# **FCC RF Test Report**

APPLICANT : VERTU Corporation Limited

**EQUIPMENT**: Cellular Telephone

BRAND NAME : VERTU

MODEL NAME : ASTER T

TYPE NAME : VM-01T

FCC ID : P7QVM-01T

STANDARD : FCC Part 15 Subpart C §15.247

**CLASSIFICATION**: (DTS) Digital Transmission System

The product was received on Mar. 20, 2014 and testing was completed on Nov. 09, 2014. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by: Joseph Lin / Supervisor

Approved by: Jones Tsai / Manager

#### SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1<sup>st</sup> Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

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Report Version

Testing Laboratory 1190

: Rev. 01

Report No.: FR492650C

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## **REVISION HISTORY**

| VERSION | DESCRIPTION             | ISSUED DATE   |
|---------|-------------------------|---------------|
| Rev. 01 | Initial issue of report | Dec. 22, 2014 |
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## **SUMMARY OF TEST RESULT**

| Report<br>Section | FCC Rule              | IC Rule            | Description  | Limit                    | Result | Remark  |  |                             |         |      |
|-------------------|-----------------------|--------------------|--|--------------------------|--------|---|--|-----------------------------|---------|------|
| -                 | 15.247(a)(2)          | RSS-210<br>A8.2(a) | 6dB Bandwidth                                      | ≥ 0.5MHz                 | Pass   | Please refer to Sporton<br>Report No. : FR430314C |  |                             |         |      |
| -                 | -                     | RSS-Gen<br>4.6.1   | 99% Bandwidth                                      | -                        | Pass   | Please refer to Sporton<br>Report No. : FR430314C |  |                             |         |      |
| -                 | 15.247(b)             | RSS-210<br>A8.4    | Power Output Measurement                           | ≤ 30dBm                  | Pass   | Please refer to Sporton<br>Report No. : FR430314C |  |                             |         |      |
| -                 | 15.247(e)             | RSS-210<br>A8.2(b) | Power Spectral Density                             | ≤ 8dBm/3kHz              | Pass   | Please refer to Sporton<br>Report No. : FR430314C |  |                             |         |      |
|                   | 15.247(d)             | RSS-210<br>A8.5    | Conducted Band Edges                               | - ≤ 20dBc                | Pass   | Please refer to Sporton<br>Report No. : FR430314C |  |                             |         |      |
| -                 | 13.247(d)             |                    | A8.5   | A8.5                     | A8.5   | A8.5  |  | Conducted Spurious Emission | ≥ 20dBC | Pass |
| 3.1               | 15.247(d)             | RSS-210<br>A8.5    | Radiated Band Edges and Radiated Spurious Emission | 15.209(a) &<br>15.247(d) | Pass   | Under limit<br>5.97 dB at<br>2483.880 MHz         |  |                             |         |      |
| 3.2               | 15.207                | RSS-Gen<br>7.2.4   | AC Conducted Emission                              | 15.207(a)                | Pass   | Under limit<br>8.60 dB at<br>13.558 MHz           |  |                             |         |      |
| 3.3               | 15.203 &<br>15.247(b) | RSS-210<br>A8.4    | Antenna Requirement                                | N/A                      | Pass   | -   |  |                             |         |      |

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## 1 General Description

## 1.1 Applicant

#### **VERTU Corporation Limited**

Beacon Hill Road, Church Crookham, Hampshire GU52 8DY, United Kingdom

### 1.2 Manufacturer

#### **VERTU Corporation Limited**

Beacon Hill Road, Church Crookham, Hampshire GU52 8DY, United Kingdom

## 1.3 Product Feature of Equipment Under Test

| Product Feature                 |                               |  |  |  |  |  |
|---------------------------------|-------------------------------|--|--|--|--|--|
| Equipment                       | Cellular Telephone            |  |  |  |  |  |
| Brand Name                      | VERTU                         |  |  |  |  |  |
| Model Name                      | ASTER T                       |  |  |  |  |  |
| Type Name                       | VM-01T                        |  |  |  |  |  |
| FCC ID                          | P7QVM-01T                     |  |  |  |  |  |
|                                 | GSM/EGPRS/WCDMA/HSPA/LTE/NFC  |  |  |  |  |  |
| FLIT aumorto Dadica application | WLAN 11a/b/g/n (HT20/HT40)    |  |  |  |  |  |
| EUT supports Radios application | WLAN 11ac (VHT20/VHT40/VHT80) |  |  |  |  |  |
|                                 | Bluetooth v4.0 EDR/LE         |  |  |  |  |  |
| HW Version                      | F2                            |  |  |  |  |  |
| EUT Stage                       | Identical Prototype           |  |  |  |  |  |

