### FCC Radio Test Report

### FCC ID: 2ABZMW75AP

This report concerns (check one): Original Grant Class II Change

| Project No. | : 1405C054   |
|-------------|--|
| Equipment   | : Wireless N900 High Power Dual Band Access Point    |
| Model Name  |  |
| Applicant   | : SHENZHEN IP-COM NETWORKS CO., LTD.                 |
| Address     | : Room 101, Unit A, First Floor, Tower E3, No. 1001, |
|             | Zhongshanyuan Road, Nanshan District,                |
|             | Shenzhen, China. 518052                              |

Tested by: Neutron Engineering Inc. EMC Laboratory Date of Receipt: May. 08, 2014 Date of Test: May. 08, 2014 ~ May. 19, 2014 Issued Date: May. 20, 2014

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#### Declaration

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| - Neutron Engineering Inc.                          |          |
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#### **REPORT ISSUED HISTORY**

| Issued No.          | Description     | Issued Date   |
|---------------------|-----------------|---------------|
| NEI-FCCP-1-1405C054 | Original Issue. | May. 20, 2014 |



#### **1. CERTIFICATION**

| Equipment :<br>Brand Name :<br>Model Name : |  |
|---|--|
| Applicant :                                 | SHENZHEN IP-COM NETWORKS CO., LTD.   |
| Manufacturer :                              | SHENZHEN IP-COM NETWORKS CO., LTD.   |
| Address :                                   | Room 101, Unit A, First Floor, Tower E3, No. 1001, Zhongshanyuan Road, Nanshan District, Shenzhen, China. 518052 |
| Date of Test :                              | May. 08, 2014 ~ May. 19, 2014  |
| Test Item :                                 | ENGINEERING SAMPLE   |
| Standard(s) :                               | FCC Part15, Subpart C(15.247) / ANSI C63.4-2009  |

The above equipment has been tested and found compliance with the requirement of the relative standards by Neutron Engineering Inc. EMC Laboratory.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. NEI-FCCP-1-1405C054) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-17025 quality assessment standard and technical standard(s).

#### 2. SUMMARY OF TEST RESULTS

#### Test procedures according to the technical standard(s):

#### Applied Standard(s): FCC Part15 (15.247) , Subpart C

| Standard(s) Section<br>FCC | Test Item                              | Judgment | Remark |
|----------------------------|--|----------|--------|
| 15.207                     | Conducted Emission                     | PASS     |        |
| 15.247(d)                  | Antenna conducted Spurious<br>Emission | PASS     |        |
| 15.247(a)(2)               | 6dB Bandwidth                          | PASS     |        |
| 15.247(b)(3)               | Peak Output Power                      | PASS     |        |
| 15.247(e)                  | Power Spectral Density                 | PASS     |        |
| 15.203                     | Antenna Requirement                    | PASS     |        |
| 15.209/15.205              | Transmitter Radiated Emissions         | PASS     |        |

#### NOTE:

(1)" N/A" denotes test is not applicable in this test report.

(2) The test follows FCC KDB Publication No. 558074 D01 DTS Meas Guidance v03r01 (Measurement Guidelines of DTS)



#### 2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **DG-C02/DG-CB03** at the location of No.3, Jinshagang 1st Road, ShiXia, Dalang Town, Dong Guan, China.523792 Neutron's test firm number for FCC: 319330

#### 2.2 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:

The reported uncertainty of measurement y  $\pm$  U, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of  $\,$  k=2 , providing a level of confidence of approximately 95 %  $^\circ$ 

#### A. Conducted Measurement :

| Test Site | Method | Measurement Frequency Range | U , (dB) | NOTE |
|-----------|--------|-----------------------------|----------|------|
| DG-C02    | CISPR  | 150 KHz ~ 30MHz             | 1.94     |      |

#### B. Radiated Measurement :

| Test Site | Method | Measurement Frequency<br>Range | Ant.<br>H / V | U,(dB) | NOTE |
|-----------|--------|--------------------------------|---------------|--------|------|
|           |        | 9KHz~30MHz                     | V             | 3.79   |      |
|           |        | 9KHz~30MHz                     | Н             | 3.57   |      |
|           |        | 30MHz ~ 200MHz                 | V             | 3.82   |      |
|           |        | 30MHz ~ 200MHz                 | Н             | 3.60   |      |
| DG-CB03   | CISPR  | 200MHz ~ 1,000MHz              | V             | 3.86   |      |
| DG-CB03   | CIOFK  | 200MHz ~ 1,000MHz              | Н             | 3.94   |      |
|           |        | 1GHz~18GHz                     | V             | 3.12   |      |
|           |        | 1GHz~18GHz                     | Н             | 3.68   |      |
|           |        | 18GHz~40GHz                    | V             | 4.15   |      |
|           |        | 18GHz~40GHz                    | Н             | 4.14   |      |

#### **3. GENERAL INFORMATION**

#### 3.1 GENERAL DESCRIPTION OF EUT

| Equipment              | Wireless N900 High Power Dual Band Access Point  |  |  |  |  |
|------------------------|--|--|--|--|--|
| Brand Name             | IP-COM   | IP-COM   |  |  |  |
| Model Name             | W75AP  |  |  |  |  |
| Model Difference       | N/A  |  |  |  |  |
|                        | Operation Frequency  | 2412~2462 MHz                                  |  |  |  |
| Product Description    | Modulation Technology  | 802.11b: DSSS<br>802.11g:OFDM<br>802.11n: OFDM |  |  |  |
|                        | Bit Rate of Transmitter<br>Bit Rate of Transmitter<br>802.11b: 11/5.5/2/1 Mbps<br>802.11g:<br>54/48/36/24/18/12/9/6 Mbps<br>802.11n up to 450 Mbps |  |  |  |  |
|                        | Output Power (Max.)<br>802.11b: 24.05dBm<br>802.11g: 24.06dBm<br>802.11n(20MHz):27.02dBm<br>802.11n(40MHz): 27.03dBm                               |  |  |  |  |
| Power Source           | PoE Power Supply<br>Manufacturer:GOSPELL DIGITAL TECHNOLOGY CO.,LTD<br>Model: GP306A-510-125   |  |  |  |  |
| Power Rating           | I/P: AC 100-240V~1.5A MAX 50/60Hz<br>O/P: DC 51V/1.25A   |  |  |  |  |
| Connecting I/O Port(s) | Please refer to the User's Manual  |  |  |  |  |

#### Note:

1. For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

#### 2. Channel List:

|   | CH 01 – CH 11 for 802.11b, 802.11g, 802.11n(20MHz)<br>CH 03 – CH 09 for 802.11n(40MHz)  |      |    |      |    |      |    |      |
|---|---|------|----|------|----|------|----|------|
|   | Channel Frequency (MHz) Channel Frequency (MHz) Channel Frequency (MHz) Channel (MHz) Channel (MHz) Frequency (MHz) Channel (MHz) |      |    |      |    |      |    |      |
| ľ | 01  | 2412 | 04 | 2427 | 07 | 2442 | 10 | 2457 |
|   | 02  | 2417 | 05 | 2432 | 08 | 2447 | 11 | 2462 |
|   | 03  | 2422 | 06 | 2437 | 09 | 2452 |    |      |

3. Table for Filed Antenna

| Ant. | Manufacturer               | Model Name | Antenna Type | Connector | Gain<br>(dBi) |
|------|----------------------------|------------|--------------|-----------|---------------|
| 0    | <b>Tend</b> a <sup>®</sup> | Q5078      | Internal     | N/A       | 5             |
| 1    | Tenda                      | Q5078      | Internal     | N/A       | 5             |
| 2    | Tenda                      | Q5078      | Internal     | N/A       | 5             |

The EUT incorporates a MIMO function. Physically, the EUT provides three completed three transmitters and three receivers (3T3R), all transmit signals are completely uncorrelated, then, **Direction gain = G**<sub>ANT</sub>, that is Directional gain=5

<sup>4.</sup> 

| Operating Mode<br>TX Mode | 1TX                            | ЗТХ                          |
|---------------------------|--------------------------------|------------------------------|
| 802.11b                   | V (ANT 0 or ANT 1 or<br>ANT 2) | -                            |
| 802.11g                   | V (ANT 0 or ANT 1 or<br>ANT 2) | -                            |
| 802.11n(20MHz)            | -                              | V (ANT 0 + ANT 1 +<br>ANT 2) |
| 802.11n(40MHz)            | -                              | V (ANT 0 + ANT 1 +<br>ANT 2) |

#### **3.2 DESCRIPTION OF TEST MODES**

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

| Pretest Mode | Description                      |
|--------------|----------------------------------|
| Mode 1       | TX B MODE CHANNEL 01/06/11       |
| Mode 2       | TX G MODE CHANNEL 01/06/11       |
| Mode 3       | TX N-20MHZ MODE CHANNEL 01/06/11 |
| Mode 4       | TX N-40MHZ MODE CHANNEL 03/06/09 |
| Mode 5       | TX MODE                          |

The EUT system operated these modes were found to be the worst case during the pre-scanning test as following:

| For Conducted Test          |         |  |
|-----------------------------|---------|--|
| Final Test Mode Description |         |  |
| Mode 5                      | TX MODE |  |

| For Radiated Test           |                                  |  |
|-----------------------------|----------------------------------|--|
| Final Test Mode Description |                                  |  |
| Mode 1                      | TX B MODE CHANNEL 01/06/11       |  |
| Mode 2                      | TX G MODE CHANNEL 01/06/11       |  |
| Mode 3                      | TX N-20MHZ MODE CHANNEL 01/06/11 |  |
| Mode 4                      | TX N-40MHZ MODE CHANNEL 03/06/09 |  |

Note:

(1) The measurements are performed at the high, middle, low available channels.

(2) 802.11b mode: DBPSK (1Mbps)
802.11g mode: OFDM (6Mbps)
802.11n HT20 mode : BPSK (19.5Mbps)
802.11n HT40 mode : BPSK (40.5Mbps)
For radiated emission tests, the highest output powers were set for final test.

