



# FCC RADIO TEST REPORT

Applicant : VSO Technology (Dongguan) Co., Ltd.

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Address : No.58 Longtou Road, Longjiantian,  
Huangjiang, Dongguan, Guangdong, China

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Equipment : Wireless Mouse

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Model No. : JM-9009G24, JM-9009AG24, KB5195W,  
MP2125BLU, MP2225RED, MP2325BLK,  
MP2425PUR

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Trade Name : N/A

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FCC ID : YLDJM-9009G24B

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## I HEREBY CERTIFY THAT :

The sample was received on Apr. 06, 2016 and the testing was carried out on Apr. 15, 2016 at CerpPASS Technology Corp. The test result refers exclusively to the test presented test model / sample. Without written approval of CerpPASS Technology Corp., the test report shall not be reproduced except in full.

Approved by:

Ray Chou

Assistant Manager

## Laboratory Accreditation:

☒ CerpPASS Technology Corporation Test Laboratory

|                 |          |
|-----------------|----------|
| NVLAP LAB Code: | 200954-0 |
| TAF LAB Code:   | 1439     |

☐ CerpPASS Technology(SuZhou) Co., Ltd.

|                 |          |
|-----------------|----------|
| NVLAP LAB Code: | 200814-0 |
| CNAS LAB Code:  | L5515    |



## Contents

|   |           |
|---|-----------|
| <b>1. Summary of Test Procedure and Test Results.....</b>     | <b>4</b>  |
| 1.1 Applicable Standards .....                                | 4         |
| <b>2. Test Configuration of Equipment under Test.....</b>     | <b>5</b>  |
| 2.1 Feature of Equipment under Test.....                      | 5         |
| 2.2 Carrier Frequency of Channels.....                        | 5         |
| 2.3 Test Mode and Test Software.....                          | 6         |
| 2.4 Description of Test System.....                           | 6         |
| 2.5 General Information of Test.....                          | 7         |
| <b>3. Test Equipment and Ancillaries Used for Tests .....</b> | <b>8</b>  |
| <b>4. Antenna Requirements.....</b>                           | <b>9</b>  |
| 4.1 Standard Applicable .....                                 | 9         |
| 4.2 Antenna Construction and Directional Gain.....            | 9         |
| <b>5. Test of AC Power Line Conducted Emission .....</b>      | <b>10</b> |
| 5.1 Test Limit .....  | 10        |
| 5.2 Test Procedures .....                                     | 10        |
| 5.3 Typical Test Setup .....                                  | 11        |
| 5.4 Test Result and Data.....                                 | 12        |
| <b>6. Test of Spurious Emission (Radiated) .....</b>          | <b>13</b> |
| 6.1 Test Limit .....  | 13        |
| 6.2 Test Procedures .....                                     | 13        |
| 6.3 Typical Test Setup .....                                  | 14        |
| 6.4 Test Result and Data (30MHz ~ 1GHz).....                  | 15        |
| 6.5 Test Result and Data (1GHz ~ 25GHz).....                  | 16        |
| <b>7. 20dB Bandwidth Measurement Data.....</b>                | <b>19</b> |
| 7.1 Test Limit .....  | 19        |
| 7.2 Test Procedure .....                                      | 19        |
| 7.3 Test Setup Layout .....                                   | 19        |
| 7.4 Test Result and Data.....                                 | 19        |
| <b>8. Band Edges Measurement.....</b>                         | <b>22</b> |
| 8.1 Test Limit .....  | 22        |
| 8.2 Test Procedure .....                                      | 22        |
| 8.3 Test Setup Layout .....                                   | 22        |
| 8.4 Restrict band emission Measurement Data .....             | 23        |
| <b>9. Restricted Bands of Operation .....</b>                 | <b>25</b> |
| 9.1 Labeling Requirement.....                                 | 25        |



☐ Additional attachment as following record:

[illegible]



## 1. Summary of Test Procedure and Test Results

### 1.1 Applicable Standards

**ANSI C63.4: 2009**

**FCC Rules and Regulations Part 15 Subpart C §15.249**

| FCC Rule | . Description of Test         | Result |
|----------|-------------------------------|--------|
| 15.203   | . Antenna Requirement         | Pass   |
| 15.207   | . Conducted Emission          | N/A    |
| 15.209   | . Radiated Emission           | Pass   |
| 15.215   | . 20dB Bandwidth Measurement  | Pass   |
| 15.249   | . Band Edges Measurement Data | Pass   |



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment under Test

|                           |  |
|---------------------------|--|
| <b>Modulation Type</b>    | FHSS   |
| <b>Frequency Range</b>    | 2402MHz -2480MHz   |
| <b>Channel Number</b>     | 40 Channels  |
| <b>Antenna Type/ gain</b> | Printed Antenna /3.85dBi   |
| <b>Power Rating</b>       | DC 3V form battery   |
| <b>Adapter Spec.</b>      | N/A  |
| <b>Model Discrepancy:</b> | All models are identical to each other except for the model name and appearance. |

