



MRT Technology (Suzhou) Co., Ltd  
Phone: +86-512-66308358  
Fax: +86-512-66308368  
Web: www.mrt-cert.com

Report No.: 1506RSU01804  
Report Version: V01  
Issue Date: 07-10-2015

# MEASUREMENT REPORT

## EMC Test Report

---

**Applicant:** Compex Systems Pte Ltd

**Address:** 135 Joo Seng Road #08-01, Singapore 368363

**Product:** WIRELESS ACCESS POINT

**Model No.:** WPJ531HV, WPJ531LV, MMZ531LV, MMZ531HV,  
MMJ531LV, MMJ531HV, MMS531LV, MMS531HV

**Brand Name:** COMPEX

**Standards:** ETSI EN 301 489 - 1 V1.9.2: 2011  
ETSI EN 301 489 - 17 V2.2.1: 2012

**Result:** Complies

**Test Date:** Jun. 25 ~ Jul. 08, 2015

Reviewed By : Robin Wu  
( Robin Wu )

Approved By : Marlin Chen  
( Marlin Chen )



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

The test report shall not be reproduced except in full without the written approval of MRT Technology (Suzhou) Co., Ltd.

### Revision History

| Report No.   | Version | Description    | Issue Date |
|--------------|---------|----------------|------------|
| 1506RSU01804 | Rev. 01 | Initial report | 07-10-2015 |
|              |         |                |            |

## CONTENTS

| Description                                                | Page      |
|------------------------------------------------------------|-----------|
| <b>1. General Information.....</b>                         | <b>6</b>  |
| 1.1. Applicant.....                                        | 6         |
| 1.2. Manufacturer .....                                    | 6         |
| 1.3. Testing Facility .....                                | 6         |
| 1.4. Feature of Product .....                              | 7         |
| 1.5. Standards Applicable for Testing .....                | 8         |
| 1.6. Performance Criteria.....                             | 9         |
| <b>2. Test Configuration of Equipment under Test .....</b> | <b>15</b> |
| 2.1. Test Mode .....                                       | 15        |
| 2.2. Configuration of Tested System .....                  | 15        |
| 2.3. Test System Details .....                             | 16        |
| 2.4. Test Software .....                                   | 16        |
| <b>3. Test Summary .....</b>                               | <b>17</b> |
| <b>4. Conducted Emission .....</b>                         | <b>18</b> |
| 4.1. Limit of Conducted Emission .....                     | 18        |
| 4.2. Test Setup .....                                      | 18        |
| 4.3. Test Procedure .....                                  | 19        |
| 4.4. Test Result.....                                      | 20        |
| 4.5. Test Photograph .....                                 | 26        |
| <b>5. Radiated Emission.....</b>                           | <b>28</b> |
| 5.1. Limit of Radiated Emission .....                      | 28        |
| 5.2. Test Setup .....                                      | 28        |
| 5.3. Test Procedure .....                                  | 30        |
| 5.4. Test Result.....                                      | 31        |
| 5.5. Test Photograph .....                                 | 35        |
| <b>6. Harmonic Current Emissions.....</b>                  | <b>36</b> |
| 6.1. Limit of Harmonic Current Emissions .....             | 36        |
| 6.2. Test Setup .....                                      | 36        |
| 6.3. Test Procedure .....                                  | 36        |
| 6.4. Test Result.....                                      | 37        |
| 6.5. Test Photograph .....                                 | 39        |
| <b>7. Voltage Fluctuations and Flicker .....</b>           | <b>40</b> |

|            |                                                      |           |
|------------|------------------------------------------------------|-----------|
| 7.1.       | Limit of Voltage Fluctuations and Flicker .....      | 40        |
| 7.2.       | Test Setup .....                                     | 41        |
| 7.3.       | Test Procedure .....                                 | 41        |
| 7.4.       | Test Result.....                                     | 42        |
| 7.5.       | Test Photograph .....                                | 43        |
| <b>8.</b>  | <b>Electrostatic Discharge .....</b>                 | <b>44</b> |
| 8.1.       | Limit of Electrostatic Discharge.....                | 44        |
| 8.2.       | Test Setup .....                                     | 44        |
| 8.3.       | Test Procedure .....                                 | 45        |
| 8.4.       | Test Result.....                                     | 46        |
| 8.5.       | Test Photograph .....                                | 47        |
| <b>9.</b>  | <b>Radio-frequency Electromagnetic Field.....</b>    | <b>49</b> |
| 9.1.       | Limit of Radio-frequency Electromagnetic Field ..... | 49        |
| 9.2.       | Test Setup .....                                     | 49        |
| 9.3.       | Test Procedure .....                                 | 50        |
| 9.4.       | Test Result.....                                     | 51        |
| 9.5.       | Test Photograph .....                                | 52        |
| <b>10.</b> | <b>Electrical Fast Transients .....</b>              | <b>53</b> |
| 10.1.      | Limit of Electrical Fast Transients .....            | 53        |
| 10.2.      | Test Setup .....                                     | 53        |
| 10.3.      | Test Procedure .....                                 | 53        |
| 10.4.      | Test Result.....                                     | 55        |
| 10.5.      | Test Photograph .....                                | 56        |
| <b>11.</b> | <b>Surges .....</b>                                  | <b>57</b> |
| 11.1.      | Limit of Surges.....                                 | 57        |
| 11.2.      | Test Setup .....                                     | 57        |
| 11.3.      | Test Procedure .....                                 | 57        |
| 11.4.      | Test Result.....                                     | 59        |
| 11.5.      | Test Photograph .....                                | 60        |
| <b>12.</b> | <b>Radio-frequency Common Mode .....</b>             | <b>61</b> |
| 12.1.      | Limit of Radio-frequency Common Mode .....           | 61        |
| 12.2.      | Test Setup .....                                     | 61        |
| 12.3.      | Test Procedure .....                                 | 62        |
| 12.4.      | Test Result.....                                     | 63        |
| 12.5.      | Test Photograph .....                                | 64        |

---

|                                                    |           |
|----------------------------------------------------|-----------|
| <b>13. Voltage Dips and Interruptions .....</b>    | <b>65</b> |
| 13.1. Limit of Voltage Dips and Interruptions..... | 65        |
| 13.2. Test Setup .....                             | 65        |
| 13.3. Test Procedure .....                         | 65        |
| 13.4. Test Result.....                             | 66        |
| 13.5. Test Photograph .....                        | 67        |
| <b>14. Uncertainty Measurement .....</b>           | <b>68</b> |
| <b>15. List of Measuring Instrument.....</b>       | <b>69</b> |
| <b>16. Appendix - EUT Photograph .....</b>         | <b>72</b> |

## 1. General Information

### 1.1. Applicant

Compex Systems Pte Ltd  
135 Joo Seng Road #08-01, Singapore 368363

### 1.2. Manufacturer

Compex Systems Pte Ltd  
135 Joo Seng Road #08-01, Singapore 368363

### 1.3. Testing Facility

#### Test Site

MRT Technology (Suzhou) Co., Ltd

#### Test Site Location

D8 Building, Youxin Industrial Park, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China

#### Radio-frequency Electromagnetic Field Test Site

CQC Intime (Suzhou) Testing Technology Co., Ltd.

#### Test Site Location

East Taihu Technology and Finance City, No. 1368, Wuzhong Dadao Road, Wuzhong District, Suzhou, Jiangsu, P.R. China

### Test Facility / Accreditations

Measurements were performed at MRT Laboratory located in Tian'edang Rd., Suzhou, China.

- MRT facility is a FCC registered (MRT Reg. No. 809388) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules.
- MRT facility is an IC registered (MRT Reg. No. 11384A-1) test laboratory with the site description on file at Industry Canada.
- MRT facility is a VCCI registered (R-4179, G-814, C-4664, T-2206) test laboratory with the site description on file at VCCI Council.
- MRT Lab is accredited to ISO 17025 by the American Association for Laboratory Accreditation (A2LA) under the American Association for Laboratory Accreditation Program (A2LA Cert. No. 3628.01) in EMC, Telecommunications and Radio testing for FCC, Industry Canada, EU and TELEC Rules.



#### 1.4. Feature of Product

|                 |                                                                                                                |
|-----------------|----------------------------------------------------------------------------------------------------------------|
| Product Name    | WIRELESS ACCESS POINT                                                                                          |
| Model No.       | WPJ531HV, WPJ531LV, MMZ531LV, MMZ531HV, MMJ531LV, MMJ531HV, MMS531LV, MMS531HV                                 |
| Brand Name      | COMPEX                                                                                                         |
| Frequency Range | 802.11b/g/n-HT20: 2412 ~ 2472MHz<br>802.11n-HT40: 2422 ~ 2462MHz                                               |
| Adapter         | Power Over Ethernet (Gigabit)<br>M/N: HS36-2401250EU<br>Input: 100-240V ~ 50/60Hz 1.0A<br>Output: +24V ~ 1.25A |

## **1.5. Standards Applicable for Testing**

The EUT complies with the requirements of EN 301489-1 V1.9.2 & EN 301489-17 V2.2.1.

### **EMI Test:**

EN 55022 2010/AC: 2011 (Conducted Emission)

EN 55022 2010/AC: 2011 (Radiated Emission)

EN 61000-3-2: 2009 (Harmonic)

EN 61000-3-3: 2008 (Flicker)

### **EMS Test:**

EN 61000-4-2: 2009 (ESD)

EN 61000-4-3: 2006+A1:2008+A2:2010 (RS)

EN 61000-4-4: 2010 (EFT)

EN 61000-4-5: 2006 (Surge)

EN 61000-4-6: 2009 (CS)

EN 61000-4-8: 2010 (PFM)

EN 61000-4-11: 2004 (Dips)



## 1.6. Performance Criteria

### **General Requirements (ETSI EN 301489-1):**

The performance criteria are used to take a decision on whether radio equipment passes or fails immunity tests.

For the purpose of the present document four categories of performance criteria apply:

- performance criteria for continuous phenomena applied to transmitters;
- performance criteria for transient phenomena applied to transmitters;
- performance criteria for continuous phenomena applied to receivers;
- performance criteria for transient phenomena applied to receivers.

Normally, the performance criteria depend on the type of radio equipment. Thus, the present document only contains general performance criteria commonly used for the assessment of radio equipment. More specific and product-related performance criteria for a dedicated type of radio equipment may be found in the part of EN 301 489 series dealing with the particular type of radio equipment.

### **Performance criteria for continuous phenomena applied to transmitters and receivers**

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for continuous phenomena shall apply.

During and after the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed a permissible performance level specified by the manufacturer when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the test the EUT shall not unintentionally transmit or change its actual operating state and stored data.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

**Performance criteria for transient phenomena applied to transmitters and receivers**

If no further details are given in the relevant part of EN 301 489 series dealing with the particular type of radio equipment, the following general performance criteria for transient phenomena shall apply.

After the test, the apparatus shall continue to operate as intended. No degradation of performance or loss of function is allowed below a permissible performance level specified by the manufacturer, when the apparatus is used as intended. In some cases this permissible performance level may be replaced by a permissible loss of performance.

During the EMC exposure to an electromagnetic phenomenon, a degradation of performance is, however, allowed. No change of the actual mode of operation (e.g. unintended transmission) or stored data is allowed.

If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be deduced from the product description and documentation and what the user may reasonably expect from the apparatus if used as intended.

**Performance criteria for equipment which does not provide a continuous communication link**

For radio equipment which does not provide a continuous communication link, the performance criteria described in clauses (1) and (2) are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 of EN 301 489-1 V1.9.2 (2010-09) have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses (1) and (2).

**Performance criteria for ancillary equipment tested on a stand-alone basis**

If ancillary equipment is intended to be tested on a stand-alone basis, the performance criteria described in clauses (1) and (2) are not appropriate, then the manufacturer shall declare, for inclusion in the test report, his own specification for an acceptable level of performance or degradation of performance during and/or after the immunity tests. The performance specification shall be included in the product description and documentation. The related specifications set out in clause 5.3 of EN 301 489-1 V1.9.2 (2010-09) have also to be taken into account.

The performance criteria specified by the manufacturer shall give the same degree of immunity protection as called for in clauses (1) and (2).

**Special Performance Requirements (ETSI EN 301489-17):**

The performance criteria are:

- performance criteria A for immunity tests with phenomena of a continuous nature;
- performance criteria B for immunity tests with phenomena of a transient nature;
- performance criteria C for immunity tests with power interruptions exceeding a certain time.

The equipment shall meet the minimum performance criteria as specified in the following clauses.

**Performance criteria for Continuous phenomena applied to Transmitters (CT)**

The performance criteria A shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an ACKnowledgement (ACK) or Not ACKnowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

**Performance criteria for Transient phenomena applied to Transmitters (TT)**

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration, for which performance criteria C shall apply.

Tests shall be repeated with the EUT in standby mode (if applicable) to ensure that unintentional transmission does not occur. In systems using acknowledgement signals, it is recognized that an acknowledgement (ACK) or not-acknowledgement (NACK) transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

**Performance criteria for Continuous phenomena applied to Receivers (CR)**

The performance criteria A shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

### Performance criteria for Transient phenomena applied to Receivers (TR)

The performance criteria B shall apply, except for voltage dips of 100 ms and voltage interruptions of 5000 ms duration for which performance criteria C shall apply.

Where the EUT is a transceiver, under no circumstances, shall the transmitter operate unintentionally during the test. In systems using acknowledgement signals, it is recognized that an ACK or NACK transmission may occur, and steps should be taken to ensure that any transmission resulting from the application of the test is correctly interpreted.

| EN 301 489 -17 Performance criteria |                                                                                                                                                          |                                                                                                                                                                                                            |
|-------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Criteria                            | During Test                                                                                                                                              | After test                                                                                                                                                                                                 |
| A                                   | Shall operate as intended<br>May show degradation of performance (see note 1)<br>Shall be no loss of function<br>Shall be no unintentional transmissions | Shall operate as intended<br>Shall be no degradation of performance (see note 2)<br>Shall be no loss of function<br>Shall be no loss of stored data or user programmable functions                         |
| B                                   | May show loss of function (one or more)<br>May show degradation of performance (see note 1)<br>No unintentional transmission                             | Functions shall be self-recoverable<br>Shall operate as intended after recovering<br>Shall be no degradation of performance (see note 2)<br>Shall be no loss of stored data or user programmable functions |
| C                                   | May be loss of function (one or more)                                                                                                                    | Functions shall be recoverable by the operator<br>Shall operate as intended after recovering<br>Shall be no degradation of performance (see note 2)                                                        |

Note 1: Degradation of performance during the test is understood as a degradation to a level not below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance.

If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

Note 2: No degradation of performance after the test is understood as no degradation below a minimum performance level specified by the manufacturer for the use of the apparatus as intended. In some cases the specified minimum performance level may be replaced by a permissible degradation of performance. After the test no change of actual operating data or user retrievable data is allowed. If the minimum performance level or the permissible performance degradation is not specified by the manufacturer then either of these may be derived from the product description and documentation (including leaflets and advertising) and what the user may reasonably expect from the apparatus if used as intended.

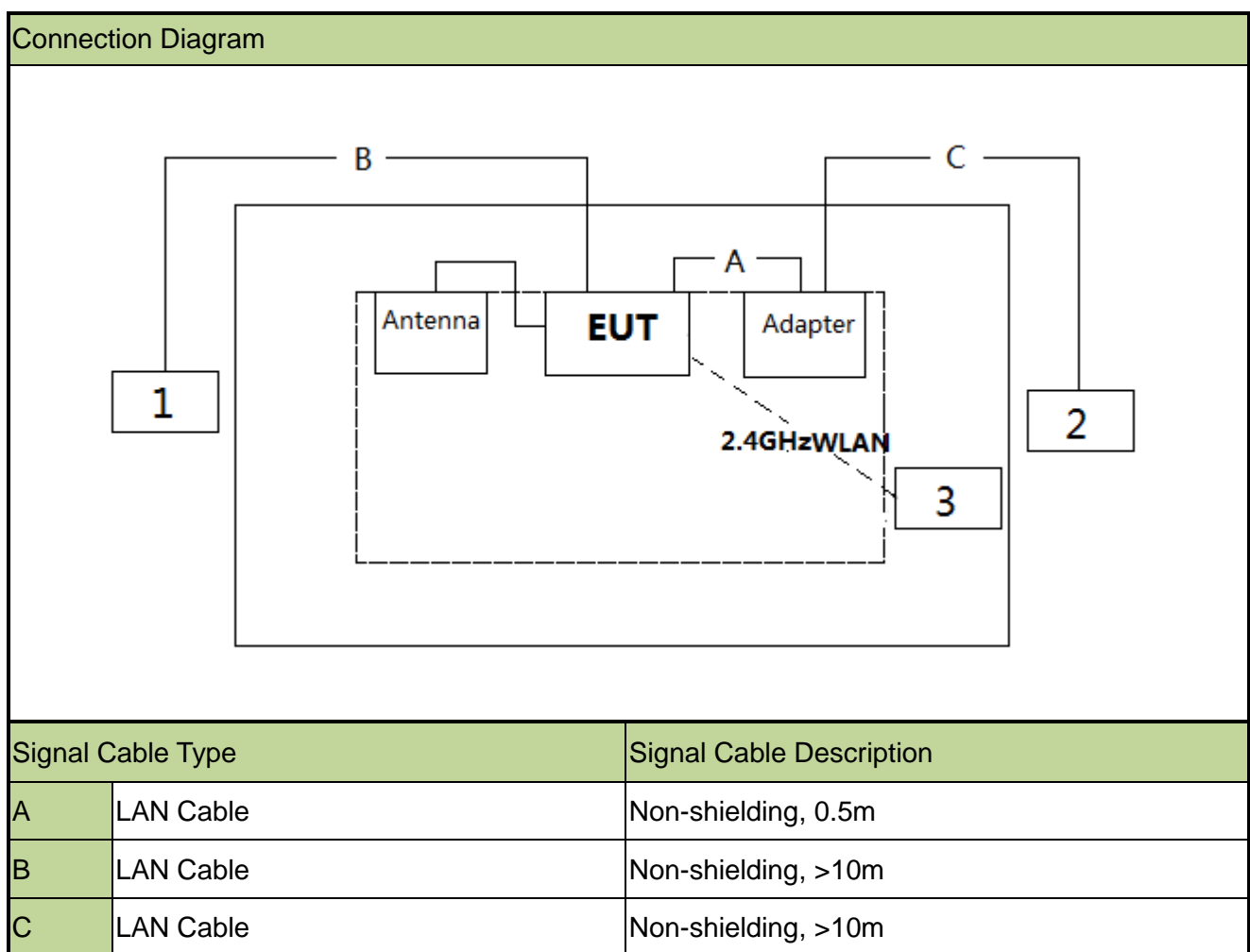
## 2. Test Configuration of Equipment under Test

### 2.1. Test Mode

|               |                                                           |
|---------------|-----------------------------------------------------------|
| EMI Test Mode | Mode 1: Power on and Communication with notebook by Wi-Fi |
| EMS Test Mode | Mode 1: Power on and Communication with notebook by Wi-Fi |

Note: In the process of communication, the EUT can transmit and receive with notebook by Wi-Fi technology.

