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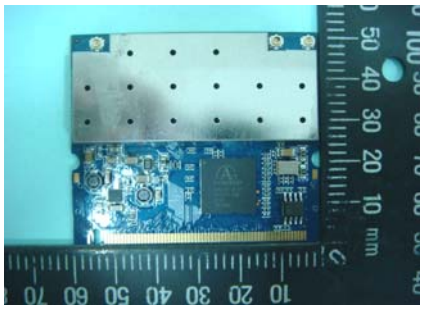
# FCC EMC TEST REPORT

| | |
|---|---|
| Applicant's company | **Wistron NeWeb Corporation** |
| Applicant Address | No.10-1,Li-hsin Road I,Hsinchu Science Park,Hsinchu 300,Taiwan, R.O.C. |
| Manufacturer's company | **Wistron NeWeb Corporation** |
| Manufacturer Address | No.10-1,Li-hsin Road I,Hsinchu Science Park,Hsinchu 300,Taiwan, R.O.C. |

| | |
|---|---|
| Product Name | WLAN a/b/g/n mini-PCI Module |
| Brand Name | WNC |
| Model Name | DNMA-83 |
| Test Standard | 47 CFR FCC Part 15 Subpart B |
| Classification of ITE | Class B |
| Received Date | Nov. 29, 2007 |
| Final Test Date | Feb. 25, 2008 |
| Submission Type | Original Equipment |



## Statement

The test result in this report refers exclusively to the presented test model / sample.
Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.4-2003** and **47 CFR FCC Part 15 Subpart B**.
The test equipment used to perform the test is calibrated and traceable to NML/ROC.

Testing Laboratory
1190

# Table of Contents

# History of This Test Report

Original Issue Date: Feb. 28, 2008

Report No.: FD7D1412

■ No additional attachment.

☐ Additional attachment were issued as following record:

| Attachment No. | Issue Date | Description |
|---|---|---|
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# 1. CERTIFICATE OF COMPLIANCE

| | | |
|---|---|---|
| Product Name | : | WLAN a/b/g/n mini-PCI Module |
| Brand Name | : | WNC |
| Model Name | : | DNMA-83 |
| Applicant | : | Wistron NeWeb Corporation |
| Test Standard | : | 47 CFR FCC Part 15 Subpart B |

Sporton International as requested by the applicant to evaluate the EMI performance of the product sample received on Nov. 29, 2007 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMI nature.

Wayne Hsu
SPORTON INTERNATIONAL INC.

## 2. SUMMARY OF THE TEST RESULT

| Applied Standard: 47 CFR FCC Part 15 Subpart B | | | | |
|---|---|---|---|---|
| **Part** | **Rule Section** | **Description of Test** | **Result** | **Under Limit** |
| 4.1 | 15.107 | AC Power Line Conducted Emissions | Complies | 13.16 dB |
| 4.2 | 15.109 | Radiated Emissions | Complies | 4.31 dB |

| Test Items | Uncertainty | Remark |
|---|---|---|
| AC Power Line Conducted Emissions | ±2.3dB | Confidence levels of 95% |
| Radiated Emissions | ±1.9dB | Confidence levels of 95% |

# 3. GENERAL INFORMATION

## 3.1. Product Details

**For 5GHz Band:**

**802.11a Band 1**

| Items | Description |
|---|---|
| Product Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation | OFDM for IEEE 802.11a |
| Data Modulation | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | OFDM (6/9/12/18/24/36/48/54) |
| Frequency Range | 5150 ~ 5250MHz |
| Channel Number | 4 |
| Channel Band Width (99%) | 16.96 MHz |
| Conducted Output Power | 16.67 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

**Draft n**

| Items | Description |
|---|---|
| Product Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation | see the below table for draft n |
| Data Modulation | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | see the below table for Draft n |
| Frequency Range | 5150 ~ 5250MHz |
| Channel Number | 4 for 20MHz bandwidth ; 2 for 40MHz bandwidth |
| Channel Band Width (99%) | MCS16 (20MHz) : 18.08 MHz ; MCS16 (40MHz) : 36.48 MHz |
| Conducted Output Power | MCS16 (20MHz) : 16.78 dBm ; MCS16 (40MHz) : 16.54 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

802.11a Band 4

| Items | Description |
|---|---|
| Power Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation | DSSS for IEEE 802.11b ; OFDM for IEEE 802.11a/g |
| Data Modulation | DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54) |
| Frequency Range | 5725 ~ 5850MHz |
| Channel Number | 5 |
| Channel Band Width (99%) | 17.76 MHz |
| Conducted Output Power | 27.64 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

Draft n

| Items | Description |
|---|---|
| Product Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation | see the below table for draft n |
| Data Modulation | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | see the below table for Draft n |
| Frequency Range | 5725 ~ 5850MHz |
| Channel Number | 3 for 20MHz bandwidth ; 2 for 40MHz bandwidth |
| Channel Band Width (99%) | MCS16 (20MHz) : 17.76 MHz ; MCS16 (40MHz) : 36.40 MHz |
| Conducted Output Power | MCS16 (20MHz) : 27.43 dBm ; MCS16 (40MHz) : 27.80 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

**For 2.4GHz Band:**

**802.11b/g**

| Items | Description |
|---|---|
| Product Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation | DSSS for IEEE 802.11b ; OFDM for IEEE 802.11g |
| Data Modulation | DSSS (BPSK / QPSK / CCK) ; OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | DSSS (1/ 2/ 5.5/11) ; OFDM (6/9/12/18/24/36/48/54) |
| Frequency Range | 2400 ~ 2483.5MHz |
| Channel Number | 11 |
| Channel Band Width (99%) | 11b: 15.24 MHz ; 11g: 16.48 MHz |
| Conducted Output Power | 11b: 24.18 dBm ; 11g: 22.01 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

**Draft n**

| Items | Description |
|---|---|
| Product Type | WLAN (3TX, 3RX) |
| Radio Type | Intentional Transceiver |
| Power Type | From Host System |
| Modulation& | see the below table for draft n |
| Data Modulation | OFDM (BPSK / QPSK / 16QAM / 64QAM) |
| Data Rate (Mbps) | see the below table for Draft n |
| Frequency Range | 2400 ~ 2483.5MHz |
| Channel Number | 11 for 20MHz bandwidth ; 7 for 40MHz bandwidth |
| Channel Band Width (99%) | MCS16 (20MHz) : 17.64 MHz ; MCS16 (40MHz) : 36.32 MHz |
| Conducted Output Power | MCS16 (20MHz) : 22.75 dBm ; MCS16 (40MHz) : 21.55 dBm |
| Carrier Frequencies | Please refer to section 3.4 |
| Antenna | Please refer to section 3.3 |

**Antenna & Band width**

| Antenna | Single (TX) | | Three (TX) | |
|---|---|---|---|---|
| Band width Mode | 20 MHz | 40 MHz | 20 MHz | 40 MHz |
| 802.11a | X | X | V | X |
| 802.11b | X | X | V | X |
| 802.11g | X | X | V | X |
| Draft n | X | X | V | V |

**Draft n Spec**

| MCS Index | Nss | Modulation | R | NBPSC | NCBPS | | NDBPS | | Data rate(Mbps) 800nsGI | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 20MHz | 40MHz | 20MHz | 40MHz | 20MHz | 40MHz |
| 0 | 1 | BPSK | 1/2 | 1 | 52 | 108 | 26 | 54 | 6.5 | 13.5 |
| 1 | 1 | QPSK | 1/2 | 2 | 104 | 216 | 52 | 108 | 13.0 | 27.0 |
| 2 | 1 | QPSK | 3/4 | 2 | 104 | 216 | 78 | 162 | 19.5 | 40.5 |
| 3 | 1 | 16-QAM | 1/2 | 4 | 208 | 432 | 104 | 216 | 26.0 | 54.0 |
| 4 | 1 | 16-QAM | 3/4 | 4 | 208 | 432 | 156 | 324 | 39.0 | 81.0 |
| 5 | 1 | 64-QAM | 2/3 | 6 | 312 | 648 | 208 | 432 | 52.0 | 108.0 |
| 6 | 1 | 64-QAM | 3/4 | 6 | 312 | 648 | 234 | 486 | 58.5 | 121.5 |
| 7 | 1 | 64-QAM | 5/6 | 6 | 312 | 648 | 260 | 540 | 65.0 | 135.0 |
| 8 | 2 | BPSK | 1/2 | 1 | 104 | 216 | 52 | 108 | 13.0 | 27.0 |
| 9 | 2 | QPSK | 1/2 | 2 | 208 | 432 | 104 | 216 | 26.0 | 54.0 |
| 10 | 2 | QPSK | 3/4 | 2 | 208 | 432 | 156 | 324 | 39.0 | 81.0 |
| 11 | 2 | 16-QAM | 1/2 | 4 | 416 | 864 | 208 | 432 | 52.0 | 108.0 |
| 12 | 2 | 16-QAM | 3/4 | 4 | 416 | 864 | 312 | 648 | 78.0 | 162.0 |
| 13 | 2 | 64-QAM | 2/3 | 6 | 624 | 1296 | 416 | 864 | 104.0 | 216.0 |
| 14 | 2 | 64-QAM | 3/4 | 6 | 624 | 1296 | 468 | 972 | 117.0 | 243.0 |
| 15 | 2 | 64-QAM | 5/6 | 6 | 624 | 1296 | 520 | 1080 | 130.0 | 270.0 |
| 16 | 3 | BPSK | 1/2 | 1 | 156 | 324 | 78 | 162 | 19.5 | 40.5 |
| 17 | 3 | QPSK | 1/2 | 2 | 312 | 648 | 156 | 324 | 39 | 81 |
| 18 | 3 | QPSK | 3/4 | 2 | 312 | 648 | 234 | 486 | 58.5 | 121.5 |
| 19 | 3 | 16-QAM | 1/2 | 4 | 624 | 1296 | 312 | 648 | 78 | 162 |
| 20 | 3 | 16-QAM | 3/4 | 4 | 624 | 1296 | 468 | 972 | 117 | 243 |
| 21 | 3 | 64-QAM | 2/3 | 6 | 936 | 1944 | 624 | 1296 | 156 | 324 |
| 22 | 3 | 64-QAM | 3/4 | 6 | 936 | 1944 | 702 | 1458 | 175.5 | 364.5 |
| 23 | 3 | 64-QAM | 5/6 | 6 | 936 | 1944 | 780 | 1620 | 195 | 4055 |

**Draft n Bandwidth**

| Symbol | Explanation |
|---|---|
| NSS | Number of spatial streams |
| R | Code rate |
| NBPSC | Number of coded bits per single carrier |
| NCBPS | Number of coded bits per symbol |
| NDBPS | Number of data bits per symbol |
| GI | guard interval |

## 3.2. Accessories

N/A

## 3.3. Table for Filed Antenna

**For 2.4GHz Band**

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Remark |
|---|---|---|---|---|---|---|
| A-1 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 4.09 | TX / RX Ant. |
| A-2 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 4.09 | TX / RX Ant. |
| A-3 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 4.09 | TX / RX Ant. |
| B-1 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 1.82 | TX / RX Ant. |
| B-2 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 1.82 | TX / RX Ant. |
| B-3 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 1.82 | TX / RX Ant. |
| C-1 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 2.1 | TX / RX Ant. |
| C-2 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 2.1 | TX / RX Ant. |
| C-3 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 2.1 | TX / RX Ant. |
| D-1 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 3.8 | TX / RX Ant. |
| D-2 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 3.8 | TX / RX Ant. |
| D-3 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 3.8 | TX / RX Ant. |

Note:

The EUT has 12 antennas.

Due to Ant. A ~ Ant. C is the same type antenna, only the higher gain antenna “Ant. A” was tested.

Both Ant. A and Ant. D were tested and recorded in the report.

**For 5GHz Band**

| Ant. | Brand | Model Name | Antenna Type | Connector | Gain (dBi) | Remark |
|---|---|---|---|---|---|---|
| A-1 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 1.23 | TX / RX Ant. |
| A-2 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 1.23 | TX / RX Ant. |
| A-3 | Colubris Networks | XS7-RU | Dipole Antenna | Reversed-SMA | 1.23 | TX / RX Ant. |
| B-1 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 4.28 | TX / RX Ant. |
| B-2 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 4.28 | TX / RX Ant. |
| B-3 | LCU | F1B-294405-32 | Dipole Antenna | Reversed-SMA | 4.28 | TX / RX Ant. |
| C-1 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 3.4 | TX / RX Ant. |
| C-2 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 3.4 | TX / RX Ant. |
| C-3 | Centurion | WTS2450-RPSMA | Dipole Antenna | Reversed-SMA | 3.4 | TX / RX Ant. |
| D-1 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 5.1 | TX / RX Ant. |
| D-2 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 5.1 | TX / RX Ant. |
| D-3 | Centurion | NanoBlade | Emdeded Antenna | Reversed-SMA | 5.1 | TX / RX Ant. |

Note: The EUT has 12 antennas.

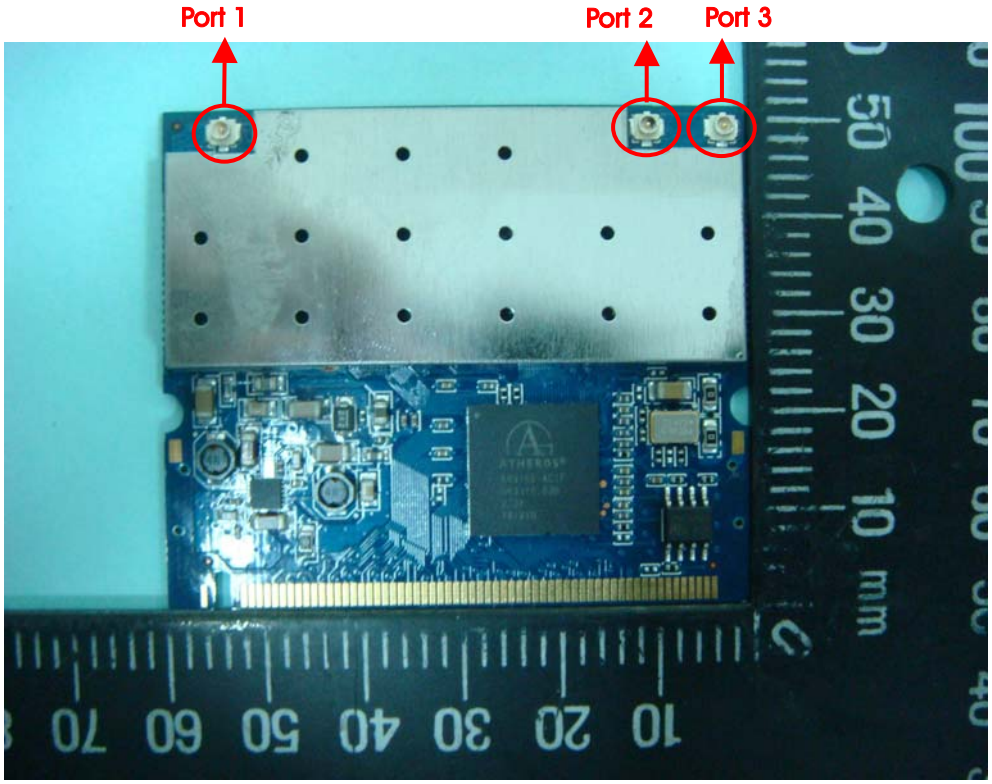
Due to Ant. A ~ Ant. C is the same type antenna, only the higher gain antenna "Ant. B" was tested.

Both Ant. B and Ant. D were tested and recorded in the report.

Port 1: Ant. A-1 (2.4GHz) / Ant. B-1 (5GHz) / Ant. D-1

Port 2: Ant. A-2 (2.4GHz) / Ant. B-2 (5GHz) / Ant. D-2

Port 3: Ant. A-3 (2.4GHz) / Ant. B-3 (5GHz) / Ant. D-3



## 3.4. Table for Carrier Frequencies

**For 2.4GHz Band: Frequency Allocation for 802.11b/g**

There are two bandwidth systems for draft n.

For both 20MHz bandwidth syetems, use Channel 1~Channel 13.

For both 40MHz bandwidth syetems, use Channel 3~Channel 11.

| Frequency Band | Channel No. | Frequency | Channel No. | Frequency |
|---|---|---|---|---|
| 2400~2483.5MHz | 1 | 2412 MHz | 7 | 2442 MHz |
| | 2 | 2417 MHz | 8 | 2447 MHz |
| | 3 | 2422 MHz | 9 | 2452 MHz |
| | 4 | 2427 MHz | 10 | 2457 MHz |
| | 5 | 2432 MHz | 11 | 2462 MHz |
| | 6 | 2437 MHz | | |

**For 5GHz Band: Frequency Allocation for 802.11a**

There are two bandwidth systems for draft n.

**802.11a Band 1**

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48.

For 40MHz bandwidth systems, use Channel 38, 46.

**802.11a Band 4**

For 20MHz bandwidth systems, use Channel 149, 157, 165.

For 40MHz bandwidth systems, use Channel 151, 159.

| Frequency Band | Channel No. | Frequency | Channel No. | Frequency |
|---|---|---|---|---|
| 5150~5250 MHz Band 1 | 36 | 5180 MHz | 44 | 5220 MHz |
| | 40 | 5200 MHz | 48 | 5240 MHz |
| 5725~5850 MHz Band 4 | 149 | 5745 MHz | | |
| | 153 | 5765 MHz | | |
| | 157 | 5785 MHz | | |
| | 161 | 5805 MHz | | |
| | 165 | 5825 MHz | | |

## 3.5. Table for Test Modes

Investigation has been done on all the possible configurations for searching the worst cases. The following table is a list of the test modes shown in this test report.

| Test Items | Mode | Antenna |
|---|---|---|
| AC Power Line Conducted Emissions | Normal Use | - |
| Radiated Emissions | CRX/Normal Use | A/B/D |

Note: CRX=continuously receiving

## 3.6. Table for Testing Locations

| Test Site No. | Site Category | Location | FCC Reg. No. | IC File No. | VCCI Reg. No |
|---|---|---|---|---|---|
| 03CH03-HY | SAC | Hwa Ya | 101377 | IC 4088 | - |
| CO04-HY | Conduction | Hwa Ya | 101377 | IC 4088 | - |

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC); Fully Anechoic Chamber (FAC).

Please refer section 6 for Test Site Address.

## 3.7. Table for Supporting Units

| Support Unit | Brand | Model | FCC ID |
|---|---|---|---|
| Notebook | DELL | D400 | E2K24GBRL |
| Modem | ACEEX | DM1414 | IFAXDM1414 |
| Mouse | QSKY | Lx-619B | DoC |
| Printer | EPSON | LQ-300+ | DOC |
| AP | PLANEX | GW-AP54SGX | DOC |

## 3.8. EUT Operation during Test

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows:

a. Turn on the power of all equipment.

b. The NB sends " H" messages to the panel, and the panel displays " H " patterns on the screen.

c. The NB sends " H " messages to the printer, then the printer prints them on the paper.

d. The NB sends " H " messages to the modem.

e. Repeat the steps from b to d.

