

# VARIANT FCC TEST REPORT (15.407)

**REPORT NO.:** RF150729C24B-1  
**MODEL NO.:** P200 Plus  
**FCC ID:** B32P400PLUS  
**RECEIVED:** Dec. 11, 2015  
**TESTED:** Dec. 18, 2015 ~ Dec. 23, 2015  
**ISSUED:** Dec. 31, 2015

**APPLICANT:** Verifone, Inc.

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Rocklin CA 95765 USA

**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:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei  
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## RELEASE CONTROL RECORD

| ISSUE NO.      | REASON FOR CHANGE | DATE ISSUED   |
|----------------|-------------------|---------------|
| RF150729C24B-1 | Original release  | Dec. 31, 2015 |



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## REPORT ISSUE RECORD OF EUT

| ISSUE NO.      | REASON FOR CHANGE                                                                                                                                                                                                                                                       | DATE ISSUED   |
|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| RF150729C24-1  | Original release                                                                                                                                                                                                                                                        | Aug. 21, 2015 |
| RF150729C24B-1 | 1. Add series model: P200 Plus.<br>2. The differences between the original model (P400 Plus) and new adding model (P200 Plus) are:<br>* LCM (Touch Panel and Non-touch Panel).<br>* The matching values of CTLS (RFID).<br>3. Dongle cable update to "CBL435-044-01-A". | Dec. 31, 2015 |



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## 1. CERTIFICATION

**PRODUCT:** Point of Sale Terminal

**MODEL NO.:** P200 Plus

**BRAND:** Verifone

**APPLICANT:** Verifone, Inc.

**TESTED:** Dec. 18, 2015 ~ Dec. 23, 2015

**TEST SAMPLE:** Identical Prototype

**STANDARDS:** FCC Part 15, Subpart E (Section 15.407)

ANSI C63.10-2013

This report issued as a supplementary report to BV ADT report no.: RF150729C24-1.

This report shall be used by combining with its original report.

**PREPARED BY**

:

*Rona Chen*

, **DATE** :

Dec. 31, 2015

Rona Chen / Specialist

**APPROVED BY**

:

*Stanley Wu*

, **DATE** :

Dec. 31, 2015

Stanley Wu / Assistant Manager

## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART E (SECTION 15.407) |                             |        |                                                                                  |
|-----------------------------------------------------------|-----------------------------|--------|----------------------------------------------------------------------------------|
| STANDARD SECTION                                          | TEST TYPE                   | RESULT | REMARK                                                                           |
| 15.407(b)(6)                                              | AC Power Conducted Emission | PASS   | Meet the requirement of limit. Minimum passing margin is -18.71dB at 0.56837MHz. |
| 15.407(b)(1/2/3)<br>(b)(6)                                | Radiated Emissions          | PASS   | Meet the requirement of limit. Minimum passing margin is -1.65dB at 365.62MHz.   |
| 15.407(a)(1/2/3)                                          | Max Average Transmit Power  | N/A    | Refer to Note                                                                    |
| 15.407(a)(1/2/3)                                          | Peak Power Spectral Density | N/A    | Refer to Note                                                                    |
| 15.407(e)                                                 | 6dB bandwidth               | N/A    | Refer to Note                                                                    |
| 15.407(g)                                                 | Frequency Stability         | N/A    | Refer to Note                                                                    |
| 15.203                                                    | Antenna Requirement         | PASS   | No antenna connector is used.                                                    |

### Note:

1. "N/A" means Not Applicable.
2. Only AC Power Conducted Emission and Radiated Emissions tests were performed for this addendum. Refer to original report for other test data.

### 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       | UNCERTAINTY |
|---------------------|-----------------|-------------|
| Conducted emissions | 9kHz~30MHz      | 2.44 dB     |
| Radiated emissions  | 30MHz ~ 200MHz  | 2.93 dB     |
|                     | 200MHz ~1000MHz | 2.95 dB     |
|                     | 1GHz ~ 18GHz    | 2.26 dB     |
|                     | 18GHz ~ 40GHz   | 1.94 dB     |

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

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                                                                                                                                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>EUT</b>                   | Point of Sale Terminal                                                                                                                                                                                                                                                                                    |
| <b>MODEL NO.</b>             | P200 Plus                                                                                                                                                                                                                                                                                                 |
| <b>POWER SUPPLY</b>          | 9.0Vdc (adapter)                                                                                                                                                                                                                                                                                          |
| <b>MODULATION TYPE</b>       | 64QAM, 16QAM, QPSK, BPSK                                                                                                                                                                                                                                                                                  |
| <b>MODULATION TECHNOLOGY</b> | OFDM                                                                                                                                                                                                                                                                                                      |
| <b>TRANSFER RATE</b>         | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0Mbps<br>802.11n: up to MCS7                                                                                                                                                                                                                          |
| <b>OPERATING FREQUENCY</b>   | 5180 ~ 5240MHz, 5260 ~ 5320MHz, 5500 ~ 5700MHz,<br>5745 ~ 5825MHz                                                                                                                                                                                                                                         |
| <b>NUMBER OF CHANNEL</b>     | 5180 ~ 5240MHz: 4 for 802.11a, 802.11n (20MHz)<br>2 for 802.11n (40MHz)<br>5260 ~ 5320MHz: 4 for 802.11a, 802.11n (20MHz)<br>2 for 802.11n (40MHz)<br>5500 ~ 5700MHz: 11 for 802.11a, 802.11n (20MHz)<br>5 for 802.11n (40MHz)<br>5745 ~ 5825MHz: 5 for 802.11a, 802.11n (20MHz)<br>2 for 802.11n (40MHz) |
| <b>ANTENNA TYPE</b>          | PIFA antenna with 1.43dBi gain (5180 ~ 5240MHz)<br>PIFA antenna with 1.80dBi gain (5260 ~ 5320MHz)<br>PIFA antenna with 1.77dBi gain (5500 ~ 5700MHz)<br>PIFA antenna with 1.88dBi gain (5745 ~ 5825MHz)                                                                                                  |
| <b>ANTENNA CONNECTOR</b>     | NA                                                                                                                                                                                                                                                                                                        |
| <b>DATA CABLE</b>            | Refer to Note as below                                                                                                                                                                                                                                                                                    |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                                                                                                                                                                                                                                    |
| <b>ACCESSORY DEVICES</b>     | Refer to Note as below                                                                                                                                                                                                                                                                                    |

#### NOTE:

- This report is issued as a supplementary report to BV ADT report no.: RF150729C24-1. The difference compared with original report is listed as below. Therefore, only AC Power Conducted Emission and Radiated Emissions tests were verified.
  - Add series model: P200 Plus.
  - The differences between the original model (P400 Plus) and new adding model (P200 Plus) are:
    - LCM (Touch Panel and Non-touch Panel)
    - The matching values of CTLS (RFID).
    - Dongle cable update to "CBL435-044-01-A".