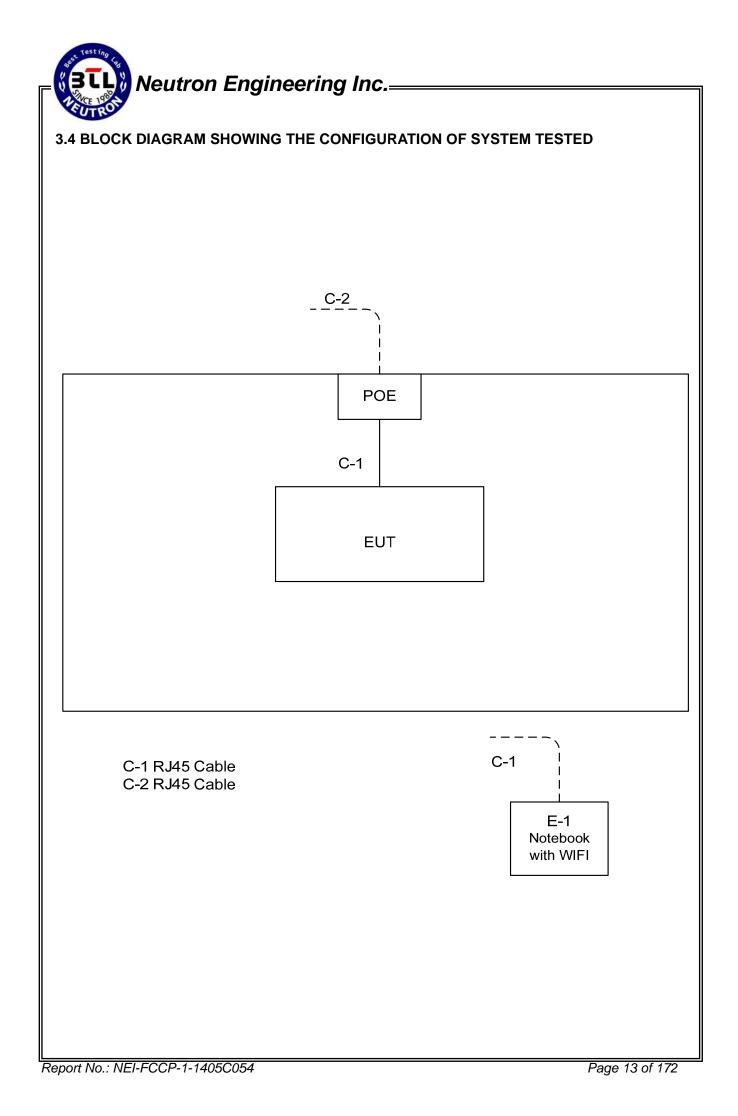
(3) For radiated below 1G test, the 802.11b is found to be the worst case and recorded.



#### 3.3 TABLE OF PARAMETERS OF TEXT SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters of WLAN

| Test software version | Duck_1_1-9 |          |          |
|-----------------------|------------|----------|----------|
| Frequency             | 2412 MHz   | 2437 MHz | 2462 MHz |
| IEEE 802.11b DSSS     | 57         | 57       | 57       |
| IEEE 802.11g OFDM     | 61         | 61       | 61       |
| IEEE 802.11n (20MHz)  | 61         | 61       | 61       |
| Frequency             | 2422 MHz   | 2437 MHz | 2452 MHz |
| IEEE 802.11n (40MHz)  | 60         | 60       | 61       |



#### **3.5 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.

| Item | Equipment | Mfr/Brand | Model/Type No. | FCC ID/IC | Series No. | Note |
|------|-----------|-----------|----------------|-----------|------------|------|
| E-1  | Notebook  | DELL      | D600           | DOC       | 7T390 A03  |      |

| Item | Shielded Type | Ferrite Core | Length | Note |
|------|---------------|--------------|--------|------|
| C-1  | NO            | NO           | 3m     |      |
| C-2  | NO            | NO           | 10m    |      |

#### 4. EMC EMISSION TEST

#### 4.1 CONDUCTED EMISSION MEASUREMENT

#### 4.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

| Frequency (MHz) | Class A    | Class A (dBuV) |            | Class B (dBuV) |          |
|-----------------|------------|----------------|------------|----------------|----------|
|                 | Quasi-peak | Average        | Quasi-peak | Average        | Standard |
| 0.15 -0.5       | 79.00      | 66.00          | 66 - 56 *  | 56 - 46 *      | CISPR    |
| 0.50 -5.0       | 73.00      | 60.00          | 56.00      | 46.00          | CISPR    |
| 5.0 -30.0       | 73.00      | 60.00          | 60.00      | 50.00          | CISPR    |
|                 |            |                |            |                |          |
| 0.15 -0.5       | 79.00      | 66.00          | 66 - 56 *  | 56 - 46 *      | FCC      |
| 0.50 -5.0       | 73.00      | 60.00          | 56.00      | 46.00          | FCC      |
| 5.0 -30.0       | 73.00      | 60.00          | 60.00      | 50.00          | FCC      |

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

#### The following table is the setting of the receiver

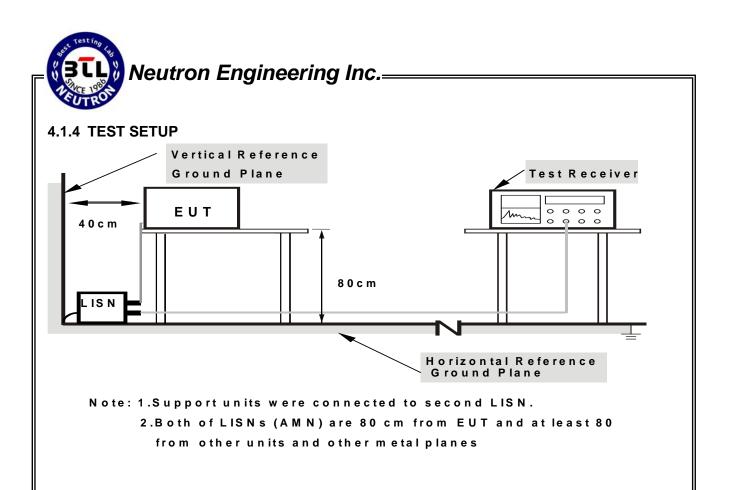
| Receiver Parameters | Setting  |
|---------------------|----------|
| Attenuation         | 10 dB    |
| Start Frequency     | 0.15 MHz |
| Stop Frequency      | 30 MHz   |
| IF Bandwidth        | 9 KHz    |

#### 4.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

#### 4.1.3 DEVIATION FROM TEST STANDARD

No deviation



#### 4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

#### 4.1.6 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

#### 4.1.7 TEST RESULTS

Please refer to the Attachment A.

#### 4.2 RADIATED EMISSION MEASUREMENT

#### 4.2.1 RADIATED EMISSION LIMITS

20dB in any 100 KHz bandwidth outside the operating frequency band. In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

LIMITS OF RADIATED EMISSION MEASUREMENT (9KHz-1000MHz)

| Frequency   | Field Strength     | Measurement Distance |
|-------------|--------------------|----------------------|
| (MHz)       | (microvolts/meter) | (meters)             |
| 0.009~0.490 | 2400/F(KHz)        | 300                  |
| 0.490~1.705 | 24000/F(KHz)       | 30                   |
| 1.705~30.0  | 30                 | 30                   |
| 30~88       | 100                | 3                    |
| 88~216      | 150                | 3                    |
| 216~960     | 200                | 3                    |
| 960~1000    | 500                | 3                    |

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

|                 | (dBuV/m) (at 3 meters) |         |  |
|-----------------|------------------------|---------|--|
| Frequency (MHz) | PEAK                   | AVERAGE |  |
| Above 1000      | 74                     | 54      |  |

Notes:

(1) The limit for radiated test was performed according to FCC PART 15C.

(2) The tighter limit applies at the band edges.

(3) Emission level (dBuV/m)=20log Emission level (uV/m).

| Spectrum Parameter            | Setting  |  |
|-------------------------------|--|--|
| Attenuation                   | Auto   |  |
| Start Frequency               | 1000 MHz                                       |  |
| Stop Frequency                | 10th carrier harmonic                          |  |
| RBW / VBW                     | 1MHz / 1MHz for Peak, 1 MHz / 10Hz for Average |  |
| (Emission in restricted band) |  |  |

| Receiver Parameter     | Setting                           |
|------------------------|-----------------------------------|
| Attenuation            | Auto                              |
| Start ~ Stop Frequency | 9KHz~90KHz for PK/AVG detector    |
| Start ~ Stop Frequency | 90KHz~110KHz for QP detector      |
| Start ~ Stop Frequency | 110KHz~490KHz for PK/AVG detector |
| Start ~ Stop Frequency | 490KHz~30MHz for QP detector      |
| Start ~ Stop Frequency | 30MHz~1000MHz for QP detector     |
|                        |                                   |

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#### 4.2.2 TEST PROCEDURE

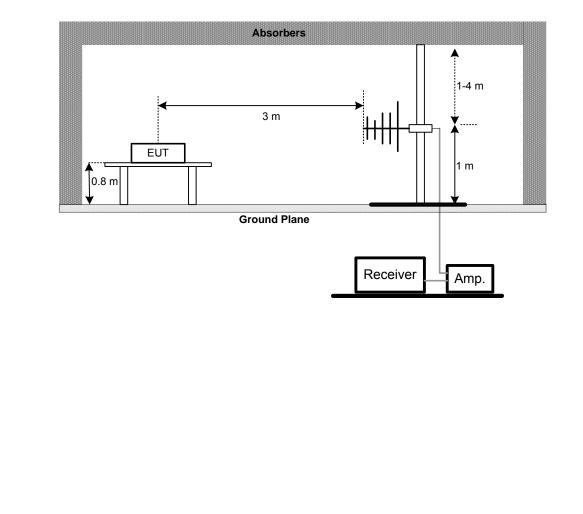
- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(below 1GHz)
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.(above 1GHz)
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item -EUT Test Photos.