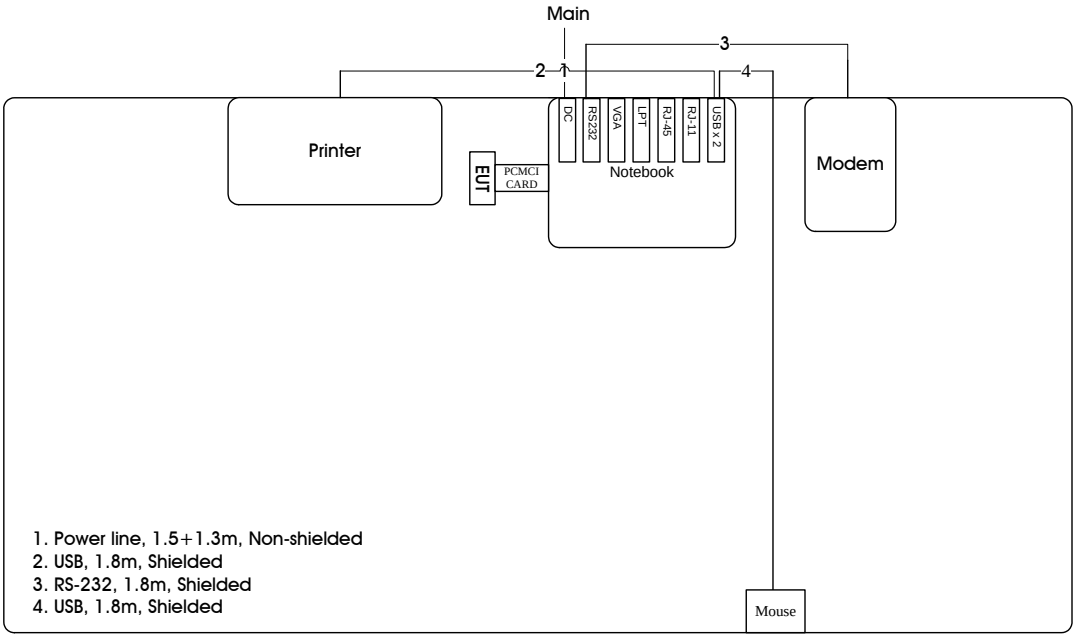
At the same time, the following programs were executed:

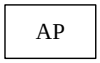
Executed "ping.exe" to link with the remote workstation to receive and transmit signal by LAN and WLAN.

## 3.9. Test Configurations

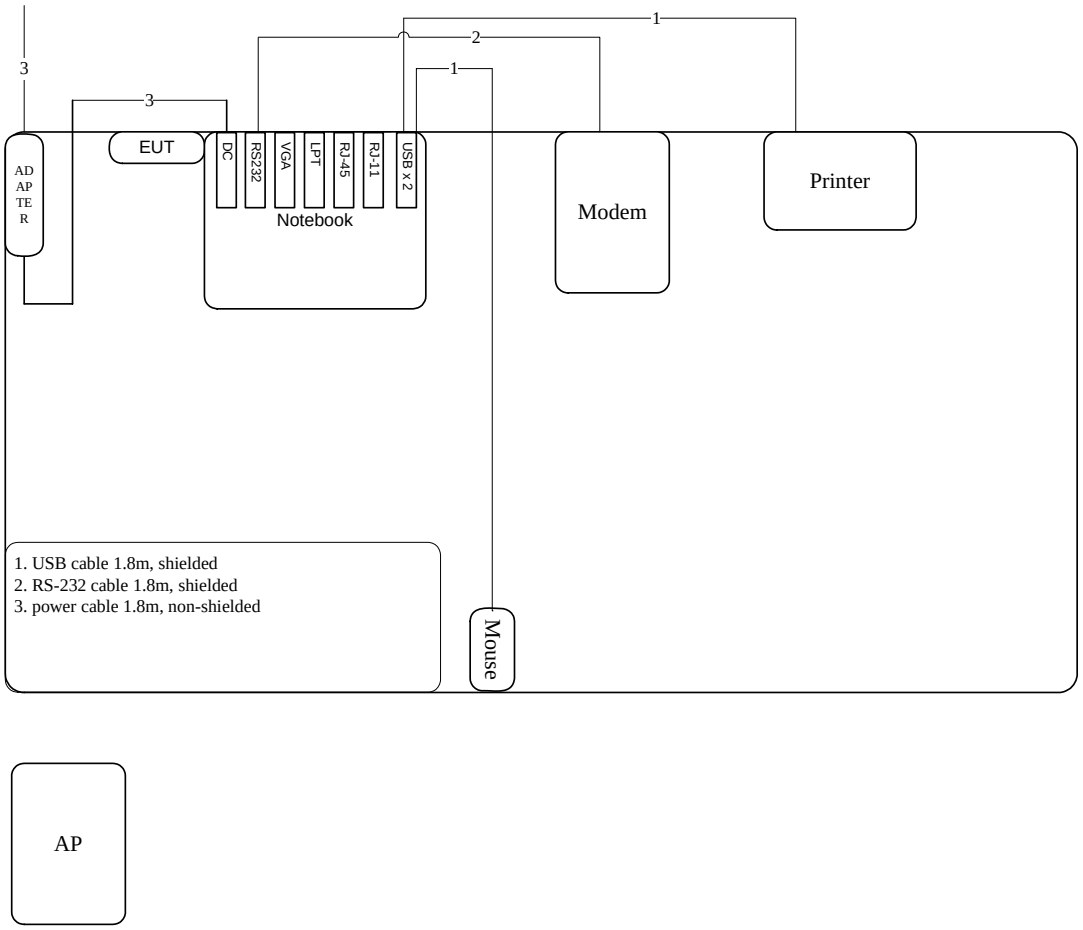
### 3.9.1. Radiation Emissions Test Configuration

Test Mode: Ant. A / Ant. B / Ant. D



## 3.9.2. AC Power Line Conduction Emissions Test Configuration



# 4. TEST RESULT

## 4.1. AC Power Line Conducted Emissions Measurement

### 4.1.1. Limit

For this product which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

| Frequency (MHz) | QP Limit (dBuV) | AV Limit (dBuV) |
|---|---|---|
| 0.15~0.5 | 66~56 | 56~46 |
| 0.5~5 | 56 | 46 |
| 5~30 | 60 | 50 |

### 4.1.2. Measuring Instruments and Setting

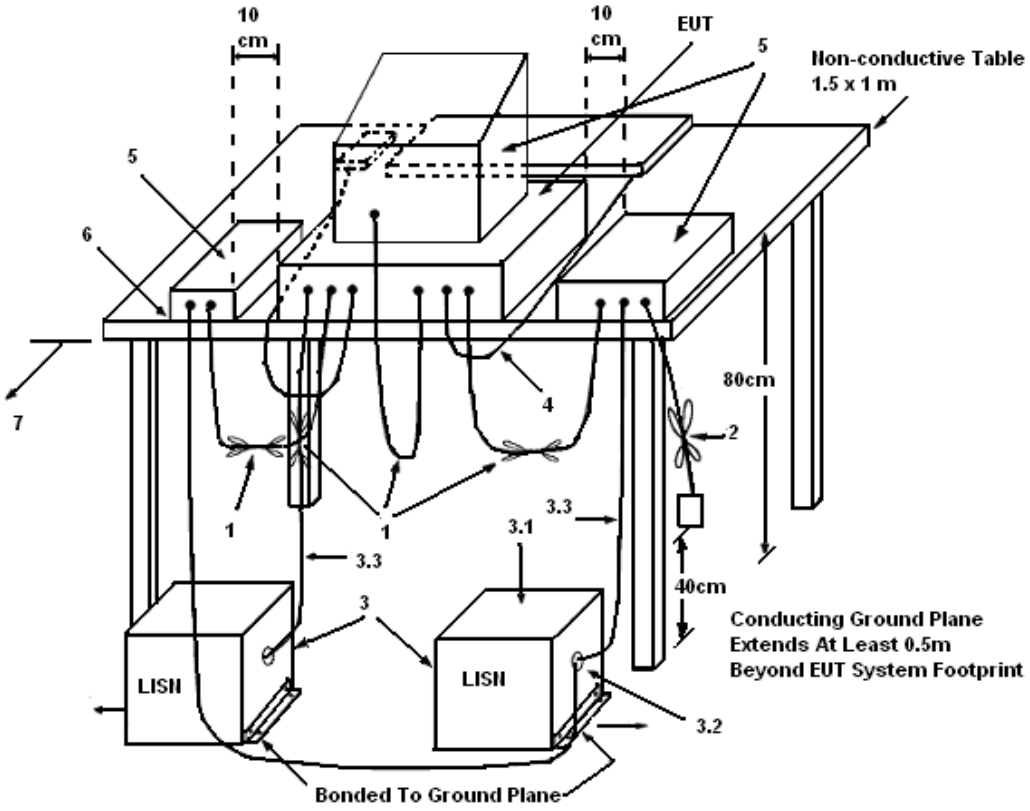
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

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

### 4.1.3. Test Procedures

1. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 KHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

### 4.1.4. Test Setup Layout




LEGEND:

(1) 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.

(2) 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.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

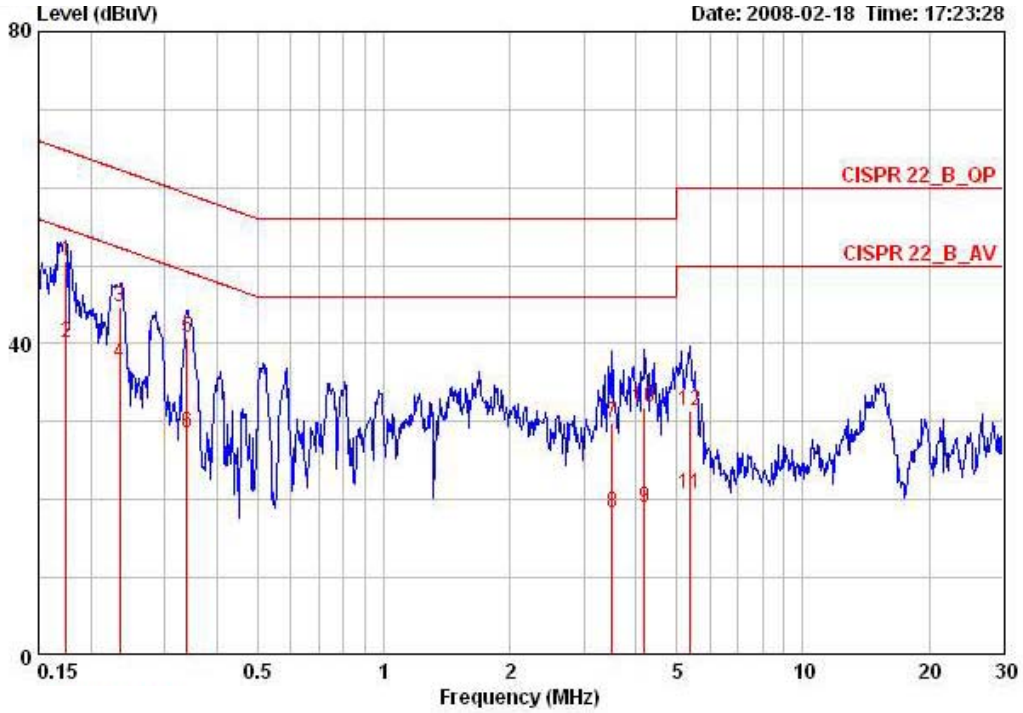
(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

### 4.1.5. Test Deviation

There is no deviation with the original standard.

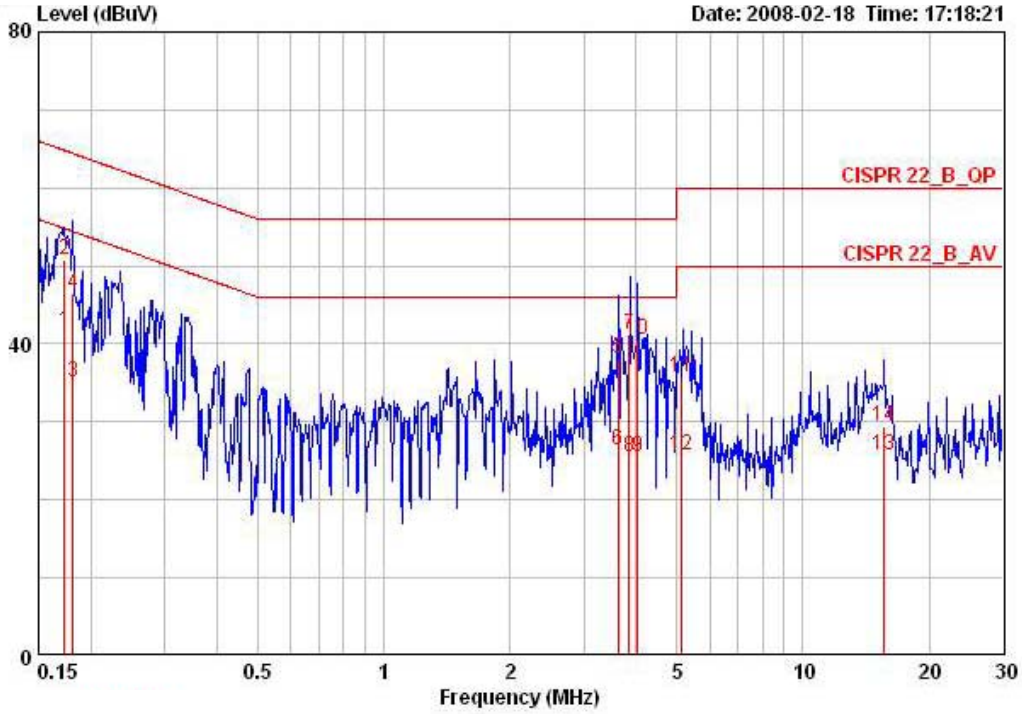
## 4.1.6. Results of AC Power Line Conducted Emissions Measurement

| Temperature | 20℃ | Humidity | 61% |
|---|---|---|---|
| Test Engineer | Andy Tsai | Phase | Line |
| Configuration | Normal Link | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | |
| 1 @ | 0.17491 | 50.53 | -14.19 | 64.72 | 50.18 | 0.15 | 0.20 | QP | LINE |
| 2 | 0.17491 | 40.11 | -14.61 | 54.72 | 39.76 | 0.15 | 0.20 | AVERAGE | LINE |
| 3 | 0.23409 | 44.71 | -17.59 | 62.30 | 44.41 | 0.10 | 0.20 | QP | LINE |
| 4 | 0.23409 | 37.49 | -14.81 | 52.30 | 37.19 | 0.10 | 0.20 | AVERAGE | LINE |
| 5 | 0.33920 | 40.71 | -18.51 | 59.22 | 40.41 | 0.10 | 0.20 | QP | LINE |
| 6 | 0.33920 | 28.64 | -20.58 | 49.22 | 28.34 | 0.10 | 0.20 | AVERAGE | LINE |
| 7 | 3.509 | 29.77 | -26.23 | 56.00 | 29.47 | 0.00 | 0.30 | QP | LINE |
| 8 | 3.509 | 18.21 | -27.79 | 46.00 | 17.91 | 0.00 | 0.30 | AVERAGE | LINE |
| 9 | 4.180 | 18.93 | -27.07 | 46.00 | 18.63 | 0.00 | 0.30 | AVERAGE | LINE |
| 10 | 4.180 | 31.72 | -24.28 | 56.00 | 31.42 | 0.00 | 0.30 | QP | LINE |
| 11 | 5.390 | 20.71 | -29.29 | 50.00 | 20.39 | 0.02 | 0.30 | AVERAGE | LINE |
| 12 | 5.390 | 31.43 | -28.57 | 60.00 | 31.11 | 0.02 | 0.30 | QP | LINE |

| Temperature | 20℃ | Humidity | 61% |
|---|---|---|---|
| Test Engineer | Andy Tsai | Phase | Neutral |
| Configuration | Normal Link | | |




| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV | dB | dBuV | dBuV | dB | dB | | |
| 1 @ | 0.17307 | 41.65 | -13.16 | 54.81 | 41.20 | 0.25 | 0.20 | AVERAGE | NEUTRAL |
| 2 @ | 0.17307 | 50.83 | -13.98 | 64.81 | 50.38 | 0.25 | 0.20 | QP | NEUTRAL |
| 3 | 0.18152 | 35.08 | -19.34 | 54.42 | 34.63 | 0.25 | 0.20 | AVERAGE | NEUTRAL |
| 4 | 0.18152 | 46.39 | -18.03 | 64.42 | 45.94 | 0.25 | 0.20 | QP | NEUTRAL |
| 5 | 3.615 | 38.23 | -17.77 | 56.00 | 37.83 | 0.10 | 0.30 | QP | NEUTRAL |
| 6 | 3.615 | 26.47 | -19.53 | 46.00 | 26.07 | 0.10 | 0.30 | AVERAGE | NEUTRAL |
| 7 | 3.854 | 41.18 | -14.82 | 56.00 | 40.78 | 0.10 | 0.30 | QP | NEUTRAL |
| 8 | 3.854 | 25.51 | -20.49 | 46.00 | 25.11 | 0.10 | 0.30 | AVERAGE | NEUTRAL |
| 9 | 4.027 | 25.40 | -20.60 | 46.00 | 25.00 | 0.10 | 0.30 | AVERAGE | NEUTRAL |
| 10 | 4.027 | 40.51 | -15.49 | 56.00 | 40.11 | 0.10 | 0.30 | QP | NEUTRAL |
| 11 | 5.153 | 35.68 | -24.32 | 60.00 | 35.28 | 0.10 | 0.30 | QP | NEUTRAL |
| 12 | 5.153 | 25.79 | -24.21 | 50.00 | 25.39 | 0.10 | 0.30 | AVERAGE | NEUTRAL |
| 13 | 15.639 | 25.69 | -24.31 | 50.00 | 25.19 | 0.10 | 0.40 | AVERAGE | NEUTRAL |
| 14 | 15.639 | 29.51 | -30.49 | 60.00 | 29.01 | 0.10 | 0.40 | QP | NEUTRAL |

Note:

Level = Read Level + LISN Factor + Cable Loss.

## 4.2. Radiated Emissions Measurement

### 4.2.1. Limit

Measurements shall be made with a quasi-peak measuring receiver in the frequency range 30 MHz to 5th harmonic of highest frequency. The quasi-peak measuring receiver shall be in accordance with clause 2 of CISPR 16-1. Receivers with peak detectors shall be in accordance with clause 3 of CISPR 16-1, and shall have a 6 dB bandwidth in accordance with clause 2 of CISPR 16-1.

| Frequency of Emission (MHz) | Field Strength QP Limit (dBuV/m) at 3m |
|---|---|
| 30~88 | 40 |
| 88~216 | 43.5 |
| 216~960 | 46 |
| Above 960 | 54 |

### 4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

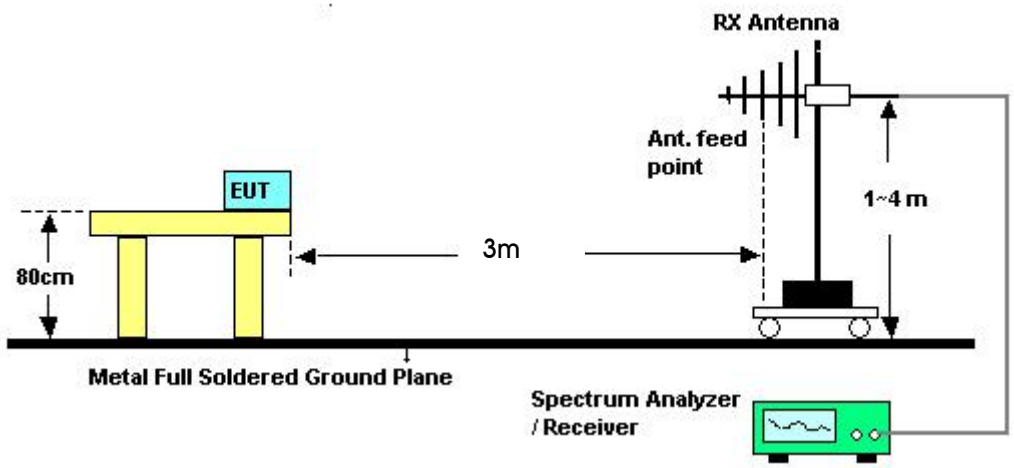
| Receiver Parameter | Setting |
|---|---|
| Attenuation | Auto |
| Start ~ Stop Frequency | 30MHz~1000MHz / RB 120kHz for QP |

| Spectrum Parameter | Setting |
|---|---|
| Start Frequency | 1000 MHz |
| Stop Frequency | 5th harmonic of highest frequency |
| RB / VB | 1 MHz / 1MHz for Peak ; 1 MHz / 10Hz for Average |

### 4.2.3. Test Procedures

1. The EUT was placed on the top of the turntable 0.8 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

### 4.2.4. Test Setup Layout



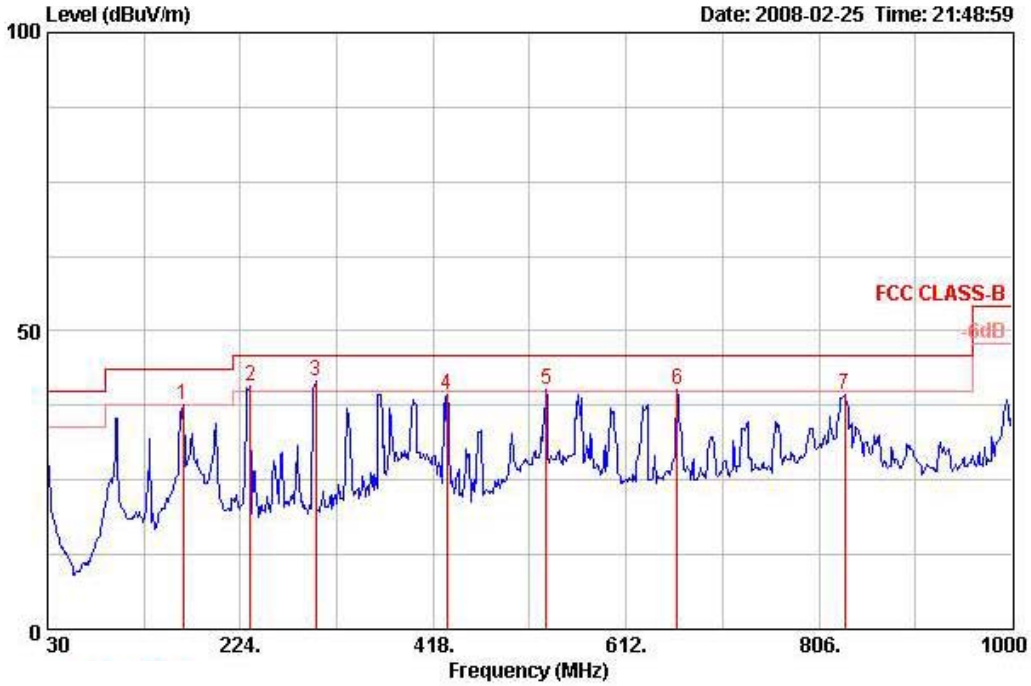

### 4.2.5. Test Deviation

There is no deviation with the original standard.

