**SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.**

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# *TEST REPORT*

| | |
|---|---|
| **Application No.:** | SHEM120300025404 |
| **Applicant:** | ICP Electronics Inc. |
| **Equipment Under Test (EUT):** | |
| **NOTE:** The following sample(s) submitted was/were identified on behalf of the client as | |
| **Trade Mark:** | iEi |
| **Name:** | WIRELESS LAN MODULE |
| **Model No.:** | WIFI-RT3593-DB |
| **Standards**: | FCC Part15 :2011 Subpart B |
| **Date of Receipt**: | Mar. 12, 2012 |
| **Date of Test**: | Mar. 14, 2012 to Apr. 1, 2012 |
| **Date of Issue**: | June. 8, 2012 |
| **Test Result :** | **PASS*** |

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Jim Xu
E&E Section Head
SGS-CSTC(Shanghai) Co., Ltd.

Neil Zhang
E&E Project Engineer
SGS-CSTC(Shanghai) Co., Ltd.

# 2 Test Summary

| Test | Test Requirement | Test Method | Class / Severity | Result |
|---|---|---|---|---|
| Radiated Emission* | FCC Part15:2011 | ANSI C63.4: 2009 | Class B | PASS |
| Conducted Emission 150KHz-30MHz | FCC Part15:2011 | ANSI C63.4: 2009 | Class B | PASS |

* If the highest frequency of the internal sources of the EUT is less than 108MHz,the measurement shall only be made up to 1GHz.

# 3 Contents

# 4 General Information

## 4.1 Client Information

| | |
|---|---|
| Applicant : | ICP Electronics Inc. |
| Applicant Address: | 3F., No.22, Zhongxing Rd., Xizhi Dist., New Taipei City 221, Taiwan, R.O.C |
| Manufacturer: | Armorlink SH Corp. |
| Address of Manufacturer: | 515.Shenfu Rd,Xinzhuang Industrial Development Zone,Minhang District,Shanghai,P.R.China |

## 4.2 General Description of E.U.T.

| | |
|---|---|
| Trade Mark: | iEi |
| Name: | WIRELESS LAN MODULE |
| Model No.: | WIFI-RT3593-DB |

## 4.3 Details of E.U.T.

| | |
|---|---|
| Power Supply: | 3.3V |
| Hardware Version: | N/A |
| Software Version: | N/A |

## 4.4 Description of Support Units

**Support equipments / Associated Equipments:**

☐ The EUT has been tested independently. and or

☒ The EUT has been tested with support equipments as below.

| Description | Manufacturer | Model No. | Serial No. | Supplied by Client or SGS? |
|---|---|---|---|---|
| MOUSE | Lenovo | M-UAE119 | 23-284953 | SGS |
| 17" LCD | Lenovo | 9227-AE1 | VENCW23 | SGS |
| Main-board | N/A | 945GSE | N/A | Client |
| Adapter for Main-board | ICP Electronics Inc. | ACE-916A | S7011400339 | Client |
| Hard Disk (HD) | Seagate | ST9160310AS | 5SV50RR5 | Client |

**Support Software:**

| Description | Manufacturer | Software name | Supplied by Client or SGS? |
|---|---|---|---|
| WiFi Test Tool | N/A | Ralink RT3593 QA Tool | Client |

## 4.5 Standards Applicable for Testing

The standards used was FCC Part15:2011.

**Table 1 : Tests Carried Out Under FCC Part 15: 2011**

| Standard | | Status |
|---|---|---|
| FCC Part 15 B: 2011 | Radiated Emission | √ |
| FCC Part 15 B: 2011 | Conducted Emission | √ |

× Indicates that the test is not applicable
√ Indicates that the test is applicable

## 4.6 Abnormalities from Standard Conditions

None.

## 4.7 Test Location

All tests were performed at:
SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
No.588 West Jindu Road, Songjiang District, Shanghai, China. 201612.
Tel: +86 21 6191 5666 Fax: +86 21 6191 5678

### 4.8 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

- **FCC – Registration No.: 402683**

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered and fully described in a report filed with the Federal Communications Commission (FCC). The acceptance letter from the FCC is maintained in our files. Registration No.: 402683, Expiry Date: 2015-02-22.

- **Industry Canada (IC) – IC Assigned Code: 8617A**

The 3m Semi-anechoic chamber of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 8617A. Expiry Date: 2014-09-20.

# 5 Equipment Used during Test

**Radiated Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESU40 | 100109 | 2012-06-03 | 2013-06-01 |
| 2 | Antenna | SCHWARZBECK | VULB9168 | 9168-313 | 2011-10-28 | 2012-10-26 |
| 3 | CONTROLLER | INNCO | CO200 | 474 | / | / |
| 4 | Antenna | SCHWARZBECK | BBHA9120D | 9120D-679 | 2011-10-28 | 2012-10-26 |
| 5 | Antenna | SCHWARZBECK | BBHA9170 | 9170-373 | 2011-10-28 | 2012-10-26 |

**Conducted Emission**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due date |
|---|---|---|---|---|---|---|
| 1 | EMI test receiver | Rohde & Schwarz | ESCS30 | 100086 | 2012-06-03 | 2013-06-01 |
| 2 | Line impedance stabilization network | SCHWARZBECK | NSLK8127 | 8127-490 | 2012-05-07 | 2013-05-05 |

**General Equipment**

| Item | Test Equipment | Manufacturer | Model No. | Serial No. | Cal. Date | Cal.Due date |
|---|---|---|---|---|---|---|
| 1 | Digital pressure meter | YONGZHI | DYM3-01 | 101012 | 2011-11-18 | 2012-11-17 |
| 2 | Digital Multimeter | FLUKE | 17B | 10560713 | 2011-08-24 | 2012-08-22 |
| 3 | Temperature& humidity recorder | ShangHai weather meter work | ZJ 1-2B | 0805126 | 2011-07-25 | 2012-07-23 |

