



A D T

# Supplemental “Transmit Simultaneously” Test Report

**REPORT NO.:** RF130725E04A-2 R1

**MODEL NO.:** MR34-HW

**FCC ID:** UDX-60025010

**RECEIVED:** Aug. 02, 2013

**TESTED:** Aug. 02 to Sep. 23, 2013

**ISSUED:** Oct. 02, 2013

**APPLICANT:** Cisco Systems, Inc.

**ADDRESS:** 170 West Tasman Drive, San Jose, CA 95134 USA

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

**LAB ADDRESS :** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

**TEST LOCATION (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

**TEST LOCATION (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen,  
Chiung Lin Hsiang, Hsin Chu Hsien 307, Taiwan,  
R.O.C.

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



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification



## Table of Contents

|                                                               |    |
|---------------------------------------------------------------|----|
| RELEASE CONTROL RECORD .....                                  | 4  |
| 1. CERTIFICATION .....                                        | 5  |
| 2. SUMMARY OF TEST RESULTS.....                               | 6  |
| 2.1 MEASUREMENT UNCERTAINTY .....                             | 7  |
| 3. GENERAL INFORMATION .....                                  | 8  |
| 3.1 GENERAL DESCRIPTION OF EUT .....                          | 8  |
| 3.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:.....   | 12 |
| 3.3 DESCRIPTION OF SUPPORT UNITS .....                        | 17 |
| 3.4 CONFIGURATION OF SYSTEM UNDER TEST.....                   | 18 |
| 4. TEST TYPES AND RESULTS.....                                | 20 |
| 4.1 CONDUCTED EMISSION MEASUREMENT.....                       | 20 |
| 4.1.1 LIMITS OF CONDUCTED EMISSION MEASUREMENT.....           | 20 |
| 4.1.2 TEST INSTRUMENTS.....                                   | 20 |
| 4.1.3 TEST PROCEDURES .....                                   | 21 |
| 4.1.4 DEVIATION FROM TEST STANDARD.....                       | 21 |
| 4.1.5 TEST SETUP .....                                        | 22 |
| 4.1.6 EUT OPERATING CONDITIONS.....                           | 22 |
| 4.1.7 TEST RESULTS (MODE 1).....                              | 23 |
| 4.1.8 TEST RESULTS (MODE 2).....                              | 25 |
| 4.1.9 TEST RESULTS (MODE 3).....                              | 27 |
| 4.1.10 TEST RESULTS (MODE 4).....                             | 29 |
| 4.2 RADIATED EMISSION MEASUREMENT.....                        | 31 |
| 4.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT.....            | 31 |
| 4.2.2 TEST INSTRUMENTS.....                                   | 32 |
| 4.2.3 TEST PROCEDURES .....                                   | 34 |
| 4.2.4 DEVIATION FROM TEST STANDARD.....                       | 34 |
| 4.2.5 TEST SETUP .....                                        | 35 |
| 4.2.6 EUT OPERATING CONDITIONS.....                           | 35 |
| 4.2.7 TEST RESULTS (MODE 1).....                              | 36 |
| 4.2.8 TEST RESULTS (MODE 2).....                              | 39 |
| 4.2.9 TEST RESULTS (MODE 5).....                              | 42 |
| 4.3 CONDUCTED OUTPUT POWER MEASUREMENT .....                  | 45 |
| 4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT .....      | 45 |
| 4.3.2 INSTRUMENTS.....                                        | 46 |
| 4.3.3 TEST PROCEDURES .....                                   | 46 |
| 4.3.4 DEVIATION FROM TEST STANDARD.....                       | 47 |
| 4.3.5 TEST SETUP .....                                        | 47 |
| 4.3.6 EUT OPERATING CONDITIONS.....                           | 47 |
| 4.3.7 TEST RESULTS .....                                      | 48 |
| 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT .....             | 52 |
| 4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT ..... | 52 |



A D T

|       |                                               |    |
|-------|-----------------------------------------------|----|
| 4.4.2 | TEST INSTRUMENTS .....                        | 52 |
| 4.4.3 | TEST PROCEDURES .....                         | 52 |
| 4.4.4 | DEVIATION FROM TEST STANDARD.....             | 52 |
| 4.4.5 | TEST SETUP .....                              | 53 |
| 4.4.6 | EUT OPERATING CONDITIONS.....                 | 53 |
| 4.4.7 | TEST RESULTS .....                            | 54 |
| 5.    | INFORMATION ON THE TESTING LABORATORIES ..... | 56 |



A D T

## RELEASE CONTROL RECORD

| ISSUE NO.         | REASON FOR CHANGE                                                                           | DATE ISSUED   |
|-------------------|---------------------------------------------------------------------------------------------|---------------|
| RF130725E04A-2    | Original release                                                                            | Aug. 27, 2013 |
| RF130725E04A-2 R1 | 1. Revised radiated emission and bandedge data.<br>2. Added power spectral density section. | Oct. 02, 2013 |



A D T

## 1. CERTIFICATION

**PRODUCT :** Cisco Meraki MR34  
**BRAND NAME :** Cisco  
**MODEL NO. :** MR34-HW  
**TEST ITEM:** R&D SAMPLE  
**APPLICANT :** Cisco Systems, Inc.  
**TESTED:** Aug. 02 to Sep. 23, 2013  
**STANDARDS :** FCC Part 15, Subpart C (Section 15.247)  
FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.10-2009

The above equipment (Model: MR34-HW) 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 :** Phoenix Huang , **DATE:** Oct. 02, 2013  
( Phoenix Huang, Specialist )

**APPROVED BY :** May Chen , **DATE:** Oct. 02, 2013  
( May Chen, Manager )



## 2. SUMMARY OF TEST RESULTS

The EUT has been tested according to the following specifications:

| APPLIED STANDARD: FCC PART 15, SUBPART C (SECTION 15.247) |                             |        |                                                                                            |
|-----------------------------------------------------------|-----------------------------|--------|--------------------------------------------------------------------------------------------|
| STANDARD SECTION                                          | TEST TYPE                   | RESULT | REMARK                                                                                     |
| 15.207                                                    | AC Power Conducted Emission | PASS   | Meet the requirement of limit. Minimum passing margin is -6.28dB at 0.49925MHz             |
| 15.247(d)<br>15.209                                       | Radiated Emissions          | PASS   | Meet the requirement of limit. Minimum passing margin is -0.2dB at 5400.00MHz & 5434.00MHz |
| 15.247(b)                                                 | Conducted Output power      | PASS   | Meet the requirement of limit.                                                             |

| 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 -6.28dB at 0.49925MHz             |
| 15.407(b)(1/2/3)<br>(b)(5)                                | Spurious Emissions          | PASS   | Meet the requirement of limit. Minimum passing margin is -0.2dB at 5400.00MHz & 5434.00MHz |
| 15.407(a)(1/2/3)                                          | Transmit Power              | PASS   | Meet the requirement of limit.                                                             |

## 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:

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

| Measurement                       | Value   |
|-----------------------------------|---------|
| Conducted emissions               | 2.98 dB |
| Radiated emissions (30MHz-1GHz)   | 5.46 dB |
| Radiated emissions (1GHz -6GHz)   | 3.54 dB |
| Radiated emissions (6GHz -18GHz)  | 4.08 dB |
| Radiated emissions (18GHz -40GHz) | 4.11 dB |

### 3. GENERAL INFORMATION

#### 3.1 GENERAL DESCRIPTION OF EUT

|                              |                                                                                                                      |
|------------------------------|----------------------------------------------------------------------------------------------------------------------|
| <b>PRODUCT</b>               | Cisco Meraki MR34                                                                                                    |
| <b>MODEL NO.</b>             | MR34-HW                                                                                                              |
| <b>POWER SUPPLY</b>          | DC 12V from power adapter,<br>DC 37~57V <sub>dc</sub> , 0.5~0.3A from POE                                            |
| <b>MODULATION TYPE</b>       | 64QAM, 16QAM, QPSK, BPSK for OFDM<br>256QAM for OFDM in 11ac mode only.                                              |
| <b>MODULATION TECHNOLOGY</b> | OFDM                                                                                                                 |
| <b>TRANSFER RATE</b>         | 802.11a: up to 54Mbps<br>802.11n: up to 450Mbps<br>802.11ac: up to 1300Mbps                                          |
| <b>OPERATING FREQUENCY</b>   | 5.26 ~ 5.32GHz, 5.50 ~ 5.58GHz & 5.66GHz ~ 5.70GHz                                                                   |
| <b>NUMBER OF CHANNEL</b>     | 12 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)<br>5 for 802.11n (HT40), 802.11ac (VHT40)<br>2 for 802.11ac (VHT80) |
| <b>MAXIMUM OUTPUT POWER</b>  | Please see NOTE                                                                                                      |
| <b>ANTENNA TYPE</b>          | Please see NOTE                                                                                                      |
| <b>DATA CABLE</b>            | NA                                                                                                                   |
| <b>I/O PORTS</b>             | Refer to user's manual                                                                                               |
| <b>ASSOCIATED DEVICES</b>    | Adapter x1                                                                                                           |

#### NOTE:

1. This report is prepared for FCC class II permissive change. The difference compared with the original report design is as the following information:

u Add DFS band <5250~5350MHz & 5470~5725MHz>



2. The maximum output power table as below table:

| MAXIMUM OUTPUT POWER (mW) |        |                  |         |
|---------------------------|--------|------------------|---------|
| Radio Card 1              |        | Radio Card 0     |         |
| Annex 9                   |        | Annex 9          |         |
| 802.11a                   | 49.545 | 802.11a          | 112.036 |
| 802.11n (HT20)            | 49.774 | 802.11n (HT20)   | 194.327 |
| 802.11n (HT40)            | 37.497 | 802.11n (HT40)   | 194.069 |
|                           |        | 802.11ac (VHT80) | 188.917 |

3. The EUT is a 2.4GHz & 5GHz WLAN device.

4. The EUT must be supplied with a adapter or POE (only for test not for sale) as below information:

| Adapter                                                                                                                                                                                 |             |                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------------------|
| Brand                                                                                                                                                                                   | Model No.   | Spec.                                                                                            |
| Powertron Electronics Corp.                                                                                                                                                             | PA1015-2HU  | AC Input : 100-240V, 0.4A, 50-60Hz<br>DC Output : 12V, 1.5A<br>DC output cable(unshielded ,1.6m) |
| POE(only for test not for sale)                                                                                                                                                         |             |                                                                                                  |
| Brand                                                                                                                                                                                   | Model No.   | Spec.                                                                                            |
| Power Dsine                                                                                                                                                                             | PD-9501G/AC | AC Input : 100-240V, 1.5A, 50-60Hz<br>DC Output : 55V, 1.35A                                     |
| For radiated emission: From above power sources, the worst case was found in Adapter (Model: <b>PA1015-2HU</b> ). Therefore only the test data of the mode was recorded in this report. |             |                                                                                                  |

5. The three radio cards and antennas provided to the EUT, please refer to the following table:

| <b>Radio Card 0 (Single band 3Tx)</b> |                                     |              |                |                                 |                      |
|---------------------------------------|-------------------------------------|--------------|----------------|---------------------------------|----------------------|
| Transmitter Circuit                   | Gain (dBi)<br>(Include cable loss ) | Antenna Type | Connector Type | Frequency range<br>(MHz to MHz) | Cable Length<br>(mm) |
| Chain (0)                             | 5.6                                 | PIFA         | IPEX           | 5150~5850                       | 185                  |
| Chain (1)                             | 5.5                                 | PIFA         | IPEX           | 5150~5850                       | 270                  |
| Chain (2)                             | 5.2                                 | PIFA         | IPEX           | 5150~5850                       | 75                   |
| <b>Radio Card 1 (Dual band 1Tx)</b>   |                                     |              |                |                                 |                      |
| Transmitter Circuit                   | Gain (dBi)<br>(Include cable loss ) | Antenna Type | Connector Type | Frequency range<br>(MHz to MHz) | Cable Length<br>(mm) |
| Chain (0)                             | 4.3                                 | PIFA         | IPEX           | 2400~2500                       | 95                   |
|                                       | 5.4                                 | PIFA         | IPEX           | 5150~5850                       | 95                   |
| <b>Radio Card 2 (Single band 3Tx)</b> |                                     |              |                |                                 |                      |
| Transmitter Circuit                   | Gain (dBi)<br>(Include cable loss ) | Antenna Type | Connector Type | Frequency range<br>(MHz to MHz) | Cable Length<br>(mm) |
| Chain (0)                             | 4.8                                 | PIFA         | IPEX           | 2400~2500                       | 45                   |
| Chain (1)                             | 2                                   | PIFA         | IPEX           | 2400~2500                       | 195                  |
| Chain (2)                             | 2.3                                 | PIFA         | IPEX           | 2400~2500                       | 165                  |

6. The EUT incorporates a MIMO function without beam forming.

| MODULATION MODE                                                                                                                                                             | RADIO CARD | TX/RX FUNCTION                                        |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------|
| <b>802.11b</b><br><b>802.11g</b><br><b>802.11n (HT20) &lt;2.4GHz&gt;</b><br><b>802.11n (HT40) &lt;2.4GHz&gt;</b>                                                            | Card 1     | 1Tx/1Rx                                               |
|                                                                                                                                                                             | Card 2     | 1Tx/1Rx (Diversity)<br>2Tx/2Rx (Diversity)<br>3Tx/3Rx |
| <b>802.11a</b><br><b>802.11n (HT20) &lt;5GHz&gt;</b><br><b>802.11n (HT40) &lt;5GHz&gt;</b>                                                                                  | Card 1     | 1Tx/1Rx                                               |
| <b>802.11a</b><br><b>802.11n (HT20) &lt;5GHz&gt;</b><br><b>802.11n (HT40) &lt;5GHz&gt;</b><br><b>802.11ac (VHT20)</b><br><b>802.11ac (VHT40)</b><br><b>802.11ac (VHT80)</b> | Card 0     | 1Tx/1Rx (Diversity)<br>2Tx/2Rx (Diversity)<br>3Tx/3Rx |



7. When the EUT operating in 802.11n, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 23.
8. When the EUT operating in 802.11ac, the software operation, which is defined by manufacturer, MCS (Modulation and Coding Schemes) from 0 to 9.
9. The above EUT information was declared by the manufacturer and for more detailed feature descriptions, please refer to the manufacturer's specifications or User's Manual.

