



# FCC RADIO TEST REPORT

Applicant : Withings SA  
Address : 2 Rue Maurice Hartmann, 92130  
Issy-les-Moulineaux, France  
Equipment : BPM Core  
Model No. : WPM04  
Trade Name : Withings  
FCC ID. : XNAWPM04

**I HEREBY CERTIFY THAT :**

The sample was received on Apr. 25, 2019 and the testing was completed on May. 27, 2019 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:

Mark Liao / Supervisor

Laboratory Accreditation:

CerpPASS Technology Corporation Test Laboratory





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History of this test report

| Report No.  | Issue Date    | Description |
|-------------|---------------|-------------|
| TEF11903241 | May. 27, 2019 | Original    |
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|             |               |             |



# 1. Summary of Test Procedure and Test Results

## 1.1 Applicable Standards

ANSI C63.4:2014

ANSI C63.10:2013

FCC Rules and Regulations Part 15 Subpart C §15.247

KDB558074

KDB662911

KDB447498

| FCC Rule         | Description of Test                     | Result |
|------------------|---|--------|
| 15.203           | . Antenna Requirement                   | PASS   |
| 15.207           | . AC Power Line Conducted Emission      | PASS   |
| 15.209<br>15.205 | . Radiated Spurious Emission            | PASS   |
| 15.247(d)        | . Conducted Spurious Emission           | PASS   |
| 15.247(a)(2)     | . 6dB Bandwidth                         | PASS   |
| 15.247(b)        | . Maximum Peak and Average Output Power | PASS   |
| 15.247(e)        | . Power Spectral Density                | PASS   |
| 2.1091           | . Radio Frequency Exposure              | PASS   |

\*The principle of judgment is made according to the laboratory's reporting control and measurement uncertainty standard procedures.

\*This EUT has been also tested and compiled with the requirement of FCC Part 15, Subpart B, recorded in a separate test report(TEFD1903241).



## 2. Test Configuration of Equipment under Test

### 2.1 Feature of Equipment

|                       |  |
|-----------------------|--|
| Frequency Range       | 2400MHz -2483.5MHz   |
| Modulation Type       | BLE: GFSK<br>802.11b: CCK, DQPSK, DBPSK<br>802.11g/n: BPSK, QPSK, 16QAM,64QAM  |
| MODULATION TECHNOLOGY | BLE: DTS<br>802.11b: DSSS<br>802.11g/n: OFDM   |
| Data Rate             | BLE:<br>GFSK for 1Mbps<br>2.4GHz:<br>802.11b: 1, 2, 5.5, 11Mbps<br>802.11g: 6, 9, 12, 18, 24, 36, 48, 54Mbps<br>802.11n: MCS0 – MCS7, HT20 |
| Antenna Type          | PCB Antenna  |
| Antenna Gain          | 2.8dBi   |

Note: for more details, please refer to the User's manual of the EUT



### 2.2 Carrier Frequency of Channels

802.11b, 802.11g, 802.11n HT20 (2412MHz~2462MHz)

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| <b>*01</b> | <b>2412</b>    | 07         | 2442           |
| 02         | 2417           | 08         | 2447           |
| 03         | 2422           | 09         | 2452           |
| 04         | 2427           | 10         | 2457           |
| 05         | 2432           | <b>*11</b> | <b>2462</b>    |
| <b>*06</b> | <b>2437</b>    | ---        | ---            |

802.11n HT40 (2422MHz~2452MHz)

| Channel    | Frequency(MHz) | Channel    | Frequency(MHz) |
|------------|----------------|------------|----------------|
| ---        | ---            | 07         | 2442           |
| ---        | ---            | 08         | 2447           |
| <b>*03</b> | <b>2422</b>    | <b>*09</b> | <b>2452</b>    |
| 04         | 2427           | ---        | ---            |
| 05         | 2432           | ---        | ---            |
| <b>*06</b> | <b>2437</b>    | ---        | ---            |

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 C63.10.
- b. The complete test system included Remote workstation and EUT for RF test. The Remote workstation included Notebook.
- c. An executive “TEAR TERM” program” type hci command” under WIN 7 was executed to transmit and receive data via WLAN.
- d. The following test modes were performed for the test:

| Conducted Emissions from the AC mains power ports                                      |                        |
|--|------------------------|
| Test Mode  | Operating Description  |
| 1  | 802.11b (1Mbps)        |
| 2  | 802.11g (6Mbps)        |
| 3  | 802.11n HT20 (6.5Mbps) |
| caused “Test Mode 2” generated the worst case, it was reported as the final data.      |                        |
| Radiation Emissions (30MHz ~ 1GHz)   |                        |
| Test Mode  | Operating Description  |
| 1  | 802.11b (1Mbps)        |
| 2  | 802.11g (6Mbps)        |
| 3  | 802.11n HT20 (6.5Mbps) |
| caused “Test Mode 2” generated the worst case, they were reported as the final data.   |                        |
| Radiation Emissions (1GHz ~ 25GHz)   |                        |
| Test Mode  | Operating Description  |
| 1  | 802.11b (1Mbps)        |
| 2  | 802.11g (6Mbps)        |
| 3  | 802.11n HT20 (6.5Mbps) |
| caused “Test Mode 1~3” generated the worst case, they were reported as the final data. |                        |

### 2.4 Description of Test System

| RF Conducted                     |       |        |             |                        |
|----------------------------------|-------|--------|-------------|------------------------|
| Equipment                        | Brand | Model  | Length/Type | Power cord/Length/Type |
| Notebook                         | ASUS  | P2430U | N/A         | Adapter / 1.8m / NS    |
| Radiated Emissions               |       |        |             |                        |
| Equipment                        | Brand | Model  | Length/Type | Power cord/Length/Type |
| Notebook                         | ASUS  | P2430U | N/A         | Adapter / 1.8m / NS    |
| AC Power Line Conducted Emission |       |        |             |                        |
| Equipment                        | Brand | Model  | Length/Type | Power cord/Length/Type |
| Notebook                         | ASUS  | P2430U | N/A         | Adapter / 1.8m / NS    |





**2.5 General Information of Test**

|                               |   |  |
|-------------------------------|---|--|
| Test Site                     | <b>CerpPASS 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, TW1439   |
|                               | IC  | 4934E-1, 4934E-2   |
|                               | VCCI  | T-2205 for Telecommunication test<br>C-4663 for Conducted emission test<br>R-4399, R-4218 for Radiated emission test<br>G-10812, G-10813 for radiated disturbance above 1GHz |
| Frequency Range Investigated: | Conducted: from 150kHz to 30 MHz<br>Radiation: from 30 MHz to 25,000MHz   |  |
| Test Distance:                | The test distance of radiated emission from antenna to EUT is 3 M.  |  |

| Test Item          | Test Site  | Tested Date | Environmental Conditions | Tested By  |
|--------------------|------------|-------------|--------------------------|------------|
| RF Conducted       | RFCON01-NK | 2019/05/27  | 21°C / 63%               | Leon Huang |
| Radiated Emissions | 3M02-NK    | 2019/05/17  | 25°C / 54%               | Leon Huang |
| RF Conduction      | CON02-NK   | 2019/05/27  | 25°C / 43%               | Leon Huang |



### 2.6 Measurement Uncertainty

| Measurement Item                         | Uncertainty |
|--|-------------|
| Radiated Spurious Emission(9KHz~30MHz)   | ±3.405dB    |
| Radiated Spurious Emission(30MHz~1GHz)   | ±5.326dB    |
| Radiated Spurious Emission(1GHz~25GHz)   | ±5.918dB    |
| Conducted Spurious Emission              | ±2.156dB    |
| 6dB Bandwidth                            | ±4.401%     |
| 20dB Bandwidth                           | ±4.40%      |
| Occupied Bandwidth                       | ±4.41%      |
| Peak Output Power(Conducted Power Meter) | ±1.31dB     |
| Dwell Time                               | ±0.11%      |
| Power Spectral Density                   | ±2.146dB    |
| Duty Cycle                               | ±0.17%      |



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

| Test Item           | Radiated Emissions          |             |                 |                  |            |
|---------------------|-----------------------------|-------------|-----------------|------------------|------------|
| Test Site           | Semi Anechoic Room(3M02-NK) |             |                 |                  |            |
| Instrument          | Manufacturer                | Model No    | Serial No       | Calibration Date | Valid Date |
| Bilog Antenna       | Schwarzbeck                 | VULB9168    | 275             | 2018/09/17       | 2019/09/16 |
| Active Loop Antenna | EMCO                        | 6507        | 40855           | 2018/05/22       | 2019/05/21 |
| Horn Antenna        | EMCO                        | 3115        | 31589           | 2019/04/01       | 2020/03/31 |
| Horn Anrenna        | EMCO                        | 3116        | 31974           | 2018/09/07       | 2019/09/06 |
| EMI Receiver        | ROHDE & SCHWARZ             | ESCI        | 101423          | 2018/06/11       | 2019/06/10 |
| Spectrum Analyzer   | ROHDE & SCHWARZ             | FSP 40      | 100219          | 2018/07/03       | 2019/07/02 |
| Preamplifier        | EM Electronics corp.        | EM330       | 60660           | 2019/03/11       | 2020/03/10 |
| Preamplifier        | EMC INSTRUMENTS             | EMC051845SE | 980333          | 2018/09/18       | 2019/09/17 |
| Bluetooth Tester    | ROHDE & SCHWARZ             | CBT         | 101133          | 2019/04/07       | 2020/04/06 |
| Cable-3in1(30M-1G)  | HARBOUR INDUSTRIES          | LL142       | CCE1315         | 2018/04/20       | 2019/04/19 |
| Cable-0.5m(1G-40G)  | Rapidtek                    | 40GHZ 50CM  | 38MS-38MS50314  | 2019/04/09       | 2020/04/08 |
| Cable-3m(1G-40G)    | Rapidtek                    | 40GHZ 300CM | 38MS-38MS300314 | 2019/04/09       | 2020/04/08 |
| Cable-8m(1G-40G)    | Rapidtek                    | 40GHZ 800CM | 38MS-38MS800314 | 2019/04/10       | 2020/04/09 |
| E3                  | AUDIX                       | v8.2014-8-6 | RK-000529       | NA               | NA         |

| Test Item           | RF Conducted    |          |             |                  |            |
|---------------------|-----------------|----------|-------------|------------------|------------|
| Test Site           | RFCON01-NK      |          |             |                  |            |
| Instrument          | Manufacturer    | Model No | Serial No   | Calibration Date | Valid Date |
| Spectrum Analyzer   | ROHDE & SCHWARZ | FSP 40   | 100219      | 2018/07/03       | 2019/07/02 |
| Bluetooth Tester    | ROHDE & SCHWARZ | CBT      | 101133      | 2019/04/07       | 2020/04/06 |
| Attenuator          | KEYSIGHT        | 8491B    | MY39250705  | 2018/09/04       | 2019/09/03 |
| TEMP & HUMI CHAMBER | T-MACHINE       | TMJ-9712 | T-12-040111 | 2018/08/30       | 2019/08/29 |
| Power Sensor        | Anritsu         | MA2411B  | 1207295     | 2019/04/11       | 2020/04/10 |

| Test Item                            | AC Power Line Conducted Emission |             |           |                  |            |
|--------------------------------------|----------------------------------|-------------|-----------|------------------|------------|
| Test Site                            | CON01-NK                         |             |           |                  |            |
| Instrument                           | Manufacturer                     | Model No    | Serial No | Calibration Date | Valid Date |
| EMI Receiver                         | ROHDE & SCHWARZ                  | ESCI        | 100821    | 2018/9/12        | 2019/09/11 |
| Line Impedance Stabilization Network | Schwarzbeck                      | NSLK 8127   | 8127-740  | 2018/6/13        | 2019/06/12 |
| Pulse Limiter                        | ROHDE & SCHWARZ                  | ESH3-Z2     | 101933    | 2018/9/4         | 2019/09/03 |
| E3                                   | AUDIX                            | v8.2014-8-6 | RK-000531 | NA               | NA         |



## 4. Antenna Requirements

### 4.1 Antenna Construction and Directional Gain

|              |             |
|--------------|-------------|
| Antenna Type | PCB Antenna |
| Antenna Gain | 2.80 dBi    |

For Power directional gain =  $G_{ant} = 2.8$  dBi

For PSD directional gain =  $G_{ant} = 2.8$  dBi



## 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, according to the methods defined in ANSI C63.4-2014. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position produced maximum conducted emissions.

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

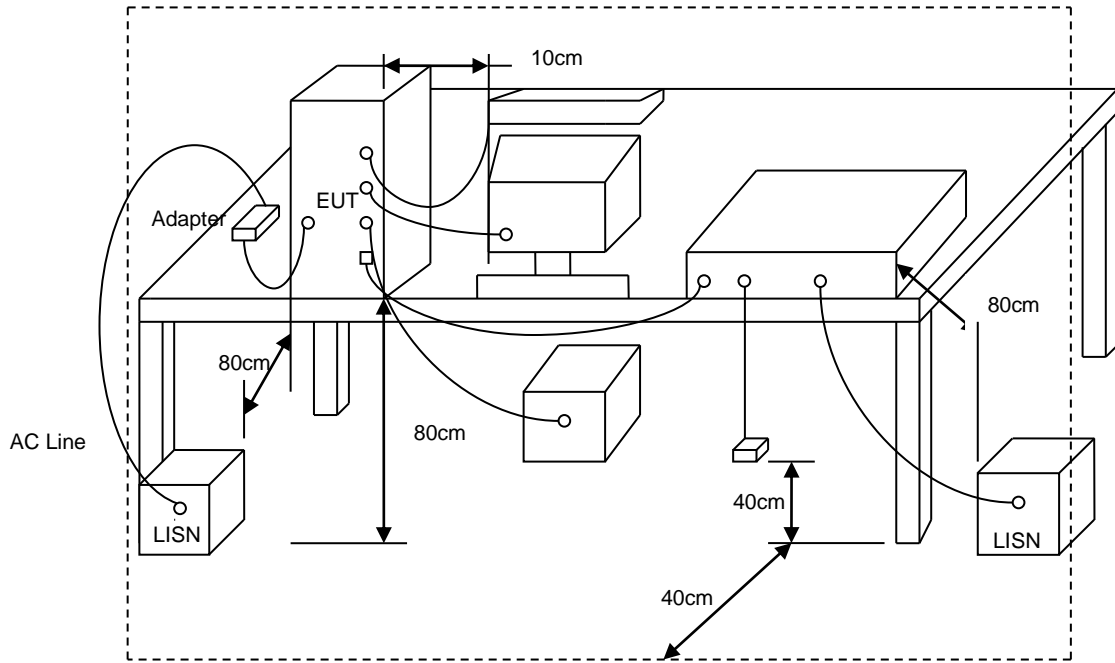
\*Decreases with the logarithm of the frequency.

### 5.2 Test Procedures

- a. 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.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connecting to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The FCC states that a 50 ohm, 50 micro-Henry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.



