

# FCC Test Report

## (BT-LE)

**Report No.:** RF120522E09N-5

**FCC ID:** UZ7MC92N0

**Test Model:** MC92N0

**Received Date:** Mar. 23, 2015

**Test Date:** Mar. 31 to Apr. 13, 2015

**Issued Date:** May 13, 2015

**Applicant:** Zebra Technologies Corporation

**Address:** 1 Zebra Plaza, Holtsville, NY 11742

**Manufacturer:** Symbol Technologies, Inc.

**Address:** 1 Zebra Plaza, Holtsville, NY 11742

**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.



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### Release Control Record

| Issue No.      | Description       | Date Issued  |
|----------------|-------------------|--------------|
| RF120522E09N-5 | Original release. | May 13, 2015 |



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## 1 Certificate of Conformity

**Product:** Mobile Computer

**Brand:** Symbol

**Test Model:** MC92N0

**Sample Status:** MASS-PRODUCTION

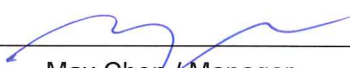
**Applicant:** Zebra Technologies Corporation

**Test Date:** Mar. 31 to Apr. 13, 2015

**Standards:** 47 CFR FCC Part 15, Subpart C (Section 15.247)  
ANSI C63.10:2009

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

**Prepared by :**  , **Date:** May 13, 2015  
Elsie Hsu / Specialist

**Approved by :**  , **Date:** May 13, 2015  
May Chen / Manager

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart C (SECTION 15.247) |                                            |        |                                                                                    |
|------------------------------------------------|--------------------------------------------|--------|------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                  | Result | Remarks                                                                            |
| 15.207                                         | AC Power Conducted Emission                | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -7.28dB at 0.72031MHz. |
| 15.205<br>5.209<br>15.247(d)                   | Radiated Emissions & Band Edge Measurement | PASS   | Meet the requirement of limit.<br>Minimum passing margin is -5.0dB at 178.65MHz.   |
| 15.247(d)                                      | Antenna Port Emission                      | PASS   | Meet the requirement of limit.                                                     |
| 15.247(a)(2)                                   | 6dB bandwidth                              | PASS   | Meet the requirement of limit.                                                     |
| 15.247(b)                                      | Conducted power                            | PASS   | Meet the requirement of limit.                                                     |
| 15.247(e)                                      | Power Spectral Density                     | PASS   | Meet the requirement of limit.                                                     |
| 15.203                                         | Antenna Requirement                        | PASS   | No antenna connector is used.                                                      |

### 2.1 Measurement Uncertainty

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

| Measurement                        | Frequency      | Expended Uncertainty (k=2) ( $\pm$ ) |
|------------------------------------|----------------|--------------------------------------|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.86 dB                              |
| Radiated Emissions up to 1 GHz     | 30MHz ~ 1GHz   | 5.37 dB                              |
| Radiated Emissions above 1 GHz     | 1GHz ~6GHz     | 3.65 dB                              |
|                                    | 6GHz ~ 18GHz   | 3.88 dB                              |
|                                    | 18GHz ~ 40GHz  | 4.11 dB                              |

### 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT (BT-LE)

|                       |                                                           |
|-----------------------|-----------------------------------------------------------|
| Product               | Mobile Computer                                           |
| Brand                 | Symbol                                                    |
| Test Model            | MC92N0                                                    |
| Status of EUT         | MASS-PRODUCTION                                           |
| Power Supply Rating   | DC 7.4V from battery<br>DC 12V to direct charging adapter |
| Modulation Type       | GFSK                                                      |
| Modulation Technology | DTS                                                       |
| Transfer Rate         | Up to 1Mbps                                               |
| Operating Frequency   | 2402MHz ~ 2480MHz                                         |
| Number of Channel     | 40                                                        |
| Output Power          | 2.158mW                                                   |
| Antenna Type          | Please see Note                                           |
| Antenna Connector     | Please see Note                                           |
| Accessory Device      | Battery x 1 (Part No.: 82-111734-01)                      |
| Data Cable Supplied   | NA                                                        |

Note:

- This report is prepared for FCC Class II change. The difference compared with the Report No.: RF120522E09 design is as the following:

- ◆ Added Bluetooth 4.0 technology used for the EUT
- ◆ Added new SKU: SE4750

| Original                    |         |            |        |        |        |        |
|-----------------------------|---------|------------|--------|--------|--------|--------|
| Scanner                     | With CR | Without CR | Keypad |        |        |        |
|                             |         |            | 53 key | 43 key | 33 key | 28 key |
| SE4500                      | V       | -          | V      | V      | V      | V      |
| SE4500                      | -       | V          | V      | V      | V      | V      |
| SE4600                      | V       | -          | V      | V      | V      | V      |
| SE4600                      | -       | V          | V      | V      | V      | V      |
| SE965                       | V       | -          | V      | V      | V      | V      |
| SE965                       | -       | V          | V      | V      | V      | V      |
| SE1524                      | V       | -          | V      | V      | V      | V      |
| SE1524                      |         | V          | V      | V      | V      | V      |
| Addition                    |         |            |        |        |        |        |
| Scanner                     | With CR | Without CR | Keypad |        |        |        |
|                             |         |            | 53 key | 43 key | 33 key | 28 key |
| SE4750                      | V       | -          | V      | V      | V      | V      |
| CR : Condensation Resistant |         |            |        |        |        |        |

- ◆ Changed the battery as below table.

| Original  |                        |
|-----------|------------------------|
| Brand:    | SYMBOL                 |
| Part No.: | 21-65587-03            |
| Rating:   | 7.4V, 2200mAh, 16.3Wh  |
| Newly     |                        |
| Brand:    | SYMBOL                 |
| Part No.: | 82-111734-01           |
| Rating:   | 7.4V, 2400mAh, 17.76Wh |

- ◆ Changed the version of EUT information as below table.

|                  |             |                   |
|------------------|-------------|-------------------|
| Mobile Computer  | OS Version  | 07.00.2806        |
|                  | OEM Version | 00.20.0005        |
| Wireless(Fusion) | Part Number | 31-FUSION-X2.00   |
|                  | Version     | X_2.00.0.0.063R   |
| XW2DMT           | Version     | X_2.00.0.0.0.28   |
|                  | Fusion      | X_2.00.0.0.0.040E |
| BTRegTest Ver4.1 | Version     | 4.1               |



2. According to above conditions, all tests of SE4750 need to be performed. And all data was verified to meet the requirements.
3. There are Bluetooth and WLAN technology used for the EUT.
4. WLAN and Bluetooth technology can transmit at same time.
5. The associated devices(optional) of EUT information are as below:

| Product                                | Brand    | Model              | S/N             |
|----------------------------------------|----------|--------------------|-----------------|
| 28keypad                               | NA       | KYPD-MC9XMR000-01R | 40A11W40H       |
| 33keypad                               | NA       | KYPD-MC9XMX000-01R | 40B52K50A       |
| 43keypad                               | NA       | KYPD-MC9XMT000-01R | 40A11R93G       |
| 53keypad                               | NA       | KYPD-MC9XMS000-01R | 40B63U43F       |
| Product                                | Brand    | Model              | P/N             |
| Headset                                | MOTOROLA | RCH50              | RCH50           |
| Headset                                | VXI      | VR10               | 50-11300-050R   |
| Power adapter<br>(for Direct charging) | HIPRO    | HP-A0502R3D        | PWRS-14000-148R |
| Direct charging adapter                | SYMBOL   | ADP9000-110R       | NA              |
| AC Line cord                           | NA       | NA                 | 23844-00-00R    |
| USB cable                              | NA       | NA                 | 25-62166-01R    |

6. The EUT could be supplied with a direct charging and battery as below table:

| Direct charging adapter (not for sale together)                |                                                                                  |
|----------------------------------------------------------------|----------------------------------------------------------------------------------|
| Brand:                                                         | SYMBOL                                                                           |
| Part No.:                                                      | ADP9000-110R                                                                     |
| I/O Ports:                                                     | RS232 Port * 1<br>RJ45 Port *2                                                   |
| Associated Devices:                                            | USB cable (unshielded, 1.8m with one core)<br>USB cable (Part No.: 25-62166-01R) |
| Power Adapter (for Direct charging, and not for sale together) |                                                                                  |
| Brand:                                                         | HIPRO                                                                            |
| Model No.:                                                     | HP-A0502R3D                                                                      |
| Part No.:                                                      | PWRS-14000-148R                                                                  |
| Input power :                                                  | 100-240V, 50-60Hz, 2.4A                                                          |
| Output power :                                                 | +12V , 4.16A                                                                     |
|                                                                | AC Line cord (unshielded, 2.2m without core) (Part No.: 23844-00-00R)            |
| Battery                                                        |                                                                                  |
| Brand:                                                         | SYMBOL                                                                           |
| Part No.:                                                      | 82-111734-01                                                                     |
| Rating:                                                        | 7.4V, 2400mAh, 17.76Wh                                                           |