**Remark:** The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

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#### **List of Accessory:**

|                        | Specification of Accessory |          |  |  |  |  |
|------------------------|----------------------------|----------|--|--|--|--|
| AC Adoptor             | Brand Name                 | VERTU    |  |  |  |  |
| AC Adapter             | Model Name                 | AC-32V   |  |  |  |  |
| Car Charger            | Brand Name                 | VERTU    |  |  |  |  |
| Car Charger            | Model Name                 | DC-30V   |  |  |  |  |
| Dattom                 | Brand Name                 | VERTU    |  |  |  |  |
| Battery                | Model Name                 | BP-9V    |  |  |  |  |
| Fornbone 1             | Brand Name                 | VERTU    |  |  |  |  |
| Earphone 1             | Model Name                 | WH-4V    |  |  |  |  |
| Formbone 2             | Brand Name                 | VERTU    |  |  |  |  |
| Earphone 2             | Model Name                 | WH-5V    |  |  |  |  |
| Farmhana 2             | Brand Name                 | VERTU    |  |  |  |  |
| Earphone 3             | Model Name                 | HP-1V    |  |  |  |  |
| Dertable Dewer Charger | Brand Name                 | VERTU    |  |  |  |  |
| Portable Power Charger | Model Name                 | DC-15V   |  |  |  |  |
| IISB Cable             | Brand Name                 | VERTU    |  |  |  |  |
| USB Cable              | Model Name                 | CA-225DV |  |  |  |  |
| Wireless sharger TV    | Brand Name                 | VERTU    |  |  |  |  |
| Wireless charger TX    | Model Name                 | AC-35V   |  |  |  |  |
| Wireless Speeker       | Brand Name                 | VERTU    |  |  |  |  |
| Wireless Speaker       | Model Name                 | SP-1V    |  |  |  |  |

## 1.4 Product Specification subjective to this standard

| Product Specification subjective to this standard |   |  |  |  |  |  |
|---|---|--|--|--|--|--|
| Tx/Rx Channel Frequency Range                     | 802.11b/g/n : 2412 MHz ~ 2462 MHz             |  |  |  |  |  |
|   | 802.11b : 19.01 dBm (0.0796 W)                |  |  |  |  |  |
| Maximum (Peak) Output Power to                    | 802.11g : 21.74 dBm (0.1493 W)                |  |  |  |  |  |
| Antenna   | 802.11n HT20: 19.56 dBm (0.0904 W)            |  |  |  |  |  |
|   | 802.11n HT40 : 19.81 dBm (0.0957 W)           |  |  |  |  |  |
| Antenna Type                                      | 802.11b/g/n: PIFA Antenna with gain -2.00 dBi |  |  |  |  |  |
| Type of Modulation                                | 802.11b: DSSS (DBPSK / DQPSK / CCK)           |  |  |  |  |  |
| Type of Modulation                                | 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) |  |  |  |  |  |

## 1.5 Modification of EUT

No modifications are made to the EUT during all test items.