### 3.2 TEST MODE APPLICABILITY AND TESTED CHANNEL DETAIL:

| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |         |                    | DESCRIPTION                                                    |
|--------------------------|---------------|---------|--------------------|----------------------------------------------------------------|
|                          | PLC           | RE < 1G | RE <sup>3</sup> 1G |                                                                |
| 1                        | √             | √       | √                  | Radio Card 1 (2.4G) + Radio Card 2 + Radio Card 0 with Adapter |
| 2                        | √             | √       | √                  | Radio Card 1 (5G) + Radio Card 2 + Radio Card 0 with Adapter   |
| 3                        | √             | -       | -                  | Radio Card 1 (2.4G) + Radio Card 2 + Radio Card 0 with POE     |
| 4                        | √             | -       | -                  | Radio Card 1 (5G) + Radio Card 2 + Radio Card 0 with POE       |
| 5                        | -             | -       | √                  | Radio Card 1 (5G) + Radio Card 0 with Adapter                  |
| EUT<br>CONFIGURE<br>MODE | APPLICABLE TO |         |                    | DESCRIPTION                                                    |
|                          | APCM          |         |                    |                                                                |
| 1                        | √             |         |                    | Radio Card 1 (5G) + Radio Card 0 with Adapter                  |

Where **PLC**: Power Line Conducted Emission

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

**RE <sup>3</sup> 1G**: Radiated Emission above 1GHz

**APCM**: Antenna Port Conducted Measurement

**Note:** 1. For the original test report: the EUT had been pre-tested on the positioned of each 2 axis. The worst case was found when positioned on **X-plane** (for below 1GHz) and **Z-plane** (for above 1GHz).

# 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.

| MODE                                                                                                                                                        | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)<br>+<br>802.11b<br>(Radio Card 1)                     | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 1 to 11           | 6              | DSSS                  | DBPSK           | 1                |
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 1) | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 6.5              |

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

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

| MODE                                                                                                                                                        | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)<br>+<br>802.11b<br>(Radio Card 1)                     | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 1 to 11           | 6              | DSSS                  | DBPSK           | 1                |
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)<br>+<br>For 5 GHz<br>802.11n (HT20)<br>(Radio Card 1) | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
|                                                                                                                                                             | 52 to 140         | 116            | OFDM                  | BPSK            | 6.5              |

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

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| MODE                                            | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------------------------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2) | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
| +                                               |                   |                |                       |                 |                  |
| For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)   | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
| +                                               |                   |                |                       |                 |                  |
| 802.11b<br>(Radio Card 1)                       | 1 to 11           | 6              | DSSS                  | DBPSK           | 1                |
| For 2.4 GHz<br>802.11n (HT20)<br>(Radio Card 2) | 1 to 11           | 6              | OFDM                  | BPSK            | 19.5             |
| +                                               |                   |                |                       |                 |                  |
| For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)   | 52 to 140         | 116            | OFDM                  | BPSK            | 19.5             |
| +                                               |                   |                |                       |                 |                  |
| For 5 GHz<br>802.11n (HT20)<br>(Radio Card 1)   | 52 to 140         | 116            | OFDM                  | BPSK            | 6.5              |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 1)   | 54 to 62          | 62             | OFDM                  | BPSK            | 13.5             |
| +                                               |                   |                |                       |                 |                  |
| For 0 GHz<br>802.11n (HT20)<br>(Radio Card 0)   | 52 to 64          | 64             | OFDM                  | BPSK            | 19.5             |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 1)   | 54 to 134         | 102            | OFDM                  | BPSK            | 13.5             |
| +                                               |                   |                |                       |                 |                  |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 0)   | 54 to 134         | 102            | OFDM                  | BPSK            | 40.5             |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 1)   | 54 to 134         | 134            | OFDM                  | BPSK            | 13.5             |
| +                                               |                   |                |                       |                 |                  |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 0)   | 54 to 134         | 134            | OFDM                  | BPSK            | 40.5             |

# **ANTENNA PORT CONDUCTED MEASUREMENT:**

- ☒ 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.

| MODE                                               | AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TECHNOLOGY | MODULATION TYPE | DATA RATE (Mbps) |
|----------------------------------------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| 802.11a<br>(Radio Card 1)<br>+                     | 52 to 64          | 52             | OFDM                  | BPSK            | 6                |
| For 5 GHz<br>802.11n (HT40)<br>(Radio Card 0)      | 52 to 64          | 54             | OFDM                  | BPSK            | 40.5             |
| For 5 GHz<br>802.11n (HT20)<br>(Radio Card 1)<br>+ | 100 to 140        | 116            | OFDM                  | BPSK            | 6.5              |
| For 5 GHz<br>802.11n (HT20)<br>(Radio Card 0)      | 100 to 140        | 116            | OFDM                  | BPSK            | 19.5             |

# **TEST CONDITION:**

| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY    |
|---------------|--------------------------|--------------|--------------|
| PLC           | 26deg. C, 66%RH          | 120Vac, 60Hz | JyunChun Lin |
|               | 25deg. C, 50%RH          | 120Vac, 60Hz | Scott Chen   |
| RE            | 25deg. C, 65%RH          | 120Vac, 60Hz | Andy Ho      |
|               | 24deg. C, 68%RH          | 120Vac, 60Hz | Tim Ho       |
|               | 24deg. C, 71%RH          | 120Vac, 60Hz | Andy Ho      |
| APCM          | 25deg. C, 60%RH          | 120Vac, 60Hz | Robert Cheng |





### 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.

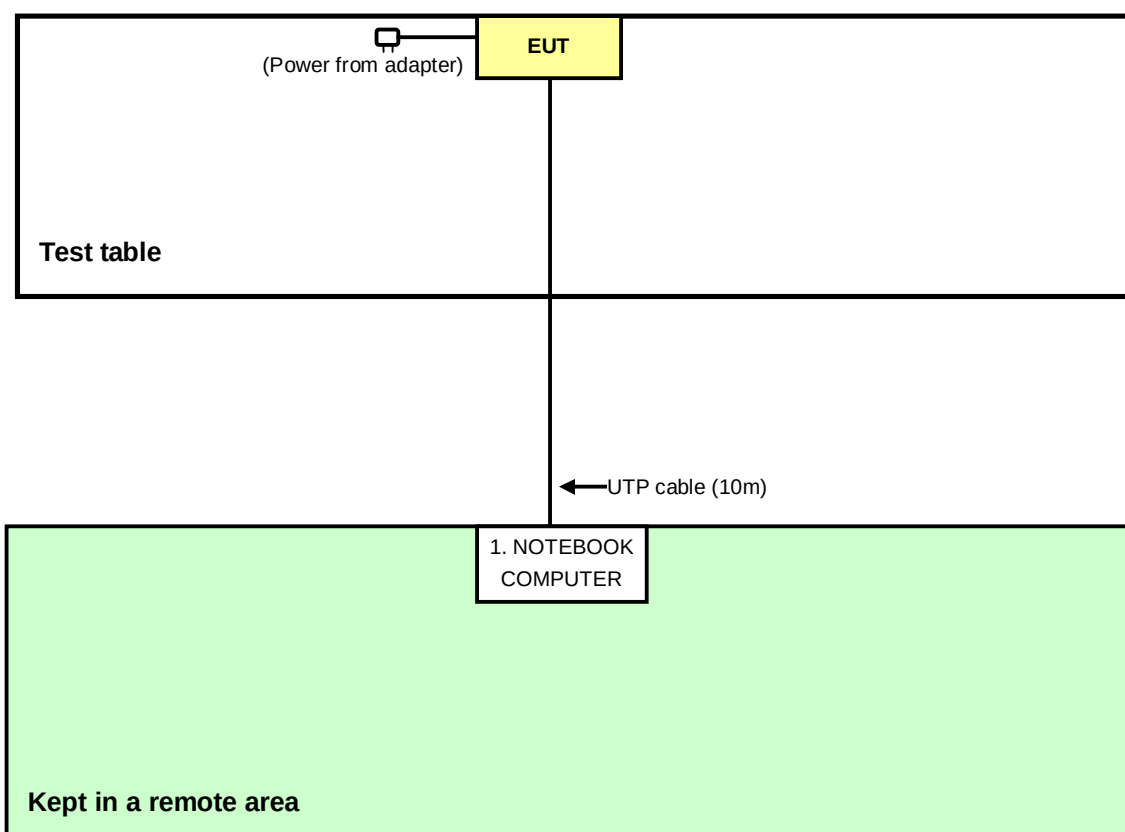
| NO. | PRODUCT           | BRAND       | MODEL NO.   | SERIAL NO. | FCC ID  |
|-----|-------------------|-------------|-------------|------------|---------|
| 1   | NOTEBOOK COMPUTER | DELL        | PP32LA      | FSLB32S    | FCC DoC |
| 2   | POE               | Power Dsine | PD-9501G/AC | NA         | NA      |

| NO. | SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS |
|-----|-----------------------------------------------------|
| 1   | UTP cable, 10m                                      |
| 2   | UTP cable, 10m                                      |

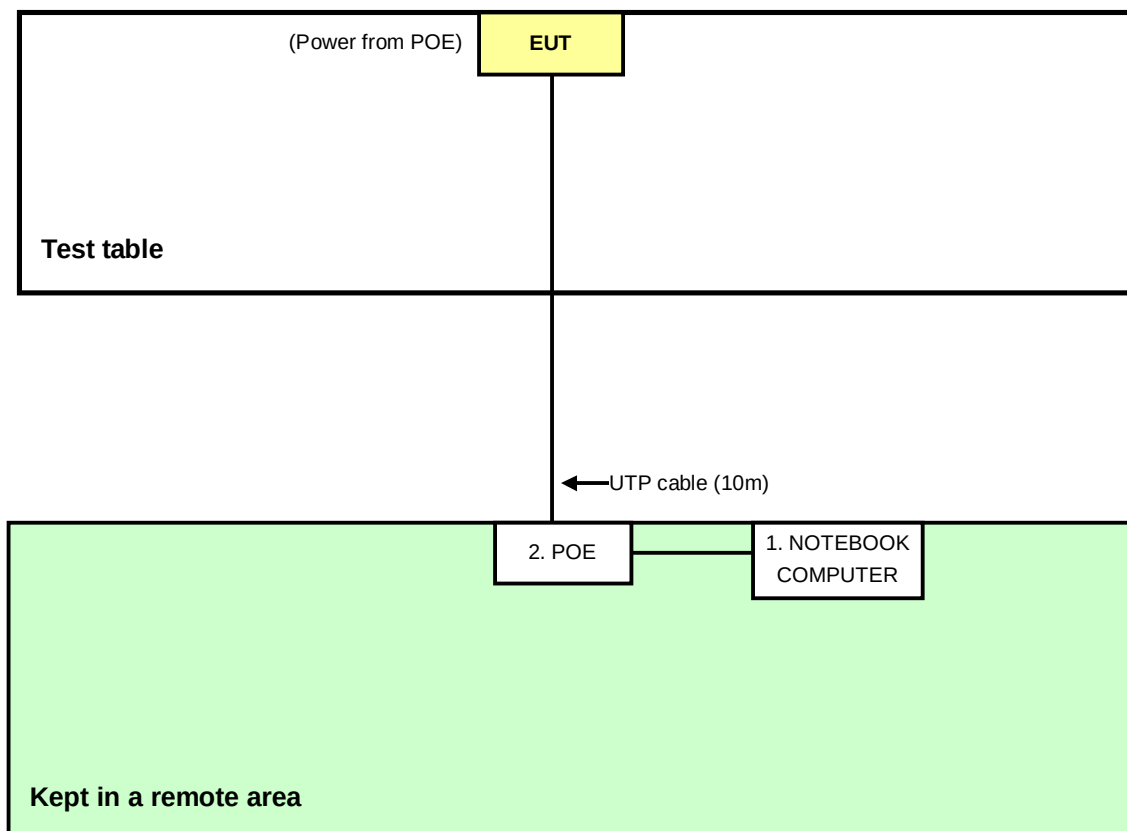
**NOTE:** All power cords of the above support units are non shielded (1.8m).