2. The EUT contains following accessory devices.

| ITEM      | BRAND    | MODEL           | SPECIFICATION                                                                      |
|-----------|----------|-----------------|------------------------------------------------------------------------------------|
| Adapter 1 | Verifone | A109-1090103U   | I/P: 100-240Vac, 50/60Hz, 0.25A<br>O/P: 9Vdc, 1A<br>1.75m shielded cable w/o core  |
| Adapter 2 | Verifone | 2ACA009E UL     | I/P: 100-240Vac, 50/60Hz, 0.5A<br>O/P: 9Vdc, 1A<br>1.7m shielded cable with 1 core |
| Dongle    | Verifone | CBL435-044-01-A | 1.0 meter with one core with shielding                                             |

3. Physically, the EUT provides 1 completed transmitter and 1 receiver.

| MODULATION MODE | TX FUNCTION |
|-----------------|-------------|
| 802.11a         | 1TX         |
| 802.11n (20MHz) | 1TX         |
| 802.11n (40MHz) | 1TX         |

4. The above EUT information is declared by the manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

### 3.2 DESCRIPTION OF TEST MODES

#### WLAN 5180 ~ 5240MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 36      | 5180 MHz  | 44      | 5220 MHz  |
| 40      | 5200 MHz  | 48      | 5240 MHz  |

2 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 38      | 5190 MHz  | 46      | 5230 MHz  |

#### FOR 5260 ~ 5320MHz

4 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 52      | 5260 MHz  | 60      | 5300 MHz  |
| 56      | 5280 MHz  | 64      | 5320 MHz  |

2 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 54      | 5270 MHz  | 62      | 5310 MHz  |

#### WLAN 5500 ~ 5700MHz

11 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 100     | 5500MHz   | 124     | 5620MHz   |
| 104     | 5520MHz   | 128     | 5640MHz   |
| 108     | 5540MHz   | 132     | 5660MHz   |
| 112     | 5560MHz   | 136     | 5680MHz   |
| 116     | 5580MHz   | 140     | 5700MHz   |
| 120     | 5600MHz   |         |           |

5 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 102     | 5510MHz   | 126     | 5630MHz   |
| 110     | 5550MHz   | 134     | 5670MHz   |
| 118     | 5590MHz   |         |           |

**FOR 5.0GHz (5745 ~ 5825MHz):**

5 channels are provided for 802.11a, 802.11n (20MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 149     | 5745MHz   | 161     | 5805MHz   |
| 153     | 5765MHz   | 165     | 5825MHz   |
| 157     | 5785MHz   |         |           |

2 channels are provided for 802.11n (40MHz):

| CHANNEL | FREQUENCY | CHANNEL | FREQUENCY |
|---------|-----------|---------|-----------|
| 151     | 5755MHz   | 159     | 5795MHz   |

### 3.2.1 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL

| EUT CONFIGURE MODE | APPLICABLE TO |       |     |      | DESCRIPTION |
|--------------------|---------------|-------|-----|------|-------------|
|                    | RE $\geq$ 1G  | RE<1G | PLC | APCM |             |
| -                  | √             | √     | √   | -    | -           |

Where **RE $\geq$ 1G**: Radiated Emission above 1GHz

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

**PLC**: Power Line Conducted Emission

**APCM**: Antenna Port Conducted Measurement

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

#### **RADIATED EMISSION TEST (ABOVE 1GHz):**

- ☒ 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 | MODE            | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11n (40MHz) | 5180-5240        | 38 to 46          | 38             | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11n (40MHz) | 5260-5320        | 54 to 62          | 62             | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11n (40MHz) | 5500-5700        | 100 to 140        | 102            | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11a         | 5745-5825        | 149 to 165        | 149            | OFDM                  | BPSK            | 6.0              |

#### **RADIATED EMISSION TEST (BELOW 1GHz):**

- ☒ 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 | MODE            | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11n (40MHz) | 5180-5240        | 38 to 46          | 38             | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11n (40MHz) | 5260-5320        | 54 to 62          | 62             | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11n (40MHz) | 5500-5700        | 100 to 140        | 102            | OFDM                  | BPSK            | MCS0             |
| -                  | 802.11a         | 5745-5825        | 149 to 165        | 149            | OFDM                  | BPSK            | 6.0              |

#### **POWER LINE CONDUCTED EMISSION TEST:**

| EUT CONFIGURE MODE | MODE            | FREQ. BAND (MHz) | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|--------------------|-----------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| -                  | 802.11n (40MHz) | 5500-5700        | 100 to 140        | 102            | OFDM                  | BPSK            | MCS0             |