## 4.2.6. Results of Radiated Emissions (30MHz~1GHz)

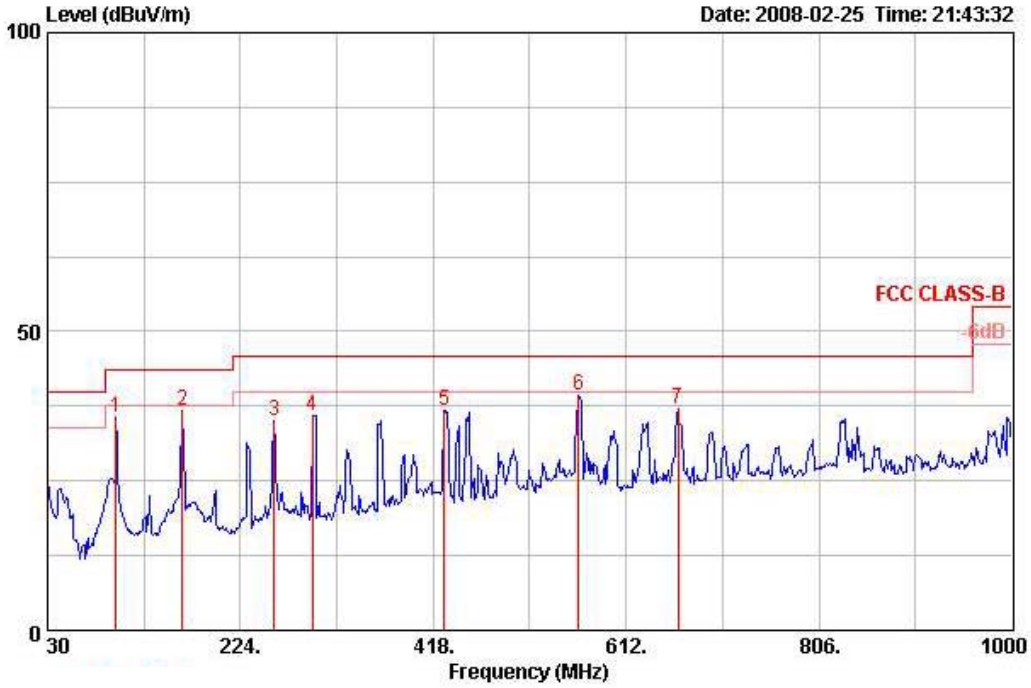
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | Ant. A |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 166.770 | 37.61 | -5.89 | 43.50 | 54.55 | 8.79 | 27.27 | 1.53 | Peak | 0 | 100 | HORIZONTAL |
| 2 @ | 233.700 | 40.69 | -5.31 | 46.00 | 55.85 | 10.04 | 27.03 | 1.83 | Peak | 0 | 100 | HORIZONTAL |
| 3 @ | 299.660 | 41.55 | -4.45 | 46.00 | 53.45 | 12.90 | 26.90 | 2.10 | Peak | 152 | 255 | HORIZONTAL |
| 4 @ | 431.580 | 39.35 | -6.65 | 46.00 | 48.24 | 16.38 | 27.76 | 2.49 | Peak | 0 | 100 | HORIZONTAL |
| 5 @ | 531.490 | 40.13 | -5.87 | 46.00 | 47.60 | 17.87 | 28.10 | 2.76 | Peak | 0 | 100 | HORIZONTAL |
| 6 @ | 663.410 | 40.06 | -5.94 | 46.00 | 45.75 | 18.90 | 28.04 | 3.45 | Peak | 0 | 100 | HORIZONTAL |
| 7 @ | 832.190 | 39.45 | -6.55 | 46.00 | 43.02 | 20.60 | 27.54 | 3.36 | Peak | 0 | 100 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 98.870 | 35.66 | -7.84 | 43.50 | 51.98 | 10.10 | 27.61 | 1.18 | Peak | 0 | 400 | VERTICAL |
| 2 @ | 165.800 | 36.84 | -6.66 | 43.50 | 53.76 | 8.82 | 27.27 | 1.53 | Peak | 0 | 400 | VERTICAL |
| 3 @ | 257.950 | 34.94 | -11.06 | 46.00 | 47.51 | 12.48 | 26.98 | 1.93 | Peak | 0 | 400 | VERTICAL |
| 4 @ | 296.750 | 35.89 | -10.11 | 46.00 | 47.87 | 12.84 | 26.91 | 2.09 | Peak | 0 | 400 | VERTICAL |
| 5 @ | 428.670 | 36.88 | -9.12 | 46.00 | 45.73 | 16.42 | 27.75 | 2.47 | Peak | 0 | 400 | VERTICAL |
| 6 @ | 564.470 | 39.30 | -6.70 | 46.00 | 45.97 | 18.60 | 28.10 | 2.83 | Peak | 0 | 400 | VERTICAL |
| 7 @ | 664.380 | 36.90 | -9.10 | 46.00 | 42.61 | 18.89 | 28.04 | 3.44 | Peak | 0 | 400 | VERTICAL |

Note:

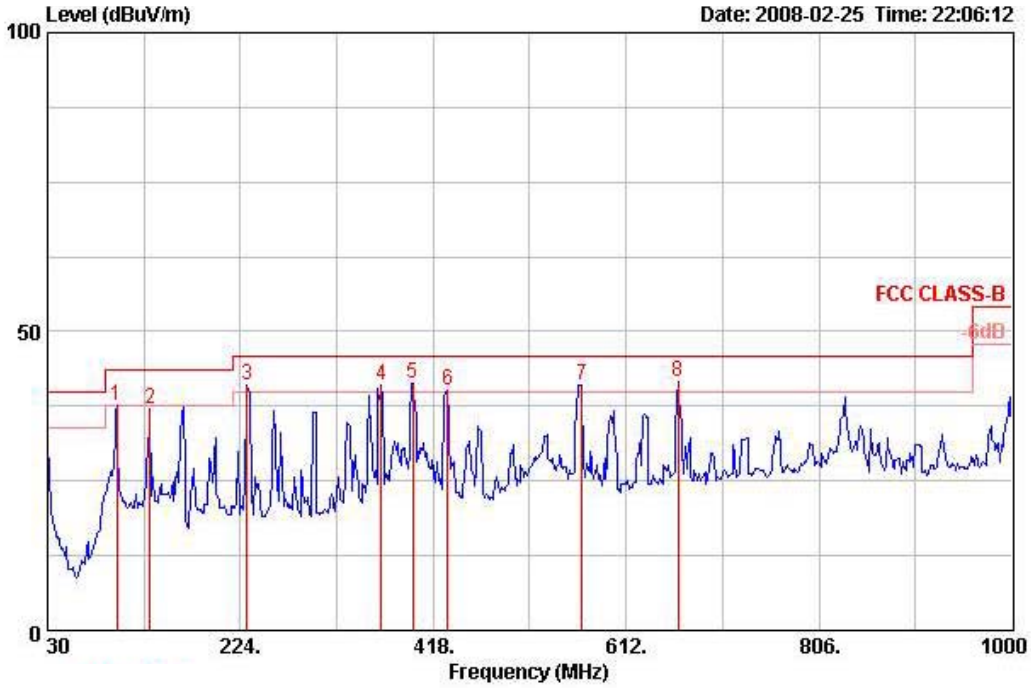
The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

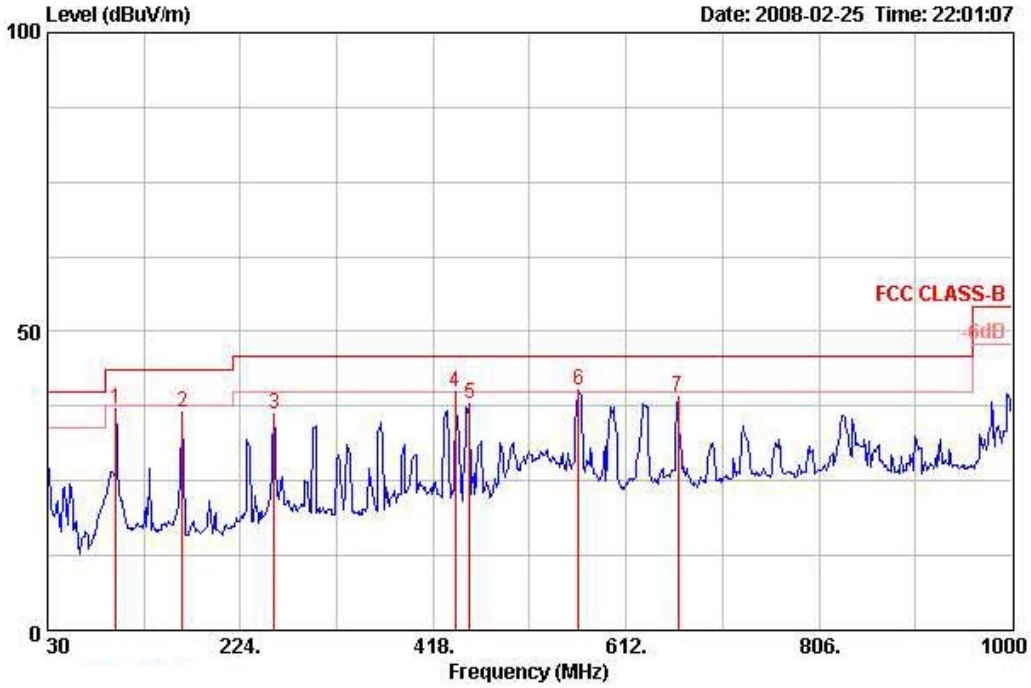
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | Ant. D |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 99.840 | 37.65 | -5.85 | 43.50 | 53.80 | 10.25 | 27.60 | 1.20 | Peak | 0 | 100 | HORIZONTAL |
| 2 @ | 132.820 | 37.17 | -6.33 | 43.50 | 51.91 | 11.37 | 27.43 | 1.33 | Peak | 0 | 100 | HORIZONTAL |
| 3 @ | 230.790 | 40.93 | -5.07 | 46.00 | 56.43 | 9.71 | 27.04 | 1.82 | Peak | 0 | 100 | HORIZONTAL |
| 4 @ | 365.620 | 41.04 | -4.96 | 46.00 | 51.59 | 14.58 | 27.36 | 2.23 | Peak | 0 | 100 | HORIZONTAL |
| 5 @ | 397.630 | 41.28 | -4.72 | 46.00 | 50.78 | 15.79 | 27.58 | 2.30 | Peak | 0 | 100 | HORIZONTAL |
| 6 @ | 432.550 | 40.05 | -5.95 | 46.00 | 48.94 | 16.37 | 27.76 | 2.50 | Peak | 0 | 100 | HORIZONTAL |
| 7 @ | 567.380 | 41.16 | -4.84 | 46.00 | 47.80 | 18.62 | 28.10 | 2.83 | Peak | 0 | 100 | HORIZONTAL |
| 8 @ | 664.380 | 41.69 | -4.31 | 46.00 | 47.39 | 18.89 | 28.04 | 3.44 | Peak | 339 | 158 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 98.870 | 37.05 | -6.45 | 43.50 | 53.37 | 10.10 | 27.61 | 1.18 | Peak | 0 | 400 | VERTICAL |
| 2 @ | 165.800 | 36.55 | -6.95 | 43.50 | 53.47 | 8.82 | 27.27 | 1.53 | Peak | 0 | 400 | VERTICAL |
| 3 @ | 257.950 | 36.23 | -9.77 | 46.00 | 48.80 | 12.48 | 26.98 | 1.93 | Peak | 0 | 400 | VERTICAL |
| 4 @ | 440.310 | 40.03 | -5.97 | 46.00 | 48.99 | 16.30 | 27.80 | 2.54 | Peak | 0 | 400 | VERTICAL |
| 5 @ | 454.860 | 37.80 | -8.20 | 46.00 | 46.76 | 16.30 | 27.87 | 2.61 | Peak | 0 | 400 | VERTICAL |
| 6 @ | 564.470 | 40.05 | -5.95 | 46.00 | 46.73 | 18.60 | 28.10 | 2.83 | Peak | 0 | 400 | VERTICAL |
| 7 @ | 664.380 | 39.00 | -7.00 | 46.00 | 44.71 | 18.89 | 28.04 | 3.44 | Peak | 0 | 400 | VERTICAL |

Note:

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

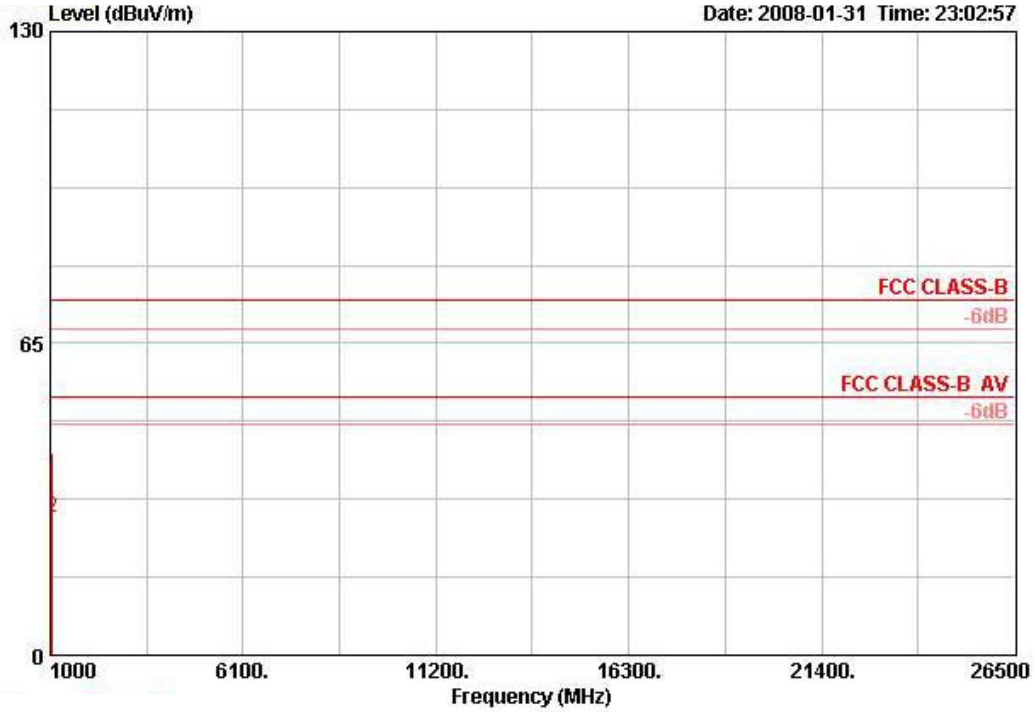
Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

## 4.2.7. Results for Radiated Emissions (1GHz~5th harmonic of highest frequency)

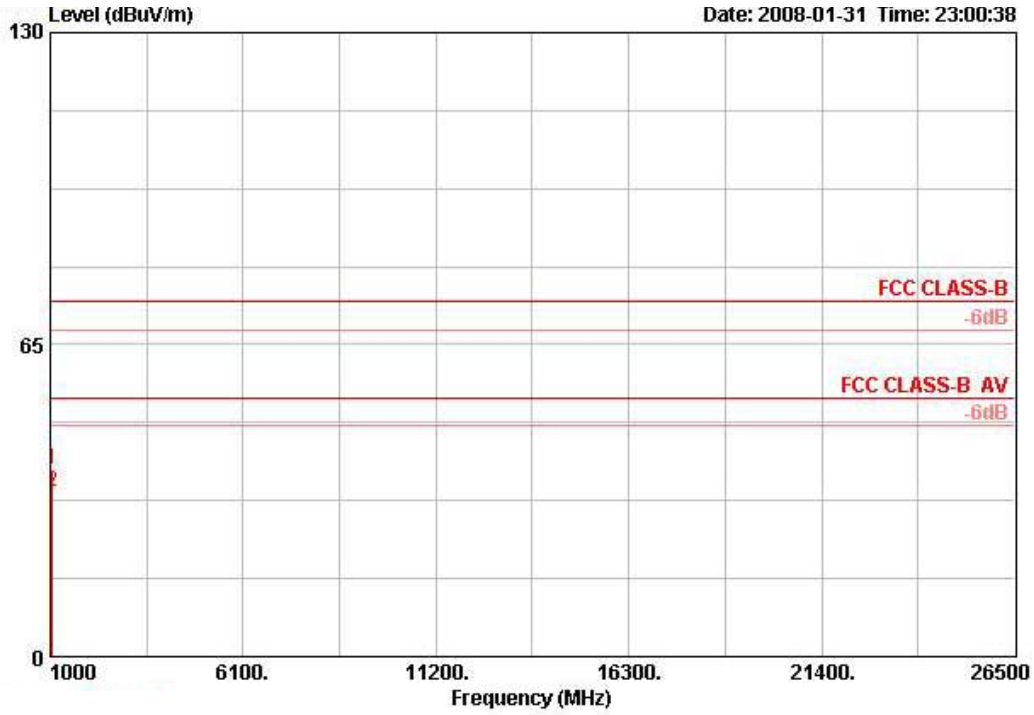
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11g Channel 6 / Ant. A |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg | |
| 1 | 1039.500 | 41.98 | -32.02 | 74.00 | 50.15 | 24.11 | 3.75 | 36.04 | PEAK | 100 | 145 | HORIZONTAL |
| 2 @ | 1060.900 | 28.78 | -25.22 | 54.00 | 36.85 | 24.22 | 3.75 | 36.04 | AVERAGE | 100 | 145 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg | |
| 1 | 1046.100 | 38.98 | -35.02 | 74.00 | 47.10 | 24.17 | 3.75 | 36.04 | PEAK | 100 | 219 | VERTICAL |
| 2 @ | 1060.800 | 34.34 | -19.66 | 54.00 | 42.40 | 24.22 | 3.75 | 36.04 | AVERAGE | 100 | 219 | VERTICAL |

