

## FCC Test Report

**Report No.:** RF150420E01A

**FCC ID:** VW3FAST3486

**Test Model:** F@ST 3486

**S/N:** Test sample only

**P/N:** 253641590

**Received Date:** Aug. 03, 2016

**Test Date:** Aug. 08, 2016

**Issued Date:** Sep.01, 2016

**Applicant:** SAGEMCOM BROADBAND SAS

**Address:** 250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

**Manufacturer:** SAGEMCOM BROADBAND SAS

**Address:** 250 Route de l' Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

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

**Lab Address:** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
Taiwan R.O.C.

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### Release Control Record

| Issue No.    | Description       | Date Issued  |
|--------------|-------------------|--------------|
| RF150420E01A | Original release. | Sep.01, 2016 |

## 1 Certificate of Conformity

**Product:** Cable Gateway

**Brand:** SAGEMCOM

**Test Model:** F@ST 3486

**S/N:** Test sample only

**P/N:** 253641590

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** SAGEMCOM BROADBAND SAS

**Test Date:** Aug. 08, 2016

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10: 2013

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

**Prepared by :**

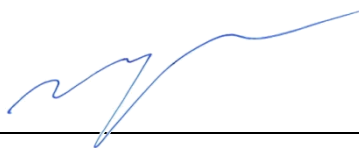


**Date:**

Sep.01, 2016

Wendy Wu / Specialist

**Approved by :**



**Date:**

Sep.01, 2016

May Chen / Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (SECTION 15.247) |                                              |        |                                                                                     |
|------------------------------------------------|----------------------------------------------|--------|-------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                    | Result | Remarks                                                                             |
| 15.207                                         | AC Power Conducted Emission                  | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -16.08dB at 3.41016MHz. |
| 15.205 /<br>15.209 /<br>15.247(d)              | Radiated Emissions and Band Edge Measurement | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -3.9dB at 83.03MHz.     |
| 15.247(d)                                      | Antenna Port Emission                        | PASS   | Meet the requirement of limit.                                                      |
| 15.203                                         | Antenna Requirement                          | PASS   | Antenna connector is i-pex(MHF) not a standard connector.                           |

NOTE: 1 This report is prepared for supplementary report.

### 2.1 Measurement Uncertainty

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

| Measurement                        | Frequency      | Expended Uncertainty (k=2) ( $\pm$ ) |
|------------------------------------|----------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 1.83 dB                              |
| Radiated Emissions up to 1 GHz     | 30MHz ~ 1GHz   | 5.37 dB                              |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                       |                                                                                                                                                                                                                                  |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product               | Cable Gateway                                                                                                                                                                                                                    |
| Brand                 | SAGEMCOM                                                                                                                                                                                                                         |
| Test Model            | F@ST 3486                                                                                                                                                                                                                        |
| Status of EUT         | ENGINEERING SAMPLE                                                                                                                                                                                                               |
| Power Supply Rating   | 12Vdc from power adapter                                                                                                                                                                                                         |
| Modulation Type       | CCK, DQPSK, DBPSK for DSSS<br>64QAM, 16QAM, QPSK, BPSK for OFDM<br>256QAM for OFDM in 11ac mode                                                                                                                                  |
| Modulation Technology | DSSS, OFDM                                                                                                                                                                                                                       |
| Transfer Rate         | 802.11b: up to 11Mbps<br>802.11a/g: up to 54Mbps<br>802.11n: up to 450Mbps<br>802.11ac: up to 1300Mbps                                                                                                                           |
| Operating Frequency   | <b>For 15.247:</b><br>2.412 ~ 2.462GHz<br><b>For 15.407</b><br>5.18 ~ 5.24GHz and 5.745 ~ 5.825GHz                                                                                                                               |
| Number of Channel     | <b>For 15.247</b><br>11 for 802.11b, 802.11g, 802.11n (HT20)<br>7 for 802.11n (HT40)<br><b>For 15.407</b><br>9 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)<br>4 for 802.11n (HT40), 802.11ac (VHT40)<br>2 for 802.11ac (VHT80) |
| Antenna Type          | Refer to Note                                                                                                                                                                                                                    |
| Antenna Connector     | Refer to Note                                                                                                                                                                                                                    |
| Accessory Device      | Adapter x 1                                                                                                                                                                                                                      |
| Data Cable Supplied   | NA                                                                                                                                                                                                                               |

