

# FCC 15B Test Report

## ***FCC ID: 2ABES-AIR***

### **Computing Device Peripheral**

**Report No.** : TB-FCC138614  
**Applicant** : Pathway Innovations and Technologies, Inc.  
**Equipment Under Test (EUT)**  
**EUT Name** : AirStation  
**Model No.** : AirStation  
**Serial No.** : KR119  
**Brand Name** : HoverCam  
**Receipt Date** : 2013-11-12  
**Test Date** : 2013-11-13 to 2013-11-28  
**Issue Date** : 2013-12-08  
**Standards** : FCC Part 15: 2012, Subpart B, Class B  
**Test Method** : ANSI C63.4-2003  
**Conclusions** : **PASS**

In the configuration tested, the EUT complied with the standards specified above,  
The EUT technically complies with the FCC requirements

**Test/Witness Engineer** : *WAN SU*

**Approved & Authorized** : *Ray Lai*

This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in the report.

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# 1. General Information about EUT

## 1.1 Client Information

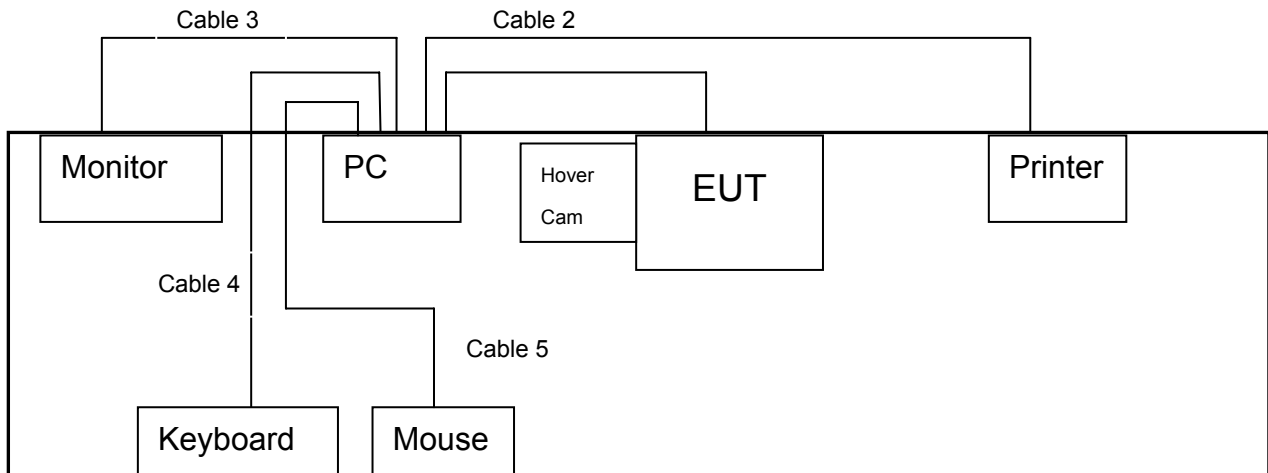
|                  |   |   |
|------------------|---|---|
| <b>Applicant</b> | : | Pathway Innovations and Technologies, Inc.  |
| <b>Address</b>   | : | 9833 Pacific Heights Blvd., Suite D, San Diego, CA 92121  |
| <b>Applicant</b> | : | ShenZhen KerunVisual Technology Co., LTD.   |
| <b>Address</b>   | : | 6/F, Building2, Zone S2, 1213 Liuxian Blvd., Honghualing Industrial Park, Nanshan District, Shenzhen, China |

## 1.2 General Description of EUT (Equipment Under Test)

|  |   |  |
|--|---|--|
| <b>EUT Name</b>  | : | AirStation   |
| <b>Model No.</b>   | : | AirStation, KR119  |
| <b>Model difference</b>  | : | The different models are identical in schematic, structure and critical component, the only different is the appearance. |
| <b>Operation Frequency:</b>  | : | 802.11b/g: 2412MHz~2462MHz   |
| <b>Number of Channel</b>   | : | 802.11b/g:11 channels  |
| <b>RF Out Power</b>  | : | 802.11b: 17.39 dBm<br>802.11g: 17.65 dBm   |
| <b>Antenna Gain</b>  | : | 2.5 dBi (Dipole Antenna)   |
| <b>Modulation</b>  | : | 802.11b: CCK, QPSK, BPSK<br>802.11g: OFDM  |
| <b>Transfer Rate</b>   | : | 802.11b:11/5.5/2/1 Mbps<br>802.11g: 54/48/36/24/18/12/9/6 Mbps   |
| <b>Power Supply</b>  | : | DC power from AC/DC Adapter.   |
| <b>Power Rating</b>  | : | AC/DC Adapter:<br>Input: AC 100~240V 50/60 Hz<br>Output: DC 5V 2A  |
| <b>Connecting I/O Port(s)</b>  | : | The equipment have USB port and RJ45 port, so the equipment is considered as a Computing Device Peripheral.              |
| <p><b>Note:</b> (1) For more detailed features description, please refer to the manufacturer's specifications or the User's Manual.<br/>(2) The EUT is a RF device. According to the EUT specifications, it have tested and comply with the FCC Part 15C requirements, more information please refer to the Radio Test Report about the EUT.</p> |   |  |