### 2.2 Carrier Frequency of Channels

| Channel | Frequency(MHz) | Channel | Frequency(MHz) |
|---------|----------------|---------|----------------|
| *1      | 2402           | 21      | 2442           |
| 2       | 2404           | 22      | 2444           |
| 3       | 2406           | 23      | 2446           |
| 4       | 2408           | 24      | 2448           |
| 5       | 2410           | 25      | 2450           |
| 6       | 2412           | 26      | 2452           |
| 7       | 2414           | 27      | 2454           |
| 8       | 2416           | 28      | 2456           |
| 9       | 2418           | 29      | 2458           |
| 10      | 2420           | 30      | 2460           |
| 11      | 2422           | 31      | 2462           |
| 12      | 2424           | 32      | 2464           |
| 13      | 2426           | 33      | 2466           |
| 14      | 2428           | 34      | 2468           |
| 15      | 2430           | 35      | 2470           |
| 16      | 2432           | 36      | 2472           |
| 17      | 2434           | 37      | 2474           |
| 18      | 2436           | 38      | 2476           |
| 19      | 2438           | 39      | 2478           |
| *20     | 2440           | *40     | 2480           |

Note: Channels remarked \* are selected to perform test.



### 2.3 Test Mode and Test Software

- a. During testing, the interface cables and equipment positions were varied according to ANSI C63.4.
  - b. The complete test system included Notebook, Mouse and EUT for the RF test.
  - c. The EUT operation by key button which transmits and receives data through Wireless.
  - d. The EUT had been tested under operating condition
- After verification, all tests were carried out with the worst case test modes as shown below except radiated spurious emission below 1GHz, which worst case was in TX mode only. EUT staying in continuous transmitting mode was programmed.  
FHSS :Channel Low (2402MHz), Channel Mid (2440MHz) and Channel High (2480MHz) were chosen for full testing.

### 2.4 Description of Test System

| Device | Manufacturer | Model No. | Description |
|--------|--------------|-----------|-------------|
| N/A    | N/A          | N/A       | N/A         |

Use Cable:

| No. | Cable | Quantity | Description |
|-----|-------|----------|-------------|
| A   | N/A   | N/A      | N/A         |



## 2.5 General Information of Test

|                                     |           |  |
|-------------------------------------|-----------|--|
| <input checked="" type="checkbox"/> | Test Site | <b>Cerpass Technology Corporation Test Laboratory</b><br>Address: No.10, Ln. 2, Lianfu St., Luzhu Dist., Taoyuan City 33848, Taiwan (R.O.C.)<br>Tel:+886-3-3226-888<br>Fax:+886-3-3226-881<br>Address: No.68-1, Shihbachongsi, Shihding Township, New Taipei City 223, Taiwan, R.O.C.<br>Tel: +886-2-2663-8582 |
|                                     | FCC       | TW1079, TW1061,390316, 228391, 641184  |
|                                     | IC        | 4934B-1, 4934E-1, 4934E-2  |
|                                     | VCCI      | T-2205 for Telecommunication Test<br>C-4663 for Conducted emission test<br>R-3428, R-4218 for Radiated emission test<br>G-812, G-813 for radiated disturbance above 1GHz   |
| <input type="checkbox"/>            | Test Site | <b>Cerpass Technology (Suzhou) Co.,Ltd</b><br>Address: No.66,Tangzhuang Road, Suzhou Industrial Park, Jiangsu 215006, China<br>Tel: +86-512-6917-5888<br>Fax: +86-512-6917-5666  |
|                                     | FCC       | 916572, 331395   |
|                                     | IC        | 7290A-1, 7290A-2   |
|                                     | VCCI      | T-343 for Telecommunication Test<br>C-2919 for Conducted emission test<br>R-2670 for Radiated emission test<br>G-227 for radiated disturbance above 1GHz   |
| Frequency Range Investigated:       |           | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 25000MHz   |
| Test Distance:                      |           | The test distance of radiated emission from antenna to EUT is 3 M.   |



### 3. Test Equipment and Ancillaries Used for Tests

| Instrument                          | Manufacturer | Model No.                        | Serial No.     | Calibration Date | Valid Date |
|-------------------------------------|--------------|----------------------------------|----------------|------------------|------------|
| Test Receiver                       | R&S          | ESCI                             | 100564         | 2016.02.22       | 2017.02.21 |
| LISN                                | SCHWARZBECK  | NSLK 8127                        | 8127748        | 2015.10.22       | 2016.10.21 |
| LISN                                | SCHWARZBECK  | NSLK 8127                        | 8127749        | 2015.10.22       | 2016.10.21 |
| Pulse Limiter with 10dB Attenuation | SCHWARZBECK  | VTSD 9561-F                      | 9561-F106      | 2016.02.22       | 2017.02.21 |
| Temperature/Humidity Meter          | mingle       | ETH529                           | N/A            | 2016.02.19       | 2017.02.18 |
| Test Receiver                       | R&S          | ESCI                             | 100853         | 2016.02.22       | 2017.02.21 |
| AMPLIFIER                           | HP           | 8447F                            | 3113A05915     | 2016.02.22       | 2017.02.21 |
| BILOG Antenna                       | SCHAFFNER    | CBL6112D                         | 22241          | 2015.09.30       | 2016.09.29 |
| Horn Antenna                        | Sunol        | DRH-118                          | A072913        | 2015.09.30       | 2016.09.29 |
| Temp&Humidity&barometer             | mingle       | ETH529                           | N/A            | 2016.02.19       | 2017.02.18 |
| Preamplifier                        | Field        | AFS44-0010180<br>0-25-<br>10P-44 | 1579008        | 2015.09.30       | 2016.09.29 |
| ESG VECTOR SIGNAL GENERATOR         | Agilent      | E4438C                           | MY4509258<br>2 | 2015.07.18       | 2016.07.17 |
| MXG VECTOR SIGNAL GENERATOR         | Agilent      | N5182B                           | MY5305012<br>7 | 2015.07.18       | 2016.07.17 |
| EXA Signal Analyzer                 | Agilent      | N9020A                           | US46220290     | 2015.07.18       | 2016.07.17 |
| Power sensor                        | e-channel    | ERS-180T-24                      | TW5451026      | 2015.06.25       | 2016.06.24 |





## 4. Antenna Requirements

### 4.1 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 15.247 (b), 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.

