



# The Sample Test Report

Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8  
FCC Part15 Subpart C

Product Name : 3D Active Glasses  
Model No. : 3DG-001-SDC  
FCC ID : P2U3DG001SDC  
IC : 10555A-3DG001SDC

Applicant : Samsung Display co., Ltd.  
Address : 95,Samsung2-ro, Giheung-gu, Yong-in-si,  
Gyeonggi-do, Korea

Date of Receipt : 07/11/2012  
Issued Date : 13/11/2012  
Report No. : 12BS021R-RF-US-P06V01  
Report Version : V 1.0

The test results relate only to the samples tested.

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

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# Test Report Certification

Issued Date : 13/11/2012

Report No. : 12BS021R-RF-US-P06V01



Product Name : 3D Active Glasses

Applicant : Samsung Display co., Ltd.

Address : 95, Samsung2-ro, Giheung-gu, Yong-in-si, Gyeonggi-do, Korea

Manufacturer : Samsung Display co., Ltd.

Address : 95, Samsung2-ro, Giheung-gu, Yong-in-si, Gyeonggi-do, Korea

Model No. : 3DG-001-SDC

FCC ID : P2U3DG001SDC

IC : 10555A-3DG001SDC

EUT Voltage : DC 3V

Brand Name : SAMSUNG

Applicable Standard : FCC CFR Title 47 Part 15 Subpart C: 2012  
ANSI C63.4: 2009; ANSI C63.10: 2009  
Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8

Test Result : Complied

Performed Location : Suzhou EMC Laboratory  
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## Laboratory Information

We, **Quietek Corporation**, are an independent EMC and safety consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted(audited or listed) by the following related bodies in compliance with ISO 17025, EN 45001 and specified testing scope:

|                      |          |                       |
|----------------------|----------|-----------------------|
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| <b>Germany</b>       | <b>:</b> | <b>TUV Rheinland</b>  |
| <b>Norway</b>        | <b>:</b> | <b>Nemko, DNV</b>     |
| <b>USA</b>           | <b>:</b> | <b>FCC, NVLAP</b>     |
| <b>Japan</b>         | <b>:</b> | <b>VCCI</b>           |
| <b>China</b>         | <b>:</b> | <b>CNAS</b>           |

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The address and introduction of Quietek Corporation's laboratories can be founded in our Web site :  
<http://www.quietek.com/>

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## 1. General Information

### 1.1. EUT Description

|                    |                     |
|--------------------|---------------------|
| Product Name       | 3D Active Glasses   |
| Brand Name         | SAMSUNG             |
| Model No.          | 3DG-001-SDC         |
| Working Voltage    | DC 3V               |
| Frequency Range    | 2402 - 2480 MHz     |
| Channel Number     | 79                  |
| Channel Separation | 1MHz                |
| Type of Modulation | FHSS                |
| Data Rate          | 1Mbps(GFSK)         |
| Channel Control    | Auto                |
| Antenna Type       | PCB Printed Antenna |
| Peak Antenna Gain  | 2.61dBi             |

Note: This product's bluetooth controller BCM20730 change to BCM20930, which reduce all function about wireless keyboard and cut down the number of GPIO port.

| Bluetooth Working Frequency of Each Channel: |           |         |           |         |           |         |           |
|----------------------------------------------|-----------|---------|-----------|---------|-----------|---------|-----------|
| Channel                                      | Frequency | Channel | Frequency | Channel | Frequency | Channel | Frequency |
| 00                                           | 2402 MHz  | 01      | 2403 MHz  | 02      | 2404 MHz  | 03      | 2405 MHz  |
| 04                                           | 2406 MHz  | 05      | 2407 MHz  | 06      | 2408 MHz  | 07      | 2409 MHz  |
| 08                                           | 2410 MHz  | 09      | 2411 MHz  | 10      | 2412 MHz  | 11      | 2413 MHz  |
| 12                                           | 2414 MHz  | 13      | 2415 MHz  | 14      | 2416 MHz  | 15      | 2417 MHz  |
| 16                                           | 2418 MHz  | 17      | 2419 MHz  | 18      | 2420 MHz  | 19      | 2421 MHz  |
| 20                                           | 2422 MHz  | 21      | 2423 MHz  | 22      | 2424 MHz  | 23      | 2425 MHz  |
| 24                                           | 2426 MHz  | 25      | 2427 MHz  | 26      | 2428 MHz  | 27      | 2429 MHz  |
| 28                                           | 2430 MHz  | 29      | 2431 MHz  | 30      | 2432 MHz  | 31      | 2433 MHz  |
| 32                                           | 2434 MHz  | 33      | 2435 MHz  | 34      | 2436 MHz  | 35      | 2437 MHz  |
| 36                                           | 2438 MHz  | 37      | 2439 MHz  | 38      | 2440 MHz  | 39      | 2441 MHz  |
| 40                                           | 2442 MHz  | 41      | 2443 MHz  | 42      | 2444 MHz  | 43      | 2445 MHz  |
| 44                                           | 2446 MHz  | 45      | 2447 MHz  | 46      | 2448 MHz  | 47      | 2449 MHz  |
| 48                                           | 2450 MHz  | 49      | 2451 MHz  | 50      | 2452 MHz  | 51      | 2453 MHz  |
| 52                                           | 2454 MHz  | 53      | 2455 MHz  | 54      | 2456 MHz  | 55      | 2457 MHz  |
| 56                                           | 2458 MHz  | 57      | 2459 MHz  | 58      | 2460 MHz  | 59      | 2461 MHz  |
| 60                                           | 2462 MHz  | 61      | 2463 MHz  | 62      | 2464 MHz  | 63      | 2465 MHz  |
| 64                                           | 2466 MHz  | 65      | 2467 MHz  | 66      | 2468 MHz  | 67      | 2469 MHz  |
| 68                                           | 2470 MHz  | 69      | 2471 MHz  | 70      | 2472 MHz  | 71      | 2473 MHz  |
| 72                                           | 2474 MHz  | 73      | 2475 MHz  | 74      | 2476 MHz  | 75      | 2477 MHz  |
| 76                                           | 2478 MHz  | 77      | 2479 MHz  | 78      | 2480 MHz  | N/A     | N/A       |

## 1.2. Mode of Operation

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in normal operation, which was shown in this test report and defined as:

| Test Mode               |
|-------------------------|
| Mode 1: Transmit by DH5 |
| Mode 2: Receive by DH5  |

Note:

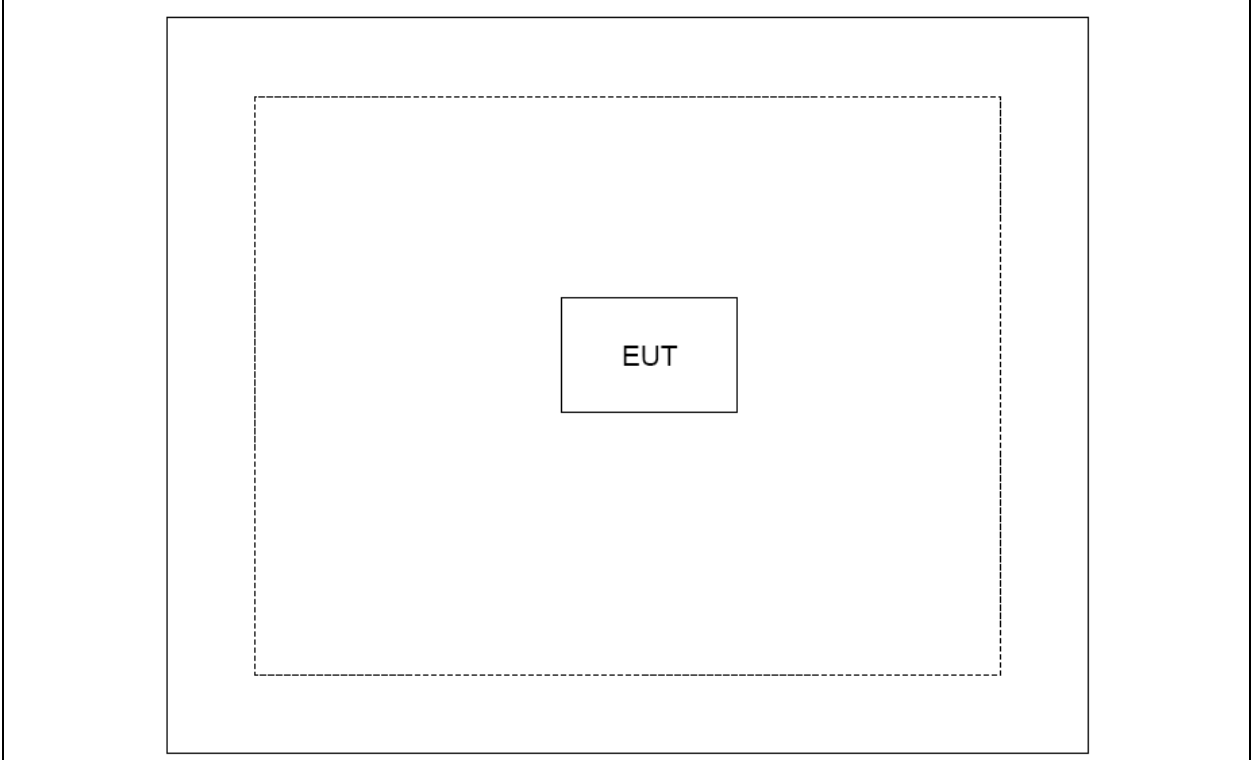
1. DH5 is for GFSK modulation.
2. Regards to the frequency band operation: the lowest, middle and highest frequency of channel were selected to perform the test, then shown on this report.
3. This device is a composite device in accordance with Part 15 Subpart B regulations.