### 1.3 Block Diagram Showing the Configuration of System Tested

#### Mode 1: Normal Mode



#### Control Room

Wireless Router

### 1.4 Description of Support Units

| Support Equipment |             |               |   |                            |      |
|-------------------|-------------|---------------|---|----------------------------|------|
| Name              | Model       | FCC ID/DOC    | Manufacturer                              | Used “√”                   |      |
| Hover Cam         | Mini 5      | ---           | ShenZhen KerunVisual Technology Co., LTD. | Provided by the applicant. |      |
| Wireless Router   | TL-WR841N   | FCC ID        | TP-Link                                   | √                          |      |
| Printer           | HP1505n     | DOC           | HP  | √                          |      |
| LCD Monitor       | E170Sc      | DOC           | DELL                                      | √                          |      |
| PC                | OPTIPLEX380 | DOC           | DELL                                      | √                          |      |
| Keyboard          | L100        | DOC           | DELL                                      | √                          |      |
| Mouse             | M-UARDEL7   | DOC           | DELL                                      | √                          |      |
| Cable Information |             |               |   |                            |      |
| Cable No.         | Description | Shielded Type | Ferrite Core                              | Length                     | Note |
| C-1               | RJ45 Cable  | Yes           | No  | 10m                        |      |
| C-2               | USB Cable   | Yes           | YES(2)                                    | 2.0M                       |      |
| C-3               | VGA Cable   | Yes           | YES(1)                                    | 1.8M                       |      |
| C-4               | USB Cable   | Yes           | NO  | 1.5M                       |      |
| C-5               | USB Cable   | Yes           | NO  | 1.5M                       |      |

### 1.5 Description of Test Mode

| <b>Mode</b> | <b>Description</b> |
|-------------|--------------------|
| Mode 1      | Normal Link        |

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of the EUT operation mode, and the maximum emission levels of the conducted and radiated emissions are compared to the FCC Part 15 Subpart B (Class B) limits.

### 1.6 Test Facility

The tests were performed at:

Shenzhen Certification Technology Service Co., Ltd

2F, Building B, East Area of Nanchang Second Industrial Zone, Gushu 2nd Road, Bao'an District, Shenzhen, 518126, China

Tel: 86-755-86375552 Fax: 86-755-26736857

At the time of testing, the Laboratory is accredited. It is listed in the United States of American Federal Communications Commission (FCC), and the registration number is 197647.

The test report was fulfilled by Shenzhen Toby Technology Co., Ltd. Shenzhen Toby Technology Co., Ltd. is assumed full responsibility for the accuracy and completeness of these measurements results.

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## 2. Test Summary

| FCC Part15, Subpart B |                 |                                       |         |          |
|-----------------------|-----------------|---------------------------------------|---------|----------|
| Section               | Test Method     | Test Item                             | Limit   | Judgment |
| 15.109                | ANSI C63.4:2003 | Radiated Emission<br>(30M~1GHz)       | Class B | PASS     |
| 15.107                | ANSI C63.4:2003 | Conducted Emission<br>(9KHz to 30MHz) | Class B | PASS     |