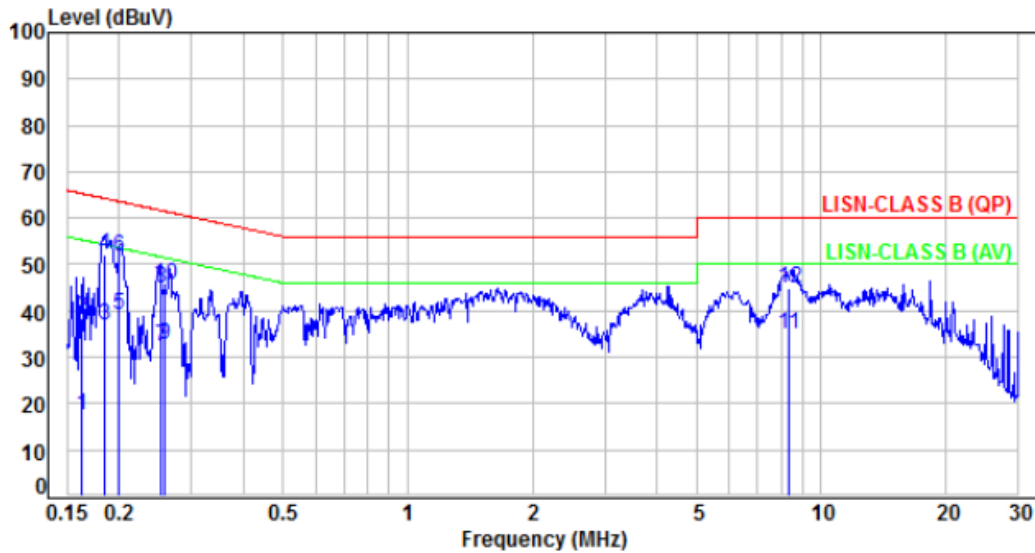
### 5.3 Typical Test Setup





### 5.4 Test Result and Data

|           |                     |           |           |
|-----------|---------------------|-----------|-----------|
| Power     | : DC 5V from system | Pol/Phase | : NEUTRAL |
| Test Mode | : Mode 2            |           | :         |

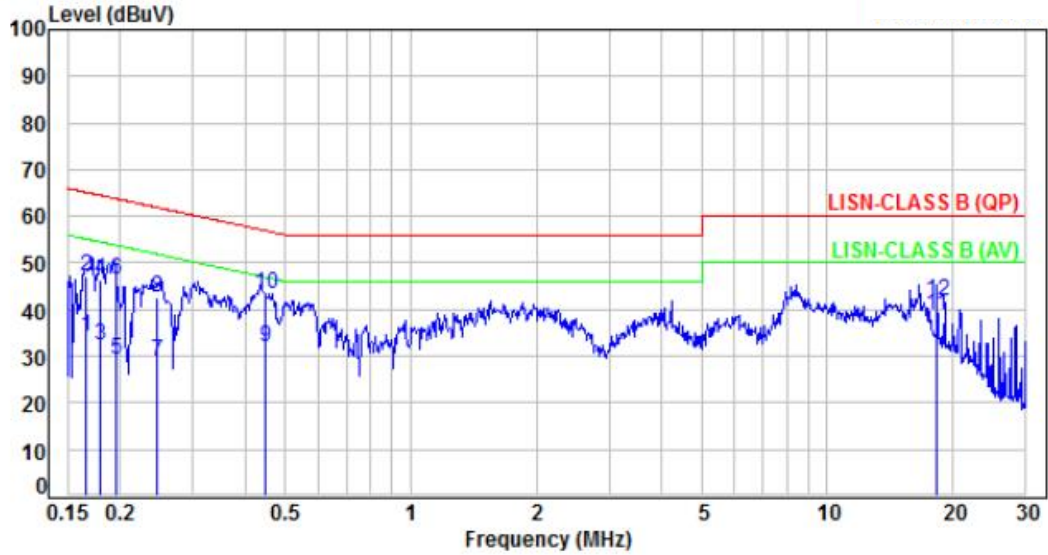


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.16            | 9.94        | 7.66           | 17.60        | 55.35        | -37.75      | Average  | P   |
| 2   | 0.16            | 9.94        | 28.29          | 38.23        | 65.35        | -27.12      | QP       | P   |
| 3   | 0.19            | 9.94        | 27.01          | 36.95        | 54.24        | -17.29      | Average  | P   |
| 4   | 0.19            | 9.94        | 42.12          | 52.06        | 64.24        | -12.18      | QP       | P   |
| 5   | 0.20            | 9.94        | 29.36          | 39.30        | 53.64        | -14.34      | Average  | P   |
| 6   | 0.20            | 9.94        | 41.64          | 51.58        | 63.64        | -12.06      | QP       | P   |
| 7   | 0.25            | 9.94        | 22.52          | 32.46        | 51.64        | -19.18      | Average  | P   |
| 8   | 0.25            | 9.94        | 34.97          | 44.91        | 61.64        | -16.73      | QP       | P   |
| 9   | 0.26            | 9.94        | 22.60          | 32.54        | 51.47        | -18.93      | Average  | P   |
| 10  | 0.26            | 9.94        | 35.72          | 45.66        | 61.47        | -15.81      | QP       | P   |
| 11  | 8.33            | 10.27       | 24.85          | 35.12        | 50.00        | -14.88      | Average  | P   |
| 12  | 8.33            | 10.27       | 34.71          | 44.98        | 60.00        | -15.02      | QP       | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=(LISN or ISN or Current Probe)Factor + Cable Loss



|           |                     |           |        |
|-----------|---------------------|-----------|--------|
| Power     | : DC 5V from system | Pol/Phase | : LINE |
| Test Mode | : Mode 2            |           |        |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV) | Limit (dBuV) | Margin (dB) | Detector | P/F |
|-----|-----------------|-------------|----------------|--------------|--------------|-------------|----------|-----|
| 1   | 0.17            | 9.94        | 24.13          | 34.07        | 55.15        | -21.08      | Average  | P   |
| 2   | 0.17            | 9.94        | 37.24          | 47.18        | 65.15        | -17.97      | QP       | P   |
| 3   | 0.18            | 9.94        | 22.31          | 32.25        | 54.54        | -22.29      | Average  | P   |
| 4   | 0.18            | 9.94        | 36.33          | 46.27        | 64.54        | -18.27      | QP       | P   |
| 5   | 0.20            | 9.94        | 19.25          | 29.19        | 53.78        | -24.59      | Average  | P   |
| 6   | 0.20            | 9.94        | 36.33          | 46.27        | 63.78        | -17.51      | QP       | P   |
| 7   | 0.25            | 9.94        | 19.11          | 29.05        | 51.92        | -22.87      | Average  | P   |
| 8   | 0.25            | 9.94        | 32.83          | 42.77        | 61.92        | -19.15      | QP       | P   |
| 9   | 0.45            | 9.96        | 21.91          | 31.87        | 46.93        | -15.06      | Average  | P   |
| 10  | 0.45            | 9.96        | 33.34          | 43.30        | 56.93        | -13.63      | QP       | P   |
| 11  | 18.31           | 10.54       | 28.24          | 38.78        | 50.00        | -11.22      | Average  | P   |
| 12  | 18.31           | 10.54       | 31.33          | 41.87        | 60.00        | -18.13      | QP       | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=(LISN or ISN or Current Probe)Factor + Cable Loss





## 6. Test of Radiated Spurious Emission

### 6.1 Test Limit

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. If the transmitter measurement is based on the maximum conducted output power, the attenuation required under this paragraph shall be 30dB instead of 20dB. In addition, radiated emissions which fall in section 15.205(a) the restricted bands must also comply with the radiated emission limit specified in section 15.209(a).

| Frequency (MHz) | Field Strength (microvolt/meter) | Measurement Distance (meters) |
|-----------------|----------------------------------|-------------------------------|
| 0.009 ~ 0.490   | 2400/F(kHz)                      | 300                           |
| 0.490 ~ 1.705   | 24000/F(kHz)                     | 30                            |
| 1.705 ~ 30.0    | 30                               | 30                            |
| 30 ~ 88         | 100                              | 3                             |
| 88 ~ 216        | 150                              | 3                             |
| 216 ~ 960       | 200                              | 3                             |
| Above 960       | 500                              | 3                             |

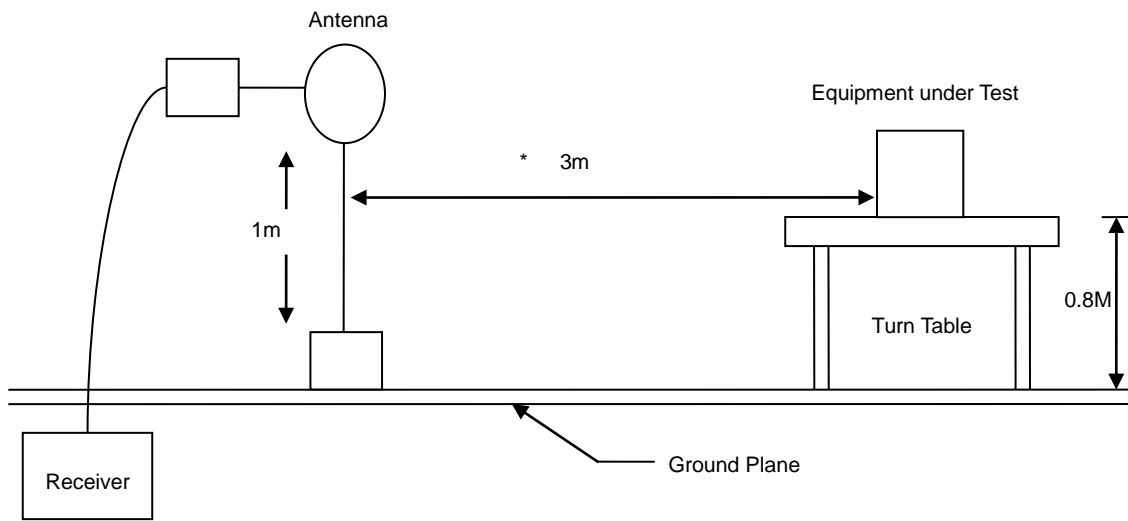
### 6.2 Test Procedures

- 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.

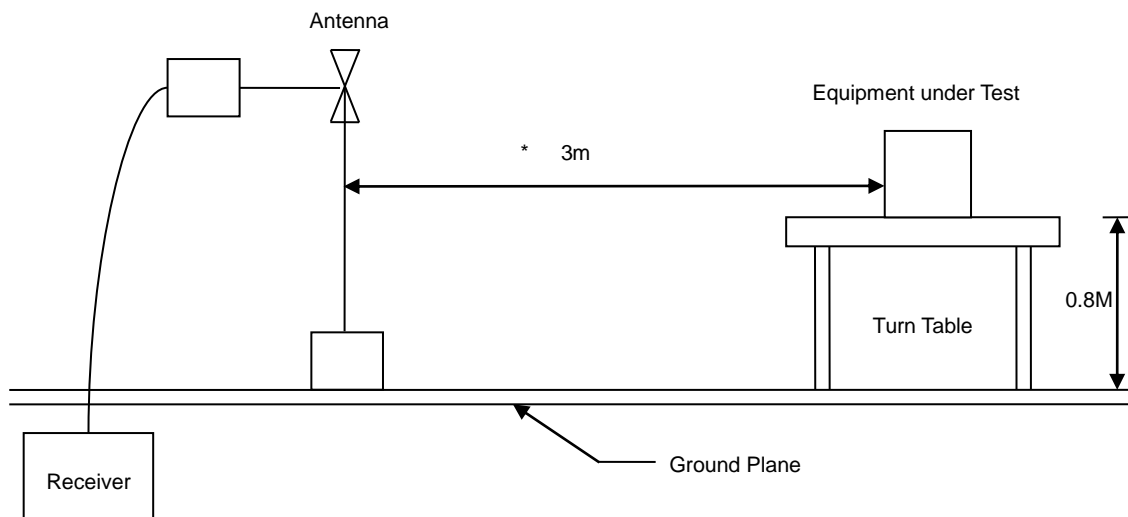


### 6.3 Typical Test Setup

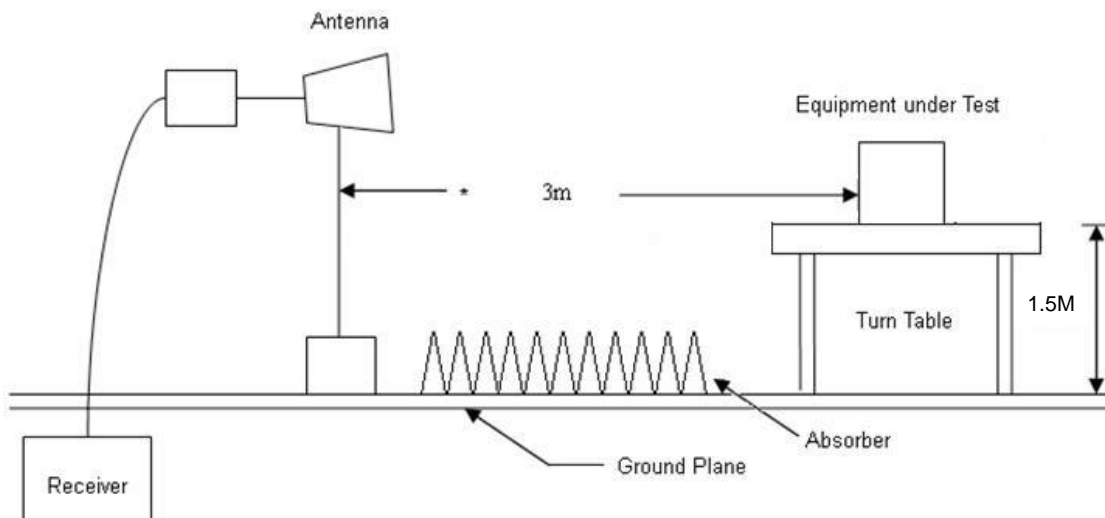
Below 30MHz test setup



30MHz- 1GHz Test Setup



Above 1GHz Test Setup



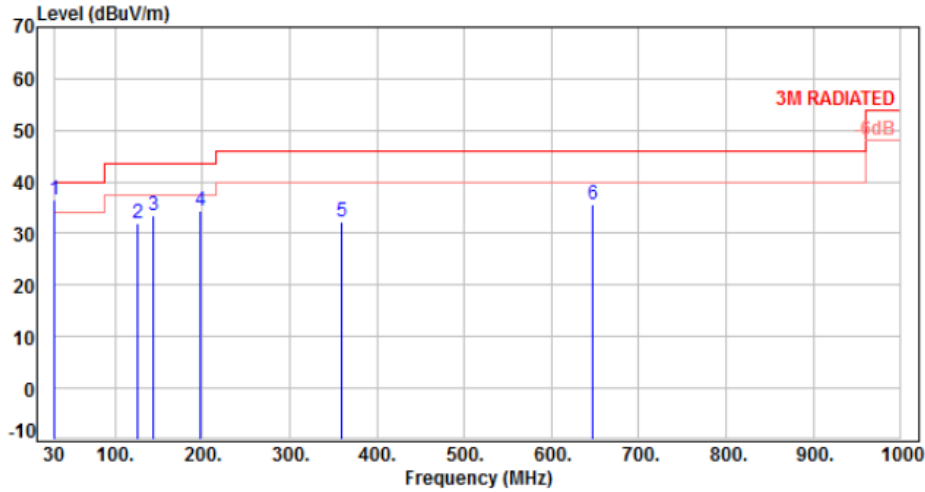


### 6.4 Test Result and Data (9KHz ~ 30MHz)

The 9kHz - 30MHz spurious emission is under limit 20dB more.