Note:

1. This is a supplementary report of Report No.: RF150420E01. The differences between them are as below information:

◆ Added a new adapter as the following table:

| Original |                |                                                                                                           |          |
|----------|----------------|-----------------------------------------------------------------------------------------------------------|----------|
| Brand    | Model No.      | Spec.                                                                                                     | Remark   |
| SAGEMCOM | NBS30B120250VU | AC Input: 100-120V, 0.9A, 60Hz<br>DC Output: 12V, 2.5A<br>DC output cable: Unshielded, 2.0m, without core | Level V  |
| Newly    |                |                                                                                                           |          |
| Brand    | Model No.      | Spec.                                                                                                     | Remark   |
| SAGEMCOM | NBS30E120250VU | AC Input: 100-120V, 0.9A, 60Hz<br>DC Output: 12V, 2.5A<br>DC output cable: Unshielded, 2.0m, without core | Level VI |

2. According to above conditions, only AC power conducted emission and radiated emission (below 1GHz) test item need to be performed. And all data was verified to meet the requirements.

### 3. Simultaneously transmission condition.

| Condition | Technology    |             |
|-----------|---------------|-------------|
| 1         | WLAN (2.4GHz) | WLAN (5GHz) |

**Note:** The emission of the simultaneous operation has been evaluated and no non-compliance was found.

### 4. The antennas provided to the EUT, please refer to the following table:

| 2.4GHz Band |               |         |       |                                          |                                 |              |                    |                      |
|-------------|---------------|---------|-------|------------------------------------------|---------------------------------|--------------|--------------------|----------------------|
| Antenna No. | PCB Chain No. | Brand   | Model | Ant. Gain(dBi)<br><Including cable loss> | Frequency range<br>(GHz to GHz) | Antenna Type | Connector Type     | Cable Length<br>(mm) |
| E           | 0             | wanshih | NA    | 2.0979                                   | 2.4~2.4835                      | PIFA         | None (like solder) | NA                   |
| B           | 1             | wanshih | NA    | 2.9762                                   | 2.4~2.4835                      | PCB          | i-pex(MHF)         | 160                  |
| F           | 2             | wanshih | NA    | 2.51                                     | 2.4~2.4835                      | PIFA         | None (like solder) | NA                   |
| 5GHz Band   |               |         |       |                                          |                                 |              |                    |                      |
| Antenna No. | PCB Chain No. | Brand   | Model | Ant. Gain(dBi)<br><Including cable loss> | Frequency range<br>(GHz to GHz) | Antenna Type | Connector Type     | Cable Length<br>(mm) |
| C           | 0             | wanshih | NA    | 3.81                                     | 5.15~5.85                       | PIFA         | None (like solder) | NA                   |
| D           | 1             | wanshih | NA    | 3.92                                     | 5.15~5.85                       | PIFA         | None (like solder) | NA                   |
| A           | 2             | wanshih | NA    | 3.8509                                   | 5.15~5.85                       | PCB          | i-pex(MHF)         | 75                   |