**Note:** N/A is an abbreviation for Not Applicable.

### 3. Conducted Emission Test

#### 3.1 Test Standard and Limit

3.1.1 Test Standard  
FCC Part 15.107

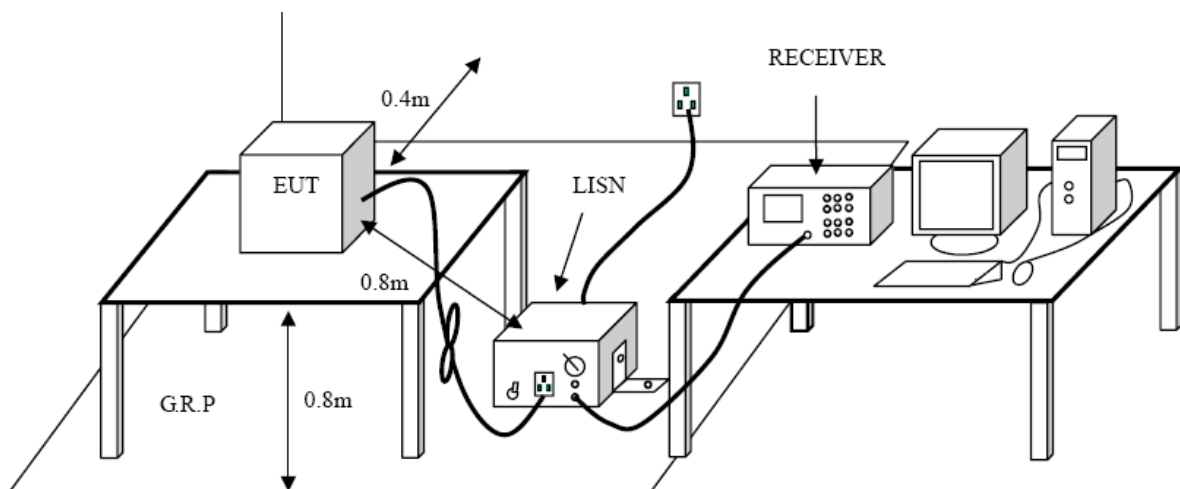
#### 3.1.2 Test Limit

**Conducted Emission Test Limit**

| Frequency (MHz) | Conducted Limit (dBuV) |               |
|-----------------|------------------------|---------------|
|                 | Quasi-peak Level       | Average Level |
| 0.15~0.5        | 66 ~ 56 *              | 56 ~ 46 *     |
| 0.5~5.0         | 56.00                  | 46.00         |
| 5.0~30.0        | 60.00                  | 50.00         |

Notes: (1) \*Decreasing linearly with logarithm of the frequency.  
(2) The lower limit shall apply at the transition frequencies.

#### 3.2 Test Setup



#### 3.3 Test Procedure

The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance.

The overall length shall not exceed 1 m.

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

The bandwidth of EMI test receiver is set at 9kHz, and the test frequency band is from 0.15MHz to 30MHz.

For the actual test configuration, please refer to the EUT test Photos.

### 3.4 Test Equipment Used

| Description       | Manufacturer    | Model No.   | Serial No. | Cal. Date  | Cal. Date  |
|-------------------|-----------------|-------------|------------|------------|------------|
| EMI Test Receiver | ROHDE& SCHWARZ  | ESCI        | 100321     | 2013-08-10 | 2014-08-09 |
| 50ΩCoaxial Switch | Anritsu         | MP59B       | X10321     | 2013-08-10 | 2014-08-09 |
| L.I.S.N           | Rohde & Schwarz | ENV216      | 101131     | 2013-08-10 | 2014-08-09 |
| L.I.S.N           | SCHWARZBECK     | NNBL 8226-2 | 8226-2/164 | 2013-08-10 | 2014-08-09 |

### 3.5 EUT Operating Mode

(1) Setup the EUT and peripherals refer to the description of test mode.

### 3.6 Deviation

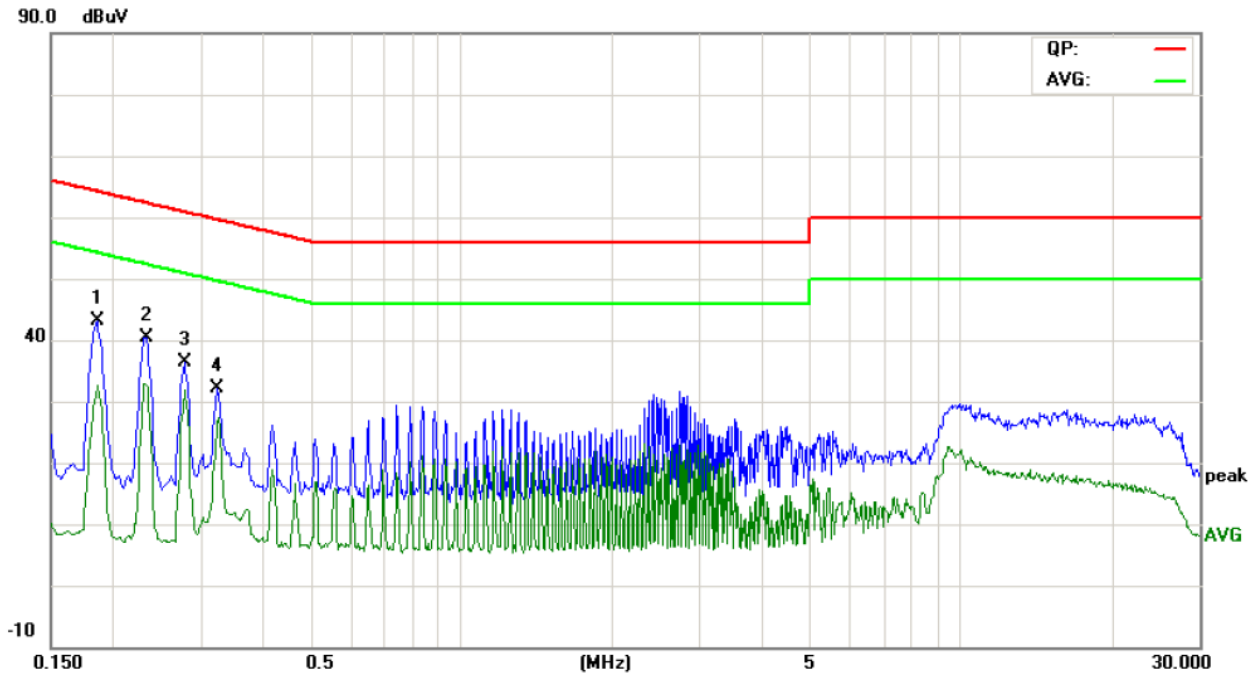
The test is no deviation from the standard.

### 3.7 Test Data

Please see the next page.