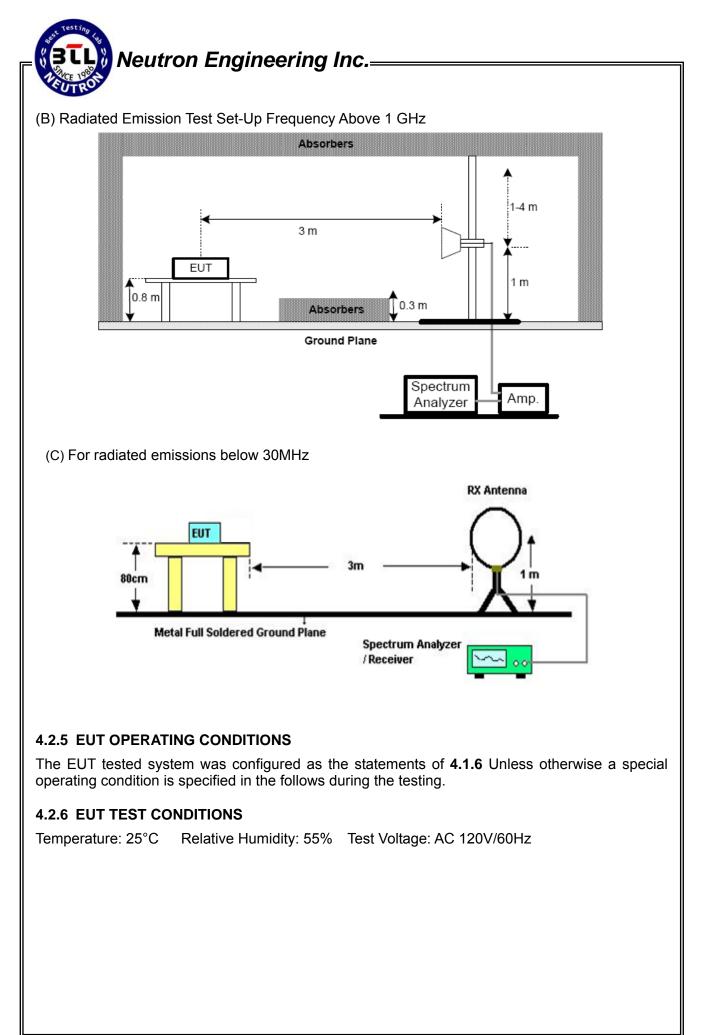
#### 4.2.3 DEVIATION FROM TEST STANDARD

#### No deviation

#### 4.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz







#### 4.2.7 TEST RESULTS (9KHZ TO 30MHZ)

Please refer to the Attachment B

Remark:

- (1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.
- (2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB).
- (3) Limit line = specific limits (dBuV) + distance extrapolation factor.

#### 4.2.8 TEST RESULTS (BETWEEN 30MHZ TO 1000 MHZ)

Please refer to the Attachment C.

#### 4.2.9 TEST RESULTS (ABOVE 1000 MHZ)

Please refer to the Attachment D.

#### 5. BANDWIDTH TEST

#### 5.1 Applied procedures

| FCC Part15 (15.247) , Subpart C |           |                          |        |  |
|---------------------------------|-----------|--------------------------|--------|--|
| Section                         | Test Item | Frequency Range<br>(MHz) | Result |  |
| 15.247(a)(2)                    | Bandwidth | 2400-2483.5              | PASS   |  |

#### 5.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = 2.5 ms.

#### 5.1.2 DEVIATION FROM STANDARD

No deviation.

#### 5.1.3 TEST SETUP

| EUT | SPECTRUM |
|-----|----------|
|     | ANALYZER |

#### 5.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 5.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

#### 5.1.6 TEST RESULTS

Please refer to the Attachment E.

#### 6. MAXIMUM OUTPUT POWER TEST

#### 6.1 Applied procedures / limit

| FCC Part15 (15.247) , Subpart C |                         |                 |                          |        |  |
|---------------------------------|-------------------------|-----------------|--------------------------|--------|--|
| Section Test Item               |                         | Limit           | Frequency Range<br>(MHz) | Result |  |
| 15.247(b)(3)                    | Maximum Output<br>Power | 1 Watt or 30dBm | 2400-2483.5              | PASS   |  |

#### 6.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. The maximum peak conducted output power was performed in accordance with method 9.1.3 of FCC KDB 558074 D01 DTS Meas Guidance v03r01.

#### 6.1.2 DEVIATION FROM STANDARD

No deviation.

#### 6.1.3 TEST SETUP



#### 6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

Transmit output power was measured while the host equipment supply voltage was varied from 85 % to 115 % of the nominal rated supply voltage. No change in transmit output power was observed.

#### 6.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

#### 6.1.6 TEST RESULTS

Please refer to the Attachment F.



#### 7. ANTENNA CONDUCTED SPURIOUS EMISSION

#### 7.1 Applied procedures / limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 7.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW= 100KHz, VBW=300KHz, Sweep time = Auto.

#### 7.1.2 DEVIATION FROM STANDARD

No deviation.

#### 7.1.3 TEST SETUP



#### 7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 7.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

#### 7.1.6 TEST RESULTS

Please refer to the Attachment G.

#### 8. POWER SPECTRAL DENSITY TEST

#### 8.1 Applied procedures / limit

|           | FCC Part15 (15.247) , Subpart C |                        |                          |        |  |  |
|-----------|---------------------------------|------------------------|--------------------------|--------|--|--|
| Section   | Test Item                       | Limit                  | Frequency Range<br>(MHz) | Result |  |  |
| 15.247(e) | Power Spectral Density          | 8 dBm<br>(in any 3KHz) | 2400-2483.5              | PASS   |  |  |

#### 8.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,
- b. Spectrum Setting: RBW=3KHz, VBW=10KHz, Sweep time = Auto.

#### 8.1.2 DEVIATION FROM STANDARD

No deviation.

#### 8.1.3 TEST SETUP

| EUT | SPECTRUM |
|-----|----------|
|     | ANALYZER |

#### 8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 4.1.6 Unless otherwise a special operating condition is specified in the follows during the testing.

#### 8.1.5 EUT TEST CONDITIONS

Temperature: 25°C Relative Humidity: 55% Test Voltage: AC 120V/60Hz

#### 8.1.6 TEST RESULTS

Please refer to the Attachment H.

#### 9. MEASUREMENT INSTRUMENTS LIST

|      | Conducted Emission Measurement |              |          |            |                  |  |  |  |
|------|--------------------------------|--------------|----------|------------|------------------|--|--|--|
| Item | Kind of Equipment              | Manufacturer | Type No. | Serial No. | Calibrated until |  |  |  |
| 1    | LISN                           | EMCO         | 3816/2   | 00052765   | Mar. 29, 2015    |  |  |  |
| 2    | LISN                           | R&S          | ENV216   | 101447     | Mar. 29, 2015    |  |  |  |
| 3    | Test Cable                     | N/A          | C_17     | N/A        | Mar. 14, 2015    |  |  |  |
| 4    | EMI TEST<br>RECEIVER           | R&S          | ESCS30   | 833364/017 | Mar. 29, 2015    |  |  |  |
| 5    | 50Ω Terminator                 | SHX          | TF2-3G-A | 08122902   | Mar. 29, 2015    |  |  |  |

|      | Radiated Emission Measurement |              |           |            |                  |  |  |
|------|-------------------------------|--------------|-----------|------------|------------------|--|--|
| Item | Kind of Equipment             | Manufacturer | Type No.  | Serial No. | Calibrated until |  |  |
| 1    | Bone Antenna                  | Schwarbeck   | VULB9160  | 9160-3232  | Mar. 29, 2015    |  |  |
| 2    | Amplifier                     | HP           | 8447D     | 2944A09673 | Mar. 29, 2015    |  |  |
| 3    | Receiver                      | AGILENT      | N9038A    | MY52130039 | Aug. 24, 2014    |  |  |
| 4    | Test Cable                    | N/A          | C-01_CB03 | N/A        | Jul. 02, 2014    |  |  |
| 5    | Controller                    | СТ           | SC100     | N/A        | N/A              |  |  |
| 6    | Horn Antenna                  | ETS          | 3115      | 00075789   | Mar. 29, 2015    |  |  |
| 7    | Amplifier                     | Agilent      | 8449B     | 3008A02274 | Mar. 29, 2015    |  |  |
| 8    | Receiver                      | AGILENT      | N9038A    | MY52130039 | Aug. 24, 2014    |  |  |
| 9    | Test Cable                    | HUBER+SUHNER | C-48      | N/A        | Apr. 30, 2015    |  |  |
| 10   | Controller                    | СТ           | SC100     | N/A        | N/A              |  |  |
| 11   | Horn Antenna                  | EMCO         | 3115      | 9605-4803  | May.25,2015      |  |  |
| 12   | Active Loop<br>Antenna        | R&S          | HFH2-Z2   | 830749/020 | May.02,2015      |  |  |
| 13   | Broad-Band Horn<br>Antenna    | Schwarzbeck  | BBHA 9170 | 9170319    | Oct.11,2014      |  |  |



|    | 6dB Bandwidth Measurement |                   |              |          |            |                  |
|----|---------------------------|-------------------|--------------|----------|------------|------------------|
| lt | em                        | Kind of Equipment | Manufacturer | Type No. | Serial No. | Calibrated until |
|    | 1                         | Spectrum Analyzer | R&S          | FSP 40   | 100185     | Nov. 11, 2014    |

|      | Peak Output Power Measurement |              |          |            |                  |  |  |
|------|-------------------------------|--------------|----------|------------|------------------|--|--|
| ltem | Kind of Equipment             | Manufacturer | Type No. | Serial No. | Calibrated until |  |  |
| 1    | P-series Power<br>meter       | Agilent      | N1911A   | MY45100473 | Apr. 24, 2015    |  |  |
| 2    | Wireband Power sensor         | Agilent      | N1921A   | MY51100041 | Apr. 24, 2015    |  |  |