# 6 Emission Test Results

## 6.1 Radiated Emissions, 30MHz to 1GHz

| | |
|---|---|
| Test Requirement: | FCC Part15: 2011 |
| Test Method: | ANSI C63.4: 2009 |
| Test Date: | March 21, 2012 |
| Frequency Range: | 30MHz to 1GHz |
| Measurement Distance: | 3m |
| Class: | Class B |
| Detector: | Peak for pre-scan (120kHz resolution bandwidth) |
| Result: | **PASS** |

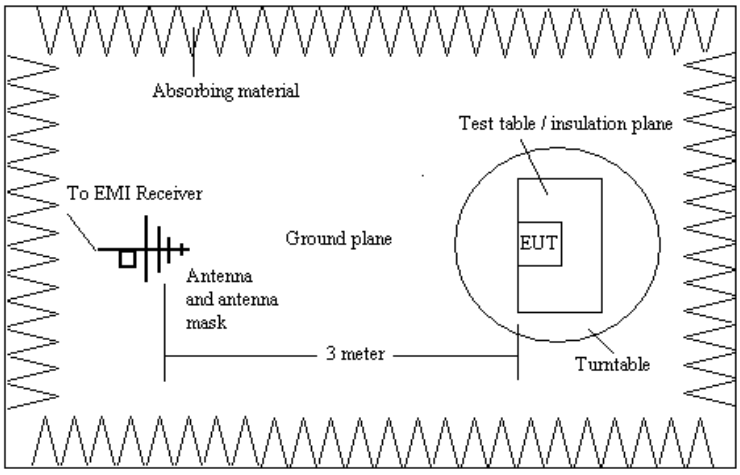
### 6.1.1E.U.T. Operation

Operating Environment:

Temperature: 22 °C Humidity: 50 % RH Atmospheric Pressure: 1006 mbar

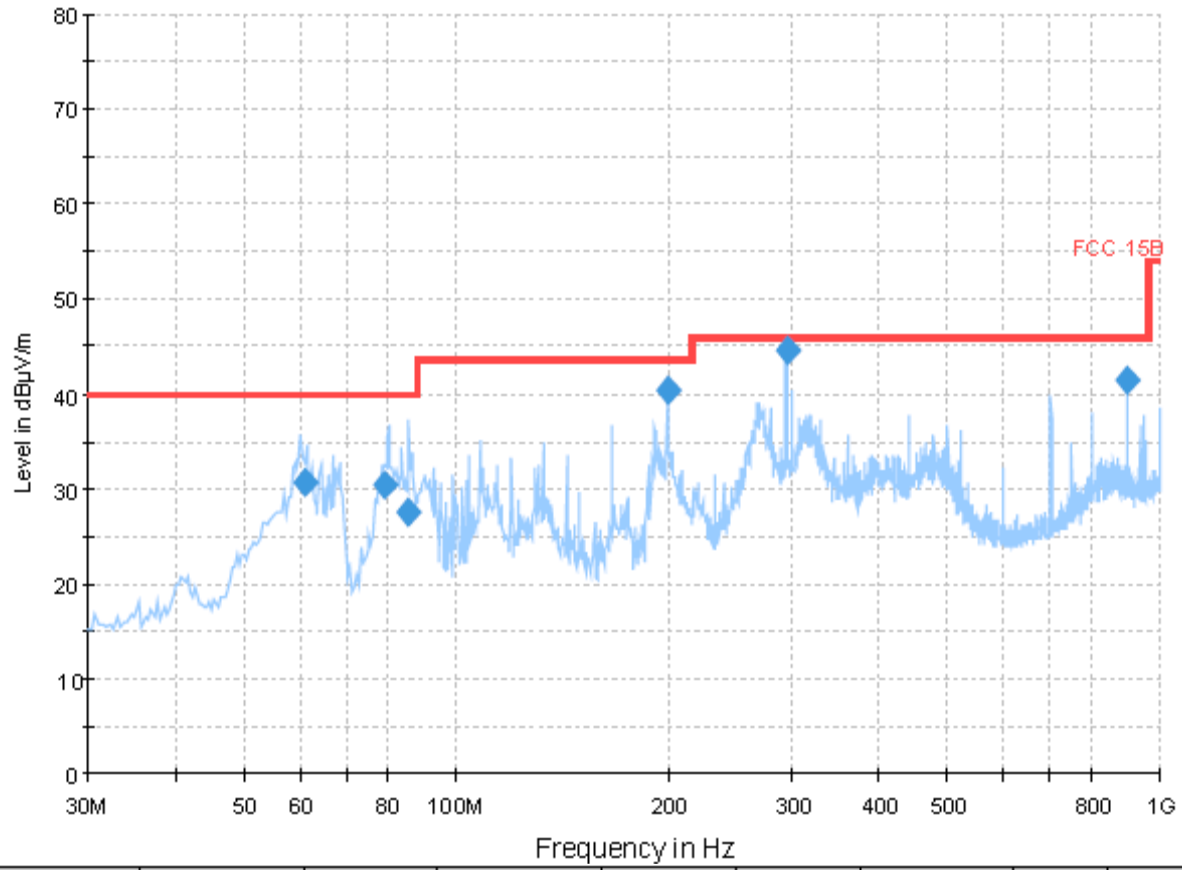
EUT Operation: The EUT is configured to create an operating communication link via test software "Ralink RT3593 QA Tool" that the client supplied.