### 1.3. Tested 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       | N/A | N/A          | N/A       | N/A        | N/A        |

1.4. Configuration of Tested System

| Connection Diagram                                                                  |     |                          |
|-------------------------------------------------------------------------------------|-----|--------------------------|
|  |     |                          |
| Signal Cable Type                                                                   |     | Signal cable Description |
| A                                                                                   | N/A | N/A                      |

**1.5. EUT Exercise Software**

|   |                                                                                                                              |
|---|------------------------------------------------------------------------------------------------------------------------------|
| 1 | Setup the EUT and simulators as shown on above.                                                                              |
| 2 | Turn on the power of equipment.                                                                                              |
| 3 | Run the RF test software "Bluetool", and set the test mode and channel, then press OK to start continue Transmit or receive. |

## 2. Technical Test

### 2.1. Summary of Test Result

☒ No deviations from the test standards

☐ Deviations from the test standards as below description:

| Performed Test Item         | Normative References                                                                                                           | Test Performed | Deviation |
|-----------------------------|--------------------------------------------------------------------------------------------------------------------------------|----------------|-----------|
| Conducted Emission          | FCC CFR Title 47 Part 15 Subpart C: 2012<br>Section 15.207<br>RSS-Gen Issue 3 December 2010 Section 7.2.2                      | No             | No        |
| Radiated Emission           | FCC CFR Title 47 Part 15 Subpart C: 2012<br>Section 15.209<br>RSS-210 Issue 8 December 2010 Section 2.7<br>Table 2 and Table 3 | Yes            | No        |
| Peak Output Power           | FCC CFR Title 47 Part 15 Subpart C: 2012<br>Section 15.247(b)(1)<br>RSS-210 Issue 8 December 2010 Section A8.4                 | Yes            | No        |
| Radiated Emission Band Edge | FCC CFR Title 47 Part 15 Subpart C: 2012<br>15.247(d)<br>RSS-210 Issue 8 December 2010 Section A8.5                            | Yes            | No        |

## 2.2. Test Environment

| Items                      | Required (IEC 68-1) | Actual   |
|----------------------------|---------------------|----------|
| Temperature (°C)           | 15-35               | 21       |
| Humidity (%RH)             | 25-75               | 50       |
| Barometric pressure (mbar) | 860-1060            | 950-1000 |

### 3. Conducted Emission

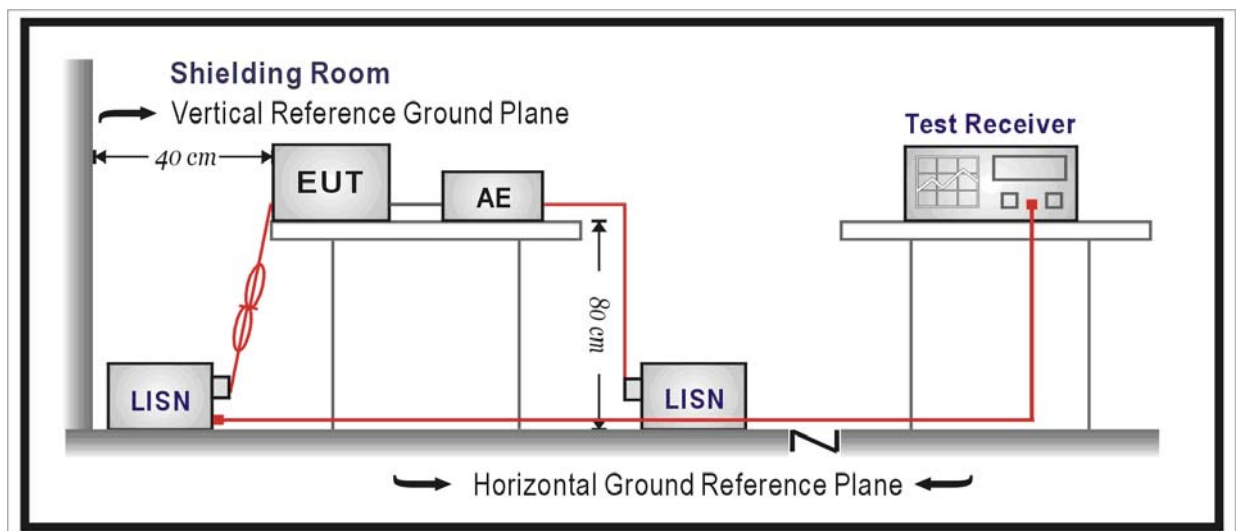
#### 3.1. Test Equipment

Conducted Emission / TR-1

| Instrument                 | Manufacturer | Type No. | Serial No. | Cal. Due Date |
|----------------------------|--------------|----------|------------|---------------|
| EMI Test Receiver          | R&S          | ESCI     | 100726     | 2013.04.18    |
| Two-Line V-Network         | R&S          | ENV216   | 101043     | 2013.04.18    |
| Two-Line V-Network         | R&S          | ENV216   | 101044     | 2013.09.17    |
| 50ohm Coaxial Switch       | Anritsu      | MP59B    | 6200464462 | 2013.05.04    |
| 50ohm Termination          | SHX          | TF2      | 07081401   | 2013.09.17    |
| Temperature/Humidity Meter | zhicheng     | ZC1-2    | TR1-TH     | 2013.01.10    |

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

#### 3.2. Test Setup



### 3.3. Limit

| FCC Part 15 Subpart C Paragraph 15.207 Limits |           |           |
|-----------------------------------------------|-----------|-----------|
| Frequency (MHz)                               | QP (dBuV) | AV (dBuV) |
| 0.15 - 0.50                                   | 66 - 56   | 56 - 46   |
| 0.50 - 5.0                                    | 56        | 46        |
| 5.0 - 30                                      | 60        | 50        |

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 0.15 MHz to 0.5 MHz.

### 3.4. Test Procedure

According to FCC ANSI C63.4: 2009 & ANSI C63.10: 2009.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

### 3.5. Uncertainty

The measurement uncertainty is defined as  $\pm 2.02$  dB

### 3.6. Test Result

The EUT rely on battery-powered, so this test item needn't perform.

## 4. Radiated Emission

### 4.1. Test Equipment

#### Radiated Emission / AC-2

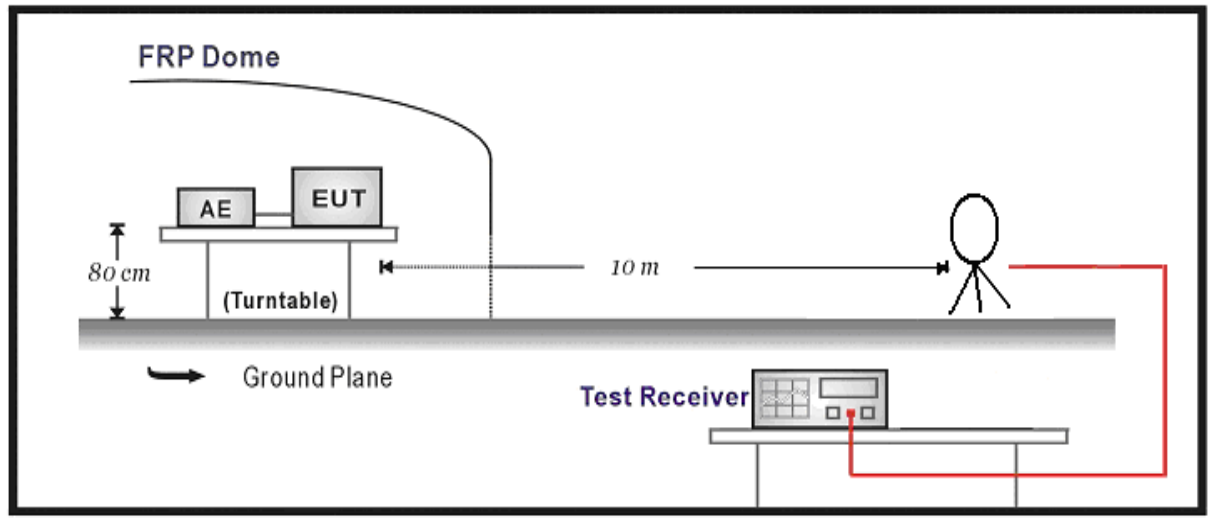
| Instrument                 | Manufacturer | Type No.     | Serial No. | Cal. Date  |
|----------------------------|--------------|--------------|------------|------------|
| EMI Test Receiver          | R&S          | ESCI         | 100573     | 2013.04.18 |
| Loop Antenna               | R&S          | HFH2-Z2      | 833799/003 | 2013.11.22 |
| Bilog Antenna              | Teseq GmbH   | CBL6112D     | 27611      | 2013.10.15 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC2-C      | 2013.03.02 |
| Temperature/Humidity Meter | Zhicheng     | ZC1-2        | AC2-TH     | 2013.01.10 |

#### Radiated Emission / AC-5

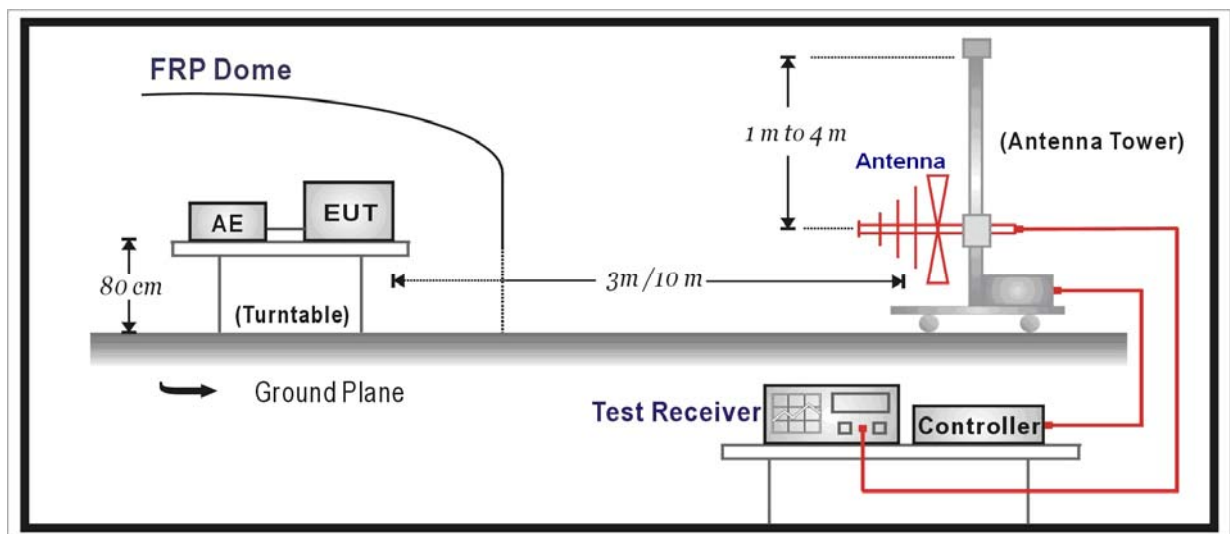
| Instrument                 | Manufacturer | Type No.     | Serial No.  | Cal. Date  |
|----------------------------|--------------|--------------|-------------|------------|
| Spectrum Analyzer          | Agilent      | N9010A       | MY48030494  | 2013.04.18 |
| Preamplifier               | Miteq        | NSP1800-25   | 1364185     | 2013.05.04 |
| Preamplifier               | Quietek      | AP-040G      | CHM-0906001 | 2013.05.04 |
| Bilog Antenna              | Teseq GmbH   | CBL6112D     | 27612       | 2013.10.15 |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9120D    | 499         | 2014.06.08 |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9170     | 294         | 2013.11.24 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC5-C1      | 2013.03.02 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC5-C2      | 2013.03.02 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 102 | AC5-C3      | 2013.03.02 |
| Temperature/Humidity Meter | Zhicheng     | ZC1-2        | AC5-TH      | 2013.01.10 |