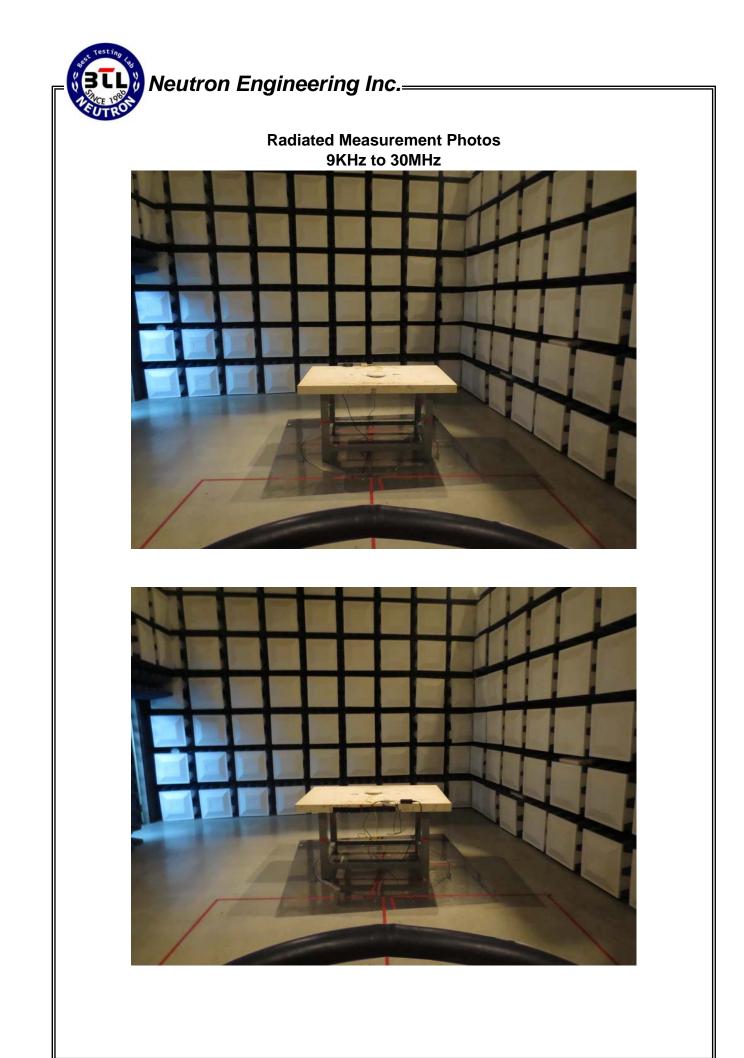
|      | Antenna Conducted Spurious Emission Measurement |              |          |            |                  |  |
|------|---|--------------|----------|------------|------------------|--|
| Item | Kind of Equipment                               | Manufacturer | Type No. | Serial No. | Calibrated until |  |
| 1    | Spectrum Analyzer                               | R&S          | FSP 40   | 100185     | Nov. 11, 2014    |  |

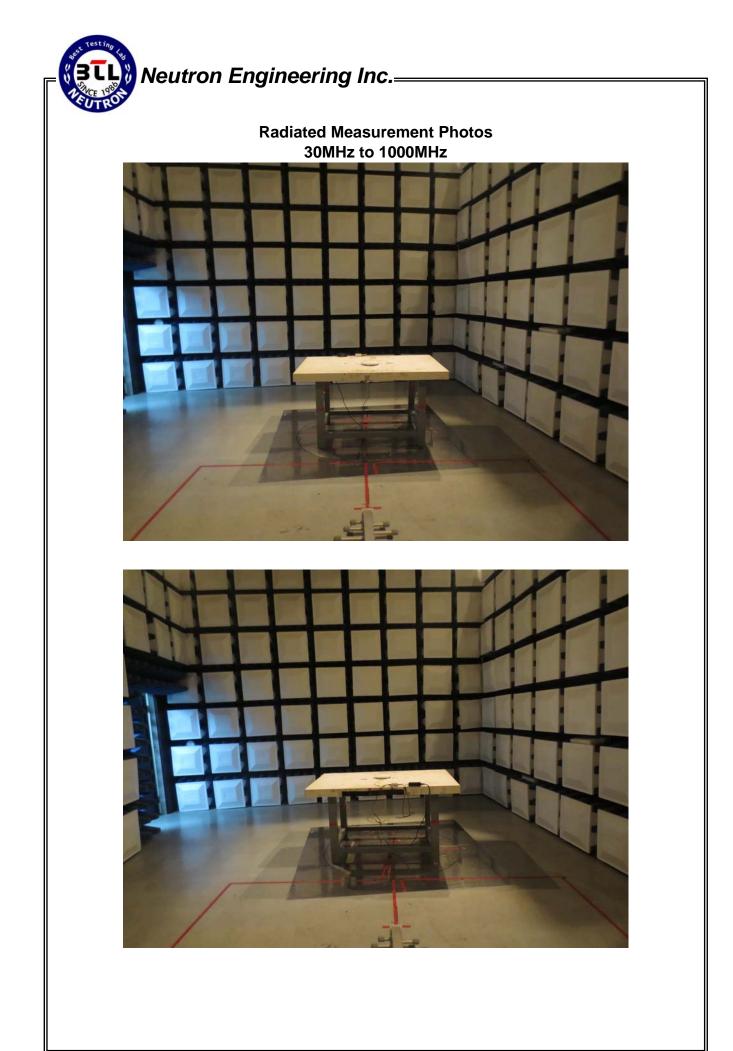
|      | Power Spectral Density Measurement |              |          |            |                  |  |
|------|------------------------------------|--------------|----------|------------|------------------|--|
| Item | Kind of Equipment                  | Manufacturer | Type No. | Serial No. | Calibrated until |  |
| 1    | Spectrum Analyzer                  | R&S          | FSP 40   | 100185     | Nov. 11, 2014    |  |

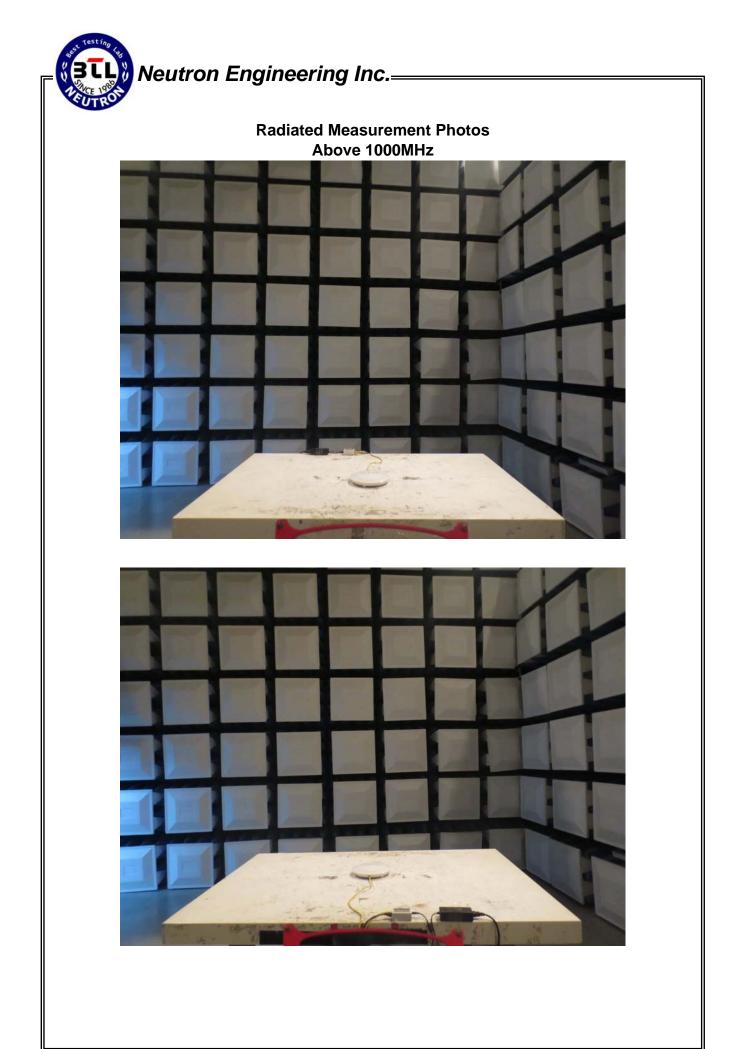
Remark: "N/A" denotes no model name, serial no. or calibration specified.

All calibration period of equipment list is one year.