### 5. The EUT incorporates a MIMO function.

| 2.4GHz Band      |                 |                       |     |
|------------------|-----------------|-----------------------|-----|
| MODULATION MODE  | DATA RATE (MCS) | TX & RX CONFIGURATION |     |
| 802.11b          | 1 ~ 11Mbps      | 1TX (diversity)       | 1RX |
| 802.11g          | 6 ~ 54Mbps      | 3TX                   | 3RX |
| 802.11n (HT20)   | MCS 0~7         | 3TX                   | 3RX |
|                  | MCS 8~15        | 3TX                   | 3RX |
|                  | MCS 16~23       | 3TX                   | 3RX |
| 802.11n (HT40)   | MCS 0~7         | 3TX                   | 3RX |
|                  | MCS 8~15        | 3TX                   | 3RX |
|                  | MCS 16~23       | 3TX                   | 3RX |
| 5GHz Band        |                 |                       |     |
| MODULATION MODE  | DATA RATE (MCS) | TX & RX CONFIGURATION |     |
| 802.11a          | 6 ~ 54Mbps      | 1TX (diversity)       | 1RX |
| 802.11n (HT20)   | MCS 0~7         | 3TX                   | 3RX |
|                  | MCS 8~15        | 3TX                   | 3RX |
|                  | MCS 16~23       | 3TX                   | 3RX |
| 802.11n (HT40)   | MCS 0~7         | 3TX                   | 3RX |
|                  | MCS 8~15        | 3TX                   | 3RX |
|                  | MCS 16~23       | 3TX                   | 3RX |
| 802.11ac (VHT20) | MCS 0~8, Nss=1  | 3TX                   | 3RX |
|                  | MCS 0~8, Nss=2  | 3TX                   | 3RX |
|                  | MCS 0~9, Nss=3  | 3TX                   | 3RX |
| 802.11ac (VHT40) | MCS 0~9, Nss=1  | 3TX                   | 3RX |
|                  | MCS 0~9, Nss=2  | 3TX                   | 3RX |
|                  | MCS 0~9, Nss=3  | 3TX                   | 3RX |
| 802.11ac (VHT80) | MCS 0~9, Nss=1  | 3TX                   | 3RX |
|                  | MCS 0~9, Nss=2  | 3TX                   | 3RX |
|                  | MCS 0~9, Nss=3  | 3TX                   | 3RX |

Note: 1. For 2.4GHz band and 5GHz band (802.11a), the EUT doesn't support beamforming mode.

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

### 3.2 Description of Test Modes

11 channels are provided for 802.11b, 802.11g and 802.11n (HT20):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 1       | 2412MHz   | 7       | 2442MHz   |
| 2       | 2417MHz   | 8       | 2447MHz   |
| 3       | 2422MHz   | 9       | 2452MHz   |
| 4       | 2427MHz   | 10      | 2457MHz   |
| 5       | 2432MHz   | 11      | 2462MHz   |
| 6       | 2437MHz   |         |           |

7 channels are provided for 802.11n (HT40):

| Channel | Frequency | Channel | Frequency |
|---------|-----------|---------|-----------|
| 3       | 2422MHz   | 7       | 2442MHz   |
| 4       | 2427MHz   | 8       | 2447MHz   |
| 5       | 2432MHz   | 9       | 2452MHz   |
| 6       | 2437MHz   |         |           |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE MODE | APPLICABLE TO |     | DESCRIPTION |
|--------------------|---------------|-----|-------------|
|                    | RE<1G         | PLC |             |
| -                  | √             | √   | -           |

Where **PLC**: Power Line Conducted Emission **RE<1G**: Radiated Emission below 1GHz

**NOTE:** In original report, The EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on Y-plane (below 1GHz)

#### **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.

| CDD Mode       |                   |                |                       |                 |                  |
|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
| 802.11n (HT20) | 1 to 11           | 6              | OFDM                  | BPSK            | 6.5              |

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

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

| CDD Mode       |                   |                |                       |                 |                  |
|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| MODE           | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
| 802.11n (HT20) | 1 to 11           | 6              | OFDM                  | BPSK            | 6.5              |

#### **Test Condition:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY |
|---------------|--------------------------|--------------|-----------|
| RE<1G         | 25deg. C, 70%RH          | 120Vac, 60Hz | Weiwei Lo |
| PLC           | 26deg. C, 60%RH          | 120Vac, 60Hz | Barry Lee |