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## 1.6 Testing Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1022 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

| Test Site          | SPORTON INTERNATION                              | SPORTON INTERNATIONAL INC. |           |  |  |  |  |
|--------------------|--|----------------------------|-----------|--|--|--|--|
|                    | No. 52, Hwa Ya 1 <sup>st</sup> Rd., I            | Hwa Ya Technology Park,    |           |  |  |  |  |
| Test Site Location | Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. |                            |           |  |  |  |  |
| lest site Location | TEL: +886-3-327-3456                             |                            |           |  |  |  |  |
|                    | FAX: +886-3-328-4978                             |                            |           |  |  |  |  |
| Took Cita No       | Sporton Site No.                                 |                            |           |  |  |  |  |
| Test Site No.      | TH02-HY  | CO05-HY                    | 03CH05-HY |  |  |  |  |

## 1.7 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- FCC Part 15 Subpart C §15.247
- FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02
- ANSI C63.10-2009

#### Remark:

- All test items were verified and recorded according to the standards and without any deviation during the test.
- 2. This EUT has also been tested and complied with the requirements of FCC Part 15, Subpart B, recorded in a separate test report.

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## 2 Test Configuration of Equipment Under Test

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: conducted emission (150 kHz to 30 MHz) and radiated emission (9 kHz to the 10th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower). For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases (Y plane) were recorded in this report.

The final configuration from all the combinations and the worst-case data rates were investigated by measuring the maximum power across all the data rates and modulation modes under section 2.2.

Based on the worst configuration found above, the RF power setting is set individually to meet FCC compliance limit for the final conducted and radiated tests shown in section 2.3.

## 2.1 Carrier Frequency Channel

| Frequency Band    | Channel | Freq.<br>(MHz) | Channel | Freq.<br>(MHz) |
|-------------------|---------|----------------|---------|----------------|
|                   | 1       | 2412           | 7       | 2442           |
|                   | 2       | 2417           | 8       | 2447           |
| 0400 0400 F MI I- | 3       | 2422           | 9       | 2452           |
| 2400-2483.5 MHz   | 4       | 2427           | 10      | 2457           |
|                   | 5       | 2432           | 11      | 2462           |
|                   | 6       | 2437           | -       | -              |

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### 2.2 Pre-Scanned RF Power

Preliminary tests were performed in different data rate and data rate associated with the highest power were chosen for full test shown in the following tables.

| 2.4GHz 802.11b mode |                    |        |          |         |  |  |  |
|---------------------|--------------------|--------|----------|---------|--|--|--|
| Data Rate (MHz)     | 1M bps             | 2M bps | 5.5M bps | 11M bps |  |  |  |
| Peak Power (dBm)    | <mark>19.01</mark> | 18.68  | 18.77    | 18.82   |  |  |  |

| 2.4GHz 802.11g mode |                    |        |         |         |         |         |         |         |  |
|---------------------|--------------------|--------|---------|---------|---------|---------|---------|---------|--|
| Data Rate (MHz)     | 6M bps             | 9M bps | 12M bps | 18M bps | 24M bps | 36M bps | 48M bps | 54M bps |  |
| Peak Power (dBm)    | <mark>21.74</mark> | 21.64  | 21.69   | 21.70   | 21.73   | 21.72   | 21.69   | 21.70   |  |

| 2.4GHz 802.11n HT20 mode |       |       |       |       |       |       |       |       |  |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|--|
| Data Rate (MHz)          | MCS0  | MCS1  | MCS2  | MCS3  | MCS4  | MCS5  | MCS6  | MCS7  |  |
| Peak Power (dBm)         | 19.56 | 19.36 | 19.31 | 19.21 | 19.08 | 19.20 | 19.11 | 19.14 |  |

| 2.4GHz 802.11n HT40 mode |       |       |       |       |       |       |       |       |
|--------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Data Rate (MHz)          | MCS0  | MCS1  | MCS2  | MCS3  | MCS4  | MCS5  | MCS6  | MCS7  |
| Peak Power (dBm)         | 19.81 | 19.77 | 19.24 | 19.34 | 19.19 | 19.22 | 18.58 | 19.47 |

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## 2.3 Test Mode

Final results of test modes, data rates and test channels are shown as following table.