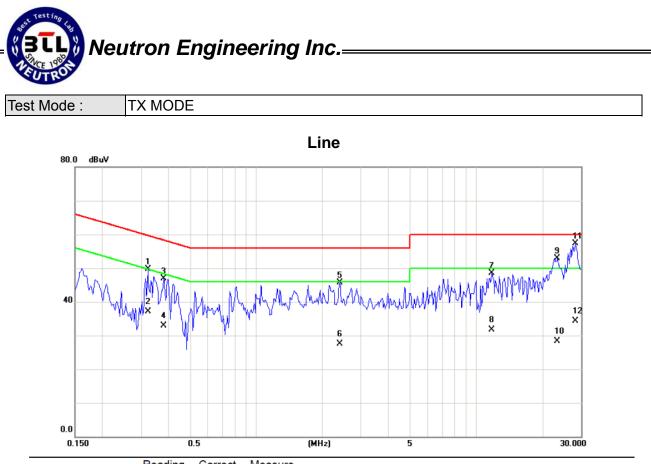






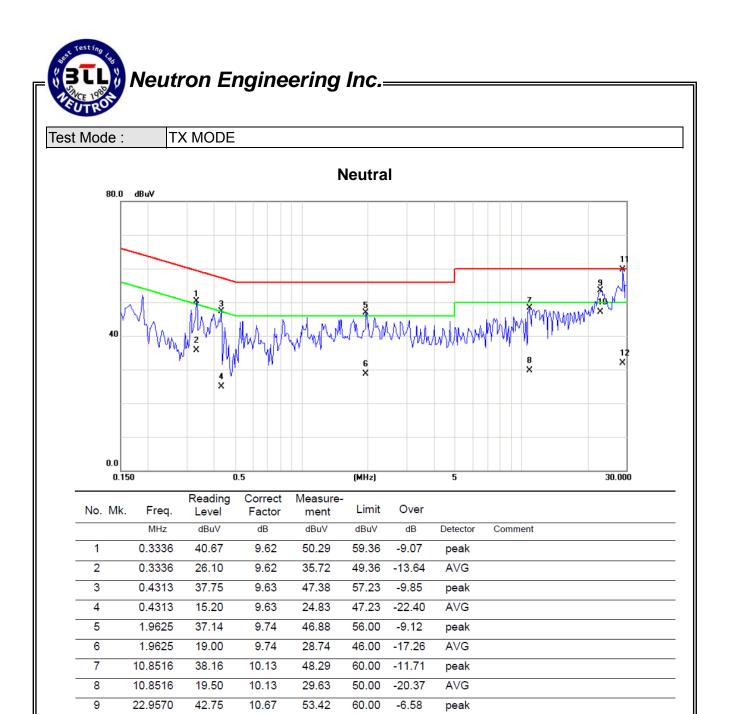


#### **ATTACHMENT A - CONDUCTED EMISSION**



| No. N | Mk. Freq. | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit | Over   |          |         |
|-------|-----------|------------------|-------------------|------------------|-------|--------|----------|---------|
|       | MHz       | dBuV             | dB                | dBuV             | dBuV  | dB     | Detector | Comment |
| 1     | 0.3220    | 40.12            | 9.60              | 49.72            | 59.66 | -9.94  | peak     |         |
| 2     | 0.3220    | 27.60            | 9.60              | 37.20            | 49.66 | -12.46 | AVG      |         |
| 3     | 0.3805    | 37.32            | 9.64              | 46.96            | 58.27 | -11.31 | peak     |         |
| 4     | 0.3805    | 23.20            | 9.64              | 32.84            | 48.27 | -15.43 | AVG      |         |
| 5     | 2.4000    | 35.99            | 9.73              | 45.72            | 56.00 | -10.28 | peak     |         |
| 6     | 2.4000    | 17.80            | 9.73              | 27.53            | 46.00 | -18.47 | AVG      |         |
| 7     | 11.7500   | 38.35            | 10.14             | 48.49            | 60.00 | -11.51 | peak     |         |
| 8     | 11.7500   | 21.60            | 10.14             | 31.74            | 50.00 | -18.26 | AVG      |         |
| 9     | 23.4297   | 42.40            | 10.54             | 52.94            | 60.00 | -7.06  | peak     |         |
| 10    | 23.4297   | 17.70            | 10.54             | 28.24            | 50.00 | -21.76 | AVG      |         |
| 11 '  | 28.1758   | 46.48            | 10.82             | 57.30            | 60.00 | -2.70  | peak     |         |
| 12    | 28.1758   | 23.40            | 10.82             | 34.22            | 50.00 | -15.78 | AVG      |         |

Note : The test result has included the cable loss.



Note : The test result has included the cable loss.

10.67

10.93

10.93

36.50

48.86

20.90

47.17

59.79

31.83

50.00

60.00

50.00

-2.83

-0.21

-18.17

AVG

QP

AVG

22.9570

28.9375

28.9375

10

11

12



#### ATTACHMENT B - RADIATED EMISSION (9KHZ TO 30MHZ)

| Test Mode: TX Mode 2412MHz |              |       |             |                 |              |            |         |      |  |
|----------------------------|--------------|-------|-------------|-----------------|--------------|------------|---------|------|--|
| Frec                       |              | Ant.  | Reading(RA) | Corr.Factor(CF) | Measured(FS) | Limits(QP) | Margin  | Note |  |
|                            | (MHz) 0°/90° |       | (dBuV)      | (dB)            | (dBuV/m)     | (dBuV/m)   | (dB)    |      |  |
| 0.008                      | .0           | 0°    | 26.32       | 24.30           | 50.62        | 128.62     | -78.00  | AVG  |  |
| 0.008                      | 39           | 0°    | 30.19       | 24.30           | 54.49        | 148.62     | -94.13  | PEAK |  |
| 0.025                      | 56           | 0°    | 22.85       | 23.94           | 46.79        | 119.43     | -72.64  | AVG  |  |
| 0.025                      |              | 0°    | 25.37       | 23.94           | 49.31        | 139.43     | -90.12  | PEAK |  |
| 0.038                      | 32           | 0°    | 20.92       | 23.15           | 44.07        | 115.96     | -71.89  | AVG  |  |
| 0.038                      | 32           | 0°    | 23.65       | 23.15           | 46.80        | 135.96     | -89.16  | PEAK |  |
| 0.065                      |              |       | 19.82       | 22.10           | 41.92        | 111.32     | -69.40  | AVG  |  |
| 0.065                      | 52           | 0°    | 24.27       | 22.10           | 46.37        | 131.32     | -84.95  | PEAK |  |
| 0.263                      | .2639 0°     |       | 20.38       | 20.37           | 40.75        | 99.18      | -58.43  | AVG  |  |
| 0.263                      | 39           | 0°    | 23.72       | 20.37           | 44.09        | 119.18     | -75.09  | PEAK |  |
| 1.486                      | 64           | 0°    | 27.68       | 19.55           | 47.23        | 64.16      | -16.93  | QP   |  |
|                            |              |       |             |                 |              |            |         |      |  |
| Free                       | q. /         | Ant.  | Reading(RA) | Corr.Factor(CF) | Measured(FS) | Limits(QP) | Margin  | Note |  |
| (MH                        | z) 0°        | °/90° | (dBuV)      | (dB)            | (dBuV/m)     | (dBuV/m)   | (dB)    | NULE |  |
| 0.009                      | 99           | 90°   | 18.56       | 24.30           | 42.86        | 127.67     | -84.81  | AVG  |  |
| 0.009                      | 99           | 90°   | 21.34       | 24.30           | 45.64        | 147.67     | -102.03 | PEAK |  |
| 0.022                      | 24           | 90°   | 14.37       | 24.15           | 38.52        | 120.59     | -82.07  | AVG  |  |
| 0.022                      | 24           | 90°   | 16.68       | 24.15           | 40.83        | 140.59     | -99.76  | PEAK |  |
| 0.046                      | 63           | 90°   | 19.72       | 22.64           | 42.36        | 114.30     | -71.94  | AVG  |  |
| 0.046                      | 63           | 90°   | 22.39       | 22.64           | 45.03        | 134.30     | -89.27  | PEAK |  |
| 0.077                      | 74           | 90°   | 20.61       | 21.85           | 42.46        | 109.83     | -67.37  | AVG  |  |
| 0.077                      | 74           | 90°   | 23.53       | 21.85           | 45.38        | 129.83     | -84.45  | PEAK |  |
| 0.375                      | 56           | 90°   | 20.29       | 20.10           | 40.39        | 96.11      | -55.72  | AVG  |  |
| 0.375                      | ).3756 90°   |       | 23.75       | 20.10           | 43.85        | 116.11     | -72.26  | PEAK |  |
| 1.671                      | 19           | 90°   | 24.92       | 19.53           | 44.45        | 63.14      | -18.69  | QP   |  |

Remark:

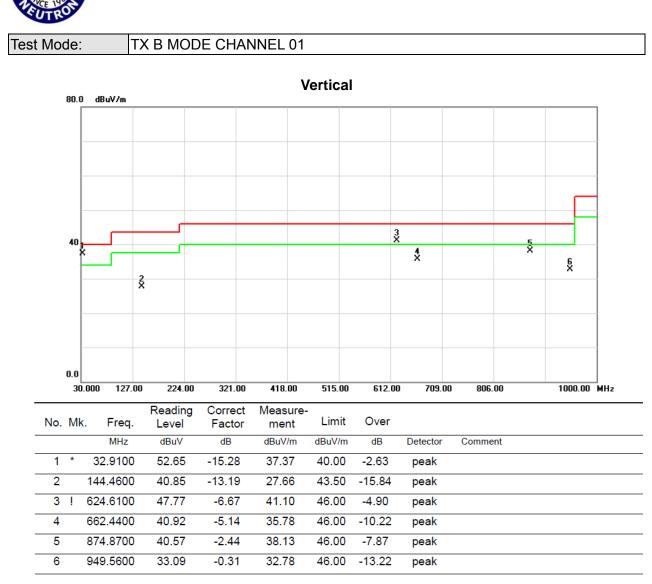
(1) The amplitude of spurious emissions which are attenuated by more than 20 dB below the permissible value has no need to be reported.

(2) Distance extrapolation factor = 40 log (specific distance / test distance) (dB);
(3) Limit line = specific limits (dBuV) + distance extrapolation factor.