### 6.1.2Test setup



### 6.1.3Measurement Data

Horizontal:

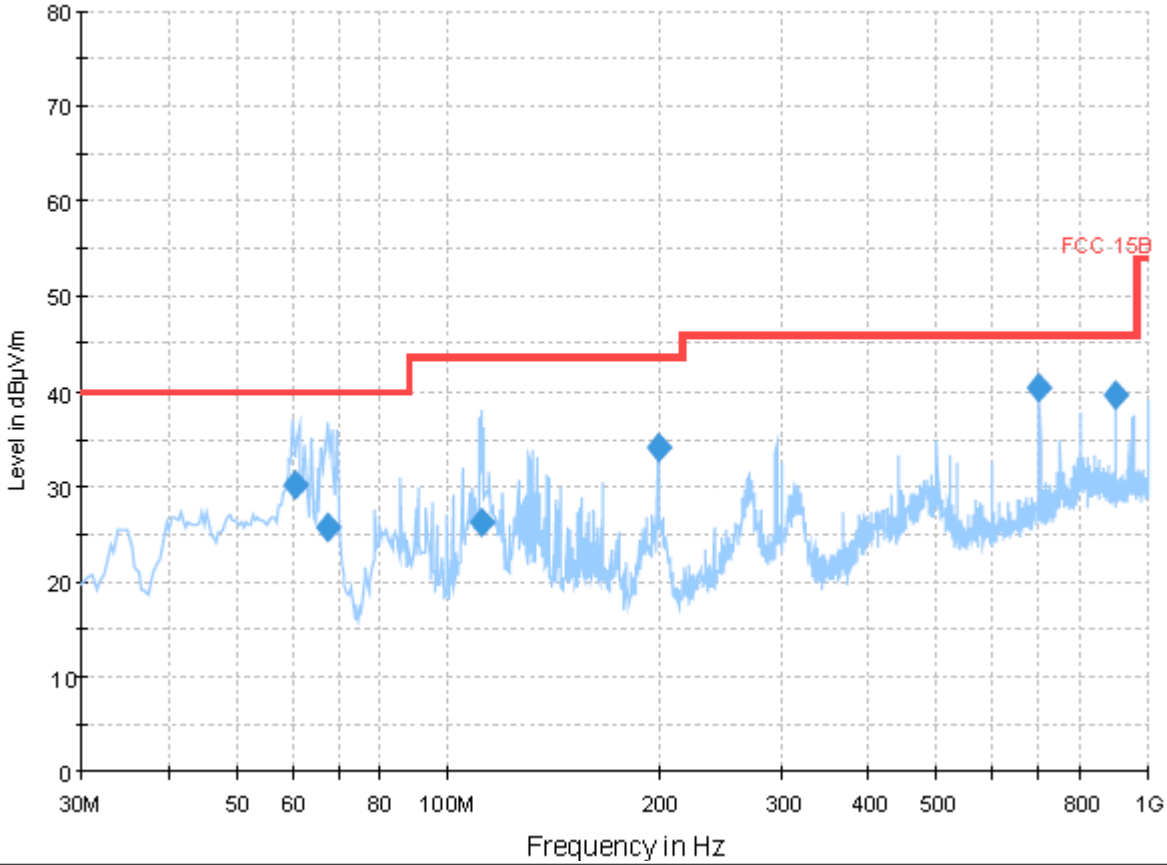



| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 60.998400 | 30.6 | 1000.000 | 120.000 | 250.0 | H | 19.0 | -10.2 | 9.4 |
| 79.619200 | 30.4 | 1000.000 | 120.000 | 250.0 | H | 272.0 | -13.2 | 9.6 |
| 85.540800 | 27.5 | 1000.000 | 120.000 | 235.0 | H | 298.0 | -13.2 | 12.5 |
| 200.014080 | 40.4 | 1000.000 | 120.000 | 165.0 | H | 188.0 | -12.0 | 3.1 |
| 294.918560 | 44.7 | 1000.000 | 120.000 | 100.0 | H | 47.0 | -8.8 | 1.3 |
| 899.986400 | 41.4 | 1000.000 | 120.000 | 100.0 | H | 58.0 | 2.5 | 4.6 |

**(continuation of the "Final Result 1" table from column 9 ...)**

| Frequency (MHz) | Limit (dBµV/m) | Comment |
|---|---|---|
| 60.998400 | 40.0 | |
| 79.619200 | 40.0 | |
| 85.540800 | 40.0 | |
| 200.014080 | 43.5 | |
| 294.918560 | 46.0 | |
| 899.986400 | 46.0 | |

Vertical：




| Frequency (MHz) | QuasiPeak (dBµV/m) | Meas. Time (ms) | Bandwidth (kHz) | Antenna height (cm) | Polarity | Turntable position (deg) | Corr. (dB) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|
| 60.696960 | 30.1 | 1000.000 | 120.000 | 100.0 | V | 116.0 | -10.2 | 9.9 |
| 67.609120 | 25.8 | 1000.000 | 120.000 | 100.0 | V | 53.0 | -11.4 | 14.2 |
| 112.084000 | 26.2 | 1000.000 | 120.000 | 100.0 | V | 299.0 | -11.1 | 17.3 |
| 200.016000 | 34.2 | 1000.000 | 120.000 | 100.0 | V | 108.0 | -12.0 | 9.3 |
| 700.034720 | 40.3 | 1000.000 | 120.000 | 109.0 | V | 187.0 | -0.2 | 5.7 |
| 900.019040 | 39.6 | 1000.000 | 120.000 | 100.0 | V | 234.0 | 2.5 | 6.4 |

**(continuation of the "Final Result 1" table from column 9 ..)**

| Frequency (MHz) | Limit (dBµV/m) | Comment |
|---|---|---|
| 60.696960 | 40.0 | |
| 67.609120 | 40.0 | |
| 112.084000 | 43.5 | |
| 200.016000 | 43.5 | |
| 700.034720 | 46.0 | |
| 900.019040 | 46.0 | |

## 6.2 Conducted Emissions, 150kHz to 30MHz

| | |
|---|---|
| Test Requirement: | FCC Part15:2011 |
| Test Method: | ANSI C63.4: 2009 |
| Test Date: | March 24, 2012 |
| Frequency Range: | 150kHz to 30MHz |
| Class: | Class B |
| Limit: | 66 dBμV - 56 dBμVbetween 150kHz & 500kHz Quasi-peak |
| | 56 dBμV between 0.5MHz & 5MHz Quasi-peak |
| | 60 dBμV between 5MHz & 30MHz Quasi-peak |
| Result: | **PASS** |