### 4.2 Antenna Construction and Directional Gain

| No. | Antenna Type    | Antenna Gain |
|-----|-----------------|--------------|
| 1   | Printed Antenna | 3.85dBi      |



## 5. Test of AC Power Line Conducted Emission

### 5.1 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                      |

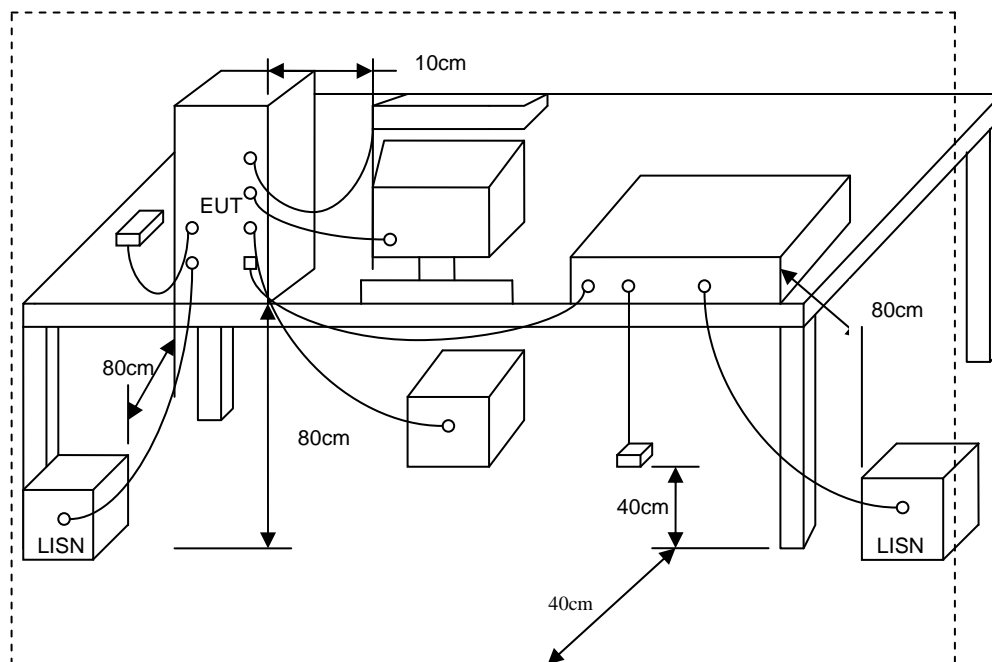
\*Decreases with the logarithm of the frequency.

### 5.2 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.



### 5.3 Typical Test Setup





## **5.4 Test Result and Data**

Not applicable since the EUT supplied by batteries.



## 6. Test of Spurious Emission (Radiated)

### 6.1 Test Limit

Radiated emissions from 30 MHz to 25 GHz were measured according to the methods defines in ANSI C63.4-2009. The EUT was placed, 0.8 meter above the ground plane, as shown in section 5.6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions for unintentional device, according to § 15.109(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

| 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                     |

For unintentional device, according to CISPR PUB.22, for Class B digital devices, the general requirement of field strength of radiated emissions from intentional radiators at a distance of 10 meters shall not exceed the below table.

| Frequency (MHz) | Distance Meters | Radiated (dB $\mu$ V/ M) |
|-----------------|-----------------|--------------------------|
| 30-230          | 10              | 30                       |
| 230-1000        | 10              | 37                       |

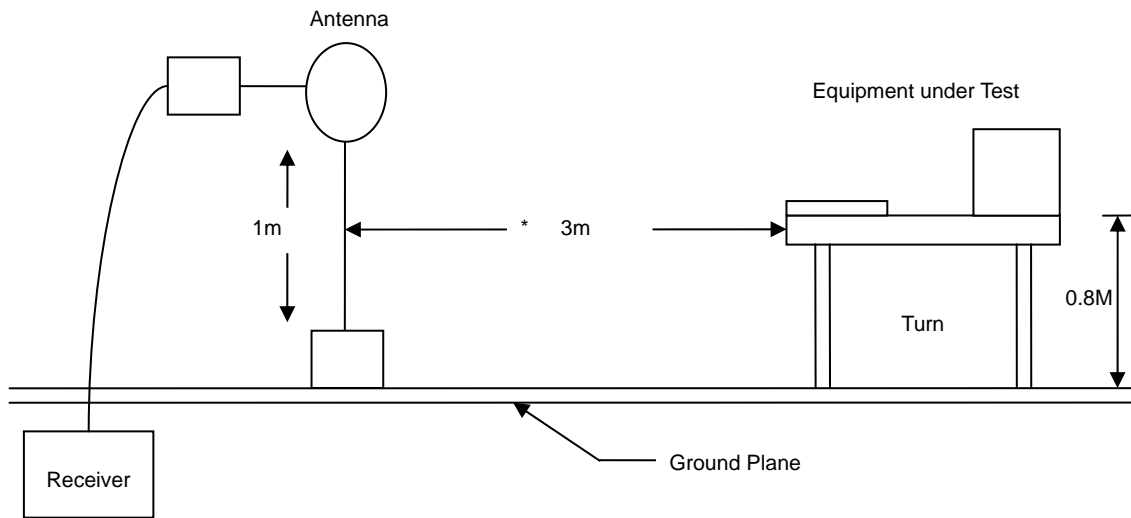
### 6.2 Test Procedures

- 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.
- "Cone of radiation" has been considered to be 3dB bandwidth of the measurement antenna.