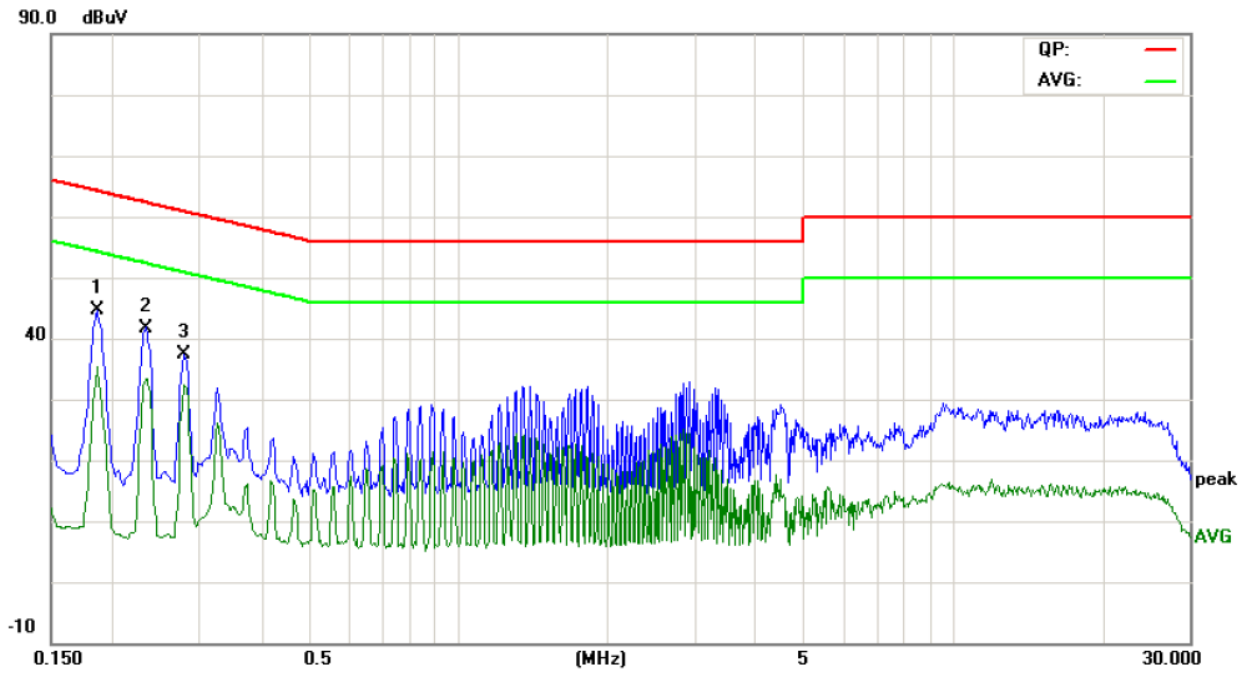


|                |                 |                     |            |
|----------------|-----------------|---------------------|------------|
| E.U.T :        | AirStation      | Model Name :        | AirStation |
| Temperature :  | 23°C            | Relative Humidity : | 55 %       |
| Terminal       | Line            |                     |            |
| Test Voltage : | AC 120 V / 60Hz |                     |            |
| Test Mode :    | Mode 1          |                     |            |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   | *   | 0.1860       | 33.24                    | 9.99                    | 43.23                    | 64.21         | -20.98     | peak     |         |
| 2   |     | 0.2340       | 30.38                    | 10.02                   | 40.40                    | 62.30         | -21.90     | peak     |         |
| 3   |     | 0.2779       | 26.38                    | 10.02                   | 36.40                    | 60.88         | -24.48     | peak     |         |
| 4   |     | 0.3220       | 21.99                    | 10.02                   | 32.01                    | 59.65         | -27.64     | peak     |         |

|                |                 |                     |            |
|----------------|-----------------|---------------------|------------|
| E.U.T :        | AirStation      | Model Name :        | AirStation |
| Temperature :  | 23°C            | Relative Humidity : | 55 %       |
| Terminal       | Neutral         |                     |            |
| Test Voltage : | AC 120 V / 60Hz |                     |            |
| Test Mode :    | Mode 1          |                     |            |



| No. | Mk. | Freq.<br>MHz | Reading<br>Level<br>dBuV | Correct<br>Factor<br>dB | Measure-<br>ment<br>dBuV | Limit<br>dBuV | Over<br>dB | Detector | Comment |
|-----|-----|--------------|--------------------------|-------------------------|--------------------------|---------------|------------|----------|---------|
| 1   | *   | 0.1860       | 34.60                    | 10.12                   | 44.72                    | 64.21         | -19.49     | peak     |         |
| 2   |     | 0.2340       | 31.64                    | 10.11                   | 41.75                    | 62.30         | -20.55     | peak     |         |
| 3   |     | 0.2779       | 27.23                    | 10.09                   | 37.32                    | 60.88         | -23.56     | peak     |         |