### 2.2. Configuration of Tested System



### 2.3. Test System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

| Product |                   | Manufacturer | Model No. | Serial No.    | Power Cord         |
|---------|-------------------|--------------|-----------|---------------|--------------------|
| 1       | Personal Computer | DELL         | Vostro270 | N/A           | Non-Shielded, 1.8m |
| 2       | Personal Computer | DELL         | Vostro270 | N/A           | Non-Shielded, 1.8m |
| 3       | Notebook          | Lenovo       | E430c     | MP-4CFX213/10 | Non-Shielded, 1.8m |

### 2.4. Test Software

|   |                                                                                    |
|---|------------------------------------------------------------------------------------|
| 1 | Setup the EUT and simulators as shown on above.                                    |
| 2 | Turn on the power of all equipment.                                                |
| 3 | Making EUT communicate with PC by LAN cable and communicate with notebook by Wi-Fi |



### 3. Test Summary

| Clause                       | Test Item                             | Test Standard | Result (Pass/Fail) | Remark                     |
|------------------------------|---------------------------------------|---------------|--------------------|----------------------------|
| <b>Emission Measurements</b> |                                       |               |                    |                            |
| EN 301489-1<br>Clause 8.4    | Conducted Emission                    | EN 55022      | Pass               | ---                        |
| EN 301489-1<br>Clause 8.2    | Radiated Emission                     | EN 55022      | Pass               | ---                        |
| EN 301489-1<br>Clause 8.5    | Harmonic current emissions            | EN 61000-3-2  | Pass               | ---                        |
| EN 301489-1<br>Clause 8.6    | Voltage fluctuations and flicker      | EN 61000-3-3  | Pass               | ---                        |
| <b>Immunity Measurements</b> |                                       |               |                    |                            |
| EN 301489-1<br>Clause 9.3    | Electrostatic discharge               | EN 61000-4-2  | Pass               | ---                        |
| EN 301489-1<br>Clause 9.2    | Radio-frequency electromagnetic field | EN 61000-4-3  | Pass               | ---                        |
| EN 301489-1<br>Clause 9.4    | Fast transients, common mode          | EN 61000-4-4  | Pass               | ---                        |
| EN 301489-1<br>Clause 9.8    | Surges                                | EN 61000-4-5  | Pass               | ---                        |
| EN 301489-1<br>Clause 9.5    | Radio-frequency common mode           | EN 61000-4-6  | Pass               | ---                        |
| EN 301489-1<br>Clause 9.6    | Transients and Surge                  | ISO 7637-2    | N/A                | Only for vehicular product |
| EN 301489-1<br>Clause 9.7    | Voltage dips and interruptions        | EN 61000-4-11 | Pass               | ---                        |

## 4. Conducted Emission

### 4.1. Limit of Conducted Emission

| Limits of conducted emission for AC mains power input/output ports |                        |          |  |  |
|--------------------------------------------------------------------|------------------------|----------|--|--|
| Frequency range<br>MHz                                             | Limits<br>dB( $\mu$ V) |          |  |  |
|                                                                    | Quasi-peak             | Average  |  |  |
| 0.15 to 0.50                                                       | 66 to 56               | 56 to 46 |  |  |
| 0.50 to 5                                                          | 56                     | 46       |  |  |
| 5 to 30                                                            | 60                     | 50       |  |  |

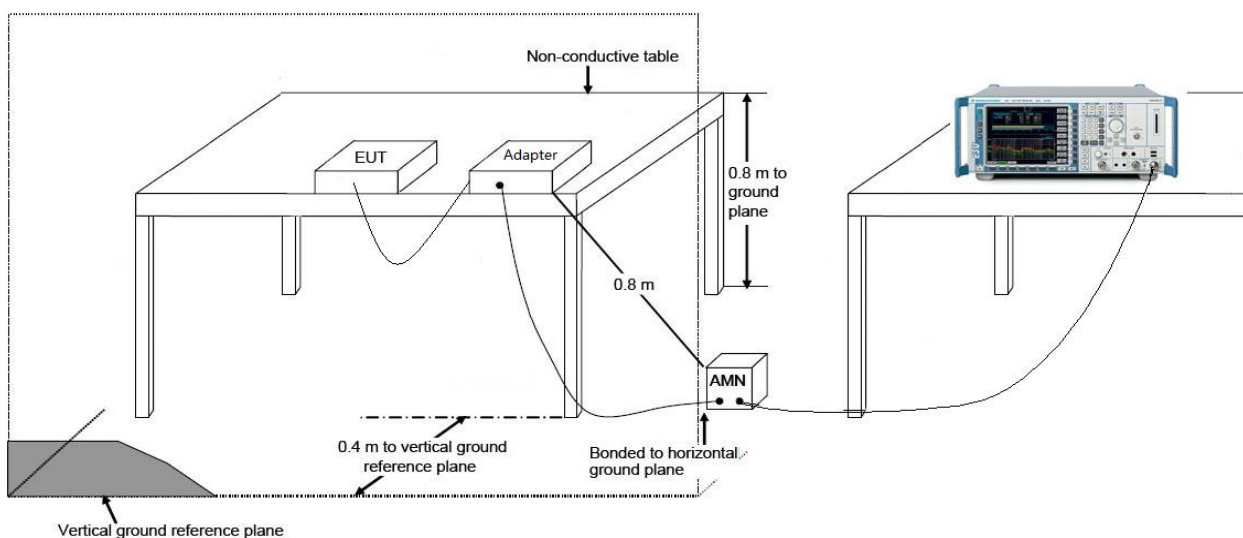
  

| Limits of conducted emission for telecommunication ports |                                |          |                                |          |
|----------------------------------------------------------|--------------------------------|----------|--------------------------------|----------|
| Frequency range<br>MHz                                   | Voltage Limits<br>dB( $\mu$ V) |          | Current limits<br>dB( $\mu$ A) |          |
|                                                          | Quasi-peak                     | Average  | Quasi-peak                     | Average  |
| 0.15 to 0.50                                             | 84 to 74                       | 74 to 64 | 40 to 30                       | 30 to 20 |
| 0.50 to 30                                               | 74                             | 64       | 30                             | 20       |

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

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

### 4.2. Test Setup



### **4.3. Test Procedure**

The receiver or associated equipment under measurement and the artificial mains network are disposed as shown in 3.2. Measurements shall be carried out using a selective voltmeter having a quasi-peak detector for broadband measurements and an average detector for narrow-band measurements in accordance with CISPR 16-1.

The mains lead shall be arranged to follow the shortest possible path between the receiver and artificial mains network on the ground. The mains lead in excess of 0,8 m separating the equipment under test from the artificial mains network shall be folded back and forth parallel to the lead so as to form a bundle with a length of 0,3 m to 0,4 m.

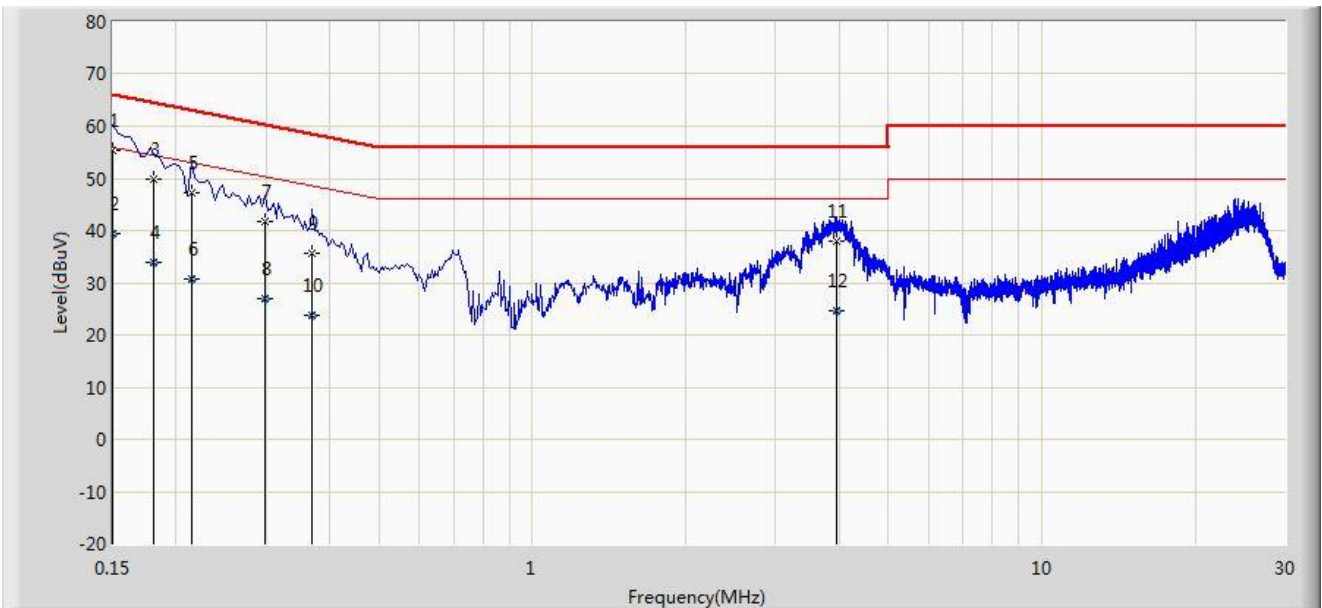
Earthing of the equipment under test if provided with a safety earth connection, shall be made to the earth terminal provided on the artificial mains network with the shortest possible lead.

If the equipment under test has a coaxial RF input connector, tests shall be performed with and without an earth connection made to the outer conductor screen of the coaxial RF input connector. When these tests are being carried out, no other earth connections shall be made to any additional earth terminal whatever.

If the equipment under test has no coaxial RF input connector and if it has an earth terminal, tests shall be performed with this terminal earthed.

#### 4.4. Test Result

|                                |                          |
|--------------------------------|--------------------------|
| Site: SR2                      | Time: 2015/07/08 - 14:22 |
| Limit: EN55022_CE_Mains_ClassB | Engineer: Milo Li        |
| Probe: ENV216_101683_Filter On | Polarity: Line           |
| EUT: WIRELESS ACCESS POINT     | Power: AC 230V/50Hz      |
| Note: Mode 1, Main Port        |                          |

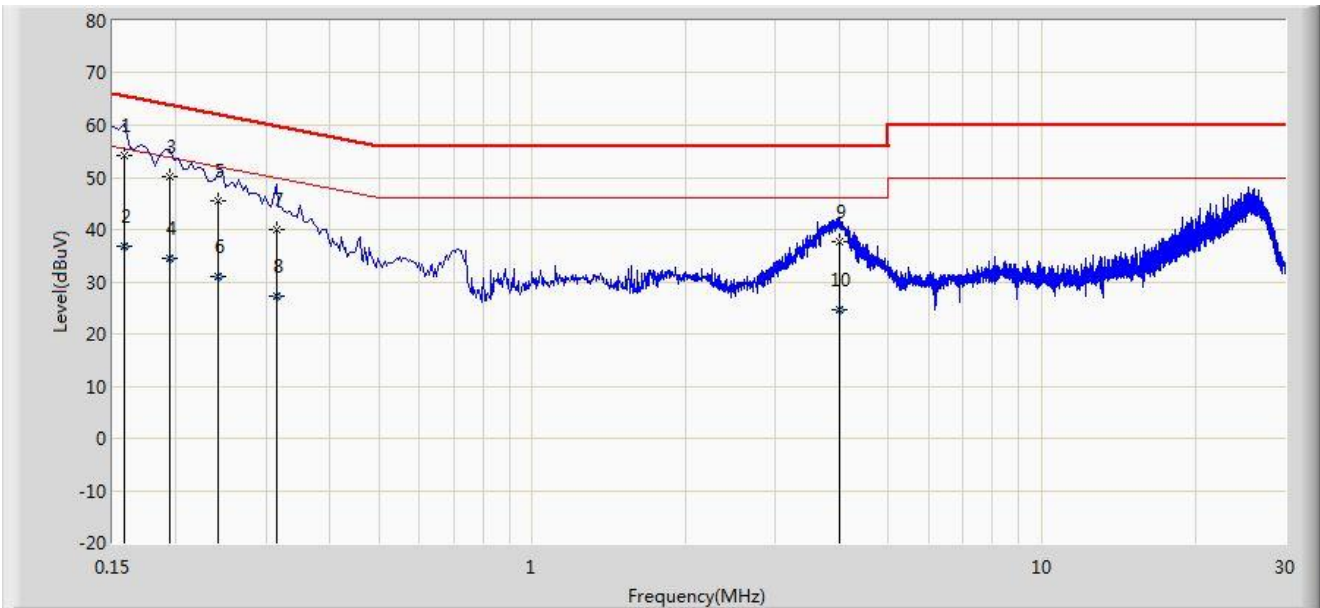


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      | *    | 0.150           | 55.231               | 44.063               | -10.769         | 66.000       | 11.168      | QP   |
| 2  |      |      | 0.150           | 39.353               | 28.185               | -16.647         | 56.000       | 11.168      | AV   |
| 3  |      |      | 0.181           | 49.736               | 39.685               | -14.695         | 64.431       | 10.050      | QP   |
| 4  |      |      | 0.181           | 33.894               | 23.844               | -20.537         | 54.431       | 10.050      | AV   |
| 5  |      |      | 0.214           | 47.319               | 37.362               | -15.730         | 63.049       | 9.957       | QP   |
| 6  |      |      | 0.214           | 30.739               | 20.783               | -22.309         | 53.049       | 9.957       | AV   |
| 7  |      |      | 0.298           | 41.639               | 31.637               | -18.659         | 60.298       | 10.002      | QP   |
| 8  |      |      | 0.298           | 26.968               | 16.966               | -23.330         | 50.298       | 10.002      | AV   |
| 9  |      |      | 0.370           | 35.784               | 25.723               | -22.717         | 58.501       | 10.061      | QP   |
| 10 |      |      | 0.370           | 23.695               | 13.634               | -24.806         | 48.501       | 10.061      | AV   |
| 11 |      |      | 3.950           | 38.088               | 28.127               | -17.912         | 56.000       | 9.961       | QP   |
| 12 |      |      | 3.950           | 24.507               | 14.546               | -21.493         | 46.000       | 9.961       | AV   |

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

|                                |                          |
|--------------------------------|--------------------------|
| Site: SR2                      | Time: 2015/07/08 - 14:08 |
| Limit: EN55022_CE_Mains_ClassB | Engineer: Milo Li        |
| Probe: ENV216_101683_Filter On | Polarity: Neutral        |
| EUT: WIRELESS ACCESS POINT     | Power: AC 230V/50Hz      |
| Note: Mode 1, Main Port        |                          |

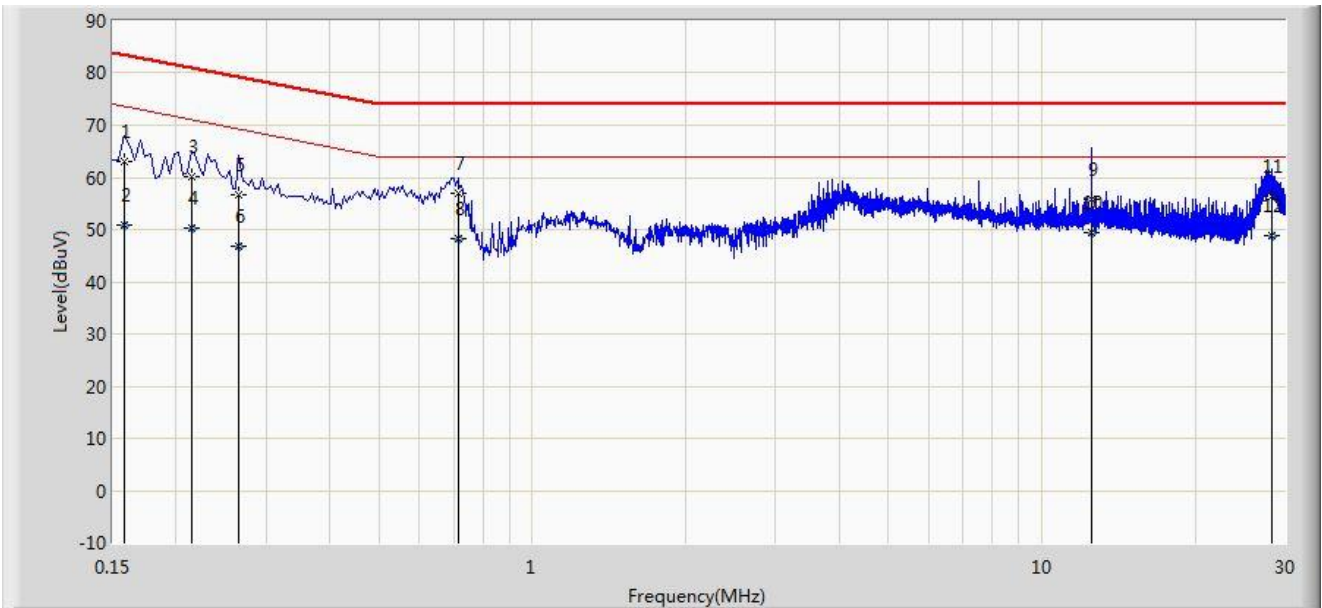


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      | *    | 0.158           | 54.141               | 43.852               | -11.427         | 65.568       | 10.290      | QP   |
| 2  |      |      | 0.158           | 36.791               | 26.501               | -18.777         | 55.568       | 10.290      | AV   |
| 3  |      |      | 0.194           | 50.289               | 40.267               | -13.596         | 63.885       | 10.022      | QP   |
| 4  |      |      | 0.194           | 34.364               | 24.342               | -19.521         | 53.885       | 10.022      | AV   |
| 5  |      |      | 0.242           | 45.377               | 35.382               | -16.650         | 62.027       | 9.995       | QP   |
| 6  |      |      | 0.242           | 31.106               | 21.111               | -20.921         | 52.027       | 9.995       | AV   |
| 7  |      |      | 0.314           | 39.975               | 29.927               | -19.889         | 59.864       | 10.048      | QP   |
| 8  |      |      | 0.314           | 27.350               | 17.302               | -22.514         | 49.864       | 10.048      | AV   |
| 9  |      |      | 4.006           | 37.581               | 27.608               | -18.419         | 56.000       | 9.973       | QP   |
| 10 |      |      | 4.006           | 24.747               | 14.774               | -21.253         | 46.000       | 9.973       | AV   |

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

|                                       |                          |
|---------------------------------------|--------------------------|
| Site: SR2                             | Time: 2015/07/09 - 22:12 |
| Limit: EN55022_CE_ISN(Voltage)_ClassB | Engineer: Milo Li        |
| Probe: TESEQ-ISN-T800-Cat 5_24811     | Polarity:                |
| EUT: WIRELESS ACCESS POINT            | Power: AC 230V/50Hz      |
| Note: Mode 1, POE Port 10Mbps         |                          |

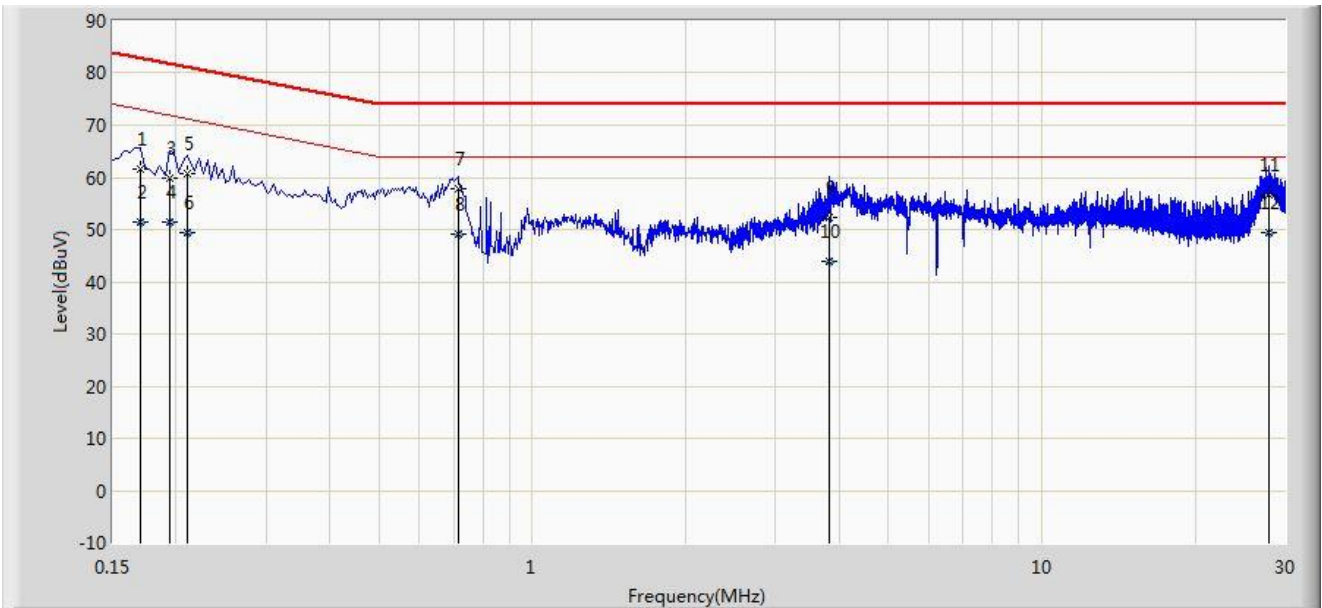


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      |      | 0.158           | 63.162               | 53.054               | -20.407         | 83.568       | 10.107      | QP   |
| 2  |      |      | 0.158           | 50.942               | 40.835               | -22.626         | 73.568       | 10.107      | AV   |
| 3  |      |      | 0.214           | 60.061               | 50.061               | -20.988         | 81.049       | 10.000      | QP   |
| 4  |      |      | 0.214           | 50.229               | 40.230               | -20.819         | 71.049       | 10.000      | AV   |
| 5  |      |      | 0.266           | 56.806               | 46.907               | -22.436         | 79.242       | 9.900       | QP   |
| 6  |      |      | 0.266           | 46.768               | 36.868               | -22.474         | 69.242       | 9.900       | AV   |
| 7  |      |      | 0.714           | 56.987               | 47.274               | -17.013         | 74.000       | 9.713       | QP   |
| 8  |      |      | 0.714           | 48.394               | 38.682               | -15.606         | 64.000       | 9.713       | AV   |
| 9  |      |      | 12.502          | 55.908               | 46.056               | -18.092         | 74.000       | 9.852       | QP   |
| 10 |      | *    | 12.502          | 49.412               | 39.560               | -14.588         | 64.000       | 9.852       | AV   |
| 11 |      |      | 28.246          | 56.379               | 45.797               | -17.621         | 74.000       | 10.581      | QP   |
| 12 |      |      | 28.246          | 48.757               | 38.176               | -15.243         | 64.000       | 10.581      | AV   |

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

|                                       |                          |
|---------------------------------------|--------------------------|
| Site: SR2                             | Time: 2015/07/09 - 22:15 |
| Limit: EN55022_CE_ISN(Voltage)_ClassB | Engineer: Milo Li        |
| Probe: TESEQ-ISN-T800-Cat 5_24811     | Polarity:                |
| EUT: WIRELESS ACCESS POINT            | Power: AC 230V/50Hz      |
| Note: Mode 1, POE Port 100Mbps        |                          |