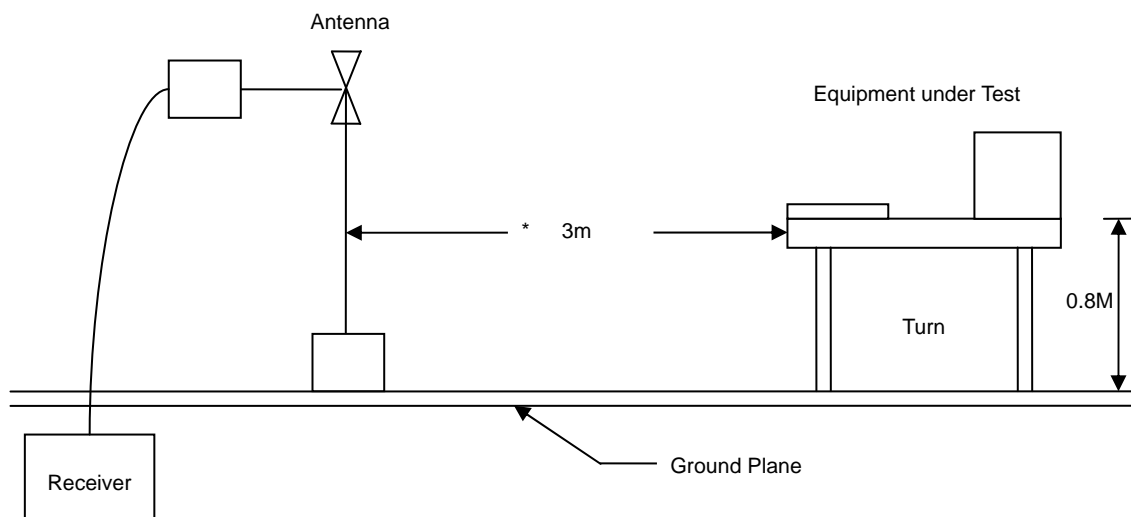


### 6.3 Typical Test Setup

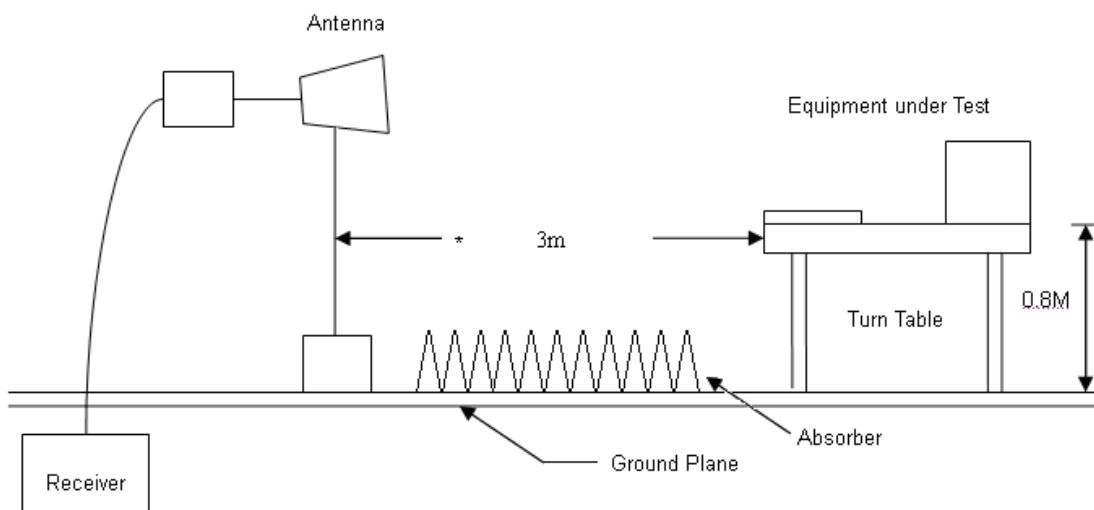
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