### 6.5 Test Result and Data (30MHz ~ 1GHz)

|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 2            |           | :          |

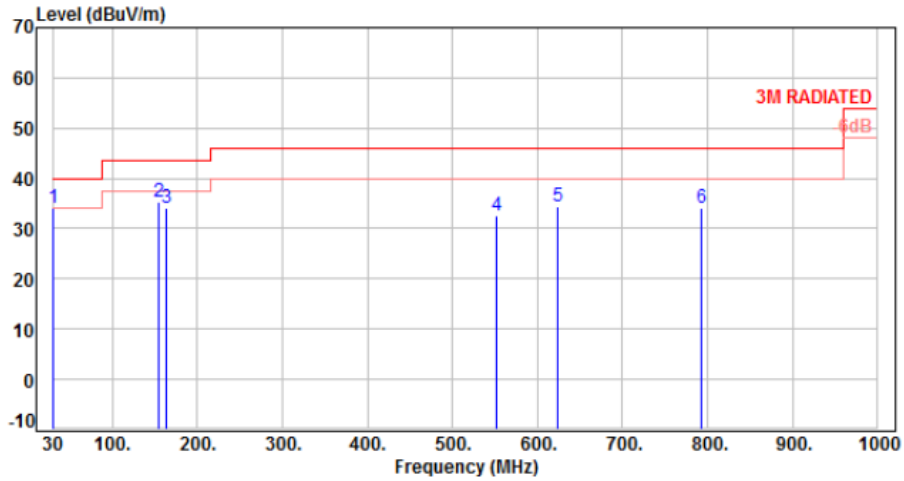


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 30.00           | -10.51      | 47.20          | 36.69          | 40.00          | -3.31       | Peak     | 400         | 0             | P   |
| 2   | 126.03          | -11.25      | 43.37          | 32.12          | 43.50          | -11.38      | Peak     | 400         | 0             | P   |
| 3   | 143.49          | -9.71       | 43.08          | 33.37          | 43.50          | -10.13      | Peak     | 400         | 0             | P   |
| 4   | 197.81          | -12.21      | 46.55          | 34.34          | 43.50          | -9.16       | Peak     | 400         | 0             | P   |
| 5   | 359.80          | -7.05       | 39.37          | 32.32          | 46.00          | -13.68      | Peak     | 400         | 0             | P   |
| 6   | 647.89          | -1.13       | 36.74          | 35.61          | 46.00          | -10.39      | Peak     | 400         | 0             | P   |

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 2            |           | :            |



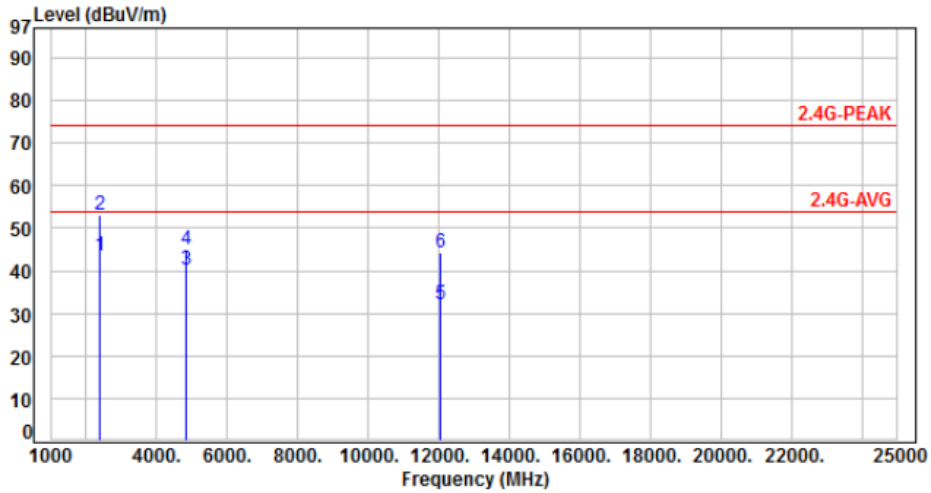
| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 30.00           | -10.51      | 44.69          | 34.18          | 40.00          | -5.82       | Peak     | 100         | 0             | P   |
| 2   | 155.13          | -9.46       | 44.74          | 35.28          | 43.50          | -8.22       | Peak     | 100         | 0             | P   |
| 3   | 163.86          | -9.41       | 43.60          | 34.19          | 43.50          | -9.31       | Peak     | 100         | 0             | P   |
| 4   | 551.86          | -2.89       | 35.56          | 32.67          | 46.00          | -13.33      | Peak     | 100         | 0             | P   |
| 5   | 623.64          | -1.21       | 35.72          | 34.51          | 46.00          | -11.49      | Peak     | 100         | 0             | P   |
| 6   | 792.42          | 1.25        | 32.94          | 34.19          | 46.00          | -11.81      | Peak     | 100         | 0             | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



### 6.6 Test Result and Data (1GHz ~ 25GHz)

|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 1, CH01      |           | :          |

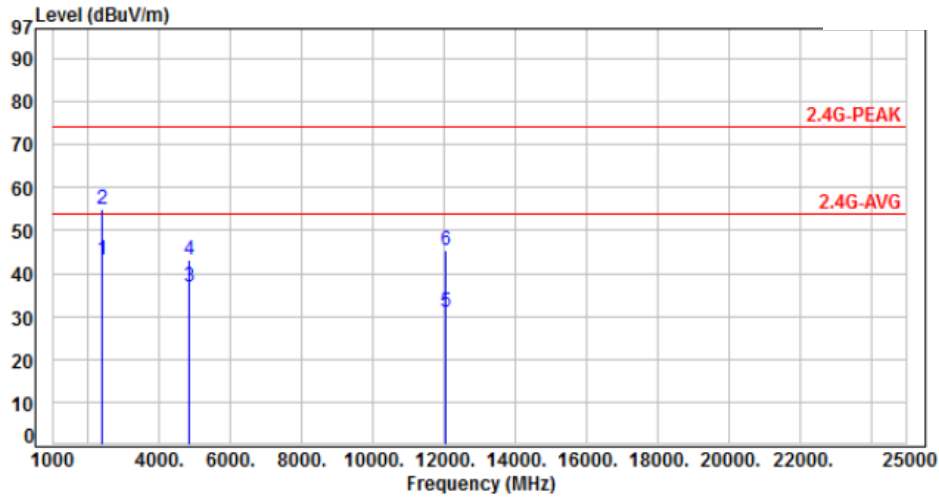


| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 58.05          | 43.44          | 54.00          | -10.56      | Average  | 190         | 213           | P   |
| 2   | 2390.00         | -14.61      | 67.78          | 53.17          | 74.00          | -20.83      | Peak     | 190         | 213           | P   |
| 3   | 4824.00         | -6.82       | 47.00          | 40.18          | 54.00          | -13.82      | Average  | 100         | 60            | P   |
| 4   | 4824.00         | -6.82       | 51.90          | 45.08          | 74.00          | -28.92      | Peak     | 100         | 60            | P   |
| 5   | 12060.00        | 4.61        | 27.35          | 31.96          | 54.00          | -22.04      | Average  | 180         | 165           | P   |
| 6   | 12060.00        | 4.61        | 39.47          | 44.08          | 74.00          | -29.92      | Peak     | 180         | 165           | P   |

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 1, CH01      |           | :            |

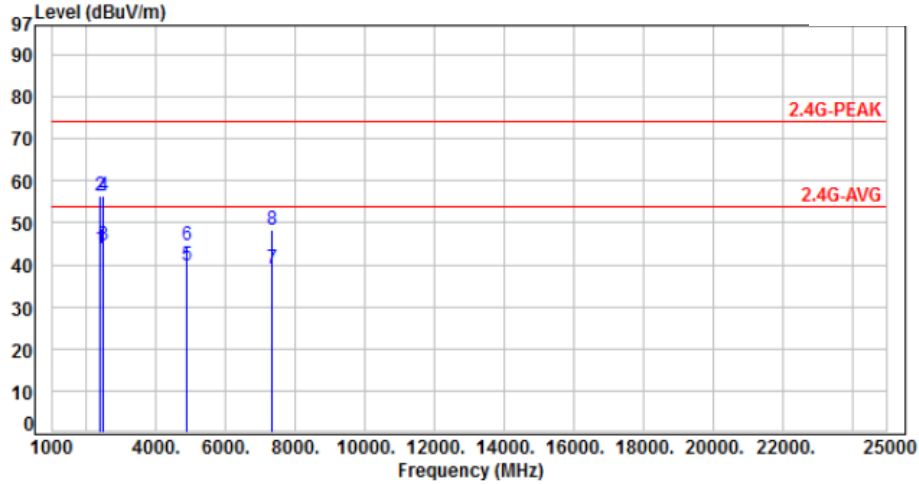


| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 57.60          | 42.99          | 54.00          | -11.01      | Average  | 130         | 200           | P   |
| 2   | 2390.00         | -14.61      | 69.74          | 55.13          | 74.00          | -18.87      | Peak     | 130         | 200           | P   |
| 3   | 4824.00         | -6.82       | 43.59          | 36.77          | 54.00          | -17.23      | Average  | 100         | 260           | P   |
| 4   | 4824.00         | -6.82       | 50.15          | 43.33          | 74.00          | -30.67      | Peak     | 100         | 260           | P   |
| 5   | 12060.00        | 4.61        | 26.26          | 30.87          | 54.00          | -23.13      | Average  | 100         | 170           | P   |
| 6   | 12060.00        | 4.61        | 40.60          | 45.21          | 74.00          | -28.79      | Peak     | 100         | 170           | P   |

Note: Level=Reading+Factor  
Margin=Level-Limit  
Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 1, CH06      |           | :          |

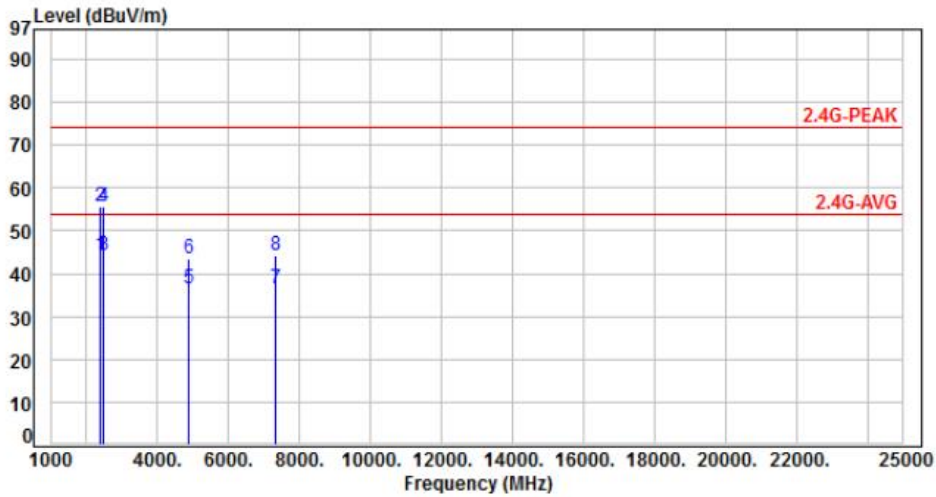


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 58.60          | 43.99          | 54.00          | -10.01      | Average  | 100         | 60            | P   |
| 2   | 2390.00         | -14.61      | 70.92          | 56.31          | 74.00          | -17.69      | Peak     | 100         | 60            | P   |
| 3   | 2483.50         | -14.22      | 58.75          | 44.53          | 54.00          | -9.47       | Average  | 100         | 60            | P   |
| 4   | 2483.50         | -14.22      | 70.71          | 56.49          | 74.00          | -17.51      | Peak     | 100         | 60            | P   |
| 5   | 4874.00         | -6.63       | 46.51          | 39.88          | 54.00          | -14.12      | Average  | 100         | 260           | P   |
| 6   | 4874.00         | -6.63       | 51.43          | 44.80          | 74.00          | -29.20      | Peak     | 100         | 260           | P   |
| 7   | 7311.00         | -1.28       | 40.55          | 39.27          | 54.00          | -14.73      | Average  | 100         | 265           | P   |
| 8   | 7311.00         | -1.28       | 49.71          | 48.43          | 74.00          | -25.57      | Peak     | 100         | 265           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 1, CH06      |           | :            |



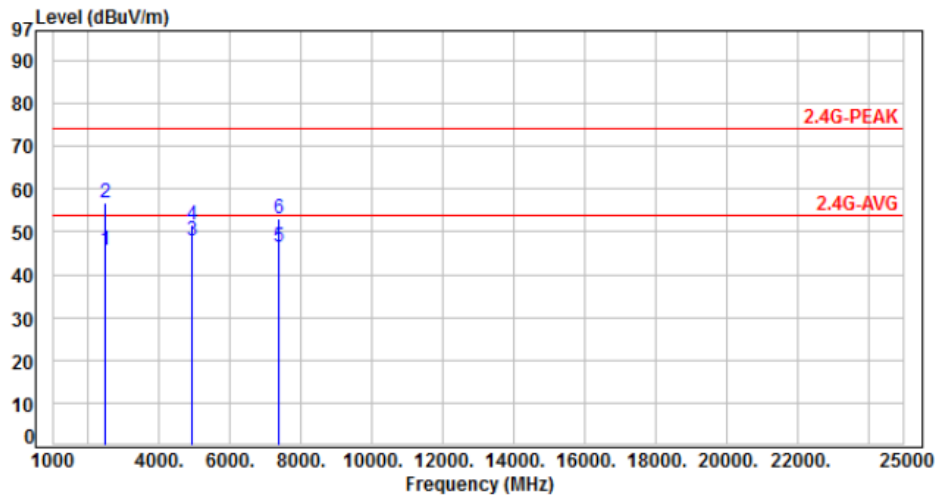
| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 58.92          | 44.31          | 54.00          | -9.69       | Average  | 390         | 355           | P   |
| 2   | 2390.00         | -14.61      | 70.44          | 55.83          | 74.00          | -18.17      | Peak     | 390         | 355           | P   |
| 3   | 2483.50         | -14.22      | 58.54          | 44.32          | 54.00          | -9.68       | Average  | 390         | 355           | P   |
| 4   | 2483.50         | -14.22      | 69.87          | 55.65          | 74.00          | -18.35      | Peak     | 390         | 355           | P   |
| 5   | 4874.00         | -6.63       | 43.16          | 36.53          | 54.00          | -17.47      | Average  | 105         | 255           | P   |
| 6   | 4874.00         | -6.63       | 50.09          | 43.46          | 74.00          | -30.54      | Peak     | 105         | 255           | P   |
| 7   | 7311.00         | -1.28       | 37.65          | 36.37          | 54.00          | -17.63      | Average  | 100         | 349           | P   |
| 8   | 7311.00         | -1.28       | 45.71          | 44.43          | 74.00          | -29.57      | Peak     | 100         | 349           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor





|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 1, CH11      |           | :          |

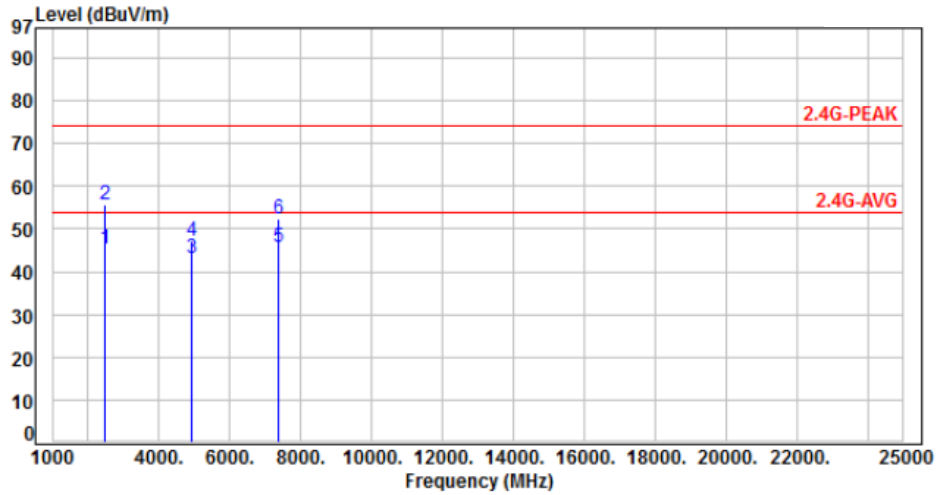


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 59.88          | 45.66          | 54.00          | -8.34       | Average  | 100         | 65            | P   |
| 2   | 2483.50         | -14.22      | 71.17          | 56.95          | 74.00          | -17.05      | Peak     | 100         | 65            | P   |
| 3   | 4924.00         | -6.50       | 54.33          | 47.83          | 54.00          | -6.17       | Average  | 100         | 258           | P   |
| 4   | 4924.00         | -6.50       | 58.24          | 51.74          | 74.00          | -22.26      | Peak     | 100         | 258           | P   |
| 5   | 7386.00         | -1.19       | 47.80          | 46.61          | 54.00          | -7.39       | Average  | 100         | 115           | P   |
| 6   | 7386.00         | -1.19       | 54.25          | 53.06          | 74.00          | -20.94      | Peak     | 100         | 115           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 1, CH11      |           | :            |