### 6.2.1E.U.T. Operation

Operating Environment:

Temperature: 23.0°C Humidity: 57% RH Atmospheric Pressure: 1012 mbar

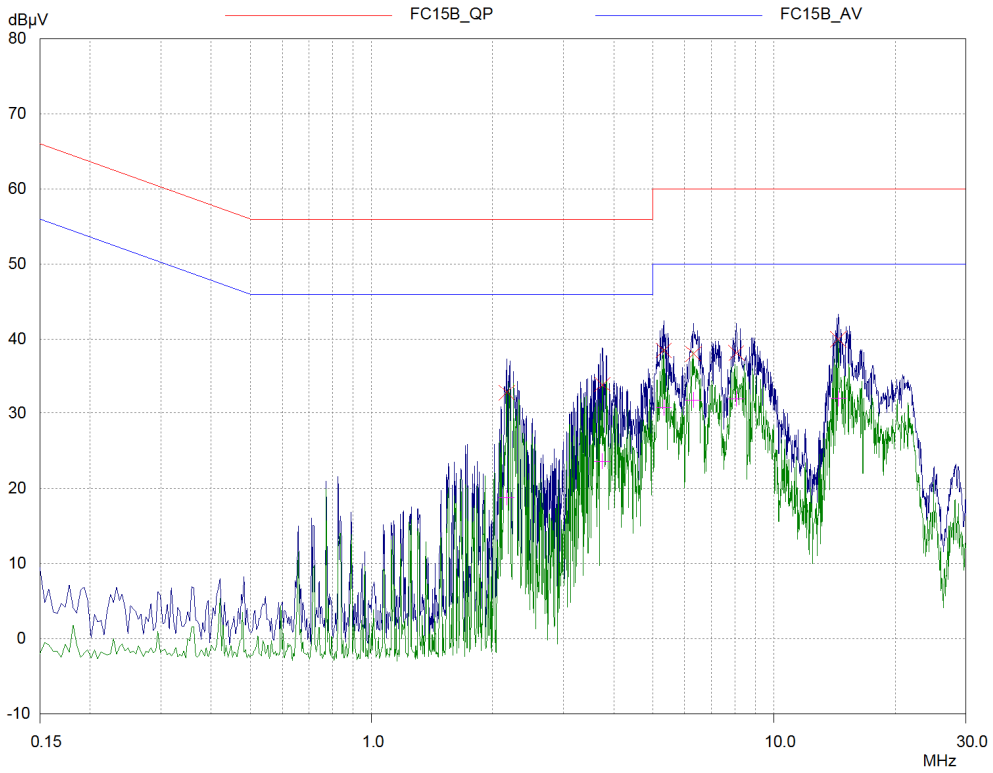
EUT Operation: The EUT is configured to create an operating communication link via test software “Ralink RT3593 QA Tool” that the client supplied.

### 6.2.2Test Result and Partial Measurement Data

Pass.

An initial pre-scan was performed in the Shielding room using the receiver in peak detection mode. The EUT was measured for 2 Lines and peak emissions from the EUT were detected within 6dB of the class B limit line.

L Line:

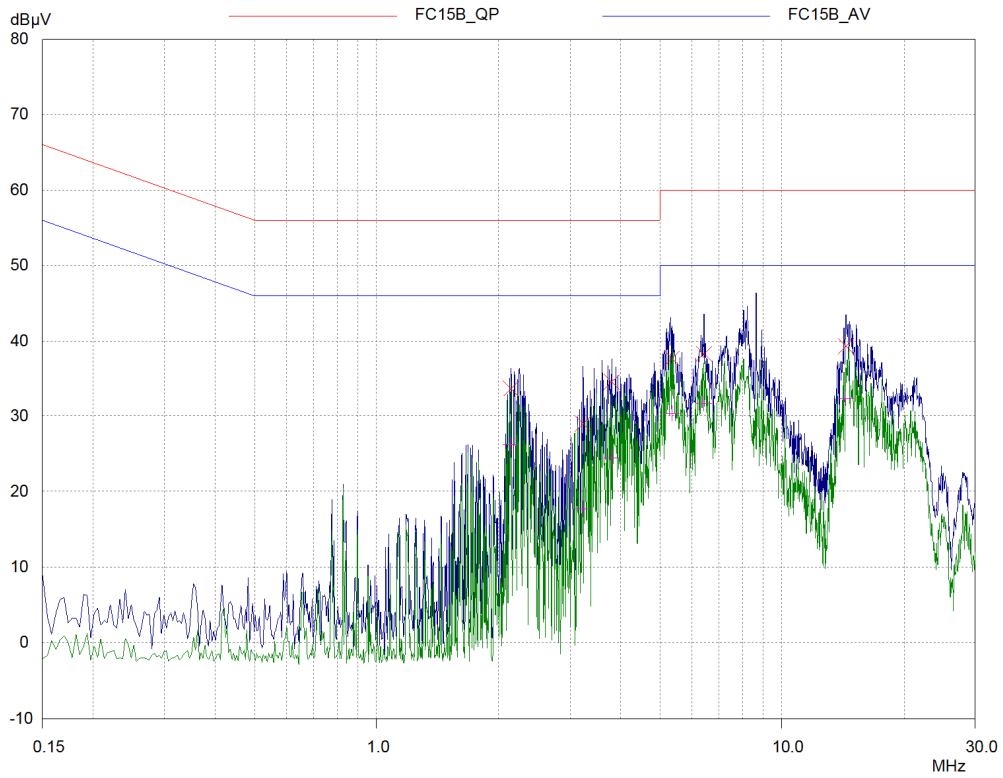



Final Measurement Results

| Frequency MHz | QP Level dBµV | QP Limit dBµV | QP Delta dB |
|---|---|---|---|
| 2.16562 | 32.80 | 56.00 | 23.20 |
| 3.74765 | 33.93 | 56.00 | 22.07 |
| 5.31796 | 38.51 | 60.00 | 21.49 |
| 6.30625 | 38.01 | 60.00 | 21.99 |
| 8.06795 | 38.20 | 60.00 | 21.80 |
| 14.45078 | 39.99 | 60.00 | 20.01 |