### 3.4 CONFIGURATION OF SYSTEM UNDER TEST

For Conducted Emission (Mode 1~2) / Radiated Emission test:



**For Conducted Emission (Mode 3~4) test:**



## 4. TEST TYPES AND RESULTS

### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 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 0.50 MHz.

#### 4.1.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER                                          | MODEL NO.                   | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|---------------------------------------------------------------------|-----------------------------|------------|-----------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ                                    | ESCS 30                     | 100375     | Mar. 08, 2013   | Mar. 07, 2014    |
| Line-Impedance<br>Stabilization Network<br>(for EUT)<br>SCHWARZBECK | NSLK8127                    | 8127-522   | Sep. 06, 2012   | Sep. 05, 2013    |
| Line-Impedance<br>Stabilization Network<br>(for Peripheral)         | ENV216                      | 100072     | June 07, 2013   | June 06, 2014    |
| RF Cable<br>(JYEBAO)                                                | 5DFB                        | COCCAB-001 | Mar. 11, 2013   | Mar. 10, 2014    |
| 50 ohms Terminator                                                  | 50                          | EMC-3      | Sep. 25, 2012   | Sep. 24, 2013    |
| Software<br>ADT                                                     | BV<br>ADT_Cond_V7.3.7.<br>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 Shielded Room No. C.
3. The VCCI Con C Registration No. is C-3611.
4. Tested Date: Aug. 02 to 05, 2013

#### 4.1.3 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.
- b. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- c. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- d. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) were not recorded.

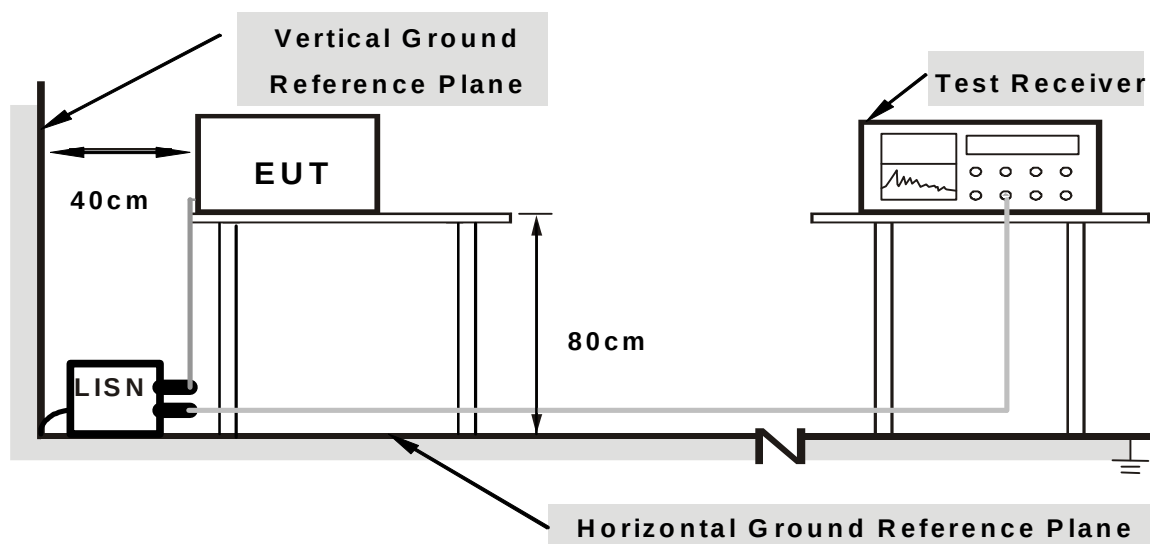
**NOTE:**

1. The resolution bandwidth of test receiver is 9kHz for Quasi-peak detection (QP) & Average detection (AV).

#### 4.1.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.1.5 TEST SETUP



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

For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

#### 4.1.6 EUT OPERATING CONDITIONS

1. Turn on the power of EUT.
2. The communication partner run test program “MTool V1.0.0.10.exe” to enable EUT under transmission/receiving condition continuously at specific channel frequency.

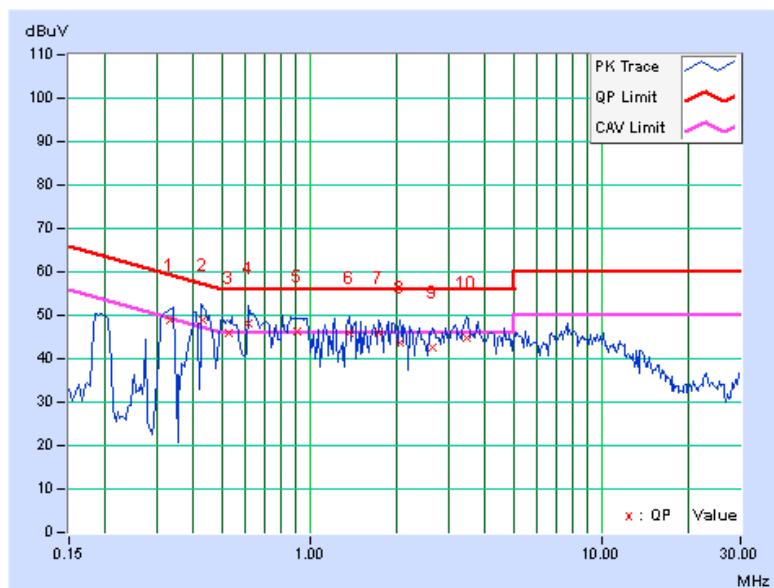
#### 4.1.7 TEST RESULTS (MODE 1)

| PHASE | Line (L) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|-------|----------|-------------------|--------------------------------|
|-------|----------|-------------------|--------------------------------|

| No | Freq.<br>[MHz] | Corr.<br>Factor<br>(dB) | Reading Value<br>[dB (uV)] |       | Emission Level<br>[dB (uV)] |       | Limit<br>[dB (uV)] |       | Margin<br>(dB) |        |
|----|----------------|-------------------------|----------------------------|-------|-----------------------------|-------|--------------------|-------|----------------|--------|
|    |                |                         | Q.P.                       | AV.   | Q.P.                        | AV.   | Q.P.               | AV.   | Q.P.           | AV.    |
| 1  | 0.33359        | 0.18                    | 48.56                      | 36.44 | 48.74                       | 36.62 | 59.36              | 49.36 | -10.62         | -12.74 |
| 2  | 0.43159        | 0.20                    | 48.76                      | 34.18 | 48.96                       | 34.38 | 57.22              | 47.22 | -8.26          | -12.84 |
| 3  | 0.52887        | 0.21                    | 45.84                      | 32.98 | 46.05                       | 33.19 | 56.00              | 46.00 | -9.95          | -12.81 |
| 4  | 0.61875        | 0.22                    | 47.96                      | 34.51 | 48.18                       | 34.73 | 56.00              | 46.00 | -7.82          | -11.27 |
| 5  | 0.90781        | 0.24                    | 46.03                      | 32.87 | 46.27                       | 33.11 | 56.00              | 46.00 | -9.73          | -12.89 |
| 6  | 1.36328        | 0.28                    | 45.50                      | 32.95 | 45.78                       | 33.23 | 56.00              | 46.00 | -10.22         | -12.77 |
| 7  | 1.71875        | 0.31                    | 45.58                      | 32.34 | 45.89                       | 32.65 | 56.00              | 46.00 | -10.11         | -13.35 |
| 8  | 2.03906        | 0.34                    | 43.36                      | 31.01 | 43.70                       | 31.35 | 56.00              | 46.00 | -12.30         | -14.65 |
| 9  | 2.64453        | 0.38                    | 42.03                      | 30.19 | 42.41                       | 30.57 | 56.00              | 46.00 | -13.59         | -15.43 |
| 10 | 3.45313        | 0.43                    | 44.34                      | 32.80 | 44.77                       | 33.23 | 56.00              | 46.00 | -11.23         | -12.77 |

#### 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

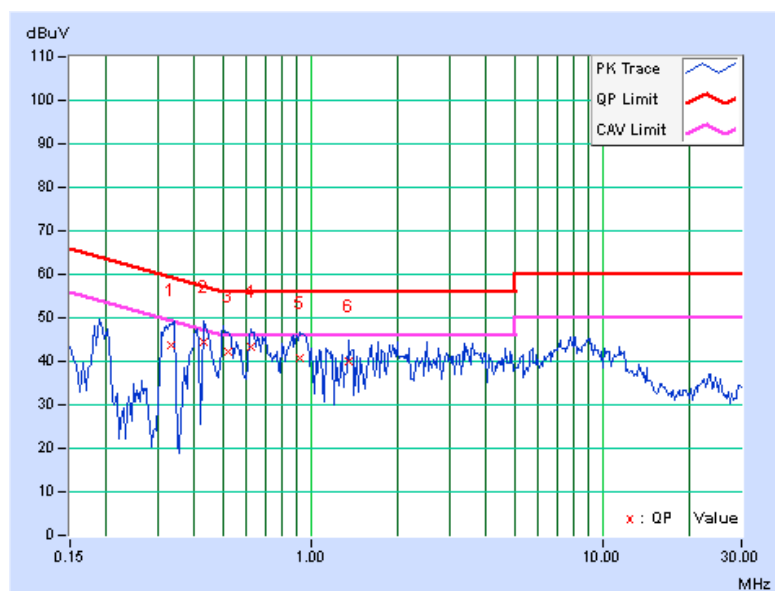


|       |             |                   |                                |
|-------|-------------|-------------------|--------------------------------|
| PHASE | Neutral (N) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|-------|-------------|-------------------|--------------------------------|

|    | Freq.   | Corr.  | Reading Value |       | Emission Level |       | Limit     |       | Margin |        |
|----|---------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
| No |         | Factor | [dB (uV)]     |       | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    | [MHz]   | (dB)   | Q.P.          | AV.   | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.33241 | 0.17   | 43.48         | 30.97 | 43.65          | 31.14 | 59.39     | 49.39 | -15.74 | -18.25 |
| 2  | 0.43125 | 0.19   | 44.15         | 29.71 | 44.34          | 29.90 | 57.23     | 47.23 | -12.89 | -17.33 |
| 3  | 0.52109 | 0.20   | 41.98         | 30.52 | 42.18          | 30.72 | 56.00     | 46.00 | -13.82 | -15.28 |
| 4  | 0.62656 | 0.20   | 43.16         | 30.93 | 43.36          | 31.13 | 56.00     | 46.00 | -12.64 | -14.87 |
| 5  | 0.92344 | 0.22   | 40.68         | 28.64 | 40.90          | 28.86 | 56.00     | 46.00 | -15.10 | -17.14 |
| 6  | 1.35156 | 0.25   | 39.62         | 25.56 | 39.87          | 25.81 | 56.00     | 46.00 | -16.13 | -20.19 |