|                 | Test Cases         |              |           |              |  |  |  |  |
|-----------------|--------------------|--------------|-----------|--------------|--|--|--|--|
|                 | Test Items         | Mode         | Data Rate | Test Channel |  |  |  |  |
|                 |                    | 802.11b      | 1 Mbps    | L/M/H        |  |  |  |  |
|                 | Radiated Band Edge | 802.11g      | 6 Mbps    | L/M/H        |  |  |  |  |
| De d'are d      |                    | 802.11n HT20 | MCS0      | L/M/H        |  |  |  |  |
| Radiated<br>TCs |                    | 802.11n HT40 | MCS0      | 3/9          |  |  |  |  |
| 105             |                    | 802.11b      | 1 Mbps    | 1/6/11       |  |  |  |  |
|                 | Radiated Spurious  | 802.11g      | 6 Mbps    | 1/6/11       |  |  |  |  |
|                 | Emission           | 802.11n HT20 | MCS0      | 1/6/11       |  |  |  |  |
|                 |                    | 802.11n HT40 | MCS0      | 3/6/9        |  |  |  |  |

| Test Cases   |  |  |  |  |
|--------------|--|--|--|--|
|              | Mode 1 : LTE Band 7 Idle + WLAN (2.4GHz) Link + Bluetooth Link + Earphone 2 + NFC On + USE     |  |  |  |
| AC Conducted | Cable (Data Link with Notebook)  |  |  |  |
| Emission     | Mode 2 : LTE Band 7 Idle + WLAN (5GHz) Link + Bluetooth Link + Earphone 2 + NFC On + USE       |  |  |  |
|              | Cable (Data Link with Notebook)  |  |  |  |
| Remark: The  | Remark: The worst case of conducted emission is mode 2; only the test data of it was reported. |  |  |  |

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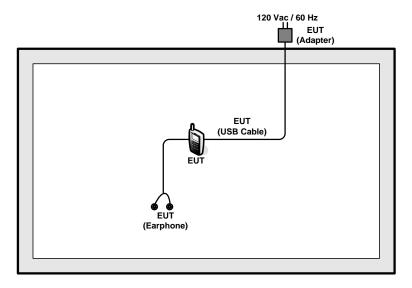
FCC ID : P7QVM-01T

Report Template No.: BU5-FR15CWL Version 1.0

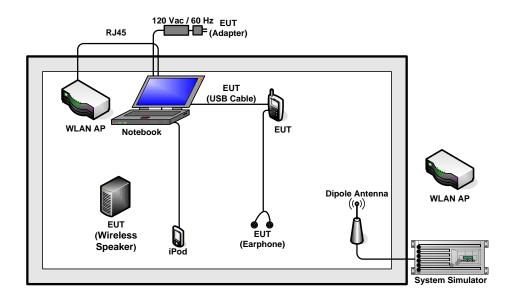
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## 2.4 Connection Diagram of Test System

#### <WLAN Tx Mode>



#### <AC Conducted Emission Mode>



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## 2.5 Support Unit used in test configuration and system

| Item | Equipment        | Trade Name   | Model Name | FCC ID                                       | Data Cable      | Power Cord   |
|------|------------------|--------------|------------|--|-----------------|--|
| 1.   | System Simulator | Anritsu      | MT8820C    | N/A  | N/A             | Unshielded, 1.8 m  |
| 2.   | WLAN AP          | D-Link       | DIR-628    | KA2DIR628A2                                  | N/A             | Unshielded, 1.8 m  |
| 3.   | WLAN AP          | D-Link       | DIR-865L   | KA2IR865LA1                                  | N/A             | Unshielded, 1.8 m  |
| 4.   | Notebook         | DELL         | Latitude   | FCC DoC/<br>Contains FCC ID:<br>QDS-BRCM1054 | N/A             | AC I/P:<br>Unshielded, 1.2 m<br>DC O/P:<br>Shielded, 1.8 m |
| 5.   | iPod             | Apple        | A1285      | FCC DoC                                      | Shielded, 1.0 m | N/A  |
| 6.   | NFC Card         | Metro Taipei | Easy Card  | N/A  | N/A             | N/A  |

## 2.6 EUT Operation Test Setup

For WLAN RF test items, an engineering test program was provided and enabled to make EUT continuous transmit/receive.