**6.4 Test Result and Data (30MHz ~ 1GHz)**

|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX Mode       | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

| Frequency<br>(MHz) | AntPol.<br>H/V | Correct<br>Factor<br>(dB) | Reading<br>level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Safe<br>Margin<br>(dB) | Detector<br>mode<br>(PK/QP) |
|--------------------|----------------|---------------------------|----------------------------|------------------------------|----------------------|------------------------|-----------------------------|
| 30.0000            | H              | -3.01                     | 30.38                      | 27.37                        | 40.00                | -12.63                 | QP                          |
| 167.7400           | H              | -11.97                    | 44.35                      | 32.38                        | 43.50                | -11.12                 | QP                          |
| 195.8700           | H              | -9.90                     | 41.24                      | 31.34                        | 43.50                | -12.16                 | QP                          |
| 277.3500           | H              | -8.71                     | 42.23                      | 33.52                        | 46.00                | -12.48                 | QP                          |
| 531.4900           | H              | -2.46                     | 35.33                      | 32.87                        | 46.00                | -13.13                 | QP                          |
| 689.6000           | H              | -1.23                     | 35.85                      | 34.62                        | 46.00                | -11.38                 | QP                          |
|                    |                |                           |                            |                              |                      |                        |                             |
| 32.9100            | V              | -4.78                     | 30.85                      | 26.07                        | 40.00                | -13.93                 | QP                          |
| 167.7400           | V              | -11.97                    | 43.20                      | 31.23                        | 43.50                | -12.27                 | QP                          |
| 196.8400           | V              | -9.84                     | 40.74                      | 30.90                        | 43.50                | -12.60                 | QP                          |
| 277.3500           | V              | -8.71                     | 43.26                      | 34.55                        | 46.00                | -11.45                 | QP                          |
| 531.4900           | V              | -2.46                     | 35.44                      | 32.98                        | 46.00                | -13.02                 | QP                          |
| 691.5400           | V              | -1.21                     | 36.88                      | 35.67                        | 46.00                | -10.33                 | QP                          |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor

**6.5 Test Result and Data (1GHz ~ 25GHz)**

|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX-2402MHz    | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

| Frequency<br>(MHz) | AntPol.<br>H/V | Correct<br>Factor<br>(dB) | Reading<br>level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Safe<br>Margin<br>(dB) | Detector<br>mode<br>(PK/QP) |
|--------------------|----------------|---------------------------|----------------------------|------------------------------|----------------------|------------------------|-----------------------------|
| 2615.000           | H              | -1.81                     | 41.36                      | 39.55                        | 74.00                | -34.45                 | peak                        |
| 3550.000           | H              | 3.57                      | 33.26                      | 36.83                        | 74.00                | -37.17                 | peak                        |
| 4272.500           | H              | 6.50                      | 32.65                      | 39.15                        | 74.00                | -34.85                 | peak                        |
| 4825.000           | H              | 8.27                      | 40.55                      | 48.82                        | 74.00                | -25.18                 | peak                        |
| 6227.500           | H              | 10.35                     | 30.54                      | 40.89                        | 74.00                | -33.11                 | peak                        |
| 6865.000           | H              | 11.64                     | 33.14                      | 44.78                        | 74.00                | -29.22                 | peak                        |
|                    |                |                           |                            |                              |                      |                        |                             |
| 2360.000           | V              | -3.18                     | 41.70                      | 38.52                        | 74.00                | -35.48                 | peak                        |
| 2870.000           | V              | -0.10                     | 41.99                      | 41.89                        | 74.00                | -32.11                 | peak                        |
| 4825.000           | V              | 8.27                      | 44.39                      | 52.66                        | 74.00                | -21.34                 | peak                        |
| 5165.000           | V              | 8.74                      | 32.07                      | 40.81                        | 74.00                | -33.19                 | peak                        |
| 6227.500           | V              | 10.35                     | 31.60                      | 41.95                        | 74.00                | -32.05                 | peak                        |
| 7247.500           | V              | 13.05                     | 36.65                      | 49.70                        | 74.00                | -24.30                 | peak                        |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor





|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX-2440MHz    | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

| Frequency<br>(MHz) | AntPol.<br>H/V | Correct<br>Factor<br>(dB) | Reading<br>level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Safe<br>Margin<br>(dB) | Detector<br>mode<br>(PK/QP) |
|--------------------|----------------|---------------------------|----------------------------|------------------------------|----------------------|------------------------|-----------------------------|
| 2785.000           | H              | -0.67                     | 40.54                      | 39.87                        | 74.00                | -34.13                 | peak                        |
| 3677.500           | H              | 4.01                      | 33.31                      | 37.32                        | 74.00                | -36.68                 | peak                        |
| 4910.000           | H              | 8.43                      | 39.59                      | 48.02                        | 74.00                | -25.98                 | peak                        |
| 5972.500           | H              | 10.19                     | 30.21                      | 40.40                        | 74.00                | -33.60                 | peak                        |
| 6822.500           | H              | 11.50                     | 32.74                      | 44.24                        | 74.00                | -29.76                 | peak                        |
| 7332.500           | H              | 13.38                     | 33.75                      | 47.13                        | 74.00                | -26.87                 | peak                        |
|                    |                |                           |                            |                              |                      |                        |                             |
| 2912.500           | V              | 0.18                      | 41.57                      | 41.75                        | 74.00                | -32.25                 | peak                        |
| 4230.000           | V              | 6.28                      | 32.69                      | 38.97                        | 74.00                | -35.03                 | peak                        |
| 4910.000           | V              | 8.43                      | 42.34                      | 50.77                        | 74.00                | -23.23                 | peak                        |
| 5590.000           | V              | 9.24                      | 31.05                      | 40.29                        | 74.00                | -33.71                 | peak                        |
| 6482.500           | V              | 10.45                     | 31.57                      | 42.02                        | 74.00                | -31.98                 | peak                        |
| 7332.500           | V              | 13.38                     | 34.47                      | 47.85                        | 74.00                | -26.15                 | peak                        |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX-2480MHz    | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

