



# TEST REPORT

According to

**FCC CFR Title 47 Part 15 Subpart E(15.407)**  
**Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8**

|           |   |                                                                |
|-----------|---|----------------------------------------------------------------|
| Applicant | : | Matrix Sound Limited                                           |
| Address   | : | 95 High Street Hail Weston St Neots<br>Cambridgeshire PE19 5JS |
| Equipment | : | Wireless Transmitter                                           |
| Model No. | : | BlueAura Wireless Transmitter                                  |
| Trademark | : | <b>BLUE AURA</b>                                               |
| FCC ID    | : | OSY-WSTT                                                       |
| IC        | : | 1015A-WSTT                                                     |

- The test result refers exclusively to the test presented test model / sample.
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- The test report must not be used by the clients to claim product certification approval by **NVLAP** or any agency of the Government.



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[illegible]



# TEST REPORT

according to

**FCC CFR Title 47 Part 15 Subpart E(15.407)  
Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8**

|              |   |                                                                                                                                 |
|--------------|---|---------------------------------------------------------------------------------------------------------------------------------|
| Applicant    | : | Matrix Sound Limited                                                                                                            |
| Address      | : | 95 High Street Hail Weston St Neots<br>Cambridgeshire PE19 5JS                                                                  |
| Manufacturer | : | Solidex audio corp                                                                                                              |
| Address      | : | Room 202, Citic Concorde Bulding, No.556,<br>Chang Tai Road, Dong Cheng District, Dong<br>Guan City, Guang Dong Province, China |
| Equipment    | : | Wireless Transmitter                                                                                                            |
| Model No.    | : | BlueAura Wireless Transmitter                                                                                                   |
| Trademark    | : | <b>BLUE AURA</b>                                                                                                                |
| FCC ID       | : | OSY-WSTT                                                                                                                        |
| IC           | : | 1015A-WSTT                                                                                                                      |

I HEREBY CERTIFY THAT :

he measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4** The equipment was ***passed*** the test performed according to **FCC Rules and Regulations Part 15 Subpart E (15.407)& Industry Canada RSS-Gen Issue 3/RSS-210 Issue 8.**

The test was carried out on Sept. 30~Dec.19, 2013 at **Cerpass Technology Corp.**

Signature

Miro Chueh/ Technical director



## 1. Report of Measurements and Examinations

### 1.1. List of Measurements and Examinations

| APPLICABLE STANDARDS                 |             |
|--------------------------------------|-------------|
| STANDARD                             | TEST RESULT |
| FCC 47 CFR Part 15 Subpart E(15.407) | PASS        |
| Canada RSS-210: 2010                 | PASS        |



## 2. Test Configuration of Equipment under Test

### 2.1. Feature of Equipment under Test

|                       |                                                                                                  |
|-----------------------|--------------------------------------------------------------------------------------------------|
| Frequency Range       | 5180MHz~5240MHz                                                                                  |
| EUT Power Ratings     | 5Vdc Supplied by adapter                                                                         |
| Adapter Specification | Model:CPS008050100*<br>Input: 100-240V, 50/60Hz, 0.2A<br>Output: 5V $\overline{\text{---}}$ 1.0A |
| Antenna Specification | 5.2GHz with 2.0dBi (Chain 0 and Chain 1)                                                         |
| Modulation technology | QPSK/BPSK                                                                                        |

**Note:** 1. The EUT has two Chains. Chain 0 and Chain 1 transmit/receive independently.

2. For more details, please refer to the User's manual of the EUT.

### 2.2. Carrier Frequency of Channels

Operated in 5180MHz-5240MHz bands:

| Channel | Frequency(MHz) |
|---------|----------------|
| 01      | 5180           |
| 02      | 5210           |
| 03      | 5240           |

### 2.3. Test Manner

| Test Manner |                                                                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| a           | During testing, the interface cables and equipment positions were varied according to ANSI C63.4                                                                              |
| b           | The complete test system included EUT for RF test.                                                                                                                            |
| c           | Adjust the EUT at the test mode and the test channel. Then test.                                                                                                              |
| d           | The following test mode was performed for conduction and radiation test: <ul style="list-style-type: none"><li>• CH low :5180MHz, CH Mid: 5210MHz, CH High: 5240MHz</li></ul> |

### 2.4. Description of Test System

| No. | Device            | Manufacturer | Model No. | Description |
|-----|-------------------|--------------|-----------|-------------|
| 1   | iPod              | APPLE        | MA477TA/A | N/A         |
| 2   | Speaker ( Left )  | Solidex      | WS 90T    | N/A         |
| 3   | Speaker ( Right ) | Solidex      | WS 90T    | N/A         |
| 5   | Remote Control    | Solidex      | N/A       | N/A         |

The cable used

| No. | Cable       | Quantity | Description                     |
|-----|-------------|----------|---------------------------------|
| A   | Audio Cable | 1        | 1.5m Non Shielding without core |
| B   | USB Cable   | 1        | 1.2m Shielding with two core    |



## 2.5. General Information of Test

|                            |                                                                                                                                                                       |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test Site:                 | Cerpass Technology Corp.                                                                                                                                              |
| Performand Location :      | No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China                                                                                                  |
| NVLAP LAB Code :           | 200814-0                                                                                                                                                              |
| FCC Registration Number :  | 916572, 331395                                                                                                                                                        |
| IC Registration Number :   | 7290A-1, 7290A-2                                                                                                                                                      |
| VCCI Registration Number : | T-343 for Telecommunication Test<br>C-2919 for Conducted emission test<br>R-2670 for Radiated emission test below 1GHz<br>G-227 for Radiated emission test above 1GHz |

Laboratory accreditation



## 2.6. Measurement Uncertainty

| Measurement Item          | Measurement Frequency | Polarization | Uncertainty |
|---------------------------|-----------------------|--------------|-------------|
| Conducted Emission        | 9 kHz ~ 30 MHz        | LINE/NEUTRAL | ±2.71 dB    |
| Radiated Emission         | 30 MHz ~ 25GHz        | Vertical     | ±4.11 dB    |
|                           |                       | Horizontal   | ±4.10 dB    |
| Occupied Bandwidth        | ---                   | ---          | ±7500 Hz    |
| Maximum Peak Output Power | ---                   | ---          | ±1.4 dB     |
| Band Edges                | ---                   | ---          | ±2.2 dB     |
| Power Spectral Density    | ---                   | ---          | ±2.2 dB     |



### 3. Antenna Requirements

#### 3.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.



## 4. Test of Conducted Emission

### 4.1. Test Limit

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 KHz on the 120 VAC power and return leads of the EUT according to the methods defined in ANSI C63.4-2009 Section 3.1. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 2.2. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

| Frequency<br>(MHz) | Quasi Peak<br>(dB $\mu$ V) | Average<br>(dB $\mu$ V) |
|--------------------|----------------------------|-------------------------|
| 0.15 – 0.5         | 66-56*                     | 56-46*                  |
| 0.5 – 5.0          | 56                         | 46                      |
| 5.0 – 30.0         | 60                         | 50                      |

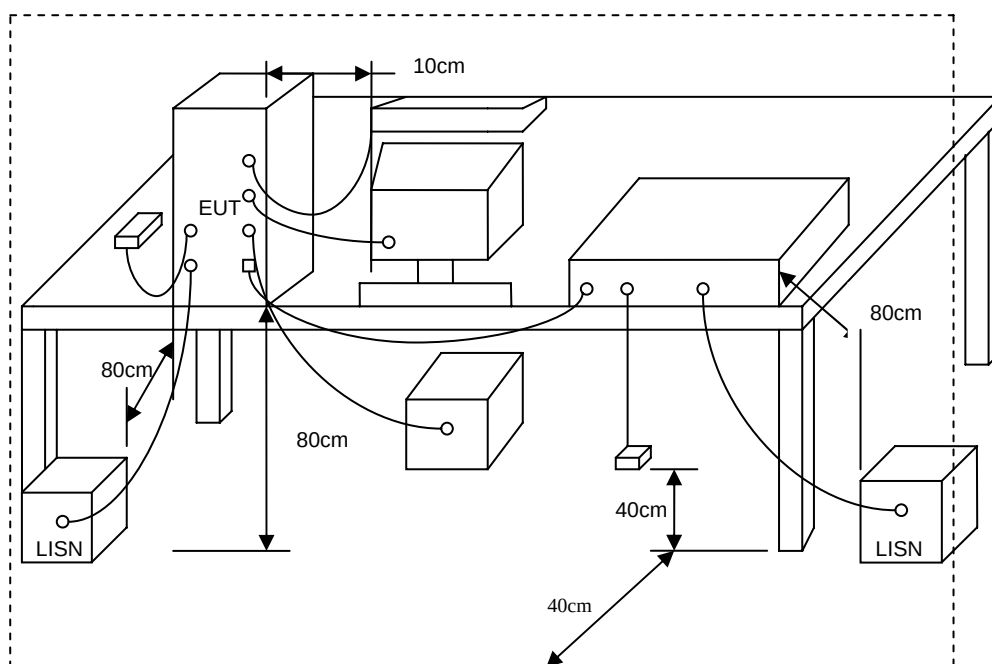
\*Decreases with the logarithm of the frequency.

### 4.2. Test Procedures

- The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
- Connect EUT to the power mains through a line impedance stabilization network (LISN).
- All the support units are connecting to the other LISN.
- The LISN provides 50 ohm coupling impedance for the measuring instrument.
- The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- Both sides of AC line were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched.
- Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



### 4.3. Typical Test Setup



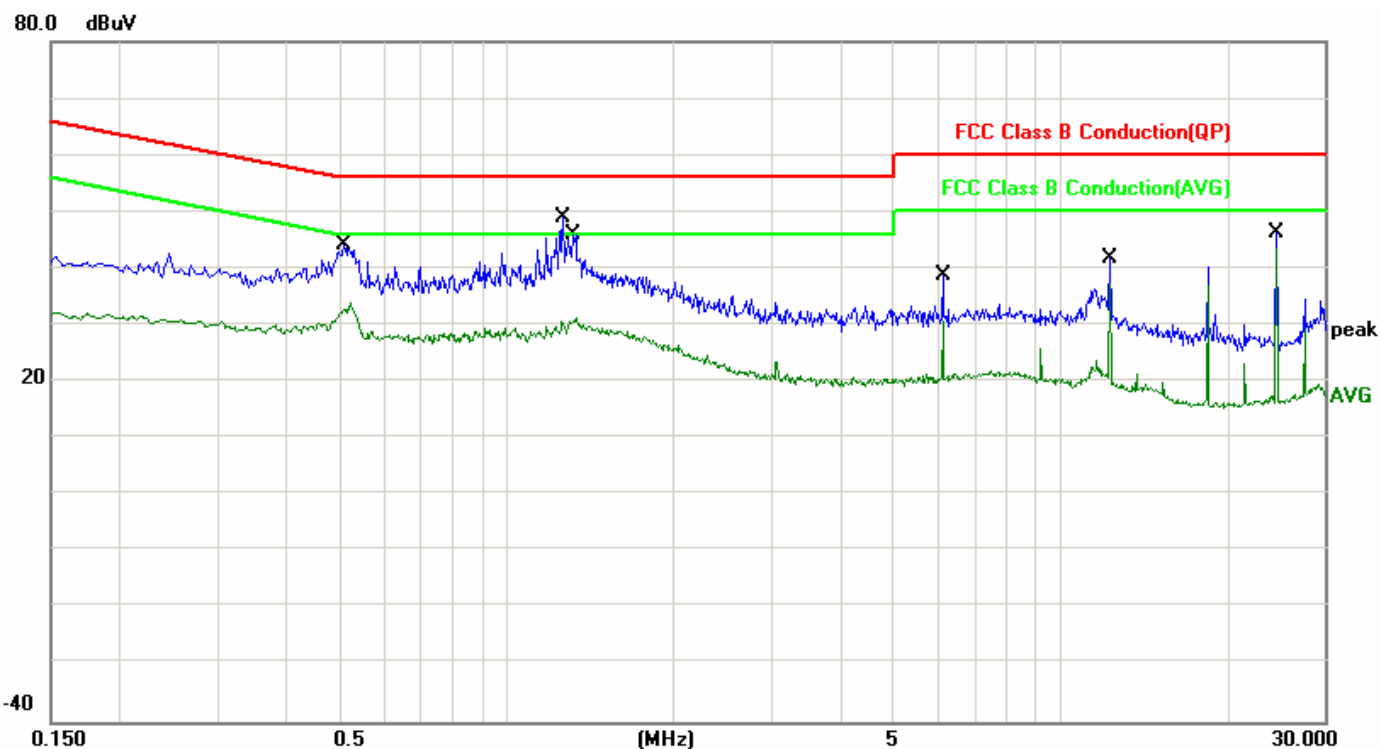
### 4.4. Measurement equipment

| Instrument/Ancillary        | Manufacturer | Model No.       | Serial No. | Calibration Date | Valid Date. |
|-----------------------------|--------------|-----------------|------------|------------------|-------------|
| Test Receiver               | R&S          | ESCI            | 100565     | 2013.03.10       | 2014.03.09  |
| AMN                         | R&S          | ESH2-Z5         | 100182     | 2013.09.11       | 2014.09.10  |
| Two-Line V-Network          | R&S          | ENV216          | 100325     | 2013.03.10       | 2014.03.09  |
| ISN                         | FCC          | FCC-TLISN-T2-02 | 20379      | 2013.06.25       | 2014.06.24  |
| ISN                         | FCC          | FCC-TLISN-T4-02 | 20380      | 2013.06.25       | 2014.06.24  |
| ISN                         | FCC          | FCC-TLISN-T8-02 | 20381      | 2013.07.09       | 2014.07.08  |
| ISN                         | TESEQ        | ISN ST08        | 30175      | 2013.09.11       | 2014.09.10  |
| Current Probe               | R&S          | EZ-17           | 100303     | 2013.03.10       | 2014.03.09  |
| Passive Voltage Probe       | R&S          | ESH2-Z3         | 100026     | 2013.03.10       | 2014.03.09  |
| Pulse Limiter               | R&S          | ESH3-Z2         | 100529     | 2013.03.10       | 2014.03.09  |
| Temperature/ Humidity Meter | Zhicheng     | ZC1-11          | CEP-TH-004 | 2013.03.10       | 2014.03.09  |



#### 4.5. Test Result and Data

|           |                |             |         |
|-----------|----------------|-------------|---------|
| Power     | : AC 120V/60Hz | Pol/Phase   | : LINE  |
| Test Mode | : Normal Link  | Temperature | : 25 °C |
| Memo      | :              | Humidity    | : 60 %  |



