

**Antenna 1****Test mode: IEEE 802.11g**

| Channel | Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Test Result |
|---------|-----------------|-----------------|-------------|-------------|
| Low     | 2412            | 15144           | >500        | PASS        |
| Mid     | 2437            | 15125           |             | PASS        |
| High    | 2462            | 15132           |             | PASS        |

**Antenna 1****Test mode: IEEE 802.11n HT20 MHz**

| Channel | Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Test Result |
|---------|-----------------|-----------------|-------------|-------------|
| Low     | 2412            | 16086           | >500        | PASS        |
| Mid     | 2437            | 15721           |             | PASS        |
| High    | 2462            | 15723           |             | PASS        |

**Antenna 1****Test mode: IEEE 802.11n HT40 MHz**

| Channel | Frequency (MHz) | Bandwidth (kHz) | Limit (kHz) | Test Result |
|---------|-----------------|-----------------|-------------|-------------|
| Low     | 2422            | 35186           | >500        | PASS        |
| Mid     | 2437            | 35788           |             | PASS        |
| High    | 2452            | 35806           |             | PASS        |

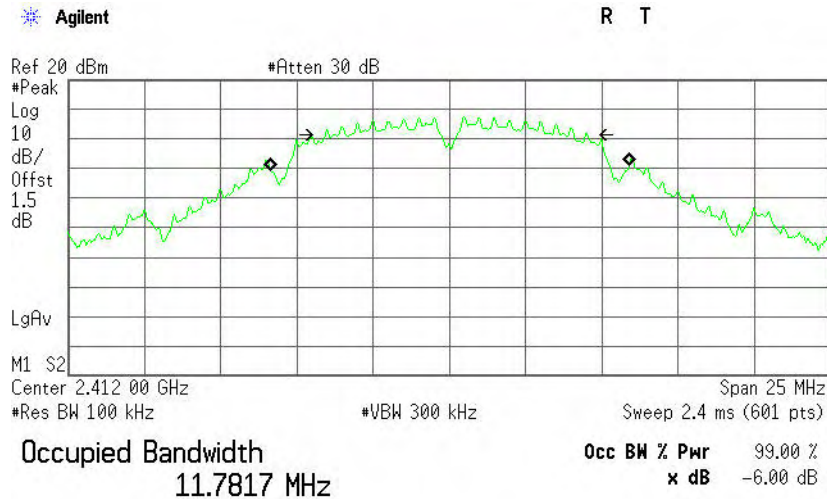


## Test Plot

### Antenna 0

#### IEEE 802.11b mode

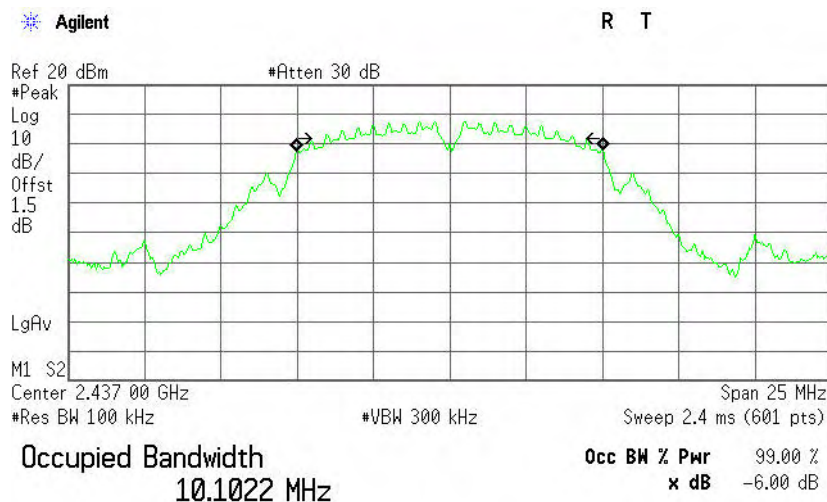
#### 6dB Bandwidth (CH Low)