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

| WLAN Antenna Spec.     |           |           |                              |
|------------------------|-----------|-----------|------------------------------|
| Antenna                | Type      | Connector | Gain (dBi)                   |
| Lant (Aux)             | PIFA      | NA        | 4.07 (2.4GHz)<br>4.96 (5GHz) |
| Rant (Main)            | PIFA      | NA        | 6.03 (2.4GHz)<br>4.51 (5GHz) |
| Bluetooth Antenna Spec |           |           |                              |
| Type                   | Connector |           | Gain (dBi)                   |
| Chip                   | NA        |           | -3.31                        |

**Note:** This report chose the max. Antenna gain to do final test.

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

### 3.2 Description of Test Modes

40 channels are provided to this EUT:

| CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) | CHANNEL | FREQ.<br>(MHz) |
|---------|----------------|---------|----------------|---------|----------------|---------|----------------|
| 0       | 2402           | 10      | 2422           | 20      | 2442           | 30      | 2462           |
| 1       | 2404           | 11      | 2424           | 21      | 2444           | 31      | 2464           |
| 2       | 2406           | 12      | 2426           | 22      | 2446           | 32      | 2466           |
| 3       | 2408           | 13      | 2428           | 23      | 2448           | 33      | 2468           |
| 4       | 2410           | 14      | 2430           | 24      | 2450           | 34      | 2470           |
| 5       | 2412           | 15      | 2432           | 25      | 2452           | 35      | 2472           |
| 6       | 2414           | 16      | 2434           | 26      | 2454           | 36      | 2474           |
| 7       | 2416           | 17      | 2436           | 27      | 2456           | 37      | 2476           |
| 8       | 2418           | 18      | 2438           | 28      | 2458           | 38      | 2478           |
| 9       | 2420           | 19      | 2440           | 29      | 2460           | 39      | 2480           |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT CONFIGURE MODE | APPLICABLE TO |       |     |      | DESCRIPTION                                                                              |
|--------------------|---------------|-------|-----|------|------------------------------------------------------------------------------------------|
|                    | RE $\geq$ 1G  | RE<1G | PLC | APCM |                                                                                          |
| 1                  | -             | -     | √   | -    | EUT(Y-Z) + Scanner (SE4750) + Headset(RCH50) + Keypad(53) + Direct charging & Without CR |
| 2                  | -             | √     | -   | -    | EUT(X-Y) + Scanner (SE4750) + Headset(VR10) + Keypad(43) + Direct charging & Without CR  |
| 3                  | √             | -     | -   | √    | EUT(Y-Z) + Scanner (SE4750) + Headset(VR10) + Keypad(43) + Direct charging & Without CR  |

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

**RE<1G**: Radiated Emission below 1GHz  
**APCM**: Antenna Port Conducted Measurement

**NOTE**: “-” means no effect.

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

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

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0, 19, 39      | GFSK            | 1                |

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

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

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0, 19, 39      | GFSK            | 1                |

#### **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.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0              | GFSK            | 1                |

### Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ 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.

| AVAILABLE CHANNEL | TESTED CHANNEL | MODULATION TYPE | DATA RATE (Mbps) |
|-------------------|----------------|-----------------|------------------|
| 0 to 39           | 0, 19, 39      | GFSK            | 1                |

### TEST CONDITION:

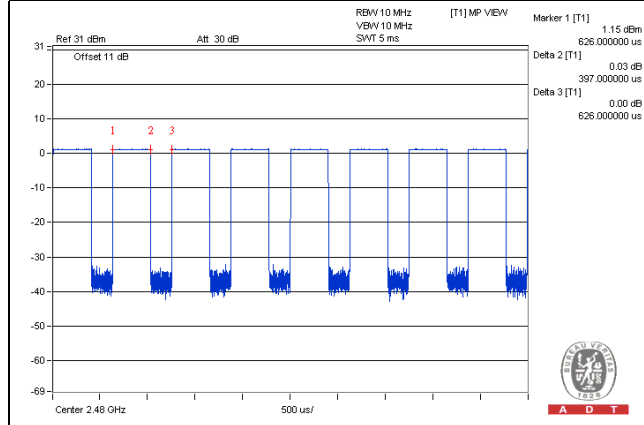
| APPLICABLE TO | ENVIRONMENTAL CONDITIONS | INPUT POWER  | TESTED BY     |
|---------------|--------------------------|--------------|---------------|
| RE $\geq$ 1G  | 22deg. C, 68%RH          | 120Vac, 60Hz | Robert Cheng  |
| RE<1G         | 24deg. C, 71%RH          | 120Vac, 60Hz | Robert Cheng  |
| PLC           | 25deg. C, 70%RH          | 120Vac, 60Hz | Eagle Chen    |
| APCM          | 21deg. C, 60%RH          | 120Vac, 60Hz | Anderson Chen |

### 3.3 Duty Cycle of Test Signal

If duty cycle of test signal is < 98%, duty factor shall be considered.

Duty cycle =  $0.397/0.626 = 0.634$ , Duty factor =  $10 * \log(1/0.634) = 2$

#### BT-LE



### 3.4 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.

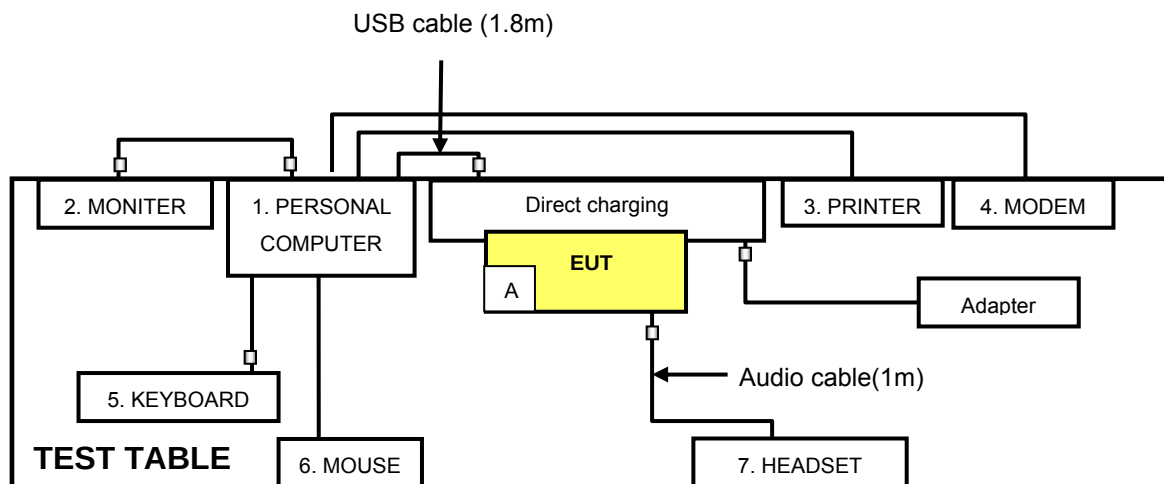
| For conducted emission test |                   |          |           |                              |            |
|-----------------------------|-------------------|----------|-----------|------------------------------|------------|
| No.                         | Product           | Brand    | Model No. | Serial No.                   | FCC ID     |
| 1                           | PERSONAL COMPUTER | DELL     | DCSCMF    | 9KKB32S                      | FCC DoC    |
| 2                           | MONITOR           | DELL     | E2210Hc   | CN-OG337R-6418<br>0-97S-OQDS | FCC DoC    |
| 3                           | PRINTER           | EPSON    | LQ-300+II | G88Y074083                   | FCC DoC    |
| 4                           | MODEM             | ACEEX    | 1414      | 0206026778                   | IFAXDM1414 |
| 5                           | KEYBOARD          | DELL     | SK-8115   | MY-0DJ325-71619-<br>99B-0476 | FCC DoC    |
| 6                           | MOUSE             | DELL     | M056UOA   | FOROOFB9                     | FCC DoC    |
| 7                           | HEADSET           | Motorola | RCH50     | NA                           | NA         |
| For other test items        |                   |          |           |                              |            |
| No.                         | Product           | Brand    | Model No. | Serial No.                   | FCC ID     |
| 1                           | NOTEBOOK COMPUTER | DELL     | PP32LA    | FSLB32S                      | FCC DoC    |
| 2                           | iPod shuffle      | Apple    | MC749TA/A | CC4DMFJUDEFDM                | NA         |
| 3                           | HEADSET           | VXI      | VR10      | NA                           | NA         |

| For conducted emission test |                                            |
|-----------------------------|--------------------------------------------|
| No.                         | Signal cable description                   |
| 1                           | USB cable (unshielded, 1.8m with one core) |
| 2                           | VGA cable. (1.8m with two cores)           |
| 3                           | USB cable.(1.8m)                           |
| 4                           | RS232 cable.(1.1m)                         |
| 5                           | USB cable.(1.8m with one core)             |
| 6                           | USB cable.(1.8m)                           |
| 7                           | Audio cable (1m with one core)             |
| For other test items        |                                            |
| No.                         | Signal cable description                   |
| 1                           | USB cable (unshielded, 1.8m with one core) |
| 2                           | USB cable (shielded, 0.1m)                 |
| 3                           | Audio cable (1.1m with one core)           |

