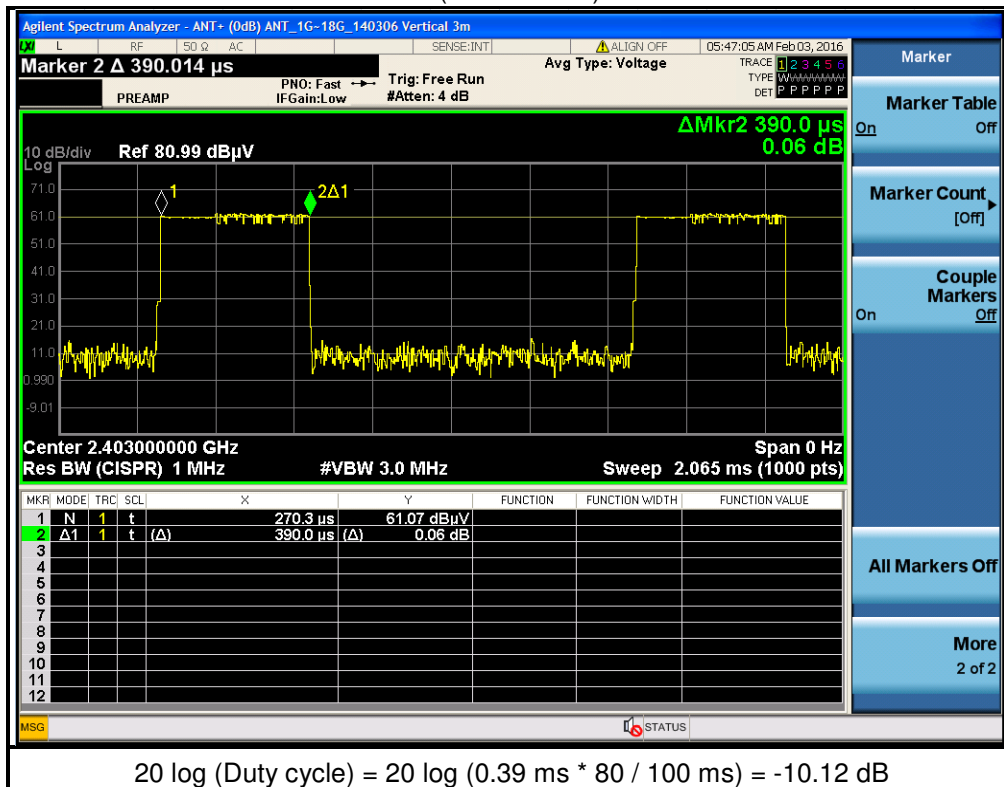
- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- The average value of fundamental frequency is: Average = Peak value + 20log(Duty cycle) Where the duty factor is calculated from following formula:  
20 log (Duty cycle) = 20 log (0.39 ms / 0.08 ms) = -10.12 dB  
Please refer to the plotted duty

### <Duty Cycle Correction Factor>

DH5 on time/100 ms (One Pulse) Plot on Channel 39



DH5 on time/100 ms (Count Pulse) Plot on Channel 39



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 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 0.50 MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer                  | Model No.                | Serial No.     | Date Of Calibration | Due Date Of Calibration |
|---------------------------------------------|--------------------------|----------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ            | ESCI                     | 100613         | Nov. 16, 2015       | Nov. 15, 2016           |
| RF signal cable (with<br>10dB PAD)<br>Woken | 5D-FB                    | Cable-cond1-01 | Dec. 26, 2015       | Dec. 25, 2016           |
| LISN<br>ROHDE & SCHWARZ<br>(EUT)            | ESH3-Z5                  | 835239/001     | Feb. 26, 2015       | Feb. 25, 2016           |
| LISN<br>ROHDE & SCHWARZ<br>(Peripheral)     | ESH3-Z5                  | 100311         | Jul. 24, 2015       | Jul. 23, 2016           |
| Software<br>ADT                             | BV ADT_Cond_<br>V7.3.7.3 | NA             | NA                  | NA                      |

- Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
  2. The test was performed in HwaYa Shielded Room 1.
  3. The VCCI Site Registration No. is C-2040.

### 4.2.3 Test Procedures

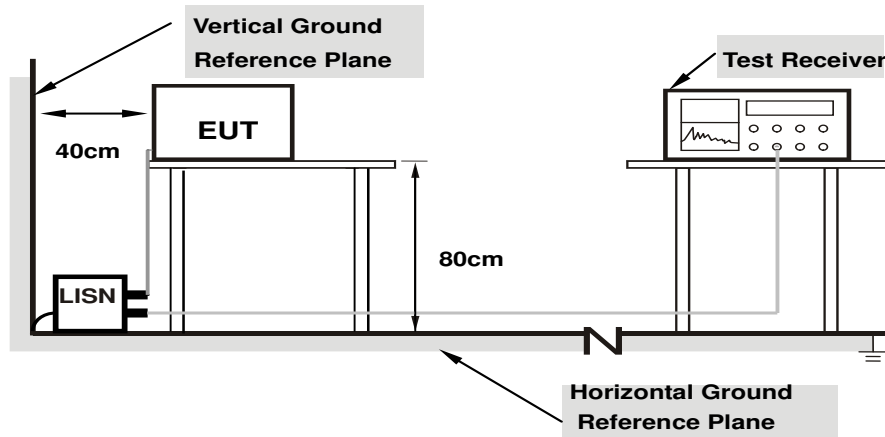
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50 uH of coupling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