Transmit Freq Error 15.276 kHz

x dB Bandwidth 8.560 MHz

#### 6dB Bandwidth (CH Mid)



Transmit Freq Error -6.298 kHz

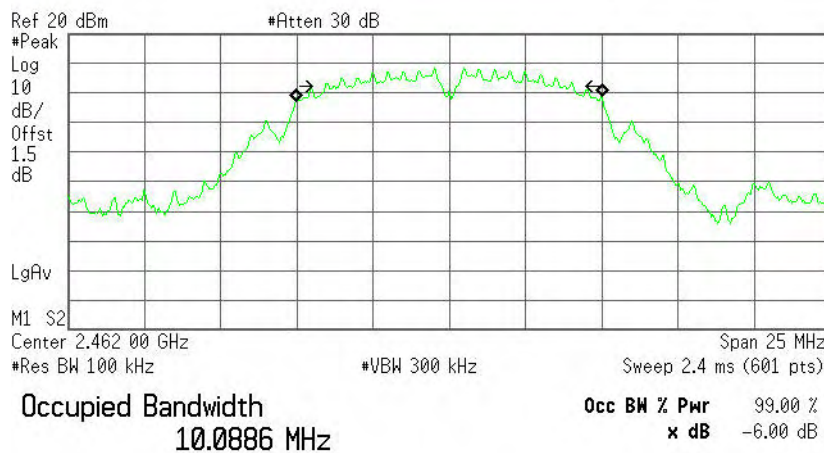
x dB Bandwidth 8.125 MHz



## 6dB Bandwidth (CH High)

Agilent

R T



Transmit Freq Error -4.539 kHz  
x dB Bandwidth 8.124 MHz

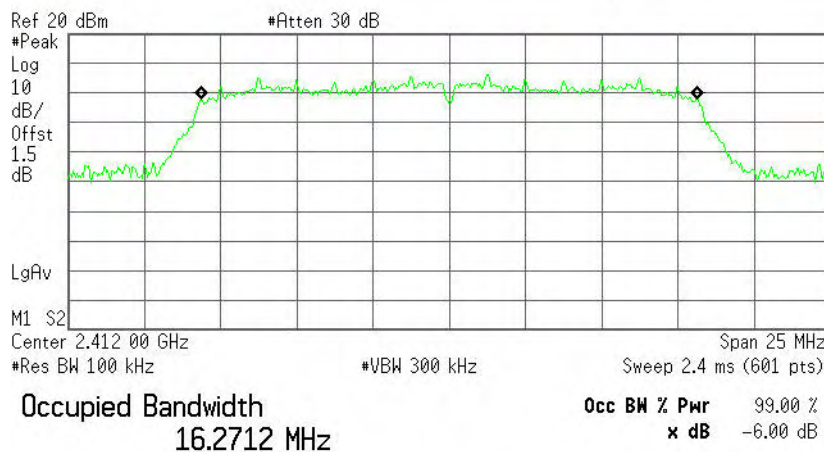
## Antenna 0

### IEEE 802.11g mode

## 6dB Bandwidth (CH Low)

Agilent

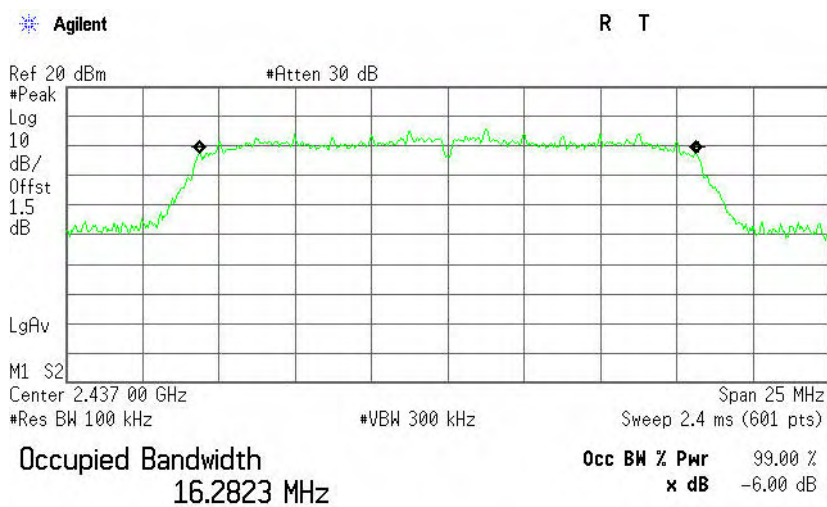
R T



Transmit Freq Error 7.863 kHz  
x dB Bandwidth 15.084 MHz

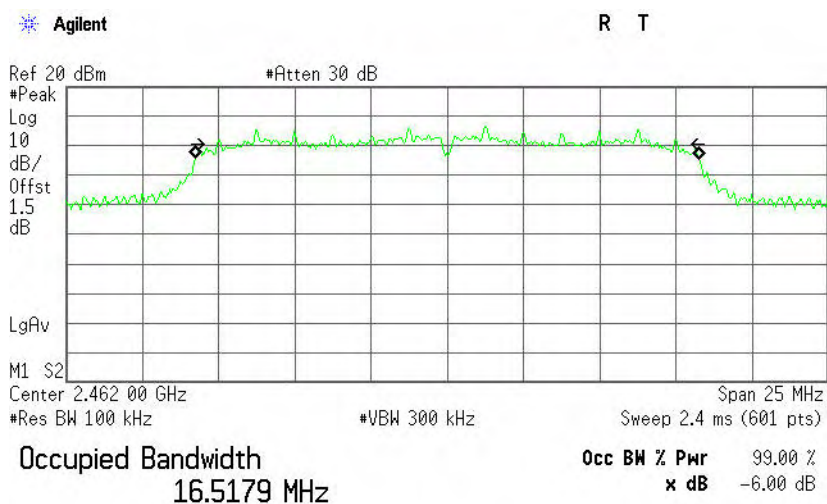


### 6dB Bandwidth (CH Mid)



Transmit Freq Error 422.372 Hz  
x dB Bandwidth 15.103 MHz

### 6dB Bandwidth (CH High)



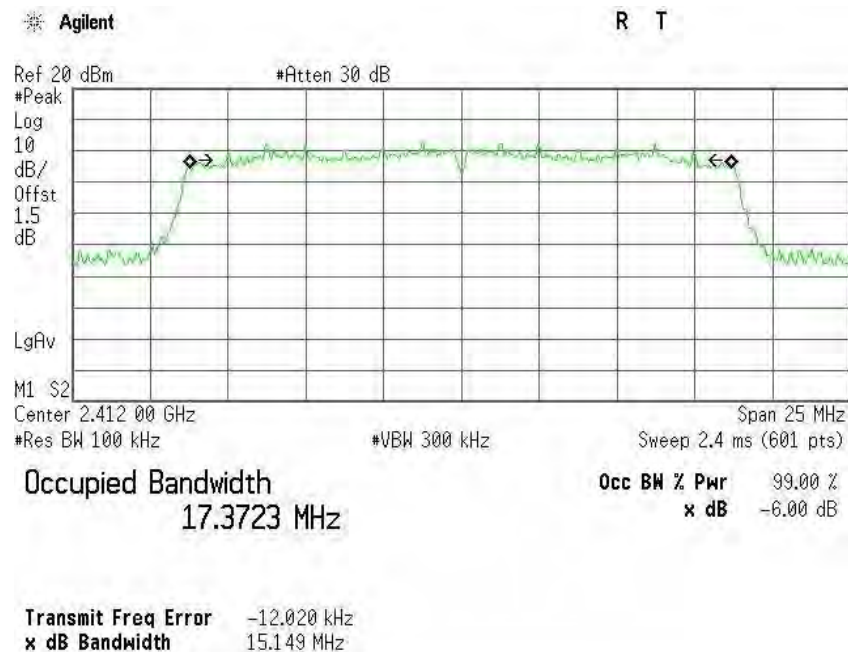
Transmit Freq Error -1.711 kHz  
x dB Bandwidth 15.117 MHz