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB |
|---|---|---|---|
| 2.16562 | 18.71 | 46.00 | 27.29 |
| 3.74765 | 23.60 | 46.00 | 22.40 |
| 5.31796 | 30.76 | 50.00 | 19.24 |
| 6.30625 | 31.74 | 50.00 | 18.26 |
| 8.06795 | 31.91 | 50.00 | 18.09 |
| 14.45078 | 31.97 | 50.00 | 18.03 |

N Line:




Final Measurement Results

| Frequency MHz | QP Level dBµV | QP Limit dBµV | QP Delta dB |
|---|---|---|---|
| 2.14218 | 33.68 | 56.00 | 22.32 |
| 3.22812 | 28.93 | 56.00 | 27.07 |
| 3.79843 | 34.59 | 56.00 | 21.41 |
| 5.34531 | 37.71 | 60.00 | 22.29 |
| 6.41171 | 38.31 | 60.00 | 21.69 |
| 14.38437 | 39.33 | 60.00 | 20.67 |

| Frequency MHz | AV Level dBµV | AV Limit dBµV | AV Delta dB |
|---|---|---|---|
| 2.14218 | 26.20 | 46.00 | 19.80 |
| 3.22812 | 17.68 | 46.00 | 28.32 |
| 3.79843 | 24.39 | 46.00 | 21.61 |
| 5.34531 | 30.30 | 50.00 | 19.70 |
| 6.41171 | 31.58 | 50.00 | 18.42 |
| 14.38437 | 32.31 | 50.00 | 17.69 |