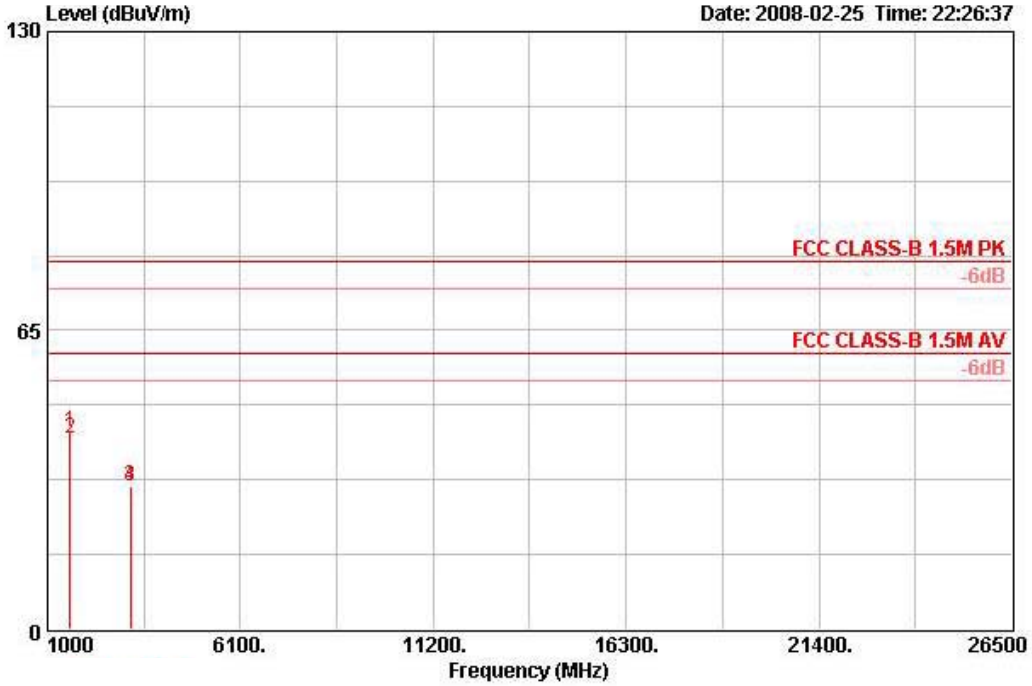
Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

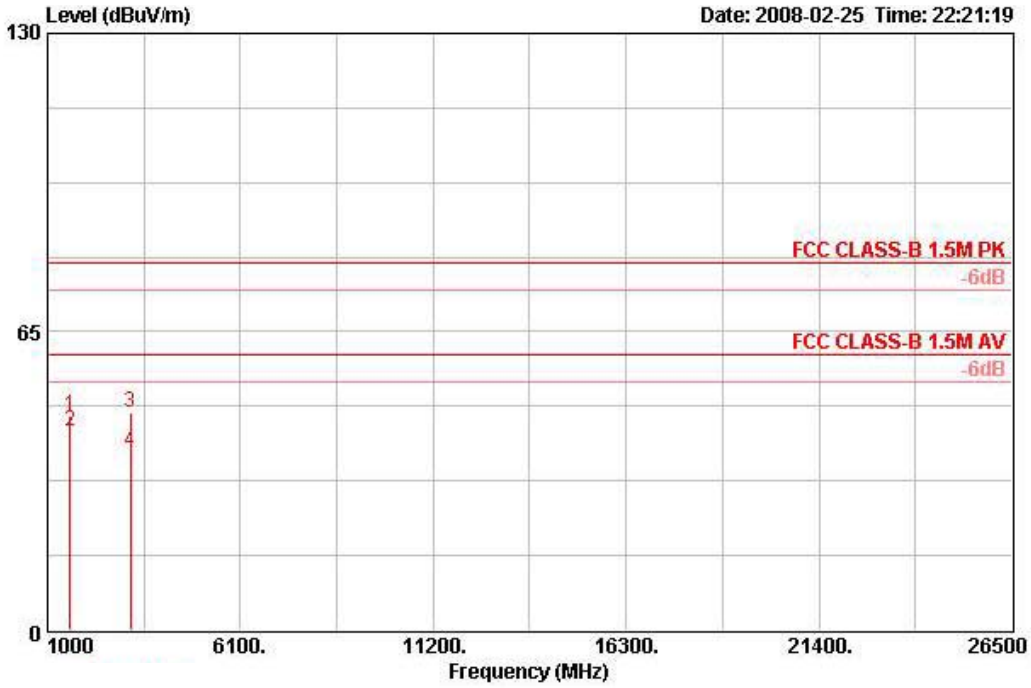
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11a Channel 40 / Ant. B |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 1590.452 | 42.79 | -17.21 | 60.00 | 47.85 | 26.42 | 34.78 | 3.29 | AVERAGE | 329 | 100 | HORIZONTAL |
| 2 | 1590.764 | 41.66 | -38.34 | 80.00 | 46.72 | 26.42 | 34.78 | 3.29 | PEAK | 329 | 100 | HORIZONTAL |
| 3 | 3200.150 | 31.27 | -28.73 | 60.00 | 31.28 | 30.34 | 34.96 | 4.61 | AVERAGE | 358 | 117 | HORIZONTAL |
| 4 | 3200.150 | 31.27 | -48.73 | 80.00 | 31.28 | 30.34 | 34.96 | 4.61 | PEAK | 358 | 117 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 | 1590.086 | 46.65 | -33.35 | 80.00 | 51.72 | 26.42 | 34.78 | 3.29 | PEAK | 272 | 100 | VERTICAL |
| 2 @ | 1590.392 | 43.16 | -16.84 | 60.00 | 48.22 | 26.42 | 34.78 | 3.29 | AVERAGE | 272 | 100 | VERTICAL |
| 3 | 3199.778 | 47.34 | -32.66 | 80.00 | 47.35 | 30.34 | 34.96 | 4.61 | PEAK | 98 | 114 | VERTICAL |
| 4 | 3200.006 | 38.79 | -21.21 | 60.00 | 38.80 | 30.34 | 34.96 | 4.61 | AVERAGE | 98 | 114 | VERTICAL |

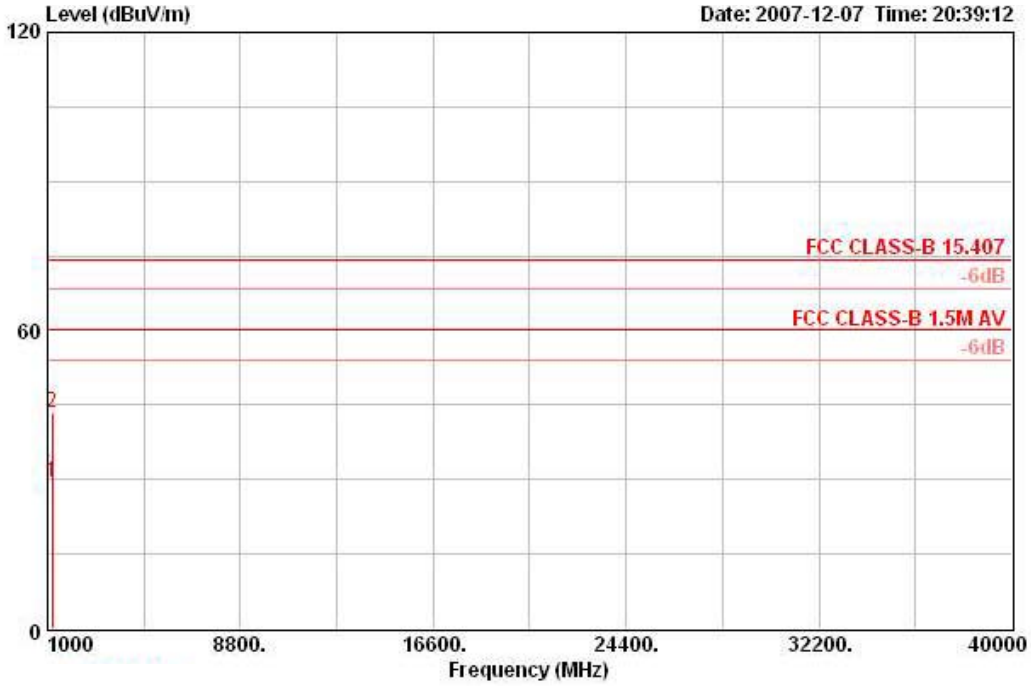
Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

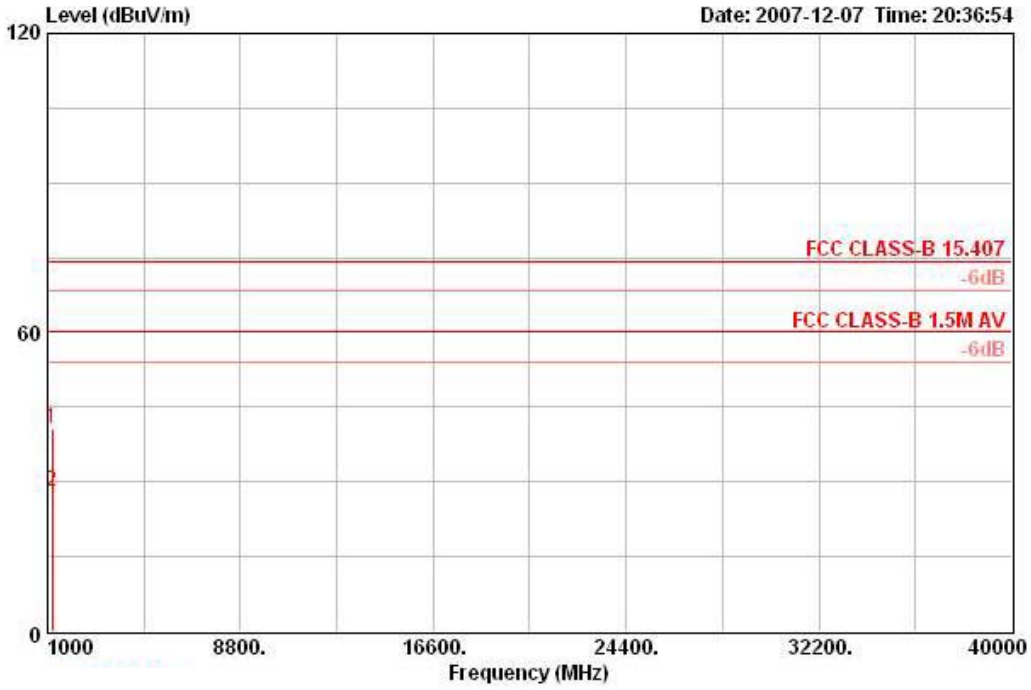
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11a Channel 157 / Ant. B |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 1198.680 | 29.39 | -30.61 | 60.00 | 37.89 | 24.39 | 35.73 | 2.85 | AVERAGE | 343 | 115 | HORIZONTAL |
| 2 | 1199.680 | 43.32 | -30.98 | 74.30 | 51.81 | 24.39 | 35.73 | 2.85 | PEAK | 343 | 115 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 | 1198.120 | 40.77 | -33.53 | 74.30 | 49.27 | 24.39 | 35.73 | 2.85 | PEAK | 351 | 100 | VERTICAL |
| 2 | 1198.560 | 28.14 | -31.86 | 60.00 | 36.63 | 24.39 | 35.73 | 2.85 | AVERAGE | 351 | 100 | VERTICAL |

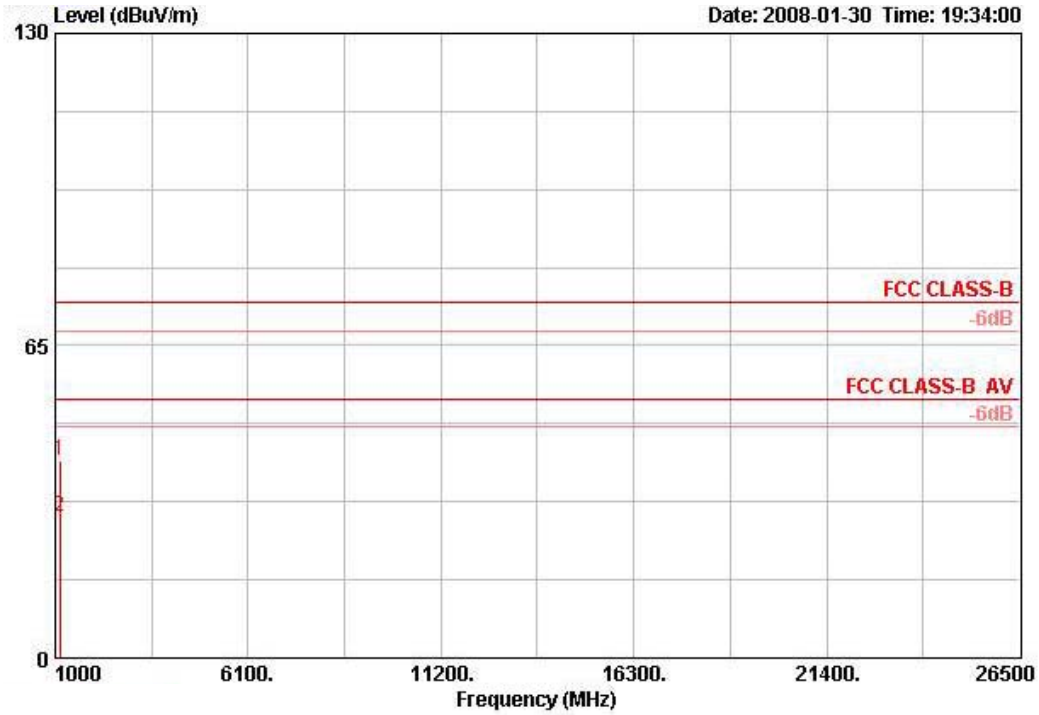
Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

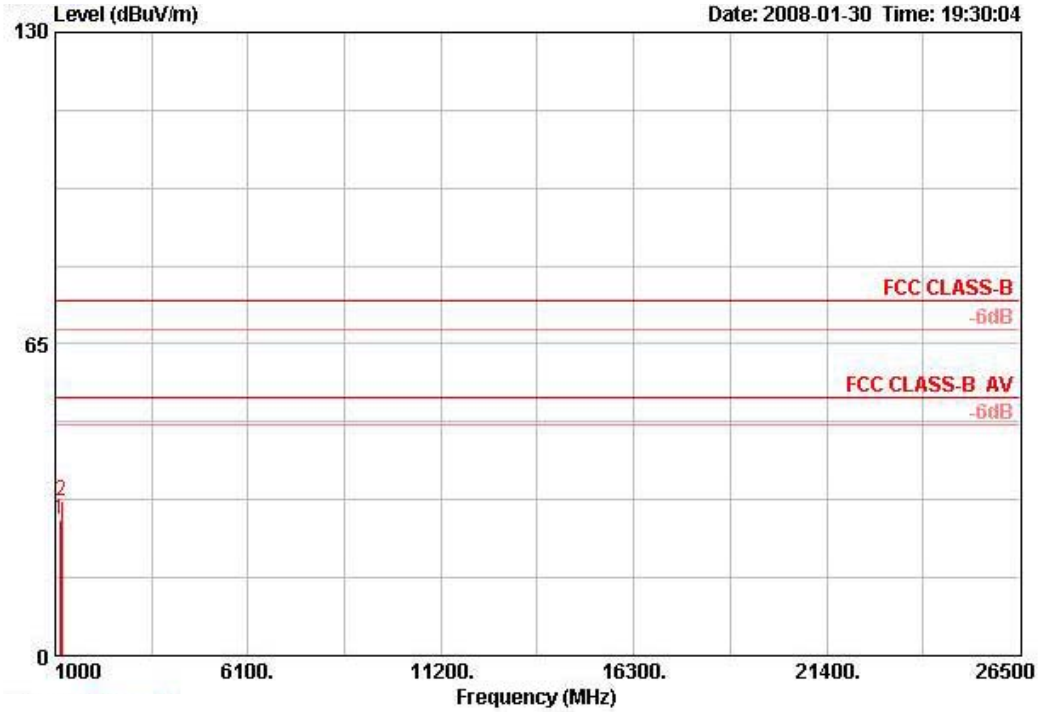
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11g Channel 6 / Ant. D |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg | |
| 1 | 1129.000 | 41.24 | -32.76 | 74.00 | 48.80 | 24.44 | 3.88 | 35.88 | PEAK | 100 | 261 | HORIZONTAL |
| 2 @ | 1131.000 | 29.54 | -24.46 | 54.00 | 37.10 | 24.44 | 3.88 | 35.88 | AVERAGE | 100 | 261 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Cable Loss | Preamp Factor | Remark | Ant Pos | Table Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | cm | deg | |
| 1 | 1125.200 | 28.44 | -25.56 | 54.00 | 36.05 | 24.39 | 3.88 | 35.88 | AVERAGE | 100 | 351 | VERTICAL |
| 2 | 1161.800 | 32.35 | -41.65 | 74.00 | 39.70 | 24.55 | 3.92 | 35.83 | PEAK | 100 | 351 | VERTICAL |

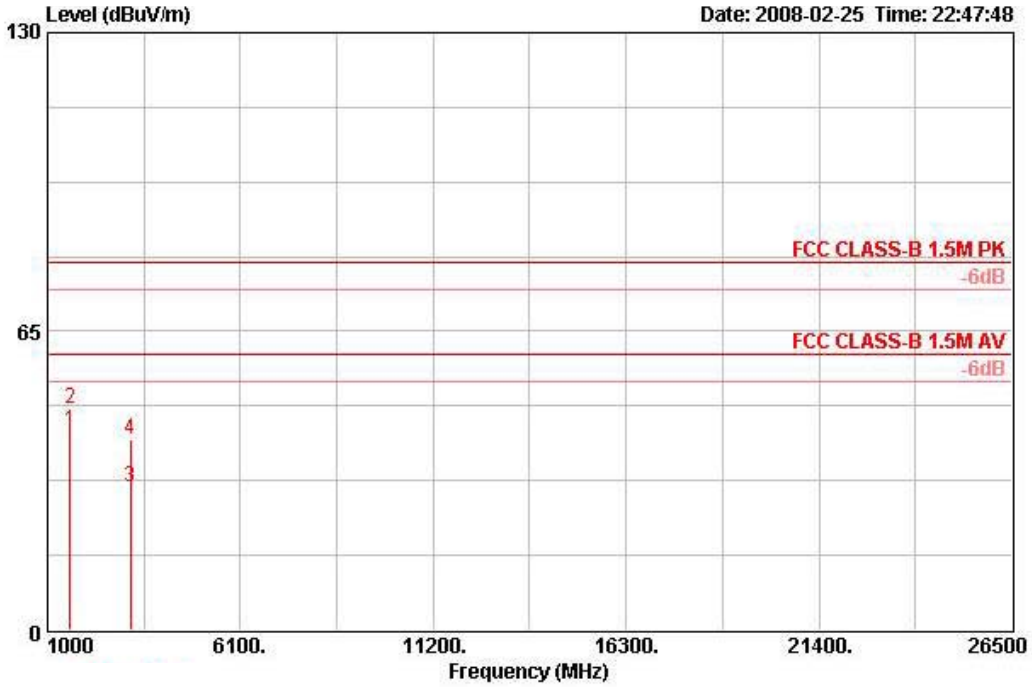
Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