### 3.3 Description of Support Units

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

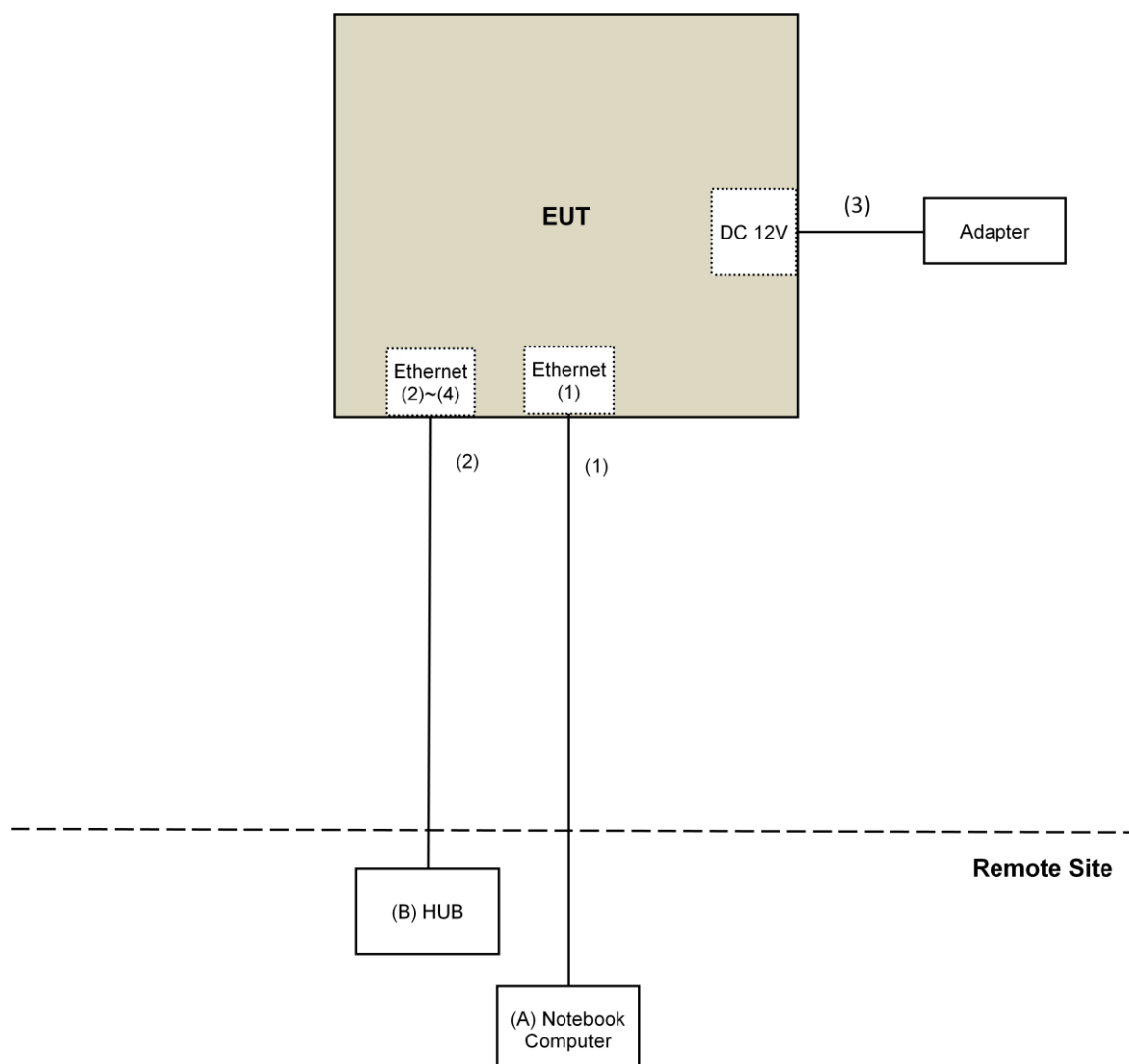
| ID | Product           | Brand | Model No. | Serial No.    | FCC ID  | Remarks         |
|----|-------------------|-------|-----------|---------------|---------|-----------------|
| A. | Notebook Computer | DELL  | E5430     | HYV4VY1       | FCC DoC | Provided by Lab |
| B. | HUB               | ZyXEL | ES-116P   | S060H02000215 | FCC DoC | Provided by Lab |