#### 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





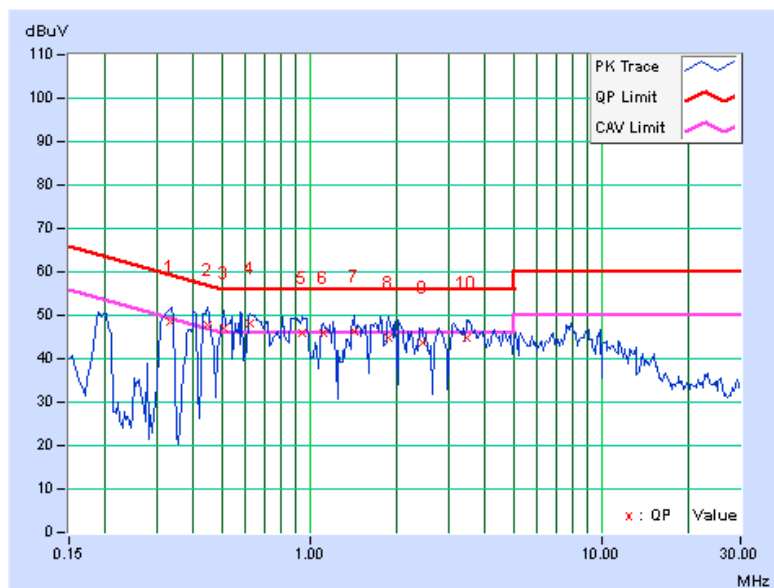
#### 4.1.8 TEST RESULTS (MODE 2)

| 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  | 0.33325 | 0.18   | 48.46         | 36.02 | 48.64          | 36.20 | 59.37     | 49.37 | -10.73 | -13.17 |
| 2  | 0.44688 | 0.20   | 47.47         | 37.89 | 47.67          | 38.09 | 56.93     | 46.93 | -9.26  | -8.84  |
| 3  | 0.50938 | 0.21   | 46.93         | 36.50 | 47.14          | 36.71 | 56.00     | 46.00 | -8.86  | -9.29  |
| 4  | 0.62266 | 0.22   | 48.08         | 36.05 | 48.30          | 36.27 | 56.00     | 46.00 | -7.70  | -9.73  |
| 5  | 0.94688 | 0.25   | 45.84         | 32.07 | 46.09          | 32.32 | 56.00     | 46.00 | -9.91  | -13.68 |
| 6  | 1.12109 | 0.26   | 45.69         | 33.60 | 45.95          | 33.86 | 56.00     | 46.00 | -10.05 | -12.14 |
| 7  | 1.41797 | 0.29   | 46.03         | 34.11 | 46.32          | 34.40 | 56.00     | 46.00 | -9.68  | -11.60 |
| 8  | 1.86328 | 0.33   | 44.53         | 32.04 | 44.86          | 32.37 | 56.00     | 46.00 | -11.14 | -13.63 |
| 9  | 2.44922 | 0.37   | 43.26         | 31.15 | 43.63          | 31.52 | 56.00     | 46.00 | -12.37 | -14.48 |
| 10 | 3.44922 | 0.43   | 44.48         | 33.22 | 44.91          | 33.65 | 56.00     | 46.00 | -11.09 | -12.35 |

#### 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

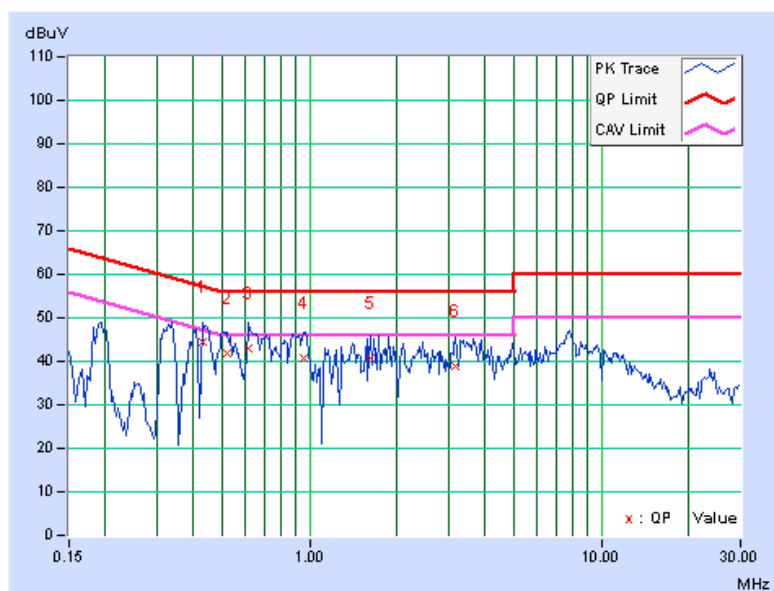


|       |             |                      |                                   |
|-------|-------------|----------------------|-----------------------------------|
| PHASE | Neutral (N) | DETECTOR<br>FUNCTION | Quasi-Peak (QP) /<br>Average (AV) |
|-------|-------------|----------------------|-----------------------------------|

|    | Freq.   | Corr.  | Reading<br>Value |       | Emission<br>Level |       | Limit     |       | Margin |        |
|----|---------|--------|------------------|-------|-------------------|-------|-----------|-------|--------|--------|
| No |         | Factor | [dB (uV)]        |       | [dB (uV)]         |       | [dB (uV)] |       | (dB)   |        |
|    | [MHz]   | (dB)   | Q.P.             | AV.   | Q.P.              | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.43300 | 0.19   | 44.17            | 30.95 | 44.36             | 31.14 | 57.19     | 47.19 | -12.83 | -16.05 |
| 2  | 0.52500 | 0.20   | 41.60            | 29.67 | 41.80             | 29.87 | 56.00     | 46.00 | -14.20 | -16.13 |
| 3  | 0.61875 | 0.20   | 42.70            | 28.79 | 42.90             | 28.99 | 56.00     | 46.00 | -13.10 | -17.01 |
| 4  | 0.95469 | 0.22   | 40.34            | 26.07 | 40.56             | 26.29 | 56.00     | 46.00 | -15.44 | -19.71 |
| 5  | 1.61719 | 0.27   | 40.59            | 28.13 | 40.86             | 28.40 | 56.00     | 46.00 | -15.14 | -17.60 |
| 6  | 3.16016 | 0.38   | 38.59            | 27.45 | 38.97             | 27.83 | 56.00     | 46.00 | -17.03 | -18.17 |

#### 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



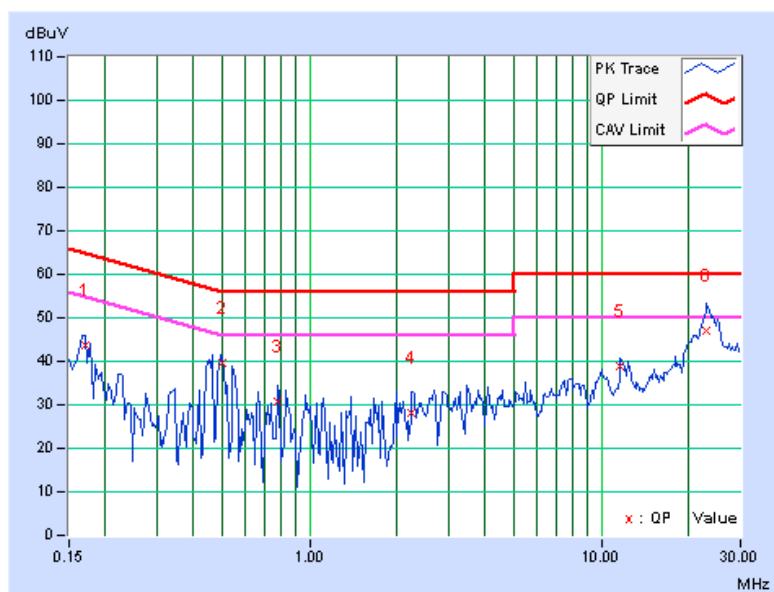
#### 4.1.9 TEST RESULTS (MODE 3)

| 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  | 0.16953  | 0.13   | 43.58         | 35.52 | 43.71          | 35.65 | 64.98     | 54.98 | -21.28 | -19.34 |
| 2  | 0.50156  | 0.19   | 39.32         | 38.62 | 39.51          | 38.81 | 56.00     | 46.00 | -16.49 | -7.19  |
| 3  | 0.78281  | 0.21   | 30.56         | 26.94 | 30.77          | 27.15 | 56.00     | 46.00 | -25.23 | -18.85 |
| 4  | 2.24609  | 0.29   | 27.84         | 17.82 | 28.13          | 18.11 | 56.00     | 46.00 | -27.87 | -27.89 |
| 5  | 11.61328 | 0.73   | 38.02         | 35.48 | 38.75          | 36.21 | 60.00     | 50.00 | -21.25 | -13.79 |
| 6  | 23.01953 | 1.12   | 46.04         | 40.08 | 47.16          | 41.20 | 60.00     | 50.00 | -12.84 | -8.80  |

#### 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

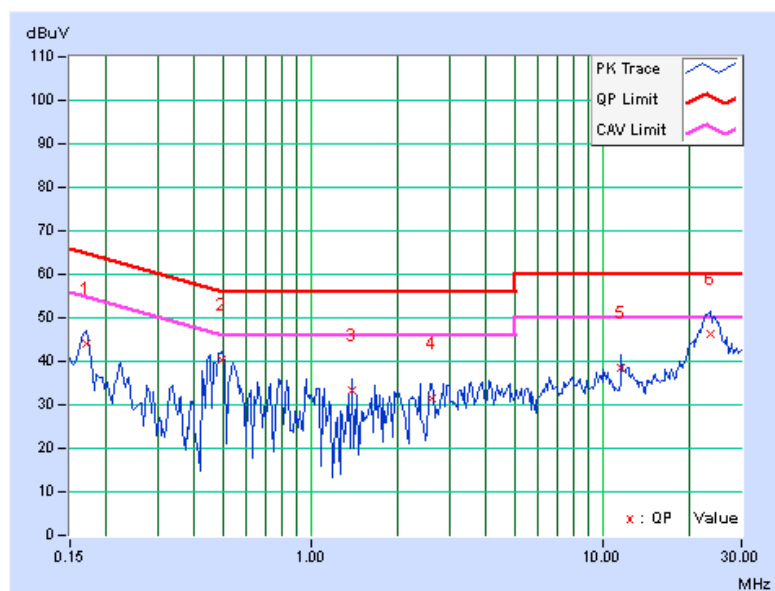


|       |             |                      |                                   |
|-------|-------------|----------------------|-----------------------------------|
| PHASE | Neutral (N) | DETECTOR<br>FUNCTION | Quasi-Peak (QP) /<br>Average (AV) |
|-------|-------------|----------------------|-----------------------------------|

|    | Freq.    | Corr.  | Reading Value |       | Emission Level |       | Limit     |       | Margin |        |
|----|----------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
| No |          | Factor | [dB (uV)]     |       | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    | [MHz]    | (dB)   | Q.P.          | AV.   | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.16953  | 0.11   | 44.02         | 36.51 | 44.13          | 36.62 | 64.98     | 54.98 | -20.86 | -18.37 |
| 2  | 0.49766  | 0.17   | 40.32         | 37.49 | 40.49          | 37.66 | 56.04     | 46.04 | -15.54 | -8.37  |
| 3  | 1.38281  | 0.22   | 33.23         | 27.06 | 33.45          | 27.28 | 56.00     | 46.00 | -22.55 | -18.72 |
| 4  | 2.60547  | 0.28   | 31.29         | 24.77 | 31.57          | 25.05 | 56.00     | 46.00 | -24.43 | -20.95 |
| 5  | 11.61328 | 0.56   | 37.96         | 35.04 | 38.52          | 35.60 | 60.00     | 50.00 | -21.48 | -14.40 |
| 6  | 23.41016 | 0.80   | 45.62         | 39.48 | 46.42          | 40.28 | 60.00     | 50.00 | -13.58 | -9.72  |

#### 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



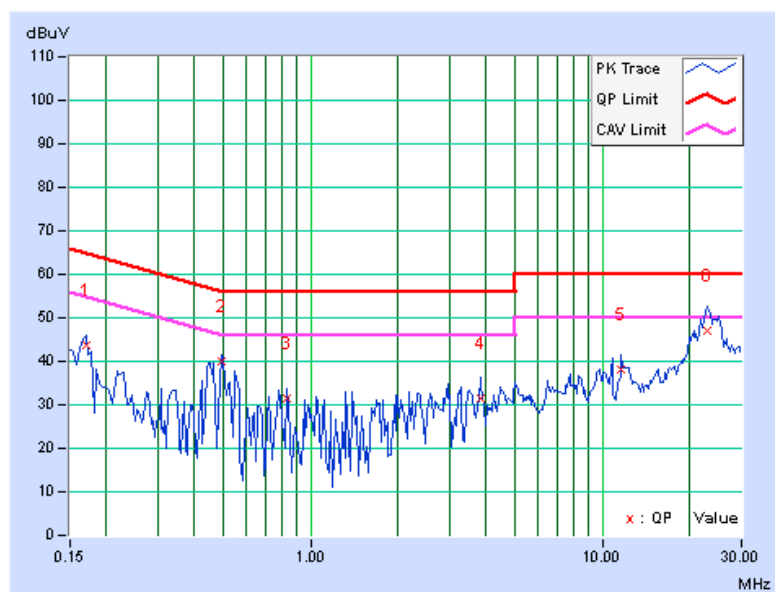
#### 4.1.10 TEST RESULTS (MODE 4)

| PHASE | Line (L) | DETECTOR FUNCTION | Quasi-Peak (QP) / Average (AV) |
|-------|----------|-------------------|--------------------------------|
|-------|----------|-------------------|--------------------------------|

| No | Freq.    | Corr.       | Reading Value  |               | Emission Level |               | Limit          |               | Margin    |          |
|----|----------|-------------|----------------|---------------|----------------|---------------|----------------|---------------|-----------|----------|
|    | [MHz]    | Factor [dB] | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. [dB (uV)] | AV. [dB (uV)] | Q.P. [dB] | AV. [dB] |
| 1  | 0.16953  | 0.13        | 43.54          | 35.38         | 43.67          | 35.51         | 64.98          | 54.98         | -21.32    | -19.48   |
| 2  | 0.49850  | 0.19        | 39.68          | 38.14         | 39.87          | 38.33         | 56.02          | 46.02         | -16.16    | -7.70    |
| 3  | 0.82969  | 0.21        | 31.28          | 26.37         | 31.49          | 26.58         | 56.00          | 46.00         | -24.51    | -19.42   |
| 4  | 3.84375  | 0.35        | 31.07          | 22.51         | 31.42          | 22.86         | 56.00          | 46.00         | -24.58    | -23.14   |
| 5  | 11.60938 | 0.73        | 37.48          | 34.43         | 38.21          | 35.16         | 60.00          | 50.00         | -21.79    | -14.84   |
| 6  | 22.96484 | 1.12        | 45.92          | 39.94         | 47.04          | 41.06         | 60.00          | 50.00         | -12.96    | -8.94    |