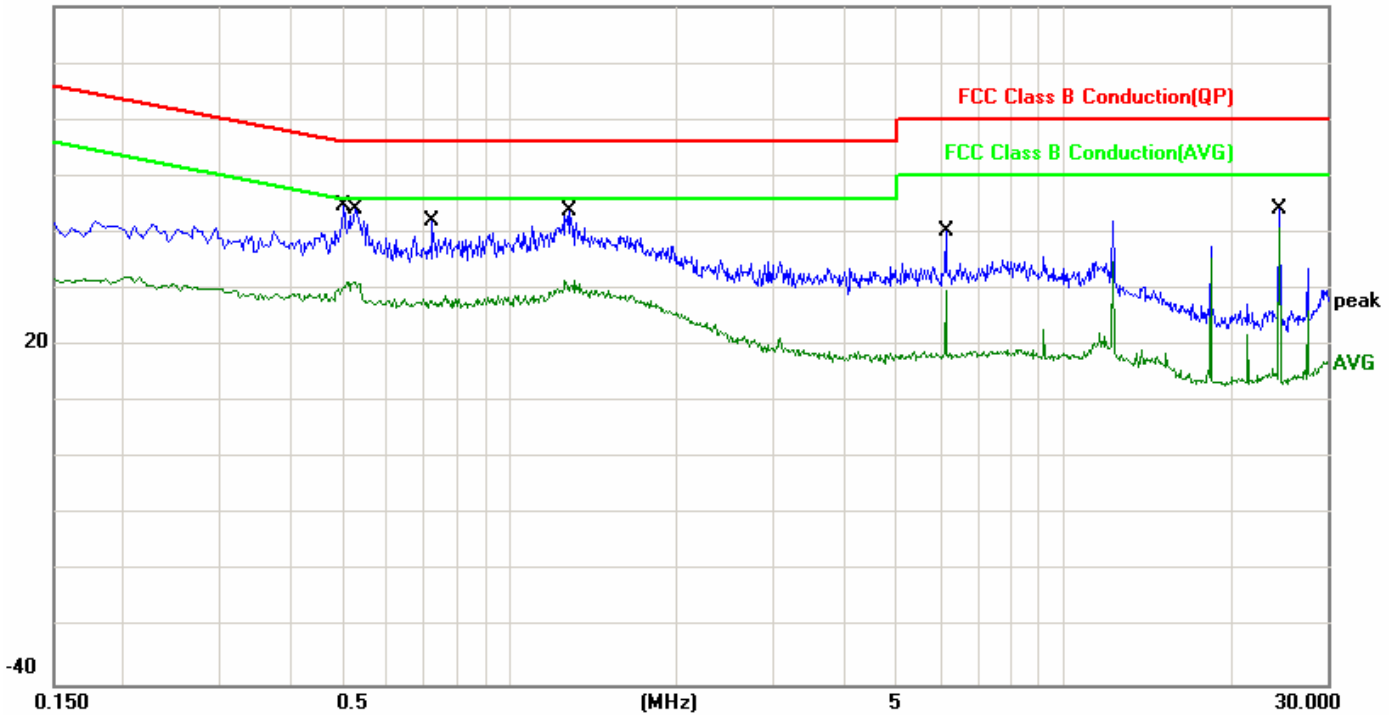
| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.5100          | 10.07       | 29.64          | 39.71        | 56.00        | -16.29      | QP       |
| 2   | 0.5100          | 10.07       | 22.84          | 32.91        | 46.00        | -13.09      | AVG      |
| 3   | 1.2660          | 10.11       | 26.74          | 36.85        | 56.00        | -19.15      | QP       |
| 4   | 1.2660          | 10.11       | 18.96          | 29.07        | 46.00        | -16.93      | AVG      |
| 5   | 1.3180          | 10.11       | 27.35          | 37.46        | 56.00        | -18.54      | QP       |
| 6   | 1.3180          | 10.11       | 19.82          | 29.93        | 46.00        | -16.07      | AVG      |
| 7   | 6.1460          | 10.23       | 25.78          | 36.01        | 60.00        | -23.99      | QP       |
| 8   | 6.1460          | 10.23       | 19.50          | 29.73        | 50.00        | -20.27      | AVG      |
| 9   | 12.2860         | 10.32       | 28.91          | 39.23        | 60.00        | -20.77      | QP       |
| 10  | 12.2860         | 10.32       | 26.24          | 36.56        | 50.00        | -13.44      | AVG      |
| 11  | 24.5780         | 10.46       | 33.57          | 44.03        | 60.00        | -15.97      | QP       |
| 12  | 24.5780         | 10.46       | 32.34          | 42.80        | 50.00        | -7.20       | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



|           |                |             |           |
|-----------|----------------|-------------|-----------|
| Power     | : AC 120V/60Hz | Pol/Phase   | : NEUTRAL |
| Test Mode | : Normal Link  | Temperature | : 25 °C   |
| Memo      | :              | Humidity    | : 60 %    |

80.0 dBuV



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|
| 1   | 0.5020          | 10.11       | 28.10          | 38.21        | 56.00        | -17.79      | QP       |
| 2   | 0.5020          | 10.11       | 20.07          | 30.18        | 46.00        | -15.82      | AVG      |
| 3   | 0.5260          | 10.12       | 29.01          | 39.13        | 56.00        | -16.87      | QP       |
| 4   | 0.5260          | 10.12       | 20.86          | 30.98        | 46.00        | -15.02      | AVG      |
| 5   | 0.7260          | 10.14       | 22.70          | 32.84        | 56.00        | -23.16      | QP       |
| 6   | 0.7260          | 10.14       | 17.24          | 27.38        | 46.00        | -18.62      | AVG      |
| 7   | 1.2860          | 10.16       | 26.37          | 36.53        | 56.00        | -19.47      | QP       |
| 8   | 1.2860          | 10.16       | 19.81          | 29.97        | 46.00        | -16.03      | AVG      |
| 9   | 6.1460          | 10.27       | 26.06          | 36.33        | 60.00        | -23.67      | QP       |
| 10  | 6.1460          | 10.27       | 17.67          | 27.94        | 50.00        | -22.06      | AVG      |
| 11  | 24.5780         | 10.47       | 32.42          | 42.89        | 60.00        | -17.11      | QP       |
| 12  | 24.5780         | 10.47       | 30.62          | 41.09        | 50.00        | -8.91       | AVG      |

Note: Measurement Level = Reading Level + Correct Factor



## 5. Test of Radiated Emission

### 5.1. Test Limit

According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

| Frequency (MHz) | Distance Meters | Radiated ( $\mu V / M$ ) | Radiated (dB $\mu V / M$ ) |
|-----------------|-----------------|--------------------------|----------------------------|
| 30-88           | 3               | 100                      | 40.0                       |
| 88-216          | 3               | 150                      | 43.5                       |
| 216-960         | 3               | 200                      | 46.0                       |
| Above 960       | 3               | 500                      | 54.0                       |

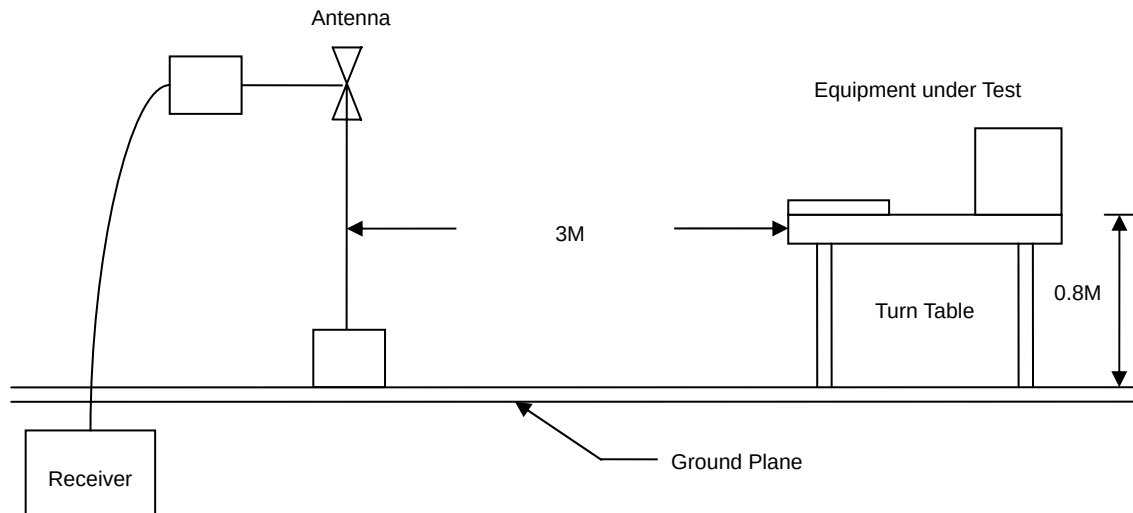
### 5.2. Test Procedures

- The EUT was placed on a rotatable table top 0.8 meter above ground.
- The EUT was set 3 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- The table was rotated 360 degrees to determine the position of the highest radiation.
- The antenna is a broadband antenna and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- Set the test-receiver system to Peak or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.
- For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

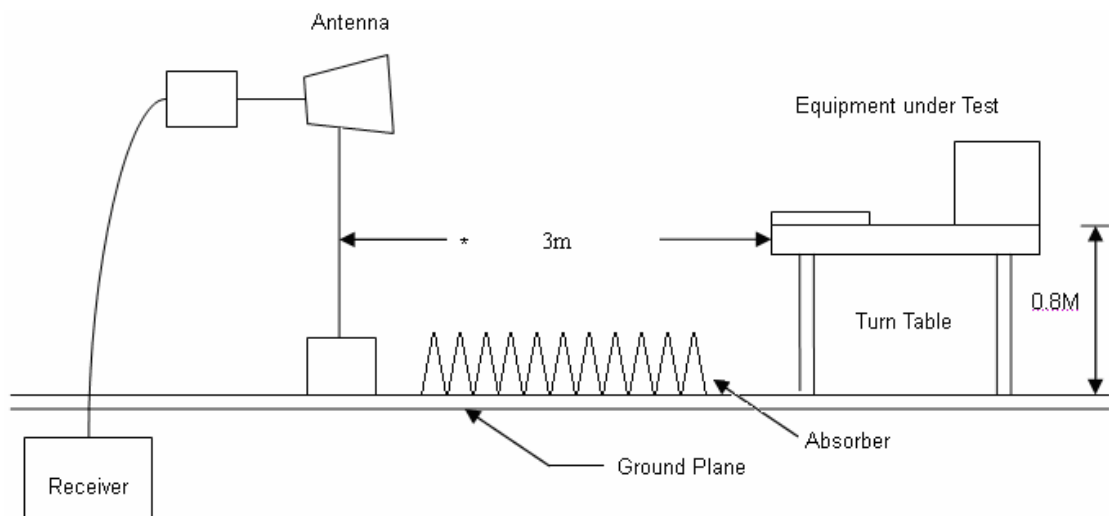


### 5.3. Typical Test Setup

#### Below 1GHz Test Setup



#### Above 1GHz Test Setup



**5.4. Measurement Equipment**

| Instrument                     | Model No.   | Manufacturer | Serial No. | Calibration Date | Valid Date |
|--------------------------------|-------------|--------------|------------|------------------|------------|
| EMI Test Receiver              | R&S         | ESCI         | 100563     | 2013.03.10       | 2014.03.09 |
| H64 Preamplifier               | HP          | 8447F        | 3113A05582 | 2013.03.10       | 2014.03.09 |
| Preamplifier                   | Agilent     | 8449B        | 3008A02342 | 2013.03.10       | 2014.03.09 |
| Ultra Broadband Antenna        | R&S         | HL562        | 100362     | 2013.05.03       | 2014.05.02 |
| Broad-Band Horn Antenna        | Schwarzbeck | BBHA9120D    | 9120D-619  | 2013.05.03       | 2014.05.02 |
| Broad-Band Horn Antenna        | Schwarzbeck | BBHA9170     | 9170-347   | 2013.05.15       | 2014.05.15 |
| Spectrum Analyzer              | R&S         | FSP40        | 100324     | 2013.03.10       | 2014.03.09 |
| Temperature/<br>Humidity Meter | Zhicheng    | ZC1-11       | CEP-TH-002 | 2013.03.10       | 2014.03.09 |



## 5.5. Test Result and Data

### Transmitter

### Under 1GHz

|                            |                              |
|----------------------------|------------------------------|
| Site : EMC Lab AC 102      | Time : 2013-12-17            |
| Limit : FCC_CLASS_B_03M_QP | Margin : 6                   |
| Test mode: Normal link     | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz       |                              |

| Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|---------------|----------------|----------------|----------------|-------------|--------------------|--------|
| 364.6500        | -16.60        | 61.11          | 44.51          | 46.00          | -1.49       | V                  | QP     |
| 416.3833        | -15.36        | 59.89          | 44.53          | 46.00          | -1.47       | V                  | QP     |
| 519.8500        | -13.15        | 57.67          | 44.52          | 46.00          | -1.48       | V                  | QP     |
| 573.2000        | -12.51        | 57.29          | 44.78          | 46.00          | -1.22       | V                  | QP     |
| 730.0167        | -11.16        | 55.79          | 44.63          | 46.00          | -1.37       | V                  | QP     |
| 885.2167        | -9.40         | 53.91          | 44.51          | 46.00          | -1.49       | V                  | QP     |
|                 |               |                |                |                |             |                    |        |
| 312.9166        | -18.26        | 59.97          | 41.71          | 46.00          | -4.29       | H                  | QP     |
| 364.6500        | -16.60        | 61.24          | 44.64          | 46.00          | -1.36       | H                  | QP     |
| 416.3833        | -15.36        | 58.05          | 42.69          | 46.00          | -3.31       | H                  | QP     |
| 521.4667        | -13.14        | 57.75          | 44.61          | 46.00          | -1.39       | H                  | QP     |
| 833.4833        | -9.68         | 51.95          | 42.27          | 46.00          | -3.73       | H                  | QP     |
| 885.2167        | -9.40         | 50.31          | 40.91          | 46.00          | -5.09       | H                  | QP     |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Above 1GHz****Chain 0**

|                                 |                              |
|---------------------------------|------------------------------|
| Site : EMC Lab AC 102           | Time : 2013-10-17            |
| Limit : FCC CLASS B 03M_QP      | Margin : 6                   |
| Test mode: Transmit by 5180 MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz            |                              |

|   | Frequency<br>(MHz) | Correct<br>Factor<br>(dB) | Reading<br>Level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Margin<br>(dB) | Limit<br>(dBuV/m) | Detector<br>Type | Antenna<br>Pole<br>(V/H) |
|---|--------------------|---------------------------|----------------------------|------------------------------|----------------|-------------------|------------------|--------------------------|
| 1 | 10365.07           | 18.28                     | 36.07                      | 54.35                        | -19.65         | 74.00             | PEAK             | V                        |
| 2 | 10365.07           | 18.28                     | 24.24                      | 42.52                        | -11.48         | 54.00             | AVG              | V                        |
|   |                    |                           |                            |                              |                |                   |                  |                          |
| 1 | 10365.07           | 18.28                     | 32.26                      | 50.54                        | -23.46         | 74.00             | PEAK             | H                        |
| 2 | 10365.07           | 18.28                     | 20.15                      | 38.43                        | -15.57         | 54.00             | AVG              | H                        |

Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-10-17            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Transmit by 5210MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency<br>(MHz) | Correct<br>Factor<br>(dB) | Reading<br>Level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Margin<br>(dB) | Limit<br>(dBuV/m) | Detector<br>Type | Antenna<br>Pole<br>(V/H) |
|---|--------------------|---------------------------|----------------------------|------------------------------|----------------|-------------------|------------------|--------------------------|
| 1 | 10420.33           | 19.08                     | 30.26                      | 49.34                        | -24.66         | 74.00             | PEAK             | V                        |
| 2 | 10420.33           | 19.08                     | 18.15                      | 37.23                        | -16.77         | 54.00             | AVG              | V                        |
|   |                    |                           |                            |                              |                |                   |                  |                          |
| 1 | 10420.38           | 19.08                     | 29.3                       | 48.38                        | -25.62         | 74.00             | PEAK             | H                        |
| 2 | 10420.38           | 19.08                     | 17.16                      | 36.24                        | -17.76         | 54.00             | AVG              | H                        |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-10-17            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Transmit by 5240MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency<br>(MHz) | Correct<br>Factor<br>(dB) | Reading<br>Level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Margin<br>(dB) | Limit<br>(dBuV/m) | Detector<br>Type | Antenna<br>Pole<br>(V/H) |
|---|--------------------|---------------------------|----------------------------|------------------------------|----------------|-------------------|------------------|--------------------------|
| 1 | 10480.14           | 19.95                     | 31.26                      | 51.21                        | -22.79         | 74.00             | PEAK             | V                        |
| 2 | 10480.14           | 19.95                     | 19.13                      | 39.08                        | -14.92         | 54.00             | AVG              | V                        |
|   |                    |                           |                            |                              |                |                   |                  |                          |
| 1 | 10480.14           | 19.95                     | 27.48                      | 47.43                        | -26.57         | 74.00             | PEAK             | H                        |
| 2 | 10480.14           | 19.95                     | 14.66                      | 34.61                        | -19.39         | 54.00             | AVG              | H                        |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Chain 1**

|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-10-18            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Transmit by 5180MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|--------------------|
| 1 | 10365.07        | 18.28               | 32.44                | 53.72                  | -20.28      | 74.00          | PEAK          | V                  |
| 2 | 10365.07        | 18.28               | 22.68                | 40.96                  | -13.04      | 54.00          | AVG           | V                  |
|   |                 |                     |                      |                        |             |                |               |                    |
| 1 | 10365.07        | 18.28               | 33.41                | 51.69                  | -22.31      | 74.00          | PEAK          | H                  |
| 2 | 10365.07        | 18.28               | 21.57                | 39.85                  | -14.15      | 54.00          | AVG           | H                  |