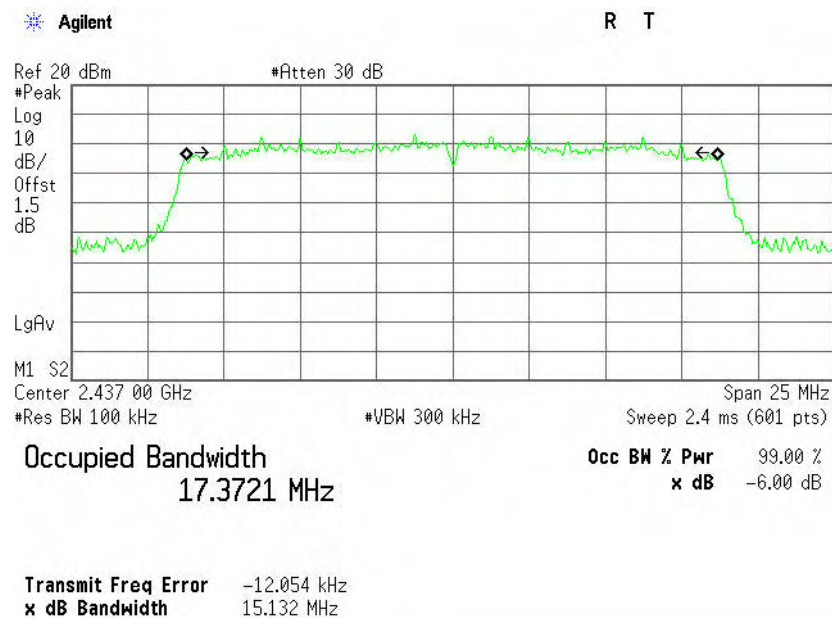
## Antenna 0

### IEEE 802.11n HT20 MHz mode

#### 6dB Bandwidth (CH Low)

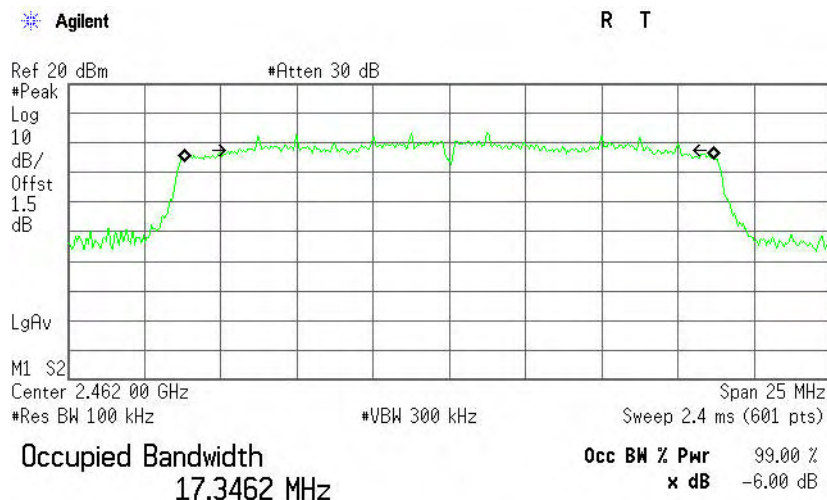


#### 6dB Bandwidth (CH Mid)





### 6dB Bandwidth (CH High)



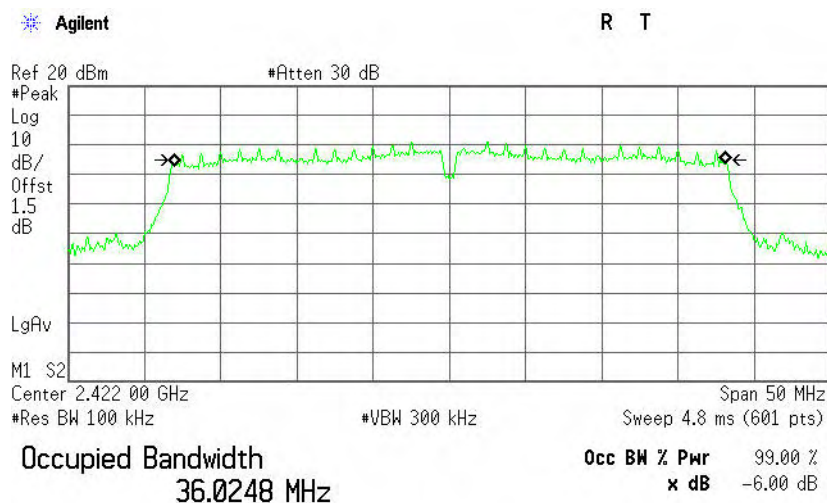
Transmit Freq Error -5.465 kHz

x dB Bandwidth 14.504 MHz

### Antenna 0

#### IEEE 802.11n HT40 MHz mode

### 6dB Bandwidth (CH Low)

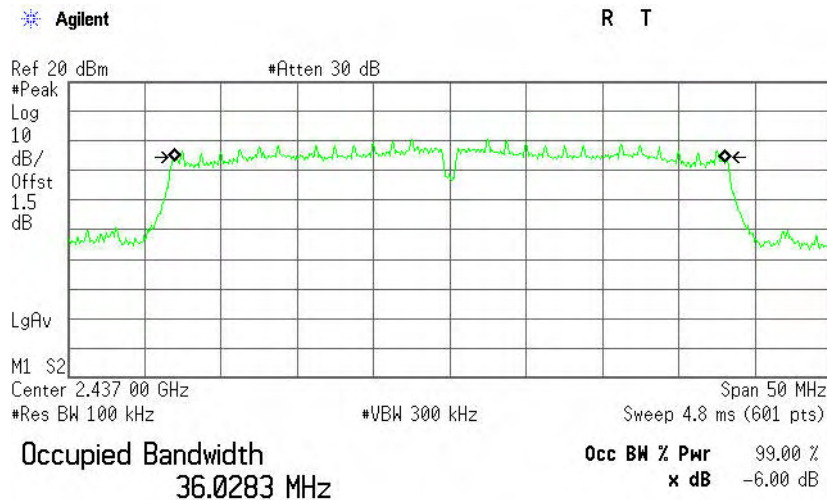


Transmit Freq Error 33.870 kHz

x dB Bandwidth 35.349 MHz