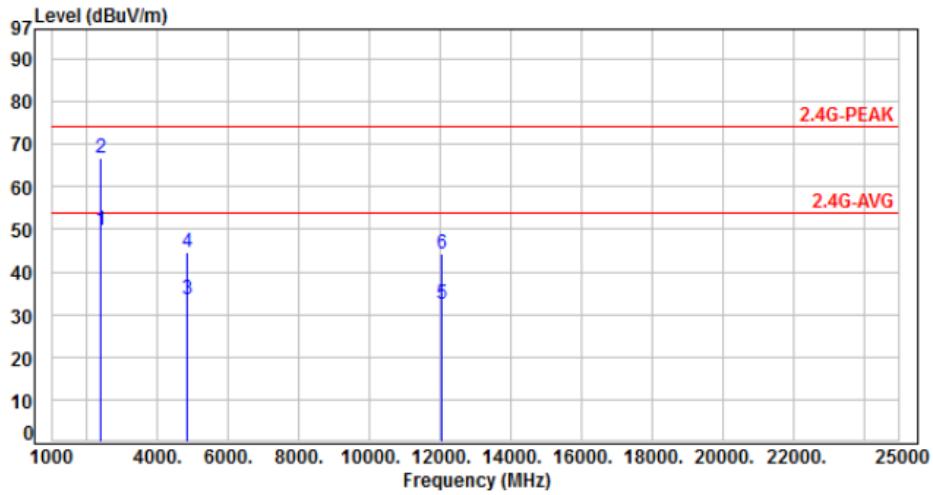


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 59.43          | 45.21          | 54.00          | -8.79       | Average  | 365         | 150           | P   |
| 2   | 2483.50         | -14.22      | 70.05          | 55.83          | 74.00          | -18.17      | Peak     | 365         | 150           | P   |
| 3   | 4924.00         | -6.50       | 49.81          | 43.31          | 54.00          | -10.69      | Average  | 100         | 290           | P   |
| 4   | 4924.00         | -6.50       | 53.53          | 47.03          | 74.00          | -26.97      | Peak     | 100         | 290           | P   |
| 5   | 7386.00         | -1.19       | 46.81          | 45.62          | 54.00          | -8.38       | Average  | 100         | 158           | P   |
| 6   | 7386.00         | -1.19       | 53.48          | 52.29          | 74.00          | -21.71      | Peak     | 100         | 158           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 2, CH01      |           | :          |

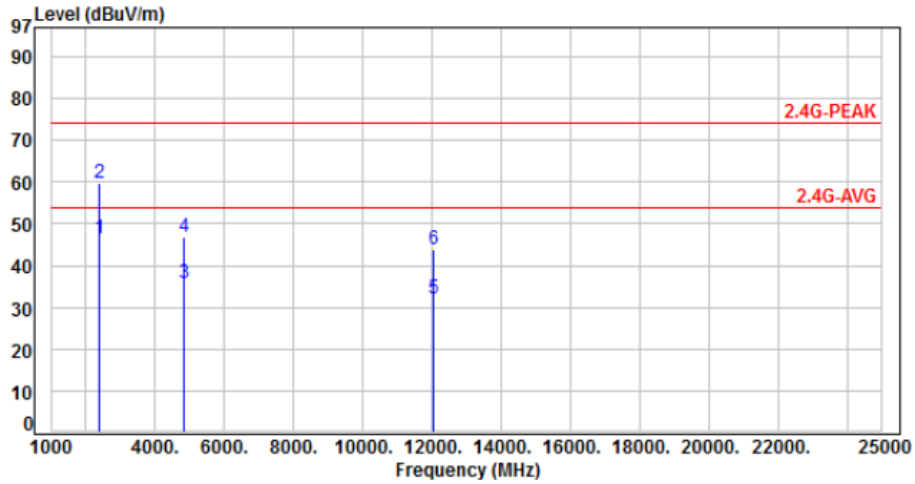


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 64.24          | 49.63          | 54.00          | -4.37       | Average  | 100         | 103           | P   |
| 2   | 2390.00         | -14.61      | 81.39          | 66.78          | 74.00          | -7.22       | Peak     | 100         | 103           | P   |
| 3   | 4824.00         | -6.82       | 40.37          | 33.55          | 54.00          | -20.45      | Average  | 100         | 268           | P   |
| 4   | 4824.00         | -6.82       | 51.57          | 44.75          | 74.00          | -29.25      | Peak     | 100         | 268           | P   |
| 5   | 12060.00        | 4.61        | 28.01          | 32.62          | 54.00          | -21.38      | Average  | 100         | 170           | P   |
| 6   | 12060.00        | 4.61        | 39.71          | 44.32          | 74.00          | -29.68      | Peak     | 100         | 170           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 2, CH01      |           | :            |

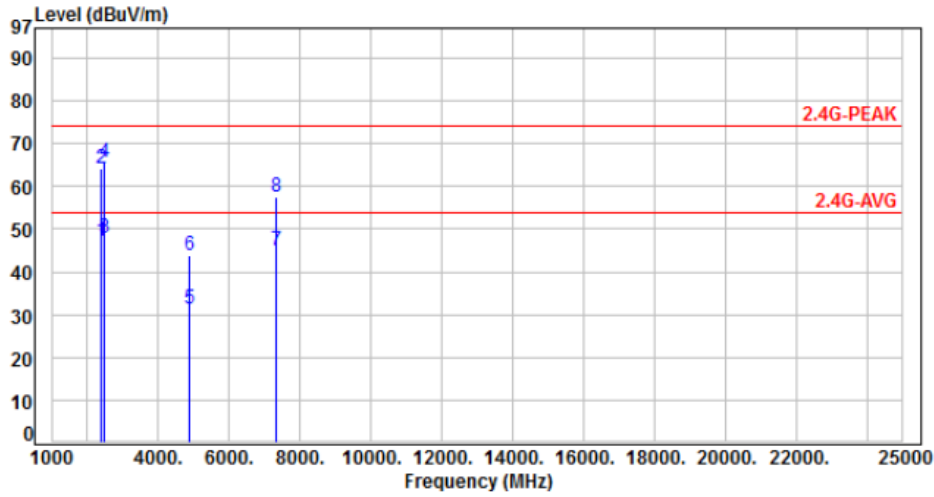


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 61.16          | 46.55          | 54.00          | -7.45       | Average  | 125         | 345           | P   |
| 2   | 2390.00         | -14.61      | 74.46          | 59.85          | 74.00          | -14.15      | Peak     | 125         | 345           | P   |
| 3   | 4824.00         | -6.82       | 42.62          | 35.80          | 54.00          | -18.20      | Average  | 100         | 260           | P   |
| 4   | 4824.00         | -6.82       | 53.65          | 46.83          | 74.00          | -27.17      | Peak     | 100         | 260           | P   |
| 5   | 12060.00        | 4.61        | 27.39          | 32.00          | 54.00          | -22.00      | Average  | 100         | 285           | P   |
| 6   | 12060.00        | 4.61        | 39.34          | 43.95          | 74.00          | -30.05      | Peak     | 100         | 285           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 2, CH06      |           | :          |

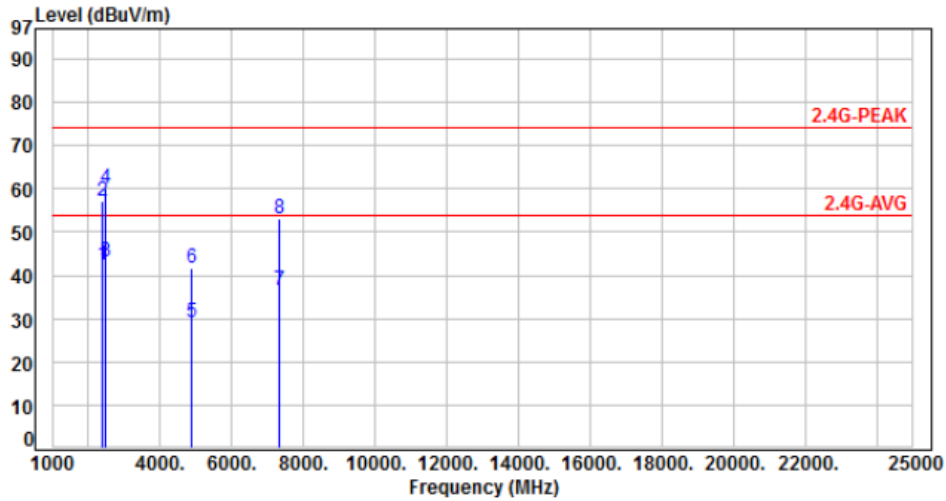


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 61.66          | 47.05          | 54.00          | -6.95       | Average  | 100         | 70            | P   |
| 2   | 2390.00         | -14.61      | 78.97          | 64.36          | 74.00          | -9.64       | Peak     | 100         | 70            | P   |
| 3   | 2483.50         | -14.22      | 62.22          | 48.00          | 54.00          | -6.00       | Average  | 100         | 70            | P   |
| 4   | 2483.50         | -14.22      | 79.87          | 65.65          | 74.00          | -8.35       | Peak     | 100         | 70            | P   |
| 5   | 4874.00         | -6.63       | 38.12          | 31.49          | 54.00          | -22.51      | Average  | 100         | 267           | P   |
| 6   | 4874.00         | -6.63       | 50.38          | 43.75          | 74.00          | -30.25      | Peak     | 100         | 267           | P   |
| 7   | 7311.00         | -1.28       | 46.24          | 44.96          | 54.00          | -9.04       | Average  | 140         | 152           | P   |
| 8   | 7311.00         | -1.28       | 58.95          | 57.67          | 74.00          | -16.33      | Peak     | 140         | 152           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 2, CH06      |           | :            |

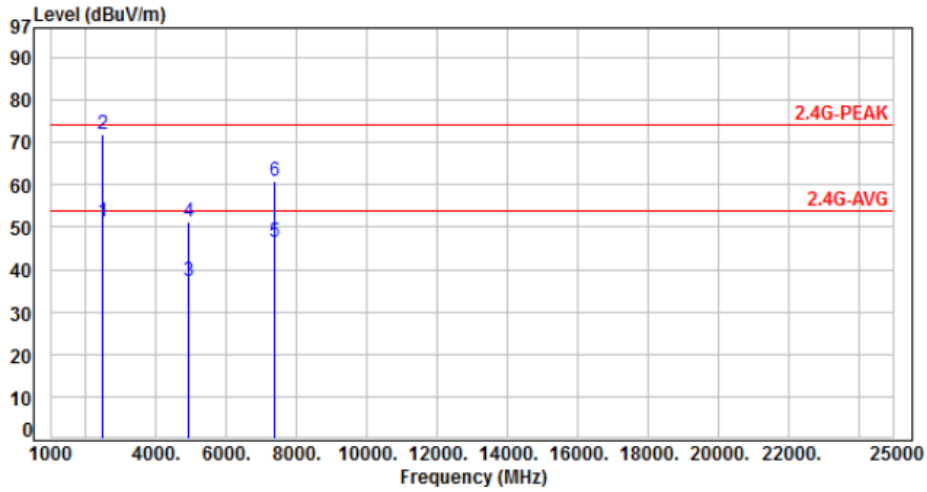


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 57.01          | 42.40          | 54.00          | -11.60      | Average  | 100         | 192           | P   |
| 2   | 2390.00         | -14.61      | 71.80          | 57.19          | 74.00          | -16.81      | Peak     | 100         | 192           | P   |
| 3   | 2483.50         | -14.22      | 57.24          | 43.02          | 54.00          | -10.98      | Average  | 100         | 192           | P   |
| 4   | 2483.50         | -14.22      | 74.50          | 60.28          | 74.00          | -13.72      | Peak     | 100         | 192           | P   |
| 5   | 4874.00         | -6.63       | 35.73          | 29.10          | 54.00          | -24.90      | Average  | 100         | 260           | P   |
| 6   | 4874.00         | -6.63       | 48.23          | 41.60          | 74.00          | -32.40      | Peak     | 100         | 260           | P   |
| 7   | 7311.00         | -1.28       | 37.95          | 36.67          | 54.00          | -17.33      | Average  | 367         | 350           | P   |
| 8   | 7311.00         | -1.28       | 54.24          | 52.96          | 74.00          | -21.04      | Peak     | 367         | 350           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 2, CH11      |           | :          |

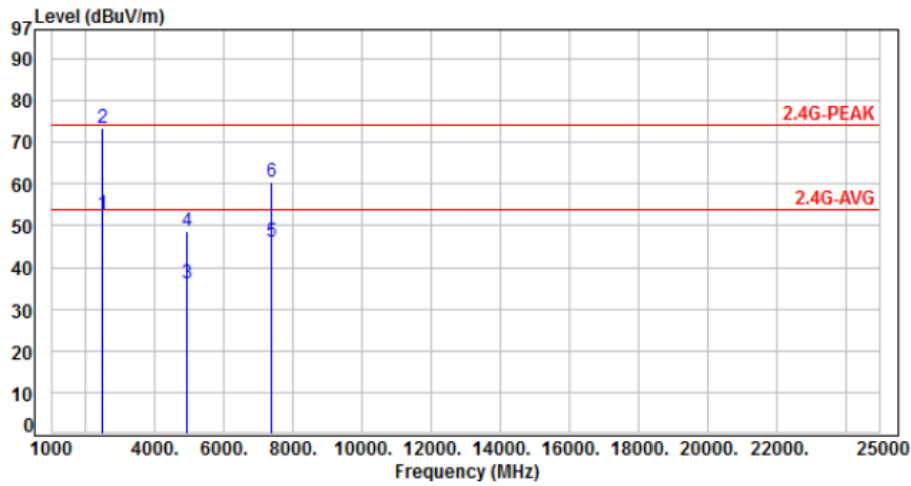


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 65.66          | 51.44          | 54.00          | -2.56       | Average  | 100         | 5             | P   |
| 2   | 2483.50         | -14.22      | 86.21          | 71.99          | 74.00          | -2.01       | Peak     | 100         | 5             | P   |
| 3   | 4924.00         | -6.50       | 43.86          | 37.36          | 54.00          | -16.64      | Average  | 100         | 65            | P   |
| 4   | 4924.00         | -6.50       | 57.67          | 51.17          | 74.00          | -22.83      | Peak     | 100         | 65            | P   |
| 5   | 7386.00         | -1.19       | 47.66          | 46.47          | 54.00          | -7.53       | Average  | 100         | 7             | P   |
| 6   | 7386.00         | -1.19       | 62.17          | 60.98          | 74.00          | -13.02      | Peak     | 100         | 7             | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 2, CH11      |           | :            |