## 4.2. Test Setup

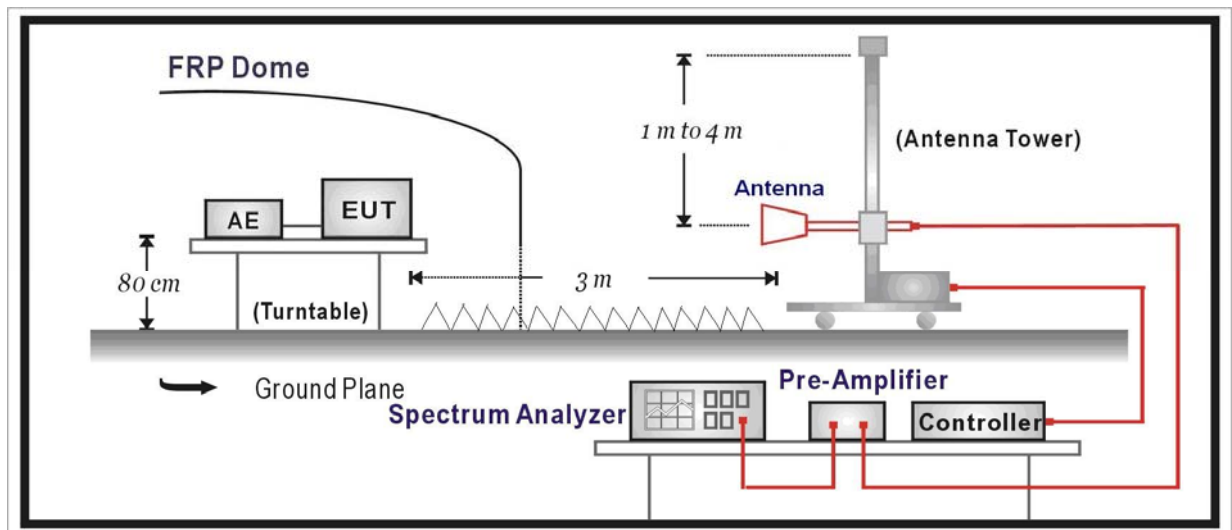
Below 30MHz Test Setup:



Below 1GHz Test Setup:



#### Above 1GHz Test Setup:



#### 4.3. Limit

| FCC Part 15 Subpart C Paragraph 15.209 |              |                |
|----------------------------------------|--------------|----------------|
| Frequency (MHz)                        | Distance (m) | Level (dBuV/m) |
| 30 - 88                                | 3            | 40             |
| 88 - 216                               | 3            | 43.5           |
| 216 - 960                              | 3            | 46             |
| Above 960                              | 3            | 54             |

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

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

#### 4.4. Test Procedure

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the

maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 30MHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the “cone of radiation” of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

#### **4.5. Uncertainty**

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB  
below 1G is defined as  $\pm 3.8$  dB

## 4.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor – Preamplifier Gain

Mode 1: Transmitter-1Mbps(GFSK\_DH5)

| CH | Antenna | Frequency (MHz) | Reading Level (dBuV/m) | Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|------------------------|-------------|------------------------|----------------|-------------|----------|
| 0  | H       | 2402.0          | 54.5                   | 36.4        | 90.9                   | Fundamental    | /           | PK       |
|    | H       | 262.4           | 5.3                    | 20.0        | 25.3                   | 46             | -20.7       | QP       |
|    | H       | 420.9           | 5.9                    | 24.4        | 30.3                   | 46             | -15.7       | QP       |
|    | H       | 3200.0          | 51.7                   | -9.5        | 42.2                   | 54(Note)       | -11.8       | PK       |
|    | V       | 4808.0          | 53.5                   | -7.7        | 45.8                   | 54(Note)       | -8.2        | PK       |
|    | V       | 7205.0          | 54.0                   | -3.1        | 50.9                   | 54(Note)       | -3.1        | PK       |
|    | H       | 24000.0         | 59.1                   | -8.9        | 50.2                   | 54(Note)       | -3.8        | PK       |
| 39 | H       | 2441.0          | 58.0                   | 36.7        | 94.7                   | Fundamental    | /           | PK       |
|    | V       | 308.0           | 6.6                    | 20.8        | 27.4                   | 46             | -18.6       | QP       |
|    | H       | 463.1           | 5.9                    | 24.6        | 30.5                   | 46             | -15.5       | QP       |
|    | H       | 3200.0          | 51.9                   | -9.5        | 42.4                   | 54(Note)       | -11.6       | PK       |
|    | V       | 4884.5          | 53.0                   | -7.6        | 45.4                   | 54(Note)       | -8.6        | PK       |
|    | V       | 7324.0          | 53.7                   | -2.9        | 50.8                   | 54(Note)       | -3.2        | PK       |
|    | H       | 24000.0         | 59.1                   | -8.9        | 50.2                   | 54(Note)       | -3.8        | PK       |
| 78 | H       | 2479.9          | 57.6                   | 37.1        | 94.7                   | Fundamental    | /           | PK       |
|    | H       | 316.2           | 5.8                    | 21.1        | 26.9                   | 46             | -19.1       | QP       |
|    | H       | 543.3           | 5.9                    | 26.4        | 32.3                   | 46             | -13.7       | QP       |
|    | V       | 3200.0          | 51.9                   | -9.8        | 42.1                   | 54(Note)       | -11.9       | PK       |
|    | V       | 4961.0          | 53.0                   | -7.5        | 45.5                   | 54(Note)       | -8.5        | PK       |
|    | V       | 7443.0          | 53.9                   | -2.5        | 51.4                   | 54(Note)       | -2.6        | PK       |
|    | V       | 24000.0         | 59.1                   | -8.9        | 50.2                   | 54(Note)       | -3.8        | PK       |

Note: 1. Measure Level = Reading Level + Factor.

2. The test trace is same as the ambient noise (the test frequency range: 9kHz~30MHz, 18GHz~25GHz), therefore no data appear in the report.

3. This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.

## 5. Peak Output Power

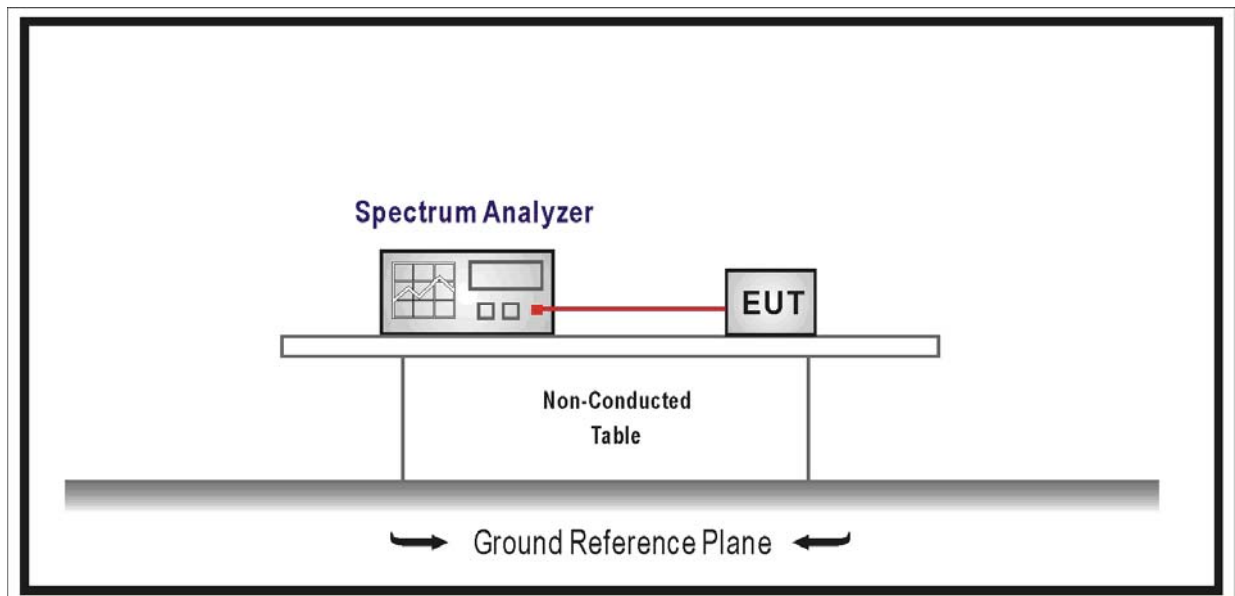
### 5.1. Test Equipment

Peak Output Power / TR-8

| Instrument                 | Manufacturer | Type No. | Serial No. | Cal. Due Date |
|----------------------------|--------------|----------|------------|---------------|
| Spectrum Analyzer          | Agilent      | E4446A   | MY45300103 | 2013.04.18    |
| Temperature/Humidity Meter | Zhicheng     | ZC1-2    | TR8-TH     | 2013.05.07    |

Note: All equipments are calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

### 5.2. Test Setup



### 5.3. Limit

- For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
- For frequency hopping systems operating in the 902-928 MHz band: 1 watt for systems employing at least 50 hopping channels; and, 0.25 watts for systems employing less than 50 hopping channels, but at least 25 hopping channels.