# 7 EQUIPMENT UNDER TEST PICTURES

## 7.1 Radiated Emission Test Setup

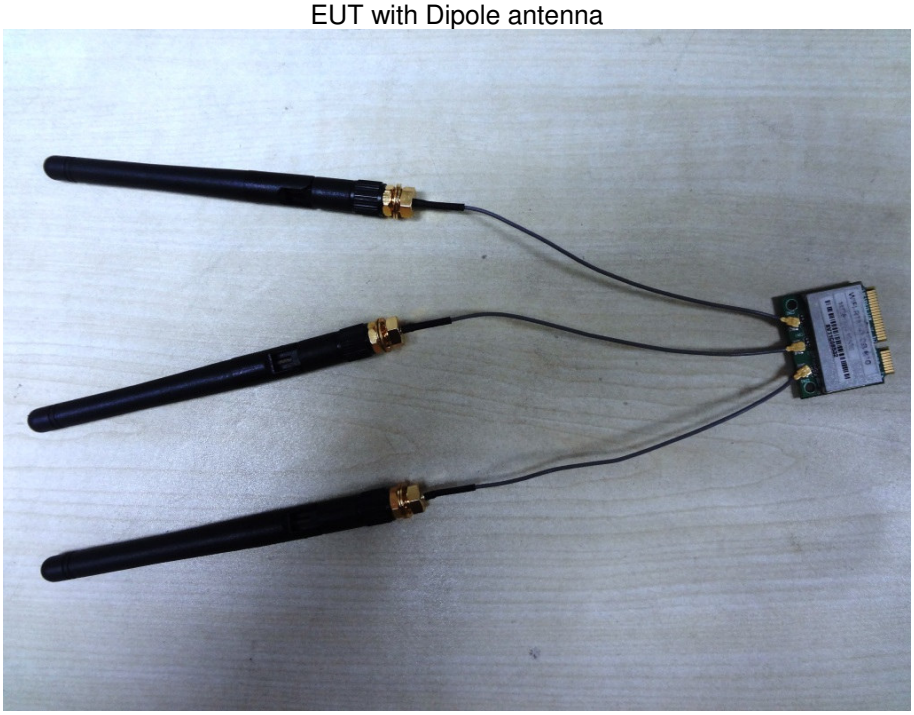

## 7.2 Conductet Emission Test Setup

# 8 Appendix B: EUT Construction Photoghaphs

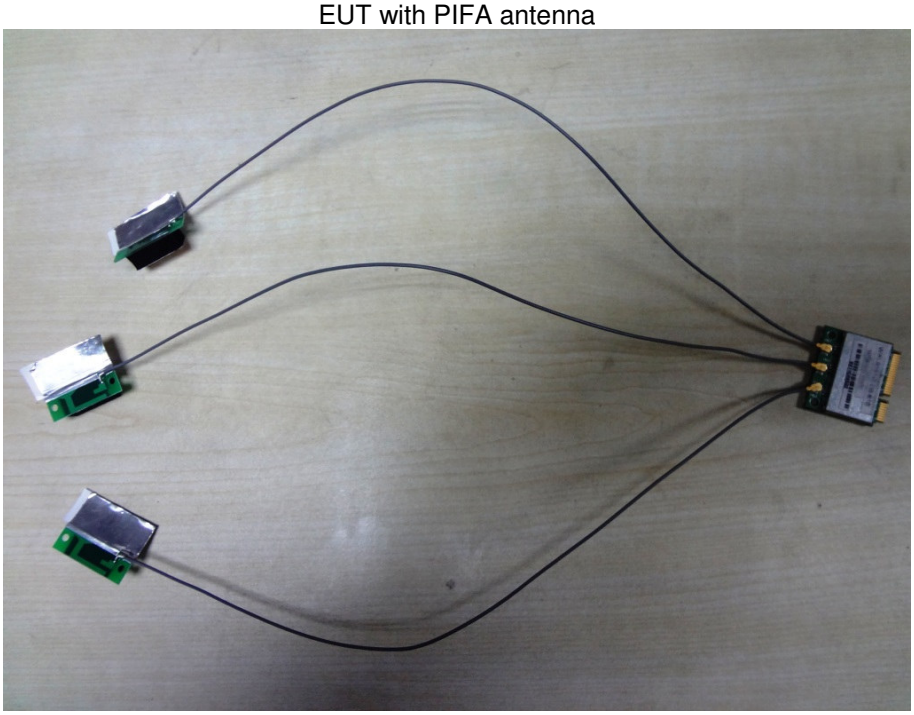
EUT Front View