#### 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

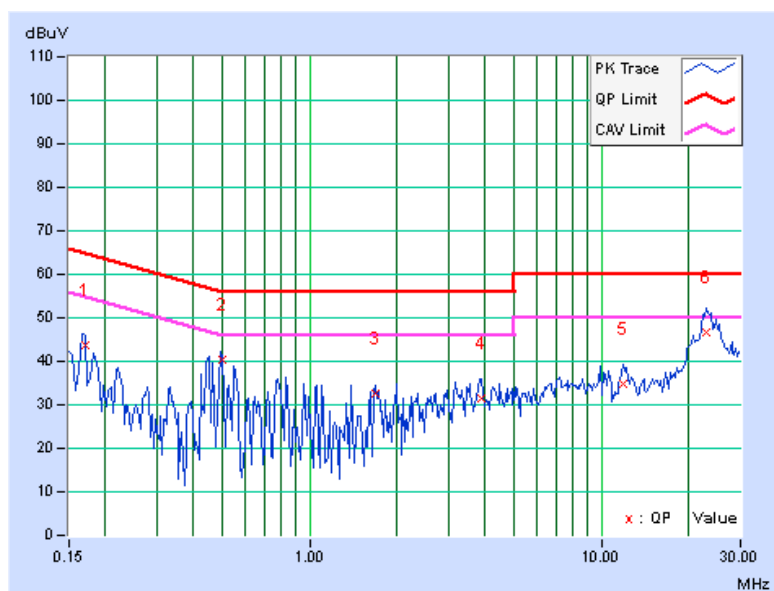


|       |             |                      |                                   |
|-------|-------------|----------------------|-----------------------------------|
| PHASE | Neutral (N) | DETECTOR<br>FUNCTION | Quasi-Peak (QP) /<br>Average (AV) |
|-------|-------------|----------------------|-----------------------------------|

|    | Freq.          | Corr.       | Reading<br>Value |              | Emission<br>Level |              | Limit        |              | Margin        |              |
|----|----------------|-------------|------------------|--------------|-------------------|--------------|--------------|--------------|---------------|--------------|
| No |                | Factor      | [dB (uV)]        |              | [dB (uV)]         |              | [dB (uV)]    |              | (dB)          |              |
|    | [MHz]          | (dB)        | Q.P.             | AV.          | Q.P.              | AV.          | Q.P.         | AV.          | Q.P.          | AV.          |
| 1  | 0.16953        | 0.11        | 43.70            | 35.94        | 43.81             | 36.05        | 64.98        | 54.98        | -21.18        | -18.94       |
| 2  | <b>0.49925</b> | <b>0.17</b> | <b>40.28</b>     | <b>39.56</b> | <b>40.45</b>      | <b>39.73</b> | <b>56.01</b> | <b>46.01</b> | <b>-15.56</b> | <b>-6.28</b> |
| 3  | 1.67578        | 0.24        | 32.40            | 26.23        | 32.64             | 26.47        | 56.00        | 46.00        | -23.36        | -19.53       |
| 4  | 3.88281        | 0.33        | 31.03            | 23.96        | 31.36             | 24.29        | 56.00        | 46.00        | -24.64        | -21.71       |
| 5  | 11.82813       | 0.57        | 34.14            | 28.26        | 34.71             | 28.83        | 60.00        | 50.00        | -25.29        | -21.17       |
| 6  | 22.95703       | 0.79        | 46.02            | 39.94        | 46.81             | 40.73        | 60.00        | 50.00        | -13.19        | -9.27        |

#### 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



## 4.2 RADIATED EMISSION MEASUREMENT

### 4.2.1 LIMITS OF RADIATED EMISSION 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 30dB below the highest level of the desired power:

| 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.

**A D T**

## 4.2.2 TEST INSTRUMENTS

**For Mode 1~2:**

| DESCRIPTION & MANUFACTURER              | MODEL NO.                | SERIAL NO.                          | CALIBRATED DATE | CALIBRATED UNTIL |
|-----------------------------------------|--------------------------|-------------------------------------|-----------------|------------------|
| Spectrum Analyzer<br>Agilent            | E4446A                   | MY48250253                          | Sep. 03, 2012   | Sep. 02, 2013    |
| MXE EMI Receiver<br>Agilent             | N9038A                   | MY50010156                          | Jan. 16, 2013   | Jan. 15, 2014    |
| Pre-Amplifier<br>Mini-Circuits          | ZFL-1000VH2<br>B         | AMP-ZFL-04                          | Nov. 14, 2012   | Nov. 13, 2013    |
| Pre-Amplifier<br>Agilent                | 8449B                    | 3008A01923                          | Oct. 30, 2012   | Oct. 29, 2013    |
| Pre-Amplifier<br>SPACEK LABS            | SLKKa-48-6               | 9K16                                | Nov. 14, 2012   | Nov. 13, 2013    |
| Trilog Broadband Antenna<br>SCHWARZBECK | VULB 9168                | 9168-361                            | Mar. 25, 2013   | Mar. 24, 2014    |
| Horn_Antenna<br>AISI                    | AIH.8018                 | 0000220091110                       | Nov. 27, 2012   | Nov. 26, 2013    |
| Horn_Antenna<br>SCHWARZBECK             | BBHA 9170                | 9170-424                            | Oct. 12, 2012   | Oct. 11, 2013    |
| RF Cable                                | NA                       | RF104-205<br>RF104-207<br>RF104-202 | Dec. 26, 2012   | Dec. 25, 2013    |
| RF Cable                                | NA                       | CHHCAB_001                          | Oct. 07, 2012   | Oct. 06, 2013    |
| Software                                | ADT_Radiated<br>_V8.7.05 | NA                                  | NA              | NA               |
| Antenna Tower & Turn Table<br>CT        | NA                       | 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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Aug. 02 to 05, 2013





A D T

**For Mode 5:**

| DESCRIPTION & MANUFACTURER              | MODEL NO.                | SERIAL NO.                          | CALIBRATED DATE | CALIBRATED UNTIL |
|-----------------------------------------|--------------------------|-------------------------------------|-----------------|------------------|
| MXE EMI Receiver<br>Agilent             | N9038A                   | MY50010156                          | Jan. 16, 2013   | Jan. 15, 2014    |
| Pre-Amplifier<br>Mini-Circuits          | ZFL-1000VH2<br>B         | AMP-ZFL-04                          | Nov. 14, 2012   | Nov. 13, 2013    |
| Trilog Broadband Antenna<br>SCHWARZBECK | VULB 9168                | 9168-361                            | Mar. 25, 2013   | Mar. 24, 2014    |
| RF Cable                                | NA                       | CHHCAB_001                          | Oct. 07, 2012   | Oct. 06, 2013    |
| Horn_Antenna<br>AISI                    | AIH.8018                 | 0000220091110                       | Nov. 27, 2012   | Nov. 26, 2013    |
| Pre-Amplifier<br>Agilent                | 8449B                    | 3008A01923                          | Oct. 30, 2012   | Oct. 29, 2013    |
| RF Cable                                | NA                       | RF104-205<br>RF104-207<br>RF104-202 | Dec. 26, 2012   | Dec. 25, 2013    |
| Spectrum Analyzer<br>Agilent            | E4446A                   | MY48250253                          | Aug. 28, 2013   | Aug. 27, 2014    |
| Pre-Amplifier<br>SPACEK LABS            | SLKKa-48-6               | 9K16                                | Nov. 14, 2012   | Nov. 13, 2013    |
| Horn_Antenna<br>SCHWARZBECK             | BBHA 9170                | 9170-424                            | Oct. 12, 2012   | Oct. 11, 2013    |
| Software                                | ADT_Radiated<br>_V8.7.07 | NA                                  | NA              | NA               |
| Antenna Tower & Turn Table<br>CT        | NA                       | 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 horn antenna, preamplifier (model: 8449B) are used only for the measurement of emission frequency above 1GHz if tested.
- 3 The test was performed in 966 Chamber No. H.
4. The FCC Site Registration No. is 797305.
- 5 The CANADA Site Registration No. is IC 7450H-3.
- 6 Tested Date: Sep. 23, 2013

### 4.2.3 TEST PROCEDURES

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**NOTE:**

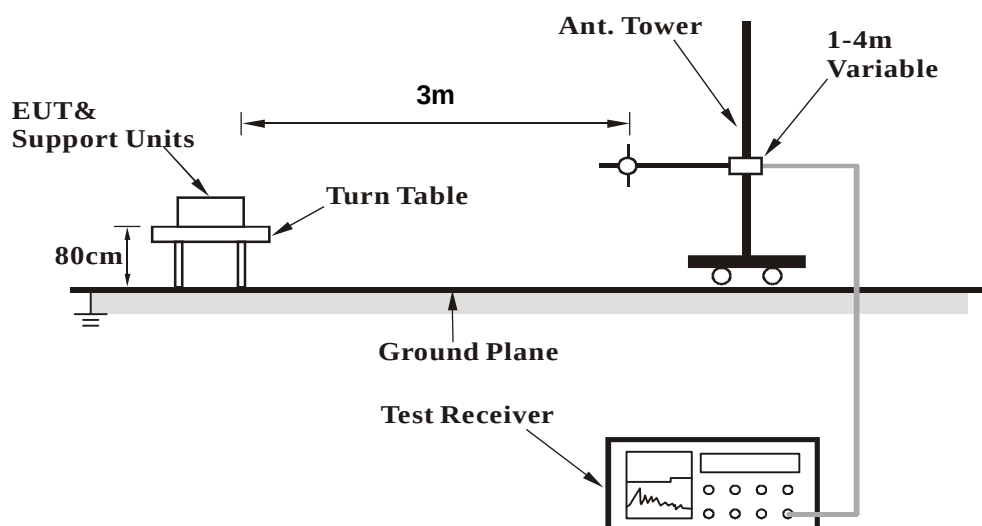
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

### 4.2.4 DEVIATION FROM TEST STANDARD

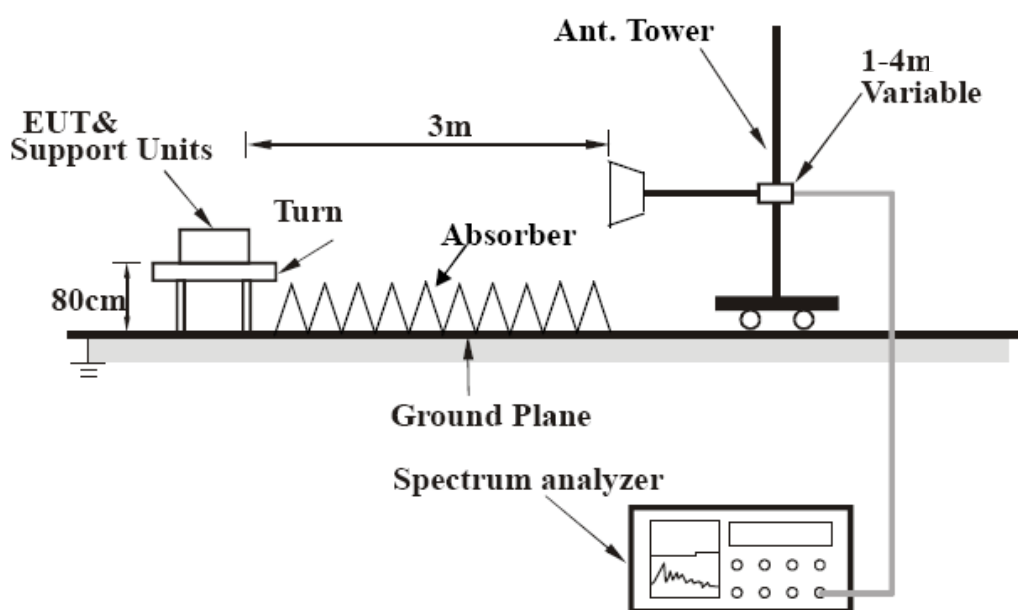
No deviation

## 4.2.5 TEST SETUP

### <Frequency Range below 1GHz>



### <Frequency Range above 1GHz>



For the actual test configuration, please refer to the related item – Photographs of the Test Configuration.