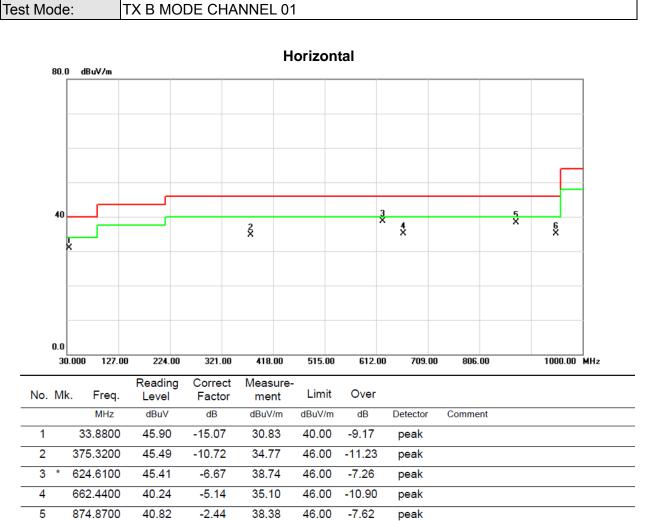


#### ATTACHMENT C - RADIATED EMISSION (30MHZ TO 1000MHZ)

# Neutron Engineering Inc.



# Neutron Engineering Inc.



46.00 -10.80

peak

6

949.5600

35.51

-0.31

35.20

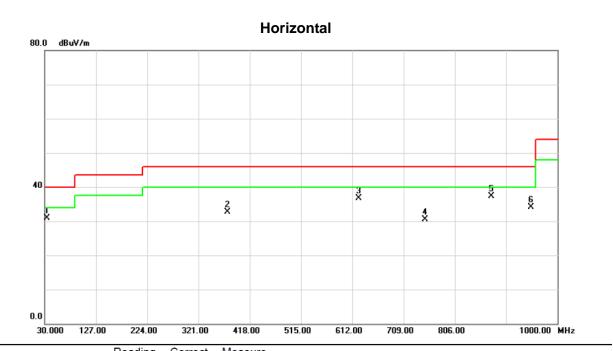
# Veutron Engineering Inc. Test Mode: TX B MODE CHANNEL 06 Vertical 0 0 0 0 0 0 0 0

|     | 0.0 |            |                  |                   |                  |        |        |          |         |         | 1   |
|-----|-----|------------|------------------|-------------------|------------------|--------|--------|----------|---------|---------|-----|
|     | 30. | 000 127.00 | 224.00           | 321.00            | 418.00           | 515.00 | 612.00 | 709.00   | 806.00  | 1000.00 | MHz |
| No. | Mk. | Freq.      | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |         |         |     |
|     |     | MHz        | dBuV             | dB                | dBuV/m           | dBuV/m | dB     | Detector | Comment |         |     |
| 1   | *   | 32.9100    | 51.65            | -15.28            | 36.37            | 40.00  | -3.63  | peak     |         |         |     |
| 2   |     | 624.6100   | 46.27            | -6.67             | 39.60            | 46.00  | -6.40  | peak     |         |         |     |
| 3   |     | 662.4400   | 39.92            | -5.14             | 34.78            | 46.00  | -11.22 | peak     |         |         |     |
| 4   |     | 749.7400   | 33.43            | -4.68             | 28.75            | 46.00  | -17.25 | peak     |         |         |     |
| 5   |     | 874.8700   | 39.57            | -2.44             | 37.13            | 46.00  | -8.87  | peak     |         |         |     |
| 6   |     | 949.5600   | 32.09            | -0.31             | 31.78            | 46.00  | -14.22 | peak     |         |         |     |
|     |     |            |                  |                   |                  |        |        |          |         |         |     |

# Neutron Engineering Inc.=

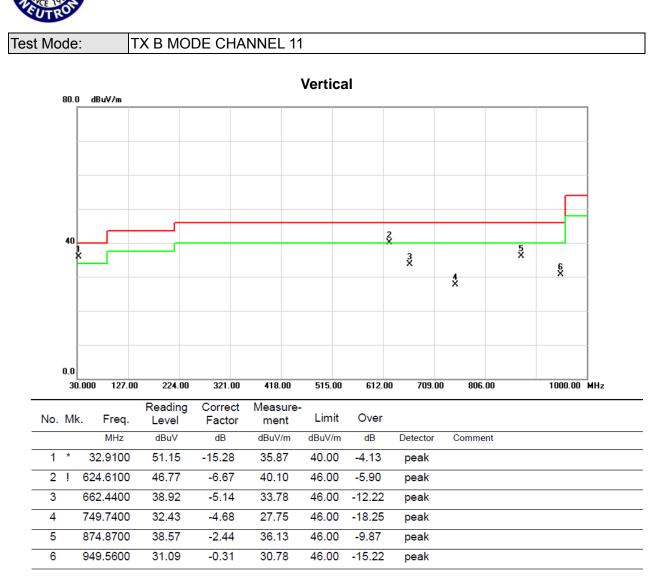
Test Mode:

TX B MODE CHANNEL 06

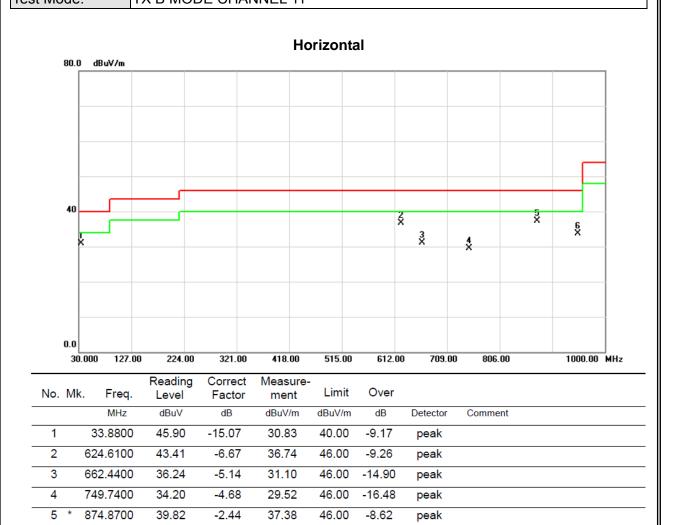


| No. | Mk. | Freq.    | Reading<br>Level | Correct<br>Factor | Measure-<br>ment | Limit  | Over   |          |         |
|-----|-----|----------|------------------|-------------------|------------------|--------|--------|----------|---------|
|     |     | MHz      | dBuV             | dB                | dBuV/m           | dBuV/m | dB     | Detector | Comment |
| 1   |     | 33.8800  | 45.90            | -15.07            | 30.83            | 40.00  | -9.17  | peak     |         |
| 2   |     | 375.3200 | 43.49            | -10.72            | 32.77            | 46.00  | -13.23 | peak     |         |
| 3   |     | 624.6100 | 43.41            | -6.67             | 36.74            | 46.00  | -9.26  | peak     |         |
| 4   |     | 749.7400 | 35.20            | -4.68             | 30.52            | 46.00  | -15.48 | peak     |         |
| 5   | *   | 874.8700 | 39.82            | -2.44             | 37.38            | 46.00  | -8.62  | peak     |         |
| 6   |     | 949.5600 | 34.51            | -0.31             | 34.20            | 46.00  | -11.80 | peak     |         |
|     |     |          |                  |                   |                  |        |        |          |         |