**Note:**

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-10-18            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Transmit by 5210MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency<br>(MHz) | Correct<br>Factor<br>(dB) | Reading<br>Level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Margin<br>(dB) | Limit<br>(dBuV/m) | Detector<br>Type | Antenna<br>Pole<br>(V/H) |
|---|--------------------|---------------------------|----------------------------|------------------------------|----------------|-------------------|------------------|--------------------------|
| 1 | 10420.38           | 19.08                     | 33.59                      | 52.67                        | -21.33         | 74.00             | PEAK             | V                        |
| 2 | 10420.38           | 19.08                     | 21.15                      | 40.23                        | -13.77         | 54.00             | AVG              | V                        |
|   |                    |                           |                            |                              |                |                   |                  |                          |
| 1 | 10420.38           | 19.08                     | 31.12                      | 50.2                         | -23.8          | 74.00             | PEAK             | H                        |
| 2 | 10420.38           | 19.08                     | 19.39                      | 38.47                        | -15.53         | 54.00             | AVG              | H                        |

**Note:**

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-10-18            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Transmit by 5240MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency<br>(MHz) | Correct<br>Factor<br>(dB) | Reading<br>Level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Margin<br>(dB) | Limit<br>(dBuV/m) | Detector<br>Type | Antenna<br>Pole<br>(V/H) |
|---|--------------------|---------------------------|----------------------------|------------------------------|----------------|-------------------|------------------|--------------------------|
| 1 | 10480.14           | 19.95                     | 30.54                      | 50.49                        | -23.51         | 74.00             | PEAK             | V                        |
| 2 | 10480.14           | 19.95                     | 18.89                      | 38.84                        | -15.16         | 54.00             | AVG              | V                        |
|   |                    |                           |                            |                              |                |                   |                  |                          |
| 1 | 10480.14           | 19.95                     | 26.26                      | 46.21                        | -27.79         | 74.00             | PEAK             | H                        |
| 2 | 10480.14           | 19.95                     | 14.47                      | 34.42                        | -19.58         | 54.00             | AVG              | H                        |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Receiver  
Under 1GHz**

|                            |                              |
|----------------------------|------------------------------|
| Site : EMC Lab AC 102      | Time : 2013-12-19            |
| Limit : FCC_CLASS_B_03M_QP | Margin : 6                   |
| Test mode: Normal link     | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz       |                              |

| Frequency (MHz) | Factor (dB/m) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Antenna Pole (V/H) | Remark |
|-----------------|---------------|----------------|----------------|----------------|-------------|--------------------|--------|
| 36.7900         | -9.07         | 43.31          | 34.24          | 40.00          | -5.76       | V                  | QP     |
| 61.0400         | -17.25        | 52.70          | 35.45          | 40.00          | -4.55       | V                  | QP     |
| 85.2900         | -13.47        | 52.79          | 39.32          | 40.00          | -0.68       | V                  | QP     |
| 110.5100        | -9.92         | 45.91          | 35.99          | 43.50          | -7.51       | V                  | QP     |
| 134.7600        | -10.74        | 44.91          | 34.17          | 43.50          | -9.33       | V                  | QP     |
| 159.0100        | -13.05        | 43.29          | 30.24          | 43.50          | -13.26      | V                  | QP     |
| 85.2900         | -13.47        | 50.05          | 36.58          | 40.00          | -3.42       | H                  | QP     |
| 110.5100        | -9.92         | 52.56          | 42.64          | 43.50          | -0.86       | H                  | QP     |
| 134.7600        | -10.74        | 51.95          | 41.21          | 43.50          | -2.29       | H                  | QP     |
| 159.0100        | -13.05        | 52.39          | 39.34          | 43.50          | -4.16       | H                  | QP     |
| 184.2300        | -11.83        | 48.66          | 36.83          | 43.50          | -6.67       | H                  | QP     |
| 208.4800        | -10.19        | 43.64          | 33.45          | 43.50          | -10.05      | H                  | QP     |

**Note:**

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor

**Above 1GHz****Chain 0**

|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Receive by 5180 MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 53.28                | -8.06               | 45.22                  | 74.00          | -28.78      | PEAK          | V                  |
| 2 | 2388.3333       | 49.24                | -6.61               | 42.63                  | 74.00          | -31.37      | PEAK          | V                  |
| 3 | 3436.6667       | 47.31                | -3.82               | 43.49                  | 74.00          | -30.51      | PEAK          | V                  |
| 4 | 4995.0000       | 45.10                | 1.30                | 46.40                  | 74.00          | -27.60      | PEAK          | V                  |
| 5 | 5278.3333       | 45.63                | 1.54                | 47.17                  | 74.00          | -26.83      | PEAK          | V                  |
| 6 | 6185.0000       | 45.66                | 3.64                | 49.30                  | 74.00          | -24.70      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1396.6667       | 48.65                | -7.84               | 40.81                  | 74.00          | -33.19      | PEAK          | H                  |
| 2 | 3465.0000       | 46.40                | -3.68               | 42.72                  | 74.00          | -31.28      | PEAK          | H                  |
| 3 | 4541.6667       | 45.82                | -0.56               | 45.26                  | 74.00          | -28.74      | PEAK          | H                  |
| 4 | 4966.6667       | 46.21                | 1.17                | 47.38                  | 74.00          | -26.62      | PEAK          | H                  |
| 5 | 5958.3333       | 44.53                | 3.03                | 47.56                  | 74.00          | -26.44      | PEAK          | H                  |
| 6 | 6383.3333       | 44.87                | 4.21                | 49.08                  | 74.00          | -24.92      | PEAK          | H                  |

**Note:**

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                               |                              |
|-------------------------------|------------------------------|
| Site : EMC Lab AC 102         | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP    | Margin : 6                   |
| Test mode: Receive by 5210MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz          |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 54.37                | -8.06               | 46.31                  | 74.00          | -27.69      | PEAK          | V                  |
| 2 | 2388.3333       | 50.13                | -6.61               | 43.52                  | 74.00          | -30.48      | PEAK          | V                  |
| 3 | 3436.6667       | 47.03                | -3.82               | 43.21                  | 74.00          | -30.79      | PEAK          | V                  |
| 4 | 4258.3333       | 45.89                | -1.36               | 44.53                  | 74.00          | -29.47      | PEAK          | V                  |
| 5 | 5901.6667       | 46.09                | 2.94                | 49.03                  | 74.00          | -24.97      | PEAK          | V                  |
| 6 | 6893.3333       | 45.13                | 5.82                | 50.95                  | 74.00          | -23.05      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1425.0000       | 48.69                | -7.94               | 40.75                  | 74.00          | -33.25      | PEAK          | H                  |
| 2 | 2785.0000       | 47.36                | -5.10               | 42.26                  | 74.00          | -31.74      | PEAK          | H                  |
| 3 | 3181.6667       | 46.94                | -4.10               | 42.84                  | 74.00          | -31.16      | PEAK          | H                  |
| 4 | 4456.6667       | 45.27                | -0.72               | 44.55                  | 74.00          | -29.45      | PEAK          | H                  |
| 5 | 5250.0000       | 45.53                | 1.54                | 47.07                  | 74.00          | -26.93      | PEAK          | H                  |
| 6 | 5533.3333       | 45.48                | 1.79                | 47.27                  | 74.00          | -26.73      | PEAK          | H                  |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                               |                              |
|-------------------------------|------------------------------|
| Site : EMC Lab AC 102         | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP    | Margin : 6                   |
| Test mode: Receive by 5240MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz          |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 54.34                | -8.06               | 46.28                  | 74.00          | -27.72      | PEAK          | V                  |
| 2 | 2388.3333       | 51.13                | -6.61               | 44.52                  | 74.00          | -29.48      | PEAK          | V                  |
| 3 | 3323.3333       | 47.32                | -4.03               | 43.29                  | 74.00          | -30.71      | PEAK          | V                  |
| 4 | 4315.0000       | 45.05                | -1.14               | 43.91                  | 74.00          | -30.09      | PEAK          | V                  |
| 5 | 5901.6667       | 45.27                | 2.94                | 48.21                  | 74.00          | -25.79      | PEAK          | V                  |
| 6 | 6185.0000       | 44.90                | 3.64                | 48.54                  | 74.00          | -25.46      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1340.0000       | 48.56                | -8.10               | 40.46                  | 74.00          | -33.54      | PEAK          | H                  |
| 2 | 2671.6667       | 47.97                | -5.55               | 42.42                  | 74.00          | -31.58      | PEAK          | H                  |
| 3 | 3181.6667       | 47.37                | -4.10               | 43.27                  | 74.00          | -30.73      | PEAK          | H                  |
| 4 | 3748.3333       | 46.50                | -2.62               | 43.88                  | 74.00          | -30.12      | PEAK          | H                  |
| 5 | 4513.3333       | 45.59                | -0.62               | 44.97                  | 74.00          | -29.03      | PEAK          | H                  |
| 6 | 5108.3333       | 45.50                | 1.44                | 46.94                  | 74.00          | -27.06      | PEAK          | H                  |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



## Chain 1

|                                |                              |
|--------------------------------|------------------------------|
| Site : EMC Lab AC 102          | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP     | Margin : 6                   |
| Test mode: Receive by 5180 MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz           |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 52.58                | -8.06               | 44.52                  | 74.00          | -29.48      | PEAK          | V                  |
| 2 | 2388.3333       | 50.13                | -6.61               | 43.52                  | 74.00          | -30.48      | PEAK          | V                  |
| 3 | 3351.6667       | 47.40                | -4.02               | 43.38                  | 74.00          | -30.62      | PEAK          | V                  |
| 4 | 4853.3333       | 44.91                | 0.65                | 45.56                  | 74.00          | -28.44      | PEAK          | V                  |
| 5 | 5760.0000       | 45.26                | 2.61                | 47.87                  | 74.00          | -26.13      | PEAK          | V                  |
| 6 | 6836.6667       | 45.92                | 5.62                | 51.54                  | 74.00          | -22.46      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1453.3333       | 49.58                | -8.06               | 41.52                  | 74.00          | -32.48      | PEAK          | H                  |
| 2 | 2671.6667       | 47.81                | -5.55               | 42.26                  | 74.00          | -31.74      | PEAK          | H                  |
| 3 | 3351.6667       | 47.62                | -4.02               | 43.60                  | 74.00          | -30.40      | PEAK          | H                  |
| 4 | 3833.3333       | 46.77                | -2.50               | 44.27                  | 74.00          | -29.73      | PEAK          | H                  |
| 5 | 5505.0000       | 45.48                | 1.74                | 47.22                  | 74.00          | -26.78      | PEAK          | H                  |
| 6 | 5845.0000       | 45.82                | 2.85                | 48.67                  | 74.00          | -25.33      | PEAK          | H                  |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                               |                              |
|-------------------------------|------------------------------|
| Site : EMC Lab AC 102         | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP    | Margin : 6                   |
| Test mode: Receive by 5210MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz          |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 53.51                | -8.06               | 45.45                  | 74.00          | -28.55      | PEAK          | V                  |
| 2 | 2388.3333       | 49.56                | -6.61               | 42.95                  | 74.00          | -31.05      | PEAK          | V                  |
| 3 | 3805.0000       | 46.62                | -2.49               | 44.13                  | 74.00          | -29.87      | PEAK          | V                  |
| 4 | 4428.3333       | 45.81                | -0.77               | 45.04                  | 74.00          | -28.96      | PEAK          | V                  |
| 5 | 5901.6667       | 45.29                | 2.94                | 48.23                  | 74.00          | -25.77      | PEAK          | V                  |
| 6 | 7120.0000       | 45.57                | 6.96                | 52.53                  | 74.00          | -21.47      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1425.0000       | 48.62                | -7.94               | 40.68                  | 74.00          | -33.32      | PEAK          | H                  |
| 2 | 3351.6667       | 47.24                | -4.02               | 43.22                  | 74.00          | -30.78      | PEAK          | H                  |
| 3 | 4315.0000       | 45.98                | -1.14               | 44.84                  | 74.00          | -29.16      | PEAK          | H                  |
| 4 | 4938.3333       | 46.13                | 1.04                | 47.17                  | 74.00          | -26.83      | PEAK          | H                  |
| 5 | 5278.3333       | 45.57                | 1.54                | 47.11                  | 74.00          | -26.89      | PEAK          | H                  |
| 6 | 6043.3333       | 45.51                | 3.22                | 48.73                  | 74.00          | -25.27      | PEAK          | H                  |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



|                               |                              |
|-------------------------------|------------------------------|
| Site : EMC Lab AC 102         | Time : 2013-12-18            |
| Limit : FCC CLASS B 03M_QP    | Margin : 6                   |
| Test mode: Receive by 5240MHz | Probe : VERTICAL/ HORIZONTAL |
| Power : AC 120V/60Hz          |                              |

|   | Frequency (MHz) | Reading Level (dBuV) | Correct Factor (dB) | Measure Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector Type | Antenna Pole (V/H) |
|---|-----------------|----------------------|---------------------|------------------------|----------------|-------------|---------------|--------------------|
| 1 | 1453.3333       | 53.46                | -8.06               | 45.40                  | 74.00          | -28.60      | PEAK          | V                  |
| 2 | 2388.3333       | 49.90                | -6.61               | 43.29                  | 74.00          | -30.71      | PEAK          | V                  |
| 3 | 3748.3333       | 46.30                | -2.62               | 43.68                  | 74.00          | -30.32      | PEAK          | V                  |
| 4 | 4938.3333       | 46.38                | 1.04                | 47.42                  | 74.00          | -26.58      | PEAK          | V                  |
| 5 | 5901.6667       | 45.11                | 2.94                | 48.05                  | 74.00          | -25.95      | PEAK          | V                  |
| 6 | 6156.6667       | 44.80                | 3.55                | 48.35                  | 74.00          | -25.65      | PEAK          | V                  |
|   |                 |                      |                     |                        |                |             |               |                    |
| 1 | 1226.6667       | 49.92                | -8.61               | 41.31                  | 74.00          | -32.69      | PEAK          | H                  |
| 2 | 2870.0000       | 47.49                | -4.76               | 42.73                  | 74.00          | -31.27      | PEAK          | H                  |
| 3 | 3720.0000       | 45.79                | -2.70               | 43.09                  | 74.00          | -30.91      | PEAK          | H                  |
| 4 | 4456.6667       | 45.30                | -0.72               | 44.58                  | 74.00          | -29.42      | PEAK          | H                  |
| 5 | 5108.3333       | 45.41                | 1.44                | 46.85                  | 74.00          | -27.15      | PEAK          | H                  |
| 6 | 6326.6667       | 44.62                | 4.05                | 48.67                  | 74.00          | -25.33      | PEAK          | H                  |

## Note:

1. All Readings below 1GHz are Quasi-Peak, above are performed with peak and/or average measurements as necessary.
2. Measurement Level = Reading Level + Correct Factor



## 6. 99% And 26dB Bandwidth Measurement Data

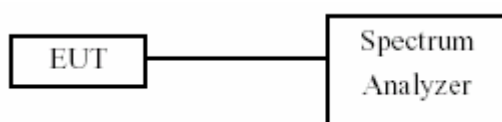
### 6.1. Test Limit

According to §15.303(c), for purposes of this subpart the emission bandwidth shall be determined by measuring the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, that are 26 dB down relative to the maximum level of the modulated carrier. Compliance with the emissions limits is based on the use of measurement instrumentation employing a peak detector function with an instrument resolutions bandwidth approximately equal to 1.0 percent of the emission bandwidth of the device under measurement.

### 6.2. Test Procedures

1. Place the EUT on the table and set it in the transmitting mode.
2. Remove the antenna from the EUT and then connect a low-loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as RBW > 1%EBW, VBW > RBW, Span >26dB bandwidth, and Sweep = auto.
4. Mark the peak frequency and -26dB (upper and lower) frequency.
5. Repeat until all the rest channels were investigated.