## 4.2.6 EUT OPERATING CONDITIONS

Same as 4.1.6



A D T

## 4.2.7 TEST RESULTS (MODE 1)

## BELOW 1GHz DATA :

|                        |                                                                                                                                                       |                          |                 |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | For 2.4 GHz 802.11n (HT20) (Radio Card 2):<br>Channel 6<br>+5 GHz 802.11n (HT20) (Radio Card 0):<br>Channel 116<br>+802.11b (Radio Card 1): 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                                                   | 89.85       | 32.4 QP                 | 43.5           | -11.1       | 2.00 H             | 103                  | 51.56            | -19.14                   |
| 2                                                   | 153.68      | 35.3 QP                 | 43.5           | -8.2        | 2.00 H             | 296                  | 47.96            | -12.62                   |
| 3                                                   | 375.03      | 32.0 QP                 | 46.0           | -14.0       | 2.00 H             | 236                  | 42.27            | -10.30                   |
| 4                                                   | 625.00      | 37.9 QP                 | 46.0           | -8.2        | 1.50 H             | 317                  | 42.63            | -4.78                    |
| 5                                                   | 866.72      | 39.7 QP                 | 46.0           | -6.3        | 1.00 H             | 26                   | 40.71            | -0.98                    |
| 6                                                   | 1000.00     | 38.4 QP                 | 54.0           | -15.6       | 1.50 H             | 130                  | 36.95            | 1.48                     |
| 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                                                   | 38.24       | 34.2 QP                 | 40.0           | -5.8        | 1.00 V             | 292                  | 48.03            | -13.79                   |
| 2                                                   | 333.37      | 36.7 QP                 | 46.0           | -9.3        | 1.50 V             | 229                  | 47.79            | -11.06                   |
| 3                                                   | 466.69      | 36.2 QP                 | 46.0           | -9.9        | 1.00 V             | 56                   | 44.36            | -8.21                    |
| 4                                                   | 625.00      | 35.1 QP                 | 46.0           | -10.9       | 1.50 V             | 32                   | 39.84            | -4.78                    |
| 5                                                   | 750.03      | 36.4 QP                 | 46.0           | -9.6        | 1.00 V             | 23                   | 38.97            | -2.55                    |
| 6                                                   | 875.02      | 39.4 QP                 | 46.0           | -6.6        | 1.00 V             | 73                   | 40.20            | -0.82                    |

## 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



A D T

## ABOVE 1GHz DATA

|                        |                                                                                                                                                 |                          |                           |
|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|
| <b>CHANNEL</b>         | For 2.4 GHz 802.11n (HT20) (Radio Card 2): Channel 6<br>+5 GHz 802.11n (HT20) (Radio Card 0): Channel 116<br>+802.11b (Radio Card 1): Channel 6 | <b>DETECTOR FUNCTION</b> | Peak (PK)<br>Average (AV) |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz                                                                                                                                    |                          |                           |

| 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                                                   | 2390.00     | 70.5 PK                 | 74.0           | -3.5        | 1.00 H             | 51                   | 74.78            | -4.28                    |
| 2                                                   | 2390.00     | 53.4 AV                 | 54.0           | -0.6        | 1.00 H             | 51                   | 57.68            | -4.28                    |
| 3                                                   | 2483.50     | 70.9 PK                 | 74.0           | -3.1        | 1.04 H             | 7                    | 74.86            | -3.96                    |
| 4                                                   | 2483.50     | 52.7 AV                 | 54.0           | -1.3        | 1.04 H             | 7                    | 56.66            | -3.96                    |
| 5                                                   | 4874.00     | 60.8 PK                 | 74.0           | -13.2       | 1.06 H             | 270                  | 56.88            | 3.92                     |
| 6                                                   | 4874.00     | 47.2 AV                 | 54.0           | -6.8        | 1.06 H             | 270                  | 43.28            | 3.92                     |
| 7                                                   | 7311.00     | 66.4 PK                 | 74.0           | -7.6        | 1.29 H             | 71                   | 54.91            | 11.49                    |
| 8                                                   | 7311.00     | 52.5 AV                 | 54.0           | -1.5        | 1.29 H             | 71                   | 41.01            | 11.49                    |
| 9                                                   | 11570.00    | 60.7 PK                 | 74.0           | -13.3       | 1.02 H             | 59                   | 47.81            | 12.89                    |
| 10                                                  | 11570.00    | 47.7 AV                 | 54.0           | -6.3        | 1.02 H             | 59                   | 34.81            | 12.89                    |
| 11                                                  | 12185.00    | 65.2 PK                 | 74.0           | -8.8        | 1.24 H             | 26                   | 51.33            | 13.87                    |
| 12                                                  | 12185.00    | 52.0 AV                 | 54.0           | -2.0        | 1.24 H             | 26                   | 38.13            | 13.87                    |

## 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



A D T

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                               | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                 | 2390.00        | 67.5 PK                       | 74.0              | -6.5           | 1.09 V                   | 68                         | 71.78                  | -4.28                          |
| 2                                                 | 2390.00        | 50.2 AV                       | 54.0              | -3.8           | 1.09 V                   | 68                         | 54.48                  | -4.28                          |
| 3                                                 | 2483.50        | 66.6 PK                       | 74.0              | -7.4           | 1.07 V                   | 73                         | 70.56                  | -3.96                          |
| 4                                                 | 2483.50        | 48.9 AV                       | 54.0              | -5.1           | 1.07 V                   | 73                         | 52.86                  | -3.96                          |
| 5                                                 | 4874.00        | 57.9 PK                       | 74.0              | -16.1          | 1.01 V                   | 360                        | 53.98                  | 3.92                           |
| 6                                                 | 4874.00        | 44.5 AV                       | 54.0              | -9.5           | 1.01 V                   | 360                        | 40.58                  | 3.92                           |
| 7                                                 | 7311.00        | 60.5 PK                       | 74.0              | -13.5          | 1.20 V                   | 320                        | 49.01                  | 11.49                          |
| 8                                                 | 7311.00        | 47.3 AV                       | 54.0              | -6.7           | 1.20 V                   | 320                        | 35.81                  | 11.49                          |
| 9                                                 | 11570.00       | 59.9 PK                       | 74.0              | -14.1          | 1.00 V                   | 71                         | 47.01                  | 12.89                          |
| 10                                                | 11570.00       | 46.9 AV                       | 54.0              | -7.1           | 1.00 V                   | 71                         | 34.01                  | 12.89                          |
| 11                                                | 12185.00       | 62.4 PK                       | 74.0              | -11.6          | 1.24 V                   | 144                        | 48.53                  | 13.87                          |
| 12                                                | 12185.00       | 48.8 AV                       | 54.0              | -5.2           | 1.24 V                   | 144                        | 34.93                  | 13.87                          |

**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

## 4.2.8 TEST RESULTS (MODE 2)

### BELOW 1GHz DATA :

|                        |                                                                                                                                                                             |                          |                 |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-----------------|
| <b>CHANNEL</b>         | For 2.4 GHz 802.11n (HT20) (Radio Card 2):<br>Channel 6<br>+5 GHz 802.11n (HT20) (Radio Card 0):<br>Channel 116<br>+For 5 GHz 802.11n (HT20) (Radio Card 1):<br>Channel 116 | <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                                                   | 89.85       | 32.4 QP                 | 43.5           | -11.1       | 2.00 H             | 103                  | 51.56            | -19.14                   |
| 2                                                   | 153.68      | 35.3 QP                 | 43.5           | -8.2        | 2.00 H             | 296                  | 47.96            | -12.62                   |
| 3                                                   | 400.01      | 30.1 QP                 | 46.0           | -15.9       | 2.00 H             | 318                  | 39.99            | -9.92                    |
| 4                                                   | 625.00      | 37.9 QP                 | 46.0           | -8.2        | 1.50 H             | 317                  | 42.63            | -4.78                    |
| 5                                                   | 866.72      | 39.7 QP                 | 46.0           | -6.3        | 1.00 H             | 26                   | 40.71            | -0.98                    |
| 6                                                   | 1000.00     | 38.4 QP                 | 54.0           | -15.6       | 1.50 H             | 130                  | 36.95            | 1.48                     |
| 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                                                   | 37.66       | 33.7 QP                 | 40.0           | -6.3        | 1.00 V             | 315                  | 47.40            | -13.70                   |
| 2                                                   | 333.37      | 36.8 QP                 | 46.0           | -9.2        | 1.50 V             | 234                  | 47.90            | -11.06                   |
| 3                                                   | 466.69      | 36.6 QP                 | 46.0           | -9.4        | 1.00 V             | 65                   | 44.80            | -8.21                    |
| 4                                                   | 750.03      | 38.4 QP                 | 46.0           | -7.6        | 1.50 V             | 360                  | 40.96            | -2.55                    |
| 5                                                   | 875.02      | 39.8 QP                 | 46.0           | -6.2        | 1.00 V             | 73                   | 40.58            | -0.82                    |
| 6                                                   | 1000.00     | 41.5 QP                 | 54.0           | -12.5       | 1.00 V             | 218                  | 40.04            | 1.48                     |

### 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



A D T

## ABOVE 1GHz DATA

|                        |                                                                                                                                                                             |                          |                           |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|
| <b>CHANNEL</b>         | For 2.4 GHz 802.11n (HT20) (Radio Card 2):<br>Channel 6<br>+5 GHz 802.11n (HT20) (Radio Card 0):<br>Channel 116<br>+For 5 GHz 802.11n (HT20) (Radio Card 1):<br>Channel 116 | <b>DETECTOR FUNCTION</b> | Peak (PK)<br>Average (AV) |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz                                                                                                                                                                |                          |                           |

| 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                                                   | 2390.00     | 70.2 PK                 | 74.0           | -3.8        | 1.00 H             | 23                   | 74.48            | -4.28                    |
| 2                                                   | 2390.00     | 53.0 AV                 | 54.0           | -1.0        | 1.00 H             | 23                   | 57.28            | -4.28                    |
| 3                                                   | 2483.50     | 69.9 PK                 | 74.0           | -4.1        | 1.04 H             | 9                    | 73.86            | -3.96                    |
| 4                                                   | 2483.50     | 52.1 AV                 | 54.0           | -1.9        | 1.04 H             | 9                    | 56.06            | -3.96                    |
| 5                                                   | 4874.00     | 60.2 PK                 | 74.0           | -13.8       | 1.00 H             | 301                  | 56.28            | 3.92                     |
| 6                                                   | 4874.00     | 46.9 AV                 | 54.0           | -7.1        | 1.00 H             | 301                  | 42.98            | 3.92                     |
| 7                                                   | 5418.00     | 65.3 PK                 | 74.0           | -8.7        | 1.35 H             | 150                  | 59.69            | 5.61                     |
| 8                                                   | 5418.00     | 53.3 AV                 | 54.0           | -0.7        | 1.35 H             | 150                  | 47.69            | 5.61                     |
| 9                                                   | #5741.00    | 65.0 PK                 | 74.0           | -9.0        | 1.33 H             | 165                  | 58.43            | 6.57                     |
| 10                                                  | #5741.00    | 52.1 AV                 | 54.0           | -1.9        | 1.33 H             | 165                  | 45.53            | 6.57                     |
| 11                                                  | 7311.00     | 66.2 PK                 | 74.0           | -7.8        | 1.32 H             | 86                   | 54.71            | 11.49                    |
| 12                                                  | 7311.00     | 51.7 AV                 | 54.0           | -2.3        | 1.32 H             | 86                   | 40.21            | 11.49                    |
| 13                                                  | 11160.00    | 48.1 PK                 | 74.0           | -25.9       | 1.00 H             | 158                  | 35.44            | 12.66                    |
| 14                                                  | 11160.00    | 36.1 AV                 | 54.0           | -17.9       | 1.00 H             | 158                  | 23.44            | 12.66                    |
| 15                                                  | 12185.00    | 64.9 PK                 | 74.0           | -9.1        | 1.31 H             | 36                   | 51.03            | 13.87                    |
| 16                                                  | 12185.00    | 51.7 AV                 | 54.0           | -2.3        | 1.31 H             | 36                   | 37.83            | 13.87                    |