## Neutron Engineering Inc.



# Test Mode: TX B MODE CHANNEL 11



6

949.5600

34.01

-0.31

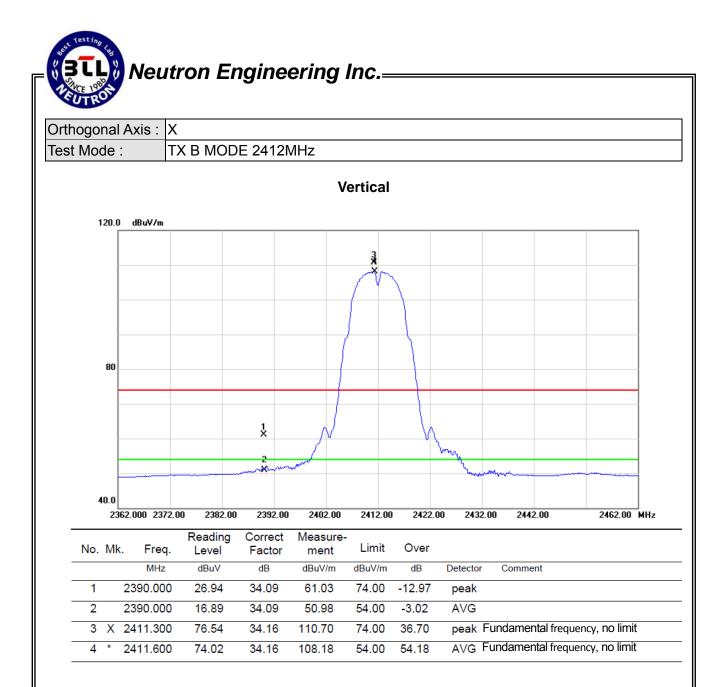
33.70

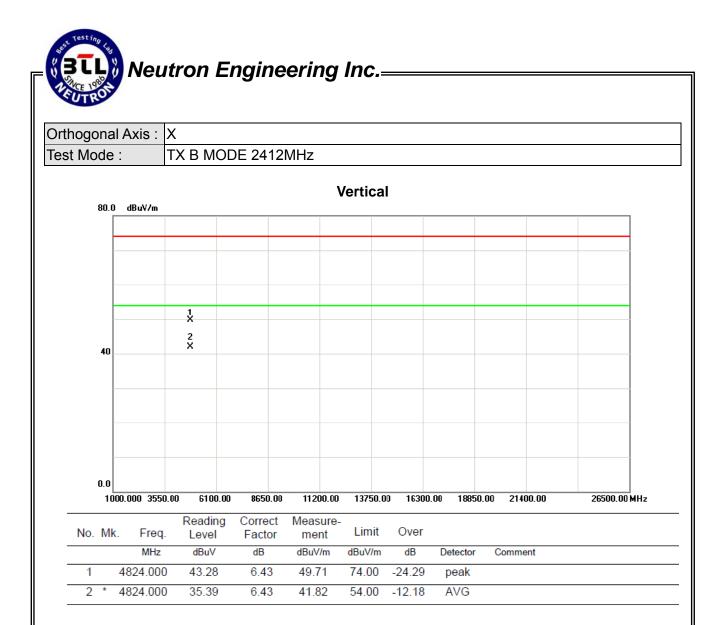
46.00 -12.30

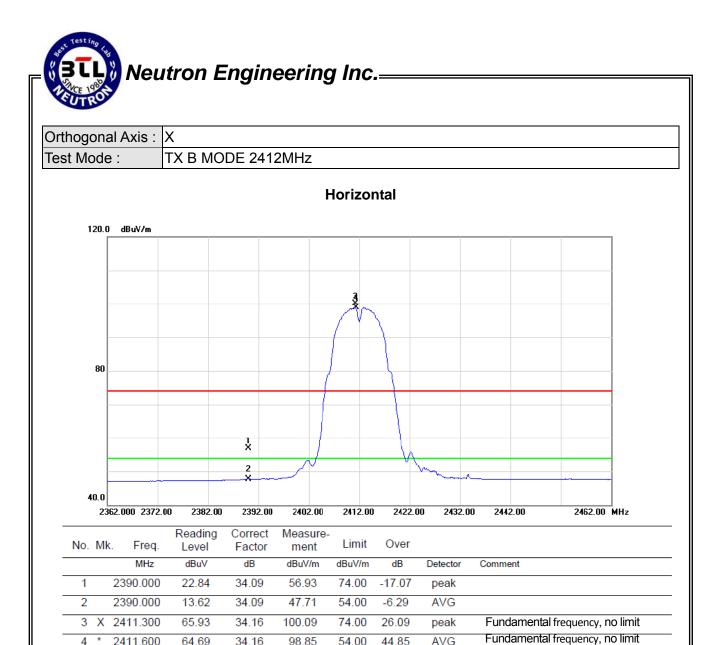
peak



### ATTACHMENT D - RADIATED EMISSION (ABOVE 1000MHZ)







4 \*

2411.600

64.69

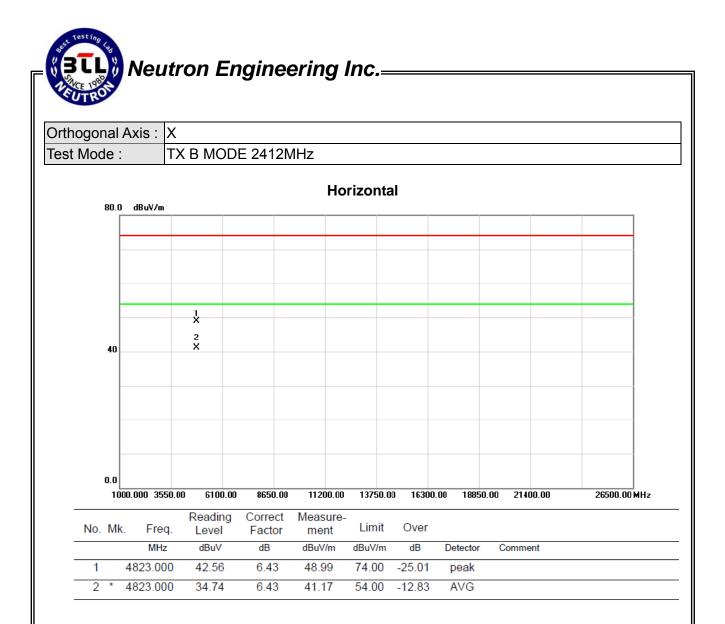
34.16

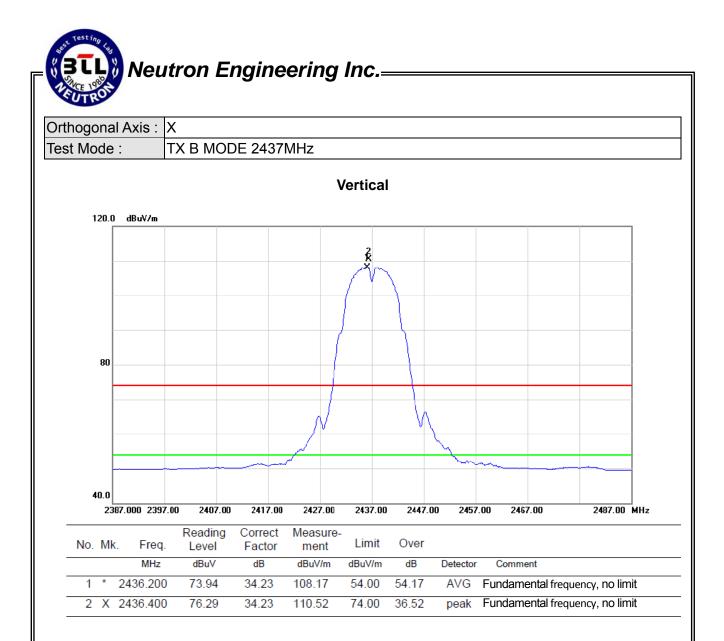
98.85

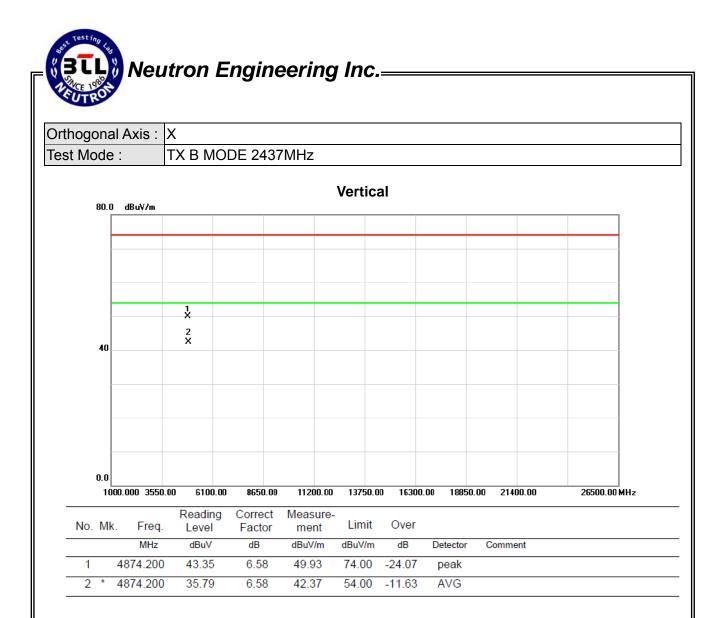
54.00

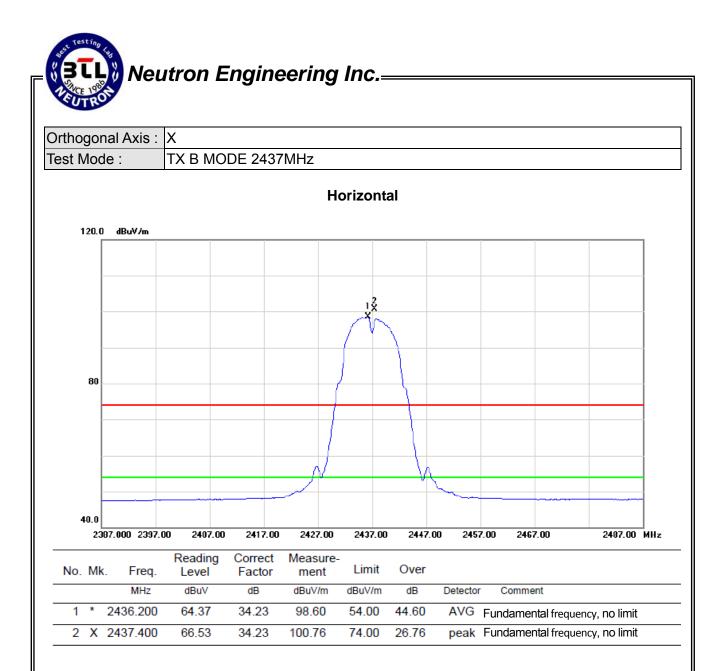
44.85

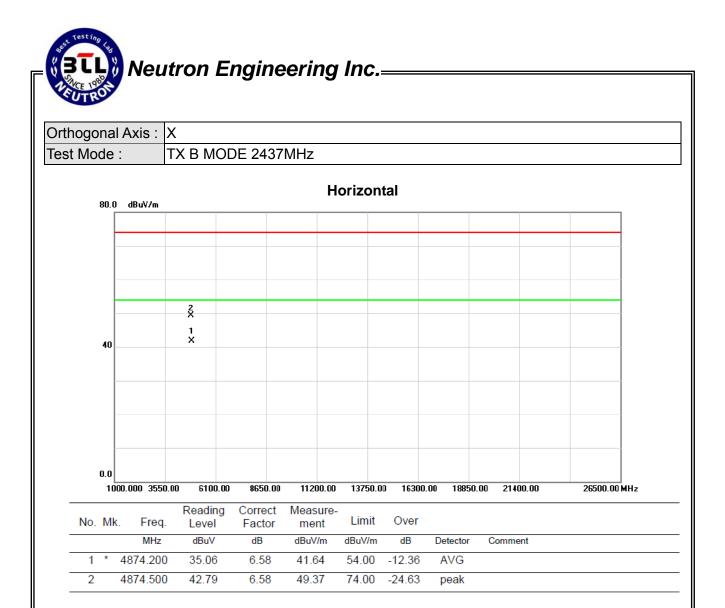
AVG

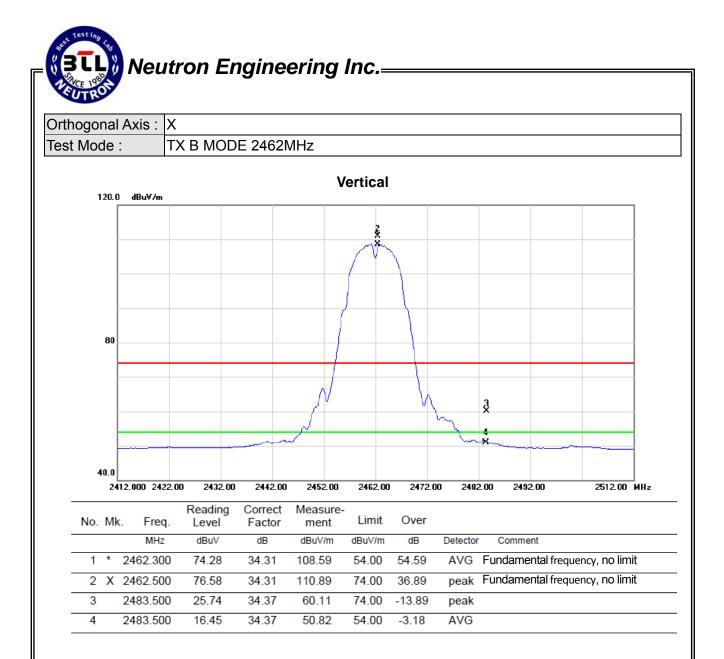


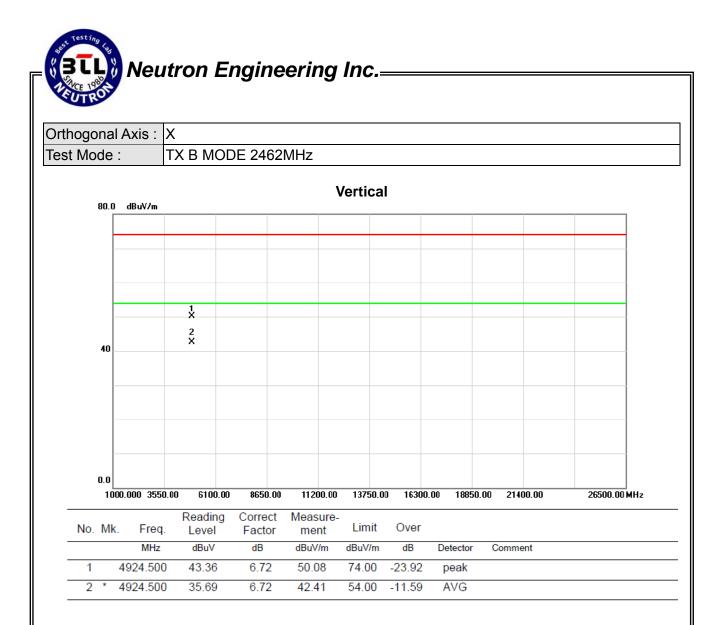


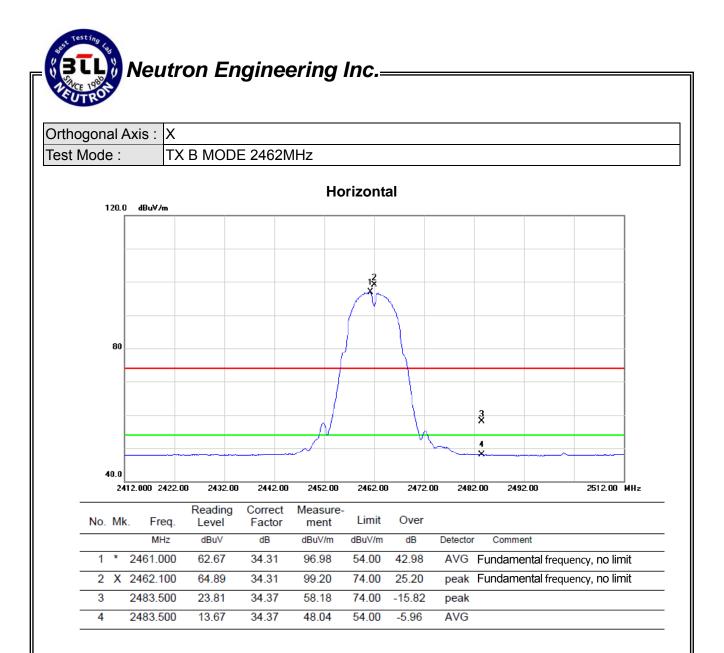