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## 3 Test Result

## 3.1 Radiated Band Edges and Spurious Emission Measurement

#### 3.1.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the FCC section 15.209 limits as below.

| Frequency     | Field Strength     | Measurement Distance |
|---------------|--------------------|----------------------|
| (MHz)         | (microvolts/meter) | (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                    |

## 3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

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#### 3.1.3 Test Procedures

- 1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v03r02.
- 2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
- 3. The EUT was placed on a turntable with 0.8 meter above ground.
- 4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
- 5. Corrected Reading: Antenna Factor + Cable Loss + Read Level Preamp Factor = Level
- 6. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
- 7. Use the following spectrum analyzer settings:
  - (1) Span shall wide enough to fully capture the emission being measured;
  - (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
  - (3) Set RBW = 1 MHz, VBW= 3MHz for  $f \ge 1$  GHz for peak measurement. For average measurement:
    - VBW = 10 Hz, when duty cycle is no less than 98 percent.
    - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

| Band                | Duty Cycle(%) | T(μs)   | 1/T(kHz) | VBW Setting |
|---------------------|---------------|---------|----------|-------------|
| 802.11b             | 97.63         | 8240.00 | 0.12     | 300Hz       |
| 802.11g             | 87.24         | 1368.00 | 0.73     | 1kHz        |
| 2.4GHz 802.11n HT20 | 86.49         | 1280.00 | 0.78     | 1kHz        |
| 2.4GHz 802.11n HT40 | 75.71         | 636.00  | 1.57     | 3kHz        |

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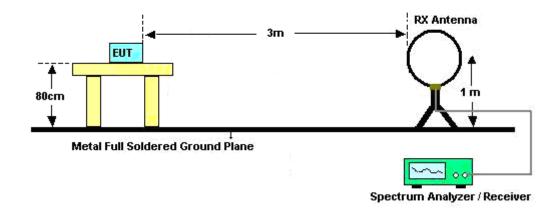
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Report Template No.: BU5-FR15CWL Version 1.0

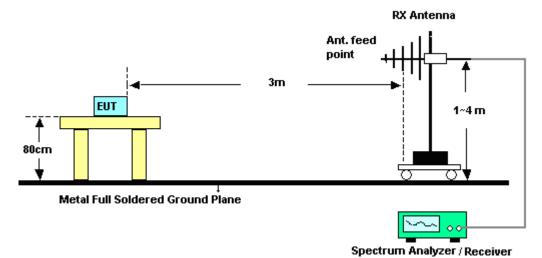
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### 3.1.4 Test Setup

#### For radiated emissions below 30MHz



#### For radiated emissions from 30MHz to 1GHz



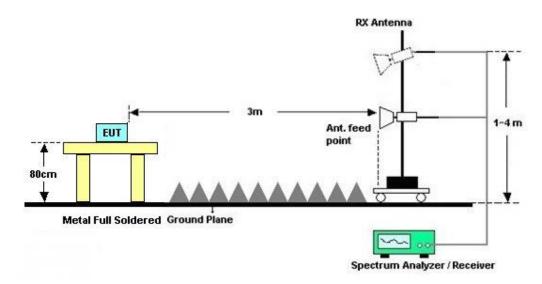
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#### For radiated emissions above 1GHz



### 3.1.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

#### 3.1.6 Test Result

Please refer to Sporton report number appendix A as below.

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#### 3.2 AC Conducted Emission Measurement

#### 3.2.1 Limit of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

| Frequency of Emission | Conducted Limit (dBµV) |           |  |  |
|-----------------------|------------------------|-----------|--|--|
| (MHz)                 | Quasi-Peak             | Average   |  |  |
| 0.15-0.5              | 66 to 56*              | 56 to 46* |  |  |
| 0.5-5                 | 56                     | 46        |  |  |
| 5-30                  | 60                     | 50        |  |  |

<sup>\*</sup>Decreases with the logarithm of the frequency.