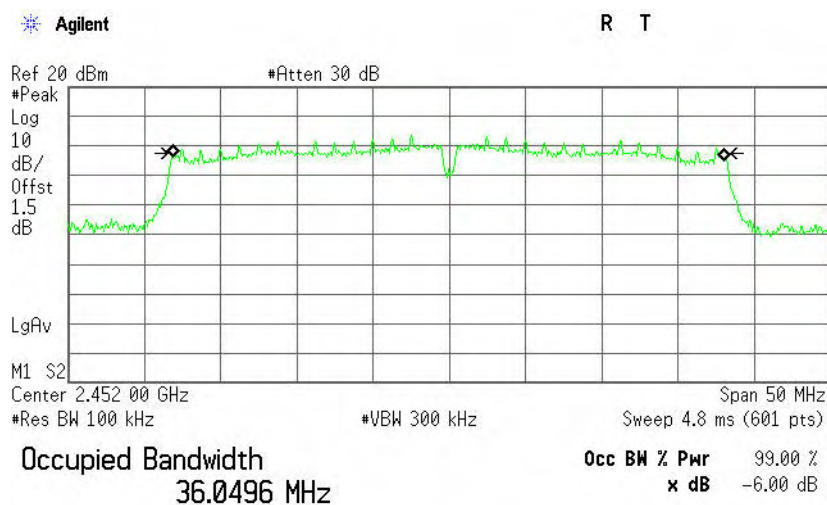


## 6dB Bandwidth (CH Mid)



Transmit Freq Error -2.334 kHz  
x dB Bandwidth 35.244 MHz

## 6dB Bandwidth (CH High)



Transmit Freq Error -28.142 kHz  
x dB Bandwidth 35.200 MHz



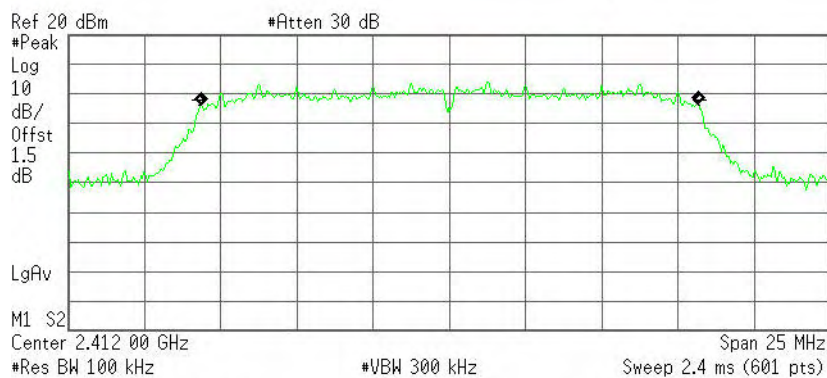
## Antenna 1

### IEEE 802.11g mode

#### 6dB Bandwidth (CH Low)

Agilent

R T



Occupied Bandwidth  
16.2958 MHz

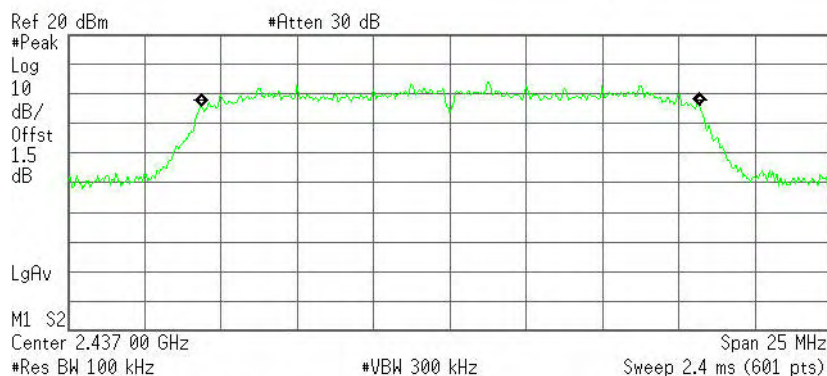
Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error 16.117 kHz  
x dB Bandwidth 15.144 MHz