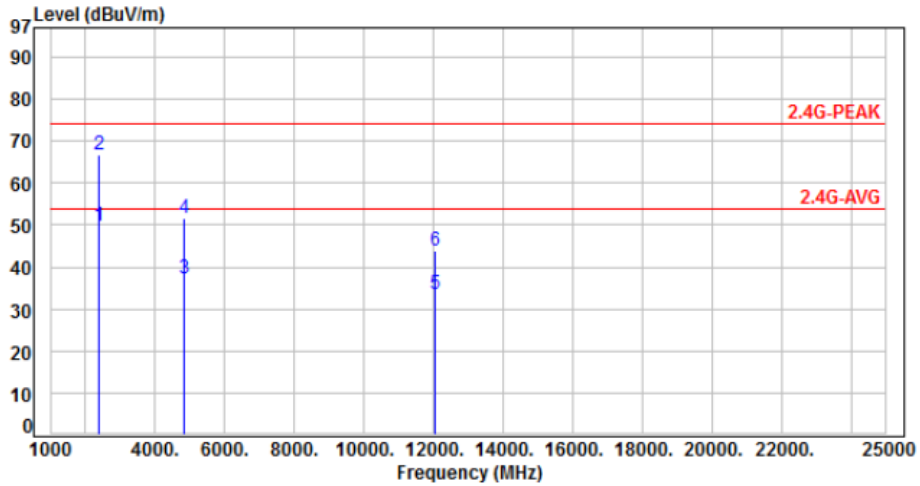
| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 66.87          | 52.65          | 54.00          | -1.35       | Average  | 360         | 200           | P   |
| 2   | 2483.50         | -14.22      | 87.48          | 73.26          | 74.00          | -0.74       | Peak     | 360         | 200           | P   |
| 3   | 4924.00         | -6.50       | 42.63          | 36.13          | 54.00          | -17.87      | Average  | 100         | 270           | P   |
| 4   | 4924.00         | -6.50       | 55.01          | 48.51          | 74.00          | -25.49      | Peak     | 100         | 270           | P   |
| 5   | 7386.00         | -1.19       | 47.45          | 46.26          | 54.00          | -7.74       | Average  | 100         | 33            | P   |
| 6   | 7386.00         | -1.19       | 61.60          | 60.41          | 74.00          | -13.59      | Peak     | 100         | 33            | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor





|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 3, CH01      |           | :          |

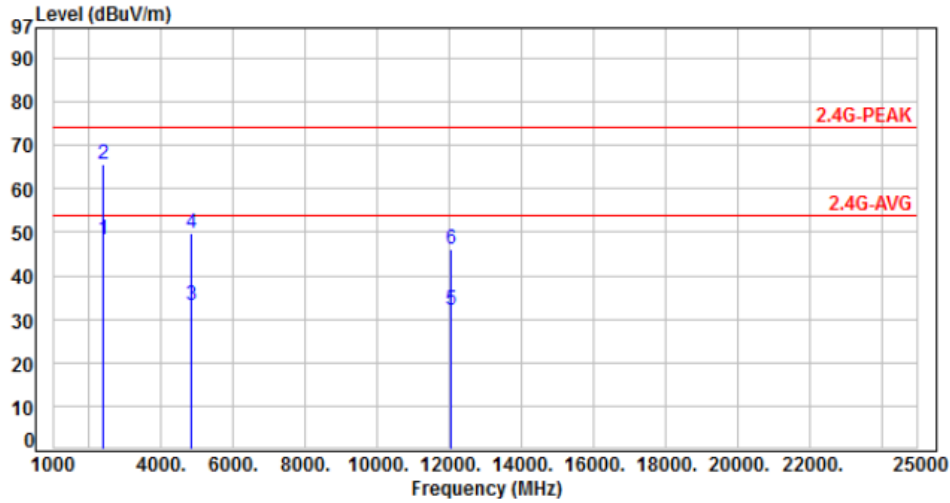


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 64.24          | 49.63          | 54.00          | -4.37       | Average  | 100         | 360           | P   |
| 2   | 2390.00         | -14.61      | 81.26          | 66.65          | 74.00          | -7.35       | Peak     | 100         | 360           | P   |
| 3   | 4824.00         | -6.82       | 44.19          | 37.37          | 54.00          | -16.63      | Average  | 100         | 40            | P   |
| 4   | 4824.00         | -6.82       | 58.29          | 51.47          | 74.00          | -22.53      | Peak     | 100         | 40            | P   |
| 5   | 12060.00        | 4.61        | 28.90          | 33.51          | 54.00          | -20.49      | Average  | 100         | 120           | P   |
| 6   | 12060.00        | 4.61        | 39.34          | 43.95          | 74.00          | -30.05      | Peak     | 100         | 120           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 3, CH01      |           | :            |

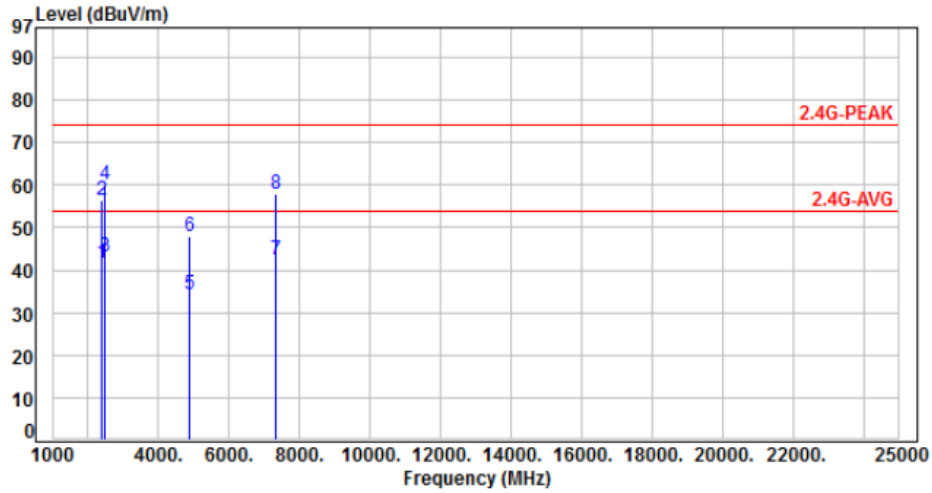


| No. | Frequency (MHz) | Factor (dB) | Reading (dBUV) | Level (dBUV/m) | Limit (dBUV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 63.05          | 48.44          | 54.00          | -5.56       | Average  | 100         | 192           | P   |
| 2   | 2390.00         | -14.61      | 80.21          | 65.60          | 74.00          | -8.40       | Peak     | 100         | 192           | P   |
| 3   | 4824.00         | -6.82       | 40.05          | 33.23          | 54.00          | -20.77      | Average  | 100         | 287           | P   |
| 4   | 4824.00         | -6.82       | 56.46          | 49.64          | 74.00          | -24.36      | Peak     | 100         | 287           | P   |
| 5   | 12060.00        | 4.61        | 27.40          | 32.01          | 54.00          | -21.99      | Average  | 100         | 135           | P   |
| 6   | 12060.00        | 4.61        | 41.44          | 46.05          | 74.00          | -27.95      | Peak     | 100         | 135           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 3, CH06      |           | :          |

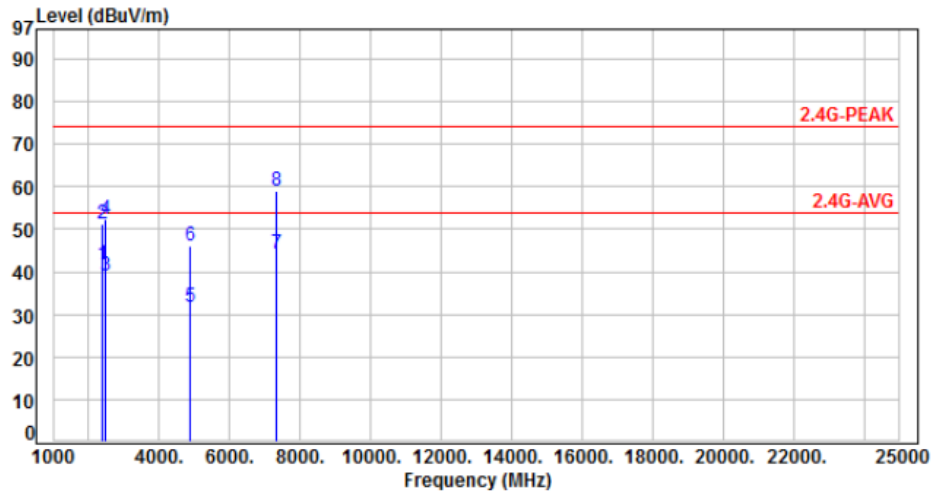


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 56.41          | 41.80          | 54.00          | -12.20      | Average  | 200         | 225           | P   |
| 2   | 2390.00         | -14.61      | 71.19          | 56.58          | 74.00          | -17.42      | Peak     | 200         | 225           | P   |
| 3   | 2483.50         | -14.22      | 57.48          | 43.26          | 54.00          | -10.74      | Average  | 200         | 225           | P   |
| 4   | 2483.50         | -14.22      | 74.17          | 59.95          | 74.00          | -14.05      | Peak     | 200         | 225           | P   |
| 5   | 4874.00         | -6.63       | 40.90          | 34.27          | 54.00          | -19.73      | Average  | 100         | 57            | P   |
| 6   | 4874.00         | -6.63       | 54.76          | 48.13          | 74.00          | -25.87      | Peak     | 100         | 57            | P   |
| 7   | 7311.00         | -1.28       | 43.87          | 42.59          | 54.00          | -11.41      | Average  | 100         | 0             | P   |
| 8   | 7311.00         | -1.28       | 59.17          | 57.89          | 74.00          | -16.11      | Peak     | 100         | 0             | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 3, CH06      |           | :            |

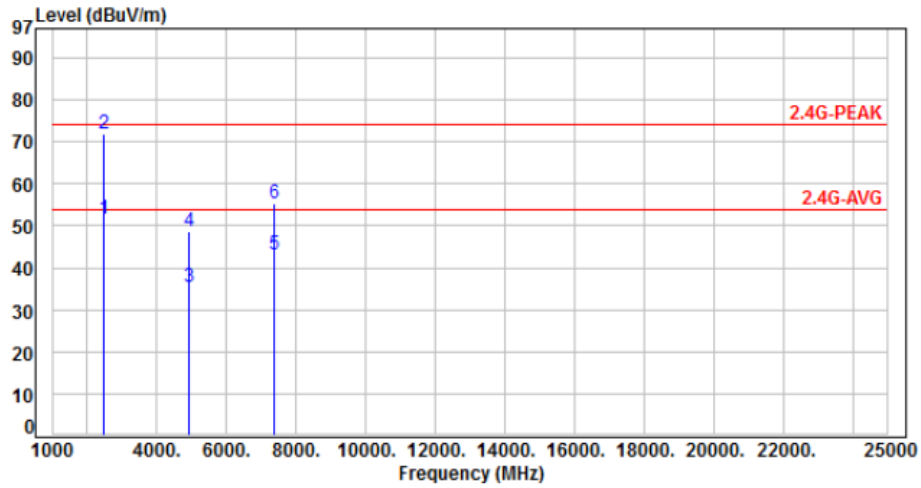


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2390.00         | -14.61      | 56.44          | 41.83          | 54.00          | -12.17      | Average  | 100         | 186           | P   |
| 2   | 2390.00         | -14.61      | 65.76          | 51.15          | 74.00          | -22.85      | Peak     | 100         | 186           | P   |
| 3   | 2483.50         | -14.22      | 53.41          | 39.19          | 54.00          | -14.81      | Average  | 100         | 186           | P   |
| 4   | 2483.50         | -14.22      | 66.53          | 52.31          | 74.00          | -21.69      | Peak     | 100         | 186           | P   |
| 5   | 4874.00         | -6.63       | 38.42          | 31.79          | 54.00          | -22.21      | Average  | 100         | 283           | P   |
| 6   | 4874.00         | -6.63       | 52.64          | 46.01          | 74.00          | -27.99      | Peak     | 100         | 283           | P   |
| 7   | 7311.00         | -1.28       | 45.40          | 44.12          | 54.00          | -9.88       | Average  | 100         | 30            | P   |
| 8   | 7311.00         | -1.28       | 60.25          | 58.97          | 74.00          | -15.03      | Peak     | 100         | 30            | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |            |
|-----------|---------------------|-----------|------------|
| Power     | : DC 5V from system | Pol/Phase | : VERTICAL |
| Test Mode | : Mode 3, CH11      |           | :          |

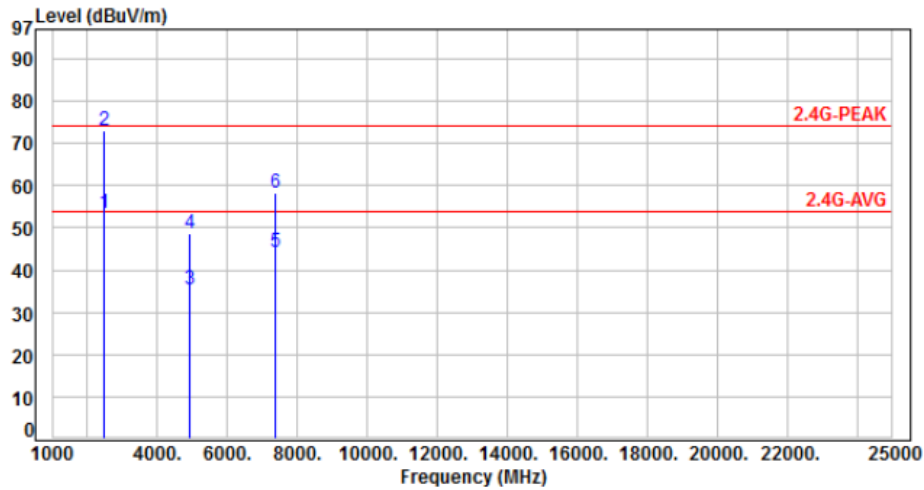


| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 65.71          | 51.49          | 54.00          | -2.51       | Average  | 100         | 227           | P   |
| 2   | 2483.50         | -14.22      | 86.25          | 72.03          | 74.00          | -1.97       | Peak     | 100         | 227           | P   |
| 3   | 4924.00         | -6.50       | 41.86          | 35.36          | 54.00          | -18.64      | Average  | 100         | 50            | P   |
| 4   | 4924.00         | -6.50       | 55.01          | 48.51          | 74.00          | -25.49      | Peak     | 100         | 50            | P   |
| 5   | 7386.00         | -1.19       | 44.48          | 43.29          | 54.00          | -10.71      | Average  | 100         | 155           | P   |
| 6   | 7386.00         | -1.19       | 56.57          | 55.38          | 74.00          | -18.62      | Peak     | 100         | 155           | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



|           |                     |           |              |
|-----------|---------------------|-----------|--------------|
| Power     | : DC 5V from system | Pol/Phase | : HORIZONTAL |
| Test Mode | : Mode 3, CH11      |           | :            |



| No. | Frequency (MHz) | Factor (dB) | Reading (dBuV) | Level (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Detector | Height (cm) | Azimuth (deg) | P/F |
|-----|-----------------|-------------|----------------|----------------|----------------|-------------|----------|-------------|---------------|-----|
| 1   | 2483.50         | -14.22      | 67.68          | 53.46          | 54.00          | -0.54       | Average  | 100         | 190           | P   |
| 2   | 2483.50         | -14.22      | 87.17          | 72.95          | 74.00          | -1.05       | Peak     | 100         | 190           | P   |
| 3   | 4924.00         | -6.50       | 41.80          | 35.30          | 54.00          | -18.70      | Average  | 100         | 283           | P   |
| 4   | 4924.00         | -6.50       | 55.21          | 48.71          | 74.00          | -25.29      | Peak     | 100         | 283           | P   |
| 5   | 7386.00         | -1.19       | 45.47          | 44.28          | 54.00          | -9.72       | Average  | 325         | 31            | P   |
| 6   | 7386.00         | -1.19       | 59.57          | 58.38          | 74.00          | -15.62      | Peak     | 325         | 31            | P   |

Note: Level=Reading+Factor  
 Margin=Level-Limit  
 Factor=Antenna Factor + cable loss - Amplifier Factor



### 6.7 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



## 7. Test of Conducted Spurious Emission

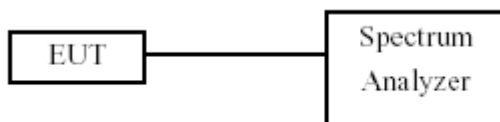
### 7.1 Test Limit

Below -30dB of the highest emission level of operating band (In 100 kHz Resolution Bandwidth)

### 7.2 Test Procedure

- a. The transmitter output was connected to the spectrum analyzer via a low loss cable.
- b. Set RBW of spectrum analyzer to 100 KHz and VBW of spectrum analyzer to 300 KHz with convenient frequency span including 100 KHz bandwidth from band edge.
- c. Peak conducted output power measured within any 100 kHz outside the authorized frequency band shall be attenuated by at least 20dB relative to the maximum measured in-band peak PSD level.
- d. The band edges was measured and recorded.