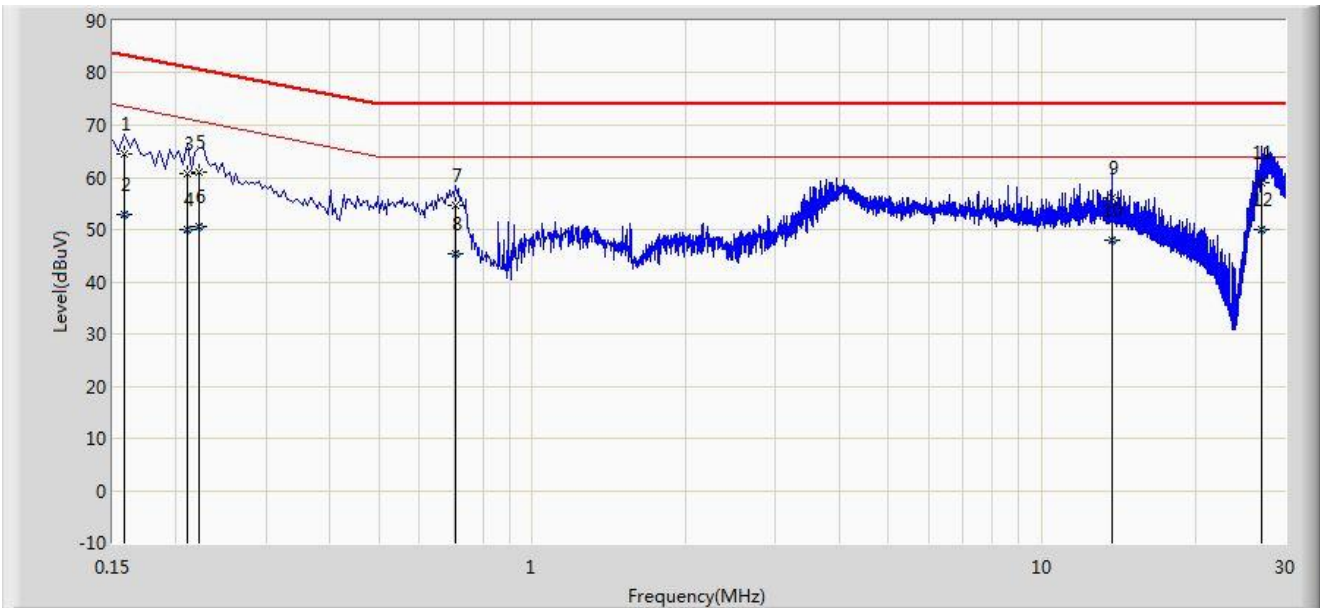


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      |      | 0.170           | 61.739               | 51.655               | -21.222         | 82.960       | 10.084      | QP   |
| 2  |      |      | 0.170           | 51.476               | 41.391               | -21.485         | 72.960       | 10.084      | AV   |
| 3  |      |      | 0.194           | 59.856               | 49.818               | -22.007         | 81.864       | 10.038      | QP   |
| 4  |      |      | 0.194           | 51.320               | 41.282               | -20.543         | 71.864       | 10.038      | AV   |
| 5  |      |      | 0.210           | 60.673               | 50.666               | -20.532         | 81.205       | 10.007      | QP   |
| 6  |      |      | 0.210           | 49.419               | 39.412               | -21.786         | 71.205       | 10.007      | AV   |
| 7  |      |      | 0.714           | 57.878               | 48.165               | -16.122         | 74.000       | 9.713       | QP   |
| 8  |      |      | 0.714           | 49.215               | 39.503               | -14.785         | 64.000       | 9.713       | AV   |
| 9  |      |      | 3.834           | 52.369               | 42.626               | -21.631         | 74.000       | 9.743       | QP   |
| 10 |      |      | 3.834           | 44.018               | 34.276               | -19.982         | 64.000       | 9.743       | AV   |
| 11 |      |      | 27.934          | 56.748               | 46.190               | -17.252         | 74.000       | 10.558      | QP   |
| 12 |      | *    | 27.934          | 49.444               | 38.886               | -14.556         | 64.000       | 10.558      | AV   |

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

|                                       |                          |
|---------------------------------------|--------------------------|
| Site: SR2                             | Time: 2015/07/09 - 22:40 |
| Limit: EN55022_CE_ISN(Voltage)_ClassB | Engineer: Milo Li        |
| Probe: TESEQ-ISN-T800-Cat 5_24811     | Polarity:                |
| EUT: WIRELESS ACCESS POINT            | Power: AC 230V/50Hz      |
| Note: Mode 1, Data Port 10Mbps        |                          |



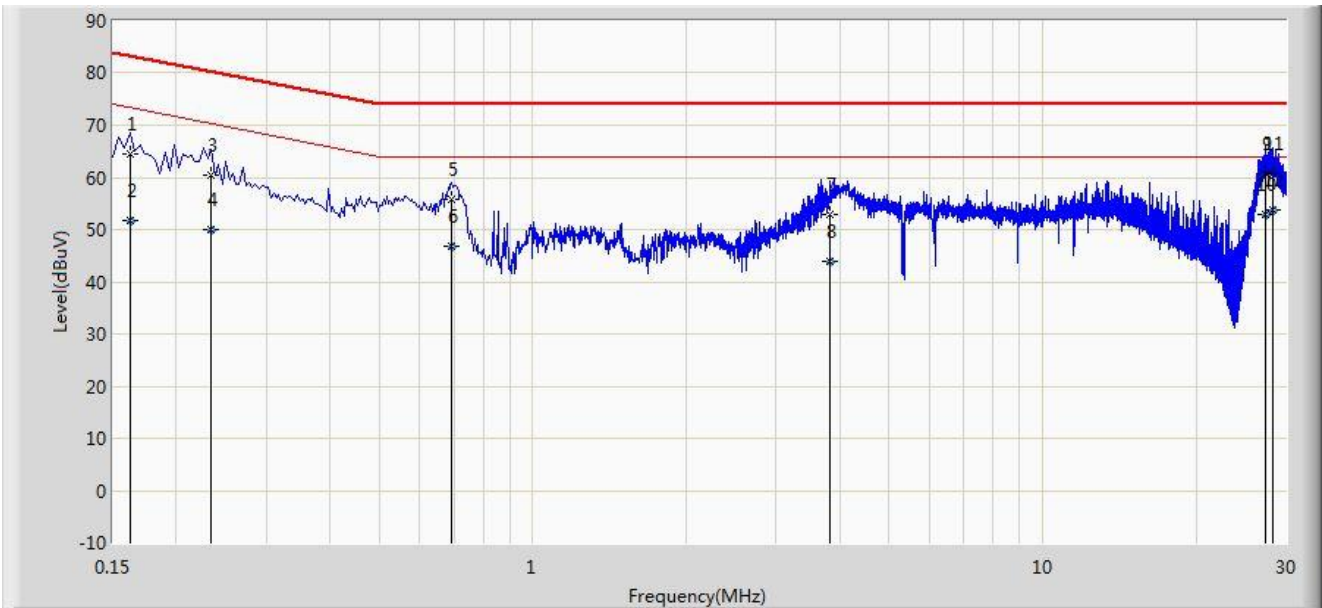
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      |      | 0.158           | 64.570               | 54.462               | -18.999         | 83.568       | 10.107      | QP   |
| 2  |      |      | 0.158           | 53.024               | 42.917               | -20.544         | 73.568       | 10.107      | AV   |
| 3  |      |      | 0.210           | 60.771               | 50.763               | -20.435         | 81.205       | 10.007      | QP   |
| 4  |      |      | 0.210           | 49.879               | 39.871               | -21.326         | 71.205       | 10.007      | AV   |
| 5  |      |      | 0.222           | 61.146               | 51.162               | -19.598         | 80.744       | 9.984       | QP   |
| 6  |      |      | 0.222           | 50.537               | 40.553               | -20.207         | 70.744       | 9.984       | AV   |
| 7  |      |      | 0.706           | 54.762               | 45.048               | -19.238         | 74.000       | 9.714       | QP   |
| 8  |      |      | 0.706           | 45.238               | 35.524               | -18.762         | 64.000       | 9.714       | AV   |
| 9  |      |      | 13.750          | 56.186               | 46.344               | -17.814         | 74.000       | 9.843       | QP   |
| 10 |      |      | 13.750          | 47.915               | 38.072               | -16.085         | 64.000       | 9.843       | AV   |
| 11 |      |      | 27.070          | 58.908               | 48.405               | -15.092         | 74.000       | 10.504      | QP   |
| 12 |      | *    | 27.070          | 50.049               | 39.545               | -13.951         | 64.000       | 10.504      | AV   |

Note: Measure Level (dBuV) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).



|                                       |                          |
|---------------------------------------|--------------------------|
| Site: SR2                             | Time: 2015/07/09 - 22:37 |
| Limit: EN55022_CE_ISN(Voltage)_ClassB | Engineer: Milo Li        |
| Probe: TESEQ-ISN-T800-Cat 5_24811     | Polarity:                |
| EUT: WIRELESS ACCESS POINT            | Power: AC 230V/50Hz      |
| Note: Mode 1, Data Port 100Mbps       |                          |



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV) | Factor (dB) | Type |
|----|------|------|-----------------|----------------------|----------------------|-----------------|--------------|-------------|------|
| 1  |      |      | 0.162           | 64.388               | 54.288               | -18.973         | 83.361       | 10.100      | QP   |
| 2  |      |      | 0.162           | 51.761               | 41.662               | -21.599         | 73.361       | 10.100      | AV   |
| 3  |      |      | 0.234           | 60.497               | 50.536               | -19.809         | 80.307       | 9.962       | QP   |
| 4  |      |      | 0.234           | 49.950               | 39.989               | -20.357         | 70.307       | 9.962       | AV   |
| 5  |      |      | 0.694           | 55.912               | 46.196               | -18.088         | 74.000       | 9.716       | QP   |
| 6  |      |      | 0.694           | 46.881               | 37.165               | -17.119         | 64.000       | 9.716       | AV   |
| 7  |      |      | 3.822           | 53.042               | 43.300               | -20.958         | 74.000       | 9.742       | QP   |
| 8  |      |      | 3.822           | 43.819               | 34.077               | -20.181         | 64.000       | 9.742       | AV   |
| 9  |      |      | 27.394          | 60.603               | 50.079               | -13.397         | 74.000       | 10.524      | QP   |
| 10 |      |      | 27.394          | 52.954               | 42.430               | -11.046         | 64.000       | 10.524      | AV   |
| 11 |      |      | 28.262          | 60.722               | 50.139               | -13.278         | 74.000       | 10.583      | QP   |
| 12 |      | *    | 28.262          | 53.788               | 43.205               | -10.212         | 64.000       | 10.583      | AV   |

Note: Measure Level (dBμV) = Reading Level (dBμV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB).

#### 4.5. Test Photograph

Test Mode: Mode 1

Description: Front View Conducted Emission Test Setup for Main Port



Test Mode: Mode 1

Description: Back View Conducted Emission Test Setup for Main Port



Test Mode: Mode 1

Description: Front View Conducted Emission Test Setup for LAN Port



Test Mode: Mode 1

Description: Back View Conducted Emission Test Setup for LAN Port



## 5. Radiated Emission

### 5.1. Limit of Radiated Emission

| Frequency range<br>MHz | Quasi-peak limits<br>dB( $\mu$ V/m) |
|------------------------|-------------------------------------|
| 30 to 230              | 40                                  |
| 230 to 1000            | 47                                  |

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

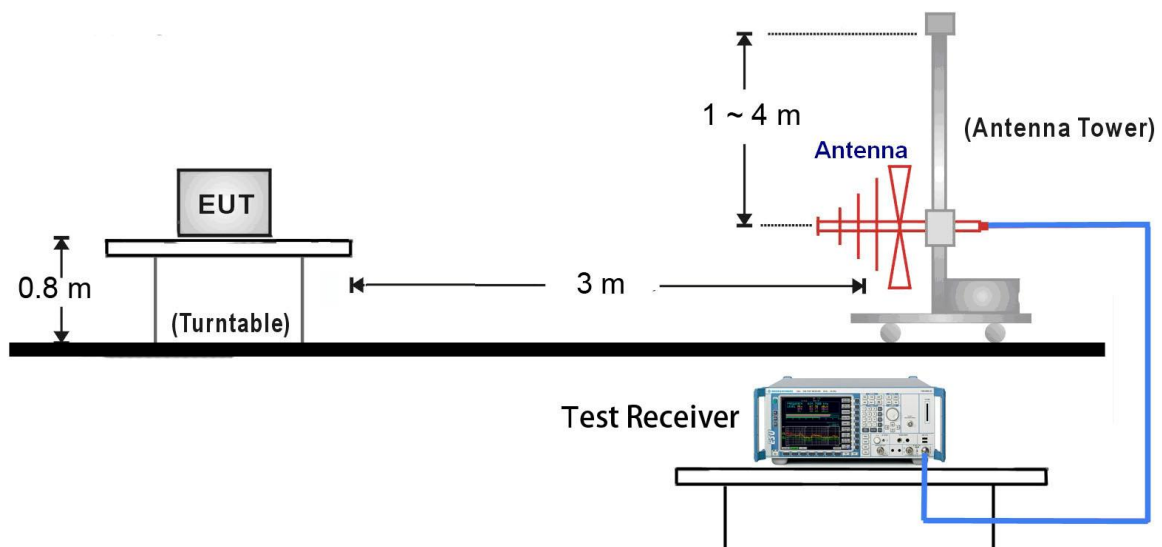
Note 2: Additional provisions may be required for cases where interference occurs.

| Frequency range<br>GHz | Average limit<br>dB( $\mu$ V/m) | Peak limit<br>dB( $\mu$ V/m) |
|------------------------|---------------------------------|------------------------------|
| 1 to 3                 | 50                              | 70                           |
| 3 to 6                 | 54                              | 74                           |

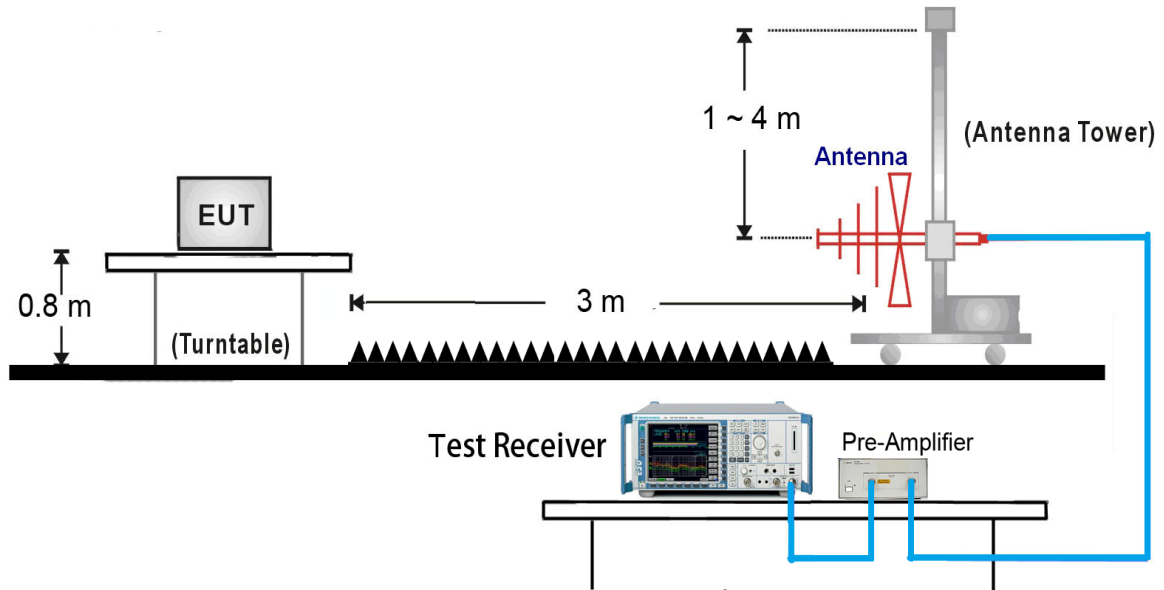
Note: The lower limit applies at the transition frequency.

### 5.2. Test Setup

30 ~ 1000 MHz



1000 ~ 6000 MHz



### 5.3. Test Procedure

Starting with the front of the receiver under test facing the measuring antenna, the measuring antenna is adjusted for horizontal polarization measurement and its height varied between 1 m and 4 m until the maximum reading is obtained.

The receiver under test is then rotated about its centre until the maximum meter reading is obtained, after which the measuring antenna height is again varied between 1 m and 4 m and the maximum reading noted.

The procedure is repeated for vertical polarization of the measuring antenna.

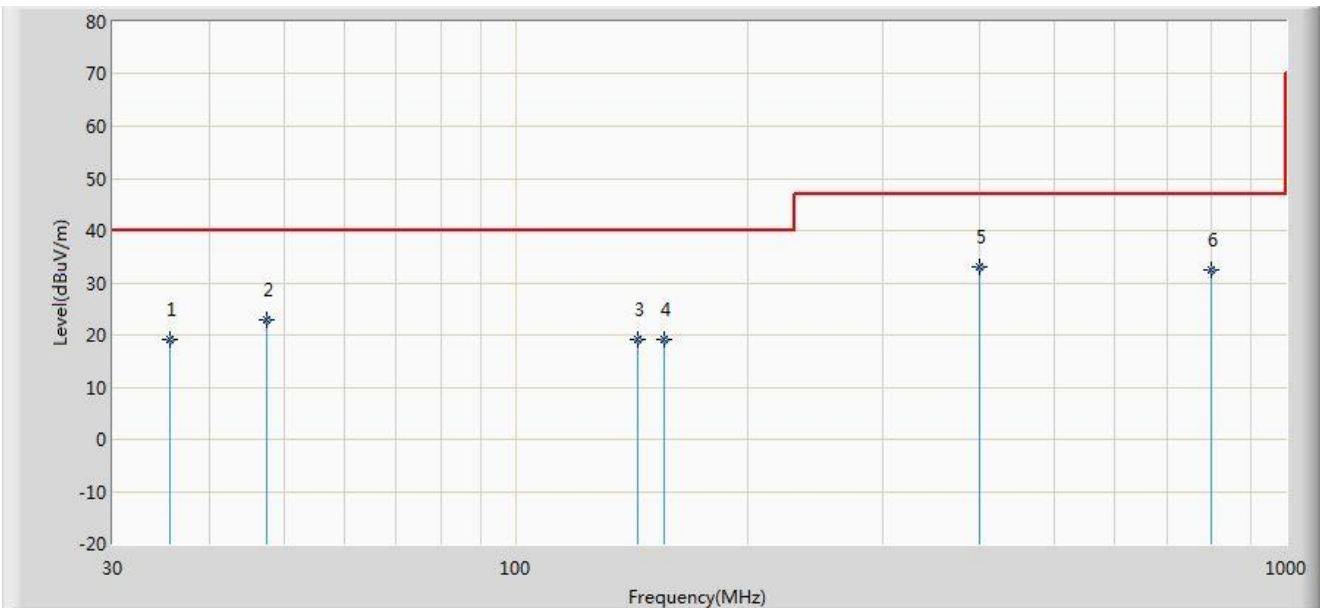
The highest value found, following this procedure, is defined as the radiation figure of the receiver.

If at certain frequencies the ambient signal field strength is high at the position of the receiving antenna, one of the following methods may be used to show compliance of the equipment under test.

- a) For small frequency bands with high ambient signals, the disturbance value may be interpolated from the adjacent values. The interpolated value shall lie on the curve describing a continuous function of the disturbance values adjacent to the ambient noise.
- b) Another possibility is to use the method described in annex C of CISPR 11.