#### 6dB Bandwidth (CH Mid)

Agilent

R T



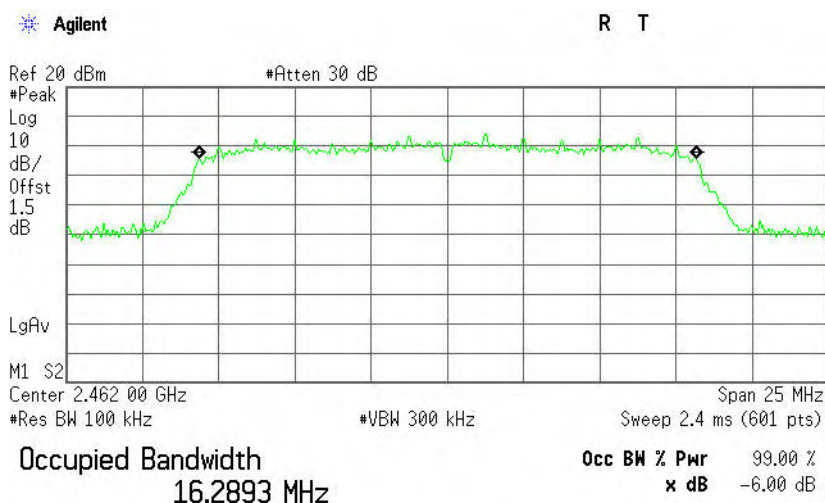
Occupied Bandwidth  
16.2981 MHz

Occ BW % Pwr 99.00 %  
x dB -6.00 dB

Transmit Freq Error 8.448 kHz  
x dB Bandwidth 15.125 MHz



## 6dB Bandwidth (CH High)



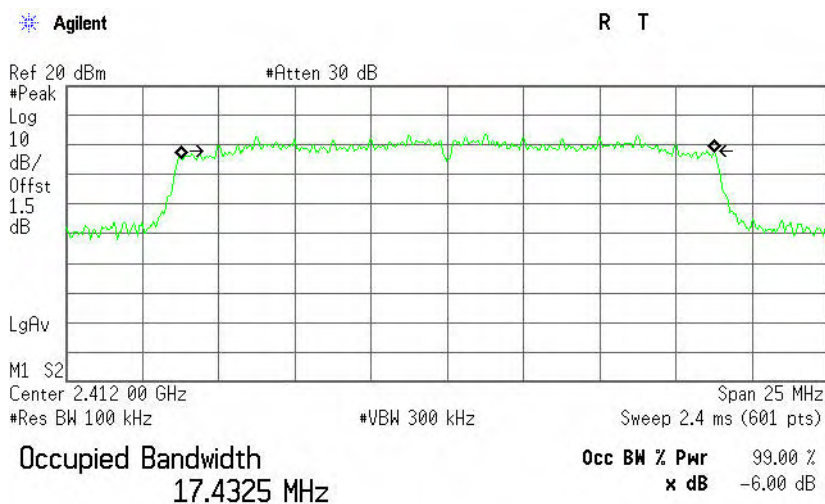
Transmit Freq Error 14.039 kHz

x dB Bandwidth 15.132 MHz

## Antenna 1

### IEEE 802.11n HT20 MHz mode

## 6dB Bandwidth (CH Low)



Transmit Freq Error 13.344 kHz

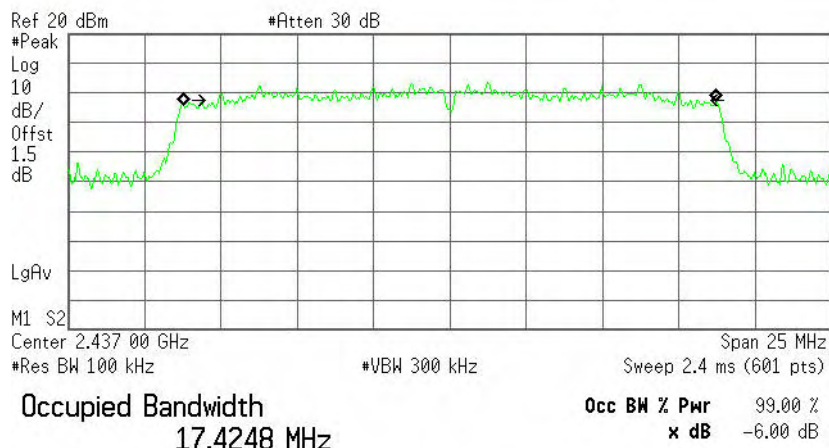
x dB Bandwidth 16.086 MHz



## 6dB Bandwidth (CH Mid)

Agilent

R T



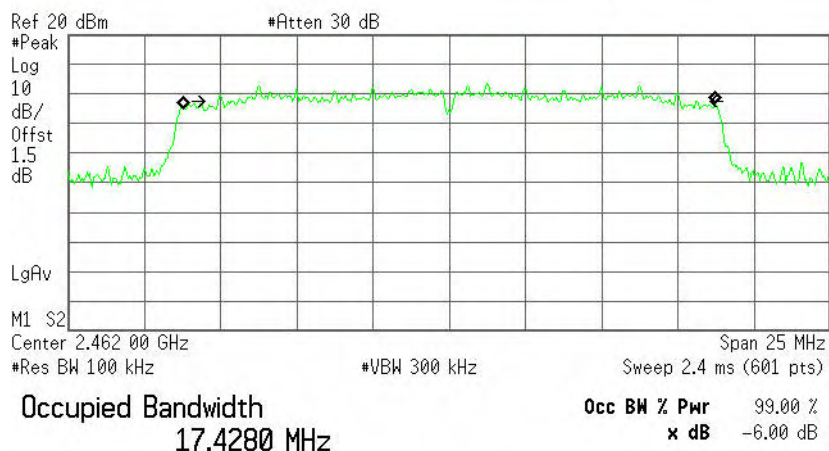
Transmit Freq Error 4.273 kHz

x dB Bandwidth 15.721 MHz

## 6dB Bandwidth (CH High)

Agilent

R T



Transmit Freq Error 767.614 Hz

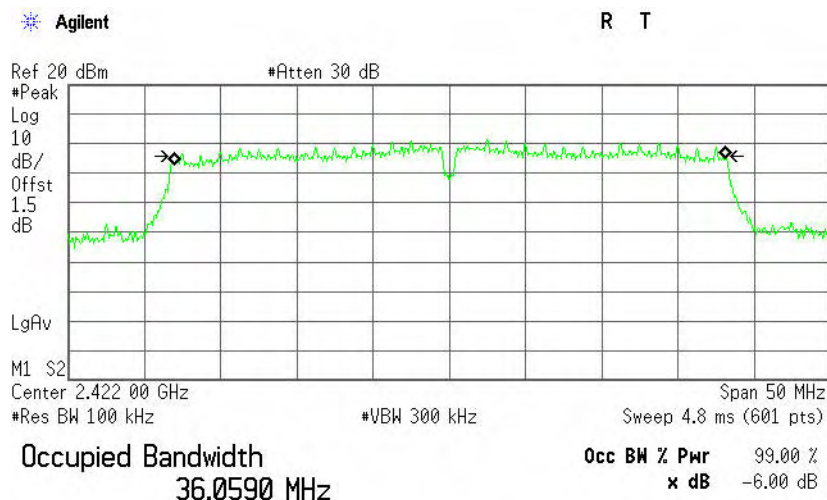
x dB Bandwidth 15.723 MHz



## Antenna 1

### IEEE 802.11n HT40 MHz mode

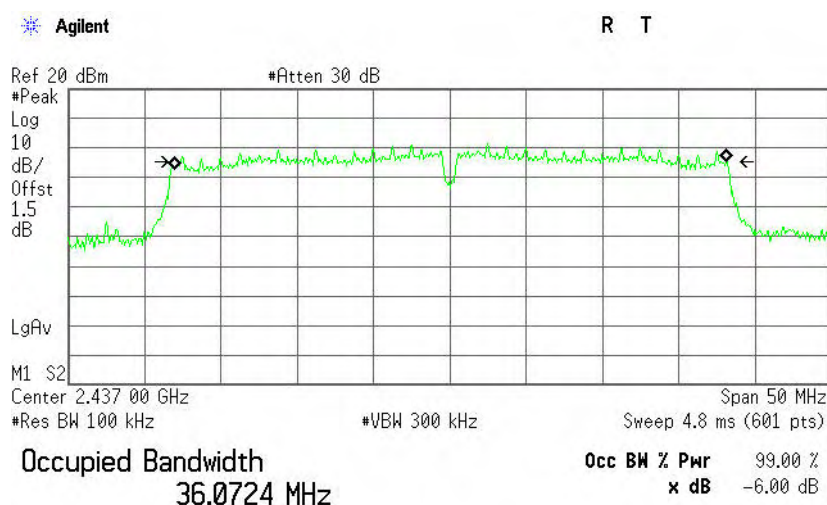
#### 6dB Bandwidth (CH Low)