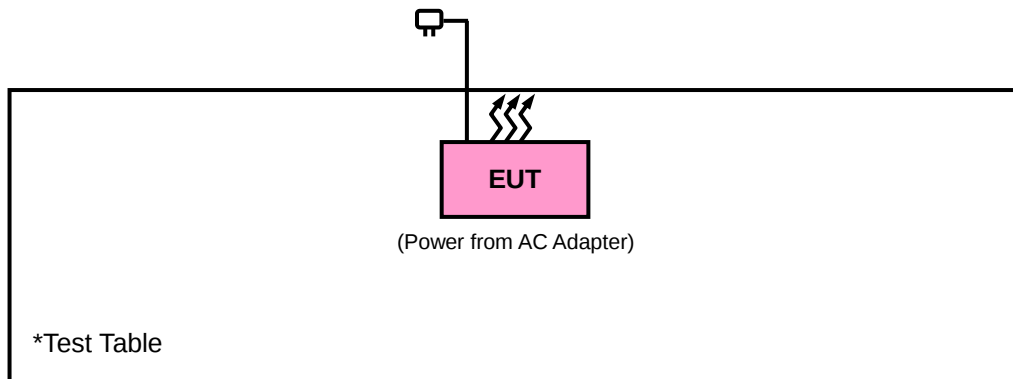
#### TEST CONDITION:

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY |
|---------------|--------------------------|--------------|-----------|
| RE $\geq$ 1G  | 25deg. C, 65%RH          | 120Vac, 60Hz | Gavin Wu  |
| RE $<$ 1G     | 25deg. C, 65%RH          | 120Vac, 60Hz | Gavin Wu  |
| PLC           | 25deg. C, 65%RH          | 120Vac, 60Hz | 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 E (15.407)**

**789033 D02 General UNII Test Procedures New Rules v01**

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

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table:

| 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 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.

#### 4.1.2 LIMITS OF UNWANTED EMISSION OUT OF THE RESTRICTED BANDS

| APPLICABLE TO                                         | LIMIT                                                              |                                                                    |
|-------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------|
| 789033 D02 General UNII Test Procedures New Rules v01 | FIELD STRENGTH AT 3m                                               |                                                                    |
|                                                       | PK: 74 (dBμV/m)                                                    | AV: 54 (dBμV/m)                                                    |
| APPLICABLE TO                                         | EIRP LIMIT                                                         | EQUIVALENT FIELD STRENGTH AT 3m                                    |
| 15.407(b)(1)                                          | PK: -27 (dBm/MHz)                                                  | PK: 68.2 (dBμV/m)                                                  |
| 15.407(b)(2)                                          |                                                                    |                                                                    |
| 15.407(b)(3)                                          |                                                                    |                                                                    |
| 15.407(b)(4)                                          | PK: -27 (dBm/MHz) <sup>*1</sup><br>PK: -17 (dBm/MHz) <sup>*2</sup> | PK: 68.2 (dBμV/m) <sup>*1</sup><br>PK: 78.2 (dBμV/m) <sup>*2</sup> |

**NOTE:** <sup>\*1</sup> beyond 10MHz of the band edge <sup>\*2</sup> within 10 MHz of band edge

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.3 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                     | MODEL NO.      | SERIAL NO.          | DATE OF CALIBRATION | DUE DATE OF CALIBRATION |
|------------------------------------------------|----------------|---------------------|---------------------|-------------------------|
| Test Receiver<br>Agilent                       | N9038A         | MY51210203          | Jan.21, 2015        | Jan.21, 2016            |
| Spectrum Analyzer<br>Agilent                   | N9010A         | MY52220314          | Sep.03, 2015        | Sep.02, 2016            |
| Spectrum Analyzer<br>ROHDE & SCHWARZ           | FSU43          | 101261              | Dec. 17, 2015       | Dec. 16, 2016           |
| BILOG Antenna<br>SCHWARZBECK                   | VULB9168       | 9168-472            | Feb. 04, 2015       | Feb. 04, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9120 D    | 9120D-969           | Feb. 09, 2015       | Feb. 09, 2016           |
| HORN Antenna<br>SCHWARZBECK                    | BBHA 9170      | 9170-480            | Feb. 04, 2015       | Feb. 04, 2016           |
| Loop Antenna                                   | EM-6879        | 269                 | Jul. 31, 2015       | Jul. 30, 2016           |
| Preamplifier<br>Agilent                        | 8449B          | 3008A01962          | Oct. 15, 2015       | Oct. 14, 2016           |
| Preamplifier<br>EMCI                           | EMC 184045     | 980116              | Jan. 09, 2015       | Jan. 08, 2016           |
| Preamplifier<br>EMCI                           | EMC 330H       | 980112              | Dec. 27, 2014       | Dec. 26, 2015           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 309219/4<br>2950114 | Oct. 12, 2015       | Oct. 11, 2016           |
| RF signal cable<br>HUBER+SUHNNER               | SUCOFLEX 104   | 250130/4            | Oct. 12, 2015       | Oct. 11, 2016           |
| RF Coaxial Cable<br>Worken                     | 8D-FB          | Cable-Ch10-01       | Oct. 12, 2015       | Oct. 11, 2016           |
| Software<br>BV ADT                             | E3<br>6.120103 | NA                  | NA                  | NA                      |
| Antenna Tower<br>MF                            | MFA-440H       | NA                  | NA                  | NA                      |
| Turn Table<br>MF                               | MFT-201SS      | 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 calibration interval of the loop antenna is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in HwaYa Chamber 10.
4. The horn antenna and HP preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1GHz if tested.
5. The FCC Site Registration No. is 690701.
6. The IC Site Registration No. is IC 7450F-10.

#### 4.1.4 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 1GHz) / 1.5 meters (for above 1GHz) 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 antenna is a broadband antenna, and its height 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.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