## 5.4. Test Result

|                              |                          |
|------------------------------|--------------------------|
| Site: AC 1                   | Time: 2015/07/09 - 19:19 |
| Limit: EN55022_RE(3m)_ClassB | Engineer: Milo Li        |
| Probe: VULB9162_0.03-8GHz    | Polarity: Horizontal     |
| EUT: WIRELESS ACCESS POINT   | Power: AC 230V/50Hz      |
| Note: Mode 1                 |                          |

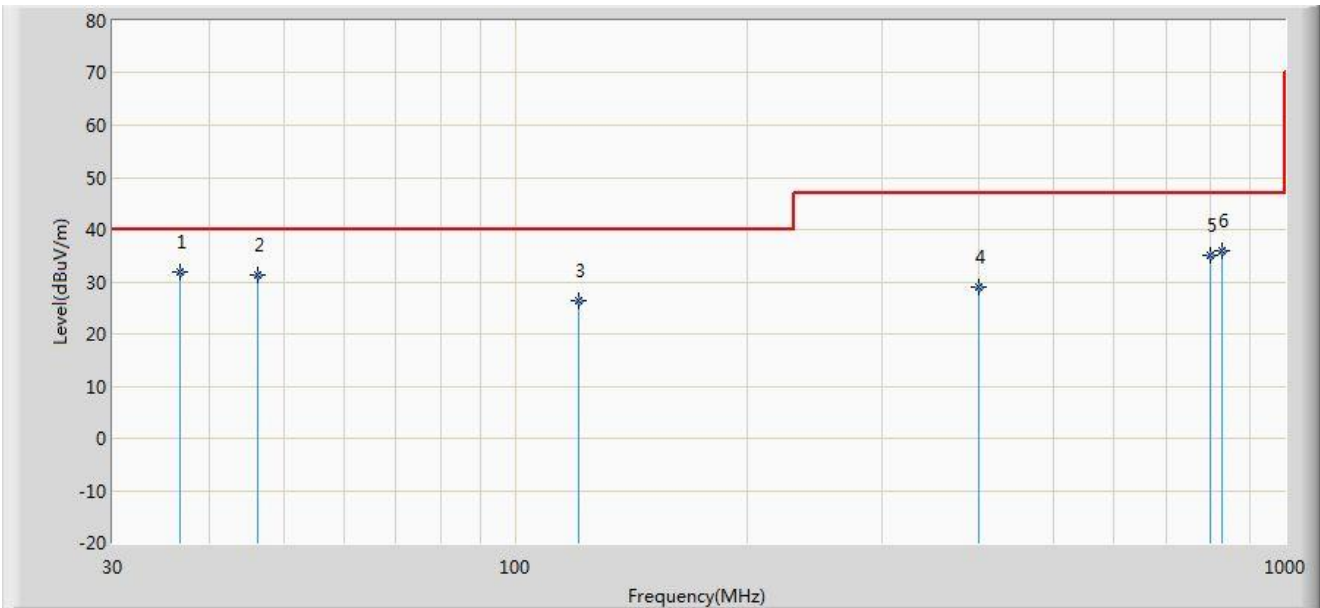


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  |      |      | 35.630          | 19.061                 | 6.030                | -20.939         | 40.000         | 13.031      | QP   |
| 2  |      |      | 47.580          | 22.975                 | 8.030                | -17.025         | 40.000         | 14.945      | QP   |
| 3  |      |      | 144.060         | 19.036                 | 9.620                | -20.964         | 40.000         | 9.416       | QP   |
| 4  |      |      | 156.210         | 19.027                 | 9.360                | -20.973         | 40.000         | 9.667       | QP   |
| 5  |      | *    | 400.240         | 32.977                 | 16.320               | -14.023         | 47.000         | 16.657      | QP   |
| 6  |      |      | 800.000         | 32.400                 | 9.680                | -14.600         | 47.000         | 22.720      | QP   |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).

|                              |                          |
|------------------------------|--------------------------|
| Site: AC 1                   | Time: 2015/07/09 - 19:19 |
| Limit: EN55022_RE(3m)_ClassB | Engineer: Milo Li        |
| Probe: VULB9162_0.03-8GHz    | Polarity: Vertical       |
| EUT: WIRELESS ACCESS POINT   | Power: AC 230V/50Hz      |
| Note: Mode 1                 |                          |



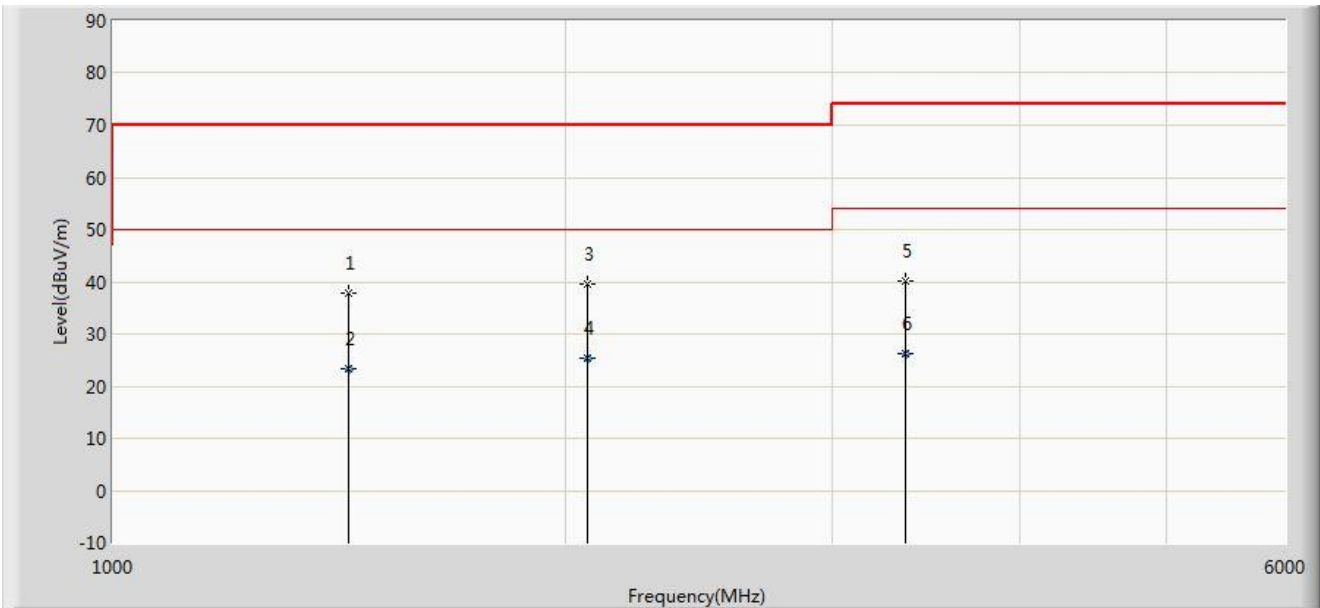
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  |      | *    | 36.630          | 31.892                 | 18.680               | -8.108          | 40.000         | 13.213      | QP   |
| 2  |      |      | 46.241          | 31.366                 | 16.400               | -8.634          | 40.000         | 14.965      | QP   |
| 3  |      |      | 121.080         | 26.316                 | 15.230               | -13.684         | 40.000         | 11.086      | QP   |
| 4  |      |      | 400.040         | 29.084                 | 12.430               | -17.916         | 47.000         | 16.654      | QP   |
| 5  |      |      | 800.320         | 35.154                 | 12.430               | -11.846         | 47.000         | 22.724      | QP   |
| 6  |      |      | 826.430         | 35.974                 | 12.840               | -11.026         | 47.000         | 23.134      | QP   |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m).



|                              |                          |
|------------------------------|--------------------------|
| Site: AC1                    | Time: 2015/07/09 - 20:33 |
| Limit: EN55022_RE(3m)_ClassB | Engineer: Milo Li        |
| Probe: BBHA9120D_1-18GHz     | Polarity: Horizontal     |
| EUT: WIRELESS ACCESS POINT   | Power: AC 230V/50Hz      |
| Note: Mode 1                 |                          |

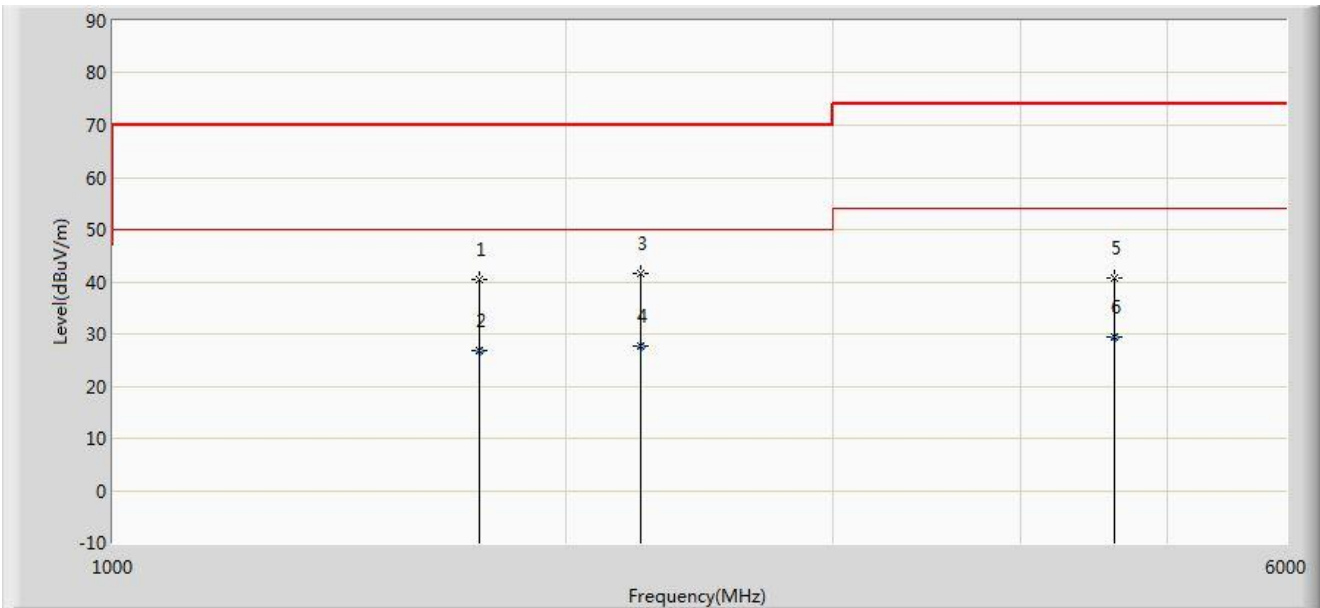


| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  |      |      | 1435.000        | 37.919                 | 45.788               | -32.081         | 70.000         | -7.869      | PK   |
| 2  |      |      | 1435.180        | 23.416                 | 31.285               | -26.584         | 50.000         | -7.869      | AV   |
| 3  |      |      | 2067.500        | 39.642                 | 44.709               | -30.358         | 70.000         | -5.067      | PK   |
| 4  |      | *    | 2067.680        | 25.447                 | 30.512               | -24.553         | 50.000         | -5.065      | AV   |
| 5  |      |      | 3360.000        | 40.059                 | 41.890               | -33.941         | 74.000         | -1.831      | PK   |
| 6  |      |      | 3360.218        | 26.289                 | 28.120               | -27.711         | 54.000         | -1.832      | AV   |

Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB).

|                              |                          |
|------------------------------|--------------------------|
| Site: AC1                    | Time: 2015/07/09 - 20:33 |
| Limit: EN55022_RE(3m)_ClassB | Engineer: Milo Li        |
| Probe: BBHA9120D_1-18GHz     | Polarity: Vertical       |
| EUT: WIRELESS ACCESS POINT   | Power: AC 230V/50Hz      |
| Note: Mode 1                 |                          |



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor (dB) | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|-------------|------|
| 1  |      |      | 1750.000        | 40.575                 | 47.821               | -29.425         | 70.000         | -7.246      | PK   |
| 2  |      |      | 1750.200        | 26.855                 | 34.100               | -23.145         | 50.000         | -7.245      | AV   |
| 3  |      |      | 2240.000        | 41.483                 | 44.960               | -28.517         | 70.000         | -3.477      | PK   |
| 4  |      | *    | 2240.231        | 27.554                 | 31.030               | -22.446         | 50.000         | -3.477      | AV   |
| 5  |      |      | 4620.000        | 40.794                 | 38.728               | -33.206         | 74.000         | 2.066       | PK   |
| 6  |      |      | 4620.300        | 29.366                 | 27.300               | -24.634         | 54.000         | 2.066       | AV   |

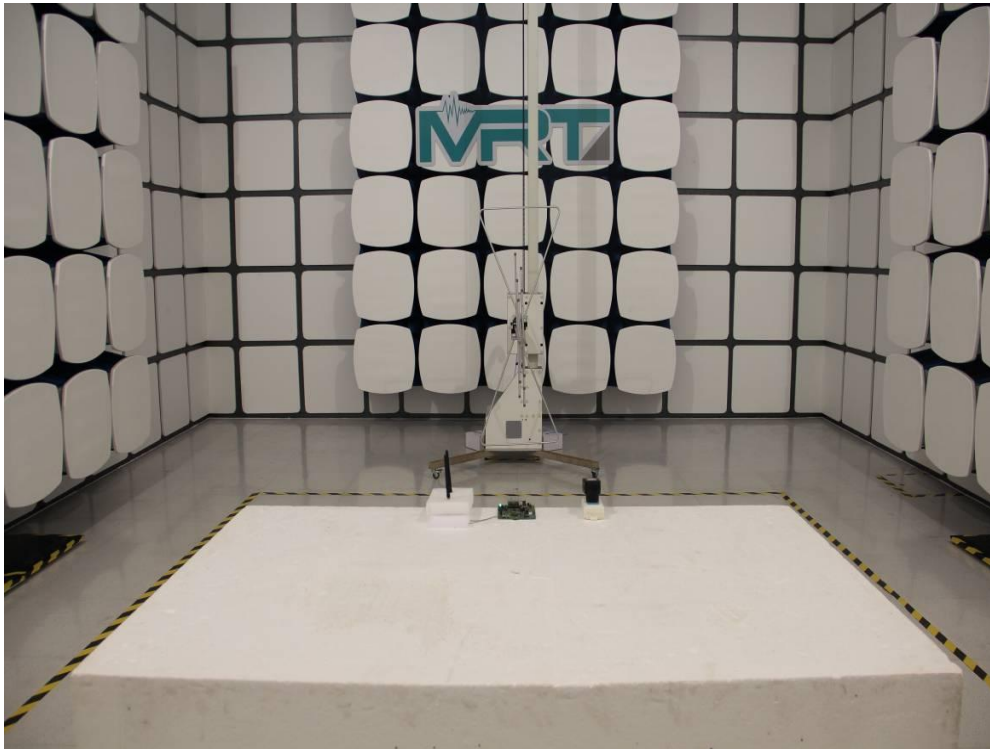
Note: Measure Level (dBuV/m) = Reading Level (dBuV) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) - Pre\_Amplifier Gain (dB).

### 5.5. Test Photograph

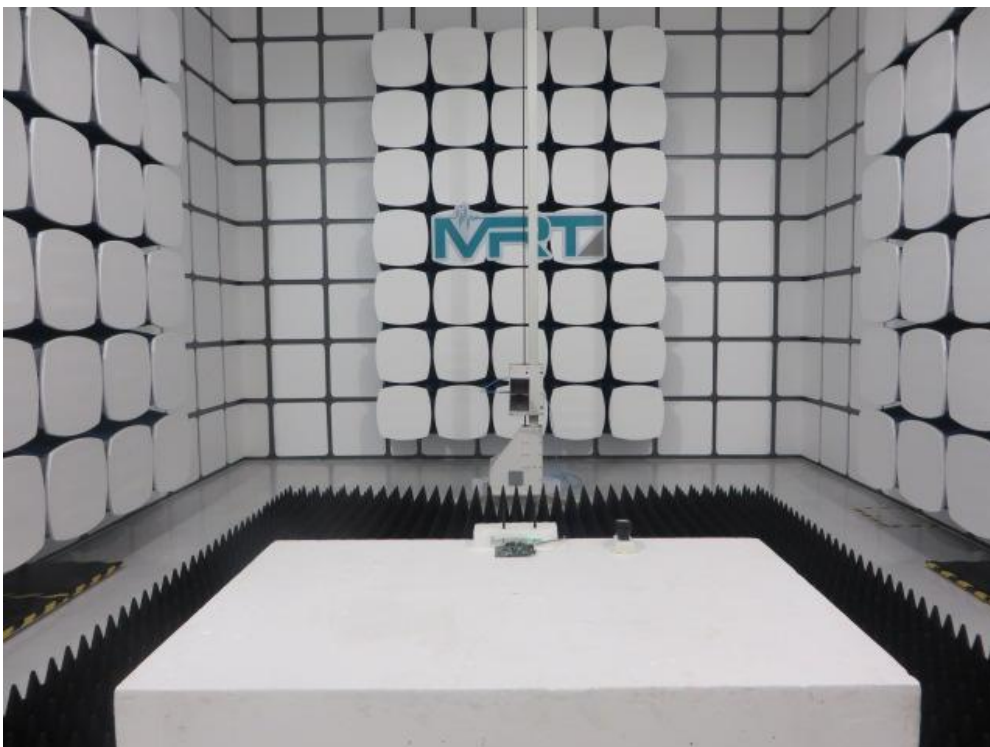
Test Mode: Mode 1

Description: Radiated Emission Test Setup (30MHz ~ 1GHz)



Test Mode: Mode 1

Description: Radiated Emission Test Setup (1 ~ 6GHz)



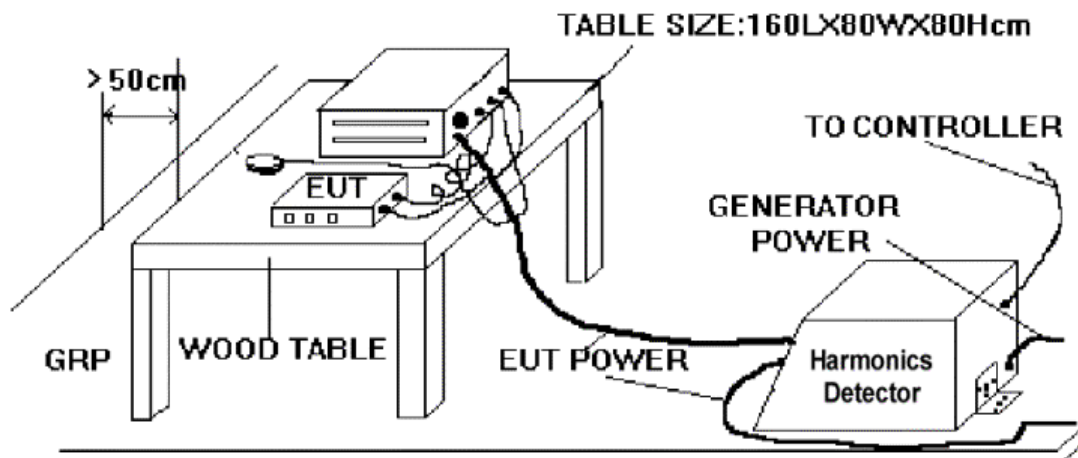
## 6. Harmonic Current Emissions

### 6.1. Limit of Harmonic Current Emissions

Limits of Class A Harmonics Currents

| Harmonics Order<br>n | Maximum Permissible<br>harmonic current<br>A | Harmonics Order<br>n | Maximum Permissible<br>harmonic current<br>A |
|----------------------|----------------------------------------------|----------------------|----------------------------------------------|
| Odd harmonics        |                                              | Even harmonics       |                                              |
| 3                    | 2.30                                         | 2                    | 1.08                                         |
| 5                    | 1.14                                         | 4                    | 0.43                                         |
| 7                    | 0.77                                         | 6                    | 0.30                                         |
| 9                    | 0.40                                         | $8 \leq n \leq 40$   | $0.23 * 8/n$                                 |
| 11                   | 0.33                                         | --                   | --                                           |
| 13                   | 0.21                                         | --                   | --                                           |
| $15 \leq n \leq 39$  | $0.15 * 15/n$                                | --                   | --                                           |

### 6.2. Test Setup



### 6.3. Test Procedure

The EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.98 times and 1.02 times shall be performed.