Note:

1. All power cords of the above support units are non-shielded (1.8m).

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks            |
|----|--------------|------|------------|--------------------|--------------|--------------------|
| 1. | RJ-45 Cable  | 1    | 10         | No                 | 0            | Provided by Lab    |
| 2. | RJ-45 Cable  | 3    | 10         | No                 | 0            | Provided by Lab    |
| 3. | DC Cable     | 1    | 2          | No                 | 0            | Supplied by client |

#### 3.3.1 Configuration of System under Test



### 3.4 General Description of Applied Standards

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

**FCC Part 15, Subpart C (15.247)**

**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. Other emissions shall be at least or 30dB below the highest level of the desired power:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(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 Test Instruments

| DESCRIPTION & MANUFACTURER                     | MODEL NO.                | SERIAL NO.                           | CALIBRATED DATE | CALIBRATED UNTIL |
|------------------------------------------------|--------------------------|--------------------------------------|-----------------|------------------|
| Test Receiver<br>Agilent                       | N9038A                   | MY51210105                           | July 06, 2016   | July 05, 2017    |
| Pre-Amplifier <sup>(*)</sup><br>EMCI           | EMC001340                | 980142                               | Jan. 20, 2016   | Jan. 19, 2018    |
| Loop Antenna <sup>(*)</sup><br>Electro-Metrics | EM-6879                  | 264                                  | Dec. 16, 2014   | Dec. 15, 2016    |
| RF Cable                                       | NA                       | LOOPCAB-001<br>LOOPCAB-002           | Jan. 18, 2016   | Jan. 17, 2017    |
| Pre-Amplifier<br>Mini-Circuits                 | ZFL-1000VH2<br>B         | AMP-ZFL-03                           | Nov. 11, 2015   | Nov. 10, 2016    |
| Trilog Broadband Antenna<br>SCHWARZBECK        | VULB 9168                | 9168-360                             | Jan. 04, 2016   | Jan. 03, 2017    |
| RF Cable                                       | 8D-FB                    | CHGCAB-001<br>-1<br>CHGCAB-001<br>-2 | Oct. 03, 2015   | Oct. 02, 2016    |
|                                                | RF-141                   | CHGCAB-004                           | Oct. 03, 2015   | Oct. 02, 2016    |
| Software                                       | ADT_Radiated<br>_V8.7.07 | NA                                   | NA              | NA               |
| Antenna Tower & Turn Table<br>CT               | CM100                    | 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 above test instruments is 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. The test was performed in 966 Chamber No. G.
4. The FCC Site Registration No. is 966073.
5. Loop antenna was used for all emissions below 30 MHz.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Aug. 08, 2016

#### 4.1.3 Test Procedures

- a. The EUT was placed on the top of a rotating table 0.8 meters (for below 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 height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.

**Note:**

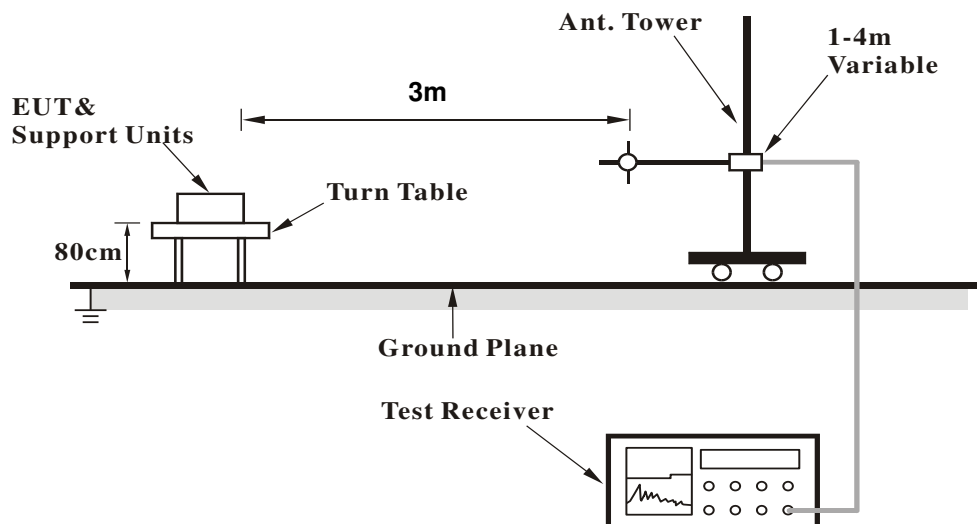
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