Note: the conducted output power limit specified above is based on the use the antennas with

directional gains that do not exceed 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values above, as appropriate, by the amount in dB that the directional gain of antenna exceeds 6 dBi.

#### **5.4. Test Procedure**

According to ANSI C63.10: 2009.

Use the following spectrum analyzer settings:

Span = approximately 5 times the 20dB bandwidth, centered on a hopping channel

RBW > the 20 dB bandwidth of the emission being measured.

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. The indicated level is the peak output power (don't forget added the external attenuation and cable loss).

#### **5.5. Uncertainty**

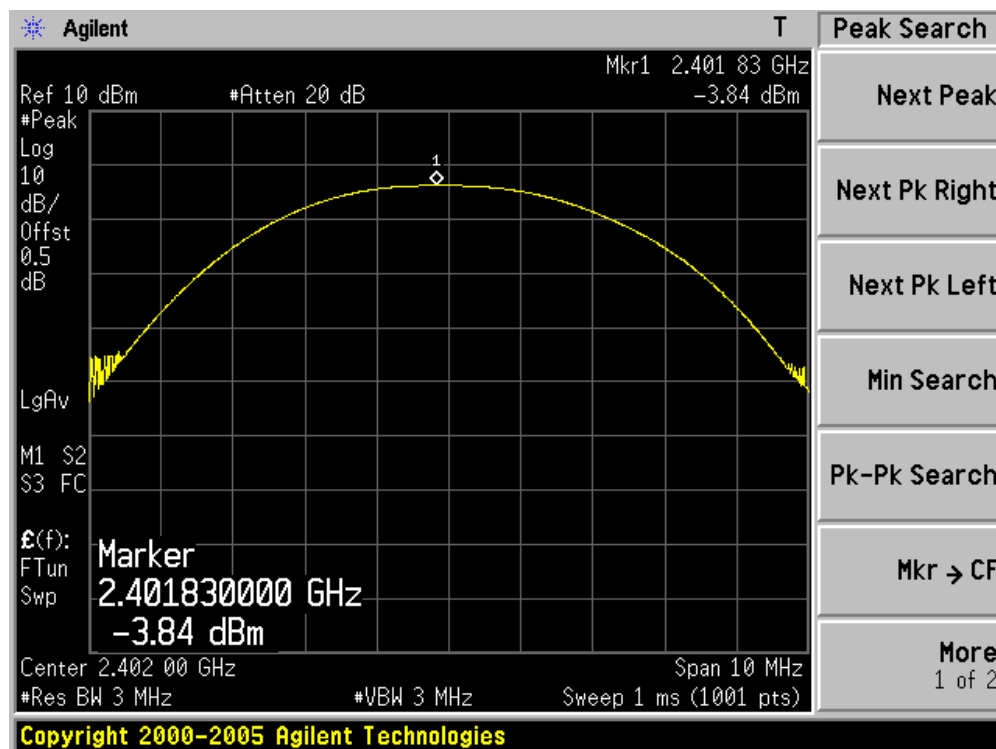
The measurement uncertainty is defined as  $\pm 1.0$  dB

## 5.6. Test Result

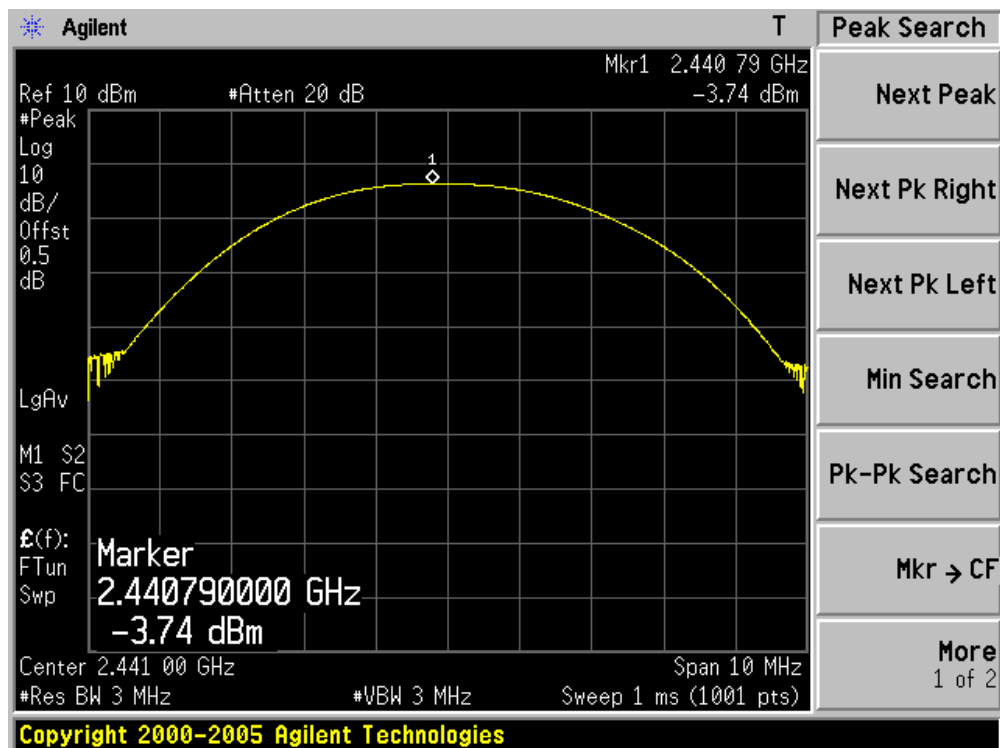
|           |   |                                     |
|-----------|---|-------------------------------------|
| Product   | : | 3D Active Glasses                   |
| Test Item | : | Power Output                        |
| Test Mode | : | Mode 1: Transmitter-1Mbps(GFSK_DH5) |

| Channel No. | Frequency (MHz) | Measurement Power Output (dBm) | Limit (dBm) | Result |
|-------------|-----------------|--------------------------------|-------------|--------|
| 0           | 2402            | -3.84                          | 30.00       | Pass   |
| 39          | 2441            | -3.74                          | 30.00       | Pass   |
| 78          | 2480            | -3.78                          | 30.00       | Pass   |