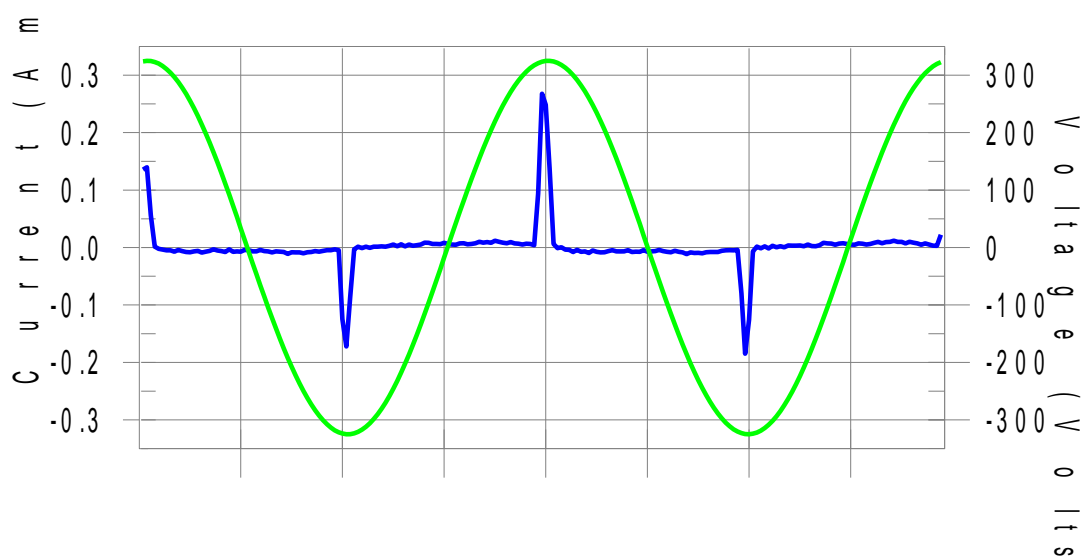
## 6.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/08 |

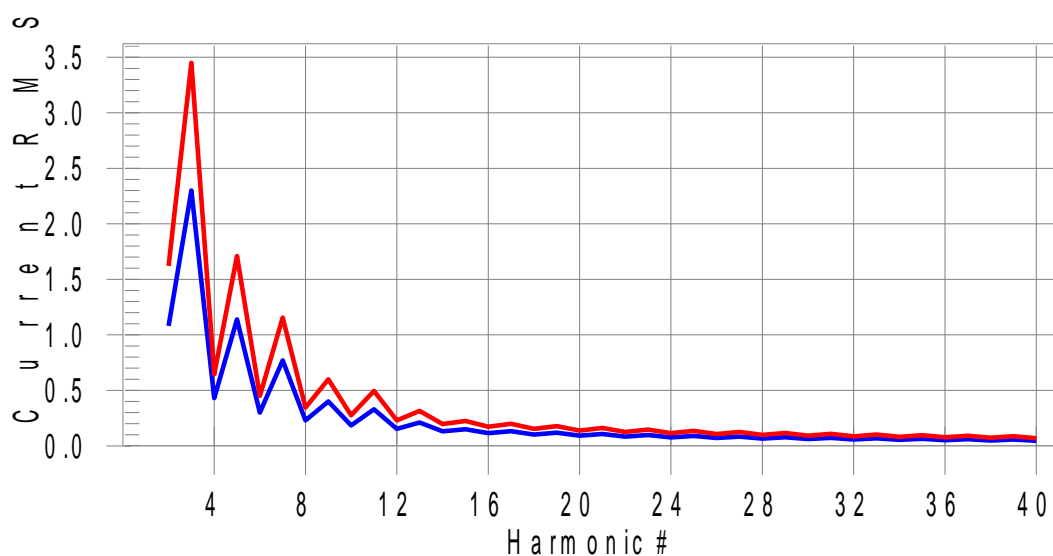
Test Result: Pass

Source qualification: Normal

### Current & voltage waveforms



### Harmonics and Class A limit line    European Limits



**Test result: Pass Worst harmonic was #21 with 5.87% of the limit.**

Test Result: Pass

Source qualification: Normal

THC(A): 0.03

I-THD(%): 219.32

POHC(A): 0.010

POHC Limit(A): 0.251

Highest parameter values during test:

V\_RMS (Volts): 229.93

Frequency(Hz): 50.00

I\_Peak (Amps): 0.274

I\_RMS (Amps): 0.036

I\_Fund (Amps): 0.014

Crest Factor: 7.714

Power (Watts): 2.9

Power Factor: 0.378

| Harm# | Harms(avg) | 100%Limit | %of Limit | Harms(max) | 150%Limit | %of Limit | Status |
|-------|------------|-----------|-----------|------------|-----------|-----------|--------|
| 2     | 0.001      | 1.080     | 0.1       | 0.001      | 1.620     | 0.06      | Pass   |
| 3     | 0.010      | 2.300     | 0.4       | 0.011      | 3.450     | 0.33      | Pass   |
| 4     | 0.001      | 0.430     | 0.1       | 0.001      | 0.645     | 0.12      | Pass   |
| 5     | 0.010      | 1.140     | 0.9       | 0.010      | 1.710     | 0.61      | Pass   |
| 6     | 0.000      | 0.300     | 0.1       | 0.000      | 0.450     | 0.11      | Pass   |
| 7     | 0.010      | 0.770     | 1.3       | 0.010      | 1.155     | 0.89      | Pass   |
| 8     | 0.000      | 0.230     | 0.1       | 0.000      | 0.345     | 0.10      | Pass   |
| 9     | 0.009      | 0.400     | 2.4       | 0.010      | 0.600     | 1.62      | Pass   |
| 10    | 0.000      | 0.184     | 0.1       | 0.000      | 0.276     | 0.13      | Pass   |
| 11    | 0.009      | 0.330     | 2.7       | 0.009      | 0.495     | 1.88      | Pass   |
| 12    | 0.000      | 0.153     | 0.2       | 0.000      | 0.230     | 0.16      | Pass   |
| 13    | 0.009      | 0.210     | 4.1       | 0.009      | 0.315     | 2.80      | Pass   |
| 14    | 0.000      | 0.131     | 0.2       | 0.000      | 0.197     | 0.16      | Pass   |
| 15    | 0.008      | 0.150     | 5.4       | 0.008      | 0.225     | 3.66      | Pass   |
| 16    | 0.000      | 0.115     | 0.2       | 0.000      | 0.173     | 0.16      | Pass   |
| 17    | 0.008      | 0.132     | 5.7       | 0.008      | 0.199     | 3.85      | Pass   |
| 18    | 0.000      | 0.102     | 0.2       | 0.000      | 0.153     | 0.18      | Pass   |
| 19    | 0.007      | 0.118     | 5.8       | 0.007      | 0.178     | 3.95      | Pass   |
| 20    | 0.000      | 0.092     | 0.2       | 0.000      | 0.138     | 0.18      | Pass   |
| 21    | 0.006      | 0.107     | 5.9       | 0.006      | 0.161     | 3.97      | Pass   |
| 22    | 0.000      | 0.084     | 0.2       | 0.000      | 0.125     | 0.19      | Pass   |
| 23    | 0.006      | 0.098     | 5.8       | 0.006      | 0.147     | 3.89      | Pass   |
| 24    | 0.000      | 0.077     | 0.2       | 0.000      | 0.115     | 0.19      | Pass   |
| 25    | 0.005      | 0.090     | 5.6       | 0.005      | 0.135     | 3.74      | Pass   |
| 26    | 0.000      | 0.071     | 0.2       | 0.000      | 0.106     | 0.19      | Pass   |
| 27    | 0.004      | 0.083     | 5.2       | 0.004      | 0.125     | 3.53      | Pass   |
| 28    | 0.000      | 0.066     | 0.2       | 0.000      | 0.099     | 0.19      | Pass   |
| 29    | 0.004      | 0.078     | 4.8       | 0.004      | 0.116     | 3.25      | Pass   |
| 30    | 0.000      | 0.061     | 0.2       | 0.000      | 0.092     | 0.19      | Pass   |
| 31    | 0.003      | 0.073     | 4.3       | 0.003      | 0.109     | 2.90      | Pass   |
| 32    | 0.000      | 0.058     | 0.2       | 0.000      | 0.086     | 0.20      | Pass   |
| 33    | 0.003      | 0.068     | 3.8       | 0.003      | 0.102     | 2.57      | Pass   |
| 34    | 0.000      | 0.054     | 0.2       | 0.000      | 0.081     | 0.18      | Pass   |
| 35    | 0.002      | 0.064     | 3.2       | 0.002      | 0.096     | 2.18      | Pass   |
| 36    | 0.000      | 0.051     | 0.2       | 0.000      | 0.077     | 0.19      | Pass   |
| 37    | 0.002      | 0.061     | 2.6       | 0.002      | 0.091     | 1.78      | Pass   |
| 38    | 0.000      | 0.048     | 0.2       | 0.000      | 0.073     | 0.19      | Pass   |
| 39    | 0.001      | 0.058     | 2.0       | 0.001      | 0.087     | 1.39      | Pass   |
| 40    | 0.000      | 0.046     | 0.2       | 0.000      | 0.069     | 0.21      | Pass   |

## 6.5. Test Photograph

Test Mode: Mode 1

Description: Harmonic current emissions Test Setup



## 7. Voltage Fluctuations and Flicker

### 7.1. Limit of Voltage Fluctuations and Flicker

The following limits apply:

- the value of  $P_{st}$  shall not be greater than 1.0;
- the value of  $P_{1t}$  shall not be greater than 0.65;
- the value of  $d(t)$  during a voltage change shall not exceed 3.3% for more than 500ms;
- the relative steady-state voltage change,  $d_c$ , shall not exceed 3.3%;
- the maximum relative voltage change,  $d_{max}$ , shall not exceed;
  - a) 4% without additional conditions;
  - b) 6% for equipment which is:
    - switched manually, or
    - switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.

NOTE: The cycling frequency will be further limited by the  $P_{st}$  and  $P_{1t}$  limit.

For example: a  $d_{max}$  of 6% producing a rectangular voltage change characteristic twice per hour will give a  $P_{1t}$  of about 0.65.

- c) 7% for equipment which is:
  - attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
  - switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

$P_{st}$  and  $P_{1t}$  requirements shall not be applied to voltage changes caused by manual switching.



Diagram illustrating the experimental setup for the proposed EUT. The setup includes a **WOOD TABLE** (TABLE SIZE: 160LX80WX80Hcm) and a **GRP** (Grounding Rod) positioned at a distance of **>50cm** from the table. The **EUT** (Electrical Under Test) is connected to the **TO CONTROLLER** and the **GENERATOR POWER** source. The **EUT** is also connected to the **Harmonics Detector** via the **EUT POWER** line.

The EUT is supplied in series with power analyzer from a power source having the same normal voltage and frequency as the rated supply voltage and the equipment under test. And the rated voltage at the supply voltage of EUT of 0.98 times and 1.02 times shall be performed.

## 7.4. Test Result

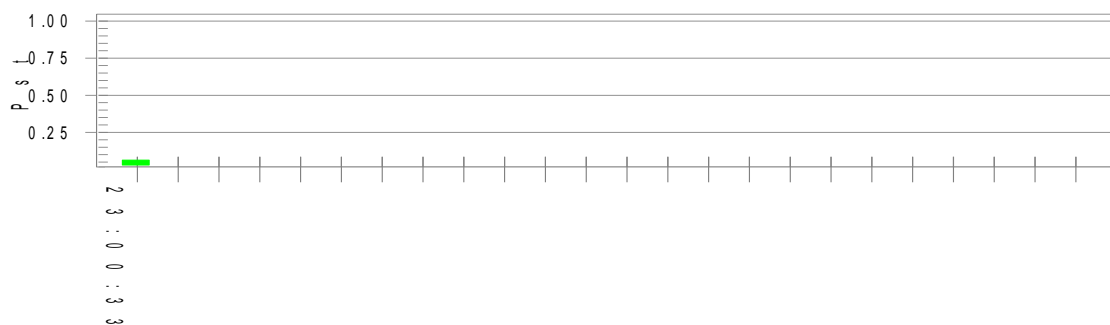
|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/08 |

Test Result: Pass

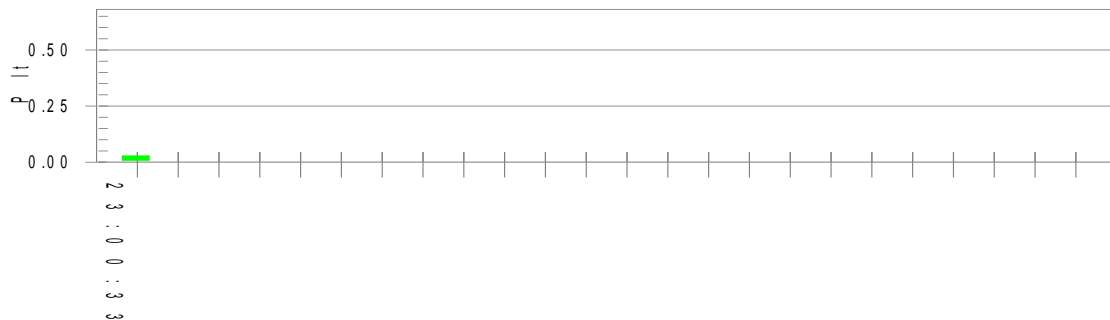
Status: Test Completed

### Pst<sub>i</sub> and limit line

### European Limits



### Plt and limit line



### Parameter values recorded during the test:

|                                 |        |                  |            |
|---------------------------------|--------|------------------|------------|
| Vrms at the end of test (Volt): | 229.90 |                  |            |
| Highest dt (%):                 | 0.00   | Test limit (%):  | 3.30 Pass  |
| Time(mS) > dt:                  | 0.0    | Test limit (mS): | 500.0 Pass |
| Highest dc (%):                 | 0.00   | Test limit (%):  | 3.30 Pass  |
| Highest dmax (%):               | 0.00   | Test limit (%):  | 4.00 Pass  |
| Highest Pst (10 min. period):   | 0.064  | Test limit:      | 1.000 Pass |
| Highest Plt (2 hr. period):     | 0.028  | Test limit:      | 0.650 Pass |

### 7.5. Test Photograph

Test Mode: Mode 1

Description: Voltage Fluctuation and Flicker Test Setup

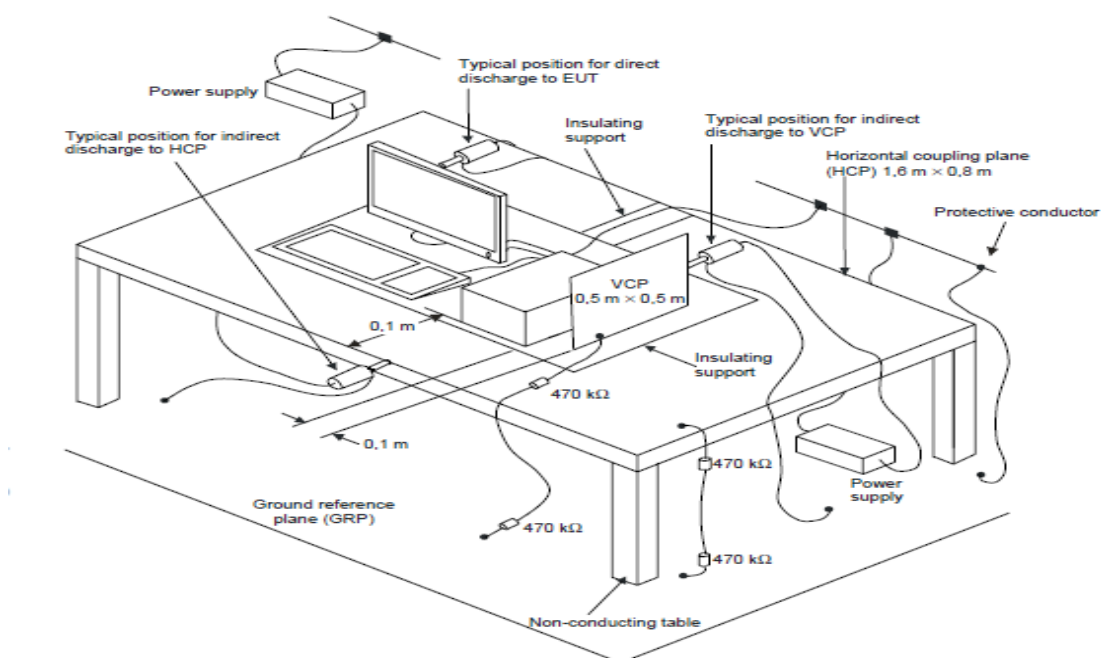


## 8. Electrostatic Discharge

### 8.1. Limit of Electrostatic Discharge

| Environmental phenomenon | Test specification     | Units               | Performance criterion |
|--------------------------|------------------------|---------------------|-----------------------|
| Enclosure port           |                        |                     |                       |
| Electrostatic Discharge  | ±4 (Contact discharge) | kV (Charge voltage) | B                     |
|                          | ±8 (Air discharge)     | kV (Charge voltage) |                       |

### 8.2. Test Setup



### **8.3. Test Procedure**

#### **Direct application of discharges to the EUT:**

Contact discharge was applied only to conductive surfaces of the EUT.

Air discharges were applied only to non-conductive surfaces of the EUT.

During the test, it was performed with single discharges. For the single discharge time between successive single discharges will be keep longer 1 second. It was at least twenty-five single discharges with positive and negative at the same selected point.

The selected point, which was performed with electrostatic discharge, was marked on the red label of the EUT.

#### **Indirect application of discharges to the EUT:**

##### Vertical Coupling Plane (VCP):

The coupling plane, of dimensions 0.5m x 0.5m, is placed parallel to, and positioned at a distance 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least twenty-five single discharges with positive and negative at the same selected point.

##### Horizontal Coupling Plane (HCP):

The coupling plane is placed under to the EUT. The generator shall be positioned vertically at a distance of 0.1m from the EUT, with the Discharge Electrode touching the coupling plane.

The four faces of the EUT will be performed with electrostatic discharge. It was at least twenty-five single discharges with positive and negative at the same selected point.

#### 8.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| EUT           | WIRELESS ACCESS POINT | Temperature       | 23°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/05 |

| Direct Application |                  | Test Result   |                   |
|--------------------|------------------|---------------|-------------------|
| Test Location      | Test Level       | Air Discharge | Contact Discharge |
| 1 ~ 4              | ±4kV             | Pass          | N/A               |
| 5 ~ 6              | ±2kV, ±4kV, ±8kV | N/A           | Pass              |

| Indirect Application       |            | Test Result         |                   |
|----------------------------|------------|---------------------|-------------------|
| Test Location              | Test Level | Horizontal Coupling | Vertical Coupling |
| Front, Rear<br>Left, Right | ±4kV       | Pass                | Pass              |

Note: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for TT&TR to MS Function.

### 8.5. Test Photograph

Test Mode: Mode 1

Description: Electrostatic Discharge Test Setup



### Electrostatic Discharge Test Location



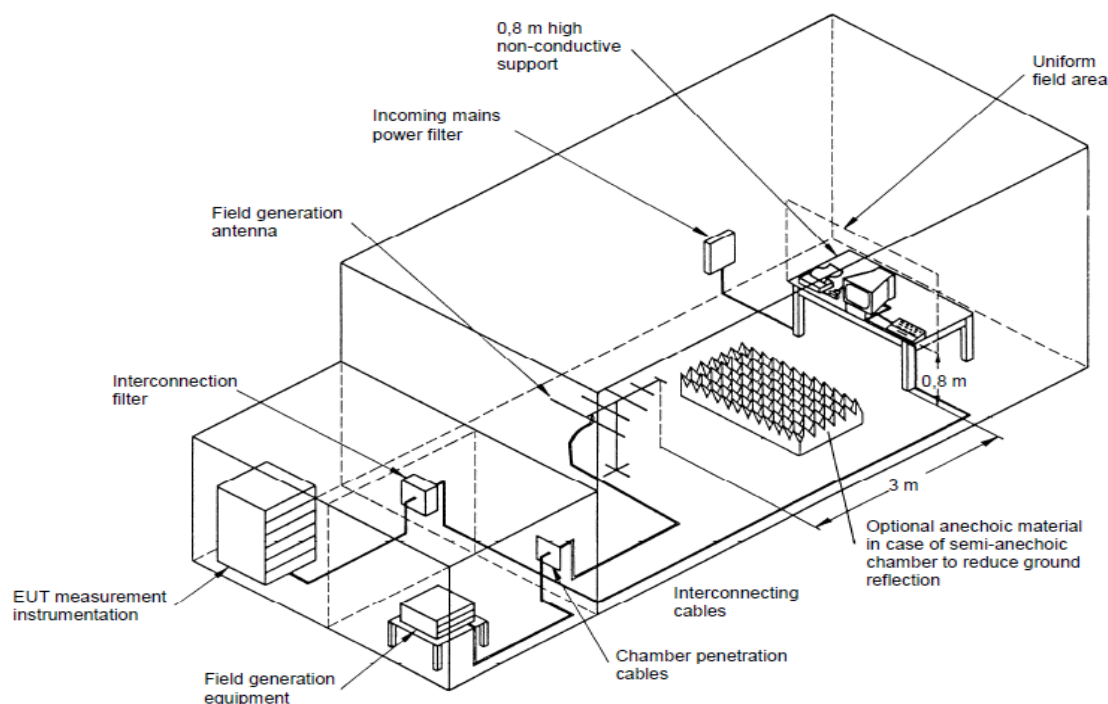


## 9. Radio-frequency Electromagnetic Field

### 9.1. Limit of Radio-frequency Electromagnetic Field

| Environmental phenomenon                                                                                                                                                                                                                                           | Test specification     | Units                    | Performance criterion |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------|-----------------------|
| Enclosure port                                                                                                                                                                                                                                                     |                        |                          |                       |
| Radio frequency<br>electromagnetic field                                                                                                                                                                                                                           | 80 - 1000, 1400 - 2700 | MHz                      | A                     |
|                                                                                                                                                                                                                                                                    | 3                      | V/m (unmodulated, r.m.s) |                       |
|                                                                                                                                                                                                                                                                    | 80                     | % AM (1kHz)              |                       |
| Note 1: If the wanted signal is modulated at 1000Hz, then an audio signal of 400Hz shall be used.                                                                                                                                                                  |                        |                          |                       |
| Note 2: The test shall be performed over the frequency range 80MHz to 1000MHz and 1400MHz to 2700MHz with the exception of the exclusion band for transmitters, receivers and duplex transceivers [see clause 4 of EN 301 489-1 V1.9.2 (2010-09)], as appropriate. |                        |                          |                       |

### 9.2. Test Setup



### 9.3. Test Procedure

The EUT and load, which are placed on a table that is 0.8 meter above ground, are placed with one coincident with the calibration plane such that the distance from antenna to the EUT was 3 meters. Both horizontal and vertical polarization of the antenna and four sides of the EUT are set on measurement.

In order to judge the EUT performance, a CCD camera is used to monitor the PC screen which shows the communication status.