### 7.3 Test Setup Layout



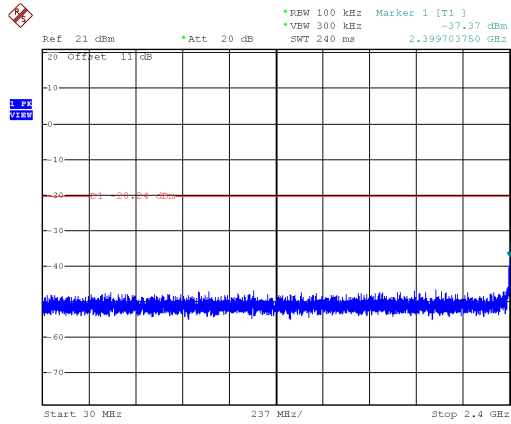
### 7.4 Test Result and Data

Note: Test plots refers to the following pages.

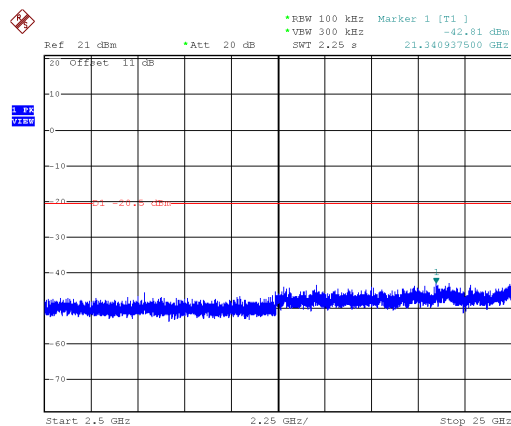
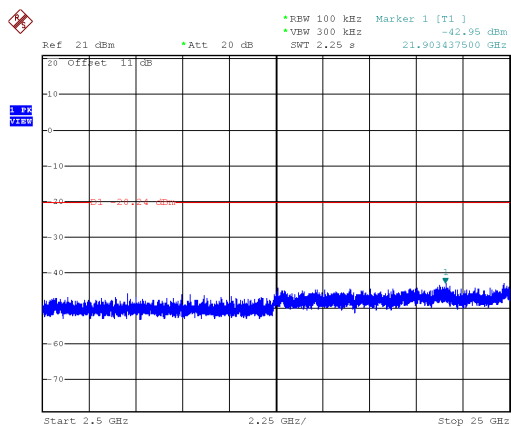
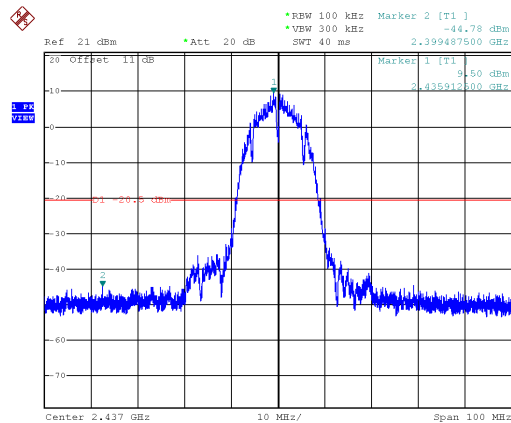
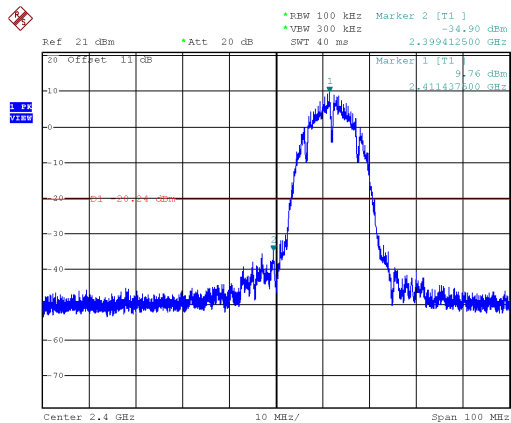
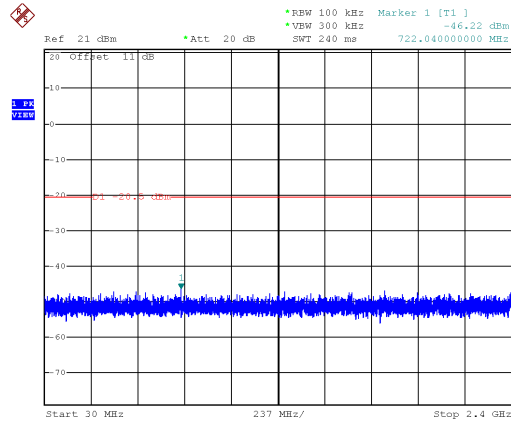




Modulation Type: 802.11b, CH 01

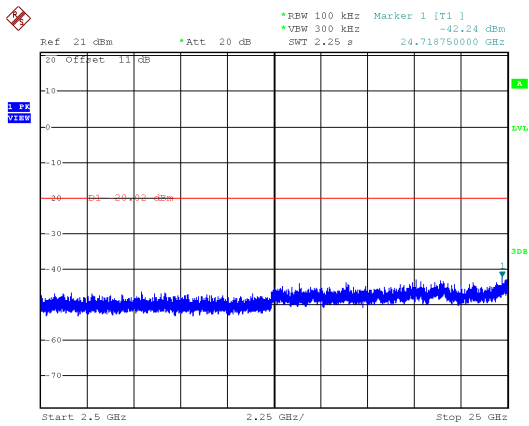
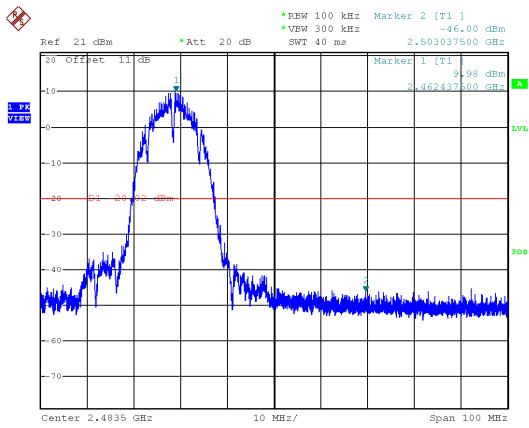
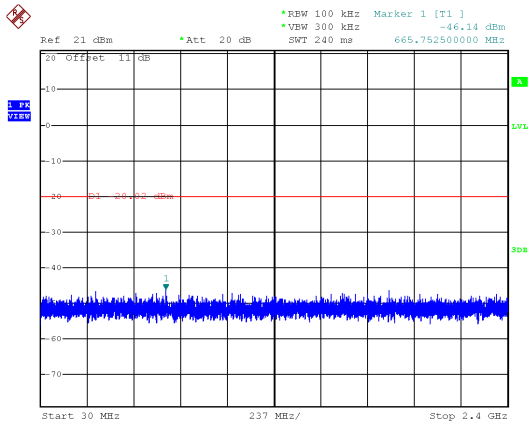


Modulation Type: 802.11b, CH 06



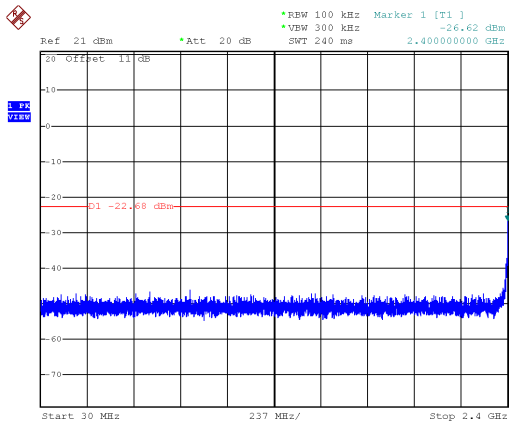


Modulation Type: 802.11b, CH 11

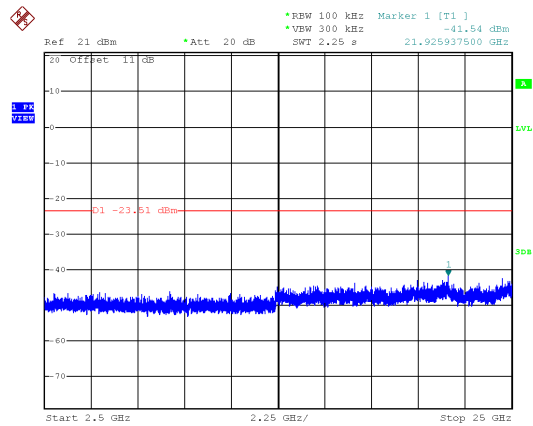
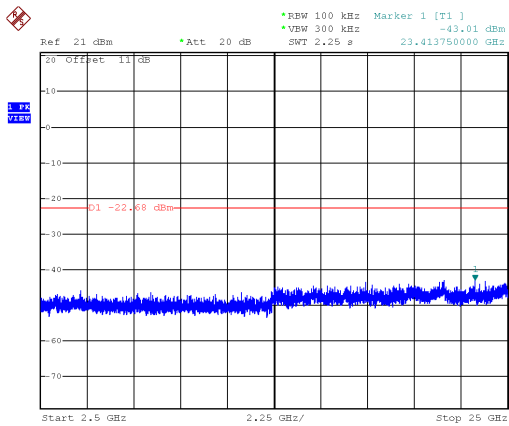
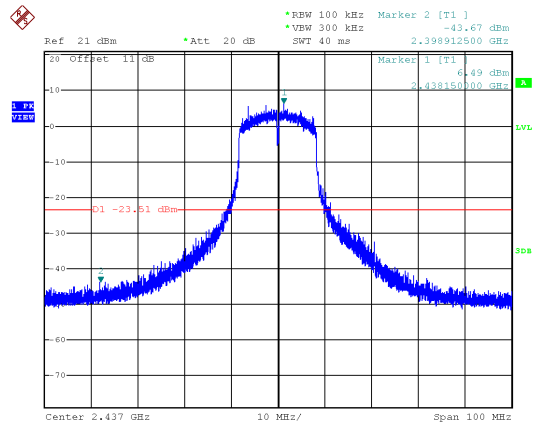
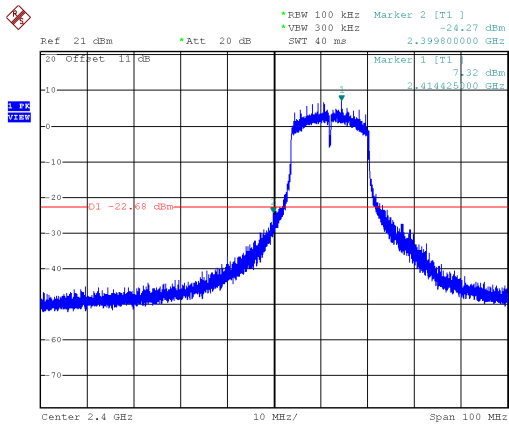
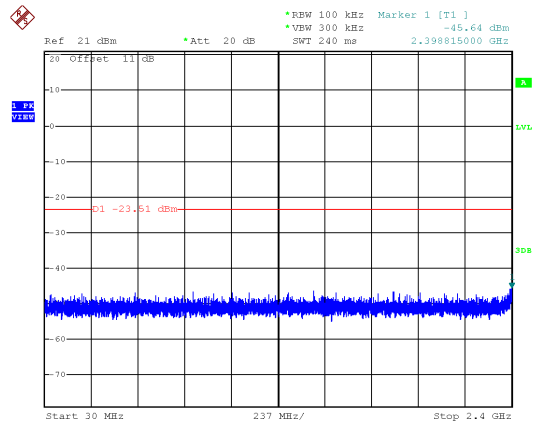




Modulation Type: 802.11g, CH 01

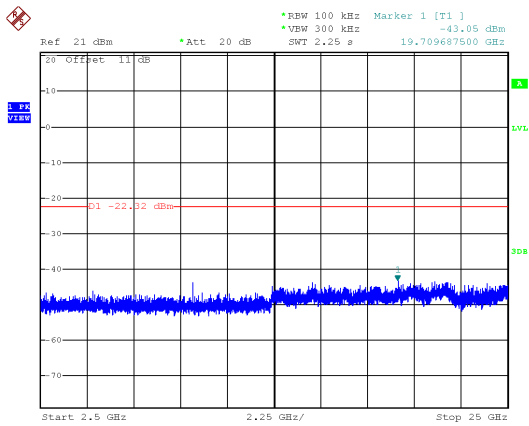
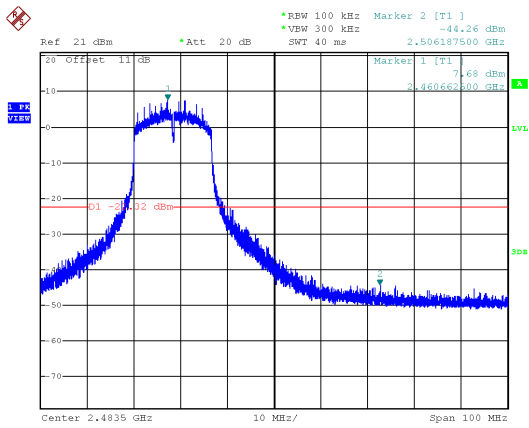
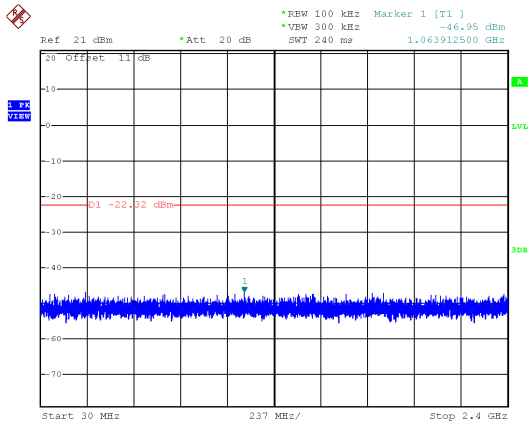