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

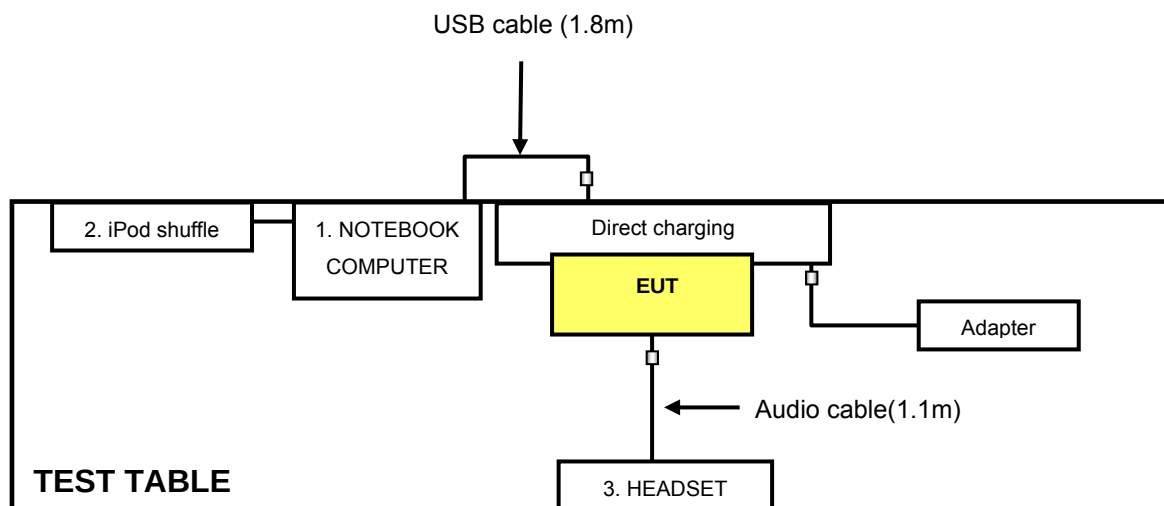
### 3.4.1 Configuration of System under Test

For Conducted emission test:



NOTE: 1. Item A is the SD Card.

For other test items





### 3.5 General Description of Applied Standards

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

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

**558074 D01 DTS Meas Guidance v03r02**

ANSI C63.10-2009

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

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

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

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

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table. Other emissions shall be at least 20dB below the highest level of the desired power:

| Frequencies<br>(MHz) | Field Strength<br>(microvolts/meter) | Measurement Distance<br>(meters) |
|----------------------|--------------------------------------|----------------------------------|
| 0.009 ~ 0.490        | 2400/F(kHz)                          | 300                              |
| 0.490 ~ 1.705        | 24000/F(kHz)                         | 30                               |
| 1.705 ~ 30.0         | 30                                   | 30                               |
| 30 ~ 88              | 100                                  | 3                                |
| 88 ~ 216             | 150                                  | 3                                |
| 216 ~ 960            | 200                                  | 3                                |
| Above 960            | 500                                  | 3                                |

#### NOTE:

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

#### 4.1.2 Test Instruments

| DESCRIPTION & MANUFACTURER              | MODEL NO.        | SERIAL NO.                      | CALIBRATED DATE | CALIBRATED UNTIL |
|-----------------------------------------|------------------|---------------------------------|-----------------|------------------|
| MXE EMI Receiver<br>Agilent             | N9038A           | MY51210105                      | July 21, 2014   | July 20, 2015    |
| Pre-Amplifier<br>Mini-Circuits          | ZFL-1000VH2<br>B | AMP-ZFL-03                      | Nov. 12, 2014   | Nov. 11, 2015    |
| Trilog Broadband Antenna<br>SCHWARZBECK | VULB 9168        | 9168-360                        | Feb. 06, 2015   | Feb. 05, 2016    |
| RF Cable                                | NA               | CHGCAB_001                      | Oct. 04, 2014   | Oct. 03, 2015    |
| Horn_Antenna<br>AISI                    | AIH.8018         | 0000320091110                   | Aug. 27, 2014   | Aug. 26, 2015    |
| Pre-Amplifier<br>Agilent                | 8449B            | 3008A02578                      | June 24, 2014   | June 23, 2015    |
| RF Cable                                | NA               | 131205<br>131214<br>SNMY23684/4 | Jan. 16, 2015   | Jan. 15, 2016    |
| Spectrum Analyzer<br>R&S                | FSV40            | 100964                          | July 05, 2014   | July 04, 2015    |
| Pre-Amplifier<br>EMCI                   | EMC184045        | 980143                          | Jan. 16, 2015   | Jan. 15, 2016    |
| Horn_Antenna<br>SCHWARZBECK             | BBHA 9170        | 9170-424                        | Aug. 26, 2014   | Aug. 25, 2015    |
| RF Cable                                | NA               | RF104-121<br>RF104-204          | Dec. 11, 2014   | Dec. 10, 2015    |
| Antenna Tower & Turn Table<br>CT        | NA               | NA                              | NA              | NA               |
| Power meter<br>Anritsu                  | ML2495A          | 1014008                         | Apr. 30, 2014   | Apr. 29, 2015    |
| Power sensor<br>Anritsu                 | MA2411B          | 0917122                         | Apr. 30, 2014   | Apr. 29, 2015    |

#### 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. G.
4. The FCC Site Registration No. is 966073.
5. The VCCI Site Registration No. is G-137.
6. The CANADA Site Registration No. is IC 7450H-2.
7. Tested Date: Apr. 02, 2015

#### 4.1.3 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:**

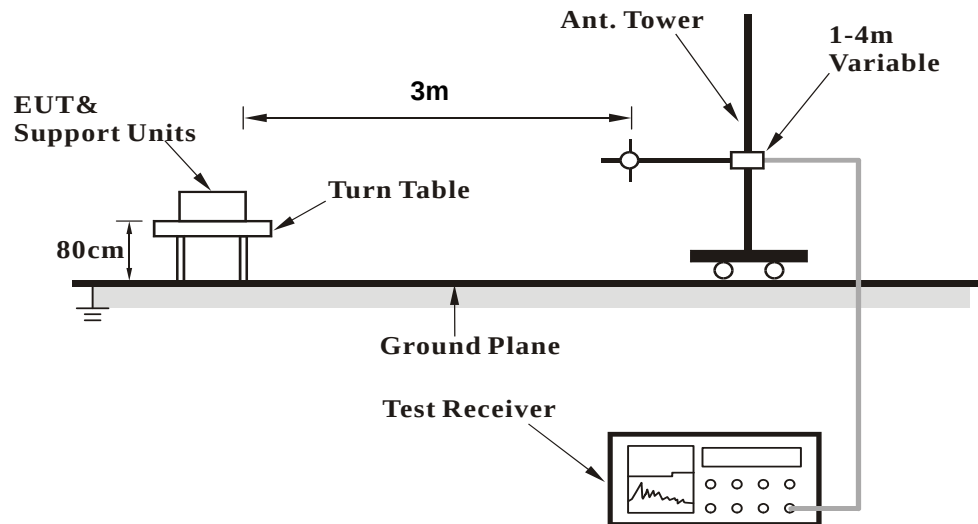
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

#### 4.1.4 Deviation from Test Standard

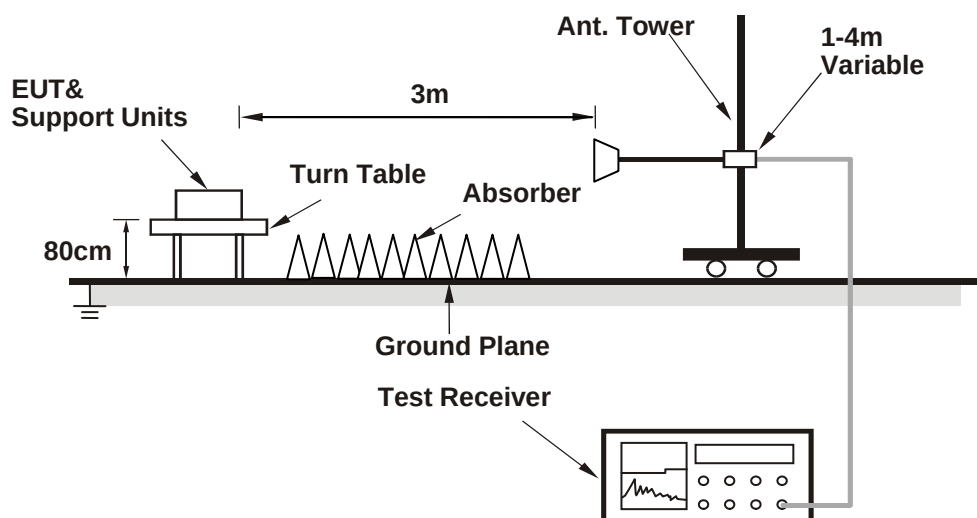
No deviation.