All the scanning conditions are as follows:

|    | Condition of Test              | Remarks                       |
|----|--------------------------------|-------------------------------|
| 1. | Field Strength                 | 3V/m                          |
| 2. | Radiated Signal                | AM 80% Modulated with 1kHz    |
| 3. | Scanning Frequency             | 80 - 1000MHz, 1.4GHz - 2.7GHz |
| 4. | Dwell Time                     | 3 Seconds                     |
| 5. | Frequency Step Size $\Delta f$ | 1%                            |

#### 9.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| EUT           | WIRELESS ACCESS POINT | Temperature       | 24°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/07 |

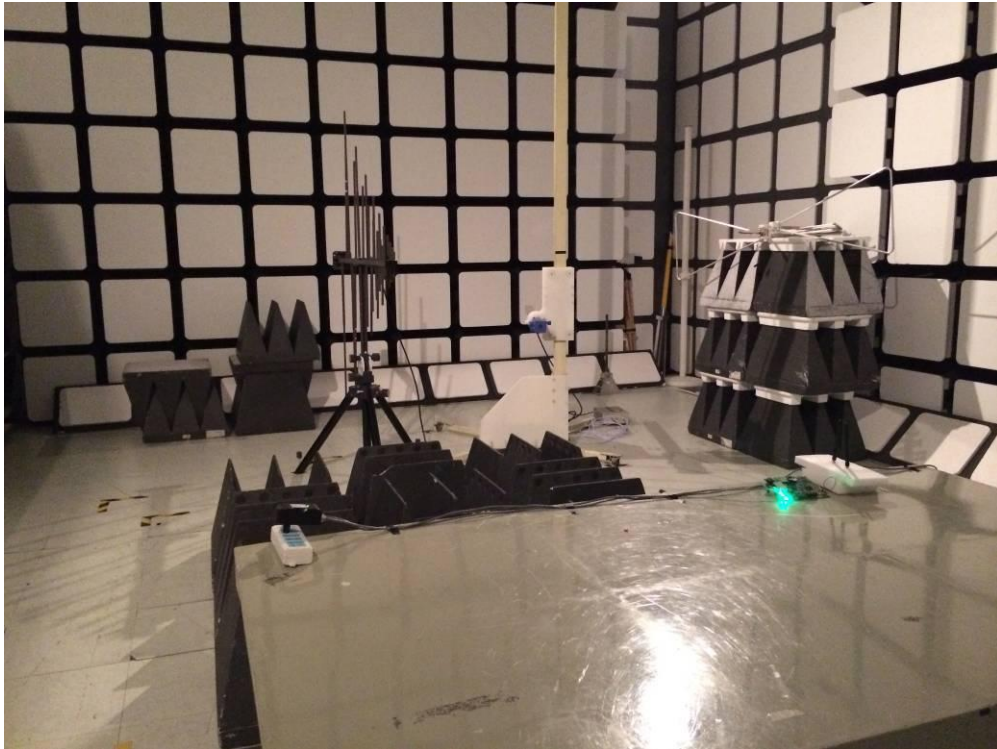
| Frequency (MHz) | Polarity            | Test Position | Field Strength (V/m) | Test Result |
|-----------------|---------------------|---------------|----------------------|-------------|
| 80-1000         | Horizontal/Vertical | Front         | 3                    | Pass        |
|                 |                     | Rear          |                      | Pass        |
|                 |                     | Left          |                      | Pass        |
|                 |                     | Right         |                      | Pass        |
|                 |                     | Top           |                      | Pass        |
|                 |                     | Bottom        |                      | Pass        |
| 1400-2700       | Horizontal/Vertical | Front         | 3                    | Pass        |
|                 |                     | Rear          |                      | Pass        |
|                 |                     | Left          |                      | Pass        |
|                 |                     | Right         |                      | Pass        |
|                 |                     | Top           |                      | Pass        |
|                 |                     | Bottom        |                      | Pass        |

Note: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for CT&CR to MS Function.

## 9.5. Test Photograph

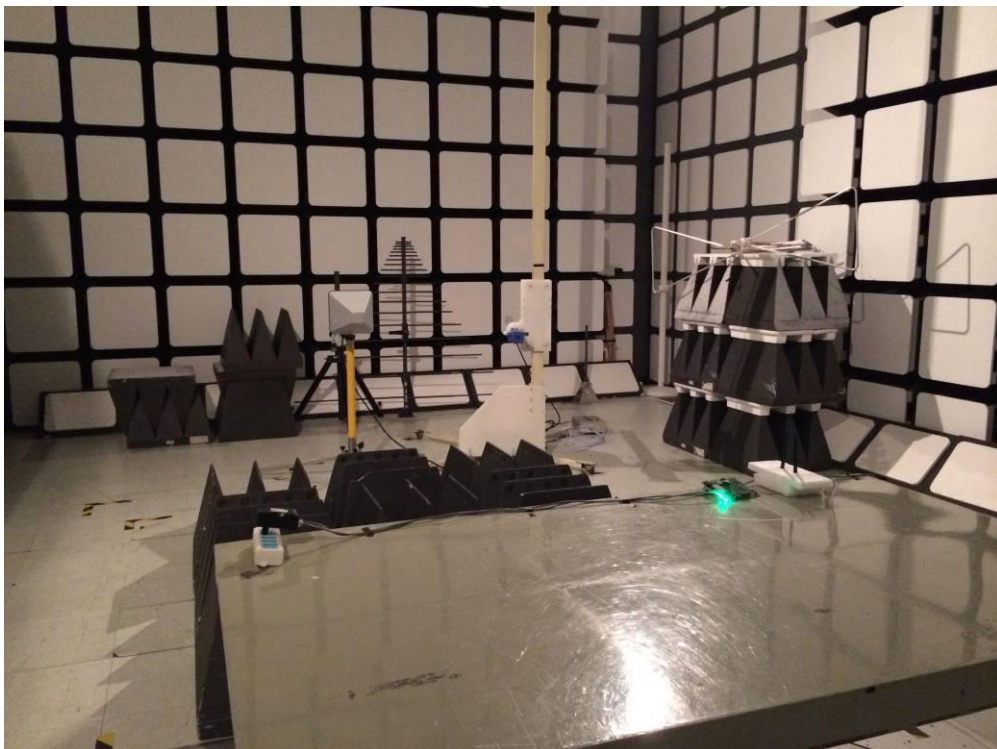
Test Mode: Mode 1

Description: Radio-frequency Electromagnetic Field Test Setup(80-1000MHz)



Test Mode: Mode 1

Description: Radio-frequency Electromagnetic Field Test Setup(1400-2700MHz)

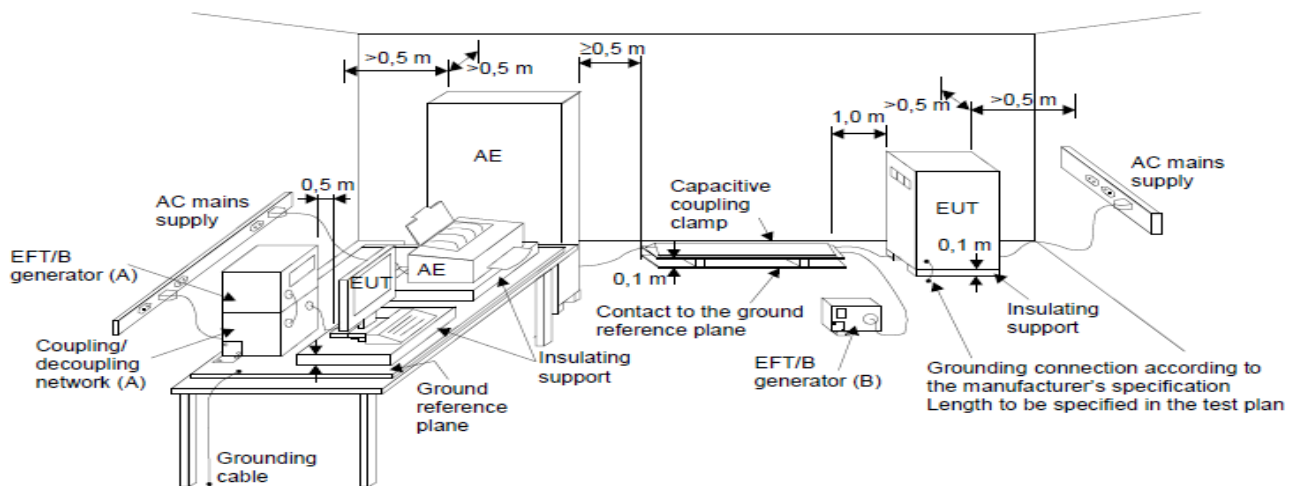


## 10. Electrical Fast Transients

### 10.1. Limit of Electrical Fast Transients

| Environmental phenomenon                                                                                                                                                                                                 | Test specification     | Units                                                                      | Performance criterion |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|----------------------------------------------------------------------------|-----------------------|
| Input AC power ports                                                                                                                                                                                                     |                        |                                                                            |                       |
| Electrical fast transients                                                                                                                                                                                               | $\pm 1$<br>5/50<br>5   | kV (open circuit test voltage)<br>Tr/Th (ns)<br>Repetition frequency (kHz) | B                     |
| Signal ports, telecommunication ports, and control ports (See Note)                                                                                                                                                      |                        |                                                                            |                       |
| Fast transients common mode                                                                                                                                                                                              | $\pm 0.5$<br>5/50<br>5 | kV (peak)<br>Tr/Th ns<br>Repetition frequency (kHz)                        | B                     |
| Note: This test shall be additionally performed on signal ports, telecommunication ports, control ports, and DC power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3m. |                        |                                                                            |                       |

### 10.2. Test Setup



### 10.3. Test Procedure

The EUT is placed on a table that is 0.8 meter height. A ground reference plane is placed on the table, and uses a 0.1m insulation between the EUT and ground reference plane.

The minimum area of the ground reference plane is 1m\*1m, and 0.65mm thick min, and projected beyond the EUT by at least 0.1m on all sides.

**For input AC power ports:**

The EUT is connected to the power mains through a coupling device that directly couples the EFT/B interference signal.

Each of the line conductors is impressed with burst noise for 1 minute.

The length of the power lines between the coupling device and the EUT is 0.5m.

**For signal ports, telecommunication ports, and control ports:**

The EFT interference signal is through a coupling clamp device couples to the signal of the EUT with burst noise for 1 minute.

The length of the signal lines between the coupling device and the EUT is 0.5m.

#### 10.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/06 |

| Inject Line | Polarity | Test Level (kV) | Test Duration (second) | Inject Method | Observation | Result |
|-------------|----------|-----------------|------------------------|---------------|-------------|--------|
| L           | +        | 1               | 60                     | Direct        | Note        | Pass   |
| L           | -        | 1               | 60                     | Direct        | Note        | Pass   |
| N           | +        | 1               | 60                     | Direct        | Note        | Pass   |
| N           | -        | 1               | 60                     | Direct        | Note        | Pass   |
| L+N         | +        | 1               | 60                     | Direct        | Note        | Pass   |
| L+N         | -        | 1               | 60                     | Direct        | Note        | Pass   |
| LAN Port    | +        | 0.5             | 60                     | Clamp         | Note        | Pass   |
| LAN Port    | -        | 0.5             | 60                     | Clamp         | Note        | Pass   |

Note: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for TT&TR to MS Function.



## 10.5. Test Photograph

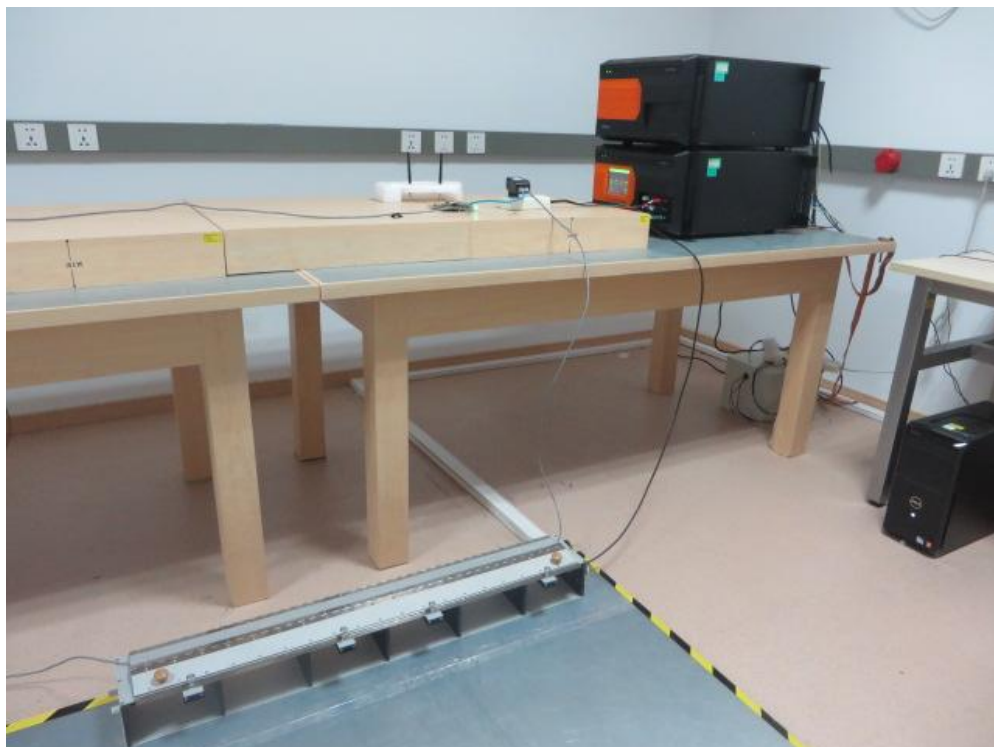
Test Mode: Mode 1

Description: Electrical Fast Transients Test Setup for Main Port



Test Mode: Mode 1

Description: Electrical Fast Transients Test Setup for LAN Port



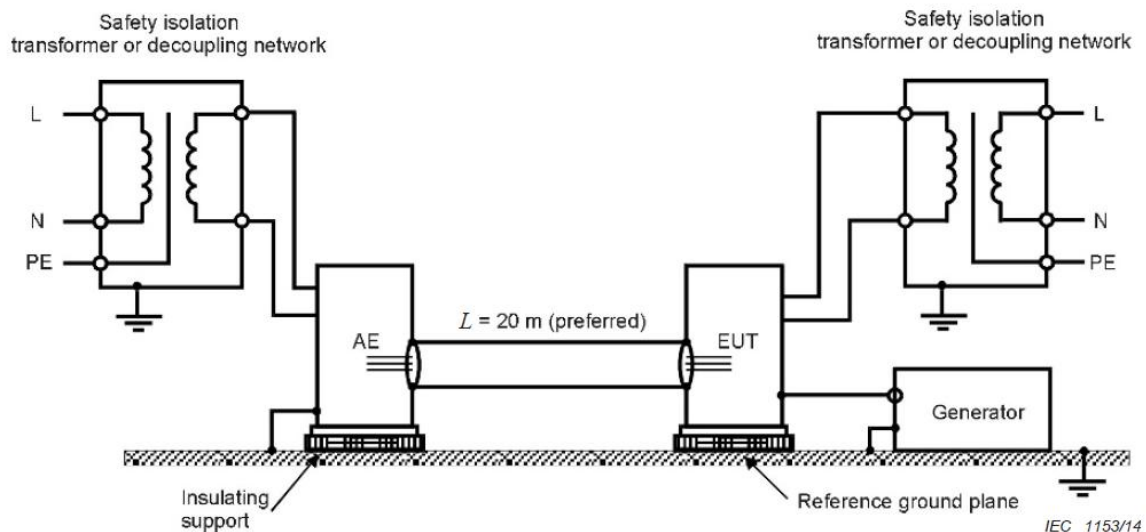


## 11. Surges

### 11.1. Limit of Surges

| Environmental phenomenon                                                                                                                                                                                                                                                                 | Test specification                                   | Units                                                                          | Performance criterion |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------|--------------------------------------------------------------------------------|-----------------------|
| Input AC power ports (See Note 1)                                                                                                                                                                                                                                                        |                                                      |                                                                                |                       |
| Surges                                                                                                                                                                                                                                                                                   | 1.2/50 (8/20)<br>±1 line to line<br>±2 line to earth | Tr/Th (us)<br>kV (open circuit test voltage)<br>kV (open circuit test voltage) | B                     |
| Telecommunication ports directly connected to indoor cables (See Note 1 and 2)                                                                                                                                                                                                           |                                                      |                                                                                |                       |
| Surges                                                                                                                                                                                                                                                                                   | 1.2/50 (8/20)<br>0.5 line to ground                  | Tr/Th us<br>kV (peak)                                                          | B                     |
| <p>Note 1: Where normal functioning cannot be achieved because of the impact of the CDN on the EUT, no test shall be required.</p> <p>Note 2: The test level for telecommunication ports, intended to be connected to indoor cables (longer than 10m) shall be 0.5kV line to ground.</p> |                                                      |                                                                                |                       |

### 11.2. Test Setup



### 11.3. Test Procedure

The EUT is placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m minimum and 0.65mm thick minimum and projected beyond the EUT by at least 0.1m on all sides. The length of power cord between the coupling device and the EUT shall be 2m or less.

**For input AC power ports:**

The EUT is connected to the power mains through a coupling device that directly couples the surge interference signal.

The surge noise shall be applied synchronized to the voltage phase at  $0^{\circ}$ ,  $90^{\circ}$ ,  $180^{\circ}$ ,  $270^{\circ}$  and the peak value of the AC voltage wave. (Positive and negative)

Each of Line to Earth and Line to Line is impressed with a sequence of five surge voltages with interval of 1 minute.

**For telecommunication ports:**

The signal line of EUT is connected to coupling and decoupling network that directly couples the surge interference signal.

Only Line to ground is impressed with a sequence of five surge voltages with interval of 1 minute.

#### 11.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/06 |

| Inject Line                   | Polarity | Angle (degree) | Test Level (kV) | Test Interval (second) | Observation | Result |
|-------------------------------|----------|----------------|-----------------|------------------------|-------------|--------|
| L+N                           | +        | 0              | 1               | 60                     | Note        | Pass   |
| L+N                           | -        | 0              | 1               | 60                     | Note        | Pass   |
| L+N                           | +        | 90             | 1               | 60                     | Note        | Pass   |
| L+N                           | -        | 90             | 1               | 60                     | Note        | Pass   |
| L+N                           | +        | 180            | 1               | 60                     | Note        | Pass   |
| L+N                           | -        | 180            | 1               | 60                     | Note        | Pass   |
| L+N                           | +        | 270            | 1               | 60                     | Note        | Pass   |
| L+N                           | -        | 270            | 1               | 60                     | Note        | Pass   |
| LAN Cable<br>(Line to Ground) | +        | N/A            | 0.5             | 60                     | Note        | Pass   |
| LAN Cable<br>(Line to Ground) | -        | N/A            | 0.5             | 60                     | Note        | Pass   |

Note: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for TT&TR to MS Function.

### 11.5. Test Photograph

Test Mode: Mode 1

Description: Surge Test Setup for Main Port



Test Mode: Mode 1

Description: Surge Test Setup for LAN Port



## 12. Radio-frequency Common Mode

### 12.1. Limit of Radio-frequency Common Mode

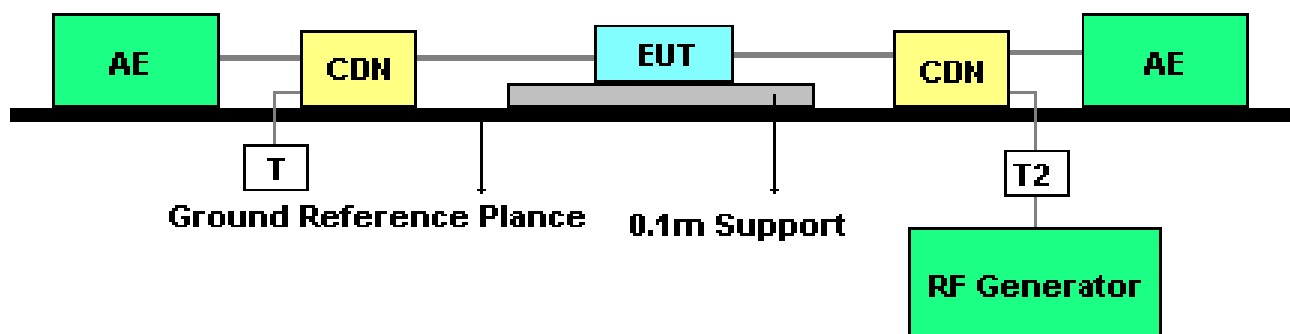
| Environmental phenomenon                                                                                                                                                                                                           | Test specification | Units                  | Performance criterion |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|------------------------|-----------------------|
| Input AC power ports (See Note 1 and 2)                                                                                                                                                                                            |                    |                        |                       |
| Radio-frequency common mode                                                                                                                                                                                                        | 0.15 - 80          | MHz                    | A                     |
|                                                                                                                                                                                                                                    | 3                  | V (unmodulated, r.m.s) |                       |
|                                                                                                                                                                                                                                    | 80                 | % AM (1kHz)            |                       |
| Signal ports, telecommunication ports, and control ports (See Note 1, 2 and 3)                                                                                                                                                     |                    |                        |                       |
| Radio frequency common mode                                                                                                                                                                                                        | 0.15 - 80          | MHz                    | A                     |
|                                                                                                                                                                                                                                    | 3                  | V (unmodulated, r.m.s) |                       |
|                                                                                                                                                                                                                                    | 80                 | % AM (1kHz)            |                       |
| NOTE 1: If the wanted signal is modulated at 1000Hz, then an audio signal of 400Hz shall be used.                                                                                                                                  |                    |                        |                       |
| NOTE 2: The test shall be performed over the frequency range 150kHz to 80MHz with the exception of the exclusion band for transmitters, and for receivers and duplex transceivers [see clause 4 of EN 301 489-1 V1.9.2 (2011-09)]. |                    |                        |                       |
| NOTE 3: This test shall be additionally performed on signal ports, telecommunication ports, control ports, and DC power ports, of radio equipment and associated ancillary equipment, if the cables may be longer than 3m.         |                    |                        |                       |

### 12.2. Test Setup

#### CDN Test Setup

**T : 50 ohm**

**T2: Power attenuator(6dB)**



### 12.3. Test Procedure

The EUT is placed on a table that is 0.8 meter height, and a ground reference plane on the table, EUT is placed upon table and use 0.1m insulation between the EUT and ground reference plane.