### 6.3. Test Setup Layout



### 6.4. Measurement equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2012.03.10       | 2014.03.09 |



## 6.5. Test Result and Data

Test Date: 2013-09-30

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 55%

### Chain 0

| Channel | Frequency (MHz) | -26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|-----------------------|------------------------------|
| Low     | 5180            | 21.064                | 13.9695                      |
| Mid     | 5210            | 21.300                | 13.8384                      |
| High    | 5240            | 21.136                | 13.7373                      |

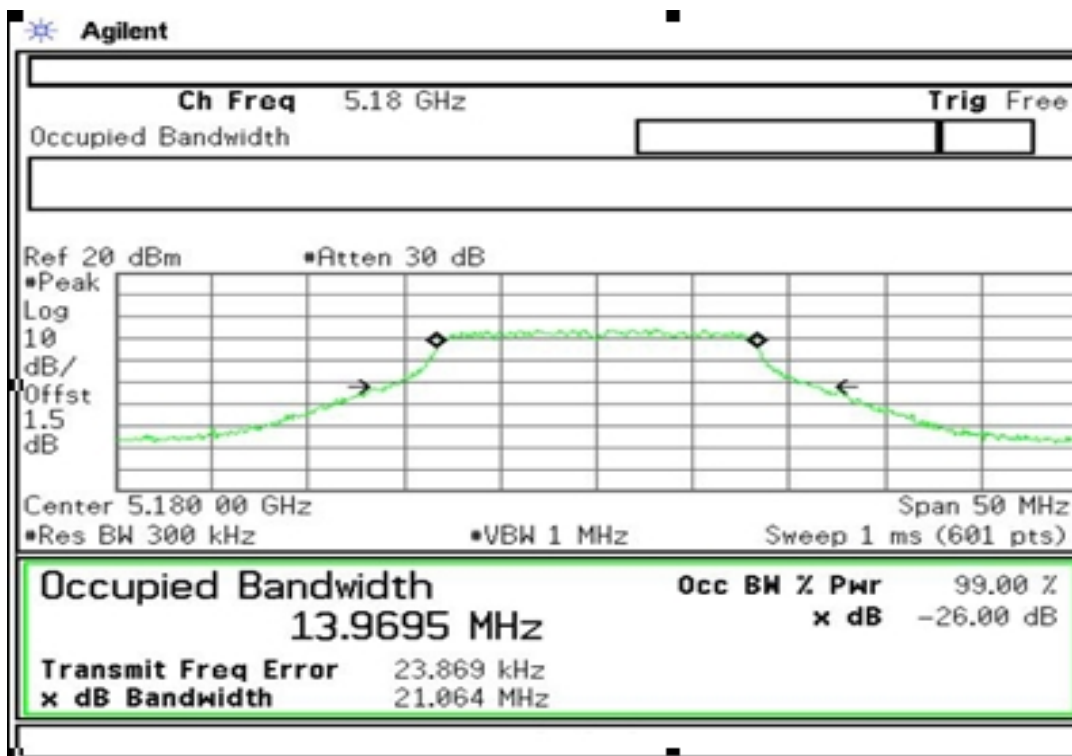
### Chain 1

| Channel | Frequency (MHz) | -26dB Bandwidth (MHz) | 99% Occupied Bandwidth (MHz) |
|---------|-----------------|-----------------------|------------------------------|
| Low     | 5180            | 20.873                | 13.8673                      |
| Mid     | 5210            | 21.155                | 12.7755                      |
| High    | 5240            | 21.224                | 13.2725                      |

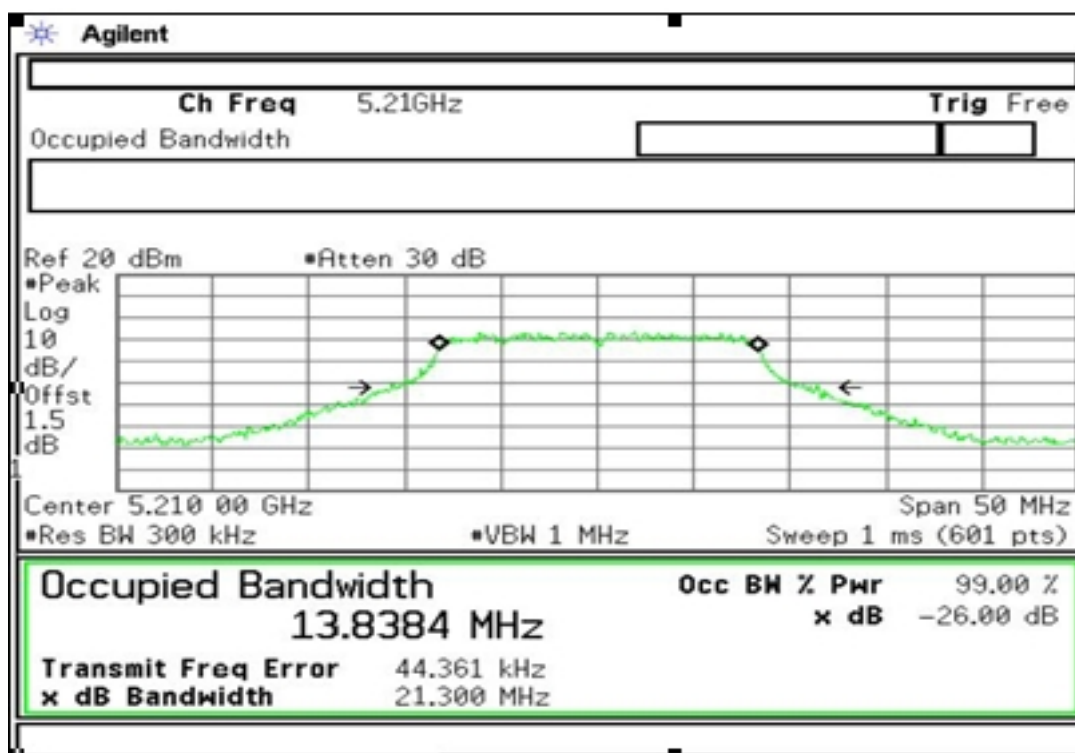


## Chain 0

Channel: Low

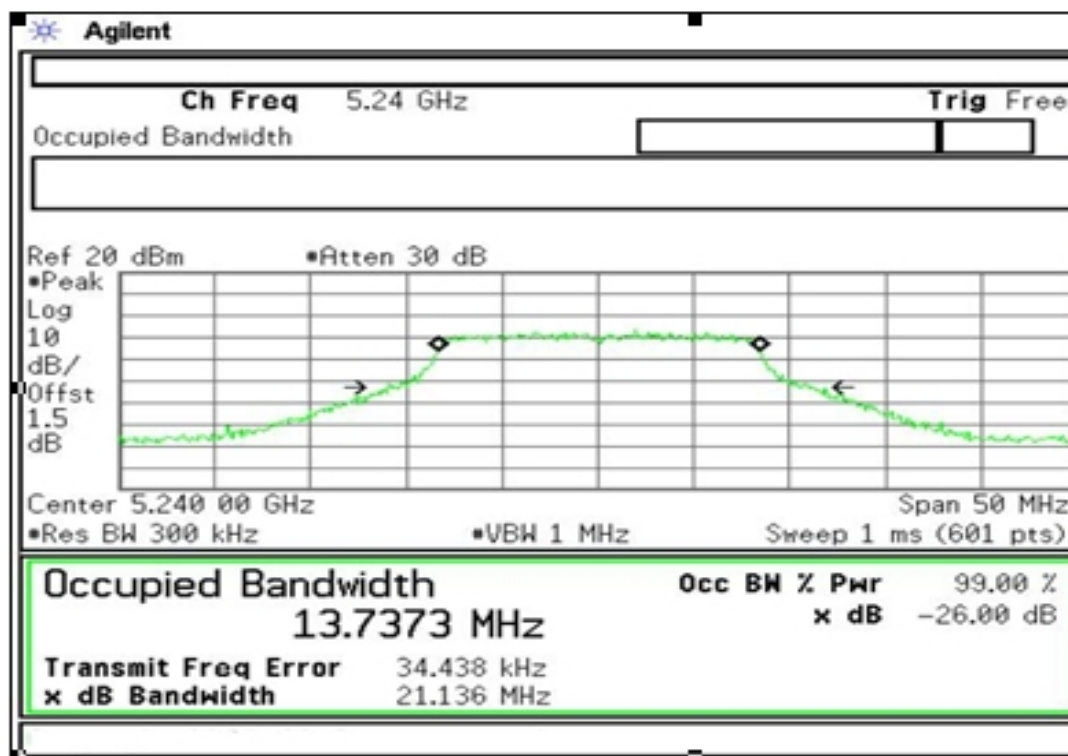


Channel: Mid



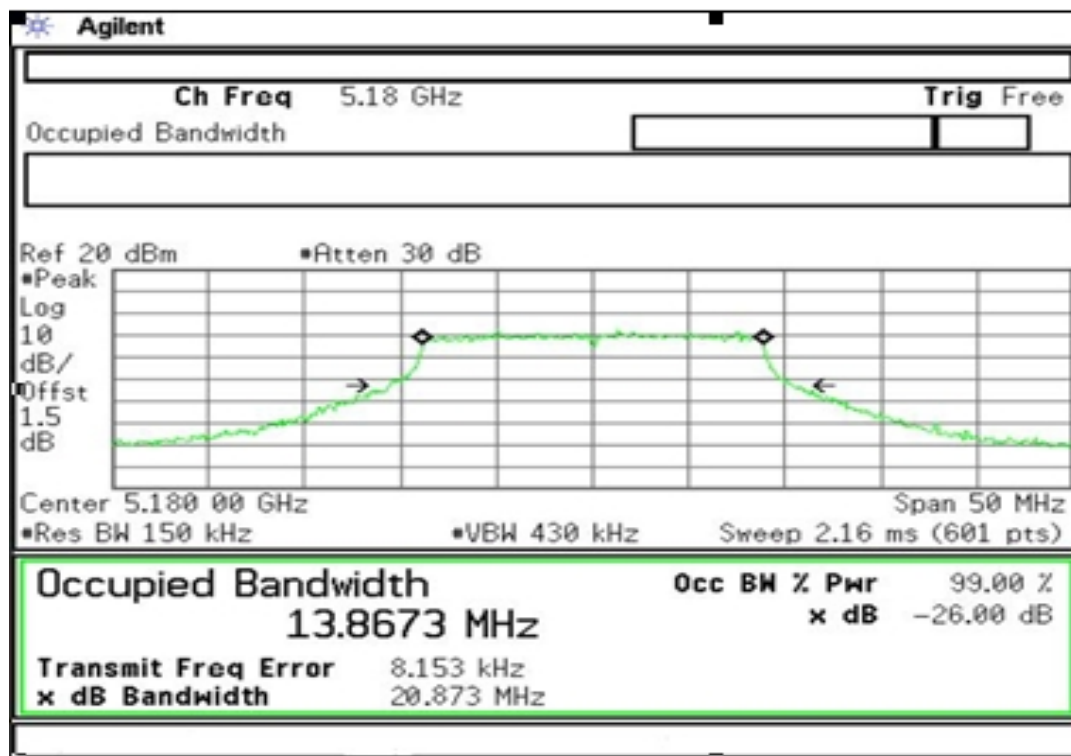


Channel: High



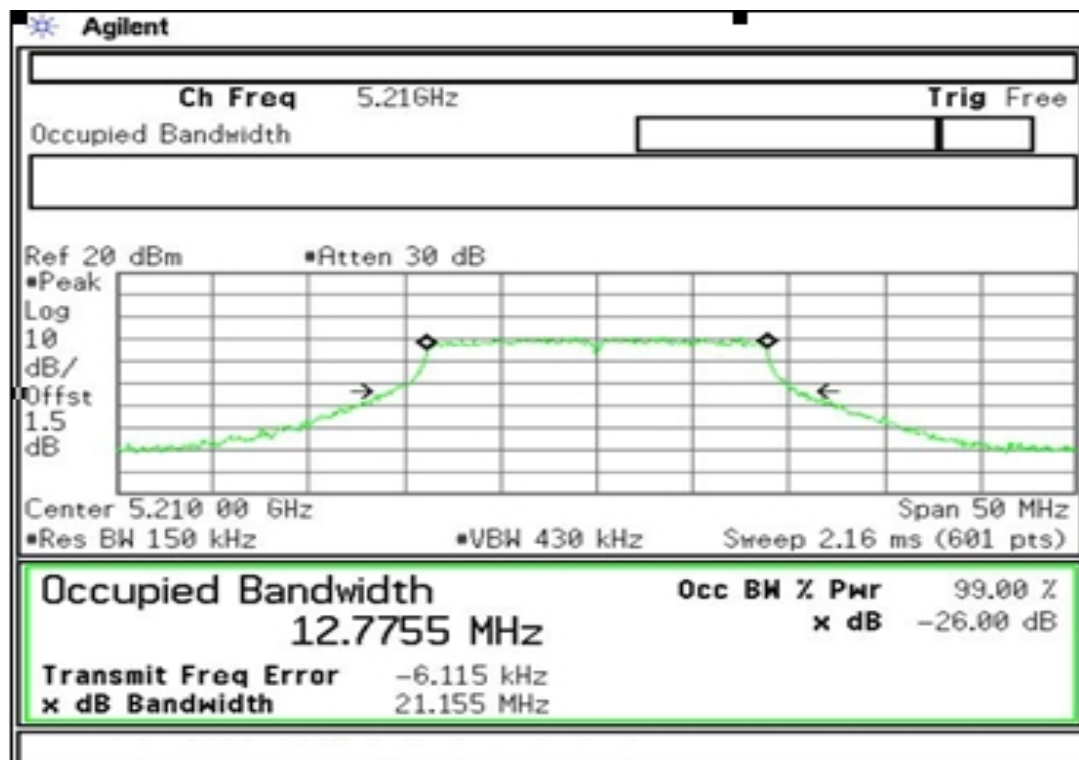
Chain 1

Channel: Low

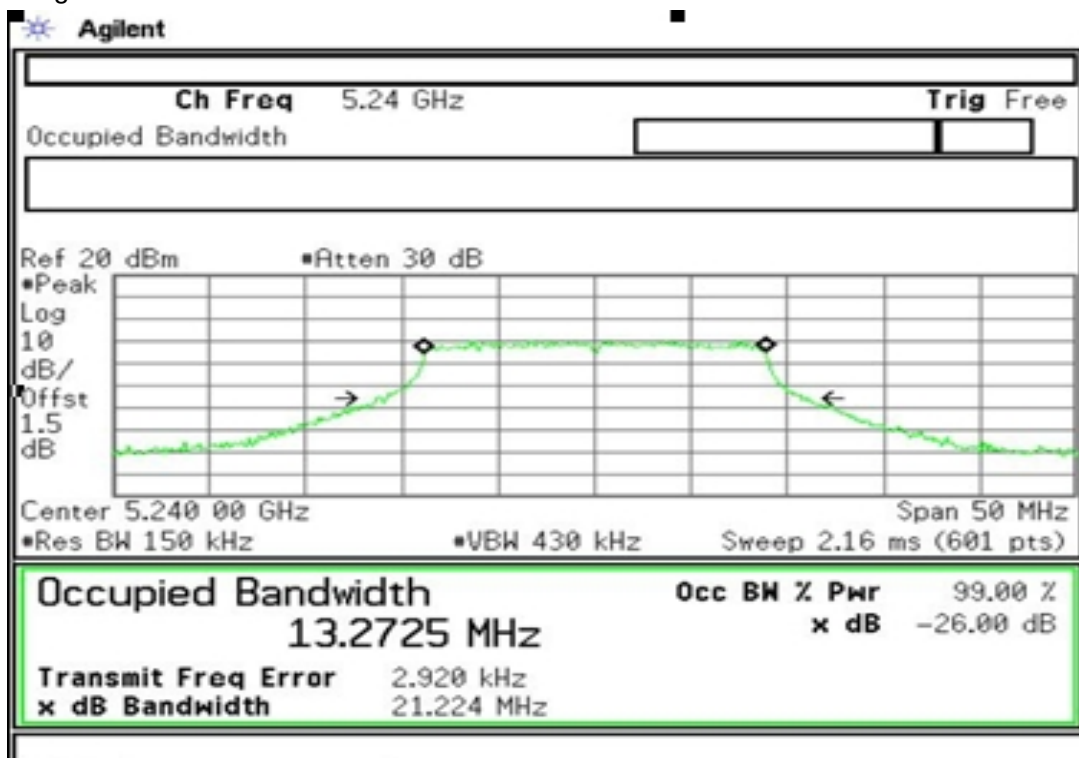




Channel: Mid



Channel: High





## 7. Band Edges Measurement

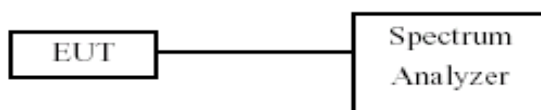
### 7.1. Test Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz (68.3dBuV/m at 3m).