## 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
5. " # ": The radiated frequency is out of the restricted band.





A D T

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                               | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                 | 2390.00        | 68.4 PK                       | 74.0              | -5.6           | 1.11 V                   | 83                         | 72.68                  | -4.28                          |
| 2                                                 | 2390.00        | 50.9 AV                       | 54.0              | -3.1           | 1.11 V                   | 83                         | 55.18                  | -4.28                          |
| 3                                                 | 2483.50        | 66.1 PK                       | 74.0              | -7.9           | 1.06 V                   | 52                         | 70.06                  | -3.96                          |
| 4                                                 | 2483.50        | 48.4 AV                       | 54.0              | -5.6           | 1.06 V                   | 52                         | 52.36                  | -3.96                          |
| 5                                                 | 4874.00        | 58.6 PK                       | 74.0              | -15.4          | 1.00 V                   | 360                        | 54.68                  | 3.92                           |
| 6                                                 | 4874.00        | 44.8 AV                       | 54.0              | -9.2           | 1.00 V                   | 360                        | 40.88                  | 3.92                           |
| 7                                                 | 5418.00        | 60.8 PK                       | 74.0              | -13.2          | 1.02 V                   | 275                        | 55.19                  | 5.61                           |
| 8                                                 | 5418.00        | 49.7 AV                       | 54.0              | -4.3           | 1.02 V                   | 275                        | 44.09                  | 5.61                           |
| 9                                                 | #5741.00       | 61.2 PK                       | 74.0              | -12.8          | 1.05 V                   | 276                        | 54.63                  | 6.57                           |
| 10                                                | #5741.00       | 48.3 AV                       | 54.0              | -5.7           | 1.05 V                   | 276                        | 41.73                  | 6.57                           |
| 11                                                | 7311.00        | 60.1 PK                       | 74.0              | -13.9          | 1.10 V                   | 311                        | 48.61                  | 11.49                          |
| 12                                                | 7311.00        | 46.9 AV                       | 54.0              | -7.1           | 1.10 V                   | 311                        | 35.41                  | 11.49                          |
| 13                                                | 11160.00       | 56.9 PK                       | 74.0              | -17.1          | 1.00 V                   | 80                         | 44.24                  | 12.66                          |
| 14                                                | 11160.00       | 43.7 AV                       | 54.0              | -10.3          | 1.00 V                   | 80                         | 31.04                  | 12.66                          |
| 15                                                | 12185.00       | 62.9 PK                       | 74.0              | -11.1          | 1.17 V                   | 139                        | 49.03                  | 13.87                          |
| 16                                                | 12185.00       | 49.3 AV                       | 54.0              | -4.7           | 1.17 V                   | 139                        | 35.43                  | 13.87                          |

**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
5. " # ": The radiated frequency is out of the restricted band.



A D T

## 4.2.9 TEST RESULTS (MODE 5)

## ABOVE 1GHz DATA

|                 |                                                                                                             |                   |                           |
|-----------------|-------------------------------------------------------------------------------------------------------------|-------------------|---------------------------|
| CHANNEL         | For 5 GHz 802.11n (HT40) (Radio Card 1): Channel 62<br>+For 5 GHz 802.11n (HT20) (Radio Card 0): Channel 64 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| FREQUENCY RANGE | 1GHz ~ 40GHz                                                                                                |                   |                           |

| 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                                                   | 5139.00     | 60.8 QP                 | 74.0           | -13.2       | 1.00 H             | 40                   | 18.58            | 42.22                    |
| 2                                                   | 5139.00     | 50.1 QP                 | 54.0           | -3.9        | 1.00 H             | 40                   | 7.88             | 42.22                    |
| 3                                                   | 5350.00     | 64.6 QP                 | 74.0           | -9.4        | 1.00 H             | 40                   | 22.09            | 42.51                    |
| 4                                                   | 5350.00     | 45.0 QP                 | 54.0           | -9.0        | 1.00 H             | 40                   | 2.49             | 42.51                    |
| 5                                                   | 5400.00     | 63.3 QP                 | 74.0           | -10.7       | 1.00 H             | 26                   | 20.77            | 42.53                    |
| 6                                                   | 5400.00     | 53.8 QP                 | 54.0           | -0.2        | 1.00 H             | 26                   | 11.27            | 42.53                    |
| 7                                                   | 10620.00    | 48.5 QP                 | 74.0           | -25.5       | 1.00 H             | 201                  | -0.58            | 49.08                    |
| 8                                                   | 10620.00    | 37.4 QP                 | 54.0           | -16.6       | 1.00 H             | 201                  | -11.68           | 49.08                    |
| 9                                                   | 15930.00    | 59.1 QP                 | 74.0           | -14.9       | 1.00 H             | 201                  | 5.09             | 54.01                    |
| 10                                                  | 15930.00    | 47.5 QP                 | 54.0           | -6.5        | 1.00 H             | 201                  | -6.51            | 54.01                    |
| 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                                                   | 5139.00     | 54.8 QP                 | 74.0           | -19.2       | 1.13 V             | 251                  | 12.58            | 42.22                    |
| 2                                                   | 5139.00     | 45.3 QP                 | 54.0           | -8.7        | 1.13 V             | 251                  | 3.08             | 42.22                    |
| 3                                                   | 5350.00     | 60.2 QP                 | 74.0           | -13.8       | 1.13 V             | 108                  | 17.69            | 42.51                    |
| 4                                                   | 5350.00     | 48.0 QP                 | 54.0           | -6.0        | 1.13 V             | 108                  | 5.49             | 42.51                    |
| 5                                                   | 5400.00     | 58.5 QP                 | 74.0           | -15.5       | 1.13 V             | 153                  | 15.97            | 42.53                    |
| 6                                                   | 5400.00     | 42.5 QP                 | 54.0           | -11.5       | 1.13 V             | 153                  | -0.03            | 42.53                    |
| 7                                                   | 10620.00    | 50.5 QP                 | 74.0           | -23.5       | 1.00 V             | 146                  | 1.42             | 49.08                    |
| 8                                                   | 10620.00    | 38.0 QP                 | 54.0           | -16.0       | 1.00 V             | 146                  | -11.08           | 49.08                    |
| 9                                                   | 15930.00    | 57.7 QP                 | 74.0           | -16.3       | 1.10 V             | 109                  | 3.69             | 54.01                    |
| 10                                                  | 15930.00    | 45.2 QP                 | 54.0           | -8.8        | 1.10 V             | 109                  | -8.81            | 54.01                    |

## 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



A D T

|                        |                                                                                                                     |                          |                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------|--------------------------|---------------------------|
| <b>CHANNEL</b>         | For 5 GHz 802.11n (HT40) (Radio Card 1):<br>Channel 102<br>+For 5 GHz 802.11n (HT40) (Radio Card 0):<br>Channel 102 | <b>DETECTOR FUNCTION</b> | Peak (PK)<br>Average (AV) |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz                                                                                                        |                          |                           |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5350.00        | 55.3 QP                       | 74.0              | -18.7          | 1.00 H                   | 24                         | 12.79                  | 42.51                          |
| 2                                                   | 5350.00        | 45.6 QP                       | 54.0              | -8.4           | 1.00 H                   | 24                         | 3.09                   | 42.51                          |
| 3                                                   | 5434.00        | 70.7 QP                       | 74.0              | -3.3           | 1.00 H                   | 137                        | 28.07                  | 42.63                          |
| 4                                                   | 5434.00        | 53.8 QP                       | 54.0              | -0.2           | 1.00 H                   | 137                        | 11.17                  | 42.63                          |
| 5                                                   | 11020.00       | 49.2 QP                       | 74.0              | -24.8          | 1.22 H                   | 158                        | -0.35                  | 49.55                          |
| 6                                                   | 11020.00       | 38.1 QP                       | 54.0              | -15.9          | 1.22 H                   | 158                        | -11.45                 | 49.55                          |
| 7                                                   | 16530.00       | 59.8 QP                       | 74.0              | -14.2          | 1.02 H                   | 146                        | 3.83                   | 55.97                          |
| 8                                                   | 16530.00       | 48.4 QP                       | 54.0              | -5.6           | 1.02 H                   | 146                        | -7.57                  | 55.97                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5350.00        | 52.8 QP                       | 74.0              | -21.2          | 1.00 V                   | 107                        | 10.29                  | 42.51                          |
| 2                                                   | 5350.00        | 45.4 QP                       | 54.0              | -8.6           | 1.00 V                   | 107                        | 2.89                   | 42.51                          |
| 3                                                   | 5434.00        | 61.6 QP                       | 74.0              | -12.4          | 1.00 V                   | 107                        | 18.97                  | 42.63                          |
| 4                                                   | 5434.00        | 50.3 QP                       | 54.0              | -3.7           | 1.00 V                   | 107                        | 7.67                   | 42.63                          |
| 5                                                   | 11020.00       | 50.4 QP                       | 74.0              | -23.6          | 1.00 V                   | 211                        | 0.85                   | 49.55                          |
| 6                                                   | 11020.00       | 37.7 QP                       | 54.0              | -16.3          | 1.00 V                   | 211                        | -11.85                 | 49.55                          |
| 7                                                   | 16530.00       | 57.9 QP                       | 74.0              | -16.1          | 1.00 V                   | 108                        | 1.93                   | 55.97                          |
| 8                                                   | 16530.00       | 45.4 QP                       | 54.0              | -8.6           | 1.00 V                   | 108                        | -10.57                 | 55.97                          |

**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



A D T

|                        |                                                                                                                     |                              |                           |
|------------------------|---------------------------------------------------------------------------------------------------------------------|------------------------------|---------------------------|
| <b>CHANNEL</b>         | For 5 GHz 802.11n (HT40) (Radio Card 1):<br>Channel 134<br>+For 5 GHz 802.11n (HT40) (Radio Card 0):<br>Channel 134 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)<br>Average (AV) |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz                                                                                                        |                              |                           |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5350.00        | 56.4 QP                       | 74.0              | -17.6          | 1.00 H                   | 24                         | 13.89                  | 42.51                          |
| 2                                                   | 5350.00        | 45.0 QP                       | 54.0              | -9.0           | 1.00 H                   | 24                         | 2.49                   | 42.51                          |
| 3                                                   | 5725.00        | 73.1 QP                       | 74.0              | -0.9           | 1.00 H                   | 32                         | 30.01                  | 43.09                          |
| 4                                                   | 5725.00        | 52.2 QP                       | 54.0              | -1.8           | 1.00 H                   | 32                         | 9.11                   | 43.09                          |
| 5                                                   | 11340.00       | 50.1 QP                       | 74.0              | -23.9          | 1.25 H                   | 153                        | 0.28                   | 49.82                          |
| 6                                                   | 11340.00       | 38.7 QP                       | 54.0              | -15.3          | 1.25 H                   | 153                        | -11.12                 | 49.82                          |
| 7                                                   | 17010.00       | 60.4 QP                       | 74.0              | -13.6          | 1.29 H                   | 131                        | 3.40                   | 57.00                          |
| 8                                                   | 17010.00       | 49.2 QP                       | 54.0              | -4.8           | 1.29 H                   | 131                        | -7.80                  | 57.00                          |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5350.00        | 55.2 QP                       | 74.0              | -18.8          | 1.00 V                   | 110                        | 12.69                  | 42.51                          |
| 2                                                   | 5350.00        | 43.5 QP                       | 54.0              | -10.5          | 1.00 V                   | 110                        | 0.99                   | 42.51                          |
| 3                                                   | 5725.00        | 56.4 QP                       | 74.0              | -17.6          | 1.00 V                   | 108                        | 13.31                  | 43.09                          |
| 4                                                   | 5725.00        | 42.7 QP                       | 54.0              | -11.3          | 1.00 V                   | 108                        | -0.39                  | 43.09                          |
| 5                                                   | 11340.00       | 50.0 QP                       | 74.0              | -24.0          | 1.02 V                   | 138                        | 0.18                   | 49.82                          |
| 6                                                   | 11340.00       | 37.2 QP                       | 54.0              | -16.8          | 1.02 V                   | 138                        | -12.62                 | 49.82                          |
| 7                                                   | 17010.00       | 57.2 QP                       | 74.0              | -16.8          | 1.00 V                   | 211                        | 0.20                   | 57.00                          |
| 8                                                   | 17010.00       | 44.5 QP                       | 54.0              | -9.5           | 1.00 V                   | 211                        | -12.50                 | 57.00                          |

**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

### 4.3 CONDUCTED OUTPUT POWER MEASUREMENT

#### 4.3.1 LIMITS OF CONDUCTED OUTPUT POWER MEASUREMENT

##### TEST STANDARD: Canada RSS-210 Issue 8 (Annex 8)

For systems using digital modulation in the 2400–2483.5 MHz band and 5725 –5850 MHz band: 1 Watt (30dBm)

##### TEST STANDARD: Canada RSS-210 Issue 8 (Annex 9)

| Frequency Band   | Limit                                         |
|------------------|-----------------------------------------------|
| 5.15 – 5.25GHz   | The lesser of 50mW (17dBm) or 4dBm + 10logB   |
| 5.25 – 5.35GHz   | The lesser of 250mW (24dBm) or 11dBm + 10logB |
| 5.47 – 5.725GHz  | The lesser of 250mW (24dBm) or 11dBm + 10logB |
| 5.725 – 5.825GHz | The lesser of 1W (30dBm) or 17dBm + 10logB    |

**Note:** Where B is the 26dB emission bandwidth in MHz.

Per KDB 662911 D01 Multiple Transmitter Output v01r02 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $NANT \leq 4$ ;

Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any NANT;

Array Gain =  $5 \log(NANT/NSS)$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $NANT \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(NANT/NSS)$  dB.