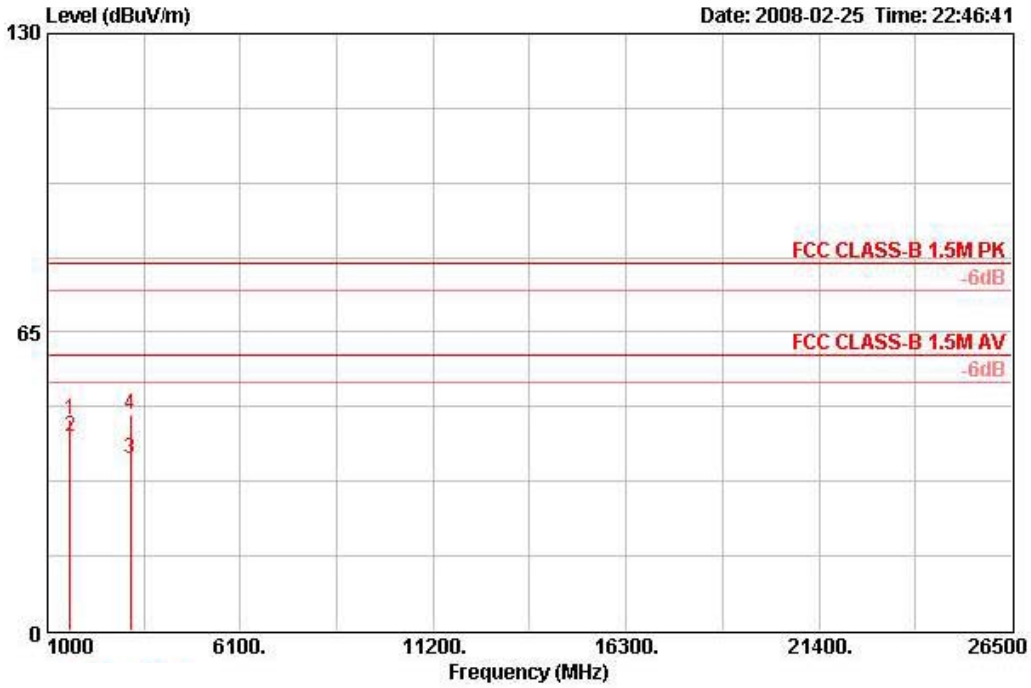
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11a Channel 40 / Ant. D |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 @ | 1590.390 | 43.30 | -16.70 | 60.00 | 48.37 | 26.42 | 34.78 | 3.29 | AVERAGE | 330 | 100 | HORIZONTAL |
| 2 | 1590.666 | 48.10 | -31.90 | 80.00 | 53.17 | 26.42 | 34.78 | 3.29 | PEAK | 330 | 100 | HORIZONTAL |
| 3 | 3199.500 | 31.09 | -28.91 | 60.00 | 31.11 | 30.34 | 34.96 | 4.61 | AVERAGE | 325 | 100 | HORIZONTAL |
| 4 | 3199.500 | 41.65 | -38.35 | 80.00 | 41.66 | 30.34 | 34.96 | 4.61 | PEAK | 325 | 100 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 | 1590.408 | 45.82 | -34.18 | 80.00 | 50.89 | 26.42 | 34.78 | 3.29 | PEAK | 272 | 100 | VERTICAL |
| 2 | 1590.410 | 42.09 | -17.91 | 60.00 | 47.16 | 26.42 | 34.78 | 3.29 | AVERAGE | 272 | 100 | VERTICAL |
| 3 | 3199.970 | 37.29 | -22.71 | 60.00 | 37.30 | 30.34 | 34.96 | 4.61 | AVERAGE | 98 | 116 | VERTICAL |
| 4 | 3200.040 | 46.89 | -33.11 | 80.00 | 46.90 | 30.34 | 34.96 | 4.61 | PEAK | 98 | 116 | VERTICAL |

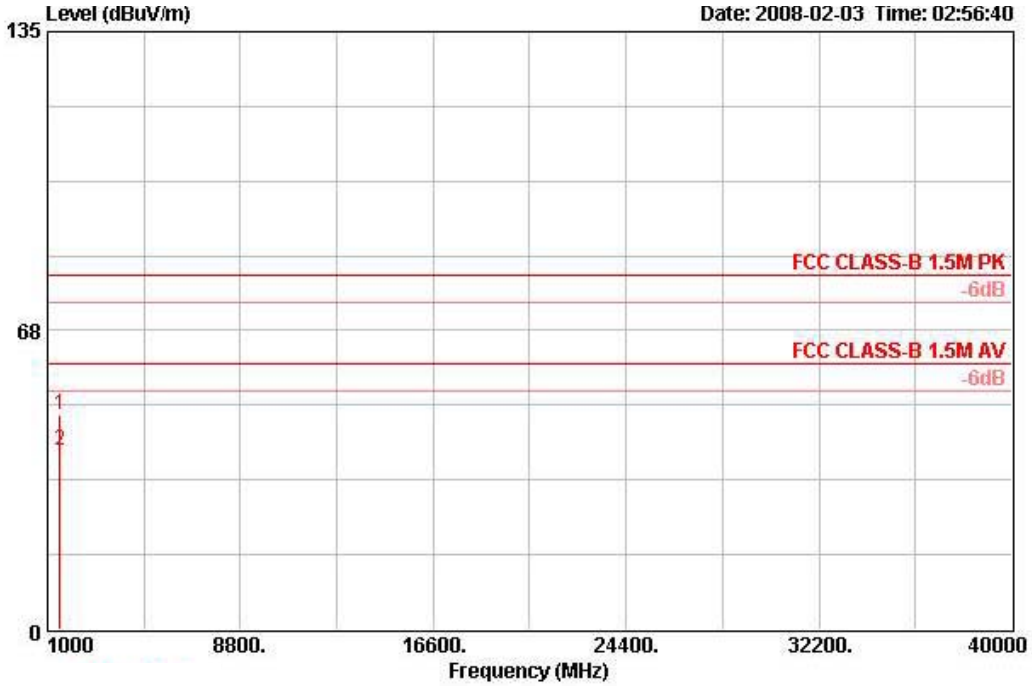
Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

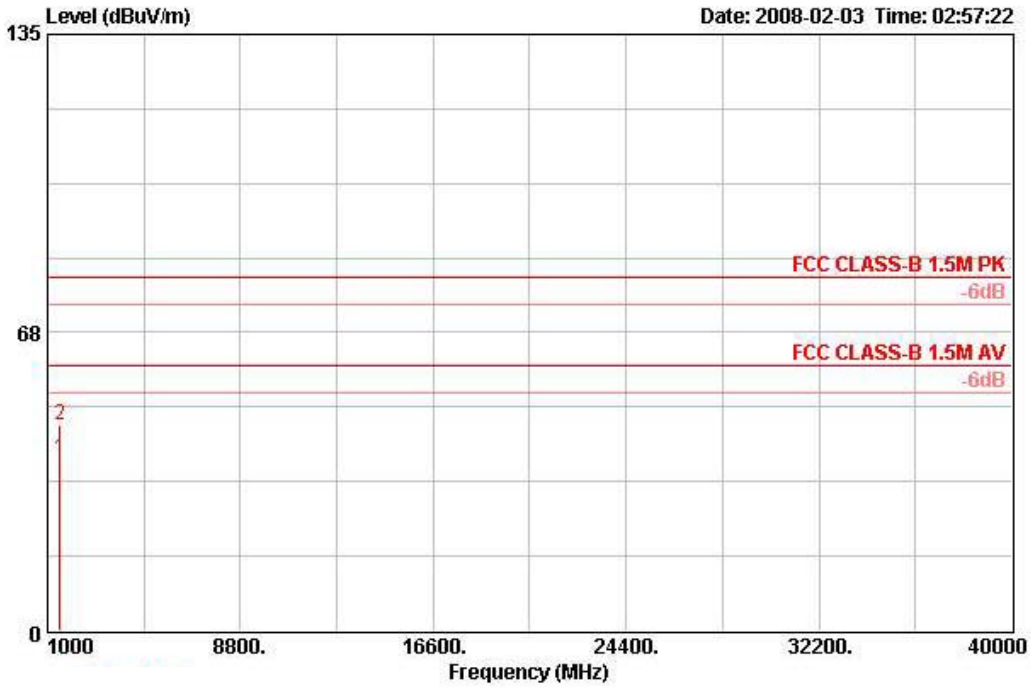
| Temperature | 26℃ | Humidity | 56% |
|---|---|---|---|
| Test Engineer | Roy Huang | Configurations | 802.11a Channel 157 / Ant. D |

*Horizontal*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 | 1499.720 | 48.41 | -31.59 | 80.00 | 54.45 | 25.50 | 34.75 | 3.20 | PEAK | 49 | 100 | HORIZONTAL |
| 2 | 1499.990 | 40.26 | -19.74 | 60.00 | 46.31 | 25.50 | 34.75 | 3.20 | AVERAGE | 49 | 100 | HORIZONTAL |

*Vertical*




| | Freq | Level | Over Limit | Limit Line | Read Level | Antenna Factor | Preamp Factor | Cable Loss | Remark | Table Pos | Ant Pos | Pol/Phase |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | MHz | dBuV/m | dB | dBuV/m | dBuV | dB/m | dB | dB | | deg | cm | |
| 1 | 1499.970 | 38.75 | -21.25 | 60.00 | 44.80 | 25.50 | 34.75 | 3.20 | AVERAGE | 104 | 100 | VERTICAL |
| 2 | 1500.100 | 46.46 | -33.54 | 80.00 | 52.50 | 25.50 | 34.75 | 3.20 | PEAK | 104 | 100 | VERTICAL |

Note:

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

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

# 5. LIST OF MEASURING EQUIPMENTS

| Instrument | Manufacturer | Model No. | Serial No. | Characteristics | Calibration Date | Remark |
|---|---|---|---|---|---|---|
| EMC Receiver | R&S | ESCS 30 | 100174 | 9kHz – 2.75GHz | Mar. 03, 2007 | Conduction (CO04-HY) |
| LISN | MessTec | NNB-2/16Z | 99079 | 9kHz – 30MHz | Mar. 31, 2007 | Conduction (CO04-HY) |
| LISN (Support Unit) | EMCO | 3810/2NM | 9703-1839 | 9kHz – 30MHz | Mar. 22, 2007 | Conduction (CO04-HY) |
| RF Cable-CON | UTIFLEX | 3102-26886-4 | CB049 | 9kHz – 30MHz | Apr. 20, 2007 | Conduction (CO04-HY) |
| ISN | SCHAFFNER | ISN T400 | 21653 | 9kHz –30MHz | Mar. 27, 2007 | Conduction (CO04-HY) |
| EMI Filter | LINDGREN | LRE-2030 | 2651 | < 450 Hz | N/A | Conduction (CO04-HY) |
| EMC Receiver | R&S | ESCS 30 | 100174 | 9kHz – 2.75GHz | Mar. 03, 2007 | Conduction (CO04-HY) |
| 3m Semi Anechoic Chamber | SIDT FRANKONIA | SAC-3M | 03CH03-HY | 30 MHz - 1 GHz 3m | Jun. 14, 2007 | Radiation (03CH03-HY) |
| Amplifier | SCHAFFNER | COA9231A | 18667 | 9 kHz - 2 GHz | Jan. 14, 2008 | Radiation (03CH03-HY) |
| Amplifier | Agilent | 8449B | 3008A02120 | 1 GHz - 26.5 GHz | Jun. 07, 2007 | Radiation (03CH03-HY) |
| Amplifier | MITEQ | AMF-6F-260400 | 9121372 | 26.5 GHz - 40 GHz | Jan. 22, 2007* | Radiation (03CH03-HY) |
| Spectrum Analyzer | R&S | FSP40 | 100305 | 9 kHz - 40 GHz | Sep. 27, 2007 | Radiation (03CH03-HY) |
| Loop Antenna | R&S | HFH2-Z2 | 860004/001 | 9 kHz - 30 MHz | May 23, 2006* | Radiation (03CH03-HY) |
| Bilog Antenna | SCHAFFNER | CBL 6112D | 22237 | 30 MHz – 1 GHz | Jul. 21, 2007 | Radiation (03CH03-HY) |
| Horn Antenna | EMCO | 3115 | 6741 | 1GHz ~ 18GHz | May 04, 2007 | Radiation (03CH03-HY) |
| Horn Antenna | SCHWARZBECK | BBHA9170 | BBHA9170154 | 15 GHz - 40 GHz | Jan. 18. 2008 | Radiation (03CH03-HY) |
| RF Cable-R03m | Jye Bao | RG142 | CB021 | 30 MHz - 1 GHz | Dec. 03, 2007 | Radiation (03CH03-HY) |
| RF Cable-HIGH | SUHNER | SUCOFLEX 106 | 03CH03-HY | 1 GHz - 40 GHz | Dec. 03, 2007 | Radiation (03CH03-HY) |
| Turn Table | HD | DS 420 | 420/650/00 | 0 – 360 degree | N/A | Radiation (03CH03-HY) |
| Antenna Mast | HD | MA 240 | 240/560/00 | 1 m - 4 m | N/A | Radiation (03CH03-HY) |

Note: Calibration Interval of instruments listed above is one year.

* Calibration Interval of instruments listed above is two year.

NCR means Non-Calibration required.

# 6. TEST LOCATION

| | | | |
|---|---|---|---|
| SHIJR | ADD | : | 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. |
| | TEL | : | 886-2-2696-2468 |
| | FAX | : | 886-2-2696-2255 |
| HWA YA | ADD | : | No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. |
| | TEL | : | 886-3-327-3456 |
| | FAX | : | 886-3-318-0055 |
| LINKOU | ADD | : | No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C |
| | TEL | : | 886-2-2601-1640 |
| | FAX | : | 886-2-2601-1695 |
| DUNGHU | ADD | : | No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. |
| | TEL | : | 886-2-2631-4739 |
| | FAX | : | 886-2-2631-9740 |
| JUNGHE | ADD | : | 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. |
| | TEL | : | 886-2-8227-2020 |
| | FAX | : | 886-2-8227-2626 |
| NEIHU | ADD | : | 4Fl., No. 339, Hsin Hu 2nd Rd., Taipei 114, Taiwan, R.O.C. |
| | TEL | : | 886-2-2794-8886 |
| | FAX | : | 886-2-2794-9777 |
| JHUBEI | ADD | : | No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. |
| | TEL | : | 886-3-656-9065 |
| | FAX | : | 886-3-656-9085 |

# 7. TAF CERTIFICATE OF ACCREDITATION

Certificate No. : L1190-070110

財團法人全國認證基金會
Taiwan Accreditation Foundation

## Certificate of Accreditation

This is to certify that

**Sporton International Inc.**
**EMC & Wireless Communications Laboratory**
No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

**is accredited in respect of laboratory**

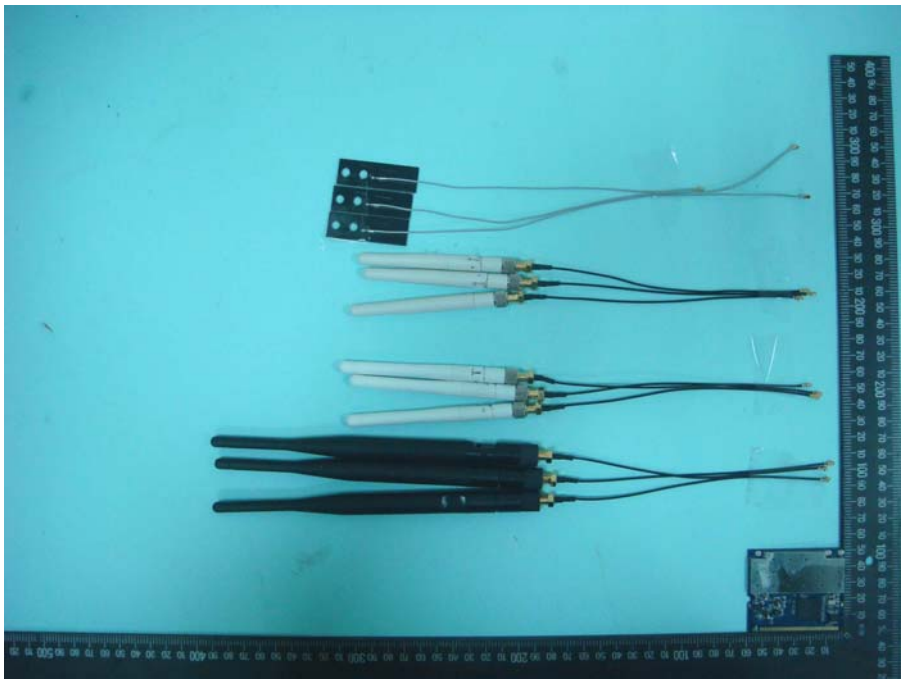
| | | |
|---|---|---|
| **Accreditation Criteria** | : | ISO/IEC 17025:2005 |
| **Accreditation Number** | : | 1190 |
| **Originally Accredited** | : | December 15, 2003 |
| **Effective Period** | : | January 10, 2007 to January 09, 2010 |
| **Accredited Scope** | : | Testing Field, see described in the Appendix |
| **Specific Accreditation Program** | : | Accreditation Program for Designated Testing Laboratory for Commodities Inspection<br>Accreditation Program for Telecommunication Equipment Testing Laboratory |

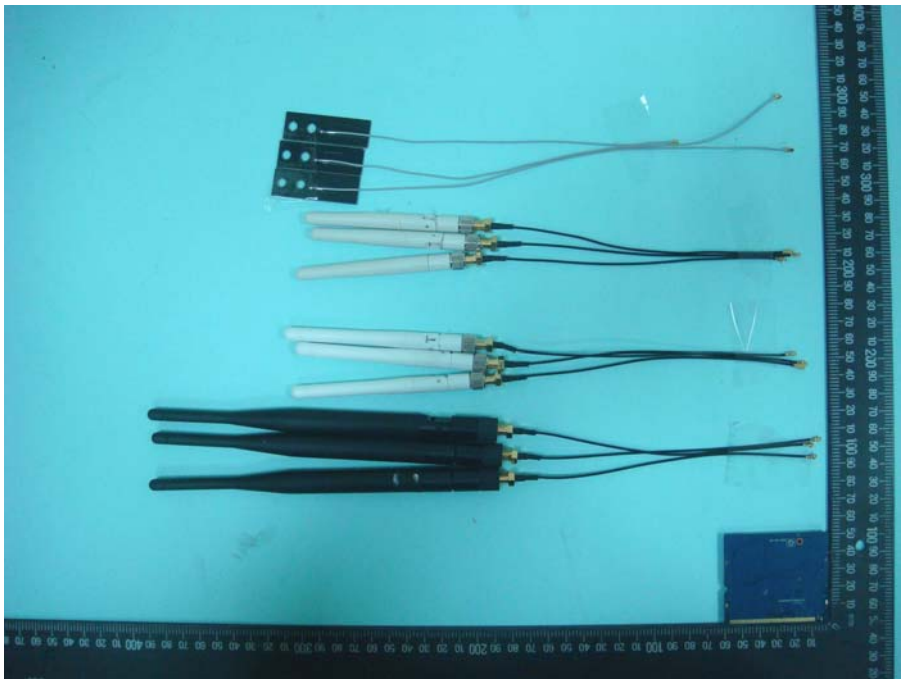
Jay-San Chen
President, Taiwan Accreditation Foundation
Date : January 10, 2007