#### NOTE:

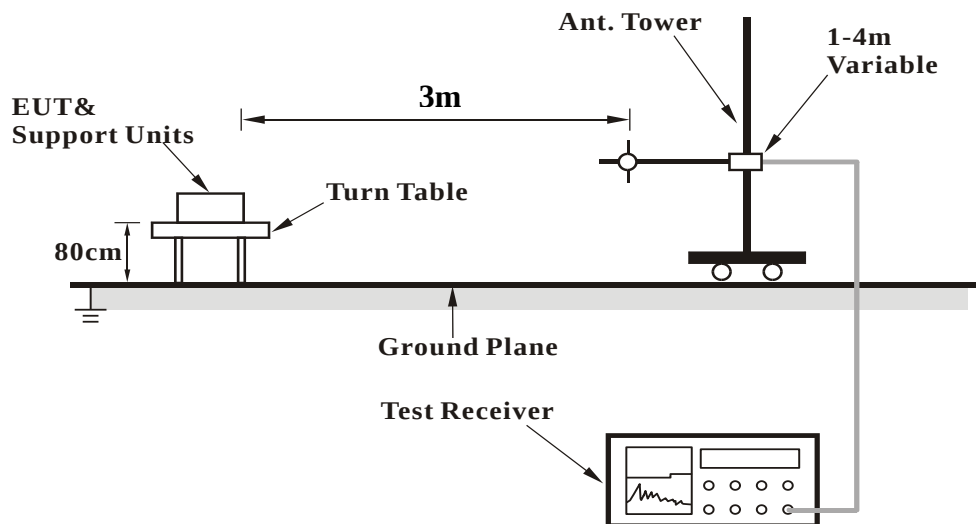
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 3MHz for Peak detection at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 1kHz (Duty cycle < 98%) or 10Hz (Duty cycle > 98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.5 DEVIATION FROM TEST STANDARD

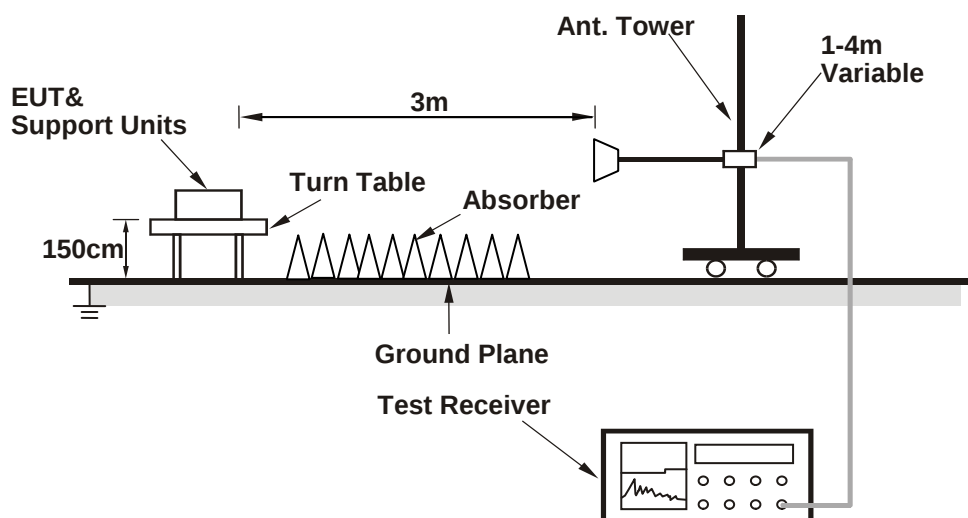
No deviation.

#### 4.1.6 TEST SETUP

<Frequency Range 30MHz ~ 1GHz>



<Frequency Range above 1GHz>



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

#### 4.1.7 EUT OPERATING CONDITIONS

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.8 TEST RESULTS

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

##### Band I

##### 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 38      | FREQUENCY RANGE    | 1GHz ~ 40GHz              |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                  |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| FREQ. (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  |
| 5150                                                | 45.86                   | 45.66             | 54             | -8.14       | 31.32                 | 6.2             | 37.32              | 187                 | 135                  | Average |
| 5150                                                | 60.4                    | 60.2              | 74             | -13.6       | 31.32                 | 6.2             | 37.32              | 187                 | 135                  | Peak    |
| 5190                                                | 90.02                   | 89.79             |                |             | 31.35                 | 6.22            | 37.34              | 187                 | 135                  | Average |
| 5190                                                | 99.28                   | 99.05             |                |             | 31.35                 | 6.22            | 37.34              | 187                 | 135                  | Peak    |
| 5442                                                | 39.02                   | 38.26             | 54             | -14.98      | 31.55                 | 6.34            | 37.13              | 187                 | 135                  | Average |
| 5442                                                | 59.99                   | 59.23             | 74             | -14.01      | 31.55                 | 6.34            | 37.13              | 187                 | 135                  | Peak    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| FREQ. (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  |
| 5130                                                | 43.24                   | 43.03             | 54             | -10.76      | 31.31                 | 6.2             | 37.3               | 106                 | 113                  | Average |
| 5130                                                | 59.68                   | 59.47             | 74             | -14.32      | 31.31                 | 6.2             | 37.3               | 106                 | 113                  | Peak    |
| 5190                                                | 89.4                    | 89.17             |                |             | 31.35                 | 6.22            | 37.34              | 106                 | 113                  | Average |
| 5190                                                | 98.47                   | 98.24             |                |             | 31.35                 | 6.22            | 37.34              | 106                 | 113                  | Peak    |
| 5382                                                | 38.19                   | 37.55             | 54             | -15.81      | 31.51                 | 6.31            | 37.18              | 106                 | 113                  | Average |
| 5382                                                | 60.11                   | 59.47             | 74             | -13.89      | 31.51                 | 6.31            | 37.18              | 106                 | 113                  | Peak    |

##### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5190MHz: Fundamental frequency.