No deviation.

#### 4.1.5 Test Set Up

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



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

#### 4.1.6 EUT Operating Conditions

1. Connect the EUT with the Notebook Computer which is placed on remote site.
2. Controlling software (MTool 2.0.1.0) has been activated to set the EUT on specific status.

#### 4.1.7 Test Results

##### Below 1GHz Data:

##### 802.11n (HT20)

|                        |              |                          |                 |
|------------------------|--------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | TX Channel 6 | <b>DETECTOR FUNCTION</b> | Quasi-Peak (QP) |
| <b>FREQUENCY RANGE</b> | below 1GHz   |                          |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |             |                         |                |             |                    |                      |                  |                          |
|-----------------------------------------------------|-------------|-------------------------|----------------|-------------|--------------------|----------------------|------------------|--------------------------|
| NO.                                                 | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                   | 83.03       | 36.1 QP                 | 40.0           | -3.9        | 1.50 H             | 342                  | 49.4             | -13.3                    |
| 2                                                   | 200.02      | 37.7 QP                 | 43.5           | -5.8        | 1.00 H             | 79                   | 48.7             | -11.0                    |
| 3                                                   | 250.00      | 35.6 QP                 | 46.0           | -10.4       | 1.00 H             | 301                  | 44.4             | -8.8                     |
| 4                                                   | 375.00      | 38.6 QP                 | 46.0           | -7.4        | 1.00 H             | 36                   | 43.1             | -4.5                     |
| 5                                                   | 625.00      | 37.0 QP                 | 46.0           | -9.0        | 1.50 H             | 360                  | 35.3             | 1.7                      |
| 6                                                   | 800.01      | 38.7 QP                 | 46.0           | -7.3        | 1.00 H             | 269                  | 34.4             | 4.3                      |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |             |                         |                |             |                    |                      |                  |                          |
| NO.                                                 | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1                                                   | 199.99      | 31.4 QP                 | 43.5           | -12.1       | 1.00 V             | 278                  | 42.4             | -11.0                    |
| 2                                                   | 250.00      | 32.5 QP                 | 46.0           | -13.5       | 2.00 V             | 360                  | 41.3             | -8.8                     |
| 3                                                   | 375.00      | 36.9 QP                 | 46.0           | -9.1        | 1.50 V             | 0                    | 41.4             | -4.5                     |
| 4                                                   | 625.02      | 35.9 QP                 | 46.0           | -10.1       | 1.50 V             | 77                   | 34.2             | 1.7                      |
| 5                                                   | 800.01      | 37.2 QP                 | 46.0           | -8.8        | 1.50 V             | 171                  | 32.9             | 4.3                      |
| 6                                                   | 875.02      | 37.8 QP                 | 46.0           | -8.2        | 1.00 V             | 78                   | 32.3             | 5.5                      |

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 60                     | 50      |