#### 3.2.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

#### 3.2.3 Test Procedures

- 1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
- 2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- 3. All the support units are connecting to the other LISN.
- 4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- 5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
- 6. Both sides of AC line were checked for maximum conducted interference.
- 7. The frequency range from 150 kHz to 30 MHz was searched.
- 8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

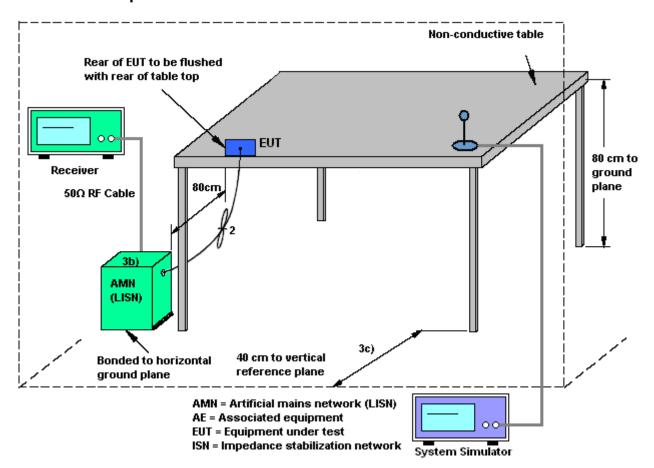
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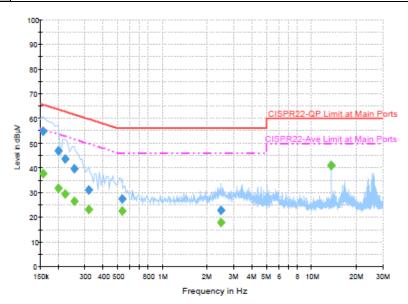
### 3.2.4 Test Setup



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### 3.2.5 Test Result of AC Conducted Emission

| Test Mode :     | Mode 2  | Temperature :       | 21~23℃ |  |  |
|-----------------|---|---------------------|--------|--|--|
| Test Engineer : | Eric Jeng   | Relative Humidity : | 46~48% |  |  |
| Test Voltage :  | 120Vac / 60Hz   | Phase :             | Line   |  |  |
| Function Type:  | LTE Band 7 Idle + WLAN (5GHz) Link + Bluetooth Link + Earphone 2 + NFC On + |                     |        |  |  |
|                 | USB Cable (Data Link with Notebook)   |                     |        |  |  |



#### Final Result : Quasi-Peak

| Frequency<br>(MHz) | Quasi-Peak<br>(dBµV) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|----------------------|--------|------|---------------|----------------|-----------------|
| 0.158000           | 54.8                 | Off    | L1   | 19.4          | 10.8           | 65.6            |
| 0.198000           | 46.8                 | Off    | L1   | 19.5          | 16.9           | 63.7            |
| 0.222000           | 43.6                 | Off    | L1   | 19.5          | 19.1           | 62.7            |
| 0.254000           | 39.7                 | Off    | L1   | 19.5          | 21.9           | 61.6            |
| 0.318000           | 31.2                 | Off    | L1   | 19.5          | 28.6           | 59.8            |
| 0.534000           | 27.5                 | Off    | L1   | 19.5          | 28.5           | 56.0            |
| 2.462000           | 22.8                 | Off    | L1   | 19.5          | 33.2           | 56.0            |
| 13.558000          | 41.0                 | Off    | L1   | 19.8          | 19.0           | 60.0            |

### Final Result : Average

| Frequency<br>(MHz) | Average<br>(dBµV) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|-------------------|--------|------|---------------|----------------|-----------------|
| 0.158000           | 37.6              | Off    | L1   | 19.4          | 18.0           | 55.6            |
| 0.198000           | 31.7              | Off    | L1   | 19.5          | 22.0           | 53.7            |
| 0.222000           | 29.4              | Off    | L1   | 19.5          | 23.3           | 52.7            |
| 0.254000           | 26.4              | Off    | L1   | 19.5          | 25.2           | 51.6            |
| 0.318000           | 23.2              | Off    | L1   | 19.5          | 26.6           | 49.8            |
| 0.534000           | 22.4              | Off    | L1   | 19.5          | 23.6           | 46.0            |
| 2.462000           | 17.7              | Off    | L1   | 19.5          | 28.3           | 46.0            |
| 13.558000          | 41.0              | Off    | L1   | 19.8          | 9.0            | 50.0            |