## Band II

### 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 62      | FREQUENCY RANGE    | 1GHz ~ 40GHz              |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                  |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                         |                   |                |                             |                       |                          |                           |                            |         |
|-----------------------------------------------------|-------------------------------|-------------------------|-------------------|----------------|-----------------------------|-----------------------|--------------------------|---------------------------|----------------------------|---------|
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK  |
| 5106                                                | 38.59                         | 38.39                   | 54                | -15.41         | 31.29                       | 6.19                  | 37.28                    | 148                       | 143                        | Average |
| 5106                                                | 60.33                         | 60.13                   | 74                | -13.67         | 31.29                       | 6.19                  | 37.28                    | 148                       | 143                        | Peak    |
| 5310                                                | 91.38                         | 90.85                   |                   |                | 31.45                       | 6.27                  | 37.19                    | 148                       | 143                        | Average |
| 5310                                                | 101.19                        | 100.66                  |                   |                | 31.45                       | 6.27                  | 37.19                    | 148                       | 143                        | Peak    |
| 5350                                                | 42.73                         | 42.14                   | 54                | -11.27         | 31.48                       | 6.29                  | 37.18                    | 148                       | 143                        | Average |
| 5350                                                | 65.83                         | 65.24                   | 74                | -8.17          | 31.48                       | 6.29                  | 37.18                    | 148                       | 143                        | Peak    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                               |                         |                   |                |                             |                       |                          |                           |                            |         |
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK  |
| 5112                                                | 38.66                         | 38.46                   | 54                | -15.34         | 31.29                       | 6.19                  | 37.28                    | 124                       | 100                        | Average |
| 5112                                                | 60.36                         | 60.16                   | 74                | -13.64         | 31.29                       | 6.19                  | 37.28                    | 124                       | 100                        | Peak    |
| 5310                                                | 88.29                         | 87.76                   |                   |                | 31.45                       | 6.27                  | 37.19                    | 124                       | 100                        | Average |
| 5310                                                | 97.21                         | 96.68                   |                   |                | 31.45                       | 6.27                  | 37.19                    | 124                       | 100                        | Peak    |
| 5348                                                | 40.8                          | 40.21                   | 54                | -13.2          | 31.48                       | 6.29                  | 37.18                    | 124                       | 100                        | Average |
| 5348                                                | 60.16                         | 59.57                   | 74                | -13.84         | 31.48                       | 6.29                  | 37.18                    | 124                       | 100                        | Peak    |

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5310MHz: Fundamental frequency.

### Band III

#### 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 102     | FREQUENCY RANGE    | 1GHz ~ 40GHz              |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                  |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| FREQ. (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  |
| 5460                                                | 42.92                   | 42.1              | 54             | -11.08      | 31.56                 | 6.34            | 37.08              | 162                 | 135                  | Average |
| 5460                                                | 61.85                   | 61.03             | 74             | -12.15      | 31.56                 | 6.34            | 37.08              | 162                 | 135                  | Peak    |
| 5470                                                | 63.39                   | 62.56             | 68.2           | -4.81       | 31.57                 | 6.34            | 37.08              | 162                 | 135                  | Peak    |
| 5510                                                | 91.61                   | 90.71             |                |             | 31.6                  | 6.36            | 37.06              | 162                 | 135                  | Average |
| 5510                                                | 537.96                  | 537.06            |                |             | 31.6                  | 6.36            | 37.06              | 162                 | 135                  | Peak    |
| 5725                                                | 60.25                   | 58.97             | 68.2           | -7.95       | 31.96                 | 6.75            | 37.43              | 162                 | 135                  | Peak    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| FREQ. (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  |
| 5348                                                | 40.29                   | 39.7              | 54             | -13.71      | 31.48                 | 6.29            | 37.18              | 106                 | 112                  | Average |
| 5348                                                | 60.62                   | 60.03             | 74             | -13.38      | 31.48                 | 6.29            | 37.18              | 106                 | 112                  | Peak    |
| 5470                                                | 63.04                   | 62.21             | 68.2           | -5.16       | 31.57                 | 6.34            | 37.08              | 106                 | 112                  | Peak    |
| 5510                                                | 88.21                   | 87.31             |                |             | 31.6                  | 6.36            | 37.06              | 106                 | 112                  | Average |
| 5510                                                | 97.6                    | 96.7              |                |             | 31.6                  | 6.36            | 37.06              | 106                 | 112                  | Peak    |
| 5725                                                | 59.59                   | 58.31             | 68.2           | -8.61       | 31.96                 | 6.75            | 37.43              | 106                 | 112                  | Peak    |

#### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5510MHz: Fundamental frequency.
- 5470MHz & 5725MHz: Out of restricted band

# Band IV

## 802.11a

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                           |
|--------------------------|-----------------|--------------------|---------------------------|
| CHANNEL                  | Channel 165     | FREQUENCY RANGE    | 1GHz ~ 40GHz              |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Average (AV) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                  |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                         |                   |                |             |                       |                 |                    |                     |                      |         |
|-----------------------------------------------------|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| FREQ. (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  |
| 5714                                                | 60.31                   | 59.12             | 68.2           | -7.89       | 31.93                 | 6.69            | 37.43              | 132                 | 154                  | Peak    |
| 5725                                                | 68.88                   | 67.6              | 78.2           | -9.32       | 31.96                 | 6.75            | 37.43              | 132                 | 154                  | Peak    |
| 5745                                                | 94.84                   | 93.57             |                |             | 31.99                 | 6.75            | 37.47              | 132                 | 154                  | Average |
| 5745                                                | 104.09                  | 102.82            |                |             | 31.99                 | 6.75            | 37.47              | 132                 | 154                  | Peak    |
| 5850                                                | 60.48                   | 58.96             | 78.2           | -17.72      | 32.15                 | 6.88            | 37.51              | 132                 | 154                  | Peak    |
| 5861                                                | 60.04                   | 58.41             | 68.2           | -8.16       | 32.18                 | 6.95            | 37.5               | 132                 | 154                  | Peak    |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                         |                   |                |             |                       |                 |                    |                     |                      |         |
| FREQ. (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  |
| 5714                                                | 59.66                   | 58.47             | 68.2           | -8.54       | 31.93                 | 6.69            | 37.43              | 102                 | 117                  | Peak    |
| 5725                                                | 64.46                   | 63.18             | 78.2           | -13.74      | 31.96                 | 6.75            | 37.43              | 102                 | 117                  | Peak    |
| 5745                                                | 91.63                   | 90.36             |                |             | 31.99                 | 6.75            | 37.47              | 102                 | 117                  | Average |
| 5745                                                | 101.41                  | 100.14            |                |             | 31.99                 | 6.75            | 37.47              | 102                 | 117                  | Peak    |
| 5850                                                | 60.56                   | 59.04             | 78.2           | -17.64      | 32.15                 | 6.88            | 37.51              | 102                 | 117                  | Peak    |
| 5861                                                | 59.68                   | 58.05             | 68.2           | -8.52       | 32.18                 | 6.95            | 37.5               | 102                 | 117                  | Peak    |