### 7.2. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:  
(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO  
(b) AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

### 7.3. Test Setup Layout



### 7.4. Measurement Equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2013.03.10       | 2014.03.09 |



## 7.5. Restrict Band Emission Measurement Data

Test Date : 2013-10-18  
Temperature : 24 °C  
Humidity : 52 %  
Atmospheric Pressure : 1023 hPa

### Chain 0

Fundamental Frequency: 5180 MHz

#### VERTICAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5150.000        | 7.030               | 49.563               | 56.593                 | -17.407     | 74.000         | PEAK          |
| 2   | 5150.000        | 7.030               | 36.592               | 43.622                 | -10.378     | 54.000         | AVG           |

#### HORIZONTAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5150.000        | 7.030               | 48.440               | 55.470                 | -18.500     | 73.970         | PEAK          |
| 2   | 5150.000        | 7.030               | 35.265               | 42.295                 | -11.675     | 53.970         | AVG           |

Fundamental Frequency: 5240 MHz

#### VERTICAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5350.000        | 7.260               | 50.021               | 57.281                 | -16.719     | 74.000         | PEAK          |
| 2   | 5350.000        | 7.260               | 36.339               | 43.599                 | -10.401     | 54.000         | AVG           |

#### HORIZONTAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5350.000        | 7.260               | 48.235               | 55.495                 | -18.505     | 74.000         | PEAK          |
| 2   | 5350.000        | 7.260               | 33.054               | 40.314                 | -13.686     | 54.000         | AVG           |

**Chain 1**

Fundamental Frequency: 5180 MHz

**VERTICAL**

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5150.000        | 7.030               | 50.225               | 57.255                 | -16.745     | 74.000         | PEAK          |
| 2   | 5150.000        | 7.030               | 36.905               | 43.935                 | -10.065     | 54.000         | AVG           |

**HORIZONTAL**

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5150.000        | 7.030               | 48.251               | 55.281                 | -18.719     | 74.000         | PEAK          |
| 2   | 5150.000        | 7.030               | 34.224               | 41.254                 | -12.746     | 54.000         | AVG           |

Fundamental Frequency: 5240 MHz

**VERTICAL**

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5350.000        | 7.260               | 48.551               | 55.811                 | -18.189     | 74.000         | PEAK          |
| 2   | 5350.000        | 7.260               | 35.988               | 43.248                 | -10.752     | 54.000         | AVG           |

**HORIZONTAL**

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 5350.000        | 7.260               | 47.255               | 54.515                 | -19.485     | 74.000         | PEAK          |
| 2   | 5350.000        | 7.260               | 34.586               | 41.846                 | -12.154     | 54.000         | AVG           |



## 8. Maximum Peak Output Power

### 8.1. Test Limit

| Test Item              | Frequency Range (MHz) | Limit                                                   | Result |
|------------------------|-----------------------|---------------------------------------------------------|--------|
| Conducted Output Power | 5150–5250             | Not exceed the lesser of 50 mW (17dBm) or 4dBm +10log B | Pass   |

**Note:**

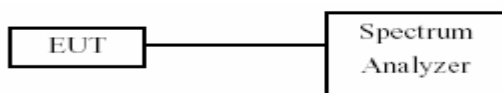
For the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10log B, where B is the 26 dB emission bandwidth in MHz.

If transmitting antennas of directional gain greater than 6dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 8.2. Test Procedures

The antenna port ( RF output ) of the EUT was connected to the input ( RF input ) of Spectrum. Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.

### 8.3. Test Setup Layout



### 8.4. Measurement equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2013.03.10       | 2014.03.09 |

**8.5. Test Result and Data**

Test Date: Dec. 18,2013

Temperature: 25℃

Atmospheric pressure: 1020 hPa

Humidity: 46%

**For Chain 0**

| Channel | Frequency (MHz) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|---------|-----------------|--------------------------------------|-------------|
| Low     | 5180            | 9.86                                 | 17.00       |
| Mid     | 5210            | 9.88                                 | 17.00       |
| High    | 5240            | 9.62                                 | 17.00       |

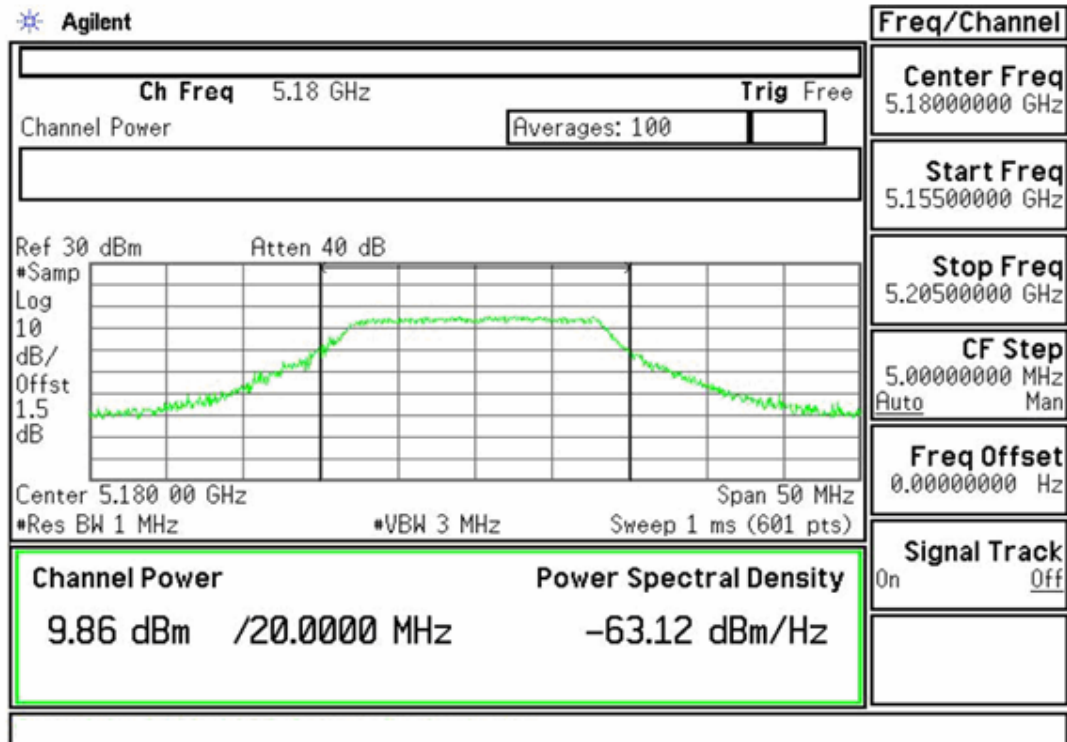
**For Chain 1**

| Channel | Frequency (MHz) | Maximum Conducted Output Power (dBm) | Limit (dBm) |
|---------|-----------------|--------------------------------------|-------------|
| Low     | 5180            | 9.66                                 | 17.00       |
| Mid     | 5210            | 9.63                                 | 17.00       |
| High    | 5240            | 9.57                                 | 17.00       |