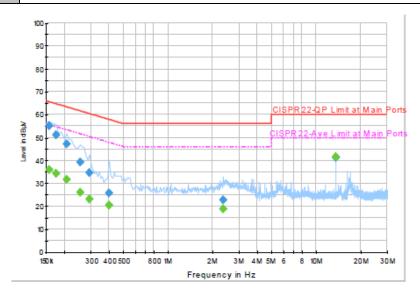
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| Test Mode :     | Mode 2  | Temperature :       | 21~23℃  |  |
|-----------------|---|---------------------|---------|--|
| Test Engineer : | Eric Jeng   | Relative Humidity : | 46~48%  |  |
| Test Voltage :  | 120Vac / 60Hz   | Phase :             | Neutral |  |
| Function Type:  | LTE Band 7 Idle + WLAN (5GHz) Link + Bluetooth Link + Earphone 2 + NFC On + |                     |         |  |
|                 | USB Cable (Data Link with Notebook)   |                     |         |  |



### Final Result : Quasi-Peak

| Frequency<br>(MHz) | Quasi-Peak<br>(dBµV) | Filter | Line | Corr.<br>(dB) | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|----------------------|--------|------|---------------|----------------|-----------------|
| 0.158000           | 55.1                 | Off    | N    | 19.5          | 10.5           | 65.6            |
| 0.174000           | 51.1                 | Off    | N    | 19.5          | 13.7           | 64.8            |
| 0.206000           | 47.0                 | Off    | N    | 19.5          | 16.4           | 63.4            |
| 0.254000           | 39.2                 | Off    | N    | 19.5          | 22.4           | 61.6            |
| 0.294000           | 34.8                 | Off    | N    | 19.5          | 25.6           | 60.4            |
| 0.398000           | 25.9                 | Off    | N    | 19.5          | 32.0           | 57.9            |
| 2.334000           | 22.9                 | Off    | N    | 19.4          | 33.1           | 56.0            |
| 13.558000          | 41.4                 | Off    | N    | 19.8          | 18.6           | 60.0            |

#### Final Result : Average

| Frequency<br>(MHz) | Average<br>(dBµV) | Filter | Line | Corr. | Margin<br>(dB) | Limit<br>(dBµV) |
|--------------------|-------------------|--------|------|-------|----------------|-----------------|
| 0.158000           | 36.0              | Off    | N    | 19.5  | 19.6           | 55.6            |
| 0.174000           | 34.4              | Off    | N    | 19.5  | 20.4           | 54.8            |
| 0.206000           | 31.8              | Off    | N    | 19.5  | 21.6           | 53.4            |
| 0.254000           | 26.0              | Off    | N    | 19.5  | 25.6           | 51.6            |
| 0.294000           | 23.2              | Off    | N    | 19.5  | 27.2           | 50.4            |
| 0.398000           | 20.3              | Off    | N    | 19.5  | 27.6           | 47.9            |
| 2.334000           | 19.0              | Off    | N    | 19.4  | 27.0           | 46.0            |
| 13.558000          | 41.4              | Off    | N    | 19.8  | 8.6            | 50.0            |

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## 3.3 Antenna Requirements

#### 3.3.1 Standard Applicable

If directional gain of transmitting antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the FCC rule.

#### 3.3.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

#### 3.3.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

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## 4 List of Measuring Equipment