#### 4.1.5 Test Setup

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



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



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

#### 4.1.6 EUT Operating Conditions

1. Turn on the power of EUT.
2. The communication partner run test program "MC92N0" to enable EUT under transmission/receiving condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1GHz Data :

|                 |              |                      |           |
|-----------------|--------------|----------------------|-----------|
| CHANNEL         | TX Channel 0 | DETECTOR<br>FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz |                      |           |

| 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                                                   | 2390.00        | 48.2 PK                       | 74.0              | -25.8          | 1.05 H                   | 101                        | 53.78                  | -5.58                          |
| 2                                                   | 2390.00        | 36.8 AV                       | 54.0              | -17.2          | 1.05 H                   | 101                        | 42.38                  | -5.58                          |
| 3                                                   | *2402.00       | 91.3 PK                       |                   |                | 1.05 H                   | 101                        | 96.84                  | -5.54                          |
| 4                                                   | *2402.00       | 90.2 AV                       |                   |                | 1.05 H                   | 101                        | 95.74                  | -5.54                          |
| 5                                                   | 4804.00        | 50.7 PK                       | 74.0              | -23.3          | 1.20 H                   | 65                         | 48.40                  | 2.30                           |
| 6                                                   | 4804.00        | 40.8 AV                       | 54.0              | -13.2          | 1.20 H                   | 65                         | 38.50                  | 2.30                           |
| 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        | 49.0 PK                       | 74.0              | -25.0          | 1.15 V                   | 310                        | 54.58                  | -5.58                          |
| 2                                                   | 2390.00        | 37.0 AV                       | 54.0              | -17.0          | 1.15 V                   | 310                        | 42.58                  | -5.58                          |
| 3                                                   | *2402.00       | 93.2 PK                       |                   |                | 1.15 V                   | 310                        | 98.74                  | -5.54                          |
| 4                                                   | *2402.00       | 89.3 AV                       |                   |                | 1.15 V                   | 310                        | 94.84                  | -5.54                          |
| 5                                                   | 4804.00        | 49.2 PK                       | 74.0              | -24.8          | 1.00 V                   | 65                         | 46.90                  | 2.30                           |
| 6                                                   | 4804.00        | 40.3 AV                       | 54.0              | -13.7          | 1.00 V                   | 65                         | 38.00                  | 2.30                           |

#### 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. " \* ": Fundamental frequency.

|                 |               |                      |           |
|-----------------|---------------|----------------------|-----------|
| CHANNEL         | TX Channel 19 | DETECTOR<br>FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      |           |

#### 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   | *2440.00       | 95.9 PK                       |                   |                | 1.09 H                   | 115                        | 101.22                 | -5.32                          |
| 2   | *2440.00       | 93.9 AV                       |                   |                | 1.09 H                   | 115                        | 99.22                  | -5.32                          |
| 3   | 4880.00        | 50.6 PK                       | 74.0              | -23.4          | 1.18 H                   | 73                         | 48.07                  | 2.53                           |
| 4   | 4880.00        | 40.8 AV                       | 54.0              | -13.2          | 1.18 H                   | 73                         | 38.27                  | 2.53                           |
| 5   | 7320.00        | 58.6 PK                       | 74.0              | -15.4          | 1.00 H                   | 96                         | 48.89                  | 9.71                           |
| 6   | 7320.00        | 48.1 AV                       | 54.0              | -5.9           | 1.00 H                   | 96                         | 38.39                  | 9.71                           |

#### 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   | *2440.00       | 94.3 PK                       |                   |                | 1.15 V                   | 304                        | 99.62                  | -5.32                          |
| 2   | *2440.00       | 92.7 AV                       |                   |                | 1.15 V                   | 304                        | 98.02                  | -5.32                          |
| 3   | 4880.00        | 49.5 PK                       | 74.0              | -24.5          | 1.01 V                   | 65                         | 46.97                  | 2.53                           |
| 4   | 4880.00        | 40.8 AV                       | 54.0              | -13.2          | 1.01 V                   | 65                         | 38.27                  | 2.53                           |
| 5   | 7320.00        | 58.3 PK                       | 74.0              | -15.7          | 1.54 V                   | 63                         | 48.59                  | 9.71                           |
| 6   | 7320.00        | 47.9 AV                       | 54.0              | -6.1           | 1.54 V                   | 63                         | 38.19                  | 9.71                           |

#### 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. " \* ": Fundamental frequency.

|                 |               |                      |           |
|-----------------|---------------|----------------------|-----------|
| CHANNEL         | TX Channel 39 | DETECTOR<br>FUNCTION | Peak (PK) |
| FREQUENCY RANGE | 1GHz ~ 25GHz  |                      |           |

| 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                                                   | *2480.00       | 94.8 PK                       |                   |                | 1.06 H                   | 116                        | 99.88                  | -5.08                          |
| 2                                                   | *2480.00       | 92.8 AV                       |                   |                | 1.06 H                   | 116                        | 97.88                  | -5.08                          |
| 3                                                   | 2483.50        | 47.6 PK                       | 74.0              | -26.4          | 1.06 H                   | 116                        | 52.65                  | -5.05                          |
| 4                                                   | 2483.50        | 36.5 AV                       | 54.0              | -17.5          | 1.06 H                   | 116                        | 41.55                  | -5.05                          |
| 5                                                   | 4960.00        | 50.3 PK                       | 74.0              | -23.7          | 1.19 H                   | 89                         | 47.44                  | 2.86                           |
| 6                                                   | 4960.00        | 40.4 AV                       | 54.0              | -13.6          | 1.19 H                   | 89                         | 37.54                  | 2.86                           |
| 7                                                   | 7440.00        | 58.8 PK                       | 74.0              | -15.2          | 1.02 H                   | 107                        | 49.04                  | 9.76                           |
| 8                                                   | 7440.00        | 48.0 AV                       | 54.0              | -6.0           | 1.02 H                   | 107                        | 38.24                  | 9.76                           |
| 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                                                   | *2480.00       | 93.6 PK                       |                   |                | 1.13 V                   | 295                        | 98.68                  | -5.08                          |
| 2                                                   | *2480.00       | 91.2 AV                       |                   |                | 1.13 V                   | 295                        | 96.28                  | -5.08                          |
| 3                                                   | 2483.50        | 49.2 PK                       | 74.0              | -24.8          | 1.17 V                   | 308                        | 54.25                  | -5.05                          |
| 4                                                   | 2483.50        | 37.2 AV                       | 54.0              | -16.8          | 1.17 V                   | 308                        | 42.25                  | -5.05                          |
| 5                                                   | 4960.00        | 49.1 PK                       | 74.0              | -24.9          | 1.03 V                   | 56                         | 46.24                  | 2.86                           |
| 6                                                   | 4960.00        | 40.5 AV                       | 54.0              | -13.5          | 1.03 V                   | 56                         | 37.64                  | 2.86                           |
| 7                                                   | 7440.00        | 58.4 PK                       | 74.0              | -15.6          | 1.54 V                   | 76                         | 48.64                  | 9.76                           |
| 8                                                   | 7440.00        | 47.9 AV                       | 54.0              | -6.1           | 1.54 V                   | 76                         | 38.14                  | 9.76                           |

#### 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. " \* ": Fundamental frequency.



#### Below 1GHz Data:

|                 |              |                      |                 |
|-----------------|--------------|----------------------|-----------------|
| CHANNEL         | TX Channel 0 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz |                      |                 |