### REMARKS:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor  
Margin value = Emission level – Limit value
- 5825MHz: Fundamental frequency.
- 5714, 5725MHz, 5850 & 5861MHz: Out of restricted band

### 9 kHz ~ 30 MHz DATA:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 30 MHz ~ 1 GHz WORST-CASE DATA:

#### Band I

#### 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                              |
|--------------------------|-----------------|--------------------|------------------------------|
| CHANNEL                  | Channel 38      | FREQUENCY RANGE    | 30MHz ~ 1GHz                 |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Quasi-peak (QP) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                     |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
|-----------------------------------------------------|-------------------------------|-------------------------|-------------------|----------------|-----------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 227.88                                              | 39.59                         | 59.47                   | 46                | -6.41          | 10.54                       | 1.41                  | 31.83                    | 140                       | 233                        | Peak   |
| 276.38                                              | 37.19                         | 55.27                   | 46                | -8.81          | 12.25                       | 1.57                  | 31.9                     | 116                       | 209                        | Peak   |
| 348.16                                              | 42.4                          | 58.38                   | 46                | -3.6           | 14.1                        | 1.76                  | 31.84                    | 120                       | 165                        | Peak   |
| 431.58                                              | 29.41                         | 43.5                    | 46                | -16.59         | 15.96                       | 1.96                  | 32.01                    | 132                       | 56                         | Peak   |
| 497.54                                              | 27.07                         | 39.38                   | 46                | -18.93         | 17.27                       | 2.08                  | 31.66                    | 119                       | 20                         | Peak   |
| 805.03                                              | 32.45                         | 38.98                   | 46                | -13.55         | 22.29                       | 2.62                  | 31.44                    | 100                       | 267                        | Peak   |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 41.64                                               | 34.1                          | 50.93                   | 40                | -5.9           | 13.56                       | 0.66                  | 31.05                    | 129                       | 161                        | Peak   |
| 189.08                                              | 28.81                         | 49.13                   | 43.5              | -14.69         | 10.12                       | 1.25                  | 31.69                    | 109                       | 34                         | Peak   |
| 227.88                                              | 33.21                         | 53.09                   | 46                | -12.79         | 10.54                       | 1.41                  | 31.83                    | 101                       | 188                        | Peak   |
| 337.49                                              | 42.84                         | 59.09                   | 46                | -3.16          | 13.84                       | 1.73                  | 31.82                    | 138                       | 116                        | Peak   |
| 503.36                                              | 29.53                         | 41.64                   | 46                | -16.47         | 17.4                        | 2.1                   | 31.61                    | 136                       | 196                        | Peak   |
| 639.16                                              | 27.68                         | 37.37                   | 46                | -18.32         | 20.08                       | 2.33                  | 32.1                     | 119                       | 292                        | Peak   |

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

## Band II

### 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |              |
|--------------------------|-----------------|--------------------|--------------|
| CHANNEL                  | Channel 62      | FREQUENCY RANGE    | 30MHz ~ 1GHz |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)    |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu     |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
|-----------------------------------------------------|-------------------------------|-------------------------|-------------------|----------------|-----------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 179.38                                              | 28.68                         | 48.48                   | 43.5              | -14.82         | 10.83                       | 1.2                   | 31.83                    | 115                       | 70                         | Peak   |
| 228.85                                              | 37.2                          | 57.06                   | 46                | -8.8           | 10.58                       | 1.41                  | 31.85                    | 118                       | 268                        | Peak   |
| 274.44                                              | 37.75                         | 55.92                   | 46                | -8.25          | 12.2                        | 1.56                  | 31.93                    | 127                       | 45                         | Peak   |
| 326.82                                              | 43.16                         | 59.7                    | 46                | -2.84          | 13.59                       | 1.7                   | 31.83                    | 129                       | 55                         | Peak   |
| 364.65                                              | 41.03                         | 56.68                   | 46                | -4.97          | 14.49                       | 1.81                  | 31.95                    | 117                       | 151                        | Peak   |
| 745.86                                              | 29.33                         | 36.71                   | 46                | -16.67         | 21.46                       | 2.53                  | 31.37                    | 131                       | 55                         | Peak   |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 41.64                                               | 33.96                         | 50.79                   | 40                | -6.04          | 13.56                       | 0.66                  | 31.05                    | 108                       | 138                        | Peak   |
| 228.85                                              | 31.46                         | 51.32                   | 46                | -14.54         | 10.58                       | 1.41                  | 31.85                    | 107                       | 345                        | Peak   |
| 269.59                                              | 31.48                         | 49.91                   | 46                | -14.52         | 12.05                       | 1.55                  | 32.03                    | 102                       | 106                        | Peak   |
| 343.31                                              | 40.75                         | 56.85                   | 46                | -5.25          | 13.98                       | 1.75                  | 31.83                    | 130                       | 308                        | Peak   |
| 427.7                                               | 28.15                         | 42.33                   | 46                | -17.85         | 15.89                       | 1.95                  | 32.02                    | 104                       | 28                         | Peak   |
| 503.36                                              | 29.46                         | 41.57                   | 46                | -16.54         | 17.4                        | 2.1                   | 31.61                    | 127                       | 217                        | Peak   |