#### For input AC power ports:

The EUT is connected to the power mains through a coupling and decoupling networks for power supply lines. And directly couples the disturbances signal into EUT.

#### For signal ports, telecommunication ports, and control ports:

The disturbance signal is through a coupling and decoupling networks (CDN) or EM-clamp device couples to the signal and telecommunication lines of the EUT.

|    | Condition of Test              | Remarks                    |
|----|--------------------------------|----------------------------|
| 1. | Field Strength                 | 3V                         |
| 2. | Radiated Signal                | AM 80% Modulated with 1kHz |
| 3. | Scanning Frequency             | 0.15 - 80MHz               |
| 4. | Dwell Time                     | 3 Seconds                  |
| 5. | Frequency Step Size $\Delta f$ | 1%                         |

## 12.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/06 |

| Frequency<br>(MHz) | Inject Voltage<br>(V) | Inject Ports | Inject Method | Observation | Result |
|--------------------|-----------------------|--------------|---------------|-------------|--------|
| 0.15-80            | 3                     | AC Mains     | CDN           | Note        | Pass   |
| 0.15-80            | 3                     | LAN Port     | CDN           | Note        | Pass   |

Note: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for TT&TR to MS Function.

## 12.5. Test Photograph

Test Mode: Mode 1

Description: Radio-frequency Common Mode Test Setup for Main Port



Test Mode: Mode 1

Description: Radio-frequency Common Mode Test Setup for LAN Port



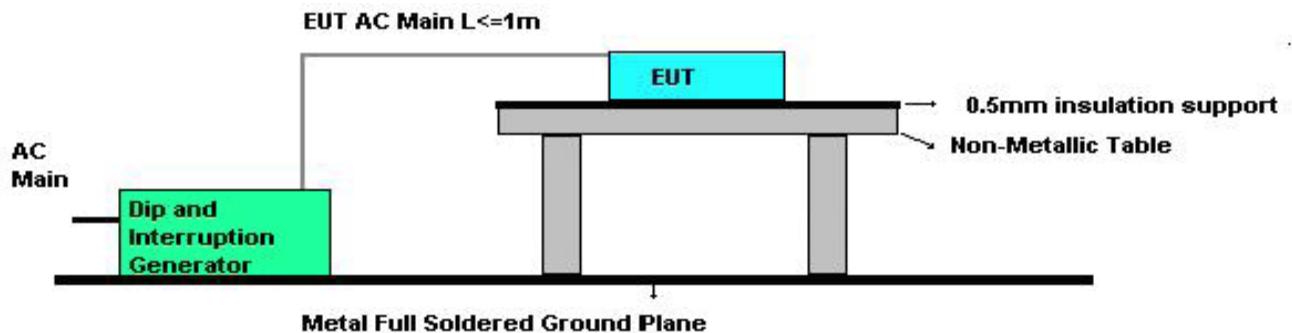


## 13. Voltage Dips and Interruptions

### 13.1. Limit of Voltage Dips and Interruptions

| Environmental phenomenon | Test specification | Units      | Performance criterion |
|--------------------------|--------------------|------------|-----------------------|
| Input AC power ports     |                    |            |                       |
| Voltage dips             | 0                  | % residual | B                     |
|                          | 0.5                | cycle      |                       |
|                          | 0                  | % residual | B                     |
|                          | 1                  | cycle      |                       |
| Voltage interruptions    | 70                 | % residual | C                     |
|                          | 25                 | cycle      |                       |
|                          | 0                  | % residual | C                     |
|                          | 250                | cycle      |                       |

### 13.2. Test Setup



### 13.3. Test Procedure

The EUT is placed on a table which is 0.8 meter above a metal ground plane measured 1m\*1m minimum, and 0.65mm thick minimum, and projected beyond the EUT by at least 0.1m on all sides. The power cord shall be used the shortest power cord as specified by the manufacturer.

For Voltage dips and interruptions test:

The selection of test voltage is based on the rated power range. If the operation range is large than 20% of lower power range, both end of specified voltage shall be tested. Otherwise, the typical voltage specification is selected as test voltage.

The EUT is connected to the power mains through a coupling device that directly couples to the voltage dips and interruption generator.

### 13.4. Test Result

|               |                       |                   |            |
|---------------|-----------------------|-------------------|------------|
| Product       | WIRELESS ACCESS POINT | Temperature       | 26°C       |
| Test Engineer | Milo Li               | Relative Humidity | 54%        |
| Test Mode     | Mode 1                | Date of Test      | 2015/07/06 |

| Voltage<br>% Residual | Test Duration<br>(ms) | Observation | Result |
|-----------------------|-----------------------|-------------|--------|
| 0                     | 10                    | Note 1      | Pass   |
| 0                     | 20                    | Note 1      | Pass   |
| 70                    | 500                   | Note 1      | Pass   |
| 0                     | 5000                  | Note 1, 2   | Pass   |

Note1: There is no any degradation of performance and function, and the EUT performance complied with performance criteria for TT&TR to MS Function.

Note 2: The system shut down during the test, but the function can be restored by the operation after the test, and the EUT performance complied with performance criteria for TT&TR to MS Function.

### 13.5. Test Photograph

Test Mode: Mode 1

Description: Voltage Dips and Interruptions Test Setup



## 14. Uncertainty Measurement

|                                                                                                                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Conducted Emission</b>                                                                                                                                                                                                       |
| The maximum measurement uncertainty is evaluated as:<br>9kHz~150kHz: $\pm 3.84\text{dB}$<br>150kHz~30MHz: $\pm 3.46\text{dB}$                                                                                                   |
| <b>Radiated Disturbance</b>                                                                                                                                                                                                     |
| The maximum measurement uncertainty is evaluated as:<br>Horizontal: 30MHz~300MHz: $\pm 4.07\text{dB}$<br>300MHz~1GHz: $\pm 3.63\text{ dB}$<br>Vertical: 30MHz~300MHz: $\pm 4.18\text{ dB}$<br>300MHz~1GHz: $\pm 3.60\text{ dB}$ |
| <b>Radiated Disturbance</b>                                                                                                                                                                                                     |
| The maximum measurement uncertainty is evaluated as:<br>Horizontal: 1GHz~6GHz: $\pm 4.16\text{ dB}$<br>Vertical: 1GHz~6GHz: $\pm 4.76\text{ dB}$                                                                                |
| <b>Harmonic Current Emissions</b>                                                                                                                                                                                               |
| The maximum measurement uncertainty is evaluated as $\pm 0.2\%$ .                                                                                                                                                               |
| <b>Voltage Fluctuation and Flicker</b>                                                                                                                                                                                          |
| The maximum measurement uncertainty is evaluated as $d_c$ and $d_{\max}$ : $\pm 0.095\%$ ,<br>$P_{st}$ and $P_{lt}$ : $\pm 4\%$ , $d_{(t)}$ : $\pm 1.5\%$ .                                                                     |
| <b>Electrostatic Discharge</b>                                                                                                                                                                                                  |
| The maximum measurement uncertainty is evaluated as Voltage: $\pm 1\%$ , Time: $\pm 6.4\%$ .                                                                                                                                    |
| <b>Radio-frequency Electromagnetic Field</b>                                                                                                                                                                                    |
| The maximum measurement uncertainty is evaluated as $\pm 2.72\text{dB}$ .                                                                                                                                                       |
| <b>Fast Transients</b>                                                                                                                                                                                                          |
| The maximum measurement uncertainty is evaluated as Voltage: $\pm 4\%$ , Time: $\pm 3\%$ .                                                                                                                                      |
| <b>Surges</b>                                                                                                                                                                                                                   |
| The maximum measurement uncertainty is evaluated as Voltage: $\pm 4\%$ , Time: $\pm 2\%$ .                                                                                                                                      |
| <b>Radio-frequency Common Mode</b>                                                                                                                                                                                              |
| The maximum measurement uncertainty is evaluated as $\pm 3.72\text{dB}$ .                                                                                                                                                       |
| <b>Voltage Dips and Interruptions</b>                                                                                                                                                                                           |
| The maximum measurement uncertainty is evaluated as Voltage: $\pm 4\%$ , Time: $\pm 1\%$ .                                                                                                                                      |

## 15. List of Measuring Instrument

### Conducted Emission

| Instrument                 | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|----------|-------------|----------------|----------------|
| EMI Test Receiver          | R&S          | ESR7     | MRTSUE06001 | 1 year         | 2015/11/07     |
| Two-Line V-Network         | R&S          | ENV216   | MRTSUE06002 | 1 year         | 2015/11/07     |
| Two-Line V-Network         | R&S          | ENV216   | MRTSUE06003 | 1 year         | 2015/11/07     |
| Temperature/Humidity Meter | Ouleinuo     | /        | MRTSUE06114 | 1 year         | 2015/11/20     |

### Radiated Disturbance

| Instrument                 | Manufacturer | Type No.  | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|-----------|-------------|----------------|----------------|
| EMI Test Receiver          | R&S          | ESR7      | MRTSUE06001 | 1 year         | 2015/11/07     |
| TRILOG Antenna             | Schwarzbeck  | VULB9162  | MRTSUE06022 | 1 year         | 2015/11/08     |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9120D | MRTSUE06023 | 1 year         | 2015/11/08     |
| Microwave System Amplifier | Agilent      | 83017A    | MRTSUE06076 | 1 year         | 2016/03/29     |
| Temperature/Humidity Meter | Ouleinuo     | /         | MRTSUE06115 | 1 year         | 2015/11/20     |

### Harmonic Current Emissions

| Instrument                 | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|----------|-------------|----------------|----------------|
| Power Analyzer             | California   | PACS-1   | MRTSUE06010 | 1 year         | 2016/01/28     |
| AC Power Source            | California   | 3001iX   | MRTSUE06011 | 1 year         | 2016/01/28     |
| Temperature/Humidity Meter | Ouleinuo     | /        | MRTSUE06114 | 1 year         | 2015/11/20     |

### Voltage Fluctuation and Flicker

| Instrument                 | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|----------|-------------|----------------|----------------|
| Power Analyzer             | California   | PACS-1   | MRTSUE06010 | 1 year         | 2016/01/28     |
| AC Power Source            | California   | 3001iX   | MRTSUE06011 | 1 year         | 2016/01/28     |
| Temperature/Humidity Meter | Ouleinuo     | /        | MRTSUE06114 | 1 year         | 2015/11/20     |

### Electrostatic Discharge

| Instrument                 | Manufacturer | Type No. | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|----------|-------------|----------------|----------------|
| ESD Simulator              | Teseq GmbH   | NSG 435  | MRTSUE06031 | 1 year         | 2015/11/11     |
| Barometer                  | BaoPing      | DYM3     | MRTSUE06044 | 1 year         | 2015/11/11     |
| Temperature/Humidity Meter | Ouleinuo     | /        | MRTSUE06111 | 1 year         | 2015/11/20     |

## Radio-frequency Electromagnetic Field

| Instrument           | Manufacturer | Type No.    | Cali. Interval | Cali. Due Date |
|----------------------|--------------|-------------|----------------|----------------|
| Signal Generator     | R&S          | SMB100A     | 1 year         | 2015/09/02     |
| Power Meter          | R&S          | NRP2        | 1 year         | 2015/09/02     |
| Power Amplifier      | FRANKONIA    | FLH-200B    | 1 year         | 2015/03/27     |
| Power Amplifier      | Bonn         | BLMA1020-50 | 1 year         | 2015/09/02     |
| Broadband antenna    | SCHWARZBECK  | AT1080      | 1year          | 2015/05/19     |
| Log-Periodic Antenna | SCHWARZBECK  | STLP9149    | 1 year         | 2015/05/19     |

## Fast Transients

| Instrument                   | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|------------------------------|--------------|-------------|-------------|----------------|----------------|
| Compact Immunity Test System | 3cTest       | CCS 600     | MRTSUE06033 | N/A            | N/A            |
| Oscilloscope                 | Agilent      | DSO-X 6002A | MRTSUE06107 | 1 year         | 2016/05/08     |
| Temperature/Humidity Meter   | Ouleinuo     | /           | MRTSUE06110 | 1 year         | 2015/11/20     |

## Surges

| Instrument                   | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|------------------------------|--------------|-------------|-------------|----------------|----------------|
| Compact Immunity Test System | 3cTest       | CCS 600     | MRTSUE06033 | N/A            | N/A            |
| CDN                          | 3cTest       | CDN-405T8   | MRTSUE06037 | N/A            | N/A            |
| Oscilloscope                 | Agilent      | DSO-X 6002A | MRTSUE06107 | 1 year         | 2016/05/08     |
| Temperature/Humidity Meter   | Ouleinuo     | /           | MRTSUE06110 | 1 year         | 2015/11/20     |

## Radio-frequency Common Mode

| Instrument                 | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|----------------------------|--------------|-------------|-------------|----------------|----------------|
| Conducted Immunity Tester  | Frankonia    | CIT-10/75   | MRTSUE06038 | N/A            | N/A            |
| CDN                        | Frankonia    | CDN M2+M3   | MRTSUE06039 | N/A            | N/A            |
| Oscilloscope               | Agilent      | DSO-X 6002A | MRTSUE06107 | 1 year         | 2016/05/08     |
| Temperature/Humidity Meter | Ouleinuo     | /           | MRTSUE06110 | 1 year         | 2015/11/20     |

# Voltage Dips and Interruptions

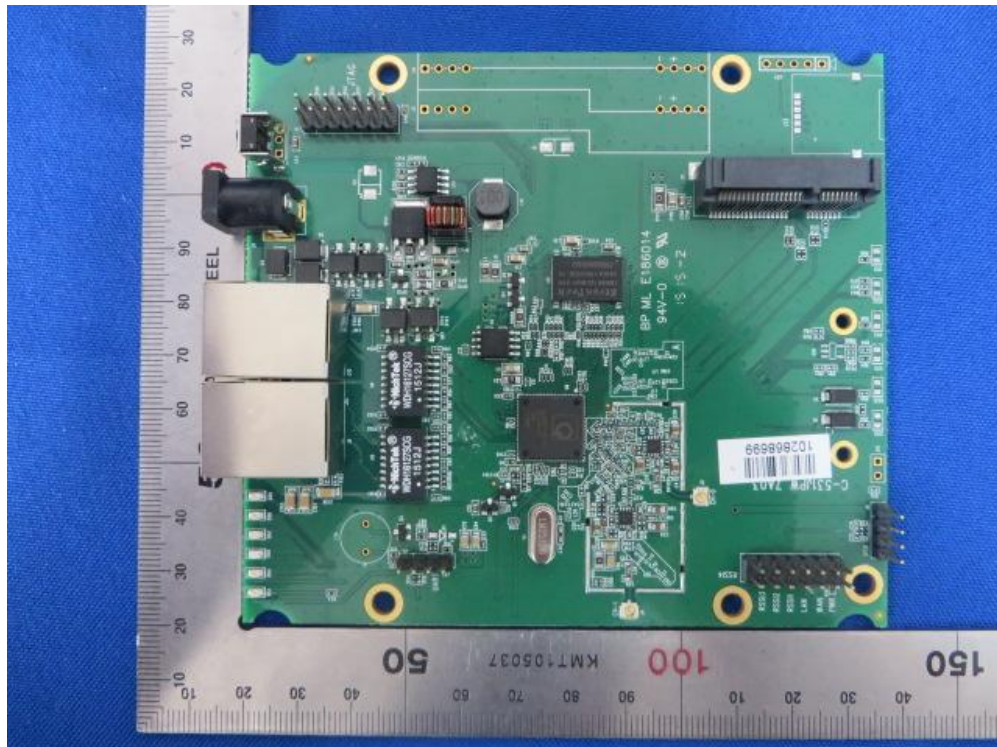
| Instrument                   | Manufacturer | Type No.    | Asset No.   | Cali. Interval | Cali. Due Date |
|------------------------------|--------------|-------------|-------------|----------------|----------------|
| Compact Immunity Test System | 3cTest       | CCS 600     | MRTSUE06033 | N/A            | N/A            |
| CDN                          | 3cTest       | VMT 2612S   | MRTSUE06034 | N/A            | N/A            |
| Oscilloscope                 | Agilent      | DSO-X 6002A | MRTSUE06107 | 1 year         | 2016/05/08     |
| Temperature/Humidity Meter   | Ouleinuo     | /           | MRTSUE06110 | 1 year         | 2015/11/20     |

| Software               | Version    | Function           |
|------------------------|------------|--------------------|
| e3                     | V 8.3.5    | EMI Test Software  |
| Compliance Test System | V 3.2.0.35 | Harmonic & Flicker |