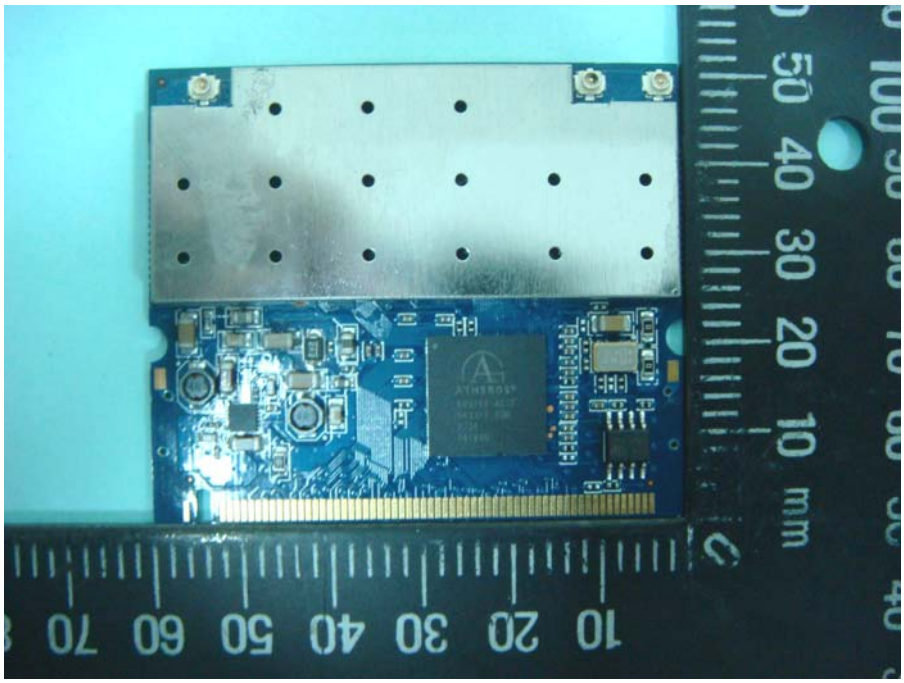
P1, total 9 pages

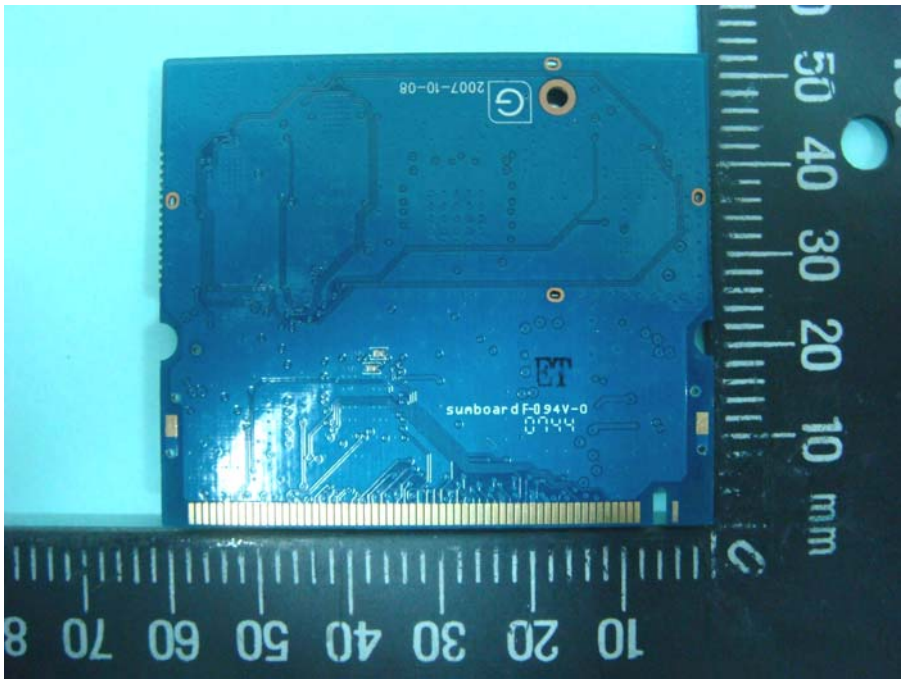
The Appendix forms an integral part of this Certificate, which shall be invalid when used without the Appendix.