#### 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   | 221.10         | 37.5 QP                       | 46.0              | -8.6           | 1.47 H                   | 304                        | 53.37                  | -15.92                         |
| 2   | 317.21         | 39.4 QP                       | 46.0              | -6.6           | 1.24 H                   | 311                        | 51.73                  | -12.32                         |
| 3   | 482.76         | 34.6 QP                       | 46.0              | -11.4          | 1.64 H                   | 301                        | 42.71                  | -8.10                          |
| 4   | 605.81         | 36.0 QP                       | 46.0              | -10.0          | 1.24 H                   | 311                        | 41.22                  | -5.25                          |
| 5   | 696.81         | 33.7 QP                       | 46.0              | -12.3          | 1.45 H                   | 344                        | 37.63                  | -3.96                          |
| 6   | 757.14         | 37.2 QP                       | 46.0              | -8.8           | 1.42 H                   | 314                        | 40.02                  | -2.78                          |

#### 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   | 201.32         | 35.2 QP                       | 43.5              | -8.3           | 1.66 V                   | 134                        | 52.01                  | -16.80                         |
| 2   | 212.30         | 38.3 QP                       | 43.5              | -5.2           | 1.64 V                   | 100                        | 54.63                  | -16.32                         |
| 3   | 294.67         | 36.3 QP                       | 46.0              | -9.8           | 1.44 V                   | 306                        | 49.24                  | -12.99                         |
| 4   | 319.51         | 37.2 QP                       | 46.0              | -8.8           | 1.24 V                   | 311                        | 49.47                  | -12.26                         |
| 5   | 475.64         | 35.0 QP                       | 46.0              | -11.0          | 1.45 V                   | 88                         | 43.29                  | -8.28                          |
| 6   | 521.21         | 34.1 QP                       | 46.0              | -11.9          | 1.66 V                   | 77                         | 41.27                  | -7.17                          |

#### 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

|                 |               |                      |                 |
|-----------------|---------------|----------------------|-----------------|
| CHANNEL         | TX Channel 19 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz  |                      |                 |

#### 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   | 178.34         | 38.2 QP                       | 43.5              | -5.3           | 1.24 H                   | 211                        | 53.14                  | -14.93                         |
| 2   | 317.54         | 39.7 QP                       | 46.0              | -6.3           | 1.34 H                   | 211                        | 51.99                  | -12.31                         |
| 3   | 482.64         | 34.8 QP                       | 46.0              | -11.2          | 1.44 H                   | 211                        | 42.92                  | -8.10                          |
| 4   | 605.94         | 35.8 QP                       | 46.0              | -10.3          | 1.44 H                   | 67                         | 41.00                  | -5.25                          |
| 5   | 696.34         | 33.2 QP                       | 46.0              | -12.8          | 1.24 H                   | 200                        | 37.21                  | -3.97                          |
| 6   | 757.34         | 37.7 QP                       | 46.0              | -8.3           | 1.24 H                   | 99                         | 40.46                  | -2.78                          |

#### 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   | 196.11         | 35.1 QP                       | 43.5              | -8.4           | 1.44 V                   | 54                         | 51.62                  | -16.51                         |
| 2   | 212.10         | 38.1 QP                       | 43.5              | -5.4           | 1.42 V                   | 64                         | 54.47                  | -16.33                         |
| 3   | 294.51         | 36.1 QP                       | 46.0              | -9.9           | 1.24 V                   | 245                        | 49.11                  | -13.01                         |
| 4   | 319.21         | 37.1 QP                       | 46.0              | -8.9           | 1.98 V                   | 67                         | 49.39                  | -12.28                         |
| 5   | 475.31         | 35.3 QP                       | 46.0              | -10.7          | 1.24 V                   | 100                        | 43.63                  | -8.29                          |
| 6   | 521.40         | 34.2 QP                       | 46.0              | -11.8          | 1.74 V                   | 45                         | 41.41                  | -7.17                          |

#### 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

|                 |               |                      |                 |
|-----------------|---------------|----------------------|-----------------|
| CHANNEL         | TX Channel 39 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz  |                      |                 |

# 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   | 178.65         | 38.5 QP                       | 43.5              | -5.0           | 1.21 H                   | 278                        | 53.50                  | -14.96                         |
| 2   | 324.11         | 40.0 QP                       | 46.0              | -6.0           | 1.42 H                   | 64                         | 52.10                  | -12.13                         |
| 3   | 482.21         | 34.5 QP                       | 46.0              | -11.5          | 1.24 H                   | 275                        | 42.65                  | -8.11                          |
| 4   | 605.41         | 35.2 QP                       | 46.0              | -10.8          | 1.27 H                   | 345                        | 40.47                  | -5.26                          |
| 5   | 696.57         | 33.8 QP                       | 46.0              | -12.3          | 1.46 H                   | 175                        | 37.71                  | -3.96                          |
| 6   | 757.21         | 37.8 QP                       | 46.0              | -8.2           | 1.64 H                   | 277                        | 40.62                  | -2.78                          |

# 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   | 191.31         | 34.6 QP                       | 43.5              | -8.9           | 1.22 V                   | 96                         | 50.70                  | -16.08                         |
| 2   | 212.10         | 38.4 QP                       | 43.5              | -5.2           | 1.42 V                   | 64                         | 54.68                  | -16.33                         |
| 3   | 294.24         | 36.4 QP                       | 46.0              | -9.6           | 1.66 V                   | 45                         | 49.44                  | -13.02                         |
| 4   | 319.45         | 37.3 QP                       | 46.0              | -8.7           | 1.45 V                   | 99                         | 49.60                  | -12.26                         |
| 5   | 475.45         | 35.5 QP                       | 46.0              | -10.5          | 1.75 V                   | 85                         | 43.83                  | -8.29                          |
| 6   | 521.41         | 34.3 QP                       | 46.0              | -11.7          | 1.45 V                   | 244                        | 41.51                  | -7.17                          |

## REMARKS:

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

## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

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

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

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

### 4.2.2 Test Instruments

| DESCRIPTION & MANUFACTURER                                                     | MODEL NO.                   | SERIAL NO. | CALIBRATED DATE | CALIBRATED UNTIL |
|--------------------------------------------------------------------------------|-----------------------------|------------|-----------------|------------------|
| Test Receiver<br>ROHDE & SCHWARZ                                               | ESCS 30                     | 100375     | Apr. 29, 2014   | Apr. 28, 2015    |
| Line-Impedance<br>Stabilization Network<br>(for EUT)<br>SCHWARZBECK            | NSLK-8127                   | 8127-522   | Sep. 15, 2014   | Sep. 14, 2015    |
| Line-Impedance<br>Stabilization Network<br>(for Peripheral)<br>ROHDE & SCHWARZ | ENV216                      | 100071     | Nov. 10, 2014   | Nov. 09, 2015    |
| RF Cable<br>(JYEBAO)                                                           | 5D-FB                       | COCCAB-001 | Mar. 09, 2015   | Mar. 08, 2016    |
| 50 ohms Terminator                                                             | N/A                         | EMC-03     | Sep. 22, 2014   | Sep. 21, 2015    |
| 50 ohms Terminator                                                             | N/A                         | EMC-02     | Sep. 30, 2014   | Sep. 29, 2015    |
| 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: Mar. 31, 2015

#### 4.2.3 Test Procedures

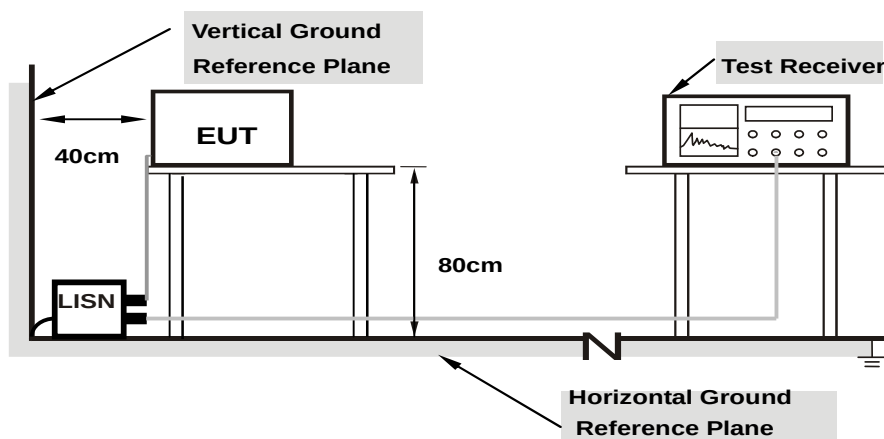
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