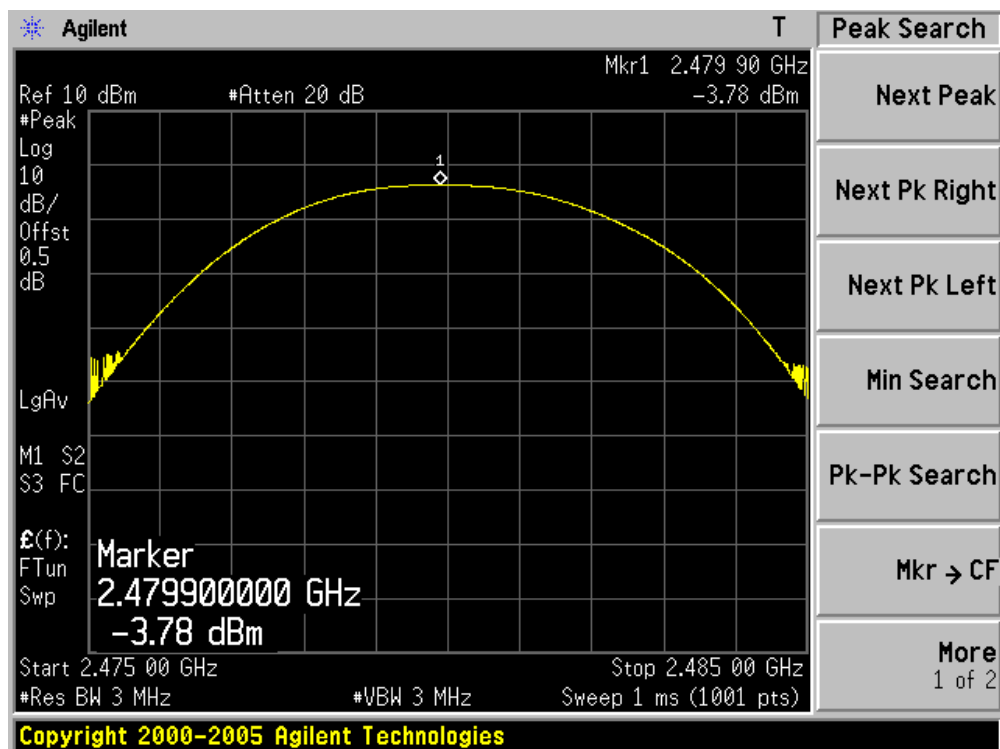
DH5 2402MHz



### DH5 2441MHz



### DH5 2480MHz



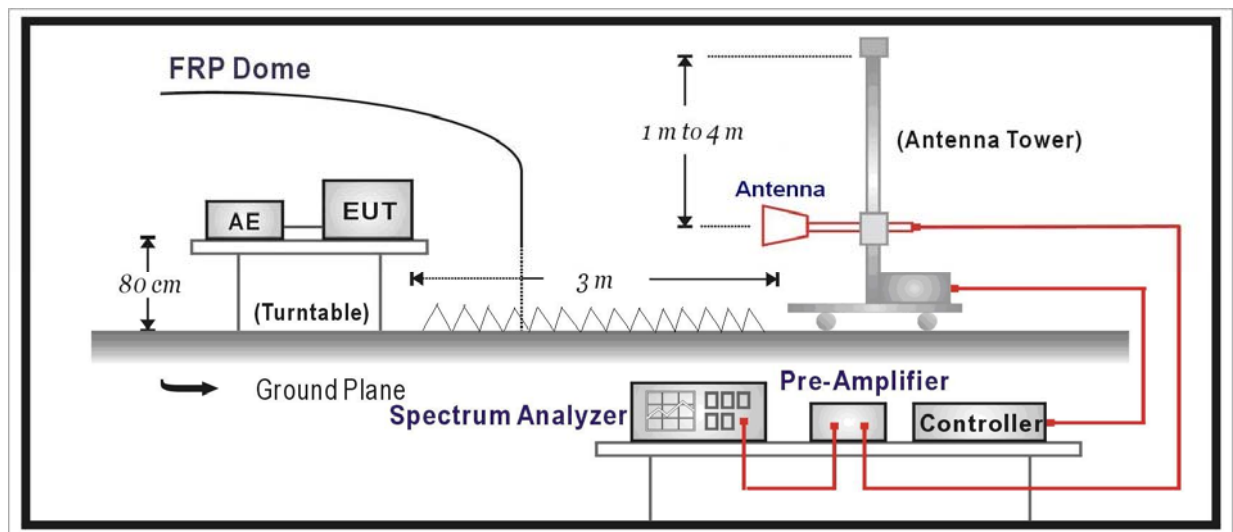
## 6. Radiated Emission Band Edge

### 6.1. Test Equipment

☒ Radiated Emission Band Edge / AC-5

| Instrument                 | Manufacturer | Type No.   | Serial No.  | Cal. Due Date |
|----------------------------|--------------|------------|-------------|---------------|
| Spectrum Analyzer          | Agilent      | N9010A     | MY48030494  | 2013.04.18    |
| EMI Test Receiver          | R&S          | ESCI       | 100573      | 2013.04.18    |
| Preamplifier               | Miteq        | NSP1800-25 | 1364185     | 2013.05.04    |
| Preamplifier               | Quietek      | AP-040G    | CHM-0906001 | 2013.05.04    |
| Bilog Antenna              | Teseq GmbH   | CBL6112D   | 27612       | 2013.10.15    |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9120D  | 499         | 2014.06.08    |
| 50ohm Coaxial Switch       | Anritsu      | MP59B      | 6200464462  | 2013.03.02    |
| Temperature/Humidity Meter | zhicheng     | ZC1-2      | AC5-TH      | 2013.01.10    |

## 6.2. Test Setup



## 6.3. Limit

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a) of FCC part 15.

## 6.4. Test Procedure

According to ANSI C63.10: 2009.

This test is required for any spurious emission or modulation product that falls in a Restricted Band, as defined in Section 15.205 of FCC part 15. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for  $f \geq 1$  GHz, 100 kHz for  $f < 1$  GHz

VBW  $\geq$  RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.4 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being

corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b) of FCC part 15.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209 of FCC Part 15. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a "duty cycle correction factor", derived from  $20\log(\text{dwell time}/100 \text{ ms})$ , in an effort to demonstrate compliance with the 15.209 limit of FCC part 15.

If the emission on which a radiated measurement must be made is located at the edge of the authorized band of operation, then the alternative "marker-delta" method may be employed.

## 6.5. Uncertainty

The measurement uncertainty above 1G is defined as  $\pm 3.9 \text{ dB}$   
below 1G is defined as  $\pm 3.8 \text{ dB}$

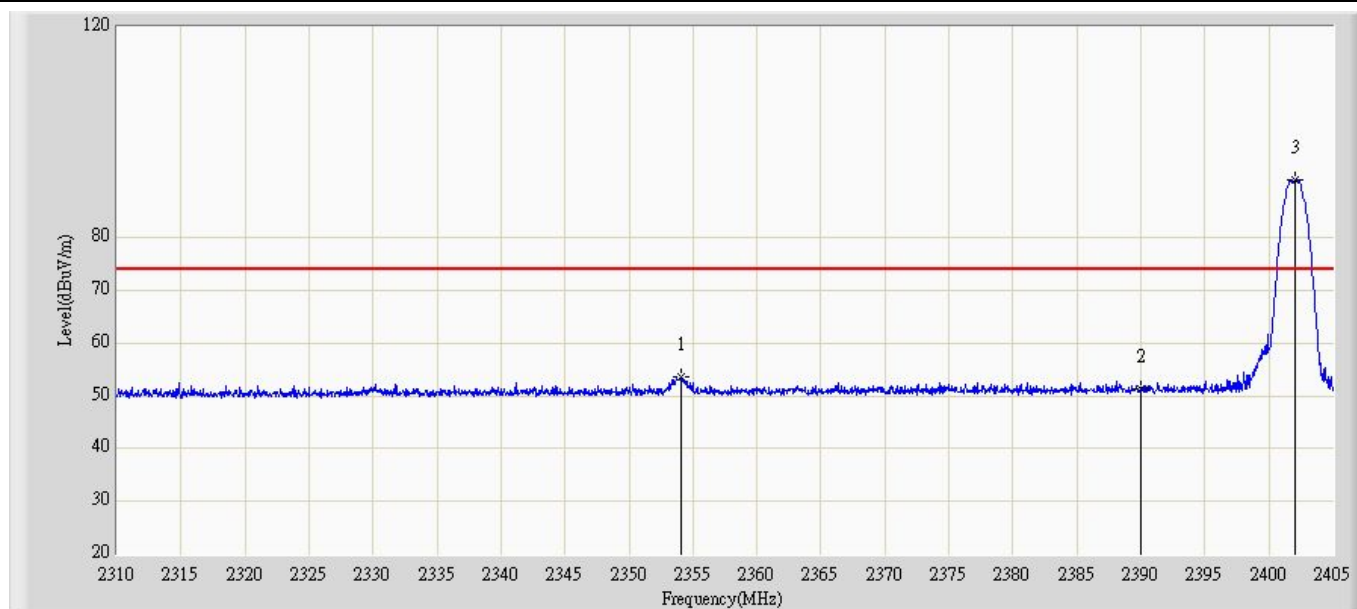
## 6.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

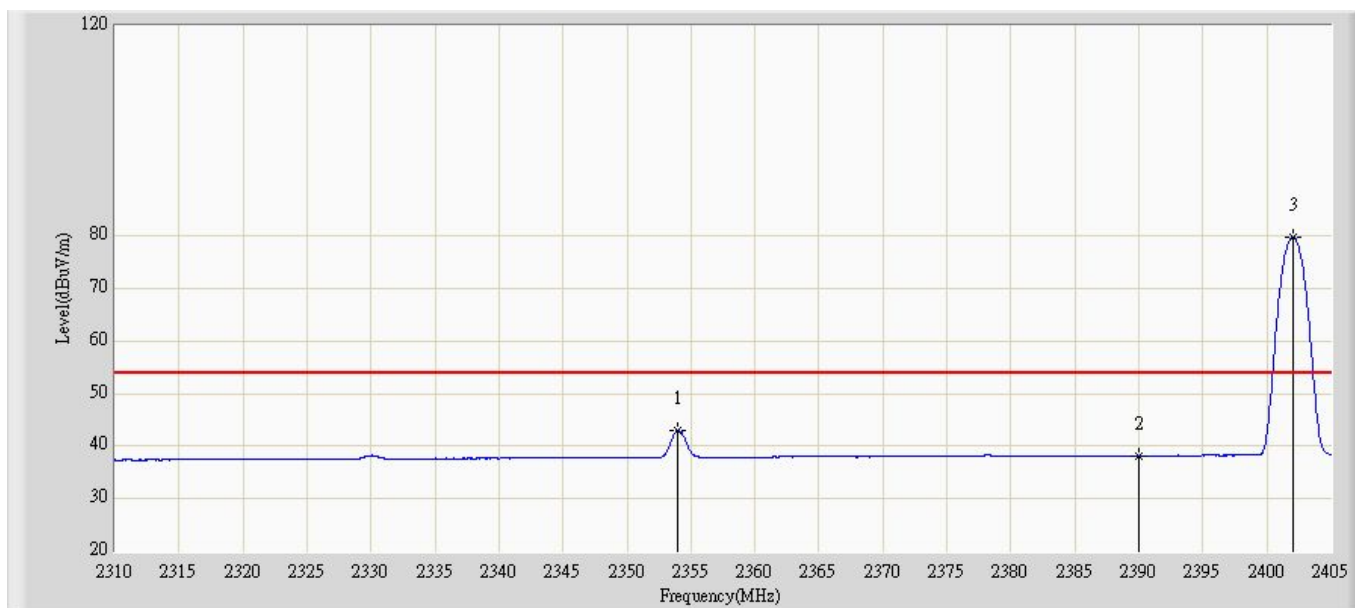
Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:23 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Horizontal     |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



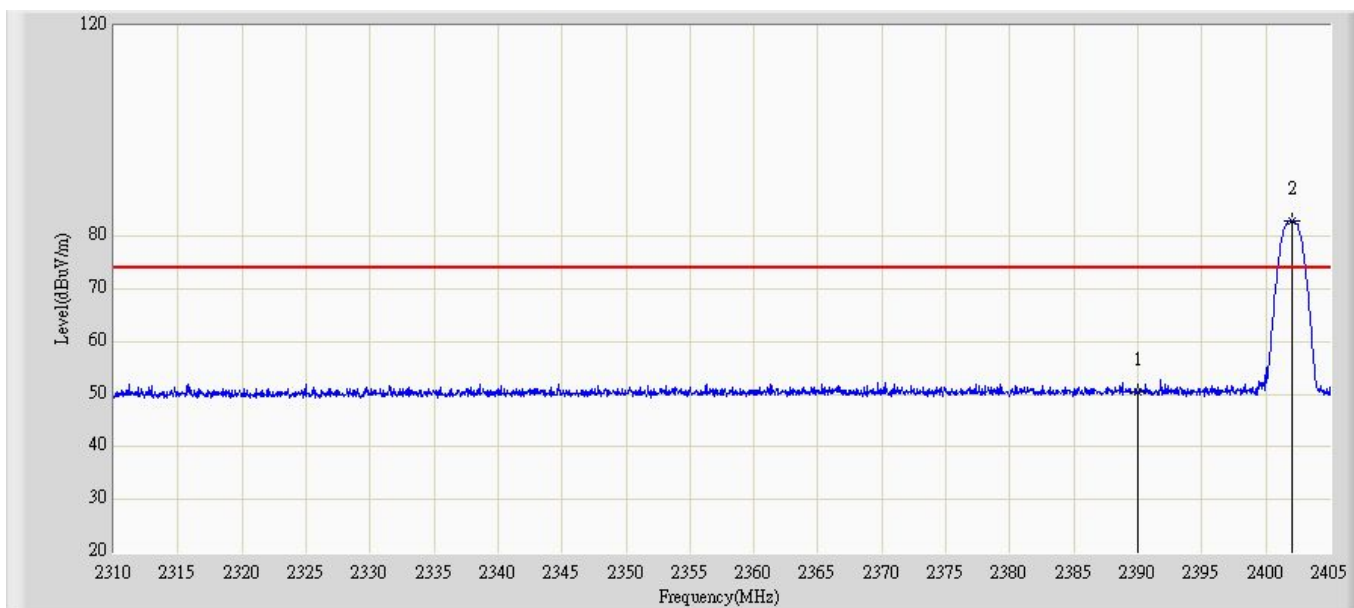
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      |      | 2354.080        | 53.722                 | 17.724               | -20.278         | 74.000         | 35.998 | PK   |
| 2  |      |      | 2390.000        | 51.394                 | 15.093               | -22.606         | 74.000         | 36.302 | PK   |
| 3  |      | *    | 2402.008        | 90.925                 | 54.525               | N/A             | N/A            | 36.400 | PK   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:29 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Horizontal     |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