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value



A D T

## Band III

## 802.11n (40MHz)

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |                              |
|--------------------------|-----------------|--------------------|------------------------------|
| CHANNEL                  | Channel 102     | FREQUENCY RANGE    | 30MHz ~ 1GHz                 |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)<br>Quasi-peak (QP) |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu                     |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
|-----------------------------------------------------|-------------------------------|-------------------------|-------------------|----------------|-----------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 227.88                                              | 37.51                         | 57.39                   | 46                | -8.49          | 10.54                       | 1.41                  | 31.83                    | 129                       | 335                        | Peak   |
| 275.41                                              | 34.15                         | 52.29                   | 46                | -11.85         | 12.22                       | 1.56                  | 31.92                    | 124                       | 218                        | Peak   |
| 364.65                                              | 40.3                          | 55.95                   | 46                | -5.7           | 14.49                       | 1.81                  | 31.95                    | 132                       | 308                        | Peak   |
| 405.39                                              | 28.2                          | 42.88                   | 46                | -17.8          | 15.45                       | 1.92                  | 32.05                    | 111                       | 29                         | Peak   |
| 525.67                                              | 21.43                         | 33.02                   | 46                | -24.57         | 17.91                       | 2.14                  | 31.64                    | 113                       | 183                        | Peak   |
| 774.96                                              | 30.68                         | 37.6                    | 46                | -15.32         | 21.87                       | 2.57                  | 31.36                    | 122                       | 213                        | Peak   |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 42.61                                               | 31.17                         | 48.01                   | 40                | -8.83          | 13.58                       | 0.66                  | 31.08                    | 117                       | 190                        | Peak   |
| 226.91                                              | 29.54                         | 49.46                   | 46                | -16.46         | 10.5                        | 1.4                   | 31.82                    | 125                       | 136                        | Peak   |
| 343.31                                              | 36.55                         | 52.65                   | 46                | -9.45          | 13.98                       | 1.75                  | 31.83                    | 136                       | 340                        | Peak   |
| 375.32                                              | 34.64                         | 49.99                   | 46                | -11.36         | 14.75                       | 1.84                  | 31.94                    | 122                       | 110                        | Peak   |
| 513.06                                              | 28.91                         | 40.75                   | 46                | -17.09         | 17.62                       | 2.12                  | 31.58                    | 132                       | 205                        | Peak   |
| 805.03                                              | 26.6                          | 33.13                   | 46                | -19.4          | 22.29                       | 2.62                  | 31.44                    | 100                       | 127                        | Peak   |

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value



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## Band IV

## 802.11a

| EUT TEST CONDITION       |                 | MEASUREMENT DETAIL |              |
|--------------------------|-----------------|--------------------|--------------|
| CHANNEL                  | Channel 149     | FREQUENCY RANGE    | 30MHz ~ 1GHz |
| INPUT POWER              | 120Vac, 60 Hz   | DETECTOR FUNCTION  | Peak (PK)    |
| ENVIRONMENTAL CONDITIONS | 25deg. C, 65%RH | TESTED BY          | Gavin Wu     |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
|-----------------------------------------------------|-------------------------------|-------------------------|-------------------|----------------|-----------------------------|-----------------------|--------------------------|---------------------------|----------------------------|--------|
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 181.32                                              | 26.37                         | 46.3                    | 43.5              | -17.13         | 10.67                       | 1.22                  | 31.82                    | 120                       | 285                        | Peak   |
| 231.76                                              | 37.3                          | 57.01                   | 46                | -8.7           | 10.71                       | 1.42                  | 31.84                    | 111                       | 129                        | Peak   |
| 278.32                                              | 40.9                          | 58.87                   | 46                | -5.1           | 12.31                       | 1.58                  | 31.86                    | 100                       | 192                        | Peak   |
| 365.62                                              | 44.35                         | 59.96                   | 46                | -1.65          | 14.52                       | 1.81                  | 31.94                    | 134                       | 144                        | Peak   |
| 611.03                                              | 24.36                         | 34.43                   | 46                | -21.64         | 19.74                       | 2.28                  | 32.09                    | 110                       | 359                        | Peak   |
| 805.03                                              | 32.64                         | 39.17                   | 46                | -13.36         | 22.29                       | 2.62                  | 31.44                    | 133                       | 222                        | Peak   |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                               |                         |                   |                |                             |                       |                          |                           |                            |        |
| FREQ.<br>(MHz)                                      | EMISSION<br>LEVEL<br>(dBuV/m) | READ<br>LEVEL<br>(dBuV) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>FACTOR<br>(dB/m) | CABLE<br>LOSS<br>(dB) | PREAMP<br>FACTOR<br>(dB) | ANTENNA<br>HEIGHT<br>(cm) | TABLE<br>ANGLE<br>(Degree) | REMARK |
| 41.64                                               | 33.59                         | 50.42                   | 40                | -6.41          | 13.56                       | 0.66                  | 31.05                    | 112                       | 89                         | Peak   |
| 227.88                                              | 30.59                         | 50.47                   | 46                | -15.41         | 10.54                       | 1.41                  | 31.83                    | 120                       | 56                         | Peak   |
| 343.31                                              | 40.18                         | 56.28                   | 46                | -5.82          | 13.98                       | 1.75                  | 31.83                    | 105                       | 325                        | Peak   |
| 365.62                                              | 38.01                         | 53.62                   | 46                | -7.99          | 14.52                       | 1.81                  | 31.94                    | 109                       | 51                         | Peak   |
| 521.79                                              | 27.36                         | 39                      | 46                | -18.64         | 17.82                       | 2.13                  | 31.59                    | 115                       | 13                         | Peak   |
| 784.66                                              | 29.65                         | 36.47                   | 46                | -16.35         | 22.01                       | 2.59                  | 31.42                    | 123                       | 231                        | Peak   |

**REMARKS:** Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor

Margin value = Emission level – Limit value

## 4.2 CONDUCTED EMISSION MEASUREMENT

### 4.2.1 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.

### 4.2.2 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 10dB PAD)<br>Woken | 5D-FB                 | Cable-cond1-01 | Dec. 26, 2014       | Dec. 25, 2015           |
| 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_Conc_ 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