## 4. Radiated Emission Test

### 4.1 Test Standard and Limit

- 4.1.1 Test Standard  
FCC Part 15.109
- 4.1.2 Test Limit

**Radiated Emission Limit**

| Frequency (MHz) | Field Strength (dBuV/m) | Measurement Distance (meters) |
|-----------------|-------------------------|-------------------------------|
| 30~88           | 40                      | 3                             |
| 88~216          | 43.5                    | 3                             |
| 216~960         | 46                      | 3                             |
| Above 960       | 54                      | 3                             |

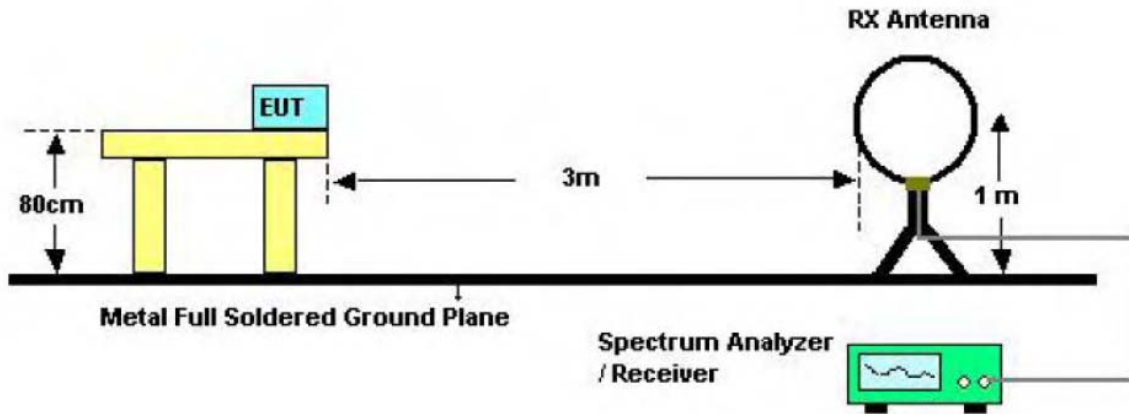
Note: Emission Level(dBuV/m)=20log Emission Level(uV/m)

For unintentional radiators (FCC Part 15, section 15.33(1)):

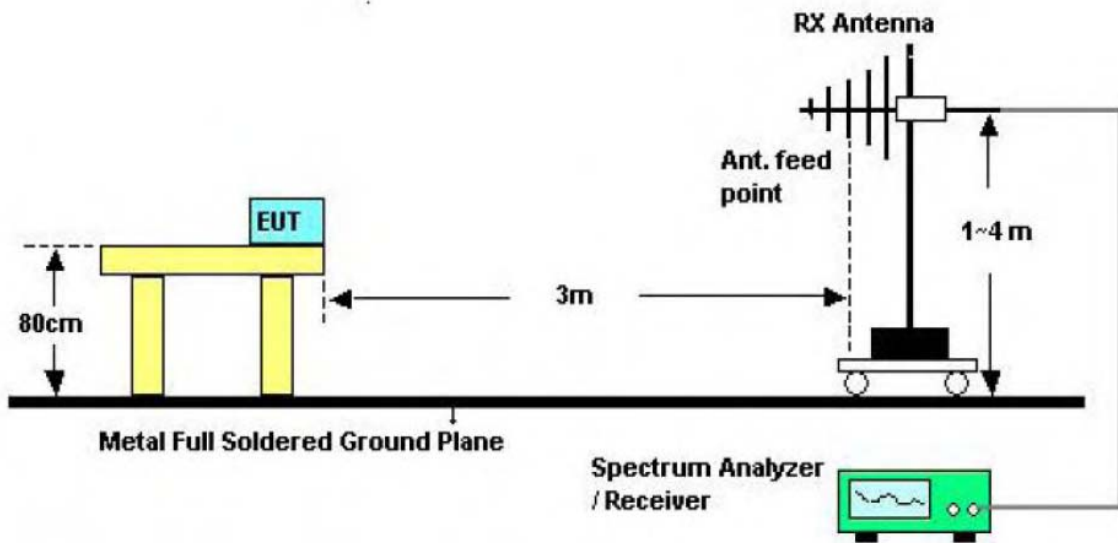
Except as otherwise indicated in paragraphs (b)(2) or (b)(3), for an unintentional radiator, including a digital device, the spectrum shall be investigated from the lowest radio frequency signal generated or used in the device, without going below the lowest frequency for which a radiated emission limit is specified, up to the frequency shown in the following table:

| Highest frequency generated or used in the device or on which the device operates or tunes (MHz) | Upper frequency of measurement range (MHz)                                      |
|--|---|
| Below 1.705  | 30  |
| 1.705~108  | 1000  |
| 108~500  | 2000  |
| 500~1000   | 5000  |
| Above 1000   | 5 <sup>th</sup> harmonic of the highest frequency or 40 GHz, whichever is lower |