## 16. Appendix - EUT Photograph

(1) EUT Photo



(2) EUT Photo

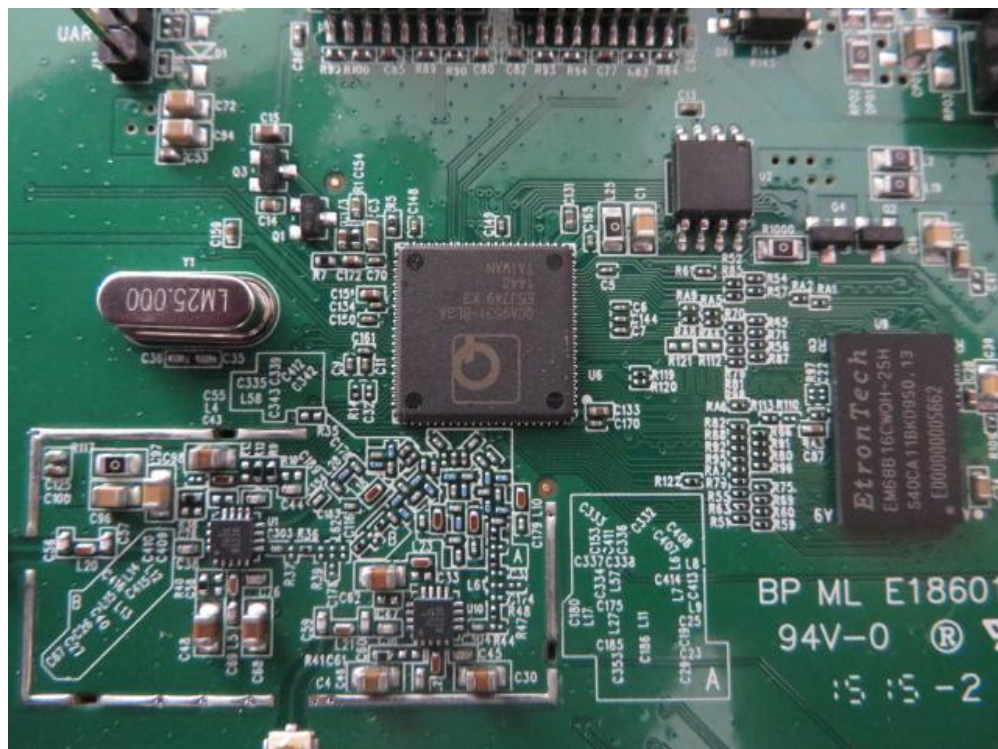




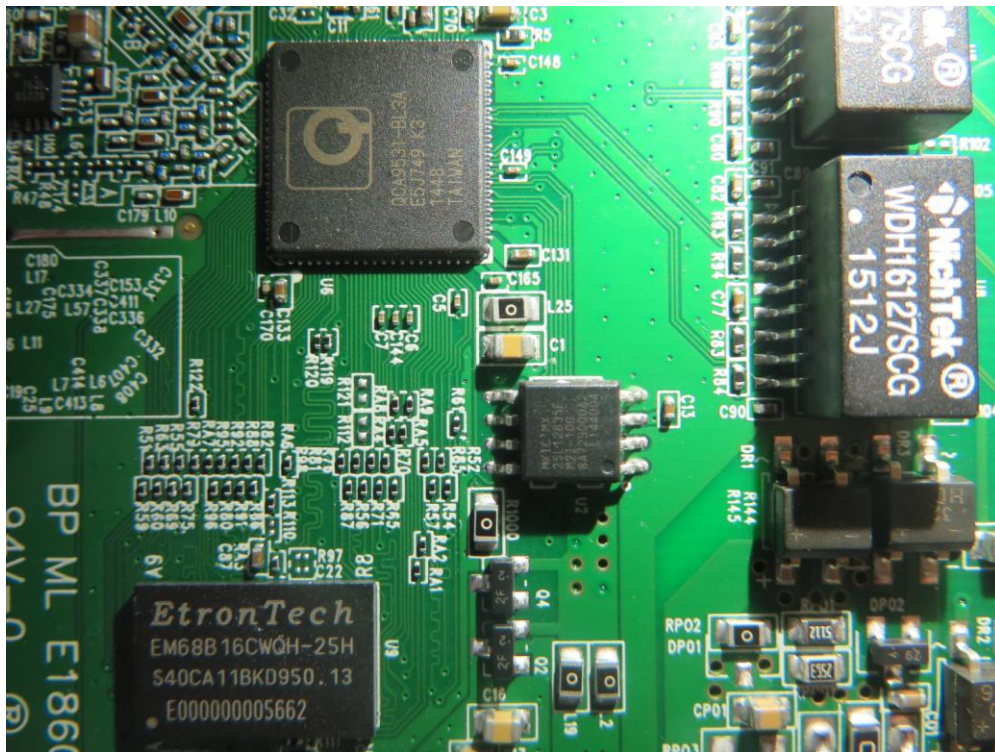
### (3) EUT Photo



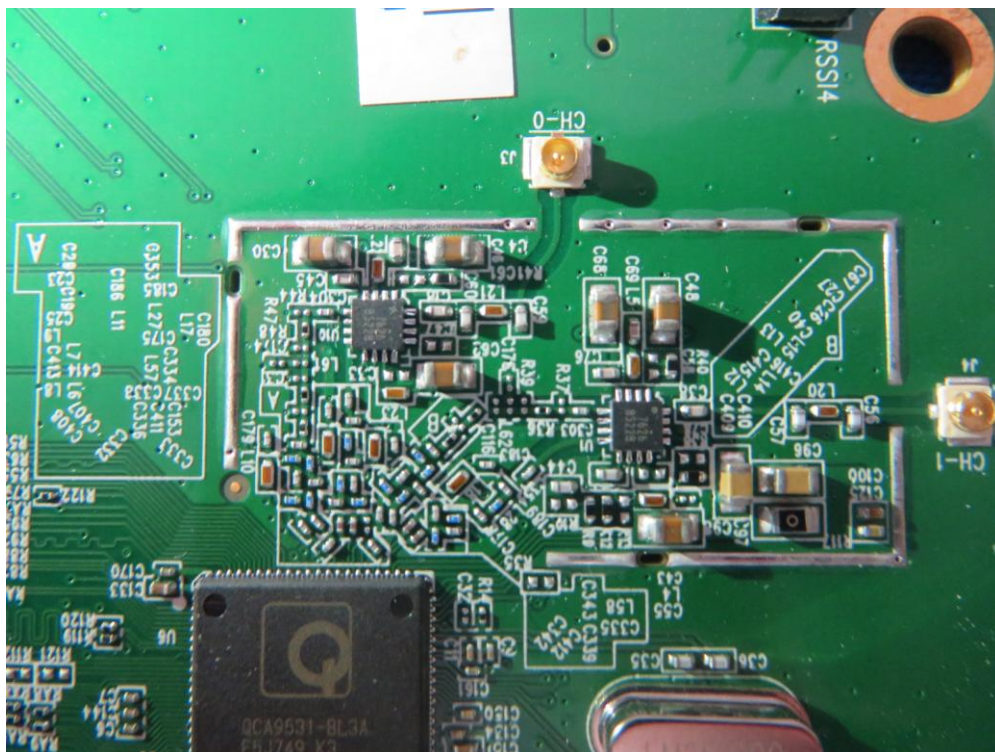
### (4) EUT Photo



(5) EUT Photo



(6) EUT Photo

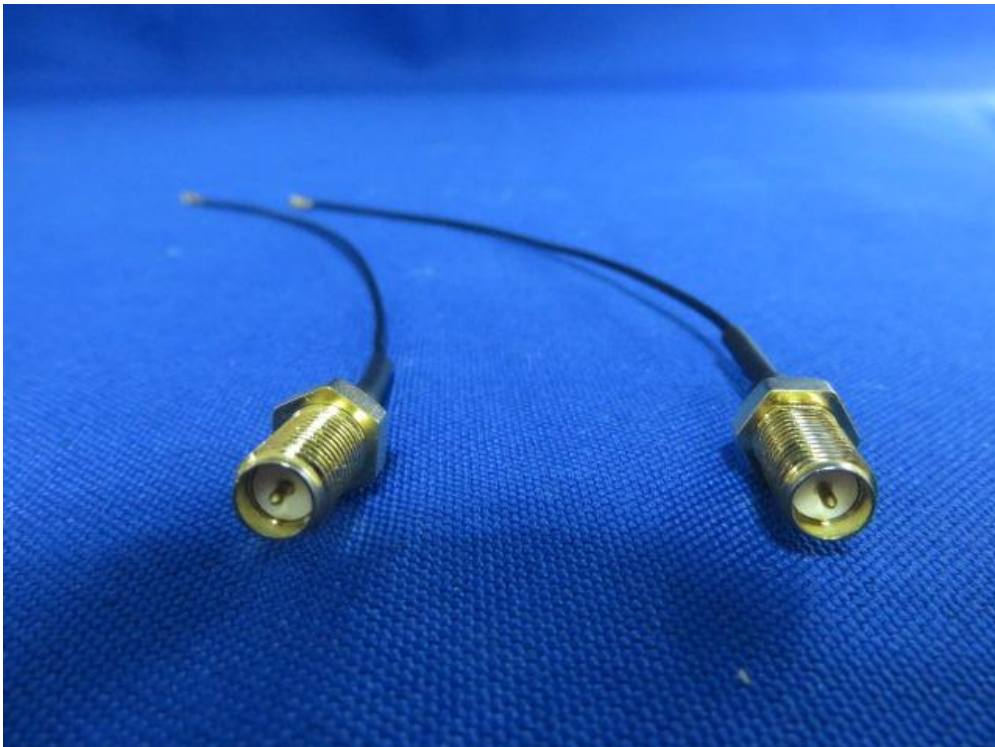




(7) EUT Photo (Dipole Antenna 1#)



(8) EUT Photo (Dipole Antenna 1#)



(9) EUT Photo (Panel Antenna 4#)

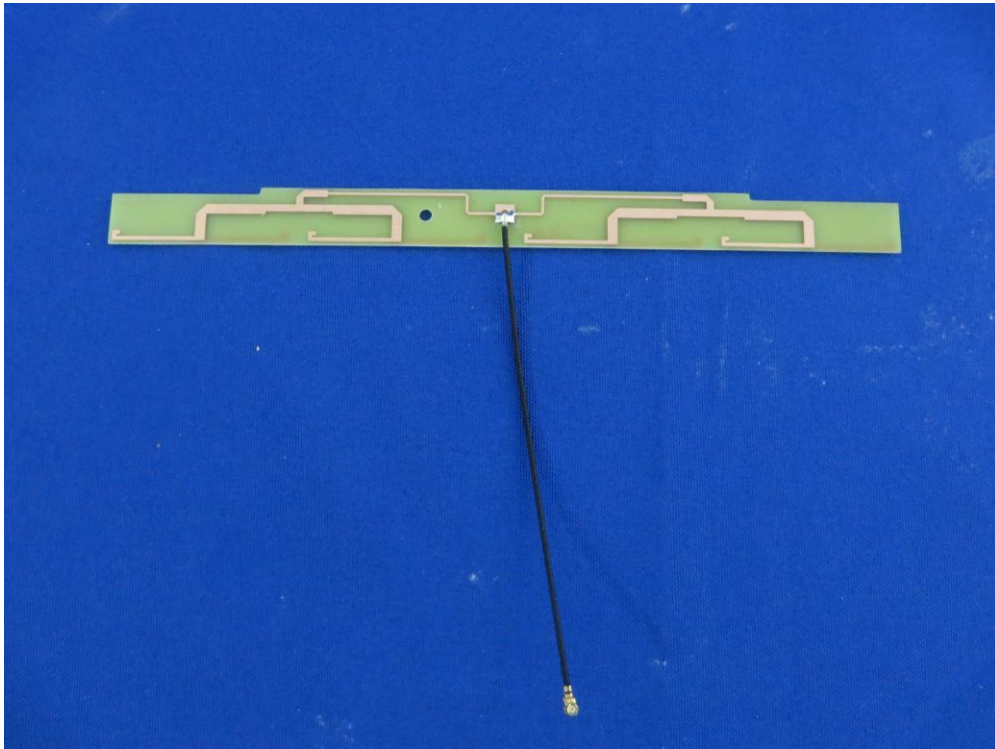


(10) EUT Photo (Panel Antenna 2#)

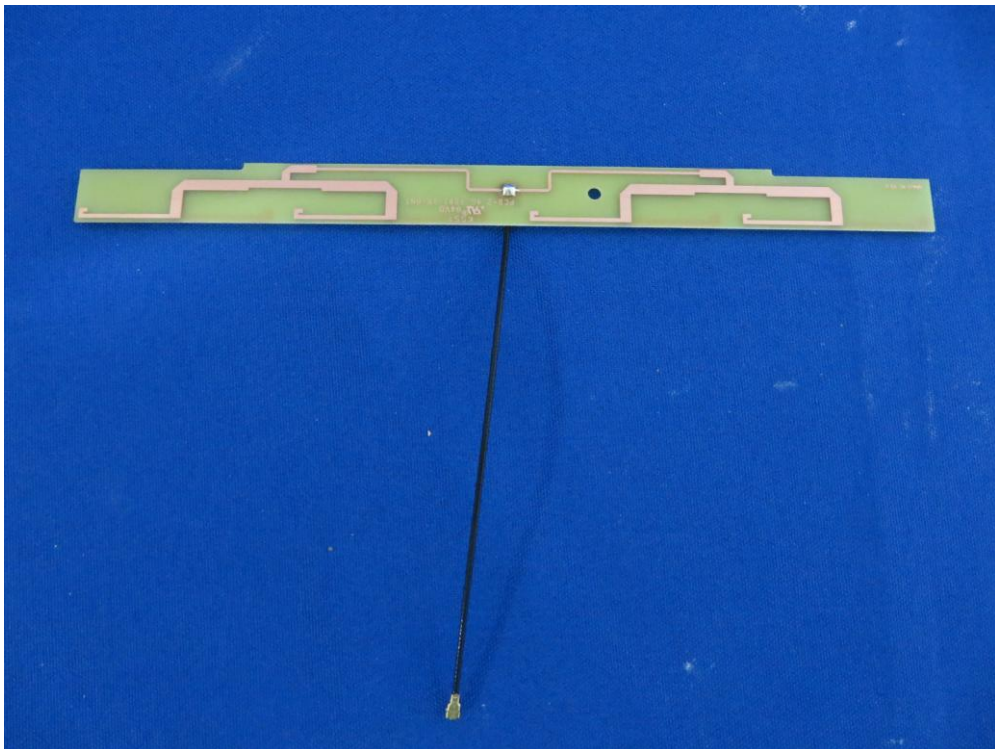




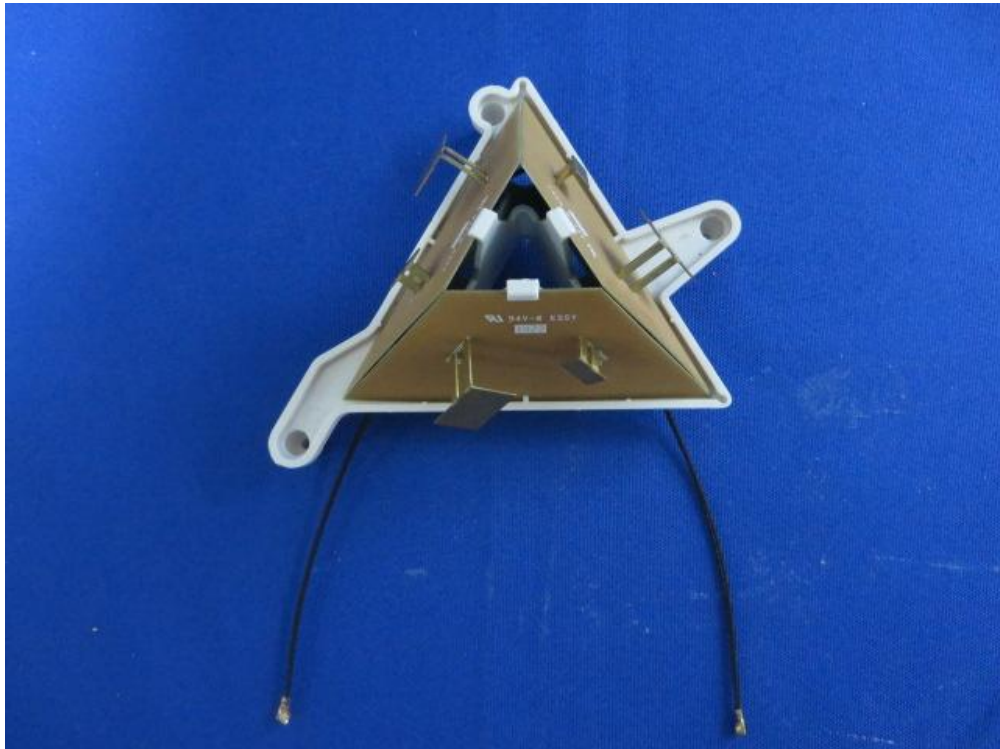
(11) EUT Photo (Panel Antenna 3#)



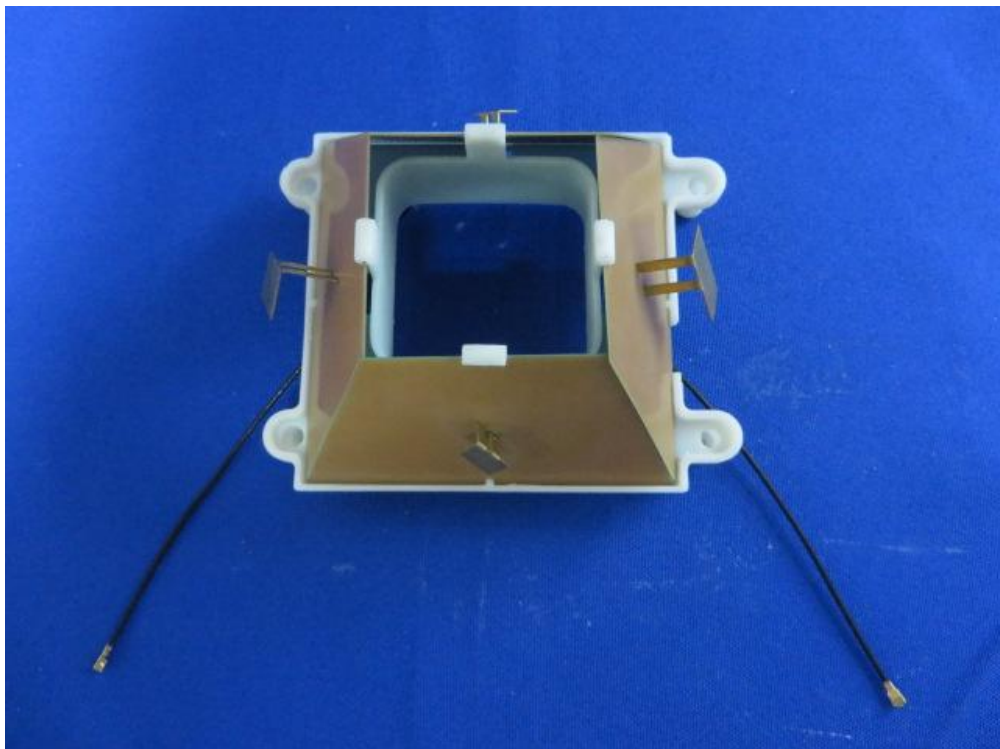
(12) EUT Photo (Panel Antenna 3#)



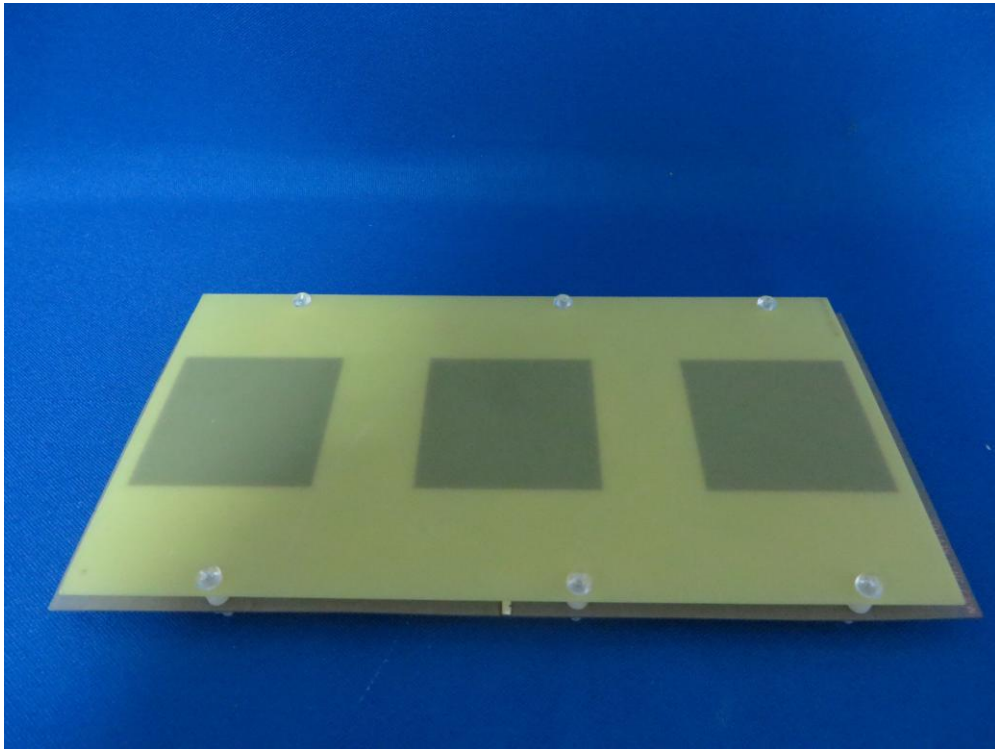
(13) EUT Photo (Panel Antenna 5#)



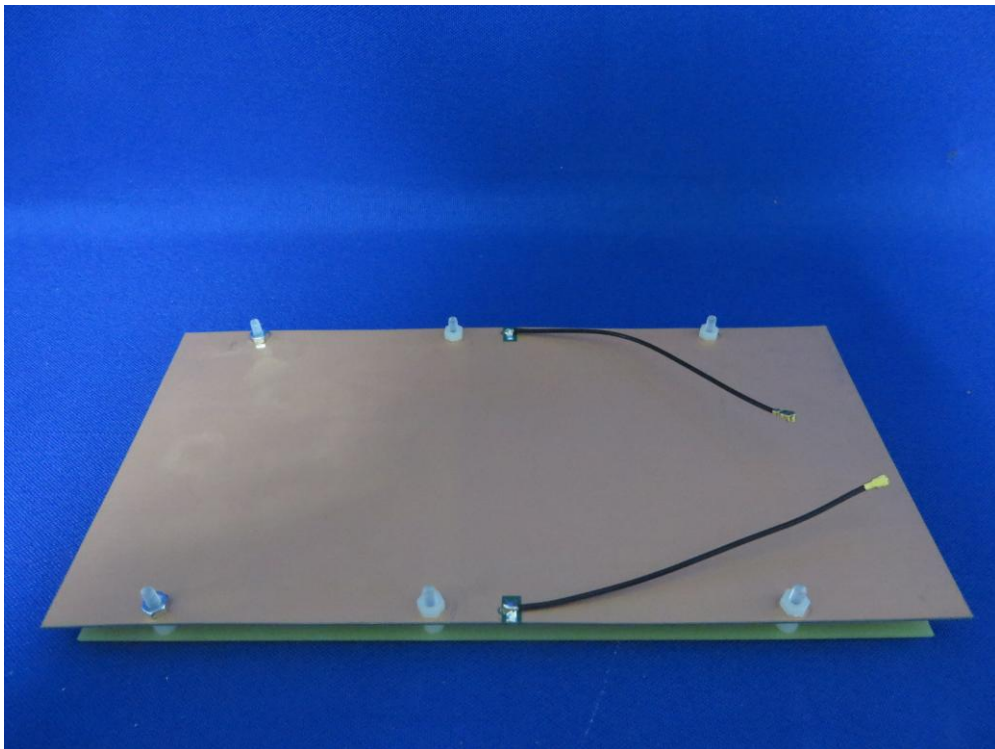
(14) EUT Photo (Panel Antenna 6#)



(15) EUT Photo (Panel Antenna 1#)



(16) EUT Photo (Panel Antenna 1#)





(17) EUT Photo



(18) EUT Photo





(19) EUT Photo