EUT Bottom View

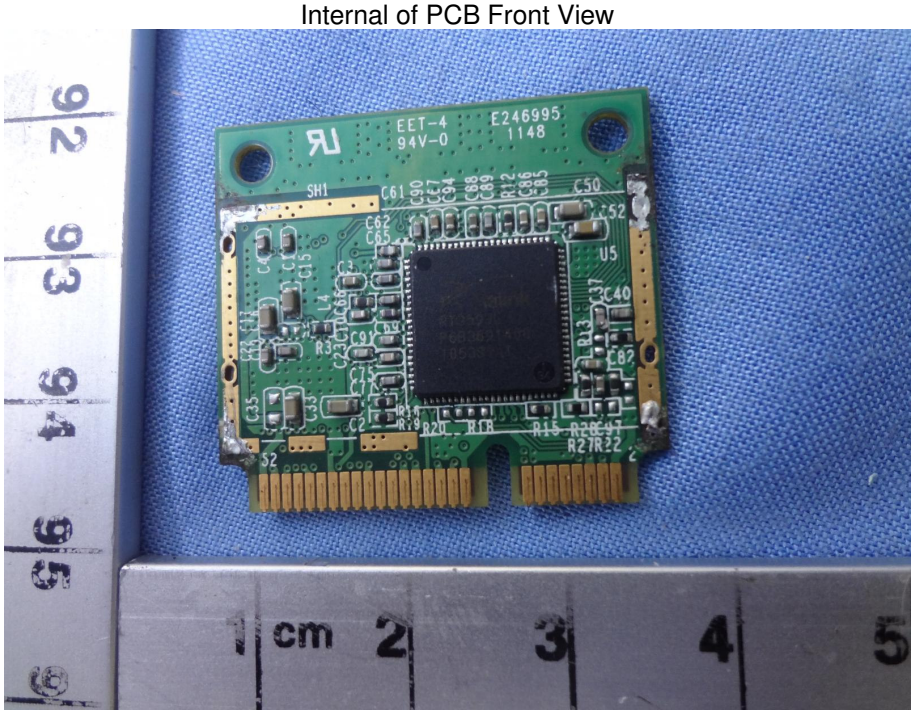
EUT with Dipole antenna



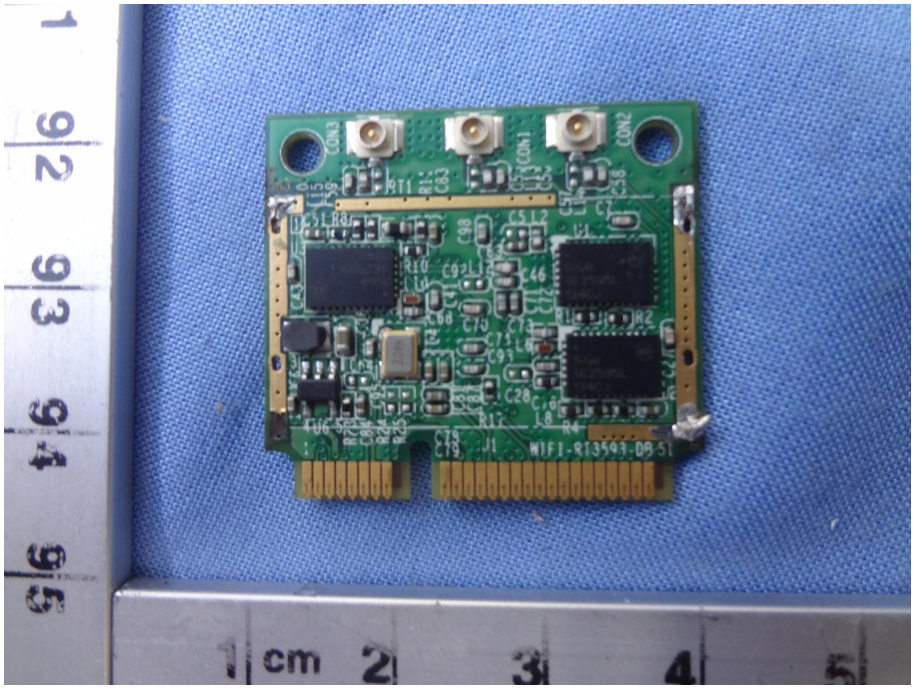
EUT with PIFA antenna



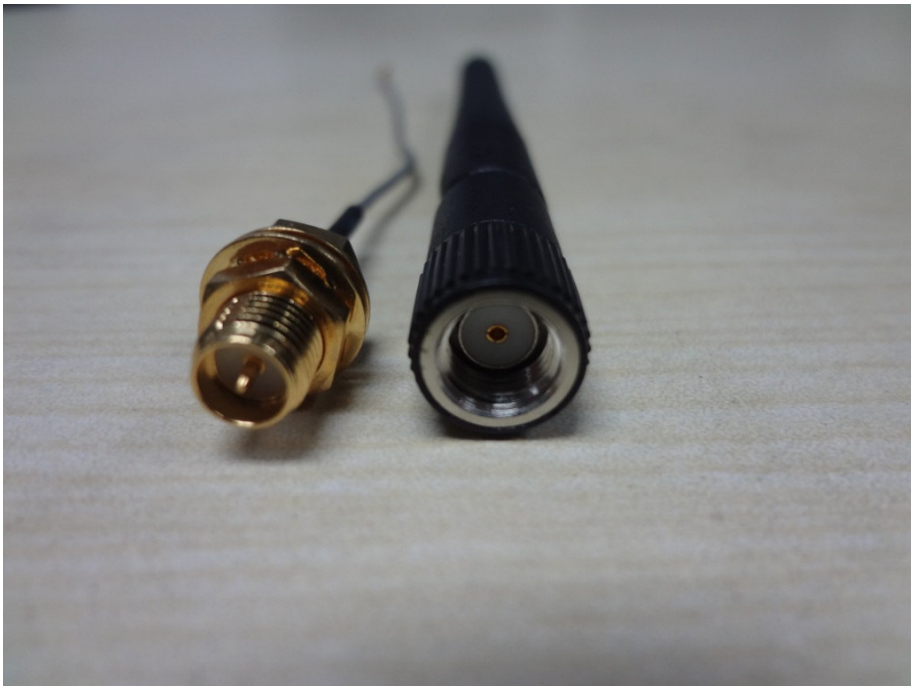
Internal of PCB Front View



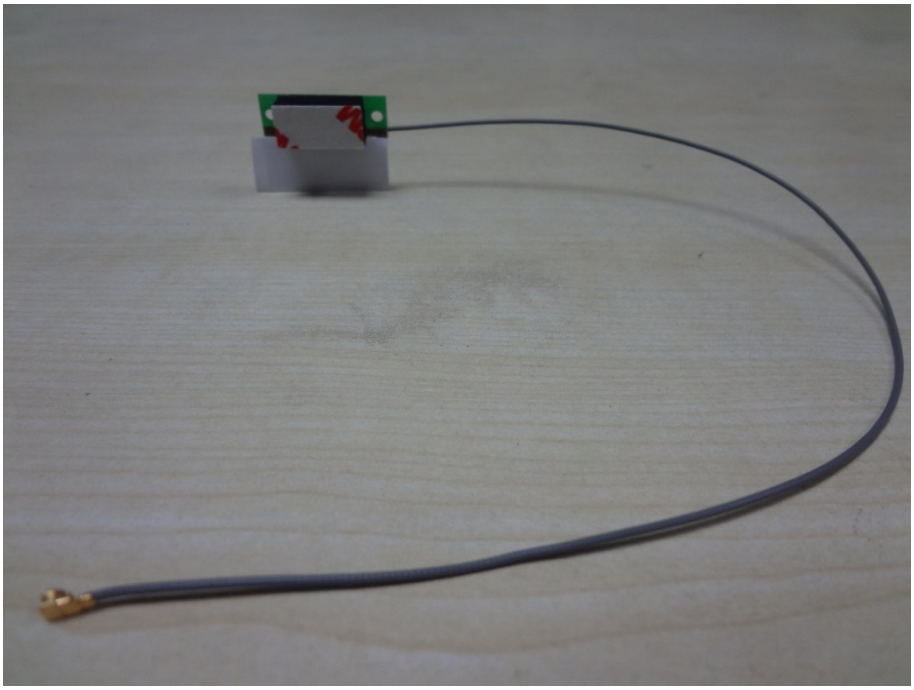