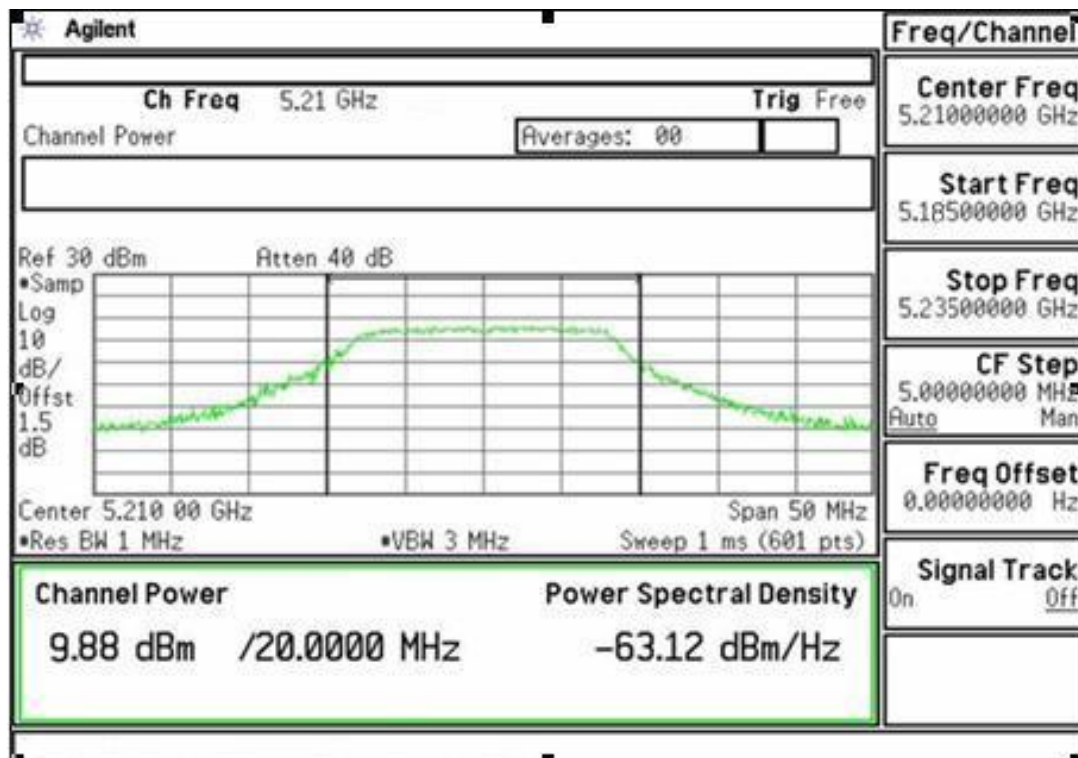
Test Plot

For Chain 0

Low

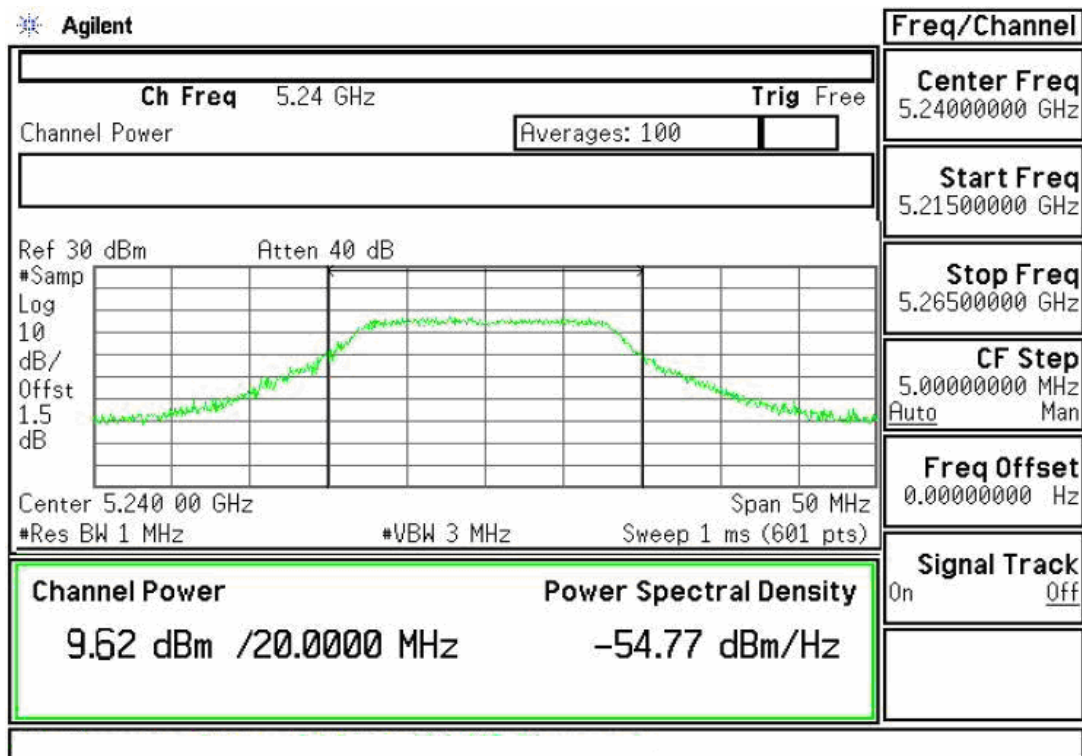


Mid



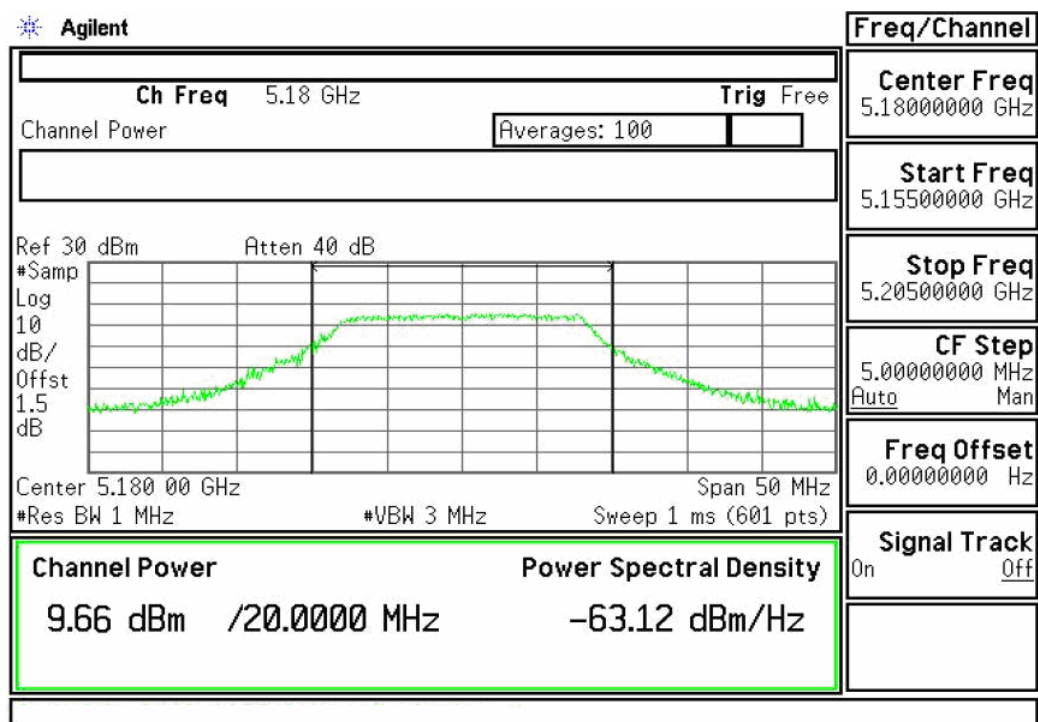


## High



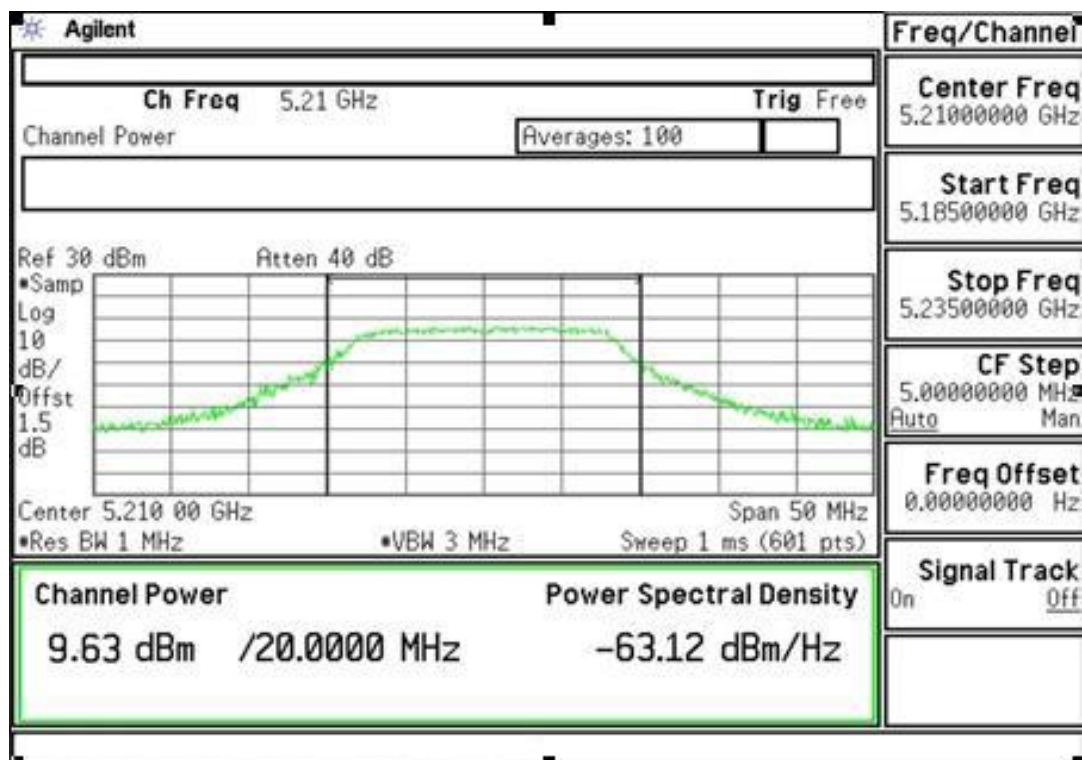
## For Chain 1

## Low

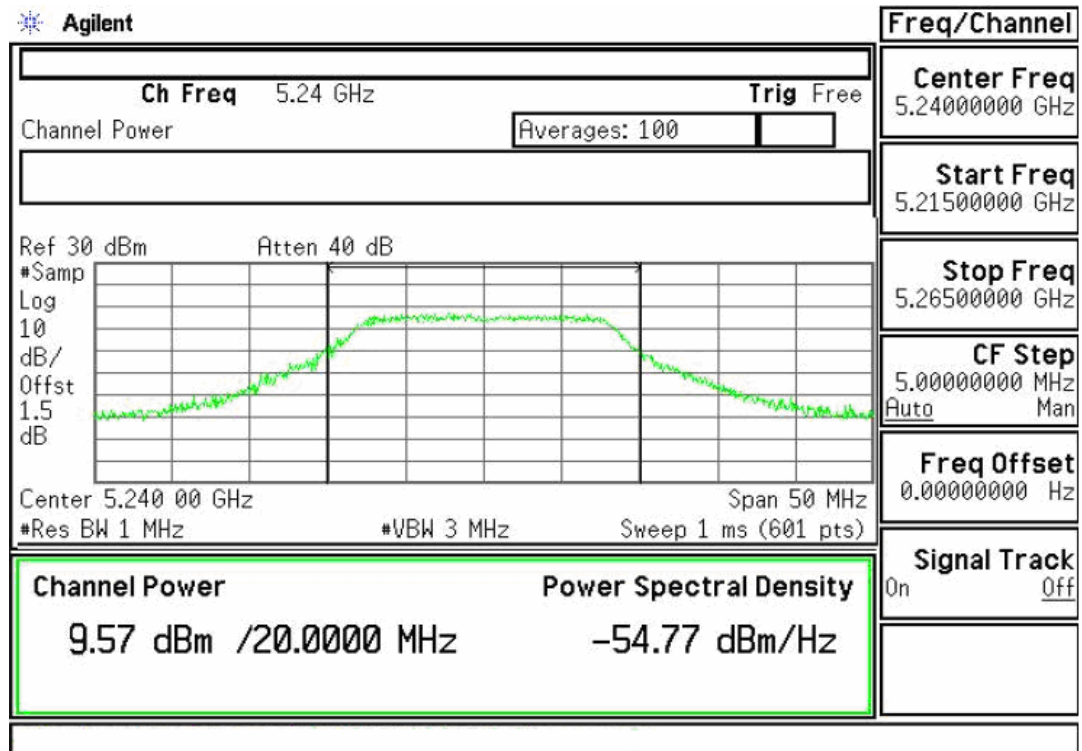




## Mid



## High





## 9. Peak Power Spectral Density

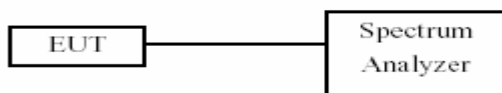
### 9.1. Test Limit

For the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4dBm in any 1MHz band.

### 9.2. Test Procedures

- 1.The antenna port ( RF output ) of the EUT was connected to the input ( RF input ) of Spectrum.  
Power was read directly from the meter and cable loss connection was added to the reading to obtain power at the EUT antenna terminal. The EUT Output Power was set to maximum to produce the worse case test result.
2. Set the spectrum analyzer as RBW = 1MHz, VBW = 3MHz, Span = Sweep= AUTO
3. Record the max. reading.
4. Repeat the above procedure until the measurements for all frequencies are completed

### 9.3. Test Setup Layout



### 9.4. Measurement equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2013.03.10       | 2014.03.09 |

**9.5. Test Result and Data**

Test Date: Dec. 18,2013

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 46%

**For Chain 0**

| Channel | Frequency<br>(MHz) | PPSD<br>(dBm) | Limit<br>(dBm) | Result |
|---------|--------------------|---------------|----------------|--------|
| Low     | 5180               | 2.51          | 4.00           | PASS   |
| Mid     | 5210               | 2.22          | 4.00           | PASS   |
| High    | 5240               | 2.35          | 4.00           | PASS   |

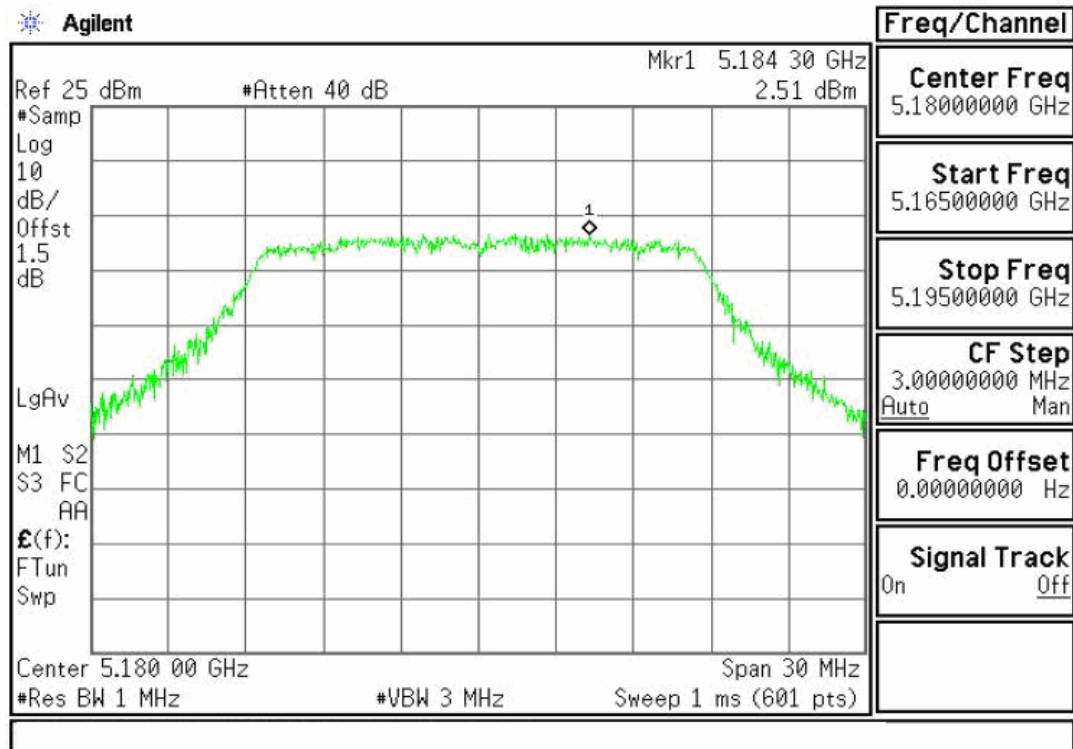
**For Chain 1**

| Channel | Frequency<br>(MHz) | PPSD<br>(dBm) | Limit<br>(dBm) | Result |
|---------|--------------------|---------------|----------------|--------|
| Low     | 5180               | 2.48          | 4.00           | PASS   |
| Mid     | 5210               | 2.50          | 4.00           | PASS   |
| High    | 5240               | 2.33          | 4.00           | PASS   |