| Frequency<br>(MHz) | AntPol.<br>H/V | Correct<br>Factor<br>(dB) | Reading<br>level<br>(dBuV) | Measure<br>Level<br>(dBuV/m) | Limit 3m<br>(dBuV/m) | Safe<br>Margin<br>(dB) | Detector<br>mode<br>(PK/QP) |
|--------------------|----------------|---------------------------|----------------------------|------------------------------|----------------------|------------------------|-----------------------------|
| 2785.000           | H              | -0.67                     | 41.25                      | 40.58                        | 74.00                | -33.42                 | peak                        |
| 4145.000           | H              | 5.85                      | 32.36                      | 38.21                        | 74.00                | -35.79                 | peak                        |
| 4995.000           | H              | 8.59                      | 39.59                      | 48.18                        | 74.00                | -25.82                 | peak                        |
| 6185.000           | H              | 10.33                     | 30.99                      | 41.32                        | 74.00                | -32.68                 | peak                        |
| 6907.500           | H              | 11.78                     | 32.91                      | 44.69                        | 74.00                | -29.31                 | peak                        |
| 7460.000           | H              | 13.87                     | 32.91                      | 46.78                        | 74.00                | -27.22                 | peak                        |
|                    |                |                           |                            |                              |                      |                        |                             |
| 2870.000           | V              | -0.10                     | 41.18                      | 41.08                        | 74.00                | -32.92                 | peak                        |
| 4995.000           | V              | 8.59                      | 41.96                      | 50.55                        | 74.00                | -23.45                 | peak                        |
| 5845.000           | V              | 9.88                      | 31.25                      | 41.13                        | 74.00                | -32.87                 | peak                        |
| 6482.500           | V              | 10.45                     | 30.83                      | 41.28                        | 74.00                | -32.72                 | peak                        |
| 7120.000           | V              | 12.55                     | 31.97                      | 44.52                        | 74.00                | -29.48                 | peak                        |
| 7460.000           | V              | 13.87                     | 33.95                      | 47.82                        | 74.00                | -26.18                 | peak                        |

Note: Level = Reading + Factor

Margin = Level – Limit

Factor= Antenna Factor + Cable Loss - Amplifier Factor



## 7. 20dB Bandwidth Measurement Data

### 7.1 Test Limit

Intentional radiators operating under the alternative provisions to the general emission limits, as contained in § 15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

### 7.2 Test Procedure

- The transmitter output was connected to the spectrum analyzer.
- Set RBW of spectrum analyzer to 30 KHz and VBW to 100KHz.
- The 20 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 7.3 Test Setup Layout



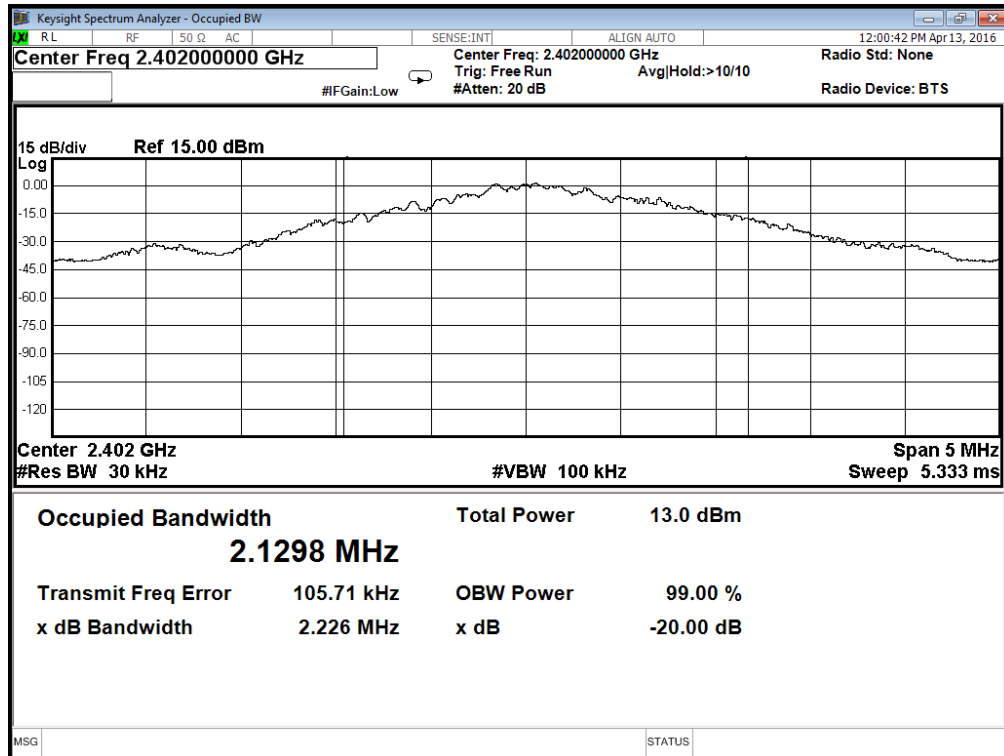
### 7.4 Test Result and Data

|           |                 |                      |            |
|-----------|-----------------|----------------------|------------|
| Power     | : DC 3V         | Temperature          | : 24 °C    |
| Test Mode | TX-Mode         | Humidity             | : 54 %     |
| Test date | : Apr. 13, 2016 | Atmospheric Pressure | : 1010 hpa |