**A D T**

#### 4.3.2 INSTRUMENTS

##### FOR POWER OUTPUT MEASUREMENT

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| Power meter<br>Anritsu     | ML2495A   | 0824006    | May 20, 2013    | May 19, 2014     |
| Power sensor<br>Anritsu    | MA2411B   | 0738172    | May 20, 2013    | May 19, 2014     |

**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. Tested date : Aug. 05, 2013

##### FOR 26dB OCCUPIED BANDWIDTH

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| Spectrum Analyzer<br>R&S   | FSP 40    | 100036     | Jan. 21, 2013   | Jan. 20, 2014    |

**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. Tested date : Aug. 05, 2013

#### 4.3.3 TEST PROCEDURES

##### FOR POWER OUTPUT MEASUREMENT

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

#### FOR 26dB OCCUPIED BANDWIDTH

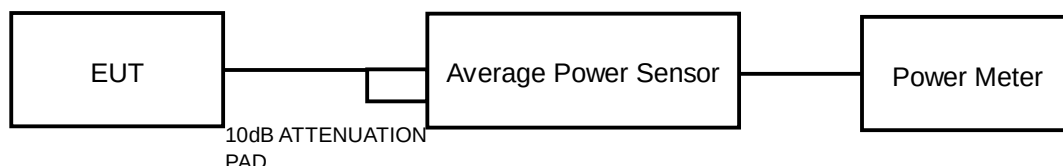
1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

#### 4.3.4 DEVIATION FROM TEST STANDARD

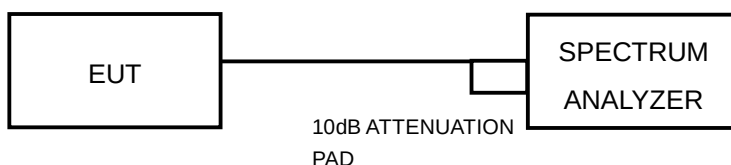
No deviation.

#### 4.3.5 TEST SETUP

##### FOR POWER OUTPUT MEASUREMENT



##### FOR 26dB OCCUPIED BANDWIDTH



#### 4.3.6 EUT OPERATING CONDITIONS

Same as Item 4.1.6



A D T

#### 4.3.7 TEST RESULTS

##### Band 2: 5250~5350MHz

##### For Radio Card 1 (5G):

##### POWER OUTPUT:

##### 802.11a

| CHANNEL | CHANNEL FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) | POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|--------------------|---------------------|-------------------|-----------|
| 52      | 5260                    | 49.204             | 16.92               | 24                | PASS      |

##### 26dB OCCUPIED BANDWIDTH:

| CHANNEL | CHANNEL FREQUENCY (MHz) | 26dBc BANDWIDTH (MHz) |
|---------|-------------------------|-----------------------|
| 52      | 5260                    | 37.09                 |

**Note: For output power limitation is determined based on 26dBc bandwidth.**

| Power Limit = $11\text{dBm} + 10\log B$ < Band 2~3> |            |             |                        |
|-----------------------------------------------------|------------|-------------|------------------------|
| Channel Number                                      | Freq.(MHz) | Min. B(MHz) | Determined Limit (dBm) |
| 52                                                  | 5260       | 37.09       | $26.69 > 24$           |





A D T

**For Radio Card 0:****POWER OUTPUT:****802.11n (HT40)**

| CHAN. | CHAN. FREQ. (MHz) | AVERAGE POWER (dBm) |         |         | TOTAL POWER (mW) | TOTAL POWER (dBm) | POWER LIMIT (dBm) | PASS / FAIL |
|-------|-------------------|---------------------|---------|---------|------------------|-------------------|-------------------|-------------|
|       |                   | CHAIN 0             | CHAIN 1 | CHAIN 2 |                  |                   |                   |             |
| 54    | 5270              | 18.12               | 18.42   | 17.76   | 194.069          | 22.88             | 24                | PASS        |

**26dB OCCUPIED BANDWIDTH:**

| CHANNEL | CHANNEL FREQUENCY (MHz) | 26dBc BANDWIDTH (MHz) |         |         |
|---------|-------------------------|-----------------------|---------|---------|
|         |                         | CHAIN 0               | CHAIN 1 | CHAIN 2 |
| 54      | 5270                    | 63.15                 | 68.08   | 51.88   |

**Note:** For output power limitation is determined based on 26dBc bandwidth.

| Power Limit = 11dBm + 10logB < Band 2~3> |            |             |                        |
|------------------------------------------|------------|-------------|------------------------|
| Channel Number                           | Freq.(MHz) | Min. B(MHz) | Determined Limit (dBm) |
| 54                                       | 5270       | 51.88       | 28.14 > 24             |

**Transmit Simultaneously Power:****For Radio Card 1 (5G) + Radio Card 0:**

| AVERAGE POWER (mW) | AVERAGE POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|--------------------|---------------------|-------------|-----------|
| 243.273            | 23.861              | 24          | PASS      |



A D T

**Band 3: 5500~5600MHz & 5650~5700MHz****For Radio Card 1 (5G):****POWER OUTPUT:****802.11n (HT20)**

| CHANNEL | CHANNEL FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) | POWER LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|--------------------|---------------------|-------------------|-----------|
| 116     | 5580                    | 49.774             | 16.97               | 24                | PASS      |

**26dB OCCUPIED BANDWIDTH:**

| CHANNEL | CHANNEL FREQUENCY (MHz) | 26dBc BANDWIDTH (MHz) |
|---------|-------------------------|-----------------------|
| 116     | 5580                    | 40.61                 |

**Note: For output power limitation is determined based on 26dBc bandwidth.**

| Power Limit = 11dBm + 10logB < Band 2~3> |            |             |                        |
|------------------------------------------|------------|-------------|------------------------|
| Channel Number                           | Freq.(MHz) | Min. B(MHz) | Determined Limit (dBm) |
| 116                                      | 5580       | 40.61       | 27.08 > 24             |



A D T

**For Radio Card 0:****POWER OUTPUT:****802.11n (HT20)**

| CHAN. | CHAN. FREQ. (MHz) | AVERAGE POWER (dBm) |         |         | TOTAL POWER (mW) | TOTAL POWER (dBm) | POWER LIMIT (dBm) | PASS / FAIL |
|-------|-------------------|---------------------|---------|---------|------------------|-------------------|-------------------|-------------|
|       |                   | CHAIN 0             | CHAIN 1 | CHAIN 2 |                  |                   |                   |             |
| 116   | 5580              | 18.34               | 18.23   | 17.75   | 194.327          | 22.89             | 24                | PASS        |

**26dB OCCUPIED BANDWIDTH:**

| CHANNEL | CHANNEL FREQUENCY (MHz) | 26dBc BANDWIDTH (MHz) |         |         |
|---------|-------------------------|-----------------------|---------|---------|
|         |                         | CHAIN 0               | CHAIN 1 | CHAIN 2 |
| 116     | 5580                    | 21.40                 | 23.62   | 27.76   |

**Note:** For output power limitation is determined based on 26dBc bandwidth.

| Power Limit = 11dBm + 10logB < Band 2~3> |            |             |                        |
|------------------------------------------|------------|-------------|------------------------|
| Channel Number                           | Freq.(MHz) | Min. B(MHz) | Determined Limit (dBm) |
| 116                                      | 5580       | 21.40       | 24.3 > 24              |

**Transmit Simultaneously Power:****For Radio Card 1 (5G) + Radio Card 0:**

| AVERAGE POWER (mW) | AVERAGE POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|--------------------|---------------------|-------------|-----------|
| 244.101            | 23.876              | 24          | PASS      |

## 4.4 PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 4.4.1 LIMITS OF PEAK POWER SPECTRAL DENSITY MEASUREMENT

| Frequency Band   | Limit |
|------------------|-------|
| 5.15 ~ 5.25GHz   | 4dBm  |
| 5.25 ~ 5.35GHz   | 11dBm |
| 5.47 ~ 5.725GHz  | 11dBm |
| 5.725 ~ 5.825GHz | 17dBm |

### 4.4.2 TEST INSTRUMENTS

| DESCRIPTION & MANUFACTURER | MODEL NO. | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|----------------------------|-----------|------------|-----------------|------------------|
| Spectrum Analyzer<br>R&S   | FSP 40    | 100036     | Jan. 21, 2013   | Jan. 20, 2014    |

**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. Tested date : Aug. 08, 2013

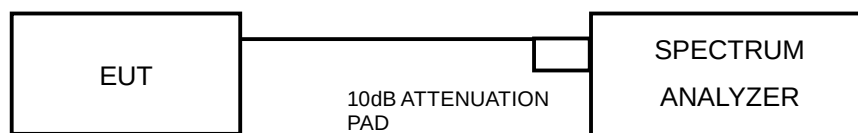
### 4.4.3 TEST PROCEDURES

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 1 MHz, Set VBW  $\geq$  3 MHz, Detector = RMS
3. Sweep time = auto, trigger set to "free run".
4. Trace average at least 100 traces in power averaging mode.
5. Record the max value and for duty cycle of test signal is  $< 98\%$  add  $10 \log (1/\text{duty cycle})$

### 4.4.4 DEVIATION FROM TEST STANDARD

No deviation

#### 4.4.5 TEST SETUP



#### 4.4.6 EUT OPERATING CONDITIONS

Same as 4.1.6

#### 4.4.7 TEST RESULTS

##### Band 2: 5250~5350MHz

##### For Radio Card 1 (5G):

###### 802.11a

| CHANNEL | CHANNEL FREQUENCY (MHz) | PSD (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-----------|---------------------|-----------|
| 60      | 5300                    | 5.85      | 11                  | PASS      |

##### For Radio Card 0:

###### 802.11n (HT20)

| CHANNEL | CHANNEL FREQUENCY (MHz) | PSD W/O DUTY FACTOR (dBm) |         |         | DUTY FACTOR (dB) | TOTAL PSD WITH DUTY FACTOR (dBm) | MAX. LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|---------------------------|---------|---------|------------------|----------------------------------|------------------|-----------|
|         |                         | CHAIN 0                   | CHAIN 1 | CHAIN 2 |                  |                                  |                  |           |
| 52      | 5260                    | 4.44                      | 4.29    | 3.96    | 0.13             | 9.14                             | 11               | PASS      |

**NOTE:** 1. Duty cycle = 0.675 ms/0.695 ms = 0.971, Duty factor =  $10 \cdot \log(1/0.971) = 0.13$

#### Transmit Simultaneously Power:

##### For Radio Card 1 (5G) + Radio Card 0:

| PSD (mW) | PSD (dBm) | LIMIT (dBm) | PASS/FAIL |
|----------|-----------|-------------|-----------|
| 12.050   | 10.810    | 11          | PASS      |



A D T

**Band 3: 5500~5600MHz & 5650~5700MHz****For Radio Card 1 (5G):****802.11a**

| CHANNEL | CHANNEL FREQUENCY (MHz) | PSD (dBm) | MAXIMUM LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|-----------|---------------------|-----------|
| 132     | 5660                    | 4.82      | 11                  | PASS      |

**For Radio Card 0:****802.11n (HT20)**

| CHANNEL | CHANNEL FREQUENCY (MHz) | PSD W/O DUTY FACTOR (dBm) |         |         | DUTY FACTOR (dB) | TOTAL PSD WITH DUTY FACTOR (dBm) | MAX. LIMIT (dBm) | PASS/FAIL |
|---------|-------------------------|---------------------------|---------|---------|------------------|----------------------------------|------------------|-----------|
|         |                         | CHAIN 0                   | CHAIN 1 | CHAIN 2 |                  |                                  |                  |           |
| 116     | 5580                    | 3.44                      | 3.23    | 3.18    | 0.13             | 8.19                             | 11               | PASS      |

**NOTE:** 1. Duty cycle = 0.675 ms/0.695 ms = 0.971, Duty factor =  $10 * \log(1/0.971) = 0.13$

**Transmit Simultaneously Power:****For Radio Card 1 (5G) + Radio Card 0:**

| PSD (mW) | PSD (dBm) | LIMIT (dBm) | PASS/FAIL |
|----------|-----------|-------------|-----------|
| 9.626    | 9.834     | 11          | PASS      |



A D T

## 5. 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: 886-2-26052943

**Hsin Chu EMC/RF Lab:**

Tel: 886-3-5935343

Fax: 886-3-5935342

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

Tel: 886-3-3183232

Fax: 886-3-3270892

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

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

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

---END---