Modulation Type: 802.11g, CH 06



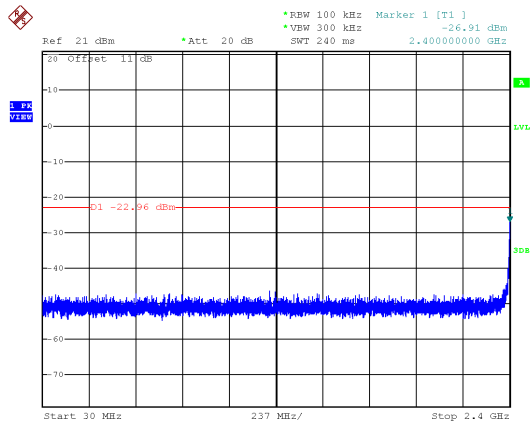


Modulation Type: 802.11g, CH 11

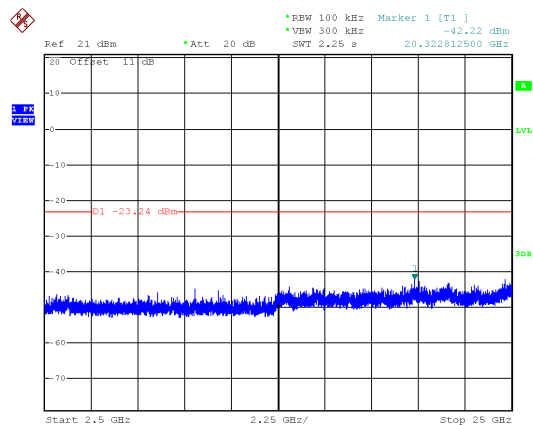
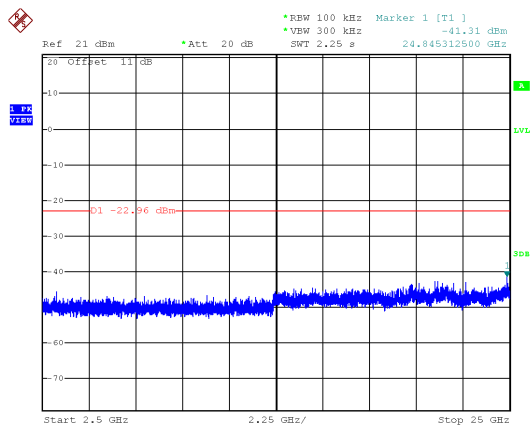
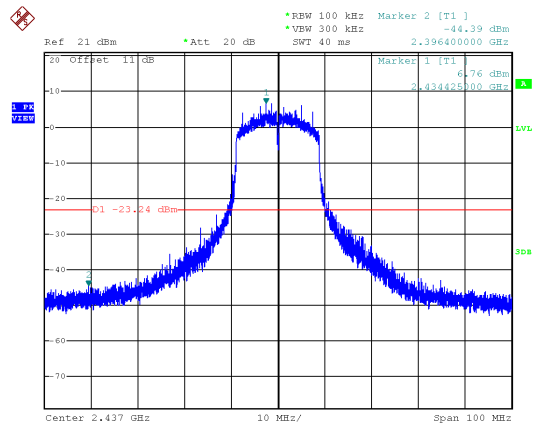
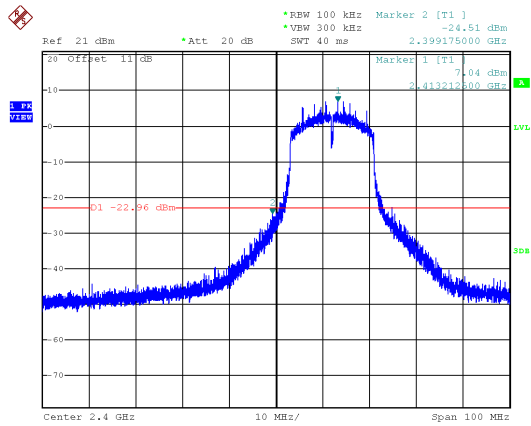
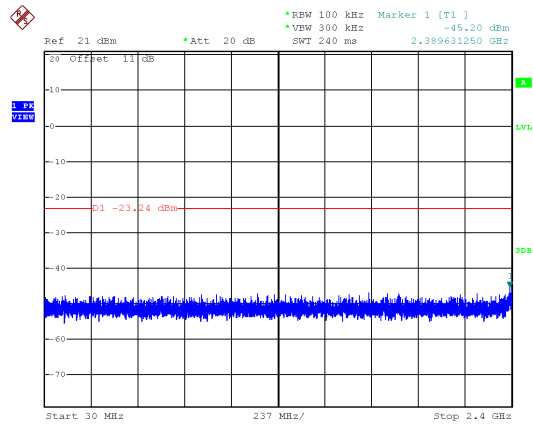




Modulation Type: 802.11n HT20, CH01

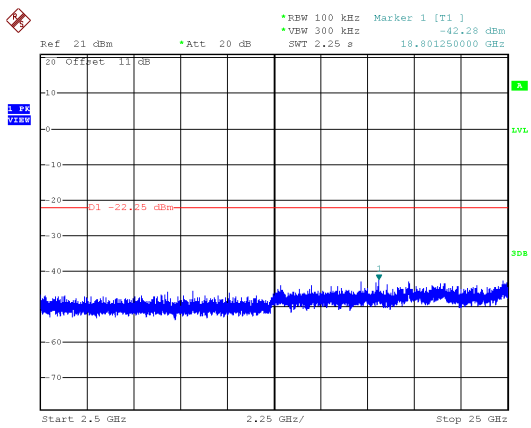
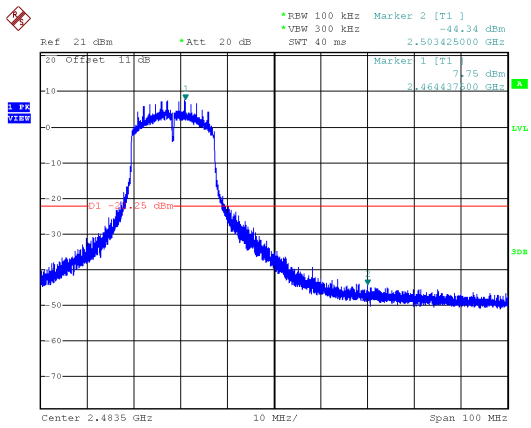
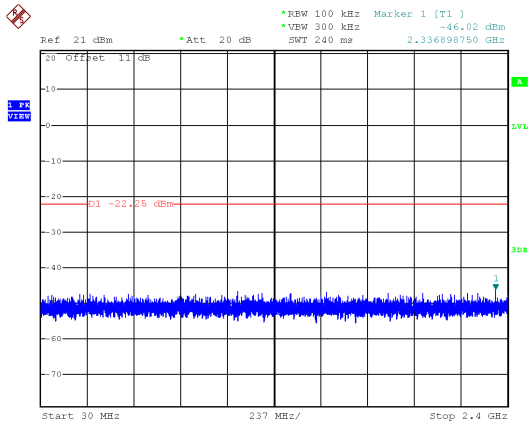


Modulation Type: 802.11n HT20, CH06





Modulation Type: 802.11n HT20, CH11





## 8. On Time, Duty Cycle and Measurement methods

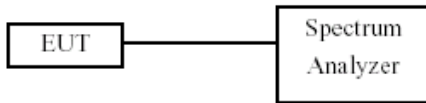
### 8.1 Test Limit

None; for reporting purposes only.

### 8.2 Test Procedure

KDB 558074 Zero-Span Spectrum Analyzer Method.

### 8.3 Test Setup Layout

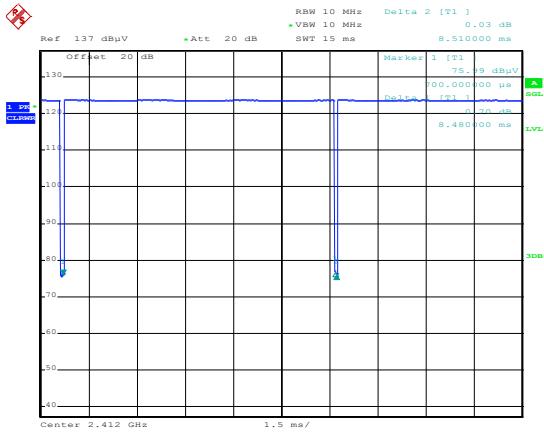


### 8.4 Test Result and Data

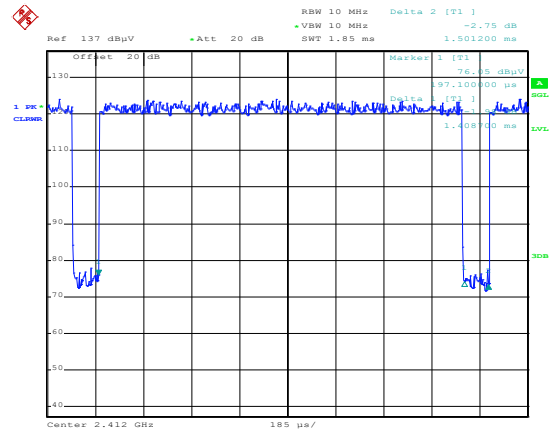
| Modulation Mode | On Time (ms) | Period Time (ms) | Duty Cycle (%) |
|-----------------|--------------|------------------|----------------|
| 11b,1M          | 8.48         | 8.51             | 99.65%         |
| 11g,6M          | 1.41         | 1.50             | 93.84%         |
| 11n HT20        | 1.33         | 1.42             | 93.64%         |



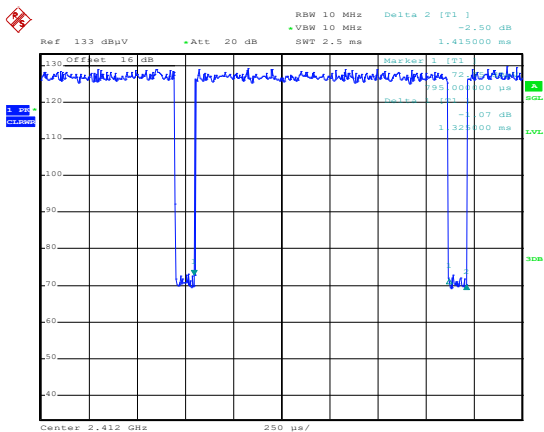
Modulation Standard: 802.11b (1Mbps)



Modulation Standard: 802.11g (6Mbps)



Modulation Standard: 802.11n HT20 (6.5Mbps)







### 9. 6dB Bandwidth Measurement Data

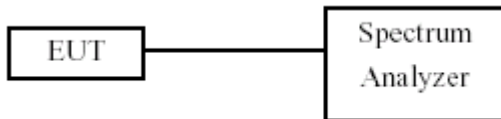
#### 9.1 Test Limit

The minimum of 6dB Bandwidth Measurement is 0.5 MHz.

#### 9.2 Test Procedures

- a. The transmitter output was connected to the spectrum analyzer.
- b. Set RBW of spectrum analyzer to 1~5% of the emission bandwidth and VBW ≥ 3x RBW.
- c. The 6 dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6 dB.
- d. The 6dB Bandwidth was measured and recorded.

#### 9.3 Test Setup Layout

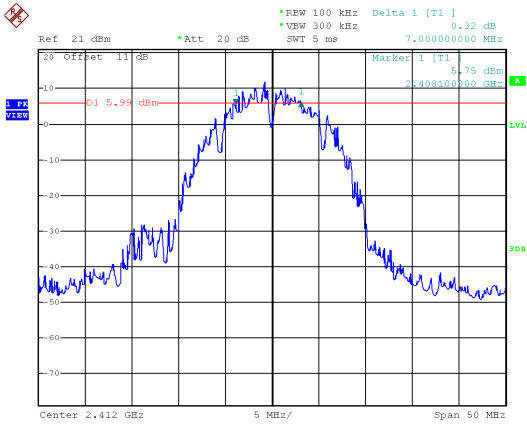


#### 9.4 Test Result and Data

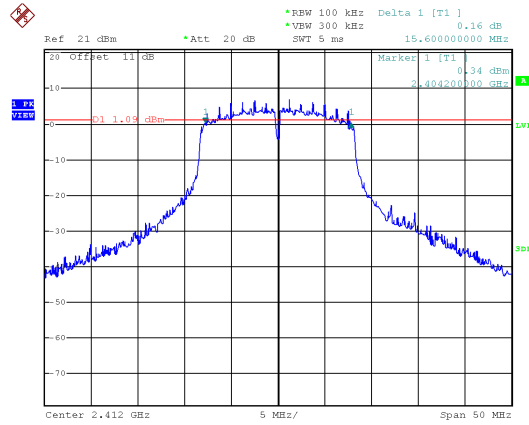
| Modulation Mode | Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Limit (MHz) |
|-----------------|---------|-----------------|---------------------|-------------|
|                 |         |                 | ANT A               |             |
| 11b             | 1       | 2412            | <b>7.00</b>         | 0.5         |
|                 | 6       | 2437            | 9.10                | 0.5         |
|                 | 11      | 2462            | 9.10                | 0.5         |
| 11g             | 1       | 2412            | 15.60               | 0.5         |
|                 | 6       | 2437            | 15.50               | 0.5         |
|                 | 11      | 2462            | 15.40               | 0.5         |
| 11n HT20        | 1       | 2412            | 15.10               | 0.5         |
|                 | 6       | 2437            | 15.50               | 0.5         |
|                 | 11      | 2462            | 15.60               | 0.5         |