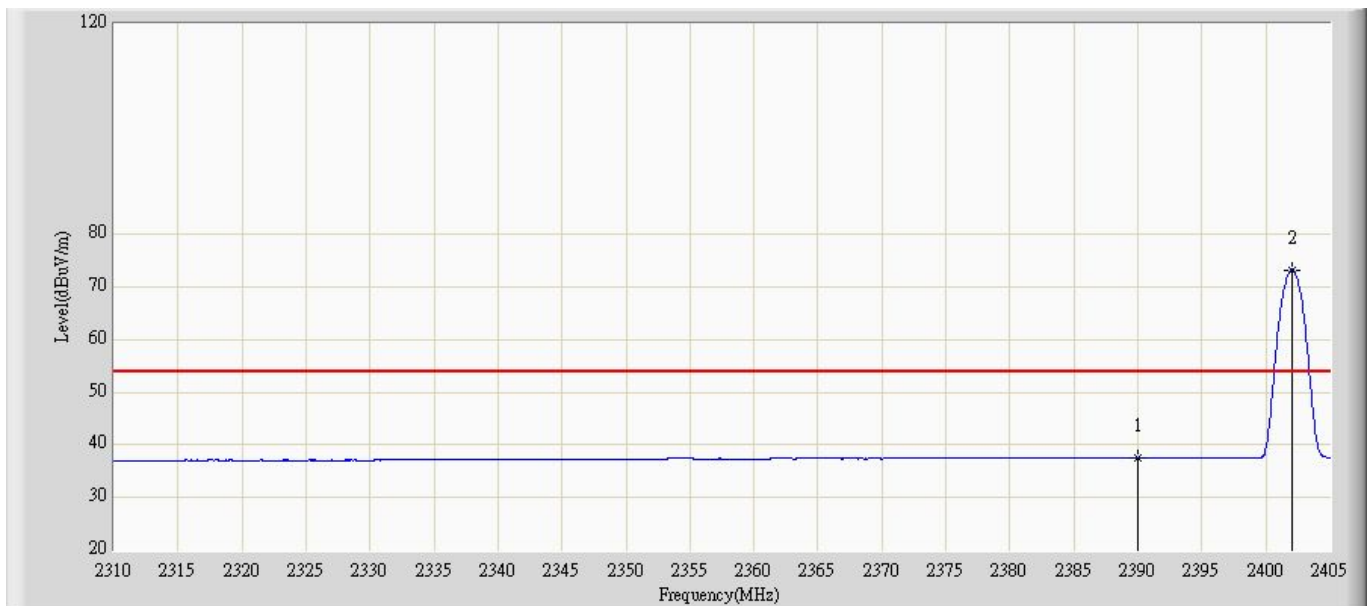
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      |      | 2353.985        | 42.994                 | 6.997                | -11.006         | 54.000         | 35.996 | AV   |
| 2  |      |      | 2390.000        | 38.233                 | 1.932                | -15.767         | 54.000         | 36.302 | AV   |
| 3  |      | *    | 2402.008        | 79.841                 | 43.441               | N/A             | N/A            | 36.400 | AV   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:29 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Vertical       |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



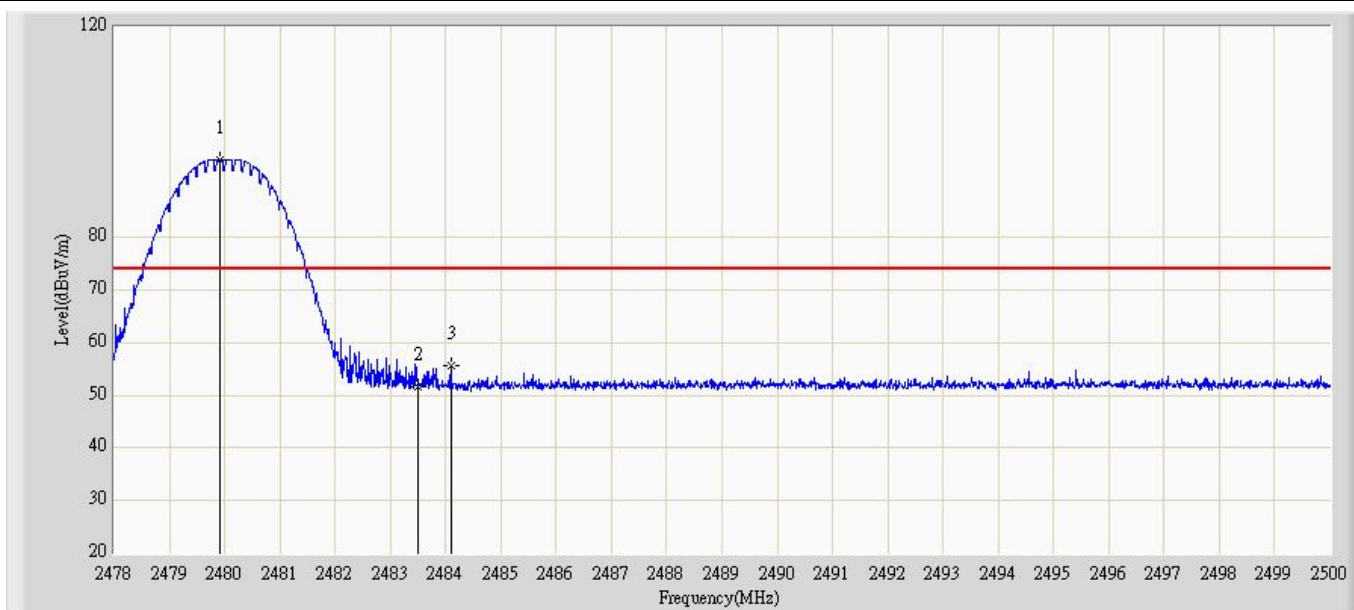
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      |      | 2390.000        | 50.335                 | 14.694               | -23.665         | 74.000         | 35.642 | PK   |
| 2  |      | *    | 2402.008        | 82.986                 | 47.294               | N/A             | N/A            | 35.692 | PK   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:31 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Vertical       |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



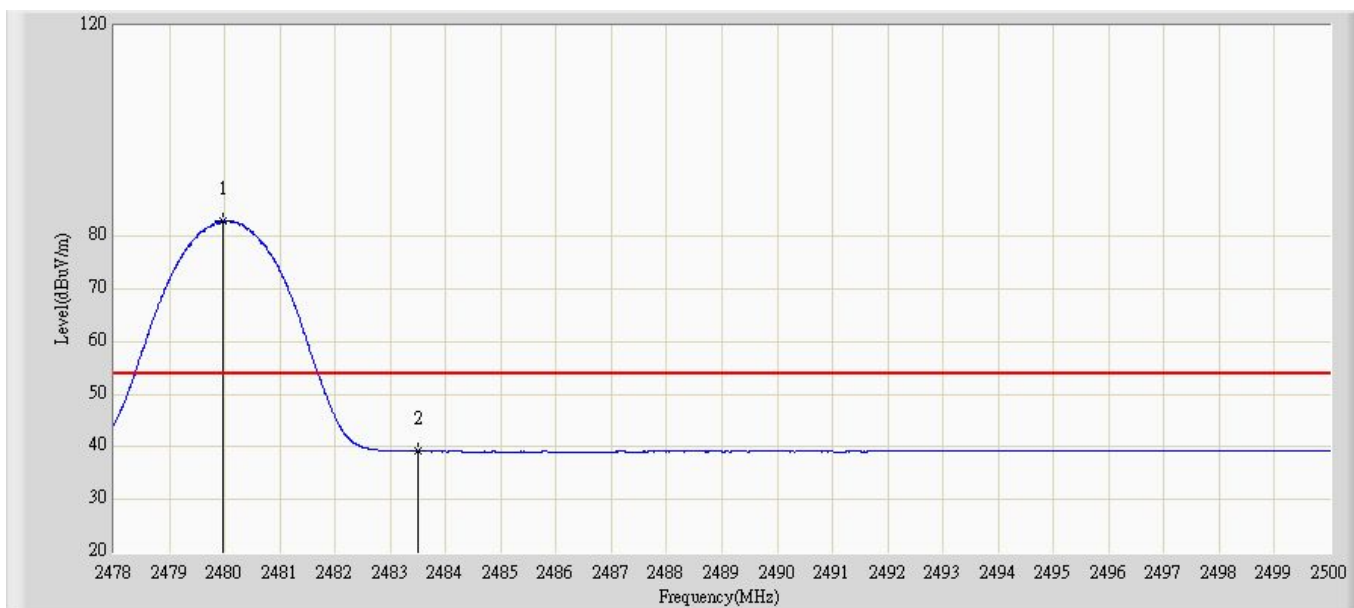
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      |      | 2390.000        | 37.499                 | 1.858                | -16.501         | 54.000         | 35.642 | AV   |
| 2  |      | *    | 2402.008        | 73.303                 | 37.611               | N/A             | N/A            | 35.692 | AV   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:14 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Horizontal     |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2480MHz by DH5 |                          |