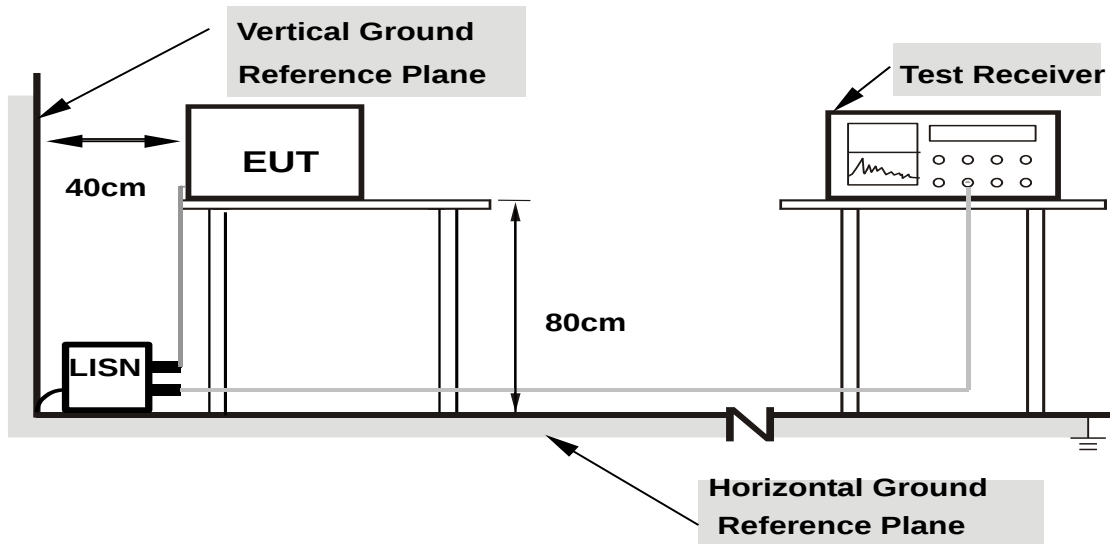
- a. The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling 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.

#### 4.2.4 DEVIATION FROM TEST STANDARD

No deviation.

#### 4.2.5 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 from other units and other metal planes

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

#### 4.2.6 EUT OPERATING CONDITIONS

Same as section 4.1.6.

#### 4.2.7 TEST RESULTS

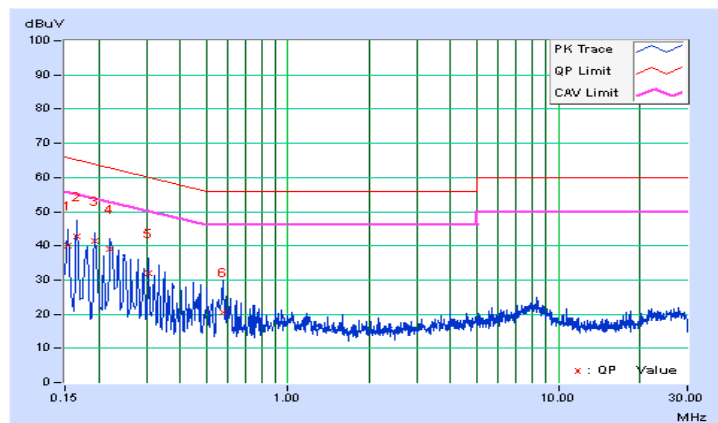
##### CONDUCTED WORST-CASE DATA :

|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| 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                                | 2015/12/18                           |

| 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                         | 0.15391         | 9.82                   | 30.39                | 22.68 | 40.21                 | 32.50 | 65.79        | 55.79 | -25.57      | -23.28 |
| 2                         | 0.16564         | 9.83                   | 32.82                | 15.91 | 42.65                 | 25.74 | 65.18        | 55.18 | -22.53      | -29.44 |
| 3                         | 0.19305         | 9.84                   | 31.70                | 18.15 | 41.54                 | 27.99 | 63.90        | 53.90 | -22.37      | -25.92 |
| 4                         | 0.22038         | 9.84                   | 29.26                | 14.35 | 39.10                 | 24.19 | 62.80        | 52.80 | -23.70      | -28.61 |
| 5                         | 0.30640         | 9.86                   | 22.07                | 8.12  | 31.93                 | 17.98 | 60.07        | 50.07 | -28.14      | -32.09 |
| 6                         | 0.57620         | 9.89                   | 10.78                | 2.17  | 20.67                 | 12.06 | 56.00        | 46.00 | -35.33      | -33.94 |

##### 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

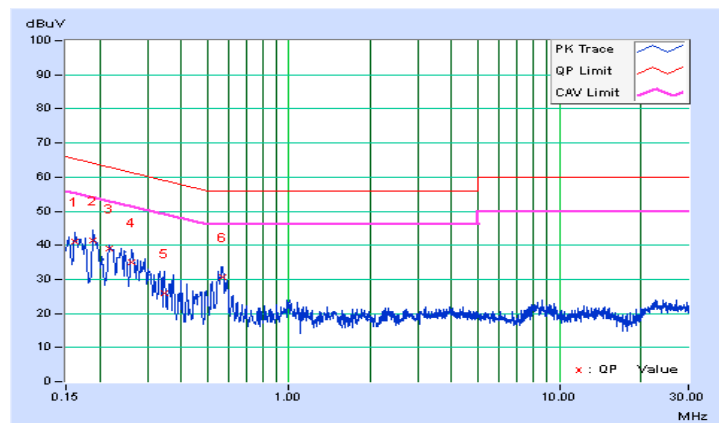


|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 25°C, 65%RH                          |
| Tested by       | Toby Tian      | Test Date                                | 2015/12/18                           |

| 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                            | 0.16181         | 9.82                   | 31.17                | 16.54 | 40.99                 | 26.36 | 65.37        | 55.37 | -24.38      | -29.01 |
| 2                            | 0.18903         | 9.83                   | 31.75                | 18.20 | 41.58                 | 28.03 | 64.08        | 54.08 | -22.50      | -26.05 |
| 3                            | 0.21679         | 9.83                   | 29.06                | 18.17 | 38.89                 | 28.00 | 62.94        | 52.94 | -24.05      | -24.94 |
| 4                            | 0.26346         | 9.85                   | 25.31                | 13.31 | 35.16                 | 23.16 | 61.32        | 51.32 | -26.17      | -28.17 |
| 5                            | 0.34550         | 9.87                   | 16.10                | 5.99  | 25.97                 | 15.86 | 59.07        | 49.07 | -33.10      | -33.21 |
| 6                            | 0.56837         | 9.89                   | 20.83                | 17.40 | 30.72                 | 27.29 | 56.00        | 46.00 | -25.28      | -18.71 |

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. PHOTOGRAPHS OF THE TEST CONFIGURATION

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

## 6. 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:**

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**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.



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## **7. 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.

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