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

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

#### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

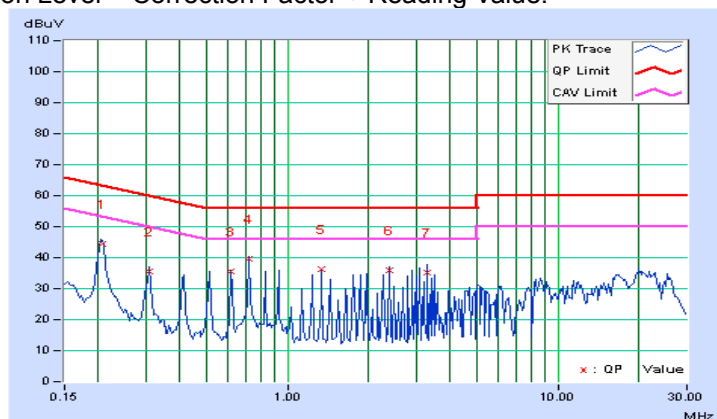
#### 4.2.7 Test Results

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

| No | Freq.<br>[MHz] | Corr.<br>Factor | Reading Value<br>[dB (uV)] |              | Emission Level<br>[dB (uV)] |              | Limit<br>[dB (uV)] |              | Margin<br>(dB) |              |
|----|----------------|-----------------|----------------------------|--------------|-----------------------------|--------------|--------------------|--------------|----------------|--------------|
|    |                | (dB)            | Q.P.                       | AV.          | Q.P.                        | AV.          | Q.P.               | AV.          | Q.P.           | AV.          |
|    |                |                 |                            |              |                             |              |                    |              |                |              |
| 1  | 0.20606        | 0.09            | 44.46                      | 38.76        | 44.55                       | 38.85        | 63.36              | 53.36        | -18.81         | -14.51       |
| 2  | 0.31016        | 0.10            | 35.36                      | 30.68        | 35.46                       | 30.78        | 59.97              | 49.97        | -24.51         | -19.19       |
| 3  | 0.61875        | 0.11            | 35.32                      | 33.96        | 35.43                       | 34.07        | 56.00              | 46.00        | -20.57         | -11.93       |
| 4  | <b>0.72031</b> | <b>0.12</b>     | <b>39.42</b>               | <b>38.60</b> | <b>39.54</b>                | <b>38.72</b> | <b>56.00</b>       | <b>46.00</b> | <b>-16.46</b>  | <b>-7.28</b> |
| 5  | 1.33831        | 0.14            | 36.28                      | 34.84        | 36.42                       | 34.98        | 56.00              | 46.00        | -19.58         | -11.02       |
| 6  | 2.36972        | 0.18            | 35.84                      | 31.70        | 36.02                       | 31.88        | 56.00              | 46.00        | -19.98         | -14.12       |
| 7  | 3.29688        | 0.20            | 34.92                      | 28.38        | 35.12                       | 28.58        | 56.00              | 46.00        | -20.88         | -17.42       |

#### REMARKS:

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

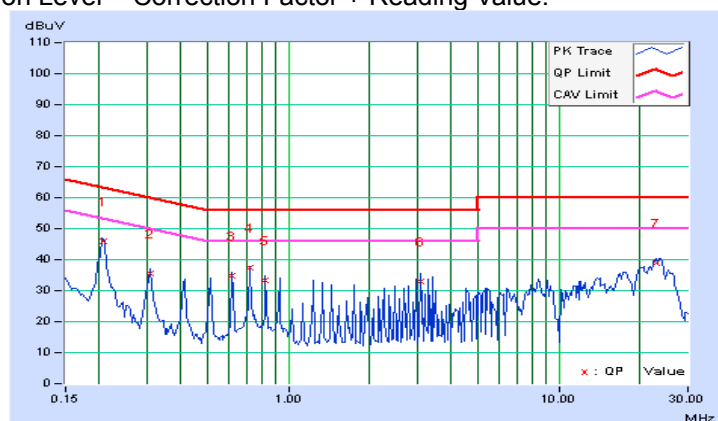


|       |             |                   |                                |
|-------|-------------|-------------------|--------------------------------|
| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|-------|-------------|-------------------|--------------------------------|

| No | Freq.<br>[MHz] | Corr.  | Reading Value |       | Emission Level |       | Limit     |       | Margin |        |
|----|----------------|--------|---------------|-------|----------------|-------|-----------|-------|--------|--------|
|    |                | Factor | [dB (uV)]     |       | [dB (uV)]      |       | [dB (uV)] |       | (dB)   |        |
|    |                | (dB)   | Q.P.          | AV.   | Q.P.           | AV.   | Q.P.      | AV.   | Q.P.   | AV.    |
| 1  | 0.20669        | 0.08   | 45.76         | 39.06 | 45.84          | 39.14 | 63.34     | 53.34 | -17.50 | -14.20 |
| 2  | 0.30912        | 0.09   | 35.40         | 30.00 | 35.49          | 30.09 | 59.99     | 49.99 | -24.50 | -19.90 |
| 3  | 0.61875        | 0.11   | 34.84         | 33.64 | 34.95          | 33.75 | 56.00     | 46.00 | -21.05 | -12.25 |
| 4  | 0.72031        | 0.12   | 37.46         | 36.40 | 37.58          | 36.52 | 56.00     | 46.00 | -18.42 | -9.48  |
| 5  | 0.82375        | 0.12   | 33.28         | 31.72 | 33.40          | 31.84 | 56.00     | 46.00 | -22.60 | -14.16 |
| 6  | 3.08984        | 0.20   | 32.92         | 22.70 | 33.12          | 22.90 | 56.00     | 46.00 | -22.88 | -23.10 |
| 7  | 22.85156       | 0.81   | 38.26         | 33.26 | 39.07          | 34.07 | 60.00     | 50.00 | -20.93 | -15.93 |

#### 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.

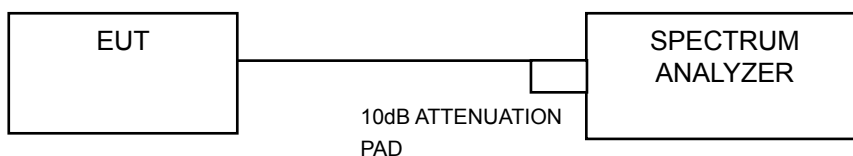


### 4.3 6dB Bandwidth Measurement

#### 4.3.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 4.3.2 Test Setup



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

- Set resolution bandwidth (RBW) = 100kHz
- Set the video bandwidth (VBW)  $\geq 3 \times$  RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

#### 4.3.5 Deviation fromTest Standard

No deviation.

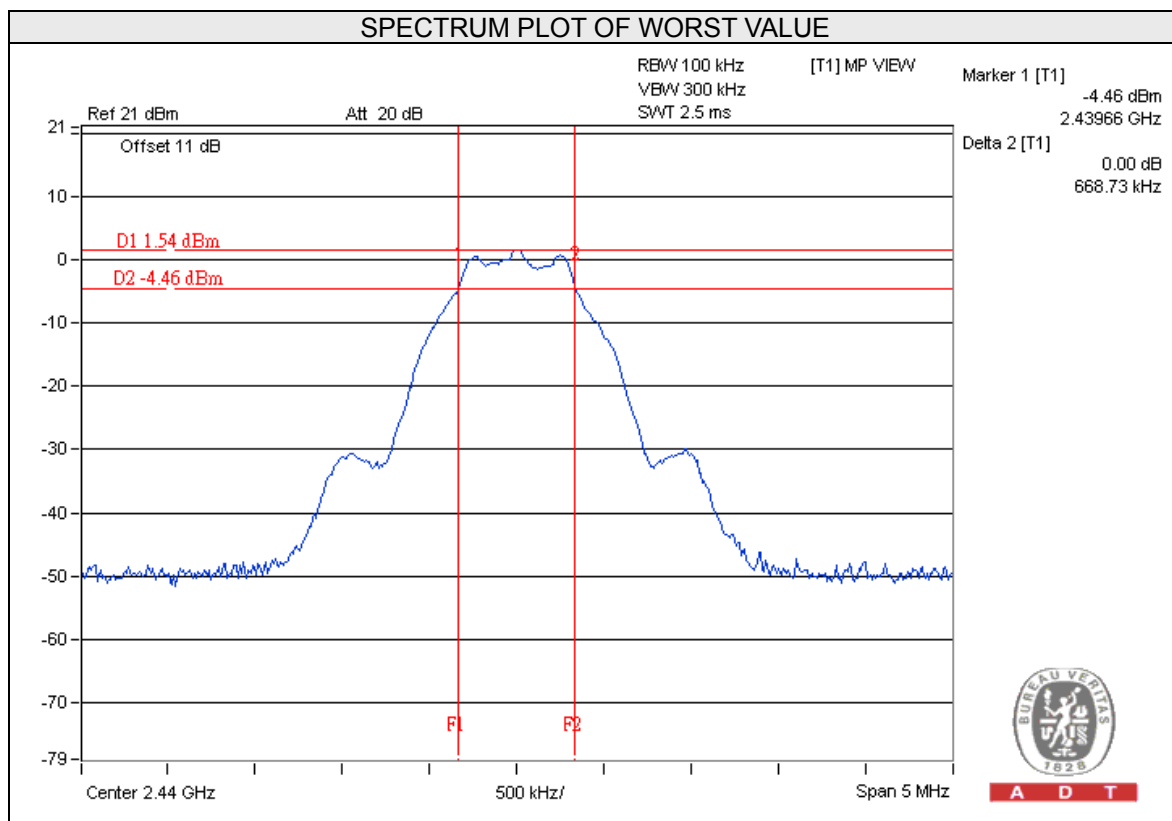
#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.