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

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

### 4.2.2 Test Instruments

| DESCRIPTION & MANUFACTURER                                          | MODEL NO.               | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---------------------------------------------------------------------|-------------------------|------------|-----------------|------------------|
| Test Receiver<br>R&S                                                | ESCS 30                 | 100375     | May 09, 2016    | May 08, 2017     |
| Line-Impedance<br>Stabilization Network<br>(for EUT)<br>SCHWARZBECK | NSLK-8127               | 8127-522   | Sep. 01, 2015   | Aug. 31, 2016    |
| Line-Impedance<br>Stabilization Network<br>(for Peripheral )<br>R&S | ENV216                  | 100072     | June 13, 2016   | June 12, 2017    |
| RF Cable                                                            | 5D-FB                   | COCCAB-001 | Mar. 08, 2016   | Mar. 07, 2017    |
| 10 dB PAD<br>Mini-Circuits                                          | HAT-10+                 | CONATT-003 | Sep. 14, 2015   | Sep. 13, 2016    |
| 50 ohms Terminator                                                  | N/A                     | EMC-03     | Sep. 23, 2015   | Sep. 22, 2016    |
| 50 ohms Terminator                                                  | N/A                     | EMC-02     | Oct. 01, 2015   | Sep. 30, 2016    |
| Software<br>BVADT                                                   | BVADT_Cond_<br>V7.3.7.3 | NA         | NA              | NA               |

#### Note:

1. The calibration interval of the above test instruments are 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. The test was performed in Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Aug. 08, 2016

#### 4.2.3 Test Procedures

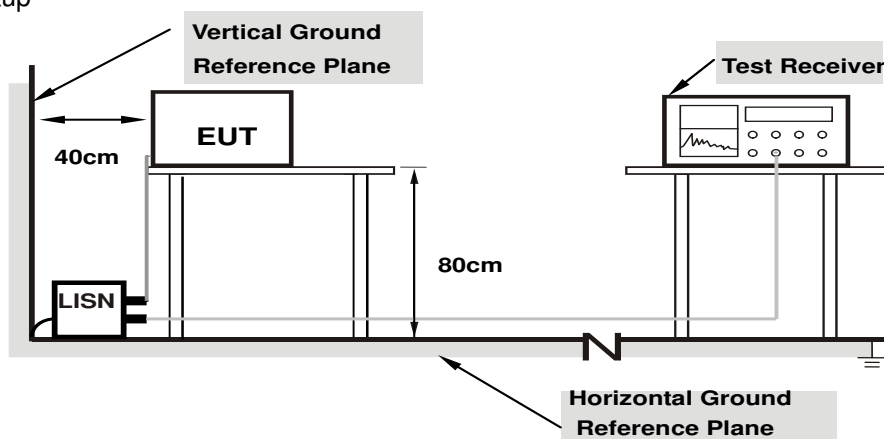
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

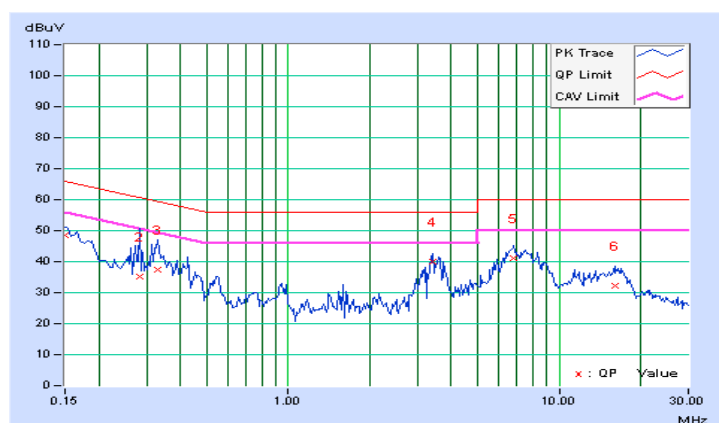
#### 4.2.7 Test Results

| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|-------|----------|-------------------|--------------------------------|
|-------|----------|-------------------|--------------------------------|