Transmit Freq Error 36.811 kHz

x dB Bandwidth 35.186 MHz

#### 6dB Bandwidth (CH Mid)

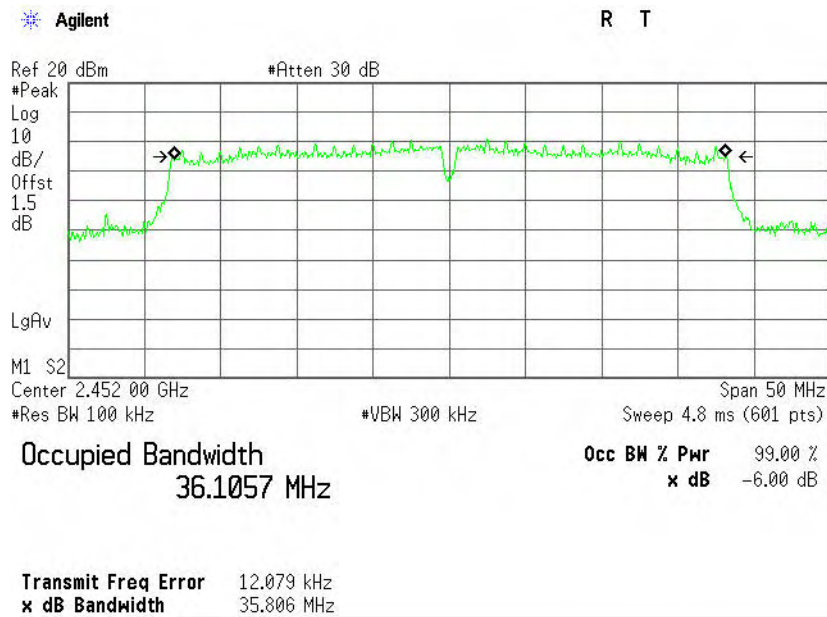


Transmit Freq Error 30.335 kHz

x dB Bandwidth 35.788 MHz



### 6dB Bandwidth (CH High)





## 7.4. PEAK OUTPUT POWER

### 7.4.1. LIMITS

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 7.4.2. TEST INSTRUMENTS

| Name of Equipment | Manufacturer | Model   | Serial Number | Last Calibration | Calibration Due |
|-------------------|--------------|---------|---------------|------------------|-----------------|
| Spectrum Analyzer | Agilent      | E4446A  | US44300399    | 03/09/2013       | 03/08/2014      |
| Power Meter       | Anritsu      | ML2495A | 1204003       | 03/09/2013       | 03/08/2014      |
| Power Sensor      | Anritsu      | MA2411B | 1126150       | 03/09/2013       | 03/08/2014      |

### 7.4.3. TEST PROCEDURES (please refer to measurement standard)

#### 9.1.1 RBW $\geq$ DTS bandwidth

This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the DTS bandwidth.

1. Set the RBW  $\geq$  DTS bandwidth.
2. Set VBW  $\geq$  3 RBW.
3. Set span  $\geq$  3 x RBW
4. Sweep time = auto couple.
5. Detector = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use peak marker function to determine the peak amplitude level.

#### 9.1.2 Integrated band power method

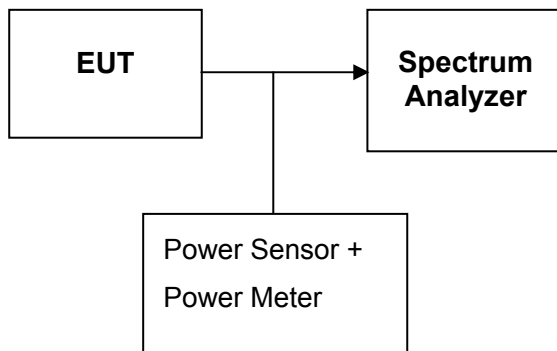
This procedure may be used when the maximum available RBW of the measurement instrument is less than the DTS bandwidth.

1. Set the RBW = 1 MHz.
2. Set the VBW  $\geq$  3 RBW
3. Set the span  $\geq$  1.5 x DTS bandwidth.
4. Detector = peak.
5. Sweep time = auto couple.



6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the instrument's band/channel power measurement function with the band limits set equal to the DTS bandwidth edges (for some instruments, this may require a manual override to select peak detector). If the instrument does not have a band power function, sum the spectrum levels (in linear power units) at intervals equal to the RBW extending across the DTS bandwidth.
- 9.1.3 PKPM1 Peak power meter method  
The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

#### 7.4.4. TEST SETUP



**7.4.5. TEST RESULTS***No non-compliance noted***Test Data****Antenna 0****Test mode: IEEE 802.11b**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---------|-----------------|--------------------|------------------|-----------|--------|
| Low     | 2412            | 17.59              | 0.05741          | 1         | PASS   |
| Mid     | 2437            | 17.52              | 0.05649          |           | PASS   |
| High    | 2462            | 17.88              | 0.06138          |           | PASS   |

**Antenna 0****Test mode: IEEE 802.11g**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---------|-----------------|--------------------|------------------|-----------|--------|
| Low     | 2412            | 23.60              | 0.22909          | 1         | PASS   |
| Mid     | 2437            | 23.03              | 0.20091          |           | PASS   |
| High    | 2462            | 22.75              | 0.18836          |           | PASS   |

**Antenna 1****Test mode: IEEE 802.11g**

| Channel | Frequency (MHz) | Output Power (dBm) | Output Power (W) | Limit (W) | Result |
|---------|-----------------|--------------------|------------------|-----------|--------|
| Low     | 2412            | 21.67              | 0.14689          | 1         | PASS   |
| Mid     | 2437            | 23.06              | 0.20230          |           | PASS   |
| High    | 2462            | 21.16              | 0.13062          |           | PASS   |

**Antenna 0+ Antenna 1****Test mode: IEEE 802.11n HT20 MHz**

| Channel | Frequency (MHz) | Output Power (dBm) |         |          | Output Power (W) | Limit (W) | Result |
|---------|-----------------|--------------------|---------|----------|------------------|-----------|--------|
|         |                 | Chain 0            | Chain 1 | Total    |                  |           |        |
| Low     | 2412            | 21.80              | 18.24   | 23.38530 | 0.21804          | 1         | PASS   |
| Mid     | 2437            | 19.82              | 22.83   | 24.59101 | 0.28781          |           | PASS   |
| High    | 2462            | 17.89              | 17.02   | 20.48705 | 0.11187          |           | PASS   |

**Antenna 0 + Antenna 1****Test mode: IEEE 802.11n HT40 MHz**

| Channel | Frequency (MHz) | Output Power (dBm) |         |          | Output Power | Limit (W) | Result |
|---------|-----------------|--------------------|---------|----------|--------------|-----------|--------|
|         |                 | Chain 0            | Chain 1 | Total    |              |           |        |
| Low     | 2422            | 20.53              | 19.00   | 22.84233 | 0.19241      | 1         | PASS   |
| Mid     | 2437            | 21.80              | 20.38   | 24.15808 | 0.26050      |           | PASS   |
| High    | 2452            | 18.25              | 14.80   | 19.86924 | 0.09703      |           | PASS   |

**Note :** Combine Power Calculation :

$$\text{Total Power(dBm)} = \log(10^{(\text{chain 0 power}/10)} + 10^{(\text{chain 1 power}/10)}) * 10$$



## 7.5. BAND EDGES MEASUREMENT

### 7.5.1. LIMITS

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a) (see Section 15.205(c)).