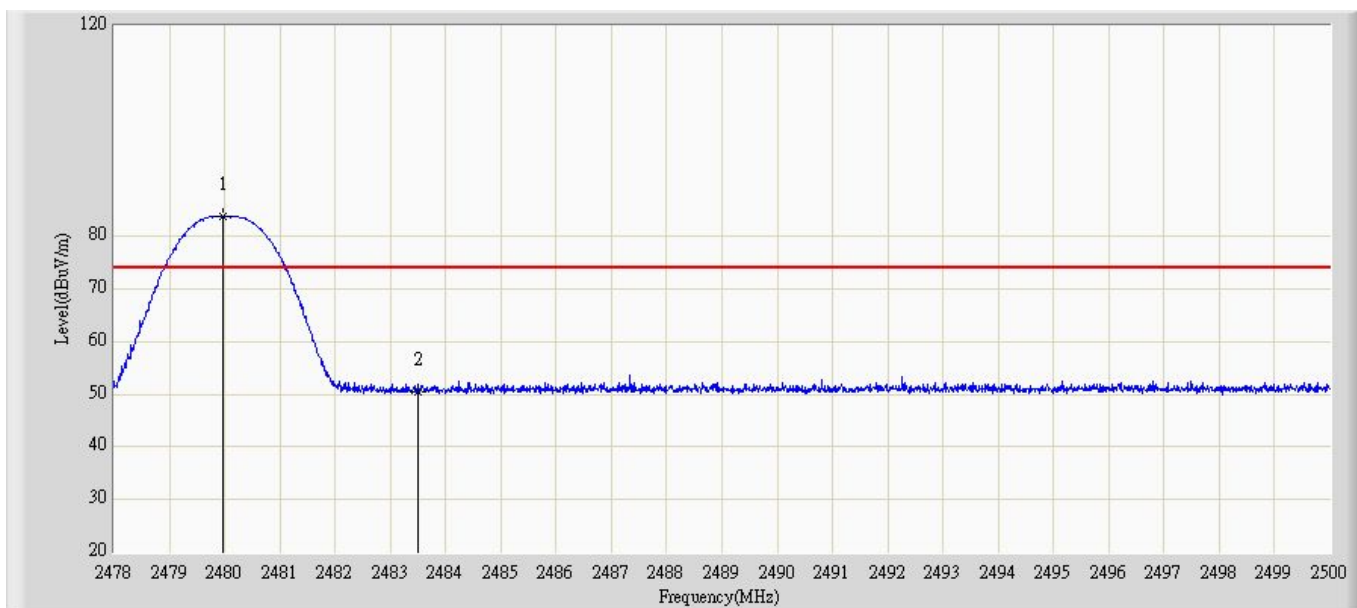
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      | *    | 2479.903        | 94.693                 | 57.635               | N/A             | N/A            | 37.058 | PK   |
| 2  |      |      | 2483.500        | 51.716                 | 14.626               | -22.284         | 74.000         | 37.089 | PK   |
| 3  |      |      | 2484.094        | 55.549                 | 18.454               | -18.451         | 74.000         | 37.095 | PK   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:19 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Horizontal     |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



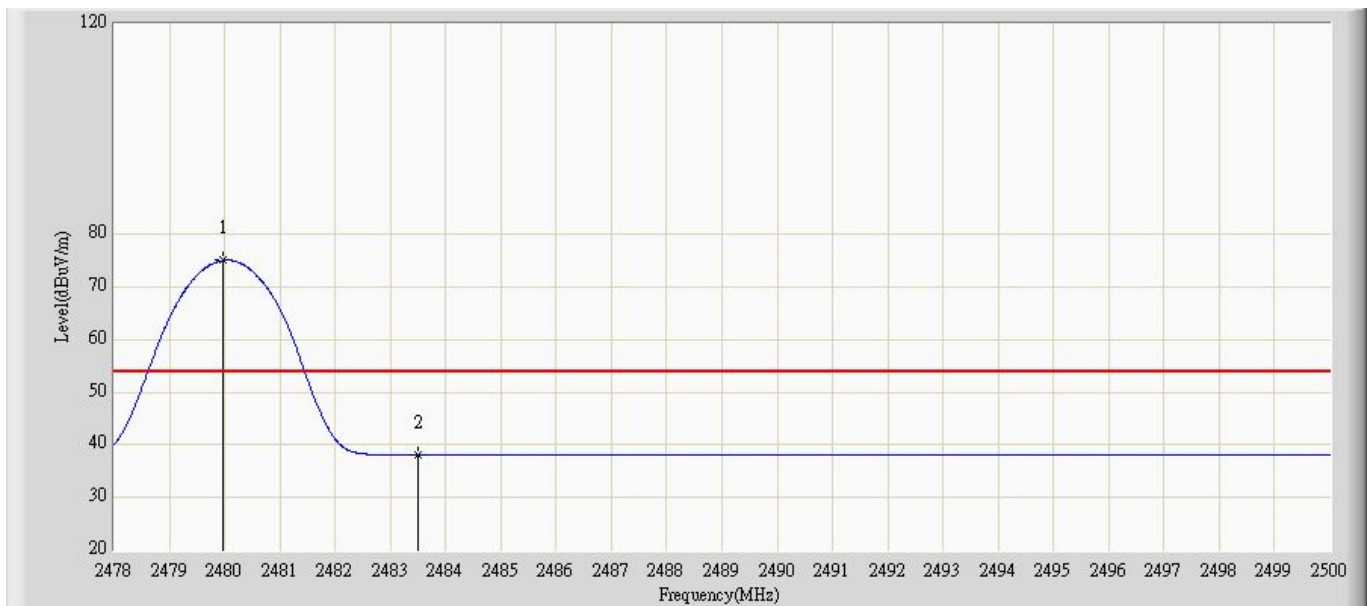
| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      | *    | 2479.980        | 82.908                 | 45.849               | N/A             | N/A            | 37.058 | AV   |
| 2  |      |      | 2483.500        | 39.150                 | 2.060                | -14.850         | 54.000         | 37.089 | AV   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:19 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Vertical       |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      | *    | 2479.969        | 83.741                 | 47.702               | N/A             | N/A            | 36.039 | PK   |
| 2  |      |      | 2483.500        | 50.596                 | 14.540               | -23.404         | 74.000         | 36.055 | PK   |

|                                         |                          |
|-----------------------------------------|--------------------------|
| Engineer: Milo                          |                          |
| Site: AC5                               | Time: 2012/11/11 - 14:21 |
| Limit: FCC_Part15.209_RE(3m)            | Margin: 0                |
| Probe: Horn_3117_988(1-18GHz)           | Polarity: Vertical       |
| EUT: 3D Active Glasses                  | Power: DC 3V             |
| Note: Mode1: Transmit at 2402MHz by DH5 |                          |



| No | Flag | Mark | Frequency (MHz) | Measure Level (dBuV/m) | Reading Level (dBuV) | Over Limit (dB) | Limit (dBuV/m) | Factor | Type |
|----|------|------|-----------------|------------------------|----------------------|-----------------|----------------|--------|------|
| 1  |      | *    | 2479.969        | 75.064                 | 39.025               | N/A             | N/A            | 36.039 | AV   |
| 2  |      |      | 2483.500        | 38.032                 | 1.976                | -15.968         | 54.000         | 36.055 | AV   |

## 7. Receiver Spurious Emission for Industry Canada RSS-Gen Requirement

### 7.1. Test Equipment

#### Radiated Emission / AC-2

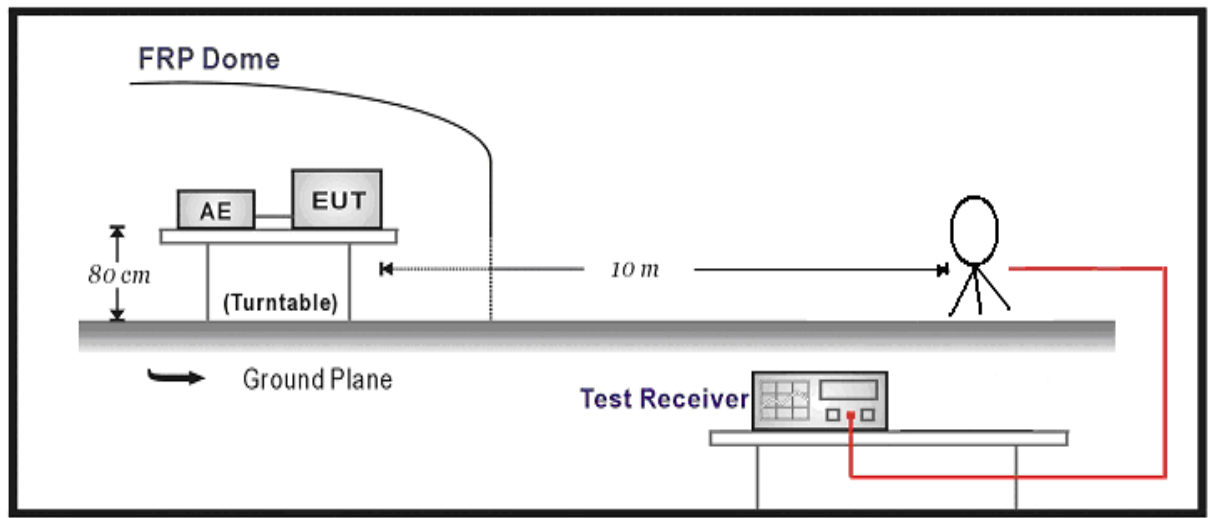
| Instrument                 | Manufacturer | Type No.     | Serial No. | Cal. Date  |
|----------------------------|--------------|--------------|------------|------------|
| EMI Test Receiver          | R&S          | ESCI         | 100573     | 2013.04.18 |
| Loop Antenna               | R&S          | HFH2-Z2      | 833799/003 | 2013.11.22 |
| Bilog Antenna              | Teseq GmbH   | CBL6112D     | 27611      | 2013.10.15 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC2-C      | 2013.03.02 |
| Temperature/Humidity Meter | Zhicheng     | ZC1-2        | AC2-TH     | 2013.01.10 |