| No       | Freq.          | Corr.        | Reading Value |              | Emission Level |              | Limit        |              | Margin        |               |
|----------|----------------|--------------|---------------|--------------|----------------|--------------|--------------|--------------|---------------|---------------|
|          | [MHz]          | Factor       | [dB (uV)]     |              | [dB (uV)]      |              | [dB (uV)]    |              | (dB)          |               |
|          |                | (dB)         | Q.P.          | AV.          | Q.P.           | AV.          | Q.P.         | AV.          | Q.P.          | AV.           |
| 1        | 0.15000        | 10.32        | 38.20         | 24.14        | 48.52          | 34.46        | 66.00        | 56.00        | -17.48        | -21.54        |
| 2        | 0.28281        | 10.29        | 24.89         | 17.40        | 35.18          | 27.69        | 60.73        | 50.73        | -25.55        | -23.04        |
| 3        | 0.32969        | 10.29        | 27.06         | 17.68        | 37.35          | 27.97        | 59.46        | 49.46        | -22.11        | -21.49        |
| <b>4</b> | <b>3.41016</b> | <b>10.38</b> | <b>29.54</b>  | <b>17.15</b> | <b>39.92</b>   | <b>27.53</b> | <b>56.00</b> | <b>46.00</b> | <b>-16.08</b> | <b>-18.47</b> |
| 5        | 6.81250        | 10.48        | 30.46         | 16.78        | 40.94          | 27.26        | 60.00        | 50.00        | -19.06        | -22.74        |
| 6        | 16.03906       | 10.82        | 21.28         | 15.30        | 32.10          | 26.12        | 60.00        | 50.00        | -27.90        | -23.88        |

#### 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.

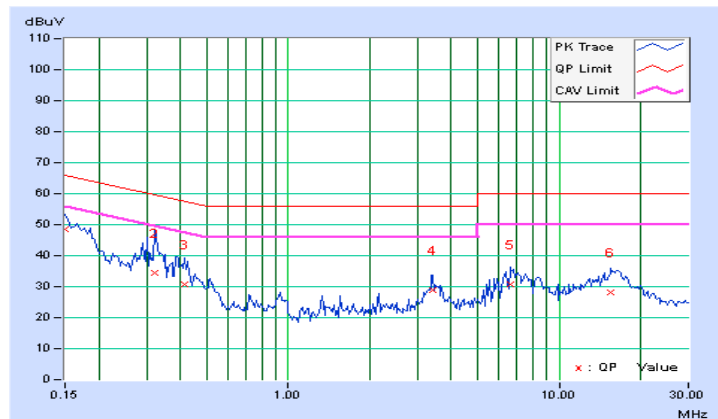


|       |             |                   |                                |
|-------|-------------|-------------------|--------------------------------|
| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|-------|-------------|-------------------|--------------------------------|

| No | Freq.<br>[MHz] | Corr.  | Reading Value |       | Emission Level |       | Limit     |       | Margin |        |
|----|----------------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
|    |                | Factor | [dB (uV)]     |       | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    |                | (dB)   | Q.P.          | AV.   | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.15000        | 10.30  | 38.12         | 23.40 | 48.42          | 33.70 | 66.00     | 56.00 | -17.58 | -22.30 |
| 2  | 0.32188        | 10.27  | 24.25         | 15.71 | 34.52          | 25.98 | 59.66     | 49.66 | -25.14 | -23.68 |
| 3  | 0.41563        | 10.28  | 20.50         | 13.47 | 30.78          | 23.75 | 57.54     | 47.54 | -26.76 | -23.79 |
| 4  | 3.41797        | 10.39  | 18.54         | 6.46  | 28.93          | 16.85 | 56.00     | 46.00 | -27.07 | -29.15 |
| 5  | 6.60547        | 10.49  | 20.26         | 7.43  | 30.75          | 17.92 | 60.00     | 50.00 | -29.25 | -32.08 |
| 6  | 15.58984       | 10.83  | 17.28         | 11.37 | 28.11          | 22.20 | 60.00     | 50.00 | -31.89 | -27.80 |

#### REMARKS:

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



## 5 Pictures of Test Arrangements

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

## Appendix – Information on the Testing Laboratories

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

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

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

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