Internal of PCB Back View

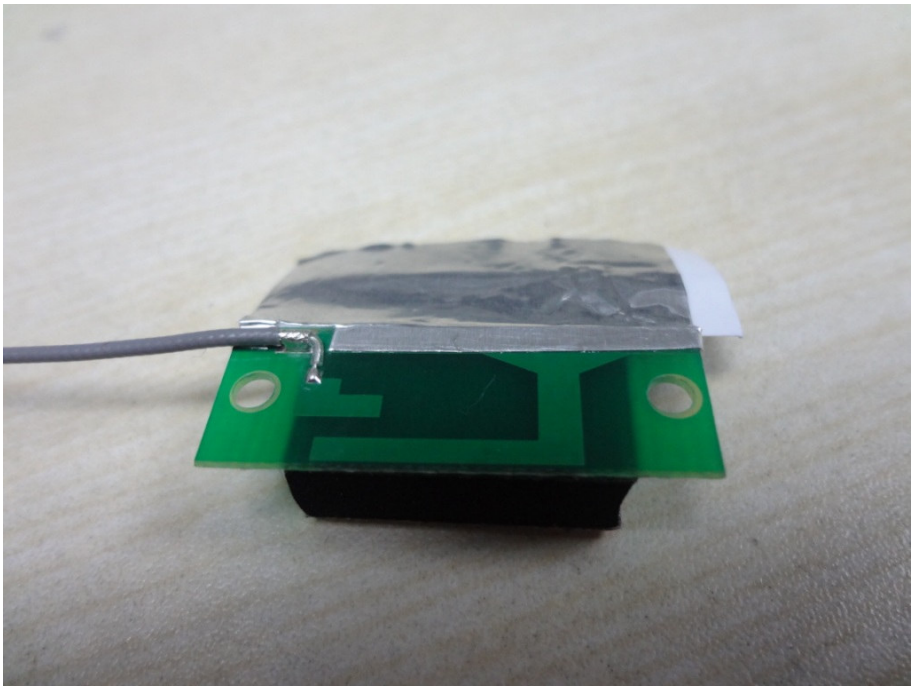


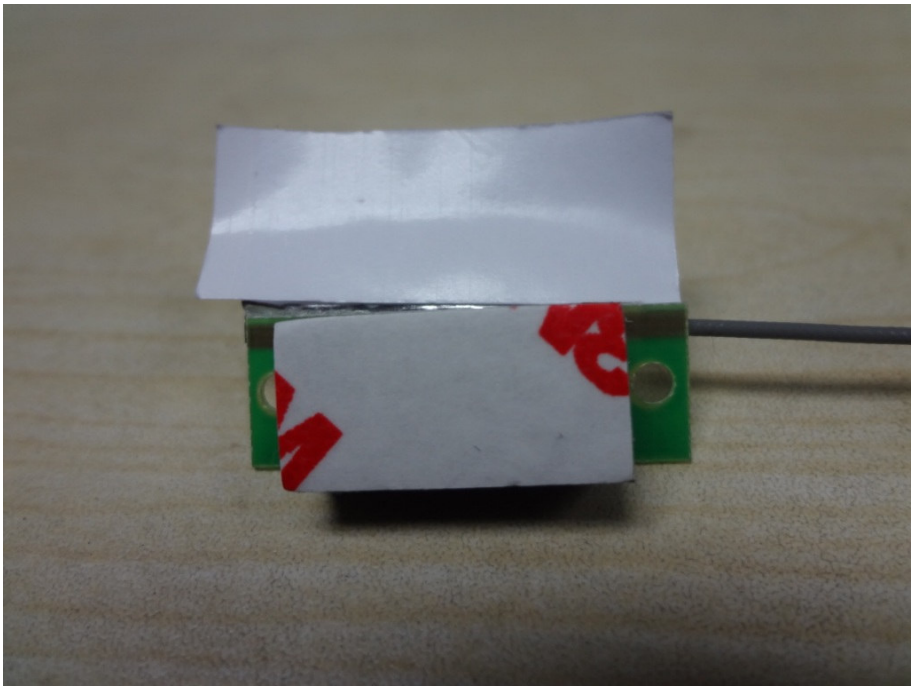
Dipole antenna



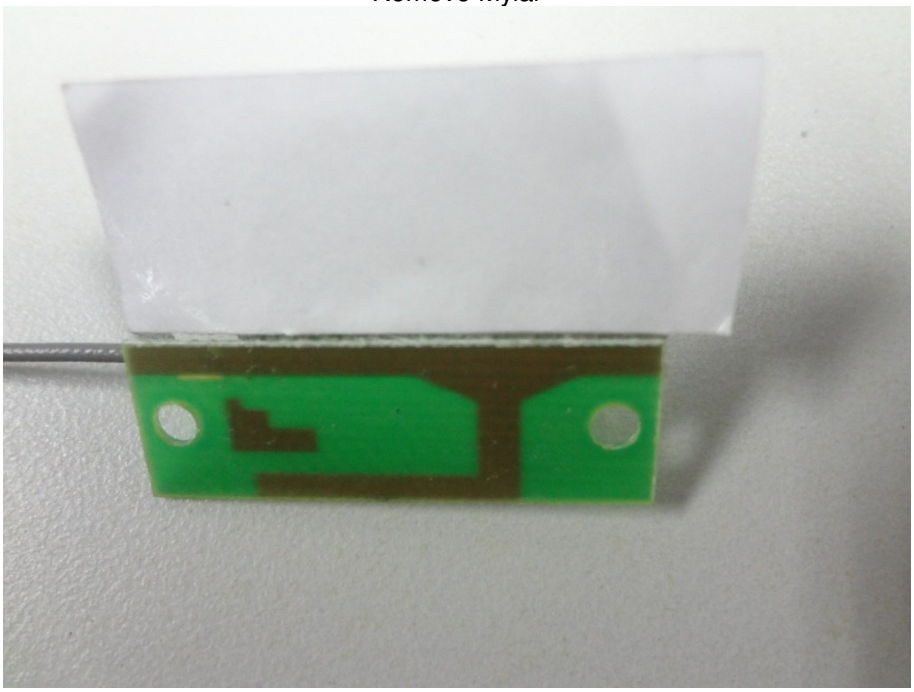
PCB antenna

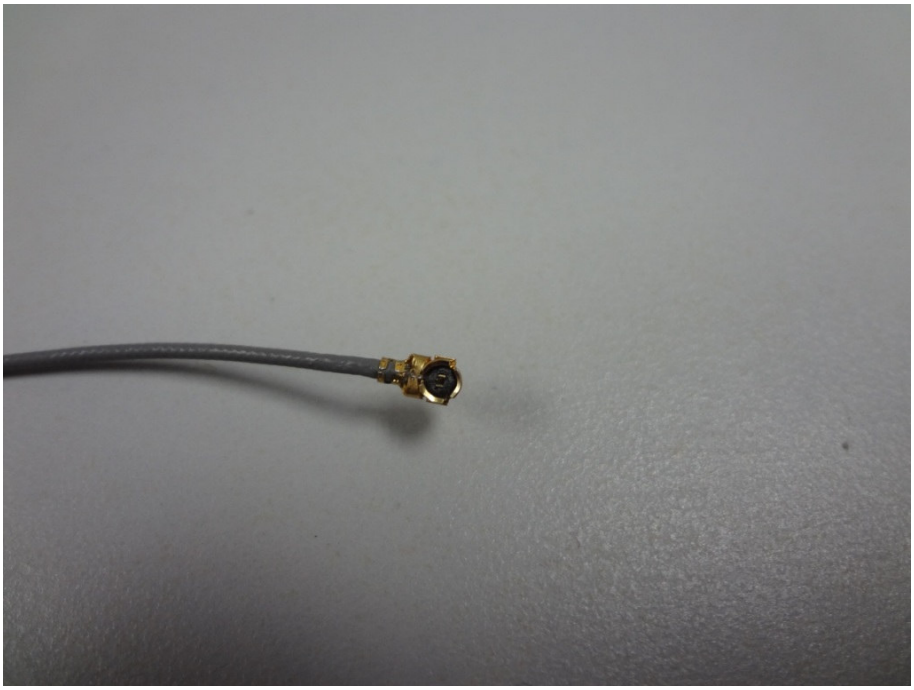






Remove Mylar





***THE END OF REPORT***