#### Radiated Emission / AC-5

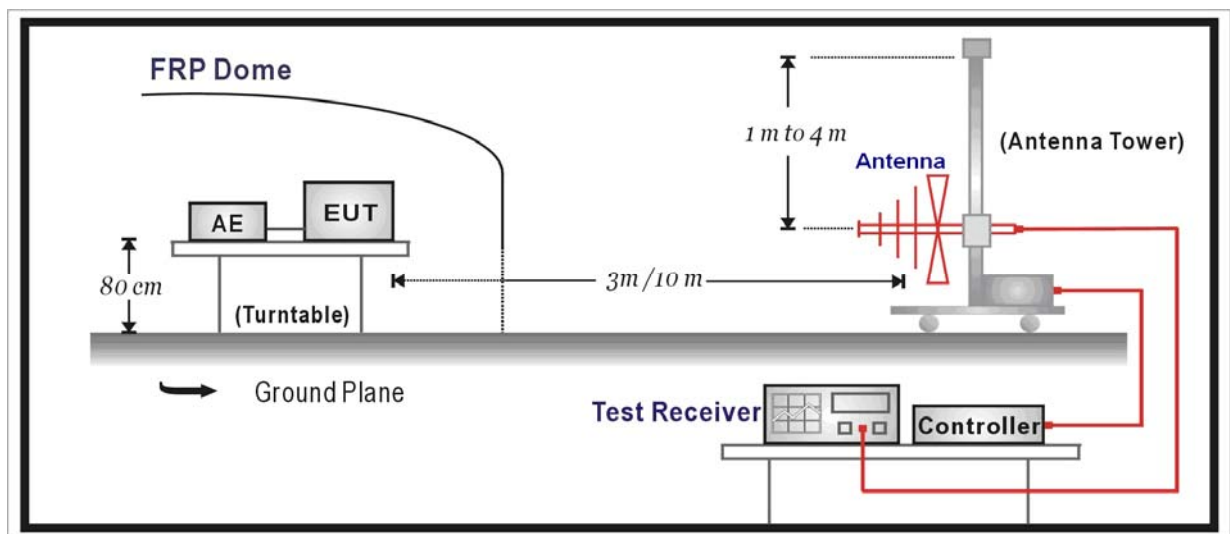
| Instrument                 | Manufacturer | Type No.     | Serial No.  | Cal. Date  |
|----------------------------|--------------|--------------|-------------|------------|
| Spectrum Analyzer          | Agilent      | N9010A       | MY48030494  | 2014.04.18 |
| Preamplifier               | Miteq        | NSP1800-25   | 1364185     | 2013.05.04 |
| Preamplifier               | Quietek      | AP-040G      | CHM-0906001 | 2013.05.04 |
| Bilog Antenna              | Teseq GmbH   | CBL6112D     | 27612       | 2013.10.15 |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9120D    | 499         | 2014.06.08 |
| Broad-Band Horn Antenna    | Schwarzbeck  | BBHA9170     | 294         | 2013.11.24 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC5-C1      | 2013.03.02 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 106 | AC5-C2      | 2013.03.02 |
| Coaxial Cable              | Huber+Suhner | SUCOFLEX 102 | AC5-C3      | 2013.03.02 |
| Temperature/Humidity Meter | Zhicheng     | ZC1-2        | AC5-TH      | 2013.01.10 |

## 7.2. Test Setup

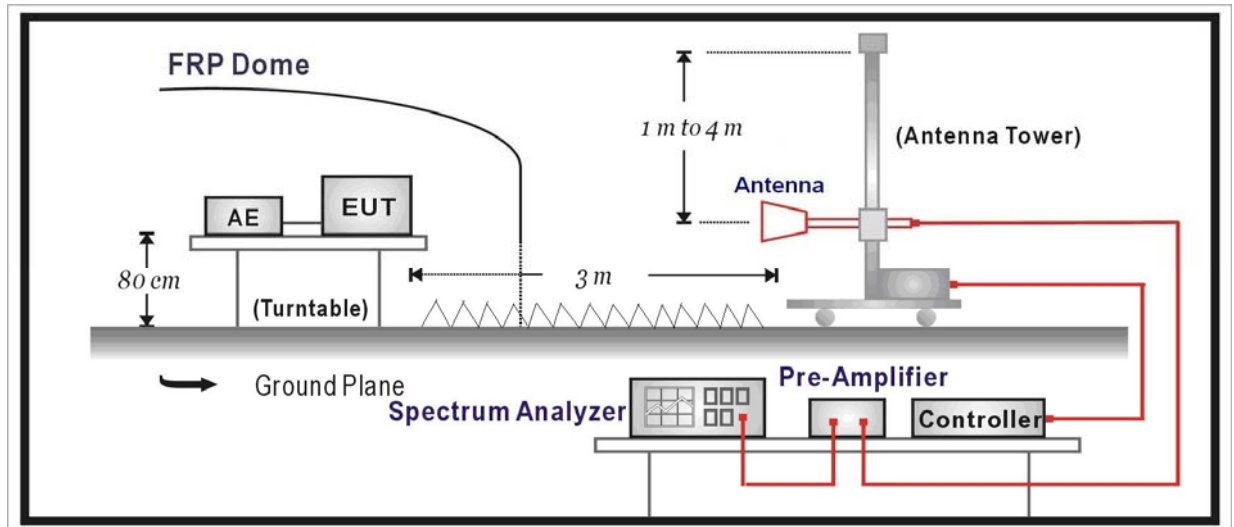
Below 30MHz Test Setup:



Below 1GHz Test Setup:



### Above 1GHz Test Setup:



### 7.3. Limit

| FCC Part 15 Subpart B Paragraph 15.109 |              |                |
|----------------------------------------|--------------|----------------|
| Frequency (MHz)                        | Distance (m) | Level (dBuV/m) |
| 30 - 88                                | 3            | 40             |
| 88 - 216                               | 3            | 43.5           |
| 216 - 960                              | 3            | 46             |
| Above 960                              | 3            | 54             |

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

Note 2: Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

Note 3: E field strength (dBuV/m) = 20 log E field strength (uV/m)

#### **7.4. Test Procedure**

According to ANSI C63.10: 2009.

The EUT is placed on a turn table which is 0.8 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.4: 2009 on radiated measurement.

The resolution bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

The frequency range from 9kHz to 10th harmonic is checked.

Note: When doing emission measurement above 1GHz, the horn antenna will be bended down a little (as horn antenna has the narrow beamwidth) in order to keeping the antenna in the "cone of radiation" of EUT. The 3dB beamwidth is 60~10 degrees for H-plane and 90~10 degrees for E-plane.

#### **7.5. Uncertainty**

The measurement uncertainty above 1G is defined as  $\pm 3.9$  dB

below 1G is defined as  $\pm 3.8$  dB

## 7.6. Test Result

All of the test result shown indicates the worst case, and spectrum analyzer parameters setting as shown below:

Peak detector: RBW = 1MHz, VBW = 3MHz, sweep time = 200ms;

Average detector: RBW = 1MHz, VBW = 10Hz, sweep time = auto.

Measure Level = Reading Level + Cable Loss + Antenna Factor - Preamplifier Gain

Mode 1: Receive-1Mbps (GFSK\_DH5)

| CH | Antenna | Frequency (MHz) | Reading Level (dBuV/m) | Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector |
|----|---------|-----------------|------------------------|-------------|------------------------|----------------|-------------|----------|
| 00 | H       | 301.6           | 5.7                    | 20.5        | 26.2                   | 46.0           | -19.8       | QP       |
|    | V       | 332.2           | 6.0                    | 21.4        | 27.4                   | 46.0           | -18.6       | QP       |
|    | H       | 415.5           | 5.2                    | 24.3        | 29.5                   | 46.0           | -16.5       | QP       |
|    | V       | 451.2           | 5.7                    | 24.2        | 29.9                   | 46.0           | -16.1       | QP       |
|    | H       | 2547.0          | 53.2                   | -10.2       | 43.0                   | 54(Note)       | -11.0       | PK       |
|    | V       | 2606.5          | 52.9                   | -10.7       | 42.2                   | 54(Note)       | -11.8       | PK       |
|    | H       | 5173.5          | 51.3                   | -7.4        | 43.9                   | 54(Note)       | -10.1       | PK       |
|    | V       | 6176.5          | 50.9                   | -5.6        | 45.3                   | 54(Note)       | -8.7        | PK       |
| 39 | H       | 315.1           | 5.7                    | 21.0        | 26.7                   | 46.0           | -19.3       | QP       |
|    | V       | 292.9           | 6.1                    | 20.2        | 26.3                   | 46.0           | -19.7       | QP       |
|    | H       | 495.7           | 5.2                    | 25.3        | 30.5                   | 46.0           | -15.5       | QP       |
|    | V       | 439.1           | 5.5                    | 24.2        | 29.7                   | 46.0           | -16.3       | QP       |
|    | H       | 2513.0          | 52.6                   | -10.0       | 42.6                   | 54(Note)       | -11.4       | PK       |
|    | V       | 2445.0          | 53.1                   | -11.3       | 41.8                   | 54(Note)       | -12.2       | PK       |
|    | H       | 4502.0          | 52.5                   | -8.0        | 44.5                   | 54(Note)       | -9.5        | PK       |
|    | V       | 4561.5          | 51.1                   | -8.2        | 42.9                   | 54(Note)       | -11.1       | PK       |
| 78 | H       | 424.3           | 6.2                    | 24.3        | 30.5                   | 46.0           | -15.5       | QP       |
|    | V       | 418.0           | 5.9                    | 24.3        | 30.2                   | 46.0           | -15.8       | QP       |
|    | H       | 530.6           | 5.8                    | 25.8        | 31.6                   | 46.0           | -14.4       | QP       |
|    | V       | 579.5           | 5.7                    | 26.7        | 32.4                   | 46.0           | -13.6       | QP       |
|    | H       | 2921.0          | 54.2                   | -10.4       | 43.8                   | 54(Note)       | -10.2       | PK       |
|    | V       | 3516.0          | 52.0                   | -9.4        | 42.6                   | 54(Note)       | -11.4       | PK       |
|    | H       | 6652.5          | 50.7                   | -4.3        | 46.4                   | 54(Note)       | -7.6        | PK       |
|    | V       | 5921.5          | 50.5                   | -6.0        | 44.5                   | 54(Note)       | -9.5        | PK       |

Note: This limit applies for using average detector, if the test result on peak is lower than average limit, then average measurement needn't be performed.