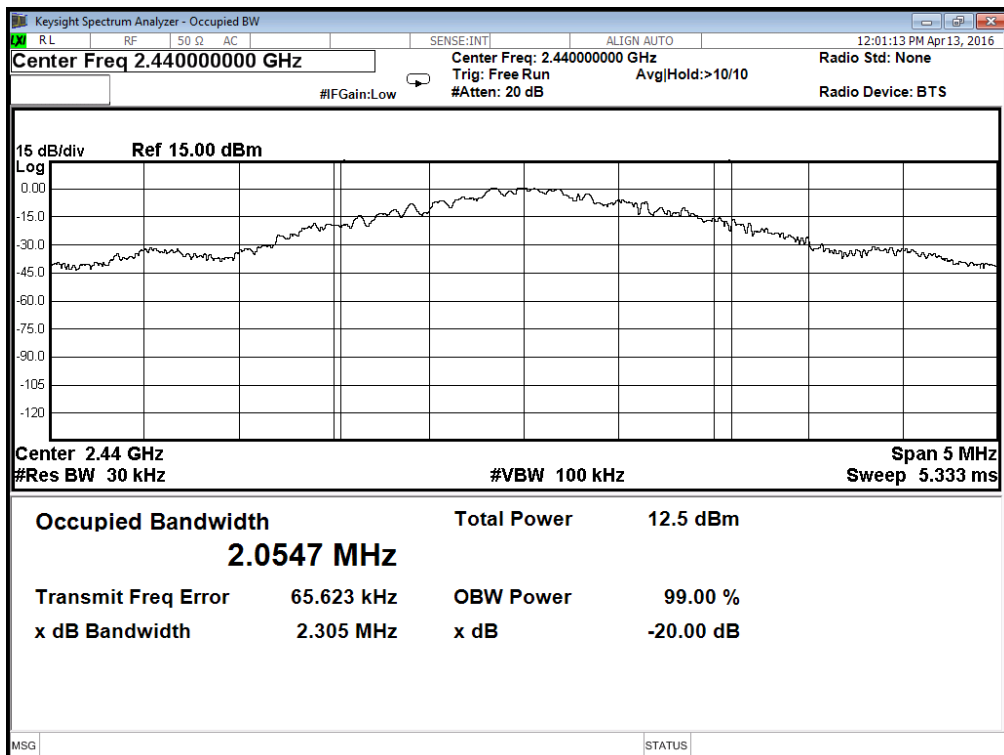
| Channel | Frequency (MHz) | 20dB Bandwidth (KHz) |
|---------|-----------------|----------------------|
| Low     | 2402            | 2226.00              |
| Mid     | 2440            | 2305.00              |
| High    | 2480            | 2252.00              |