# APPENDIX A. Photographs of EUT

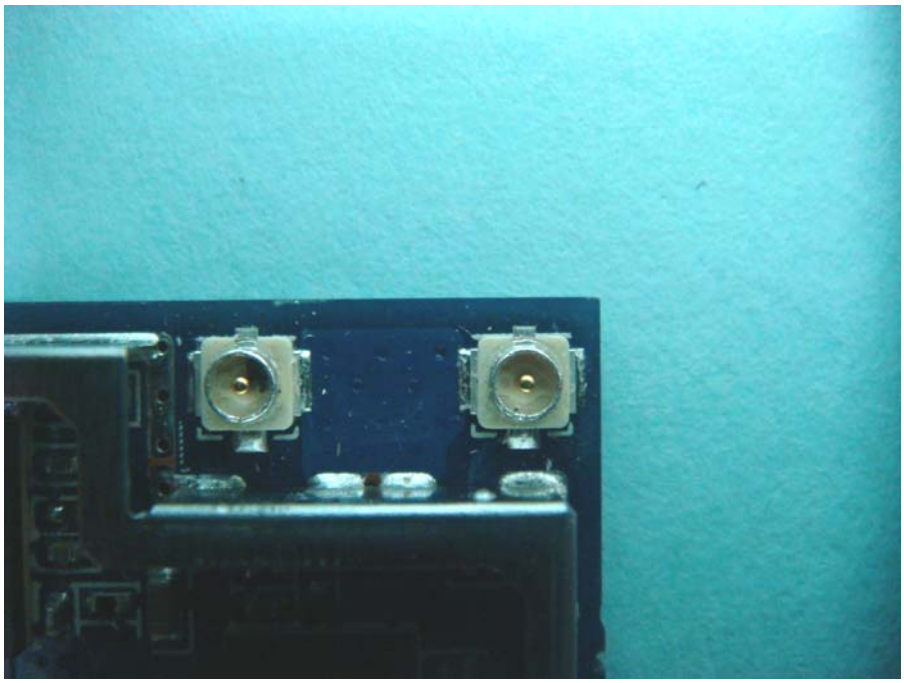


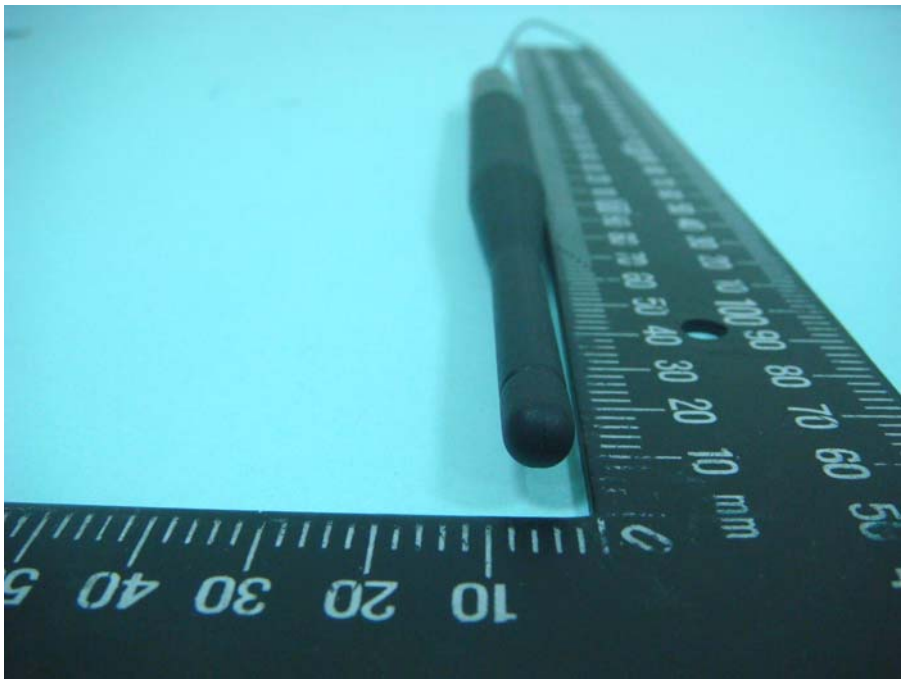




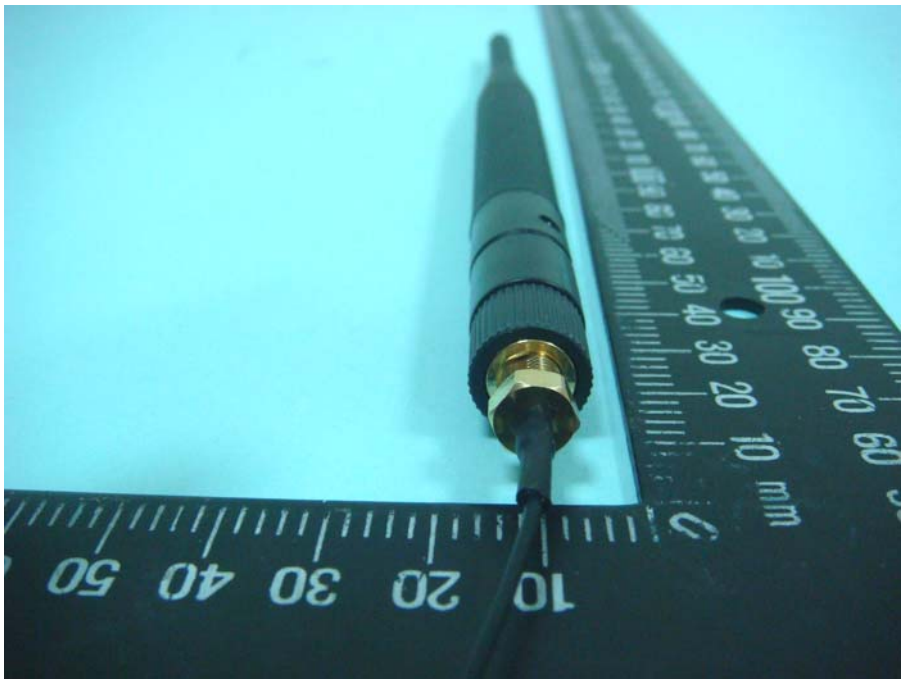


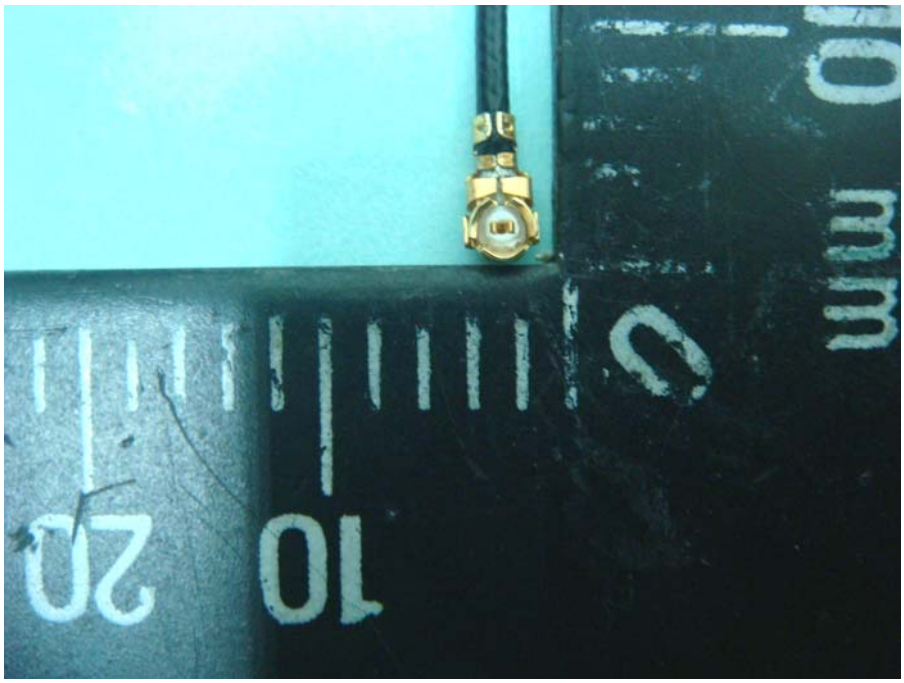

**SPORTON International Inc.**
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255



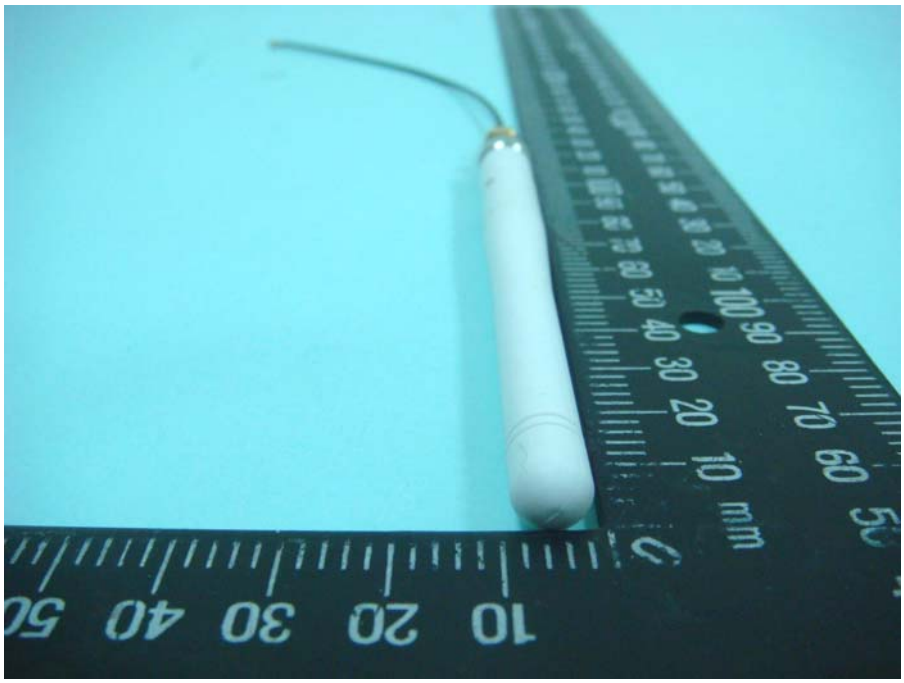


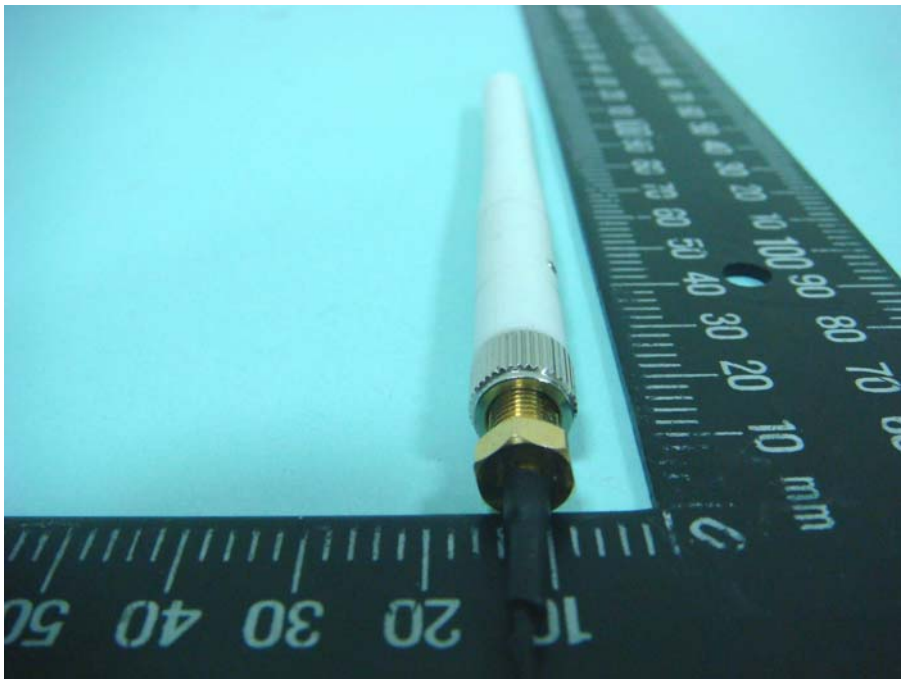

**SPORTON International Inc.**
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255

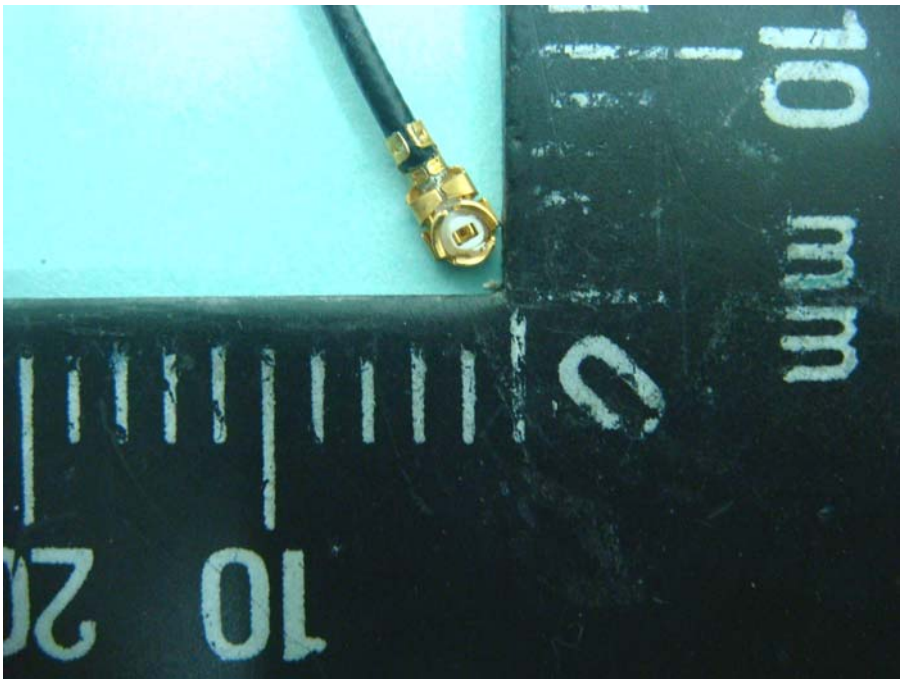



***SPORTON International Inc.***
TEL : 886-2-2696-2468
FAX : 886-2-2696-2255



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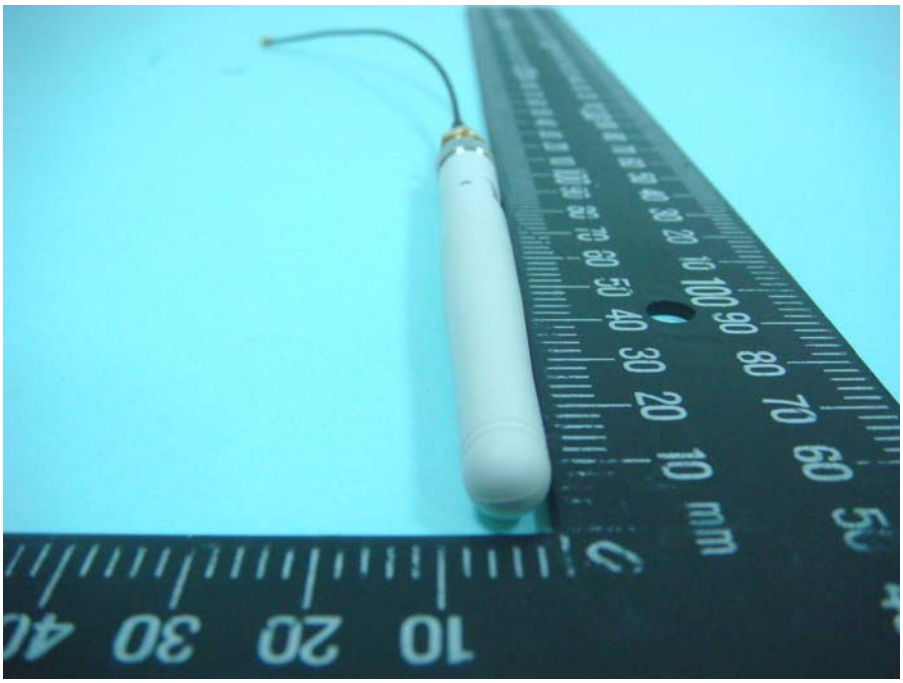
mm
0
10
20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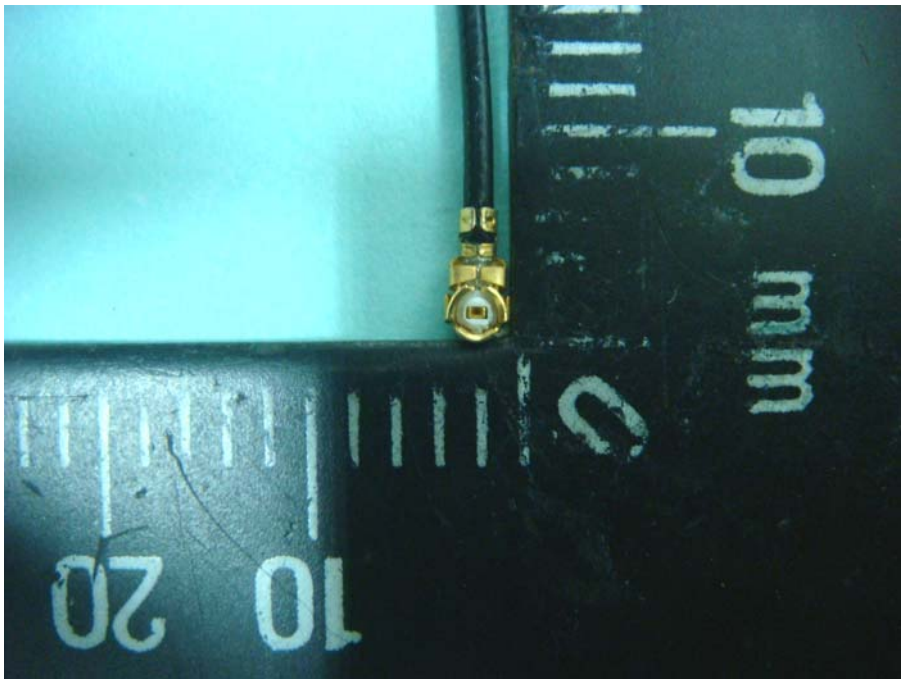
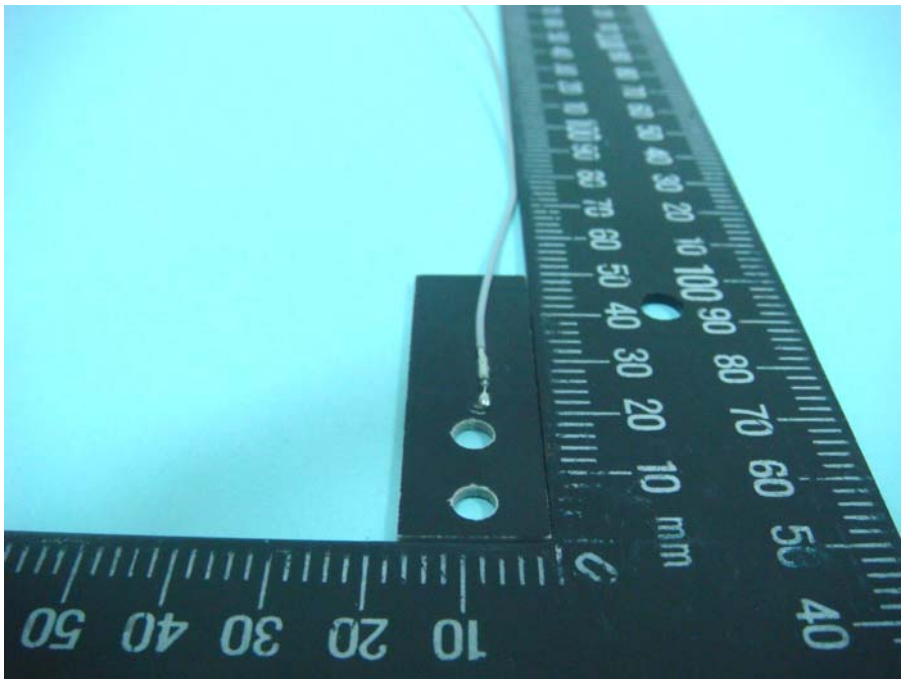
30
mm



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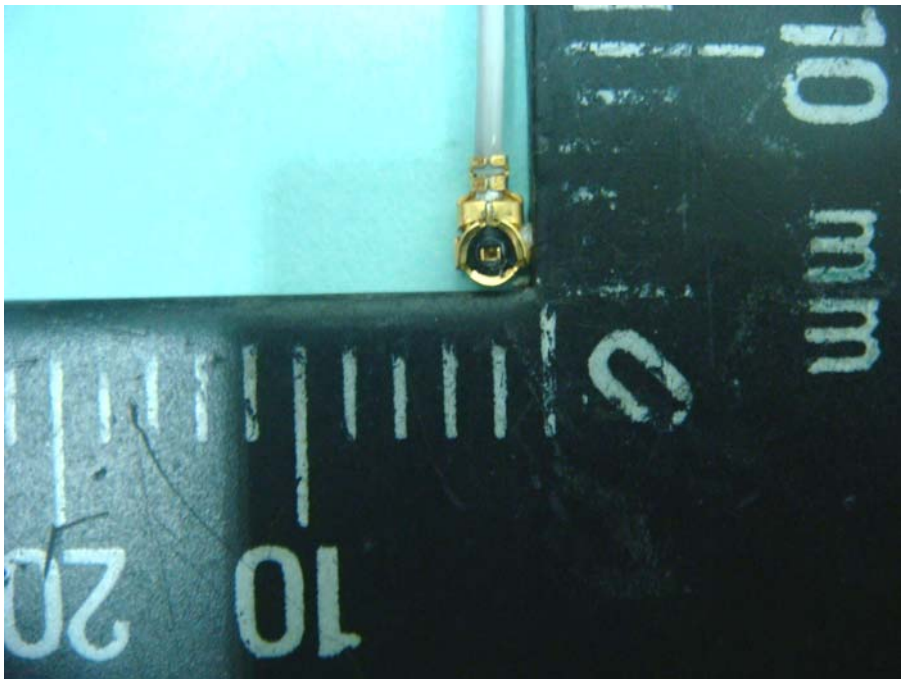
mm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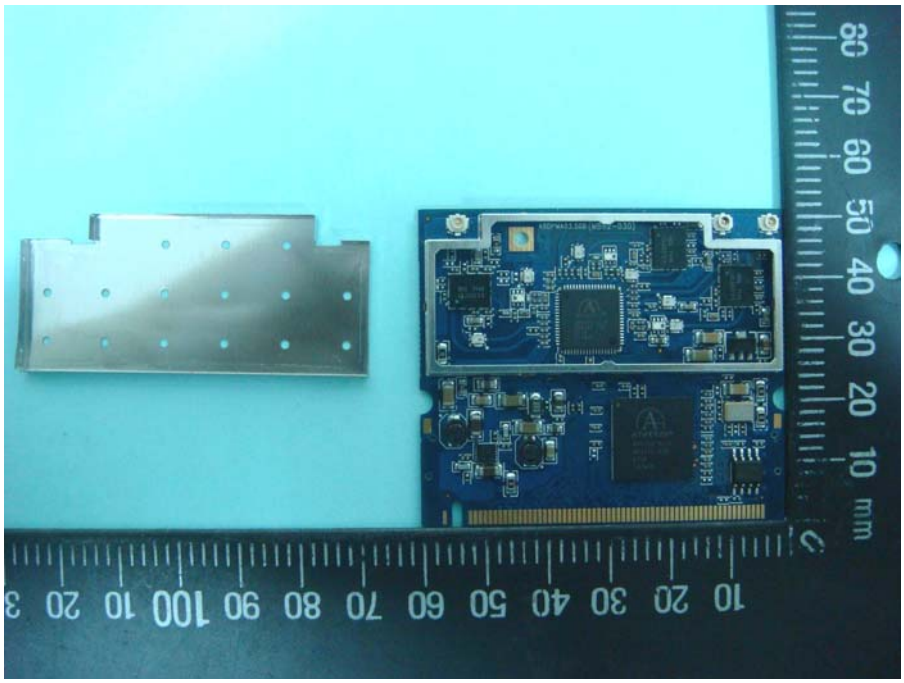
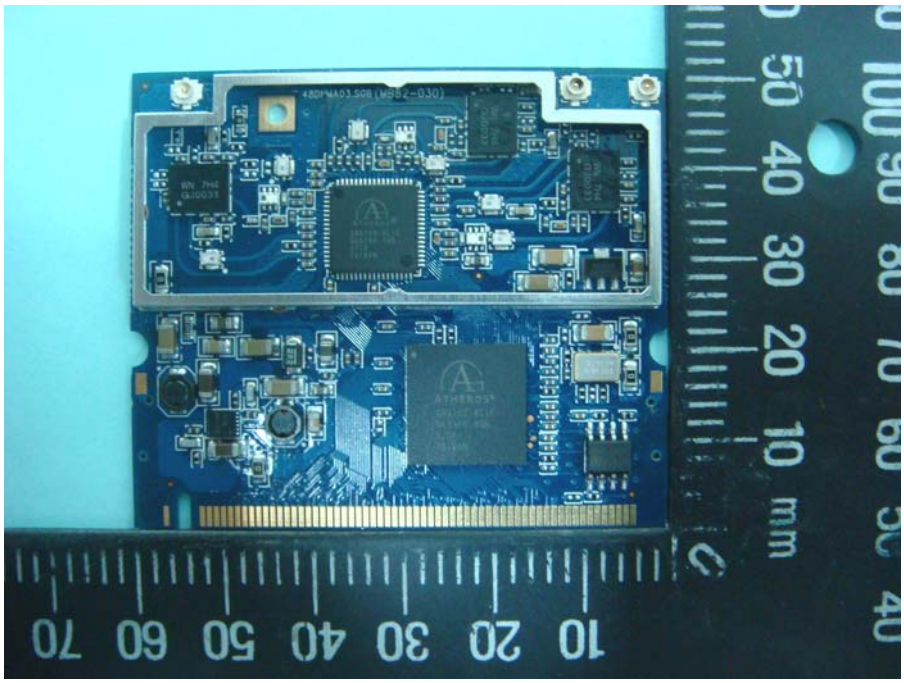
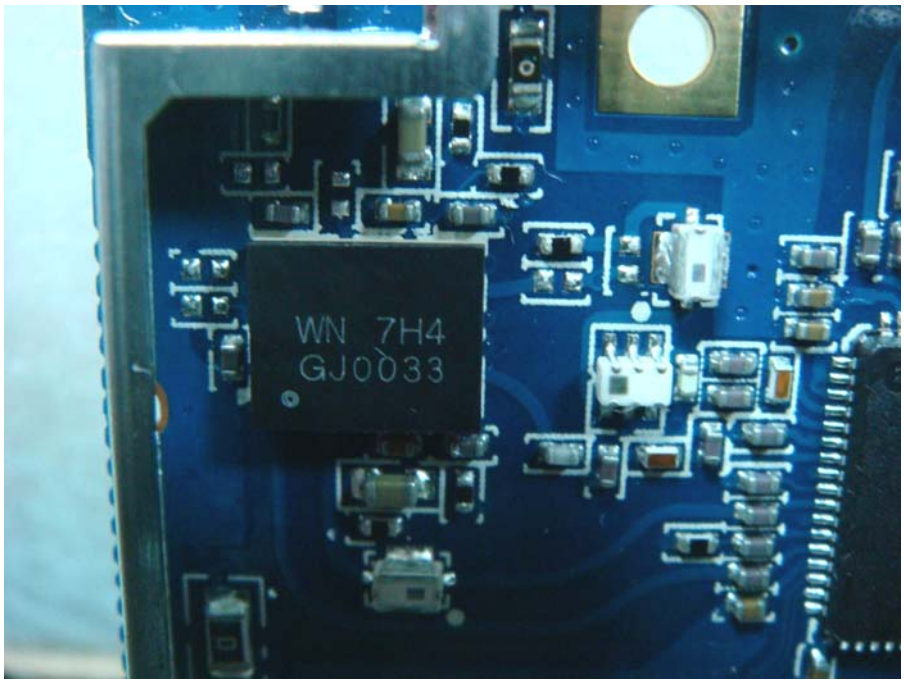





ATHEROS®
AR9160-AC1E
N63340.03B
0734
TAIWAN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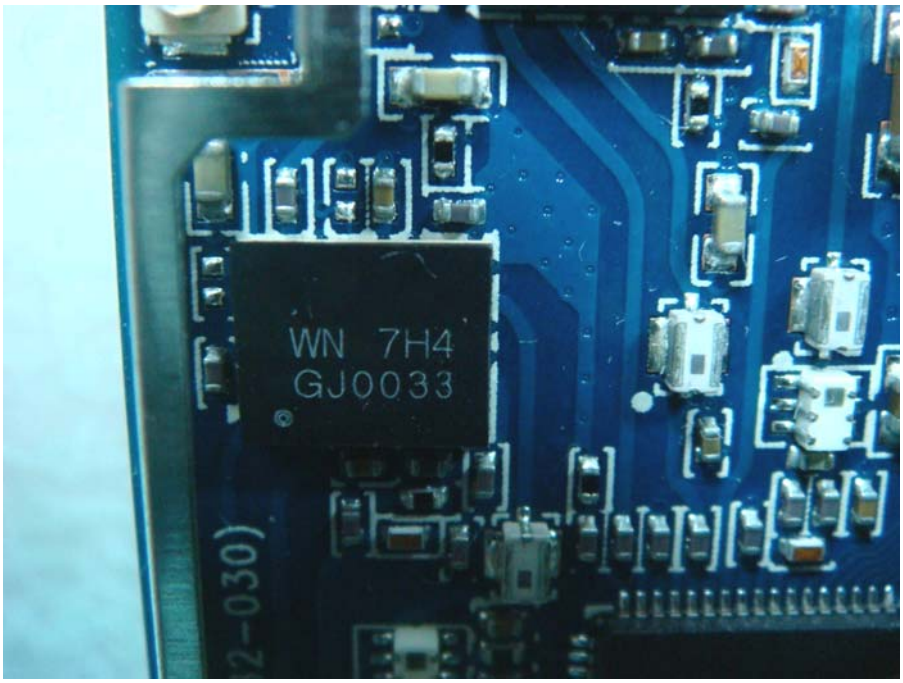
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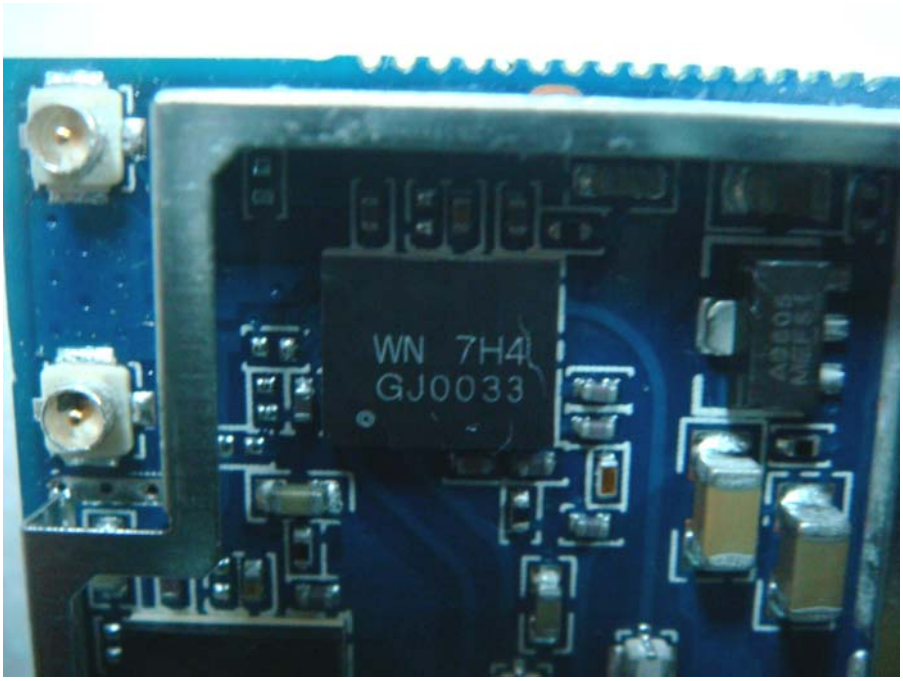
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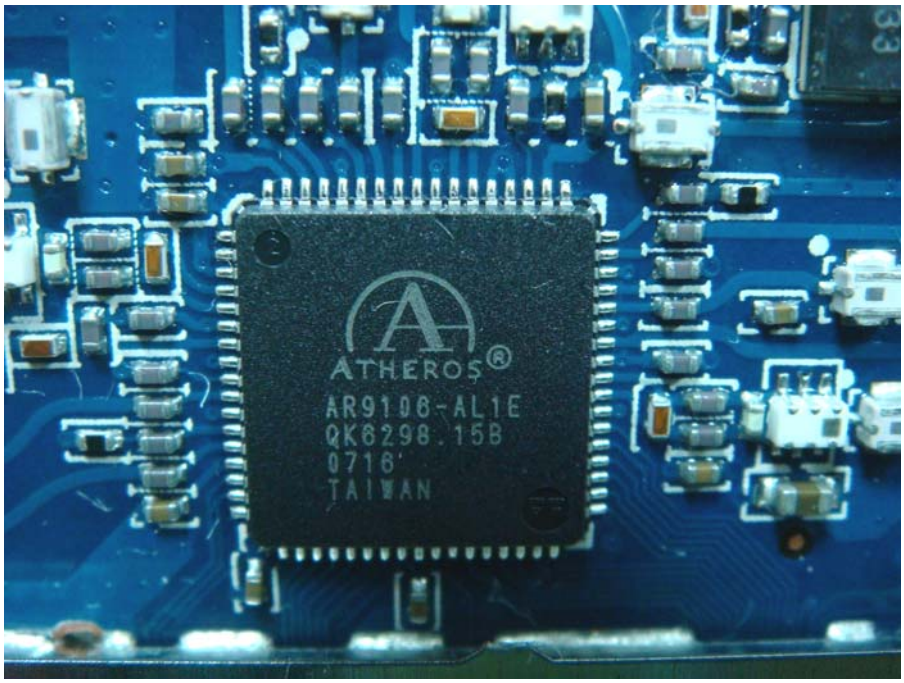
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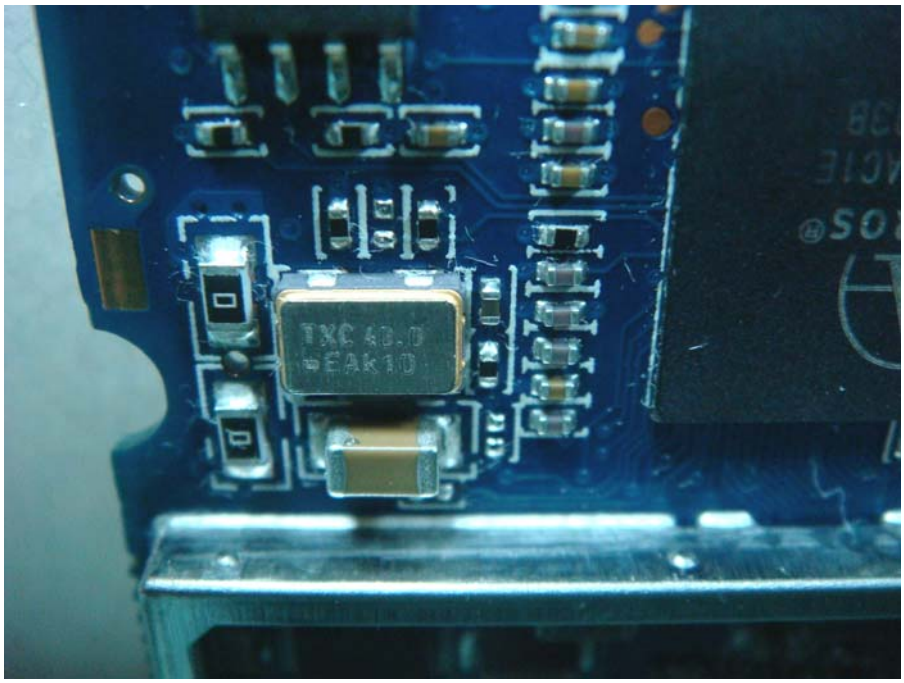
TAIWAN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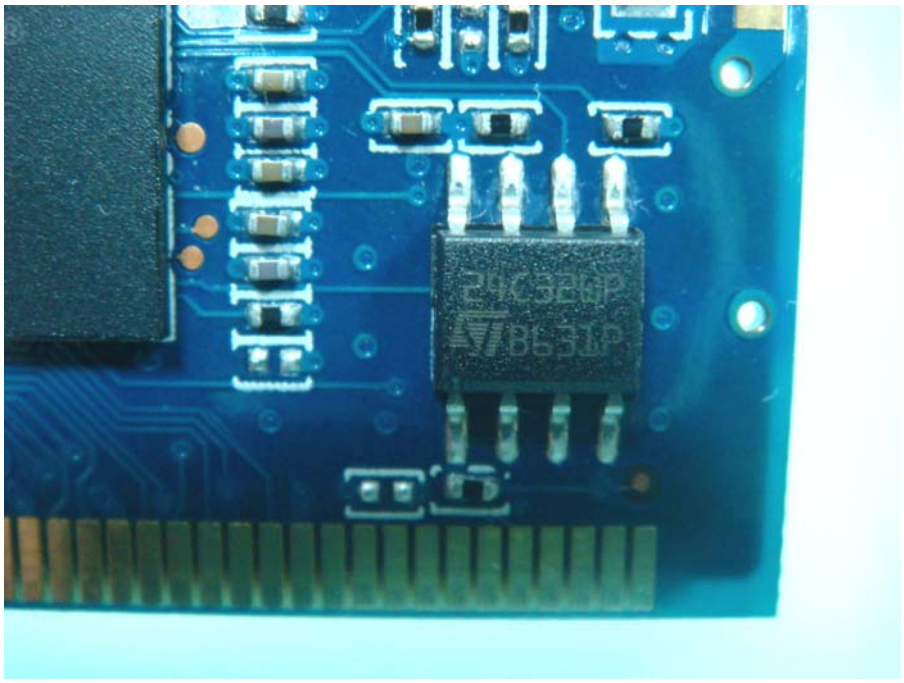
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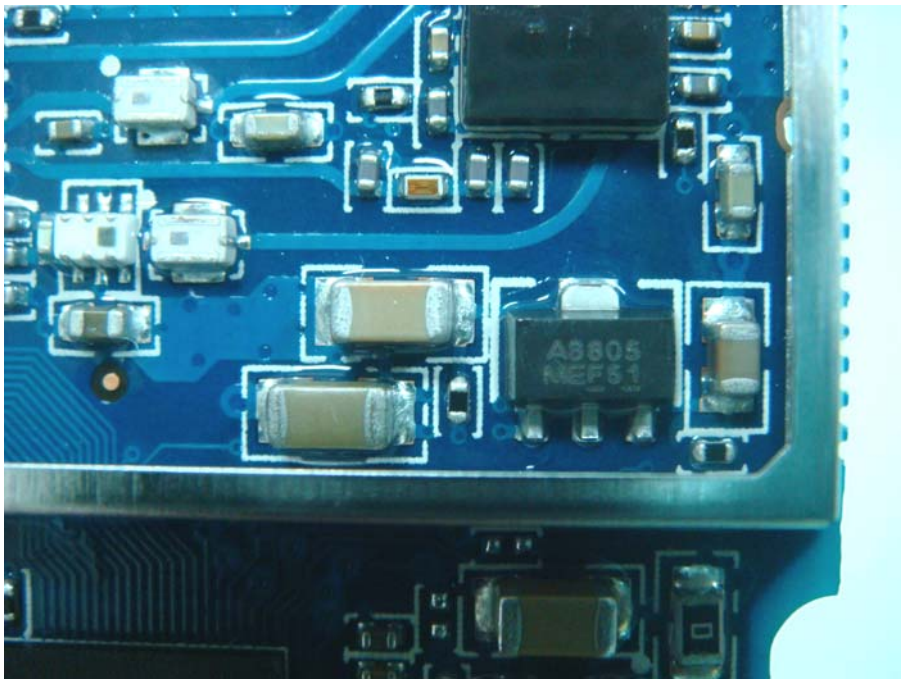
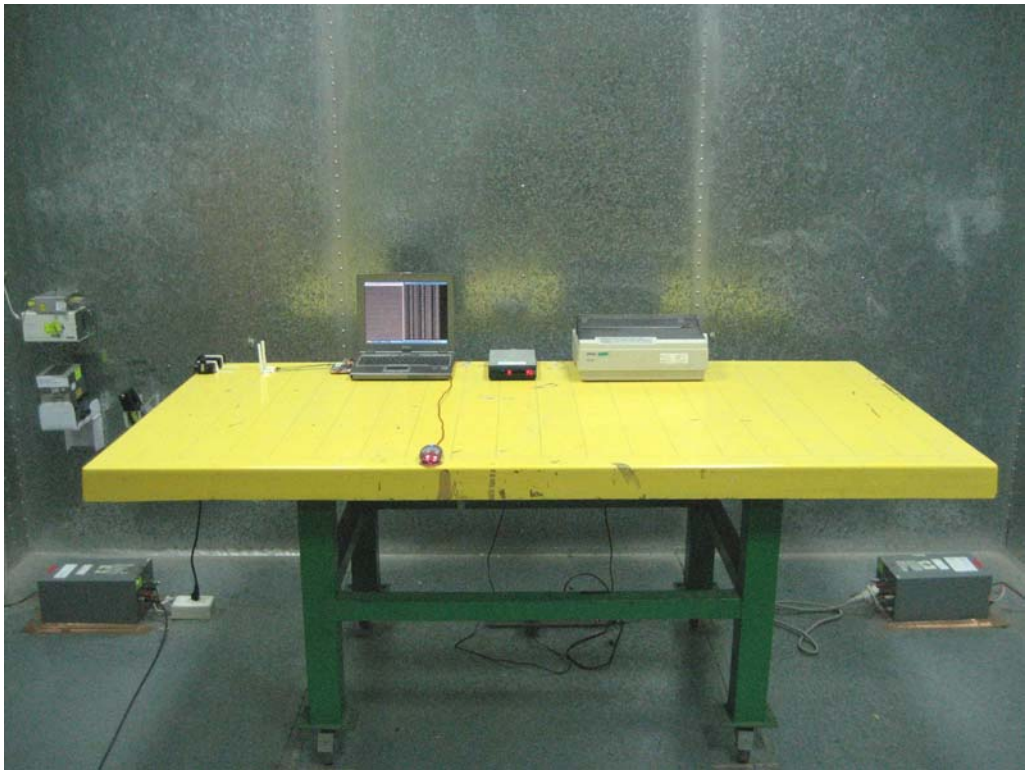