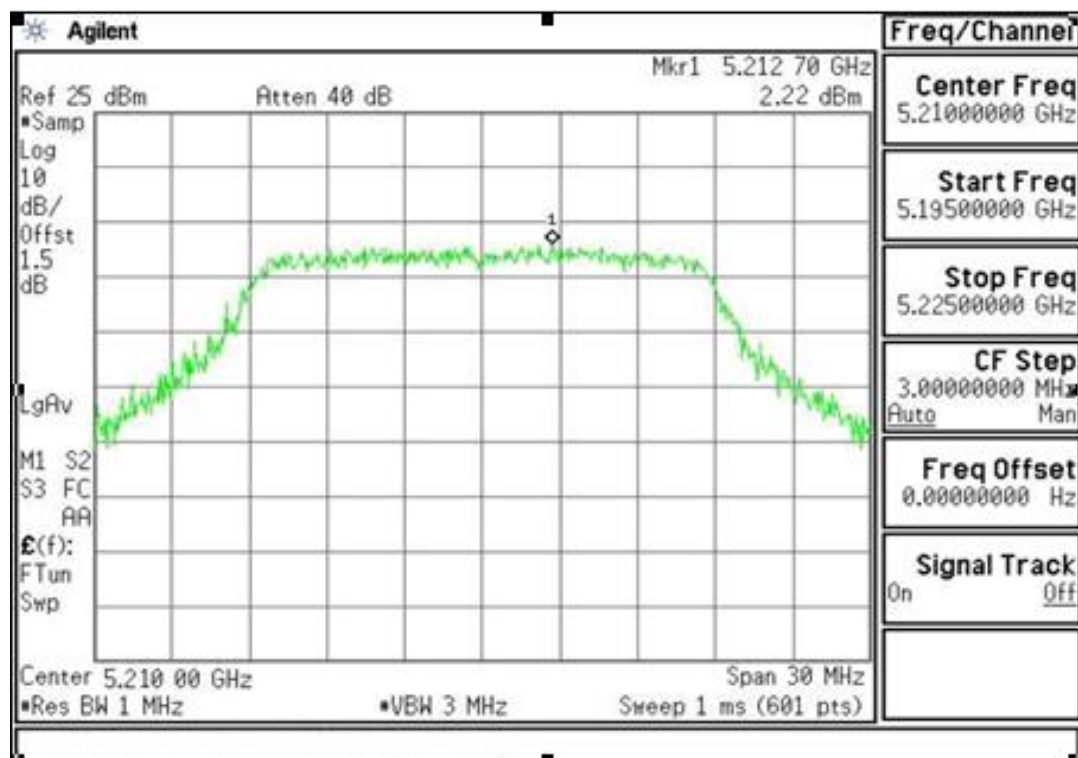
**Test Plot**

For Chain 0

Low

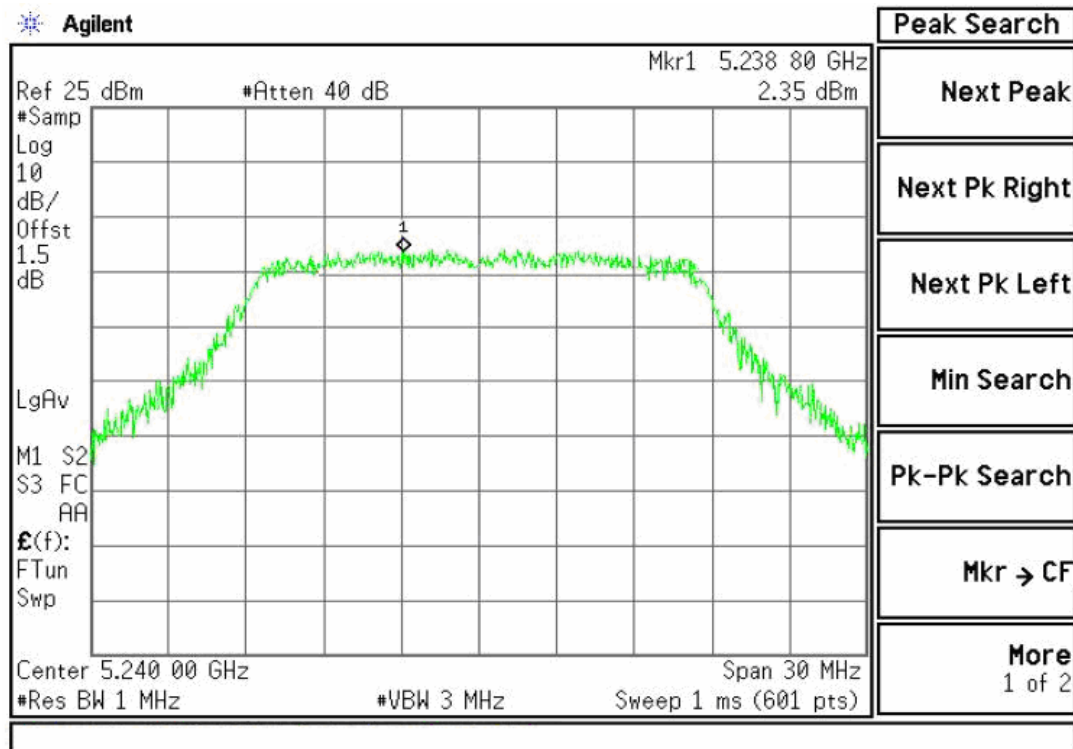


Mid



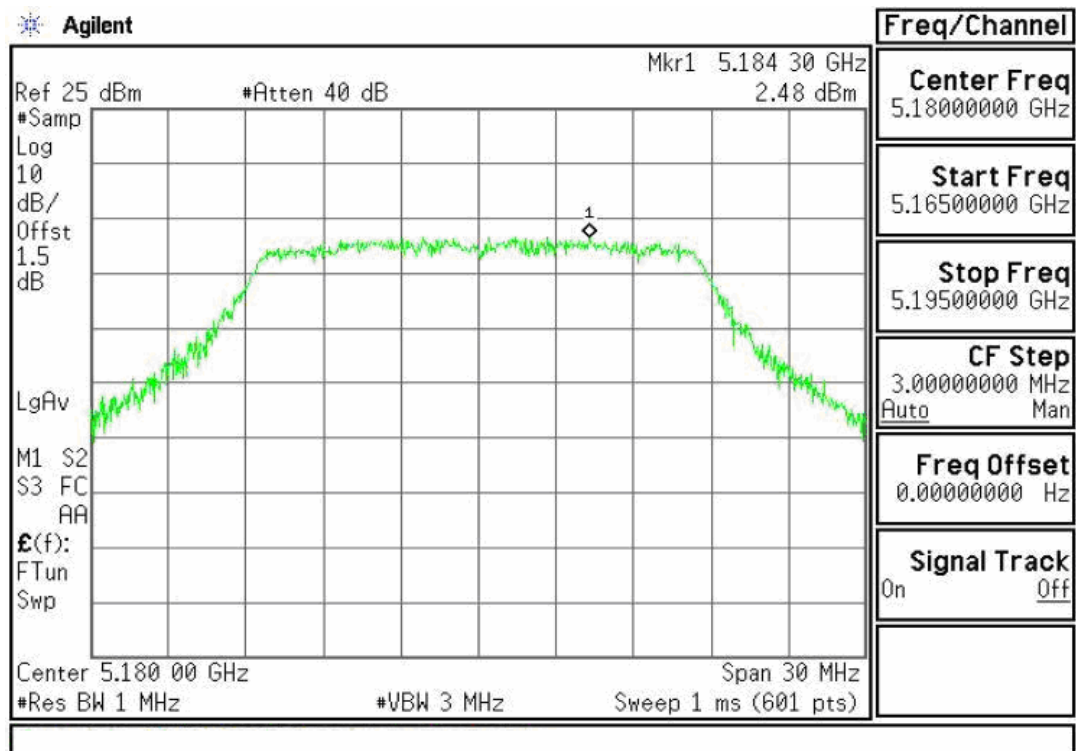


## High



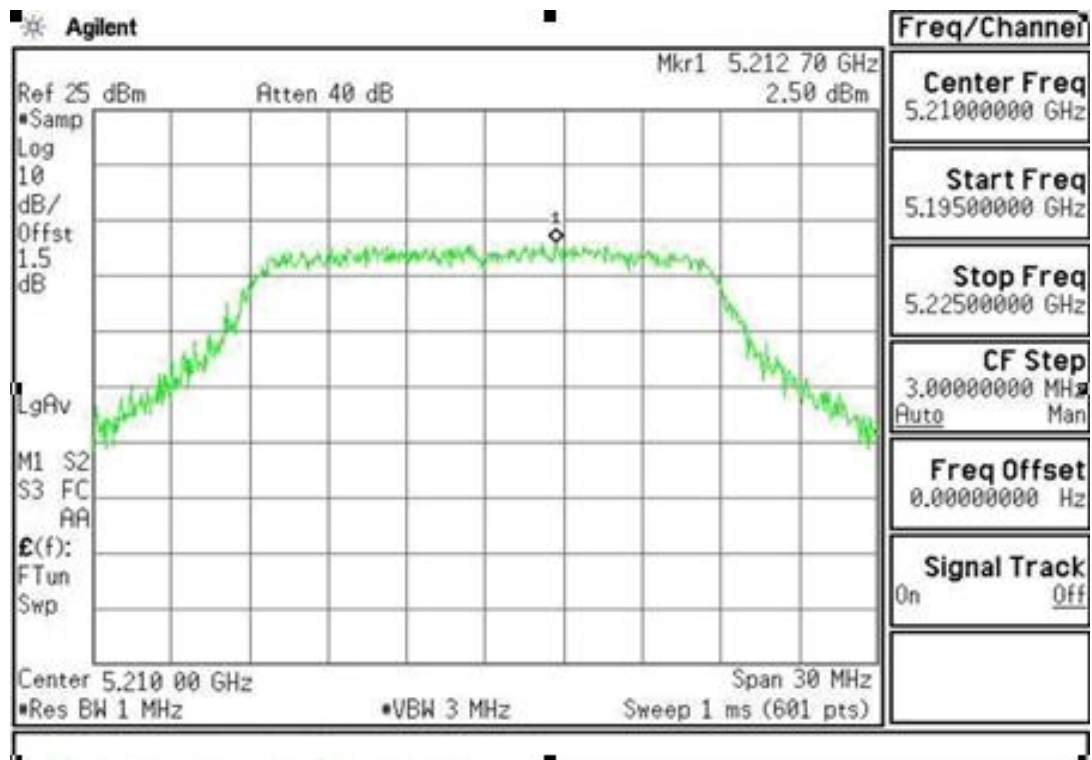
## For Chain 1

## Low

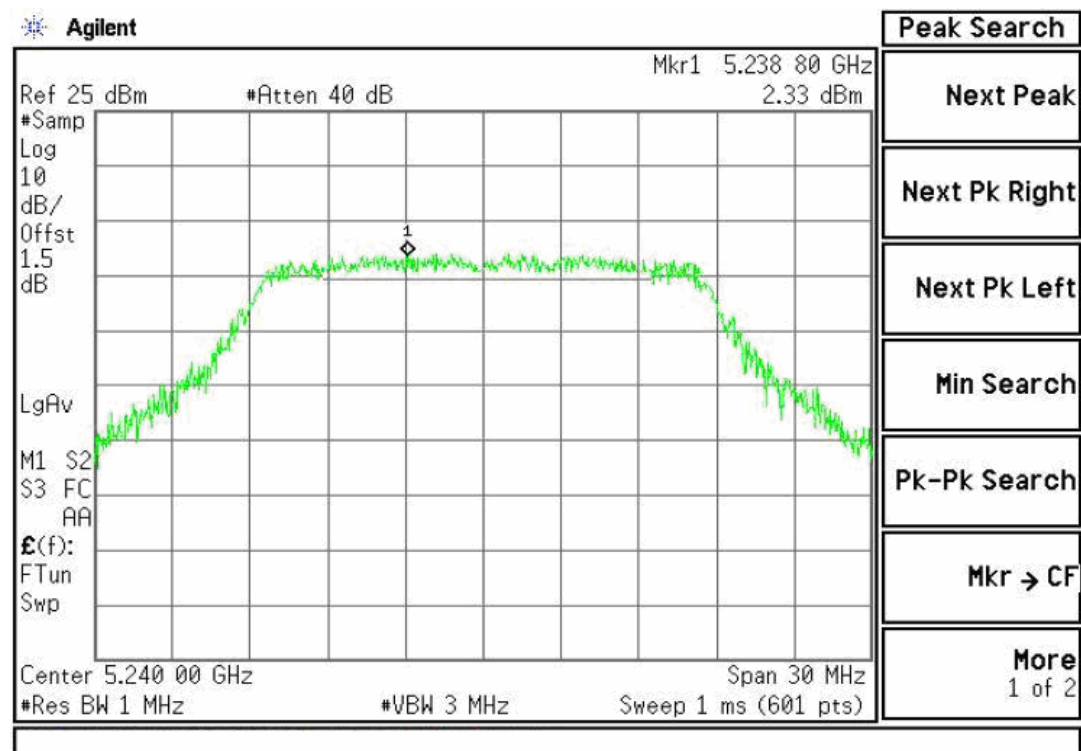




## Mid



## High





## 10. Peak Excursion

### 10.1. Test Limit

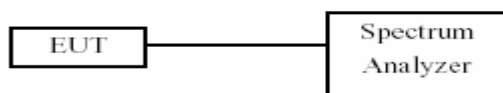
According to §15.407(a)(6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the maximum conducted output power (measured as specified above) shall not exceed 13 dB across any 1 MHz bandwidth or the emission bandwidth whichever is less.

### 10.2. Test Procedures

The test is performed in accordance with <FCC Public Notice: APPENDIX A Guidelines for Assessing Unlicensed National Information Infrastructure (U-NII) Devices> – Part 15, Subpart E, August 2002.

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to spectrum.
3. Trace A, Set RBW =1MHz, VBW = 3MHz, Span >26dB bandwidth, Max. hold.
4. Delta Mark trace A Maximum frequency and trace B same frequency.
5. Repeat the above procedure until measurements for all frequencies were complete.

### 10.3. Test Setup Layout



### 10.4. Measurement equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2013.03.10       | 2014.03.09 |

**10.5. Test Result and Data**

Test Date: Dec. 18, 2013

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 46%

**For Chain 0**

| Channel | Frequency (MHz) | Peak Excursion (dB) | Limit (dBm) | Margin (dB) | Result |
|---------|-----------------|---------------------|-------------|-------------|--------|
| Low     | 5180            | 8.56                | 13.00       | -4.44       | PASS   |
| Mid     | 5210            | 8.02                | 13.00       | -4.98       | PASS   |
| High    | 5240            | 7.82                | 13.00       | -5.18       | PASS   |

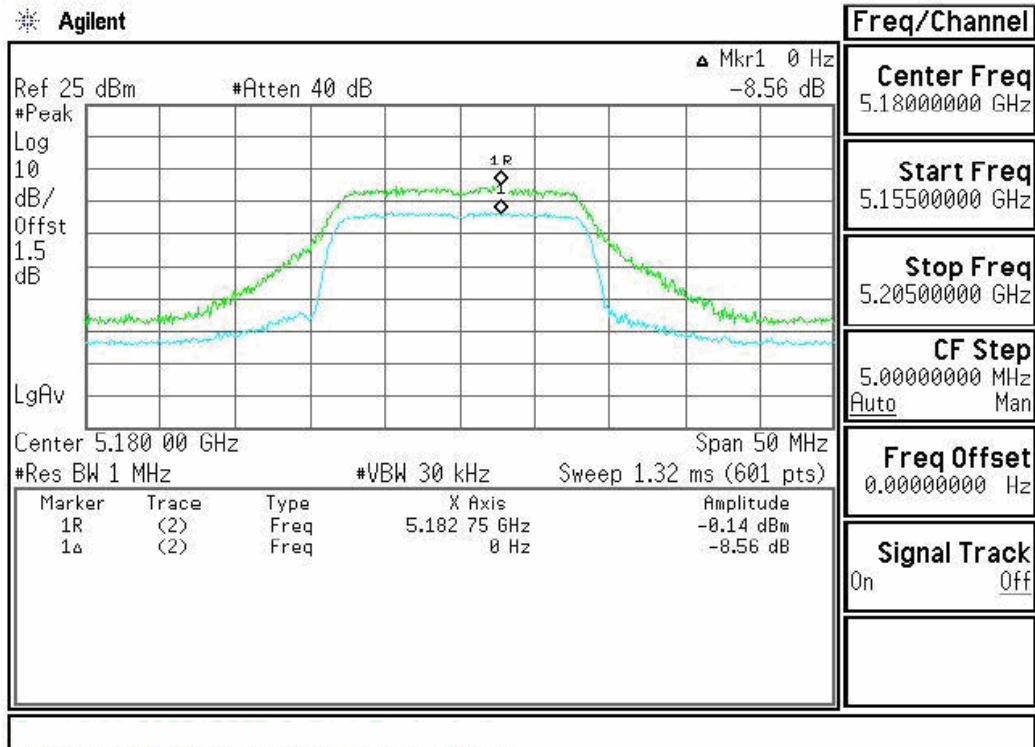
**For Chain 1**

| Channel | Frequency (MHz) | Peak Excursion (Db) | Limit (dBm) | Margin (dB) | Result |
|---------|-----------------|---------------------|-------------|-------------|--------|
| Low     | 5180            | 8.64                | 13.00       | -4.36       | PASS   |
| Mid     | 5210            | 8.33                | 13.00       | -4.67       | PASS   |
| High    | 5240            | 7.57                | 13.00       | -5.43       | PASS   |