**NOTE:** The resolution bandwidth and video bandwidth of test receiver is 9 kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15 MHz - 30 MHz.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



**Note: 1.Support units were connected to second LISN.**

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

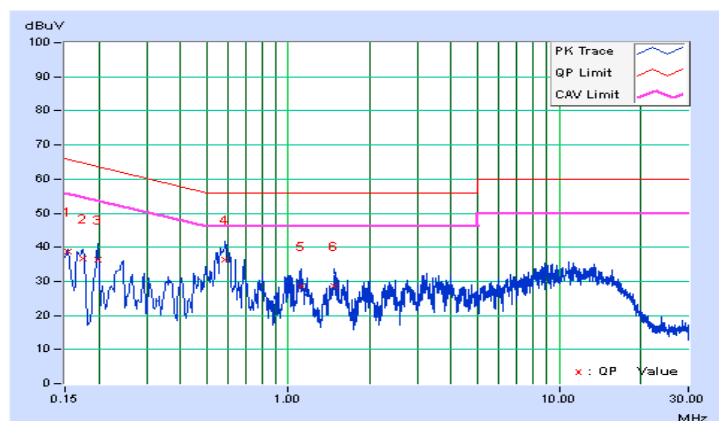
#### 4.2.7 Test Results

|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 25°C, 65%RH                          |
| Tested by       | Toby Tian      | Test Date                                | 2016/2/23                            |

| Phase Of Power : Line (L) |                 |                        |                      |       |                       |       |              |       |             |        |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                        | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                           |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                         | 0.15400         | 9.93                   | 28.86                | 24.02 | 38.79                 | 33.95 | 65.78        | 55.78 | -26.99      | -21.83 |
| 2                         | 0.17384         | 9.94                   | 26.92                | 14.07 | 36.86                 | 24.01 | 64.77        | 54.77 | -27.92      | -30.77 |
| 3                         | 0.19800         | 9.95                   | 26.43                | 15.51 | 36.38                 | 25.46 | 63.69        | 53.69 | -27.32      | -28.24 |
| 4                         | 0.58255         | 10.05                  | 26.39                | 16.18 | 36.44                 | 26.23 | 56.00        | 46.00 | -19.56      | -19.77 |
| 5                         | 1.11000         | 10.12                  | 18.55                | 8.90  | 28.67                 | 19.02 | 56.00        | 46.00 | -27.33      | -26.98 |
| 6                         | 1.48600         | 10.14                  | 18.41                | 7.83  | 28.55                 | 17.97 | 56.00        | 46.00 | -27.45      | -28.03 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

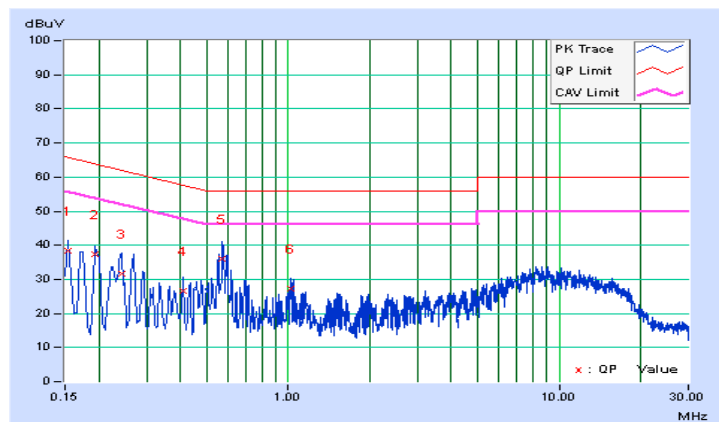


|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 25°C, 65%RH                          |
| Tested by       | Toby Tian      | Test Date                                | 2016/2/23                            |

| Phase Of Power : Neutral (N) |                 |                        |                      |       |                       |       |              |       |             |        |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                           | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                              |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                            | 0.15400         | 9.93                   | 28.57                | 24.26 | 38.50                 | 34.19 | 65.78        | 55.78 | -27.29      | -21.60 |
| 2                            | 0.19418         | 9.94                   | 27.30                | 11.11 | 37.24                 | 21.05 | 63.86        | 53.86 | -26.62      | -32.81 |
| 3                            | 0.24200         | 9.96                   | 21.78                | 7.94  | 31.74                 | 17.90 | 62.03        | 52.03 | -30.29      | -34.13 |
| 4                            | 0.41000         | 10.03                  | 16.61                | 2.51  | 26.64                 | 12.54 | 57.65        | 47.65 | -31.01      | -35.11 |
| 5                            | 0.57040         | 10.05                  | 26.14                | 14.17 | 36.19                 | 24.22 | 56.00        | 46.00 | -19.81      | -21.78 |
| 6                            | 1.02200         | 10.11                  | 17.00                | 5.34  | 27.11                 | 15.45 | 56.00        | 46.00 | -28.89      | -30.55 |

#### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



## **5 Pictures of Test Arrangements**

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

## Appendix – Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Linko EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---