### 7.5.2. TEST INSTRUMENTS

| Radiated Emission Test Site 966(2) |                |                    |               |                  |                 |
|------------------------------------|----------------|--------------------|---------------|------------------|-----------------|
| Name of Equipment                  | Manufacturer   | Model Number       | Serial Number | Last Calibration | Due Calibration |
| PSA Series Spectrum Analyzer       | Agilent        | E4446A             | US44300399    | 03/09/2013       | 03/08/2014      |
| ESCI EMI TEST RECEIVER.ESCI        | ROHDE&SCHWARZ  | ESCI               | 100783        | 03/09/2013       | 03/08/2014      |
| Amplifier                          | MITEQ          | AM-1604-3000       | 1123808       | 03/18/2013       | 03/18/2014      |
| High Noise Amplifier               | Agilent        | 8449B              | 3008A01838    | 03/18/2013       | 03/18/2014      |
| Board-Band Horn Antenna            | Schwarzbeck    | BBHA 9170          | 9170-497      | 06/21/2013       | 06/21/2014      |
| Bilog Antenna                      | SCHAFFNER      | CBL6143            | 5082          | 03/02/2013       | 03/01/2014      |
| Horn Antenna                       | SCHWARZBECK    | BBHA9120           | D286          | 03/02/2013       | 03/01/2014      |
| Loop Antenna                       | A、R、A          | PLA-1030/B         | 1029          | 03/23/2013       | 03/23/2014      |
| Turn Table                         | N/A            | N/A                | N/A           | N.C.R            | N.C.R           |
| Controller                         | Sunol Sciences | SC104V             | 022310-1      | N.C.R            | N.C.R           |
| Controller                         | CT             | N/A                | N/A           | N.C.R            | N.C.R           |
| Temp. / Humidity Meter             | Anymetre       | JR913              | N/A           | 03/04/2013       | 03/03/2014      |
| Antenna Tower                      | SUNOL          | TLT2               | N/A           | N.C.R            | N.C.R           |
| Test S/W                           | FARAD          | LZ-RF / CCS-SZ-3A2 |               |                  |                 |

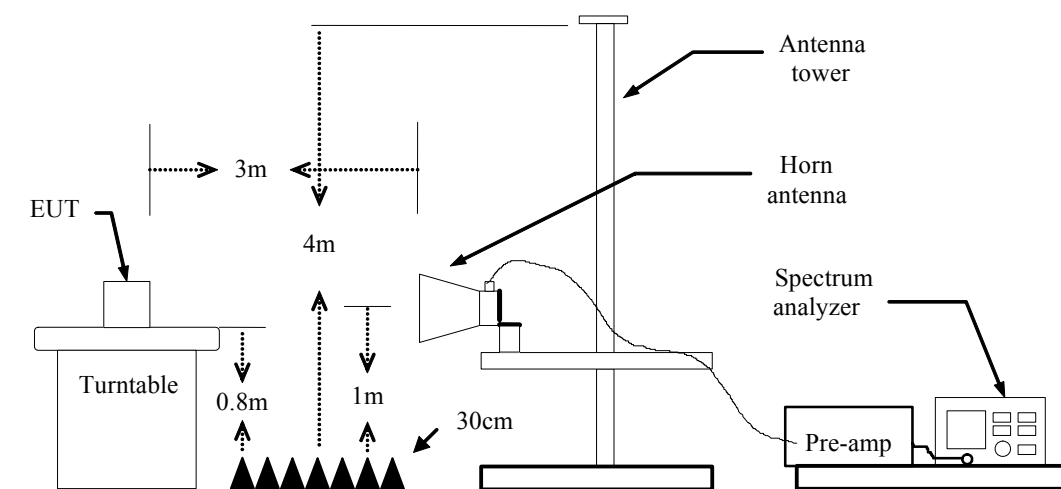
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The FCC Site Registration number is 101879.  
3. N.C.R = No Calibration Required.