A3805
NEF51

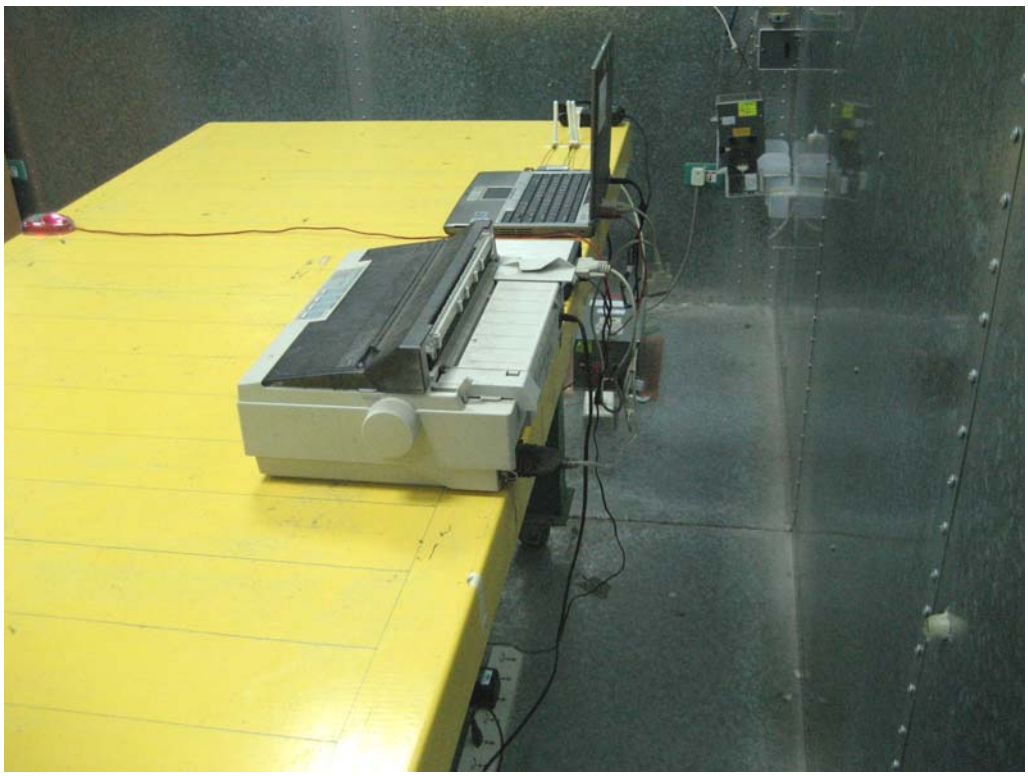
# Appendix B. Test Photos

# 1. Photographs of Conducted Emissions Test Configuration

FRONT VIEW



REAR VIEW

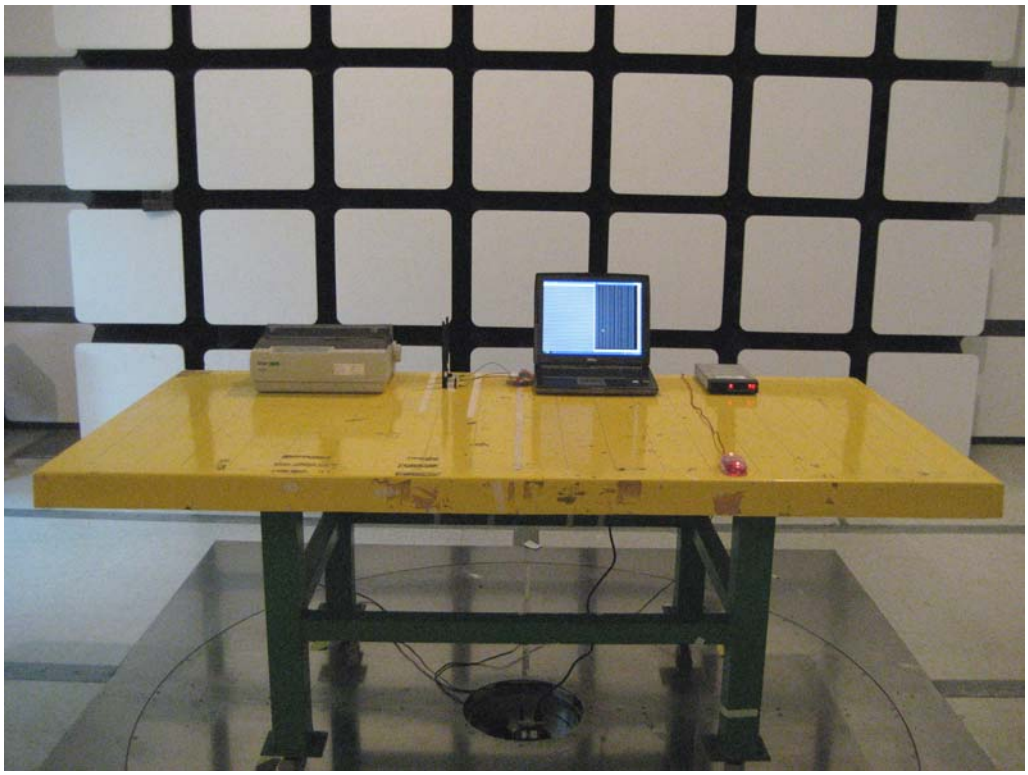



MAC ID : 000B6BB008C4
DNMA-83 D00F74500058C01

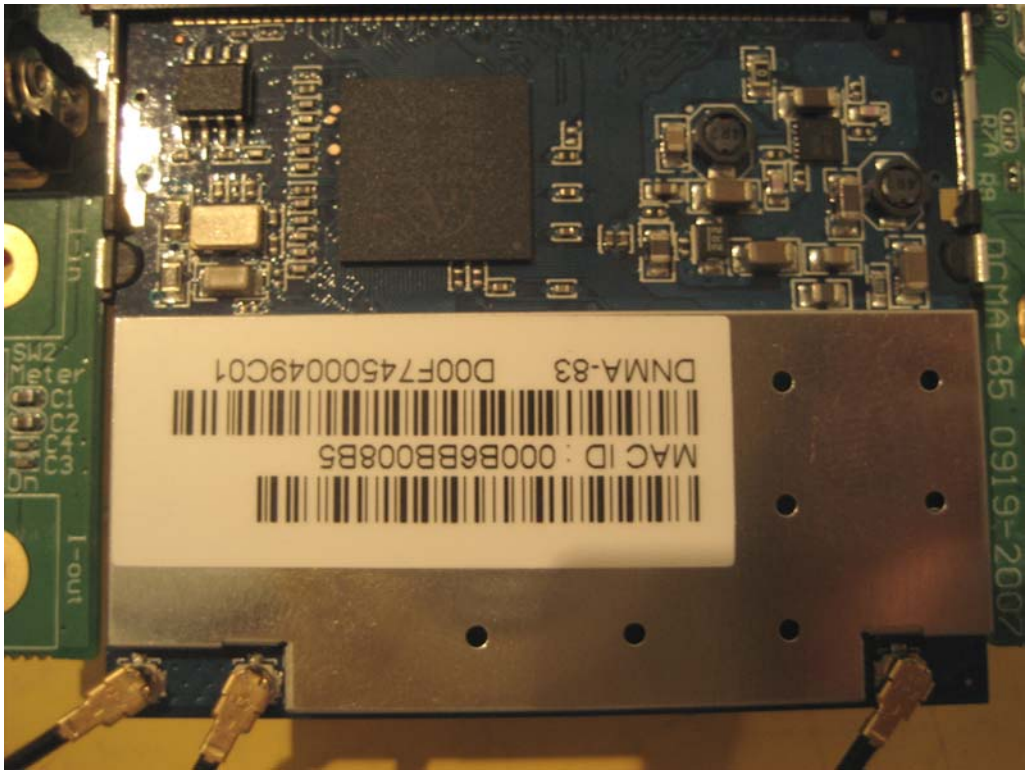
# 2. Photographs of Radiated Emissions Test Configuration

**For 2.4GHz: Ant. A**

**FRONT VIEW**



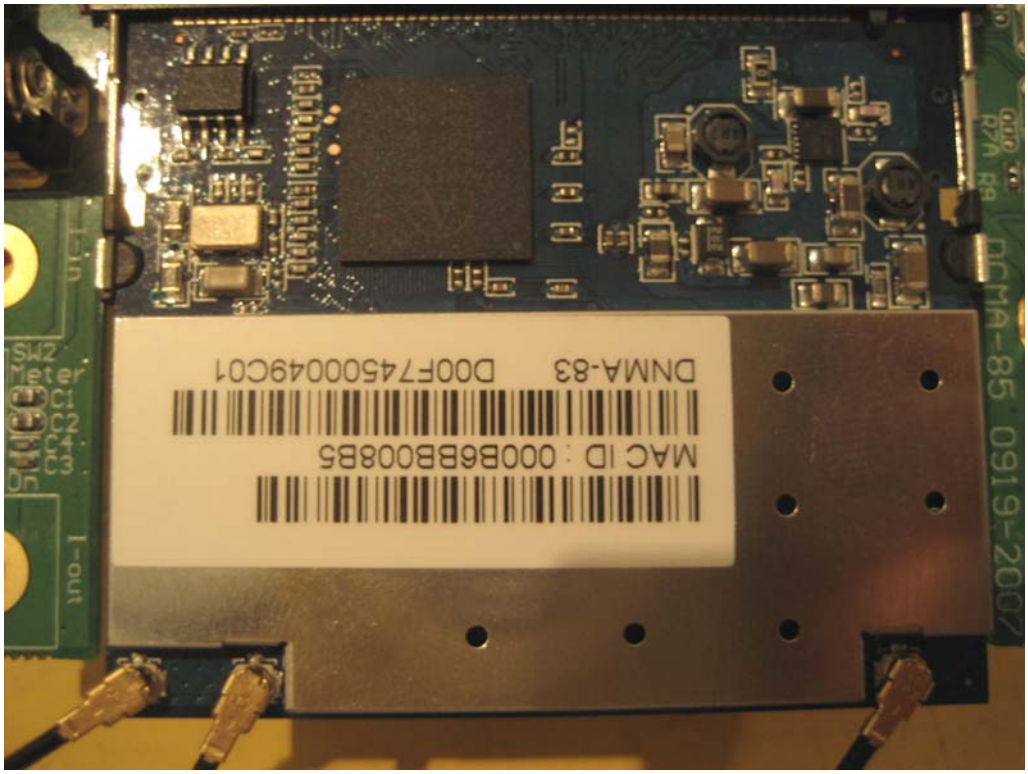
**REAR VIEW**


DNMA-83 D00F74500049C01
MAC ID : 000B6BB008B5
SW2
Meter
C1
C2
C4
C3
I-out
DCMA-85 0919-200

For 5GHz: Ant. B

FRONT VIEW

REAR VIEW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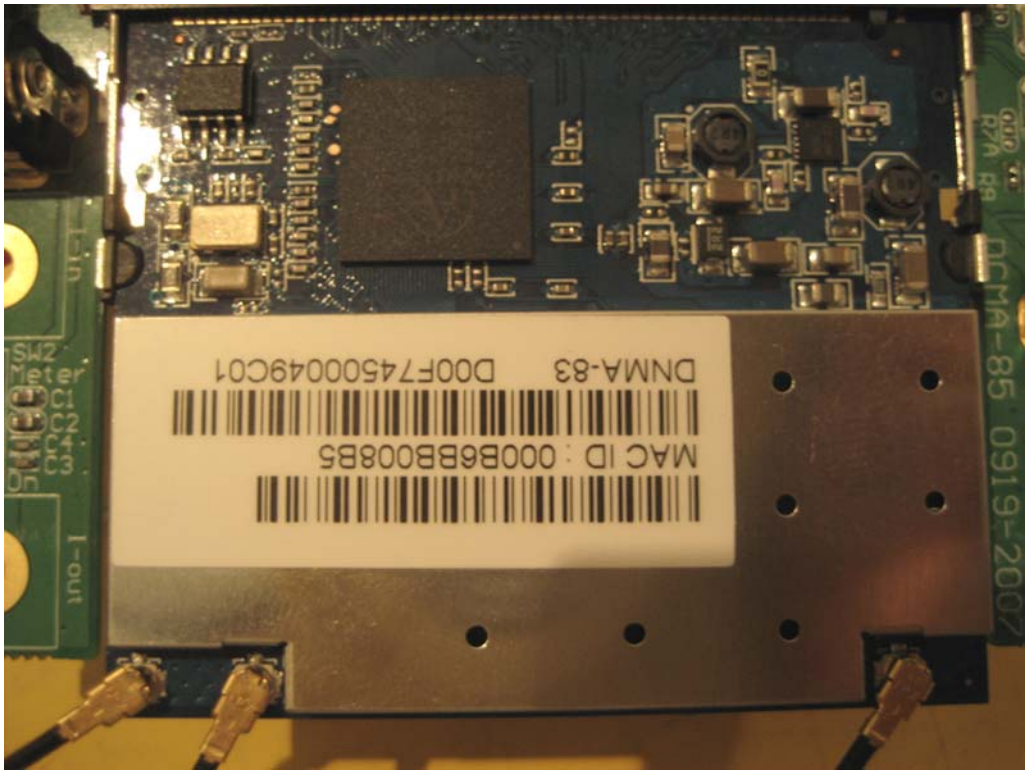
MAC ID : 000B6BB008B5
SW2
Meter
C1
C2
C4
C3
I-out
DCMA-85 0919-2007

Ant. D

FRONT VIEW

REAR VIEW


DNMA-83 D00F74500049C01
MAC ID : 000B6BB008B5
SW2
Meter
C1
C2
C4
C3
I-out
DCMA-85 0919-2007