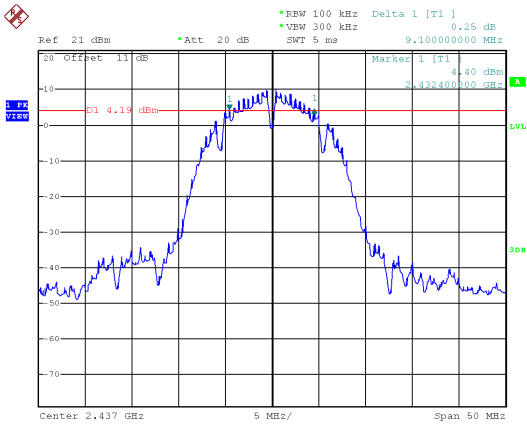
Modulation Type: 802.11b  
CH01



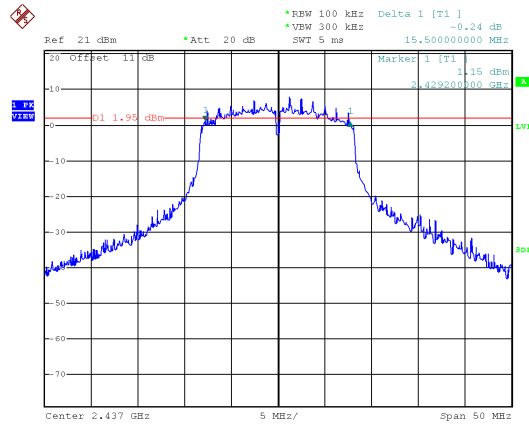
Modulation Type: 802.11g  
CH01



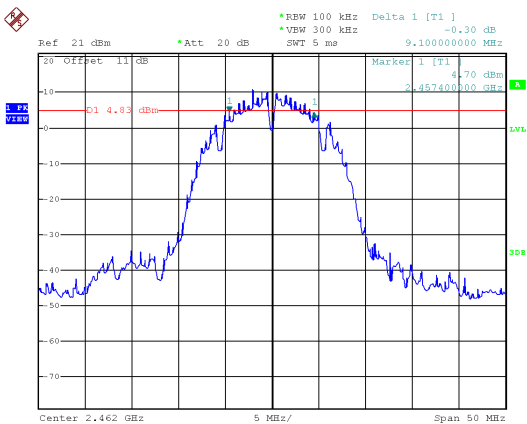
CH06



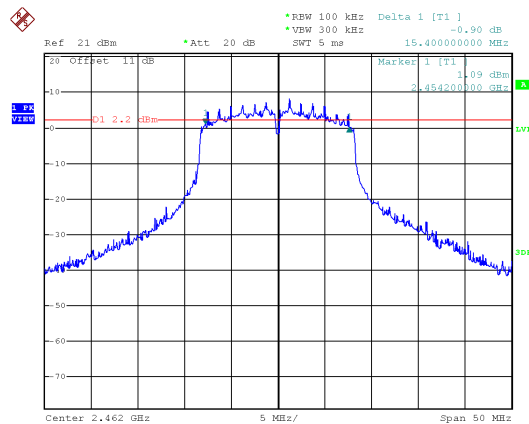
CH06



CH11

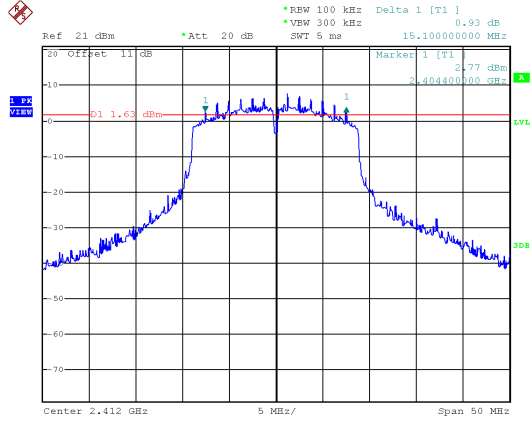


CH11

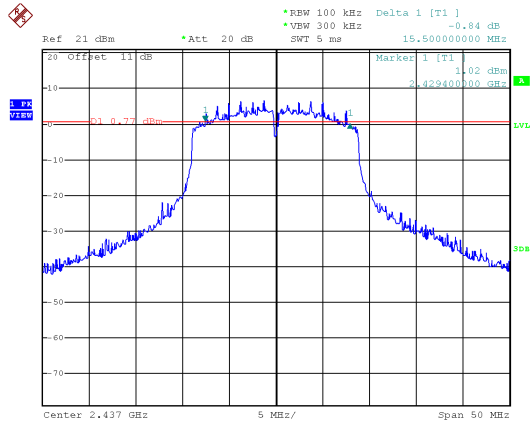




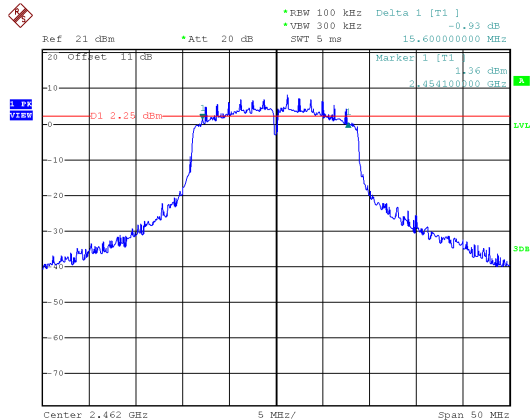
Modulation Type: 802.11n HT20  
CH01



CH06



CH11





### 10. Maximum Average Output Power

#### 10.1 Test Limit

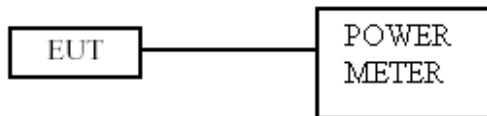
The Maximum Average Output Power Measurement is 30dBm.

If transmitting antennas of directional gain greater than 6 dBi are used, the Average output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

#### 10.2 Test Procedures

The antenna port (RF output) of the EUT was connected to the input (RF input) of a power meter. 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.

#### 10.3 Test Setup Layout



#### 10.4 Test Result and Data

| Modulation Mode | Channel | Frequency (MHz) | Conducted(average) output power (dBm) | Total AV power (dBm) | Total AV power (mW) | Powe Limit (dBm) |
|-----------------|---------|-----------------|---------------------------------------|----------------------|---------------------|------------------|
| 11b             | 1       | 2412            | 2.97                                  | 2.97                 | 1.982               | 30.00            |
|                 | 6       | 2437            | 3.22                                  | 3.22                 | 2.099               | 30.00            |
|                 | 11      | 2462            | 3.38                                  | <b>3.38</b>          | 2.178               | 30.00            |
| 11g             | 1       | 2412            | 2.70                                  | 2.70                 | 1.862               | 30.00            |
|                 | 6       | 2437            | 3.68                                  | 3.68                 | 2.333               | 30.00            |
|                 | 11      | 2462            | 4.00                                  | <b>4.00</b>          | 2.512               | 30.00            |
| 11n HT20        | 1       | 2412            | 2.45                                  | 2.45                 | 1.758               | 30.00            |
|                 | 6       | 2437            | 2.73                                  | 2.73                 | 1.875               | 30.00            |
|                 | 11      | 2462            | 2.90                                  | <b>2.90</b>          | 1.950               | 30.00            |



### 11. Power Spectral Density

#### 11.1 Test Limit

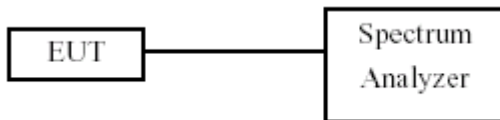
The Maximum of Power Spectral Density Measurement is 8dBm.

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

#### 11.2 Test Procedures

- a. The transmitter output was connected to spectrum analyzer.
- b. The spectrum analyzer’s resolution bandwidth were set at 3kHz RBW and 30KHz VBW as that of the fundamental frequency. Set the sweep time=auto couple.
- c. The power spectral density was measured and recorded.

#### 11.3 Test Setup Layout

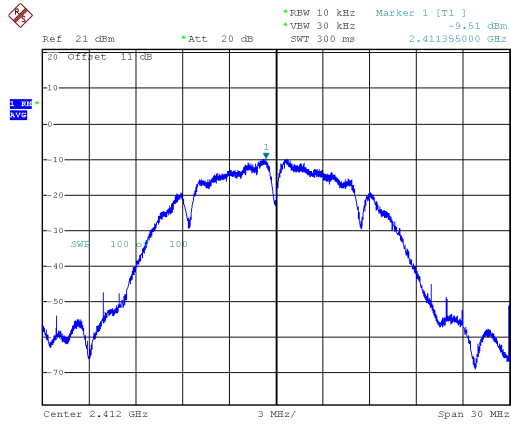


#### 11.4 Test Result and Data

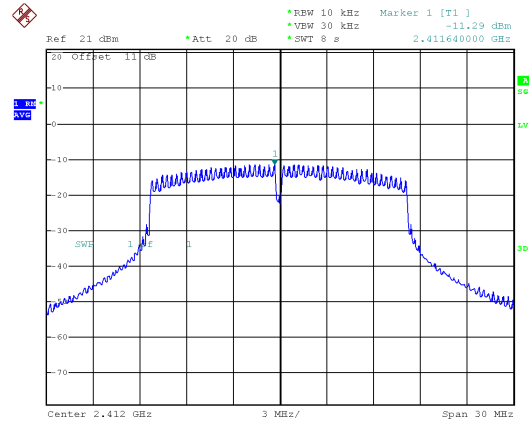
| Modulation Mode | Channel | Frequency (MHz) | Maximum Power Density of 3KHz Bandwidth(dBm) | Sum chain (dBm) | Duty Cycle CF(dB) | Total PSD (dBm) | Limit (dBm) |
|-----------------|---------|-----------------|--|-----------------|-------------------|-----------------|-------------|
| 11b             | 1       | 2412            | -9.51  | -9.51           | 0.00              | -9.51           | 8.00        |
|                 | 6       | 2437            | -9.41  | -9.41           | 0.00              | -9.41           | 8.00        |
|                 | 11      | 2462            | -8.72  | -8.72           | 0.00              | <b>-8.72</b>    | 8.00        |
| 11g             | 1       | 2412            | -11.29                                       | -11.29          | 0.28              | -11.01          | 8.00        |
|                 | 6       | 2437            | -10.99                                       | -10.99          | 0.28              | -10.71          | 8.00        |
|                 | 11      | 2462            | -10.46                                       | -10.46          | 0.28              | -10.18          | 8.00        |
| 11n HT20        | 1       | 2412            | -11.45                                       | -11.45          | 0.29              | -11.16          | 8.00        |
|                 | 6       | 2437            | -11.18                                       | -11.18          | 0.29              | -10.89          | 8.00        |
|                 | 11      | 2462            | -10.82                                       | -10.82          | 0.29              | -10.53          | 8.00        |



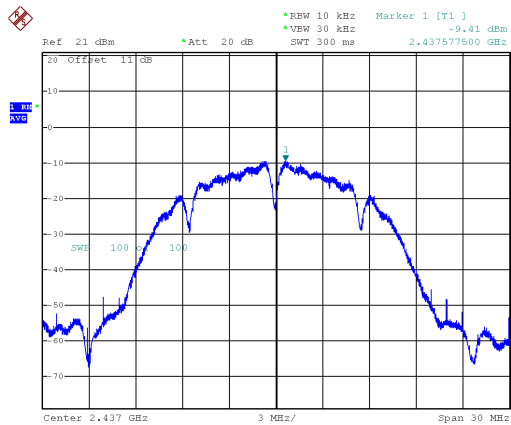
Modulation Type: 802.11b  
CH01



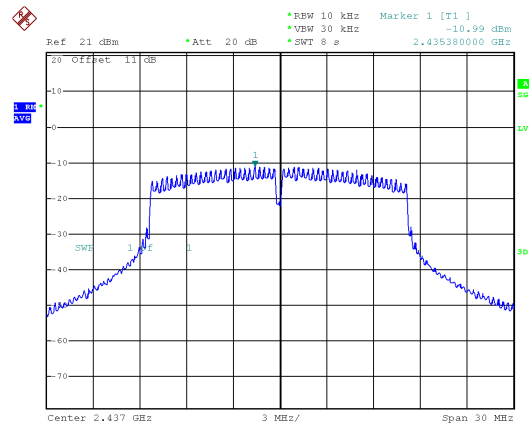
Modulation Type: 802.11g  
CH01



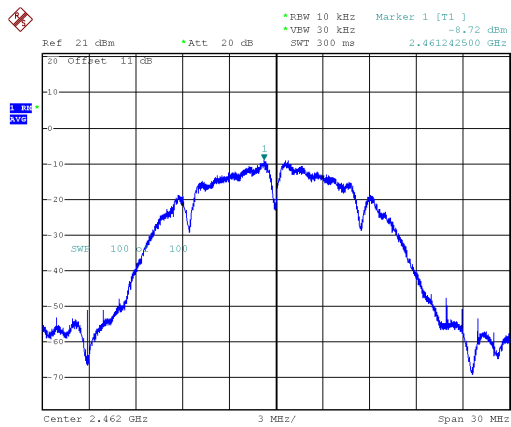
CH06



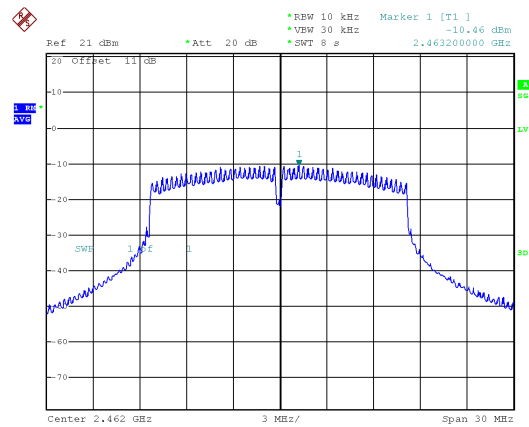
CH06



CH11

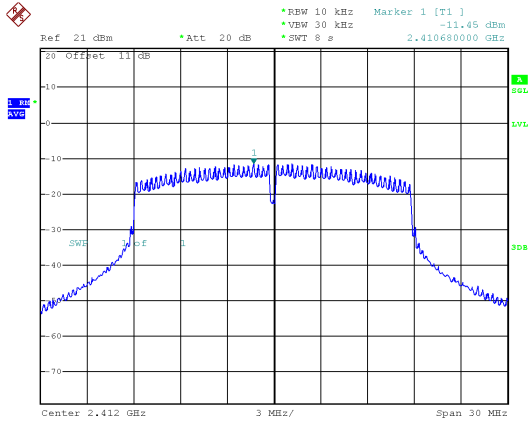


CH11

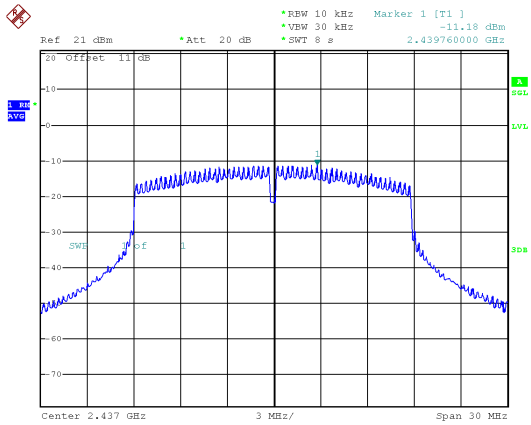




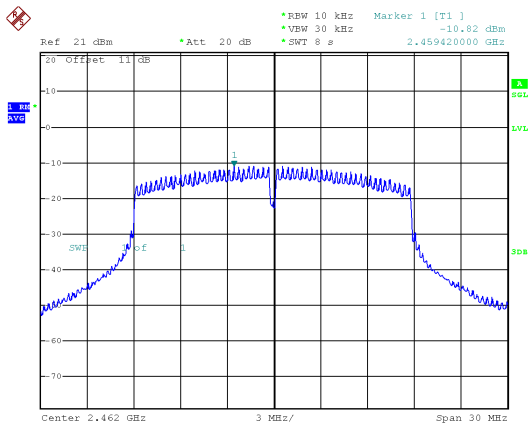
Modulation Type: 802.11n HT20  
CH01



CH06



CH11





## 12. Radio Frequency Exposure

### 12.1 Applicable Standards

The measurements shown in this test report were made in accordance with the procedures given in FCC Part 2 (Section 2.1093)

KDB 447498

IEEE C95.1:2005

#### LIMIT

KDB 447498 D01 § 4.3(a)

For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR, where

\*f(GHz) is the RF channel transmit frequency in GHz

\* Power and distance are rounded to the nearest mW and mm before calculation

\*The result is rounded to one decimal place for comparison

\*The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is  $\leq 50$  mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is  $< 5$  mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion

### 12.2 EUT Specification

|                                   |  |
|-----------------------------------|--|
| <b>Frequency band (Operating)</b> | <input checked="" type="checkbox"/> WLAN: 2412MHz ~ 2462MHz<br><input type="checkbox"/> Bluetooth: 2402MHz ~ 2480MHz   |
| <b>Device category</b>            | <input checked="" type="checkbox"/> Portable (<20cm separation)<br><input type="checkbox"/> Mobile (>20cm separation)  |
| <b>Exposure classification</b>    | <input type="checkbox"/> Occupational/Controlled exposure<br><input checked="" type="checkbox"/> General Population/Uncontrolled exposure  |
| <b>Antenna diversity</b>          | <input checked="" type="checkbox"/> Single antenna<br><input type="checkbox"/> Multiple antennas<br><input type="checkbox"/> Tx diversity<br><input type="checkbox"/> Rx diversity<br><input type="checkbox"/> Tx/Rx diversity |
| <b>Evaluation applied</b>         | <input type="checkbox"/> MPE Evaluation*<br><input checked="" type="checkbox"/> SAR Evaluation<br><input type="checkbox"/> N/A   |

#### **Remark:**

1. The maximum conducted output power is 4dBm (2.512mW) at 2462MHz (with 2.8 dBi antenna gain.)
2. DTS device is not subject to routine RF evaluation; MPE estimate is used to justify the compliance.
3. For mobile or fixed location transmitters, no SAR consideration applied.





### 12.3 Test Results

No non-compliance noted.

According to the KDB447498:

The SAR test exclusion thresholds Level:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * \text{sqrt}(\text{freq. in GHz}) < 3$

Calculation

| Channel Frequency (MHz) | Max. Conducted output power(dBm) | Max. Conducted output power(mW) | Distance (mm) | SAR test exclusion thresholds (mW) |
|-------------------------|----------------------------------|---------------------------------|---------------|------------------------------------|
| 2412-2462               | 4.00                             | 2.51                            | 5             | 10.00                              |

Since the source-based time-averaging conducted output power is well below the SAR low threshold level, so the EUT is considered to comply with SAR requirement without testing