### 7.5.3. TEST PROCEDURES (please refer to measurement standard)

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

### 7.5.4. TEST SETUP





## 7.5.5. TEST RESULTS

### Test Plot

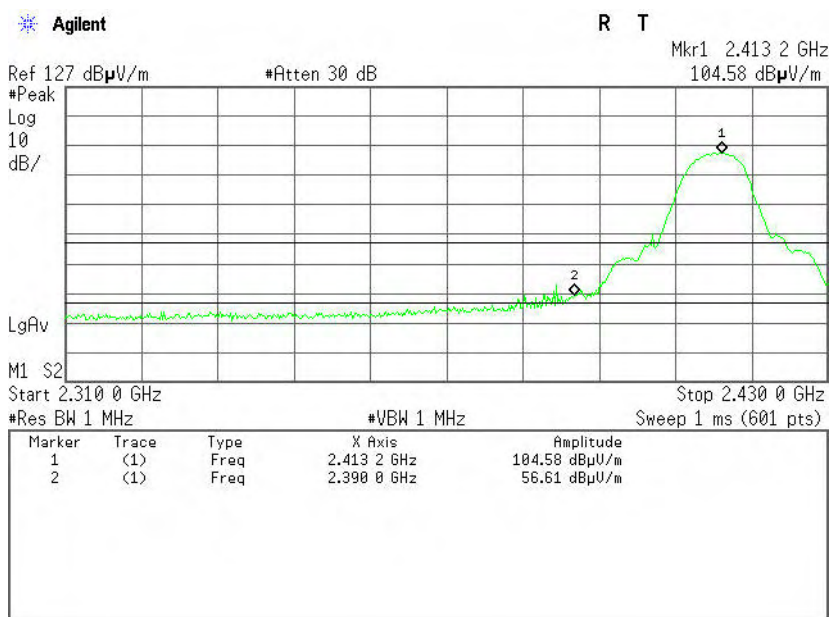
#### Antenna 0+ Antenna 1

#### IEEE 802.11b mode

#### Band Edges (CH Low)

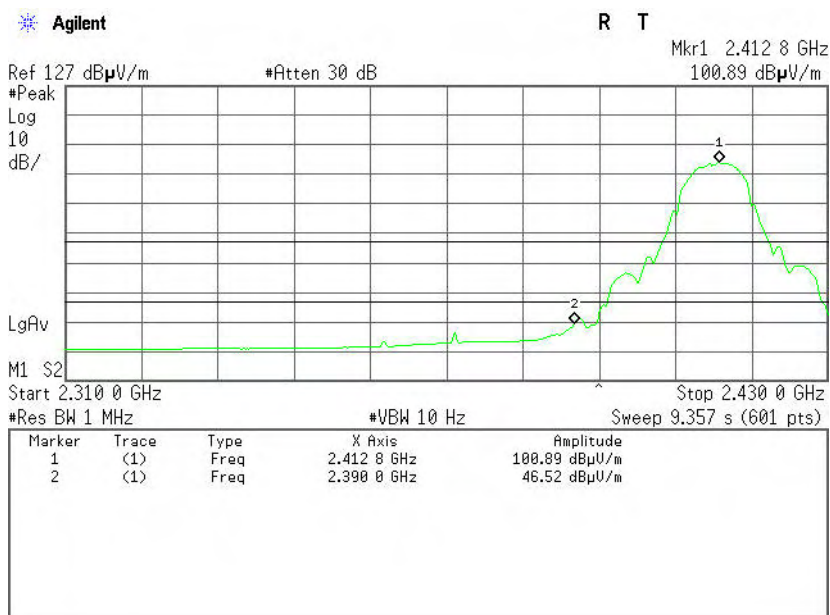
Detector mode: Peak

Polarity: Vertical



Detector mode: Average

Polarity: Vertical

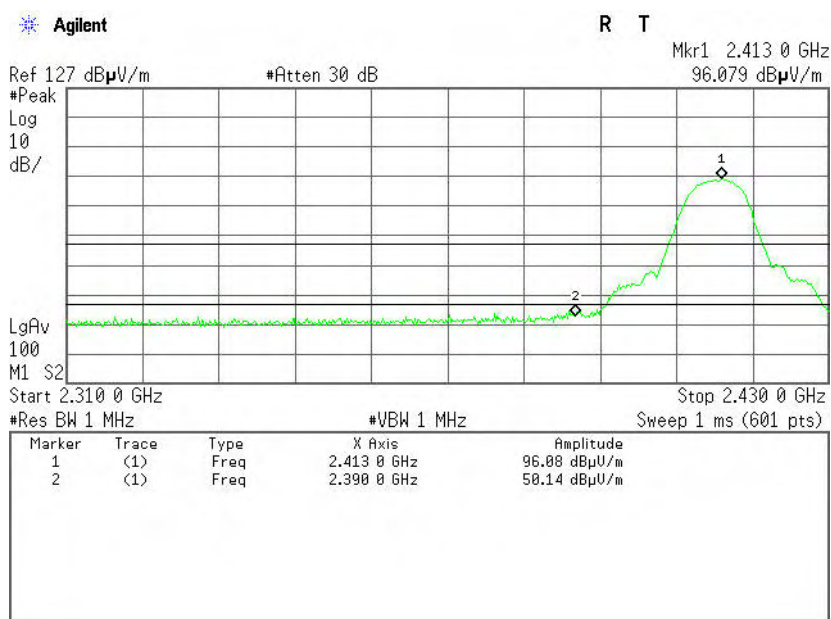


| No. | Frequency (MHz) | Reading (dBuV) | Corrected (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Detector | Antenna Pole |
|-----|-----------------|----------------|----------------|---------------|--------------|-------------|----------|--------------|
| 1   | 2390.0000       | 50.01          | -6.60          | 56.61         | 74.00        | -17.39      | Peak     | Vertical     |
| 2   | 2390.0000       | 39.92          | -6.60          | 46.52         | 54.00        | -7.48       | Average  | Vertical     |



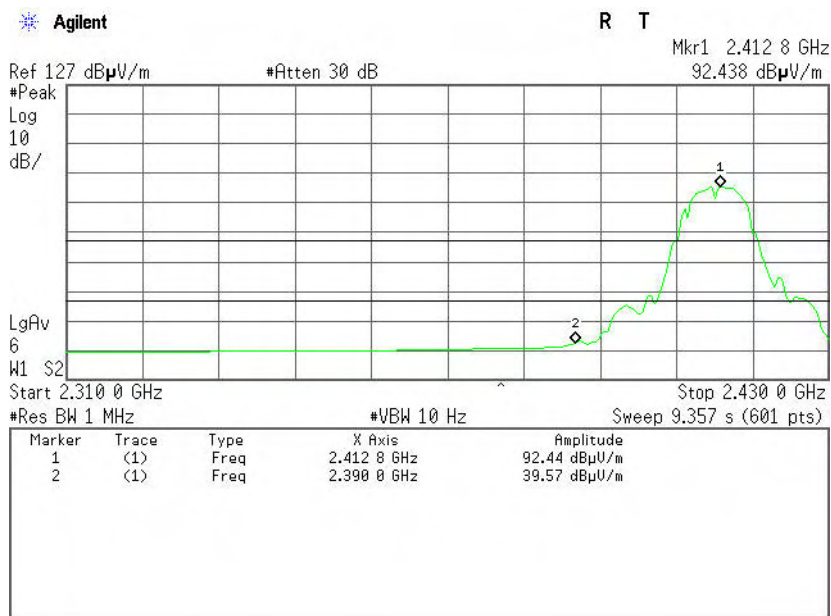
## Detector mode: Peak

## Polarity: Horizontal



## Detector mode: Average

## Polarity: Horizontal



| No. | Frequency (MHz) | Reading (dBuV) | Corrected (dB) | Result (dBuV) | Limit (dBuV) | Margin (dB) | Detector | Antenna Pole |
|-----|-----------------|----------------|----------------|---------------|--------------|-------------|----------|--------------|
| 1   | 2390.0000       | 43.54          | -6.60          | 50.14         | 74.00        | -23.86      | Peak     | Horizontal   |
| 2   | 2390.0000       | 32.97          | -6.60          | 39.57         | 54.00        | -14.43      | Average  | Horizontal   |