| Instrument                             | Manufacturer       | Model No.                  | Serial No.      | Characteristics | Calibration<br>Date | Test Date                       | Due Date      | Remark                   |
|--|--------------------|----------------------------|-----------------|-----------------|---------------------|---------------------------------|---------------|--------------------------|
| Power Meter                            | Anritsu            | ML2495A                    | 1036004         | 300MHz~40GHz    | Aug. 17, 2013       | Mar. 20, 2014                   | Aug. 16, 2014 | Conducted<br>(TH02-HY)   |
| Power Sensor                           | Anritsu            | MA2411B                    | 1027253         | 300MHz~40GHz    | Aug. 17, 2013       | Mar. 20, 2014                   | Aug. 16, 2014 | Conducted<br>(TH02-HY)   |
| Spectrum<br>Analyzer                   | Rohde &<br>Schwarz | FSP40                      | 100055          | 9kHz~40GHz      | Jun. 09, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Jun. 08, 2015 | Radiation<br>(03CH05-HY) |
| Bilog Antenna                          | Schaffner          | CBL6111C                   | 2725            | 30MHz~1GHz      | Sep. 27, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Sep. 26, 2015 | Radiation<br>(03CH05-HY) |
| Double Ridged<br>Guide Horn<br>Antenna | SCHWARZBE<br>CK    | BBHA 9120 D                | 9120D-1241      | 1GHz~18GHz      | Apr. 16, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Apr. 15, 2015 | Radiation<br>(03CH05-HY) |
| SHF-EHF Horn<br>Antenna                | SCHWARZBE<br>CK    | BBHA 9170                  | BBHA91702<br>51 | 18GHz~40GHz     | Oct. 02, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Oct. 01, 2015 | Radiation<br>(03CH05-HY) |
| Preamplifier                           | MITEQ              | AMF-7D-0010<br>1800-30-10P | 1590074         | 100kHz~18GHz    | Jul. 07, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Jul. 06, 2015 | Radiation<br>(03CH05-HY) |
| Preamplifier                           | EMCI               | EMC011830                  | 980148          | DC~18GHz        | Jun. 23, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Jun. 22, 2015 | Radiation<br>(03CH05-HY) |
| Preamplifier                           | COM-POWER          | PA-103                     | 161075          | 9kHz~30MHz      | Apr. 15, 2014       | Nov. 06, 2014~<br>Nov. 09, 2014 | Apr. 14, 2015 | Radiation<br>(03CH05-HY) |
| Preamplifier                           | Miteq              | TTA0204                    | 1872107         | 18GHz~40GHz     | May 23, 2014        | Nov. 06, 2014~<br>Nov. 09, 2014 | May 22, 2015  | Radiation<br>(03CH05-HY) |
| Turn Table                             | HD                 | HD100                      | 420/611         | 0 - 360 degree  | N/A                 | Nov. 06, 2014~<br>Nov. 09, 2014 | N/A           | Radiation<br>(03CH05-HY) |
| Antenna Mast                           | HD                 | HD100                      | 240/666         | 1 m - 4 m       | N/A                 | Nov. 06, 2014~<br>Nov. 09, 2014 | N/A           | Radiation<br>(03CH05-HY) |
| Loop Antenna                           | TESEQ              | HLA 6120                   | 31244           | 9 kHz~30 MhZ    | Dec. 02, 2012       | Nov. 06, 2014~<br>Nov. 09, 2014 | Dec. 01, 2014 | Radiation<br>(03CH05-HY) |
| EMI Test Receiver                      | Rohde &<br>Schwarz | ESCS 30                    | 100356          | 9kHz ~ 2.75GHz  | Nov. 15, 2013       | Nov. 06, 2014                   | Nov. 14, 2014 | Conduction<br>(CO05-HY)  |
| LISN<br>(for auxiliary<br>equipment)   | Rohde &<br>Schwarz | ENV216                     | 100081          | 9kHz ~ 30MHz    | Dec. 12, 2013       | Nov. 06, 2014                   | Dec. 11, 2014 | Conduction<br>(CO05-HY)  |
| LISN                                   | Rohde &<br>Schwarz | ENV216                     | 100080          | 9kHz ~ 30MHz    | Dec. 04, 2013       | Nov. 06, 2014                   | Dec. 03, 2014 | Conduction<br>(CO05-HY)  |
| AC Power Source                        | ChainTek           | APC-1000W                  | N/A             | N/A             | N/A                 | Nov. 06, 2014                   | N/A           | Conduction<br>(CO05-HY)  |

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## 5 Uncertainty of Evaluation

### **Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)**

| Measuring Uncertainty for a Level of | 2.26 |
|--------------------------------------|------|
| Confidence of 95% (U = 2Uc(y))       | 2.26 |

### **Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)**

| Measuring Uncertainty for a Level of | 5.1 |  |
|--------------------------------------|-----|--|
| Confidence of 95% (U = 2Uc(y))       | 5.1 |  |

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