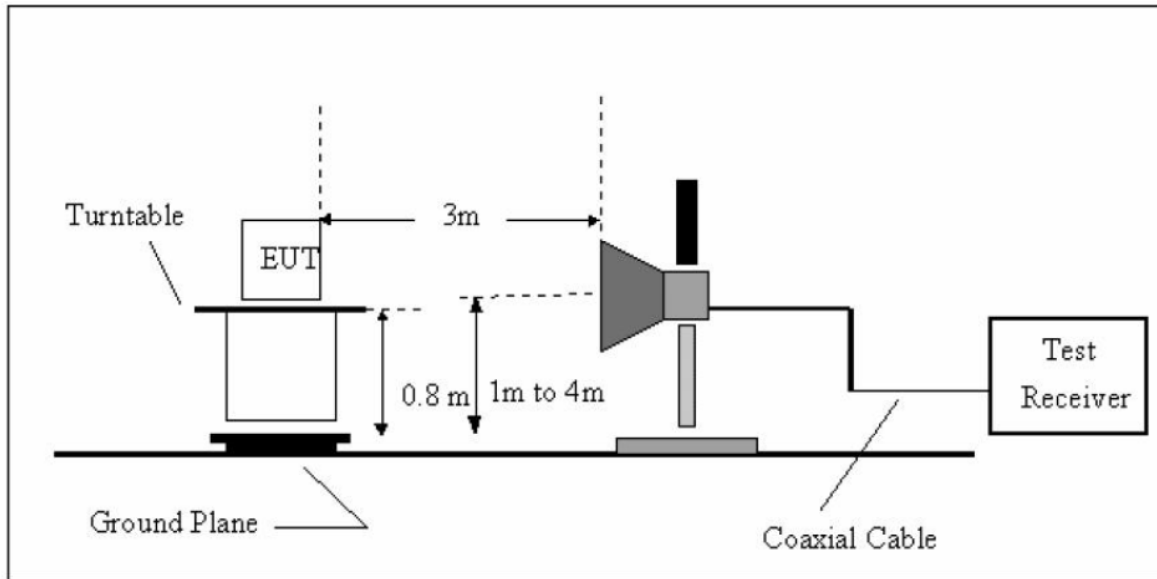
### 4.2 Test Setup



Bellow 30MHz Test Setup



30MHz to 1000MHz Test Setup



Above 1GHz Test Setup

### 4.3 Test Procedure

- (1) The measuring distance of 3m shall be used for measurements at frequency from 30MHz up to 1GHz.
- (2) The EUT was placed on the top of a rotating table 0.8 meters above the ground. The table was rotated 360 degrees to determine the position of the highest radiation.
- (3) The height of the equipment or of the substitution antenna shall be 0.8m, the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- (4) The initial step in collecting radiated emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured.
- (5) If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP Limits and then no additional QP Mode measurement performed.
- (6) For more details, please refer to the EUT Test Photos.

### 4.4 Test Equipment

| Description       | Manufacturer    | Model No. | Serial No. | Cal. Date  | Cal. Date  |
|-------------------|-----------------|-----------|------------|------------|------------|
| Spectrum Analyzer | ROHDE & SCHWARZ | FSP30     | DE25181    | 2012-12-31 | 2013-12-30 |
| Spectrum Analyzer | Agilent         | E4407B    | MY49510055 | 2012-12-31 | 2013-12-30 |
| EMI Test Receiver | ROHDE & SCHWARZ | ESCI      | 101165     | 2012-12-31 | 2013-12-30 |

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|                     |              |            |             |            |            |
|---------------------|--------------|------------|-------------|------------|------------|
| Bilog Antenna       | SCHWARZBECK  | VULB9168   | 9168-438    | 2013-02-12 | 2014-02-11 |
| Horn Antenna        | SCHWARZBECK  | BBHA 9120D | BBHA9120D   | 2013-02-12 | 2014-02-11 |
| Horn Antenna        | SCHWARZBECK  | BBHA 9170  | BBHA9170D   | 2013-02-12 | 2014-02-11 |
| Active Loop Antenna | Beijing Daze | ZN30900A   | SEL0097     | 2013-02-12 | 2014-02-11 |
| Pre-amplifier       | SCHWARZBECK  | BBV9743    | 9743-019    | 2013-10-28 | 2014-10-27 |
| Pre-amplifier       | Quietek      | AP-180C    | CHM-0602012 | 2013-10-28 | 2014-10-27 |

#### 4.5 EUT Operating Condition

(1) Setup the EUT and peripherals refer to the description of test mode.