#### 4.3.7 Test Result

| CHANNEL | FREQUENCY (MHz) | 6dB BANDWIDTH (MHz) | MINIMUM LIMIT (MHz) | PASS / FAIL |
|---------|-----------------|---------------------|---------------------|-------------|
| 0       | 2402            | 0.68                | 0.5                 | PASS        |
| 19      | 2440            | 0.67                | 0.5                 | PASS        |
| 39      | 2480            | 0.67                | 0.5                 | PASS        |

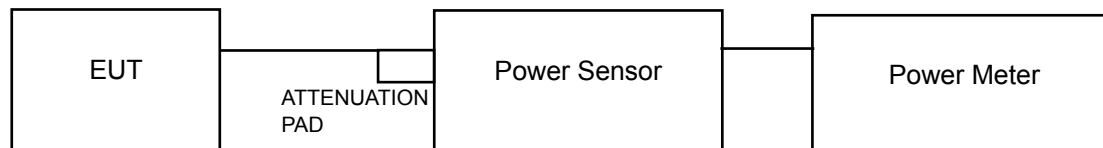


#### 4.4 Conducted Output Power Measurement

##### 4.4.1 Limits of Conducted Output Power Measurement

For systems using digital modulation in the 2400–2483.5 MHz bands: 1 Watt (30dBm)

##### 4.4.2 Test Setup



##### 4.4.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

##### 4.4.4 Test Procedures

A peak / average power sensor was used on the output port of the EUT. A power meter was used to read the response of the peak / average power sensor. Record the power level.

##### 4.4.5 Deviation from Test Standard

No deviation.

##### 4.4.6 EUT Operating Conditions

Same as Item 4.3.6.

#### 4.4.7 Test Results

##### FOR PEAK POWER

| CHANNEL | FREQUENCY (MHz) | PEAK POWER (mW) | PEAK POWER (dBm) | LIMIT (dBm) | PASS/FAIL |
|---------|-----------------|-----------------|------------------|-------------|-----------|
| 0       | 2402            | 2.158           | 3.34             | 30          | PASS      |
| 19      | 2440            | 2.084           | 3.19             | 30          | PASS      |
| 39      | 2480            | 2.094           | 3.21             | 30          | PASS      |

##### FOR AVERAGE POWER

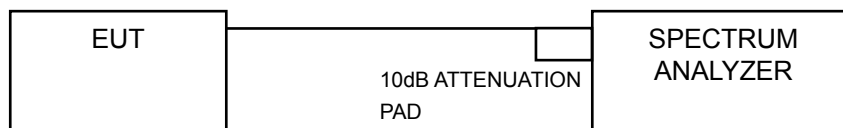
| CHANNEL | FREQUENCY (MHz) | AVERAGE POWER (mW) | AVERAGE POWER (dBm) |
|---------|-----------------|--------------------|---------------------|
| 0       | 2402            | 1.799              | 2.55                |
| 19      | 2440            | 1.766              | 2.47                |
| 39      | 2480            | 1.778              | 2.50                |

## 4.5 Power Spectral Density Measurement

### 4.5.1 Limits of Power Spectral Density Measurement

The Maximum of Power Spectral Density Measurement is 8dBm.

### 4.5.2 Test Setup



### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedure

- Set analyzer center frequency to DTS channel center frequency.
- Set the span to 1.5 times the DTS bandwidth.
- Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
- Set the VBW  $\geq 3 \times \text{RBW}$ .
- Detector = peak.
- Sweep time = auto couple.
- Trace mode = max hold.
- Allow trace to fully stabilize.
- Use the peak marker function to determine the maximum amplitude level within the RBW.

### 4.5.5 Deviation from Test Standard

No deviation.

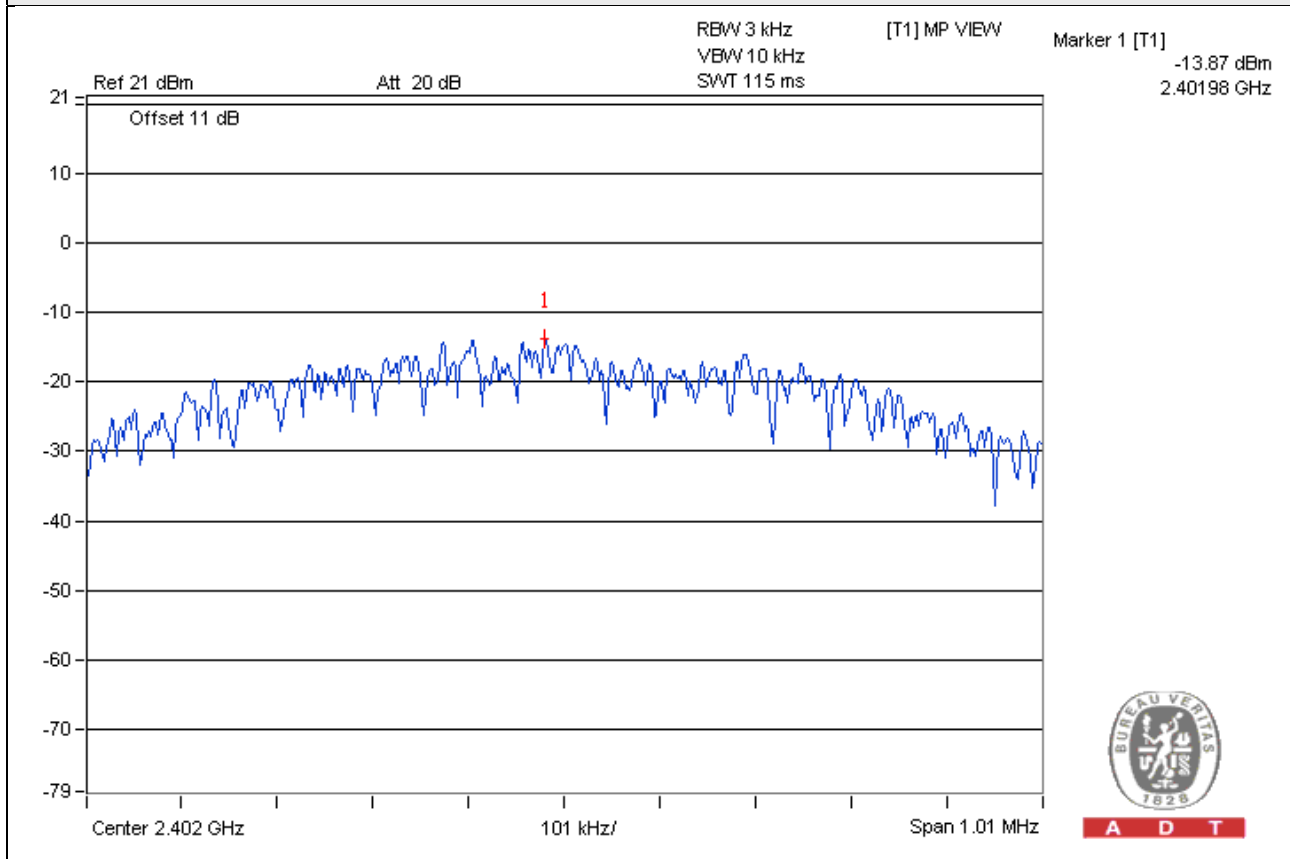
### 4.5.6 EUT Operating Condition

Same as Item 4.3.6

#### 4.5.7 Test Results

| Channel | Freq. (MHz) | PSD (dBm/3kHz) | Limit (dBm/3kHz) | PASS /FAIL |
|---------|-------------|----------------|------------------|------------|
| 0       | 2402        | -13.87         | 8                | PASS       |
| 19      | 2440        | -13.99         | 8                | PASS       |
| 39      | 2480        | -13.94         | 8                | PASS       |

#### SPECTRUM PLOT OF WORST VALUE

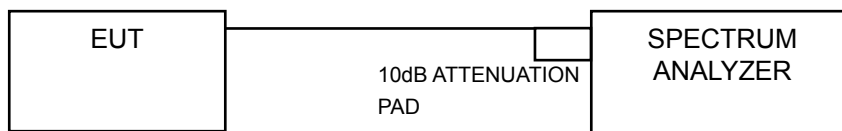


## 4.6 Conducted Out of Band Emission Measurement

### 4.6.1 Limits of Conducted Out of Band Emission Measurement

Below  $-20\text{dB}$  of the highest emission level of operating band (in 100kHz Resolution Bandwidth).