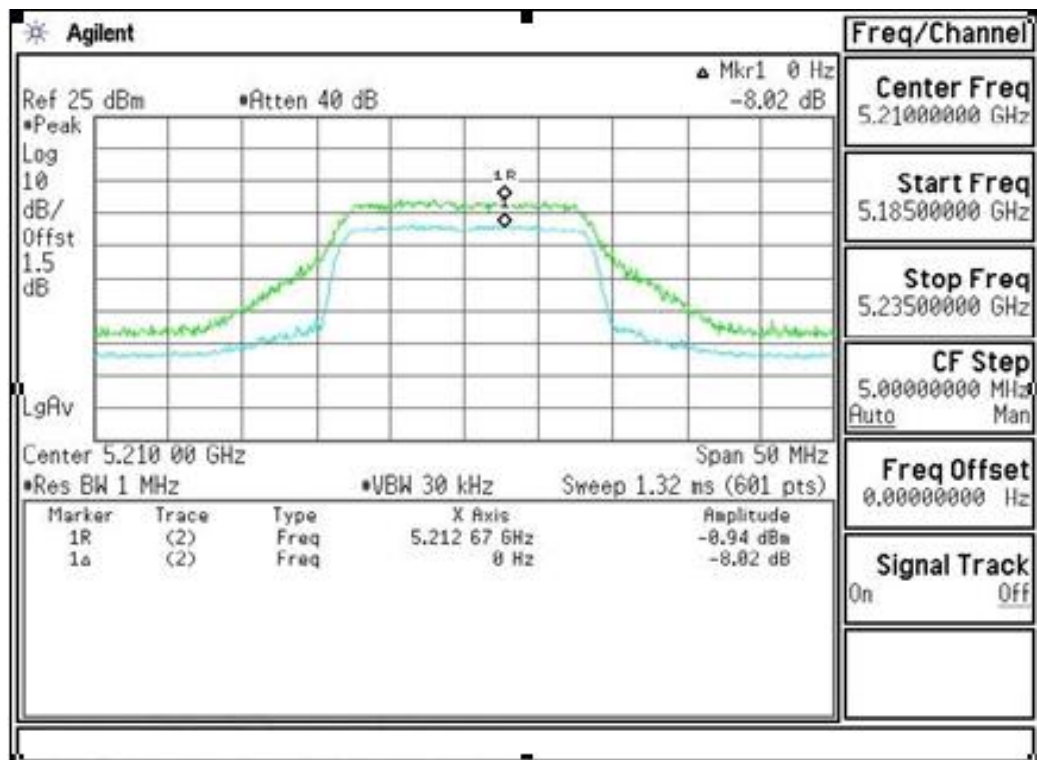
**Test Plot**

For Chain 0

Low

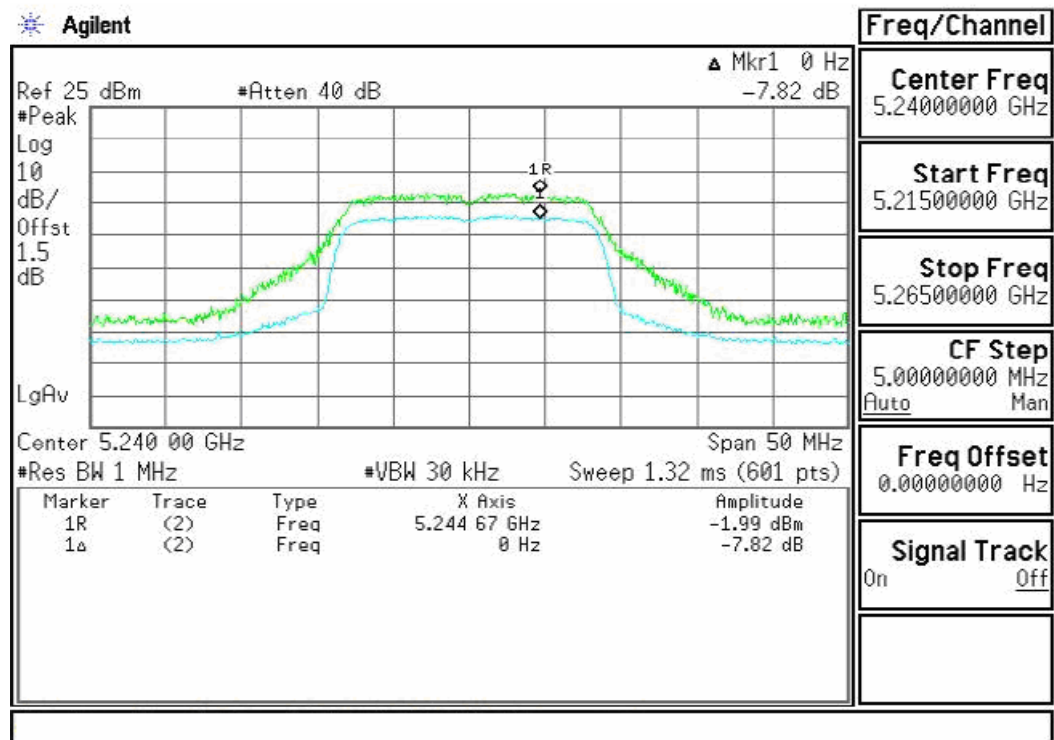


Mid



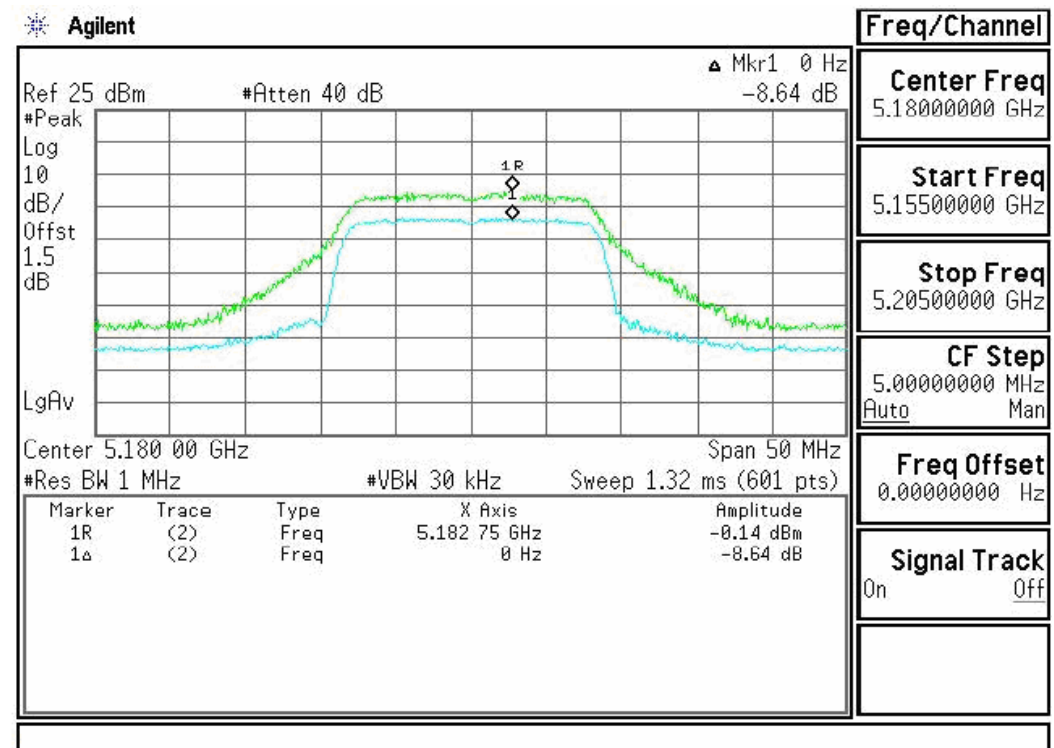


## High



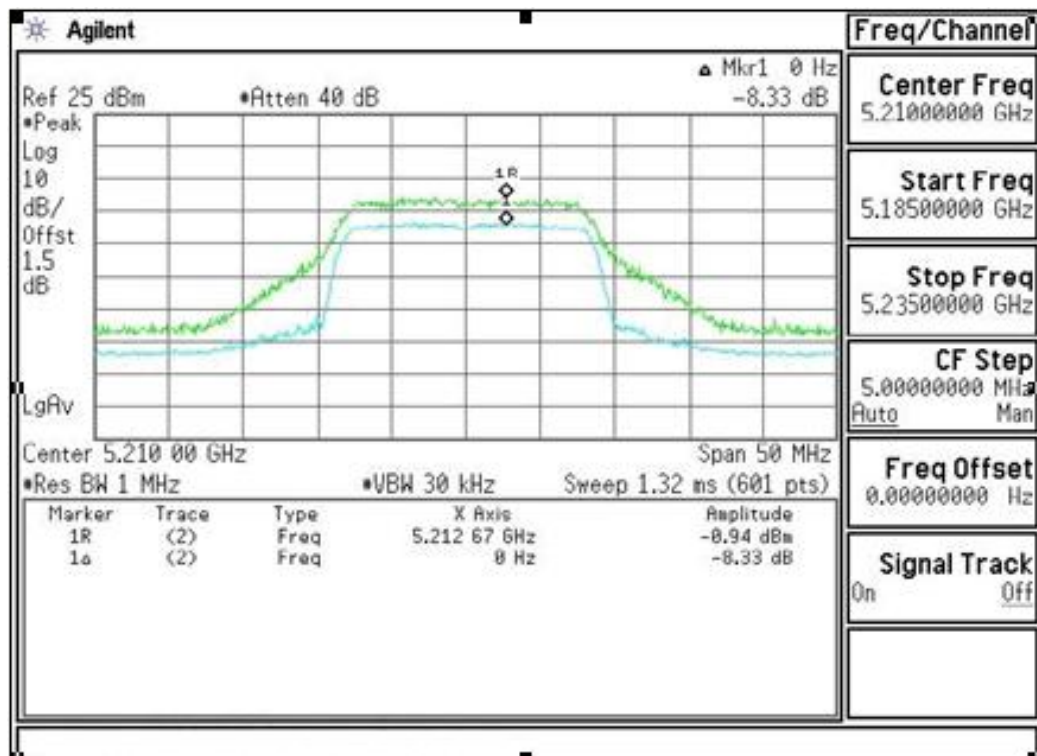
## For Chain 1

## Low

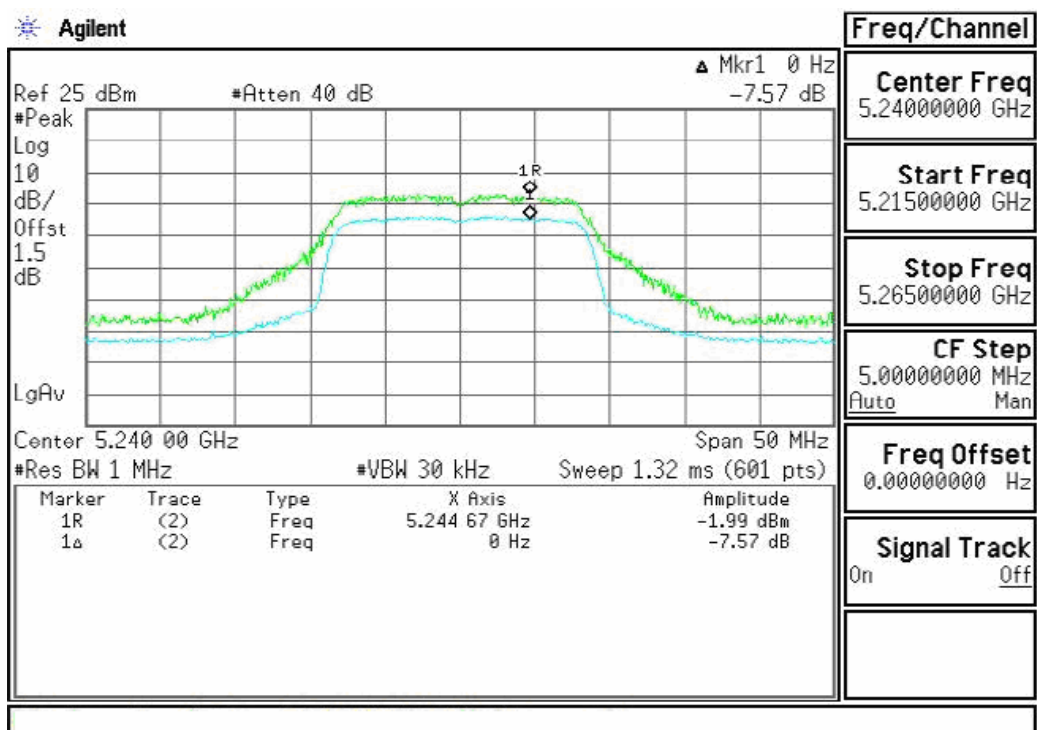




## Mid



## High





## 11. Frequency Stability Measurement

### 11.1. Test Limit

§ 15.407 (g) manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

### 11.2. Test Procedures

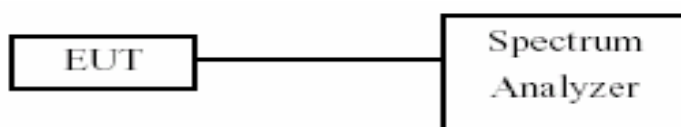
a. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below,

| Spectrum Parameter | Setting                                          |
|--------------------|--------------------------------------------------|
| Attenuation        | Auto                                             |
| Span Frequency     | Entire absence of modulation emissions bandwidth |
| RB                 | 10 kHz                                           |
| VB                 | 10 kHz                                           |
| Sweep Time         | Auto                                             |

b. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value

c. Extreme temperature rule is -30°C~50°C.

### 11.3. Test Setup Layout



### 11.4. Measurement equipment

| Instrument/Ancillary | Model No. | Manufacturer | Serial No. | Calibration Date | Valid Date |
|----------------------|-----------|--------------|------------|------------------|------------|
| Spectrum Analyzer    | FSP40     | R&S          | 100324     | 2013.03.10       | 2014.03.09 |

**11.5. Test Result and Data**

Test Date: Dec. 18, 2013

Temperature: 25°C

Atmospheric pressure: 1020 hPa

Humidity: 46%

**For Chain 0**

| Environment Temperature (°C) | Voltage (V) | CH Low Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|------------------------------|-------------|------------------------------------|-------------------|-------------|
| 60                           | 120         | 5180.0064                          | 5150~5250         | PASS        |
| 50                           |             | 5180.0065                          | 5150~5250         | PASS        |
| 40                           |             | 5180.0062                          | 5150~5250         | PASS        |
| 30                           |             | 5180.0060                          | 5150~5250         | PASS        |
| 20                           |             | 5180.0055                          | 5150~5250         | PASS        |
| 10                           |             | 5180.0056                          | 5150~5250         | PASS        |
| 0                            |             | 5180.0054                          | 5150~5250         | PASS        |
| -10                          |             | 5180.0055                          | 5150~5250         | PASS        |
|                              |             |                                    |                   |             |
| 20                           | 108         | 5180.0050                          | 5150~5250         | PASS        |
|                              | 120         | 5180.0054                          | 5150~5250         | PASS        |
|                              | 132         | 5180.0057                          | 5150~5250         | PASS        |

| Environment Temperature (°C) | Voltage (V) | CH Middle Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|------------------------------|-------------|---------------------------------------|-------------------|-------------|
| 60                           | 120         | 5210.0060                             | 5150~5250         | PASS        |
| 50                           |             | 5210.0066                             | 5150~5250         | PASS        |
| 40                           |             | 5210.0064                             | 5150~5250         | PASS        |
| 30                           |             | 5210.0057                             | 5150~5250         | PASS        |
| 20                           |             | 5210.0056                             | 5150~5250         | PASS        |
| 10                           |             | 5210.0050                             | 5150~5250         | PASS        |
| 0                            |             | 5210.0051                             | 5150~5250         | PASS        |
| -10                          |             | 5210.0054                             | 5150~5250         | PASS        |
|                              |             |                                       |                   |             |
| 20                           | 108         | 5210.0067                             | 5150~5250         | PASS        |
|                              | 120         | 5210.0060                             | 5150~5250         | PASS        |
|                              | 132         | 5210.0059                             | 5150~5250         | PASS        |



| Environment Temperature (℃) | Voltage (V) | CH High Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|-----------------------------|-------------|-------------------------------------|-------------------|-------------|
| 60                          | 120         | 5240.0055                           | 5150~5250         | PASS        |
| 50                          |             | 5240.0045                           | 5150~5250         | PASS        |
| 40                          |             | 5240.0044                           | 5150~5250         | PASS        |
| 30                          |             | 5240.0054                           | 5150~5250         | PASS        |
| 20                          |             | 5240.0059                           | 5150~5250         | PASS        |
| 10                          |             | 5240.0053                           | 5150~5250         | PASS        |
| 0                           |             | 5240.0057                           | 5150~5250         | PASS        |
| -10                         |             | 5240.0052                           | 5150~5250         | PASS        |
|                             |             |                                     |                   |             |
| 20                          | 108         | 5240.0053                           | 5150~5250         | PASS        |
|                             | 120         | 5240.0050                           | 5150~5250         | PASS        |
|                             | 132         | 5540.0053                           | 5150~5250         | PASS        |

**For Chain 1**

| Environment Temperature (°C) | Voltage (V) | CH Low Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|------------------------------|-------------|------------------------------------|-------------------|-------------|
| 60                           | 120         | 5180.0058                          | 5150~5250         | PASS        |
| 50                           |             | 5180.0060                          | 5150~5250         | PASS        |
| 40                           |             | 5180.0062                          | 5150~5250         | PASS        |
| 30                           |             | 5180.0059                          | 5150~5250         | PASS        |
| 20                           |             | 5180.0054                          | 5150~5250         | PASS        |
| 10                           |             | 5180.0051                          | 5150~5250         | PASS        |
| 0                            |             | 5180.0059                          | 5150~5250         | PASS        |
| -10                          |             | 5180.0052                          | 5150~5250         | PASS        |
|                              |             |                                    |                   |             |
| 20                           | 108         | 5180.0050                          | 5150~5250         | PASS        |
|                              | 120         | 5180.0058                          | 5150~5250         | PASS        |
|                              | 132         | 5180.0057                          | 5150~5250         | PASS        |



| Environment Temperature (℃) | Voltage (V) | CH Middle Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|-----------------------------|-------------|---------------------------------------|-------------------|-------------|
| 60                          | 120         | 5210.0063                             | 5150~5250         | PASS        |
| 50                          |             | 5210.0061                             | 5150~5250         | PASS        |
| 40                          |             | 5210.0060                             | 5150~5250         | PASS        |
| 30                          |             | 5210.0078                             | 5150~5250         | PASS        |
| 20                          |             | 5210.0060                             | 5150~5250         | PASS        |
| 10                          |             | 5210.0059                             | 5150~5250         | PASS        |
| 0                           |             | 5210.0060                             | 5150~5250         | PASS        |
| -10                         |             | 5210.0078                             | 5150~5250         | PASS        |
|                             |             |                                       |                   |             |
| 20                          | 108         | 5210.0060                             | 5150~5250         | PASS        |
|                             | 120         | 5210.0057                             | 5150~5250         | PASS        |
|                             | 132         | 5210.0059                             | 5150~5250         | PASS        |

| Environment Temperature (°C) | Voltage (V) | CH High Measurement Frequency (MHz) | Limit Range (dBm) | Test Result |
|------------------------------|-------------|-------------------------------------|-------------------|-------------|
| 60                           | 120         | 5240.0055                           | 5150~5250         | PASS        |
| 50                           |             | 5240.0050                           | 5150~5250         | PASS        |
| 40                           |             | 5240.0051                           | 5150~5250         | PASS        |
| 30                           |             | 5240.0053                           | 5150~5250         | PASS        |
| 20                           |             | 5240.0057                           | 5150~5250         | PASS        |
| 10                           |             | 5240.0059                           | 5150~5250         | PASS        |
| 0                            |             | 5240.0058                           | 5150~5250         | PASS        |
| -10                          |             | 5240.0057                           | 5150~5250         | PASS        |
|                              |             |                                     |                   |             |
| 20                           | 108         | 5240.0055                           | 5150~5250         | PASS        |
|                              | 120         | 5240.0059                           | 5150~5250         | PASS        |
|                              | 132         | 5540.0057                           | 5150~5250         | PASS        |



## 12. Restricted Bands of Operation

(a) Only spurious emissions are permitted in any of the frequency bands listed below:

| MHz                 | MHz                   | MHz             | GHz             |
|---------------------|-----------------------|-----------------|-----------------|
| 0.09000 – 0.11000   | 16.42000 – 16.42300   | 399.9 – 410.0   | 4.500 – 5.250   |
| 0.49500 – 0.505**   | 16.69475 – 16.69525   | 608.0 – 614.0   | 5.350 – 5.460   |
| 2.17350 – 2.19050   | 16.80425 – 16.80475   | 960.0 – 1240.0  | 7.250 – 7.750   |
| 4.12500 – 4.12800   | 25.50000 – 25.67000   | 1300.0 – 1427.0 | 8.025 – 8.500   |
| 4.17725 – 4.17775   | 37.50000 – 38.25000   | 1435.0 – 1626.5 | 9.000 – 9.200   |
| 4.20725 – 4.20775   | 73.00000 – 74.60000   | 1645.5 – 1646.5 | 9.300 – 9.500   |
| 6.21500 – 6.21800   | 74.80000 – 75.20000   | 1660.0 – 1710.0 | 10.600 – 12.700 |
| 6.26775 – 6.26825   | 108.00000 – 121.94000 | 1718.8 – 1722.2 | 13.250 – 13.400 |
| 6.31175 – 6.31225   | 123.00000 – 138.00000 | 2200.0 – 2300.0 | 14.470 – 14.500 |
| 8.29100 – 8.29400   | 149.90000 – 150.05000 | 2310.0 – 2390.0 | 15.350 – 16.200 |
| 8.36200 – 8.36600   | 156.52475 – 156.52525 | 2483.5 – 2500.0 | 17.700 – 21.400 |
| 8.37625 – 8.38675   | 156.70000 – 156.90000 | 2655.0 – 2900.0 | 22.010 – 23.120 |
| 8.41425 – 8.41475   | 162.01250 – 167.17000 | 3260.0 – 3267.0 | 23.600 – 24.000 |
| 12.29000 – 12.29300 | 167.72000 – 173.20000 | 3332.0 – 3339.0 | 31.200 – 31.800 |
| 12.51975 – 12.52025 | 240.00000 – 285.00000 | 3345.8 – 3358.0 | 36.430 – 36.500 |
| 12.57675 – 12.57725 | 322.00000 – 335.40000 | 3600.0 – 4400.0 | Above 38.6      |
| 13.36000 – 13.41000 |                       |                 |                 |

\*\* : Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.