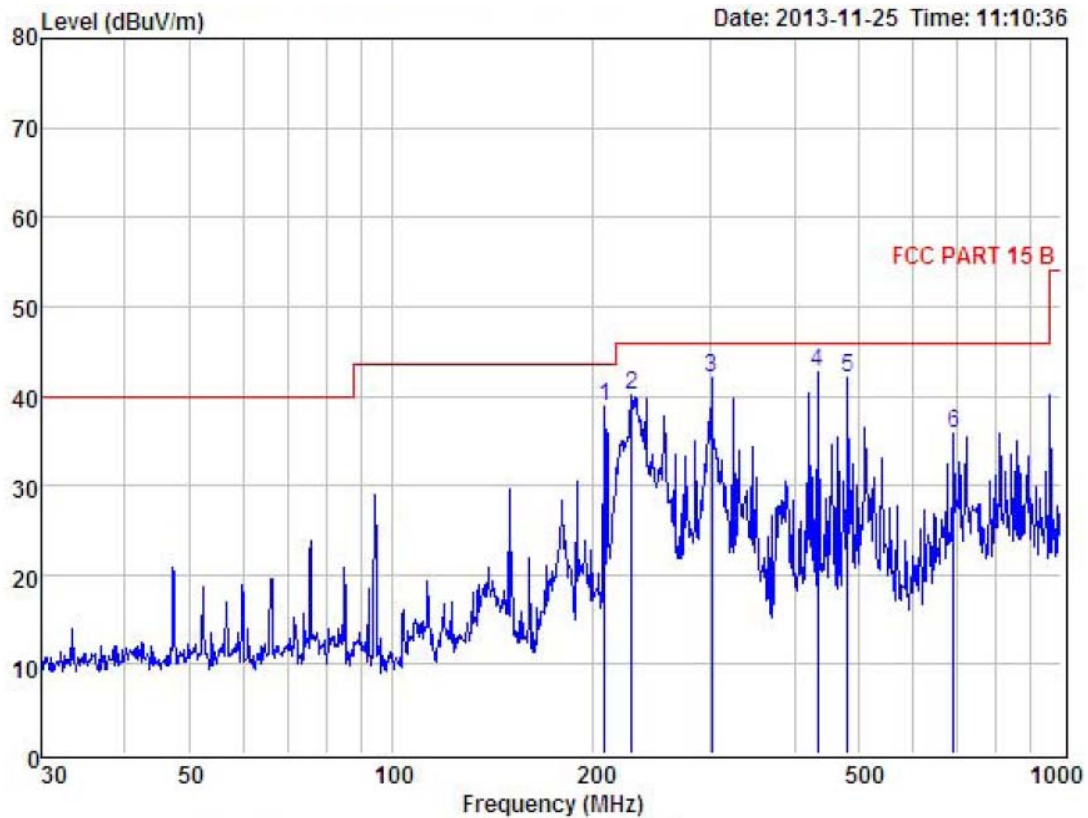
#### 4.6 Deviation

The test is no deviation from the standard.

#### 4.7 Test Data

### (1) Bellow 1GHz

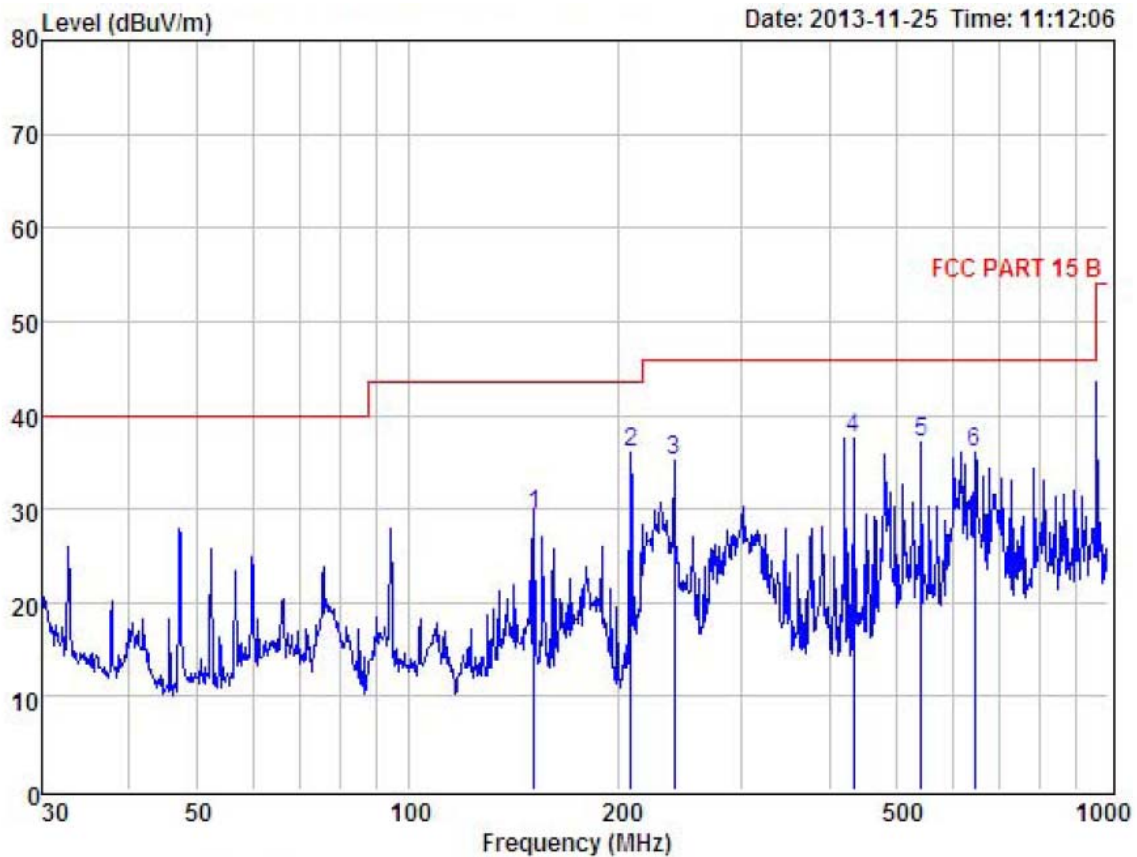
|                |                 |                     |            |
|----------------|-----------------|---------------------|------------|
| E.U.T :        | AirStation      | Model Name :        | AirStation |
| Temperature :  | 23°C            | Relative Humidity : | 55 %       |
| Test Voltage : | AC 120 V / 60Hz |                     |            |
| Antenna. Pol:  | Horizontal      |                     |            |
| Test Mode :    | Mode 1          |                     |            |



| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 207.85      | 55.20                 | 10.04                   | 27.01                  | 0.49                | 38.72         | 43.50         | -4.78          | Peak   |
| 2    | 228.49      | 55.59                 | 11.10                   | 27.08                  | 0.55                | 40.16         | 46.00         | -5.84          | Peak   |
| 3    | 300.37      | 55.79                 | 12.85                   | 27.19                  | 0.64                | 42.09         | 46.00         | -3.91          | Peak   |
| 4    | 432.55      | 53.92                 | 15.53                   | 27.46                  | 0.74                | 42.73         | 46.00         | -3.27          | Peak   |
| 5    | 480.53      | 52.58                 | 16.28                   | 27.57                  | 0.81                | 42.10         | 46.00         | -3.90          | Peak   |
| 6    | 691.99      | 42.88                 | 19.56                   | 27.77                  | 1.19                | 35.86         | 46.00         | -10.14         | Peak   |

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss

|                |                 |                     |            |
|----------------|-----------------|---------------------|------------|
| E.U.T :        | AirStation      | Model Name :        | AirStation |
| Temperature :  | 23°C            | Relative Humidity : | 55 %       |
| Test Voltage : | AC 120 V / 60Hz |                     |            |
| Antenna. Pol:  | Vertical        |                     |            |
| Test Mode :    | Mode 1          |                     |            |



| Item | Freq<br>MHz | Read<br>Level<br>dBuV | Antenna<br>Factor<br>dB | Preamp<br>Factor<br>dB | Cable<br>Loss<br>dB | Level<br>dBuV | Limit<br>dBuV | Margin<br>dBuV | Remark |
|------|-------------|-----------------------|-------------------------|------------------------|---------------------|---------------|---------------|----------------|--------|
| 1    | 151.60      | 41.81                 | 14.16                   | 26.91                  | 0.42                | 29.48         | 43.50         | -14.02         |        |
| 2    | 207.85      | 52.61                 | 10.04                   | 27.01                  | 0.49                | 36.13         | 43.50         | -7.37          |        |
| 3    | 239.99      | 50.35                 | 11.45                   | 27.09                  | 0.53                | 35.24         | 46.00         | -10.76         |        |
| 4    | 432.55      | 48.81                 | 15.53                   | 27.46                  | 0.74                | 37.62         | 46.00         | -8.38          |        |
| 5    | 541.37      | 46.52                 | 17.22                   | 27.69                  | 1.01                | 37.06         | 46.00         | -8.94          |        |
| 6    | 645.12      | 43.71                 | 19.04                   | 27.80                  | 1.13                | 36.08         | 46.00         | -9.92          |        |

Remark: Level = Read Level + Antenna Factor - Preamp Factor + Cable Loss



**(2) Above 1GHz**

|                |                 |                     |            |
|----------------|-----------------|---------------------|------------|
| E.U.T :        | AirStation      | Model Name :        | AirStation |
| Temperature :  | 23°C            | Relative Humidity : | 55 %       |
| Test Voltage : | AC 120 V / 60Hz |                     |            |
| Test Mode :    | Mode 1          |                     |            |

| Freq. (MHz) | Ant.Pol. H/V | Emission Level (dBuV/m) |       | Limit3m (dBuV/m) |       | Margin(dB) |       |
|-------------|--------------|-------------------------|-------|------------------|-------|------------|-------|
|             |              | PK                      | AV    | PK               | AV    | PK         | AV    |
| 1624.500    | V            | 43.25                   | 32.68 | 74.00            | 54.00 | 30.75      | 21.32 |
| --          | V            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | V            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | V            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | V            | --                      | --    | 74.00            | 54.00 | --         | --    |
| 1624.500    | H            | 44.35                   | 34.42 | 74.00            | 54.00 | 29.65      | 19.58 |
| --          | H            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | H            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | H            | --                      | --    | 74.00            | 54.00 | --         | --    |
| --          | H            | --                      | --    | 74.00            | 54.00 | --         | --    |

**Note**

- (1) Peak measuring use spectrum setting: RBW/VBW 1 MHz/3 MHz  
Average measuring use spectrum setting: RBW/VBW 1 MHz/10 Hz
- (2) The emission levels of other frequencies are very lower than the limit and not show in the test report.