### 4.6.2 Test Setup



### 4.6.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.6.4 Test Procedure

#### MEASUREMENT PROCEDURE REF

1. Set the RBW = 100 kHz.
2. Set the VBW  $\geq 300$  kHz.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW.

#### MEASUREMENT PROCEDURE OOB

1. Set RBW = 100 kHz.
2. Set VBW  $\geq 300$  kHz.
3. Detector = peak.
4. Sweep = auto couple.
5. Trace Mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

### 4.6.5 Deviation from Test Standard

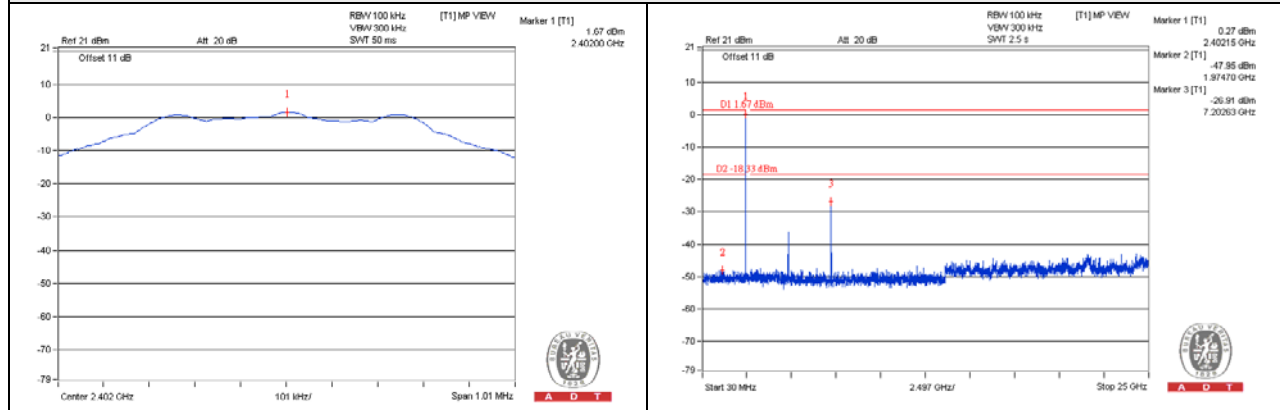
No deviation.

### 4.6.6 EUT Operating Condition

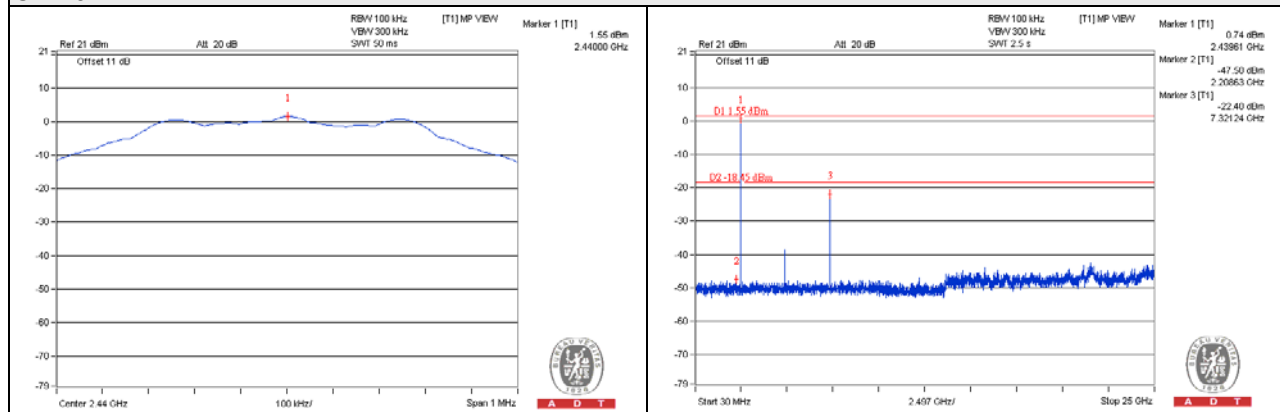
Same as Item 4.3.6

## 4.6.7 Test Results

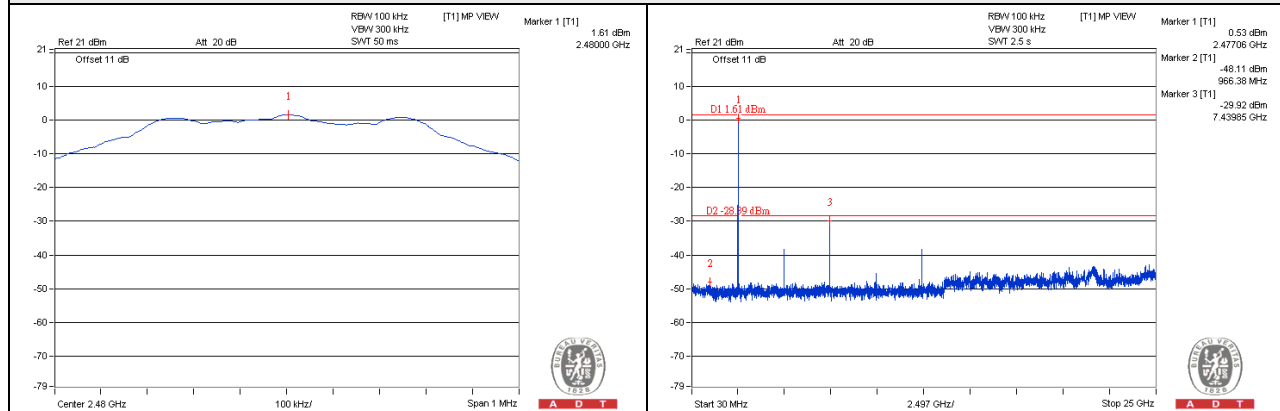
### CH 0



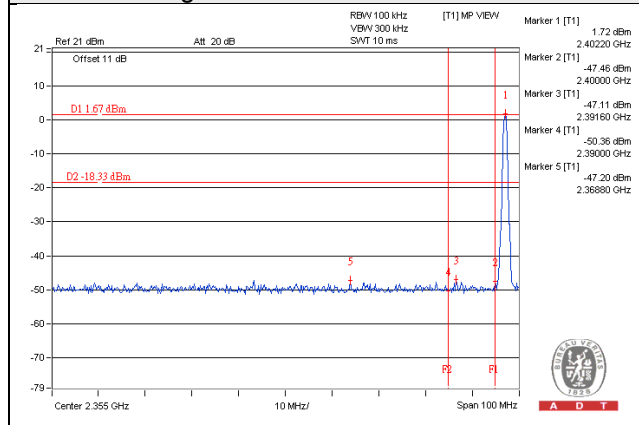
### CH 19



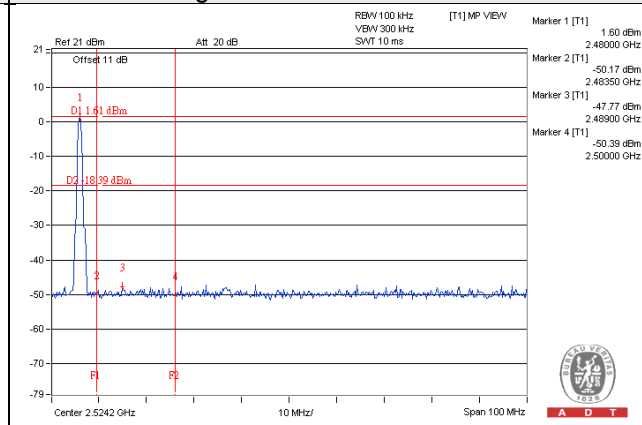
### CH 39



### CH 0 Band edge



### CH 39 Band edge



## 5 Pictures of Test Arrangements

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



## Appendix – Information on the Testing Laboratories

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

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

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