Channel: Low

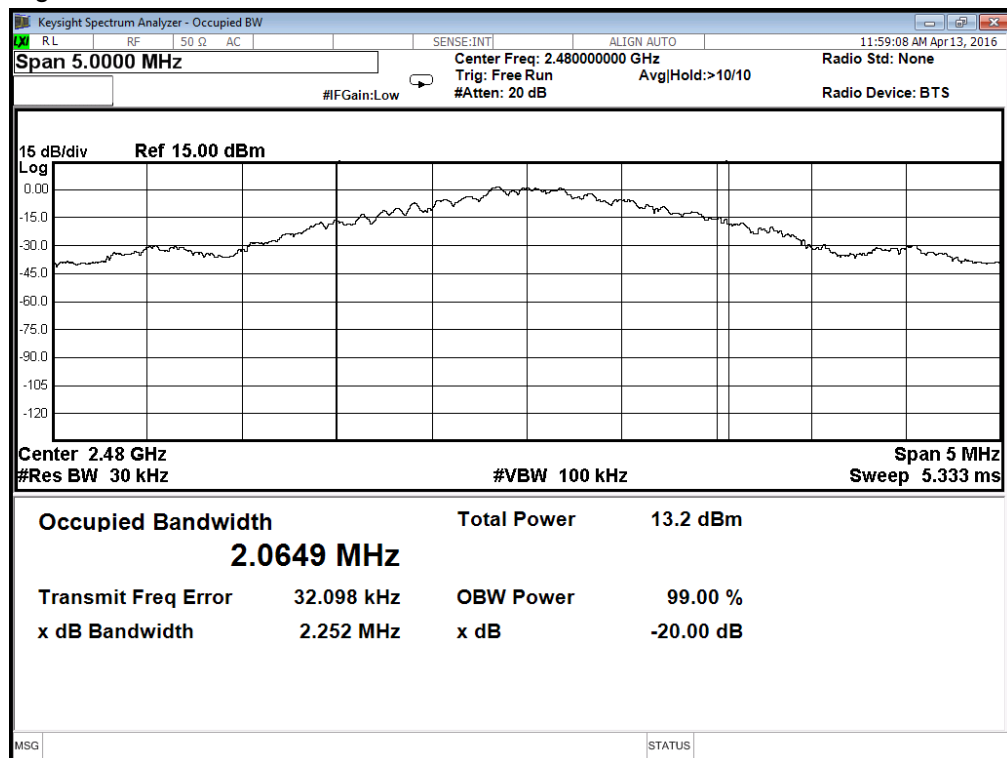


Channel: Mid





Channel: High





## 8. Band Edges Measurement

### 8.1 Test Limit

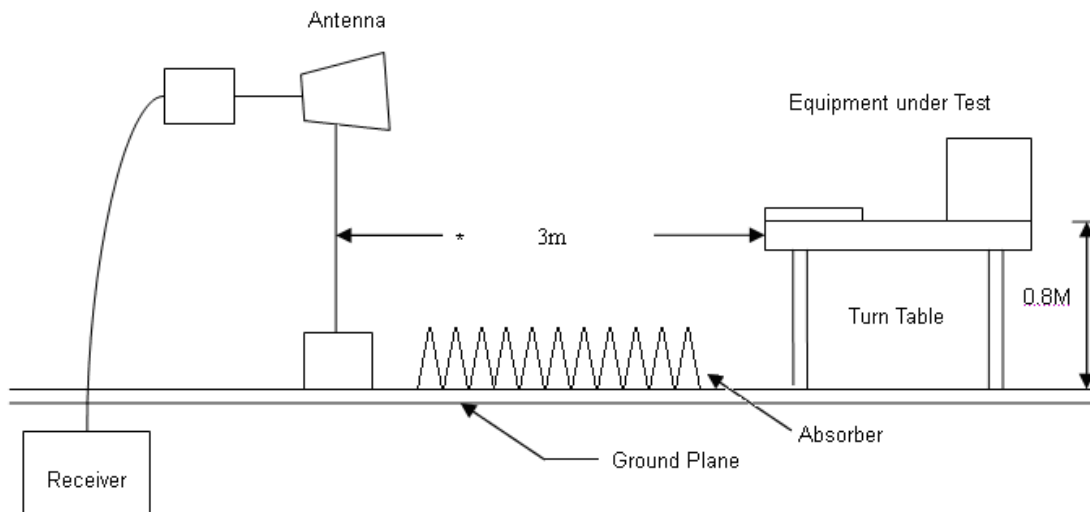
Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

### 8.2 Test Procedure

- 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 resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and video bandwidth is 3 MHz for Peak detection at frequency above 1GHz.
- The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and video bandwidth is 10Hz for Average detection at frequency above 1GHz
- The band edges was measured and recorded.

### 8.3 Test Setup Layout

Above 1GHz Test Setup





#### 8.4 Restrict band emission Measurement Data

|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX-2402MHz    | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

##### VERTICAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 2390.000        | -3.05               | 53.20                | 50.15                  | -23.85      | 74.000         | PEAK          |
| 2   | 2390.000        | -3.05               | 39.84                | 36.79                  | -17.21      | 54.000         | AVG           |
| 3   | 2400.000        | -3.01               | 70.41                | 67.40                  | -6.60       | 74.000         | PEAK          |
| 4   | 2400.000        | -3.01               | 55.26                | 52.25                  | -1.75       | 54.000         | AVG           |
| 5   | 2401.700        | -3.00               | 85.45                | 82.45                  | -31.55      | 114.000        | PEAK          |
| 6   | 2401.700        | -3.00               | 71.85                | 68.85                  | -25.15      | 94.000         | AVG           |

##### HORIZONTAL

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 2390.000        | -3.05               | 53.55                | 50.50                  | -23.50      | 74.000         | PEAK          |
| 2   | 2390.000        | -3.05               | 38.73                | 35.68                  | -18.32      | 54.000         | AVG           |
| 3   | 2400.000        | -3.01               | 70.81                | 67.80                  | -6.20       | 74.000         | PEAK          |
| 4   | 2400.000        | -3.01               | 54.18                | 51.17                  | -2.83       | 54.000         | AVG           |
| 5   | 2402.300        | -3.00               | 86.97                | 83.97                  | -30.03      | 114.000        | PEAK          |
| 6   | 2402.300        | -3.00               | 71.67                | 68.67                  | -25.33      | 94.000         | AVG           |



|           |   |               |                      |   |          |
|-----------|---|---------------|----------------------|---|----------|
| Power     | : | DC 3V         | Temperature          | : | 24 °C    |
| Test Mode | : | TX-2480MHz    | Humidity             | : | 54 %     |
| Test date | : | Apr. 13, 2016 | Atmospheric Pressure | : | 1010 hpa |

**VERTICAL**

| No. | Frequency (MHz) | Correct Factor (dB) | Reading Level (dBuV) | Measure Level (dBuV/m) | Margin (dB) | Limit (dBuV/m) | Detector Type |
|-----|-----------------|---------------------|----------------------|------------------------|-------------|----------------|---------------|
| 1   | 2479.600        | -2.67               | 85.01                | 82.34                  | -31.66      | 114.000        | PEAK          |
| 2   | 2479.600        | -2.67               | 70.35                | 67.68                  | -26.32      | 94.000         | AVG           |
| 3   | 2483.500        | -2.65               | 58.07                | 55.42                  | -18.58      | 74.000         | PEAK          |
| 4   | 2483.500        | -2.65               | 44.23                | 41.58                  | -12.42      | 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   | 2480.400        | -2.66               | 84.91                | 82.25                  | -31.75      | 114.000        | PEAK          |
| 2   | 2480.400        | -2.66               | 69.45                | 66.79                  | -27.21      | 94.000         | AVG           |
| 3   | 2483.500        | -2.65               | 54.13                | 51.48                  | -22.52      | 74.000         | PEAK          |
| 4   | 2483.500        | -2.65               | 40.18                | 37.53                  | -16.47      | 54.000         | AVG           |





## 9. Restricted Bands of Operation

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

### 9.1 Labeling Requirement

The device shall bear the following statement in a conspicuous location on the device:

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.