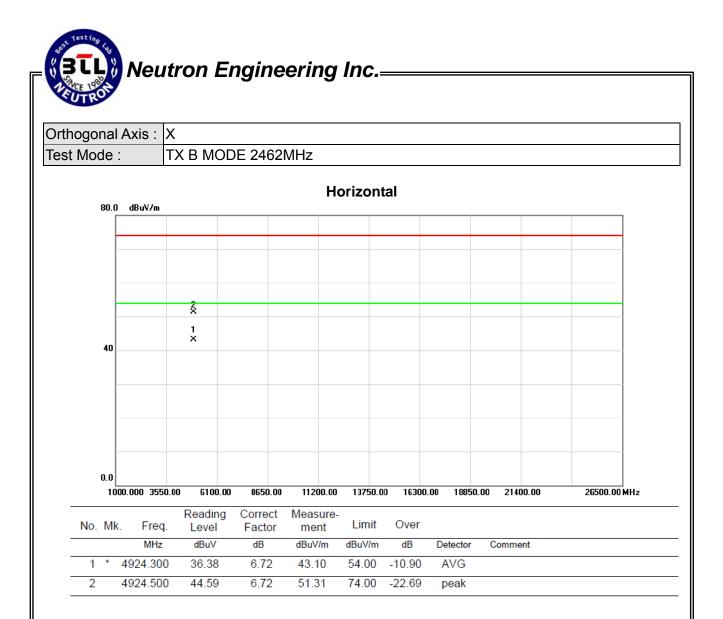


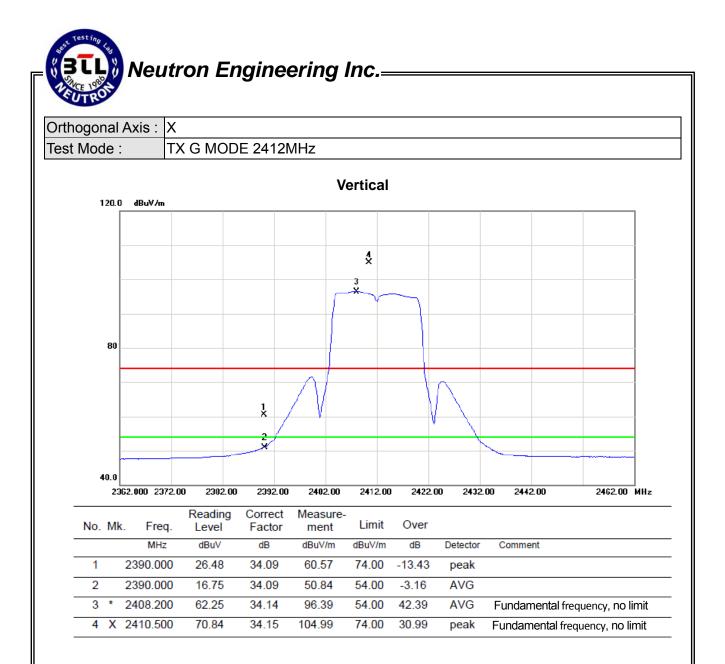


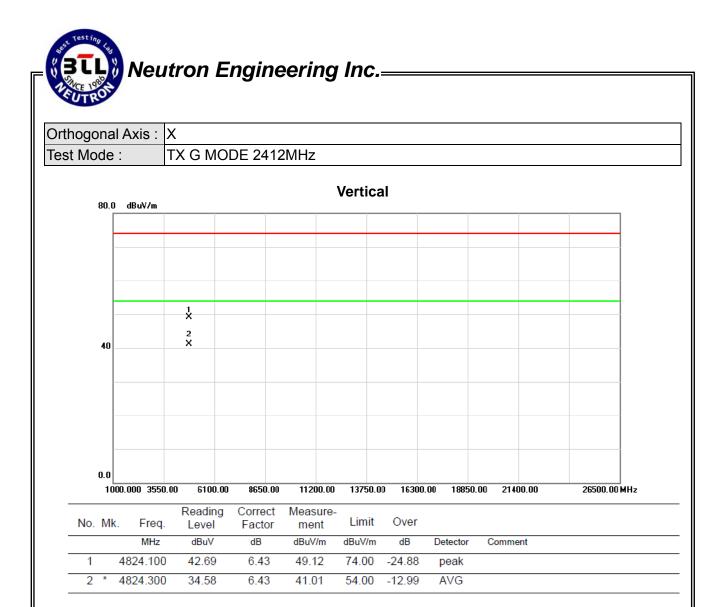


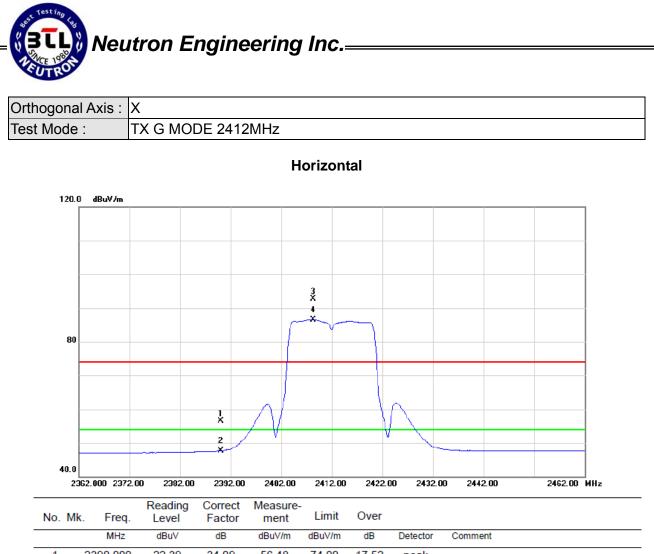












| 1   | 2390.000   | 22.39 | 34.09 | 56.48 | 74.00 | -17.52 | peak |                                 |
|-----|------------|-------|-------|-------|-------|--------|------|---------------------------------|
| 2   | 2390.000   | 13.57 | 34.09 | 47.66 | 54.00 | -6.34  | AVG  |                                 |
| 3)  | K 2408.300 | 58.63 | 34.14 | 92.77 | 74.00 | 18.77  | peak | Fundamental frequency, no limit |
| 4 * | 2408.500   | 52.38 | 34.14 | 86.52 | 54.00 | 32.52  | AVG  | Fundamental frequency, no limit |

