

Testing Tomorrow's Technology

#### Application

For

# Part 2, Subpart J, Paragraph 2.907 Equipment Authorization of Certification for an Intentional Radiator per Part 15, Subpart C, paragraphs 15.207, 15.209 and 15.247

For the

WINK Inc.

Model: HUB (WIFI Radio Evaluation)

# FCC ID: 2ACAJ-WINK22

UST Project: 14-0071 Issue Date: May 15, 2014

Total Pages in this Report: 102

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Page 1 of 102



I certify that I am authorized to sign for the Test Agency and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US TECH (Agent Responsible For Test):

By: Alan Ghasiani

Name: Man Masian

Title: Compliance Engineer – President

Date May 15, 2014

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#### MEASUREMENT TECHNICAL REPORT

MODEL: HUB

FCC ID: 2ACAJ-WINK22

**DATE:** May 15, 2014

| This report concerns (check one): Original grant X<br>Class II change<br>Equipment type: 2.4 GHz Transmitter Module  |  |  |
|--|--|--|
| Deferred grant requested per 47 CFR 0.457(d)(1)(ii)? yes No X  |  |  |
| If yes, defer until: $\underline{N/A}_{date}$<br>agrees to notify the Commission by $\underline{N/A}_{date}$<br>of the intended date of announcement of the product so that the grant can be<br>issued on that date. |  |  |
| Report prepared by:<br>US Tech<br>3505 Francis Circle<br>Alpharetta, GA 30004<br>Phone Number: (770) 740-0717<br>Fax Number: (770) 740-1508  |  |  |

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#### List of Attachments

Agency Agreement Application Forms Letter of Confidentiality Equipment Label(s) Block Diagram(s) Schematic(s) Test Configuration Photographs Internal Photographs Theory of Operation RF Exposure User's Manual

#### 1 General Information

#### 1.1 **Purpose of this Report**

This report is prepared as a means of conveying test results and information concerning the suitability of this exact product for public distribution according to the FCC Rules and Regulations Part 15, Section 247.

#### 1.2 Characterization of Test Sample

The sample used for testing was received by US Tech on April 14, 2014 in good operating condition.

#### 1.3 **Product Description**

The Equipment under Test (EUT) is the WINK Inc. home automation radio module, model HUB. The HUB has five transmitters, including: three 2.4 GHZ transmitters (Wifi, Bluetooth, and Zigbee), one 908 MHz transmitter (Zwave), and one 431 MHz transmitter (Lutron). The circuit board uses four trace antennas. The Bluetooth and Wifi radios share one antenna and the other transmitters each have their own antennas.

This report will cover in detail the test results for the WiFi transmitter which includes 802.11b, 802.11g, and 802.11n. The test results for the other transmitters will be covered in separate reports.

Below are excerpts from a customer email describing the function of the transmitters.

The 802.11b testing:

- 1. The 802.11b test was run using a data rate of 11Mb/s using a 20MHz channel bandwidth (22MHz actual spacing)
- 2. The 802.11b test used DSSS (direct sequence spread spectrum) with CCK (complimentary code keying) spread spectrum with QPSK modulation for a total data rate of 11Mb/s

Looking at the two WiFi standards:

- 1. 802.11G and 802.11N both use OFDM with QAM64 modulation (at the higher data rates) providing 6 bits per symbol at high data rates 54Mb/s and 65Mb/s respectively
- 2. 802.11G uses a coding rate of ¾ while 802.11N uses 5/6 with less FEC which is more efficient, so N can push more data through, given the same bandwidth, with one spatial stream (no MIMO)
- 3. 802.11G uses 64 subcarriers (OFDM) while 802.11N uses 52
- 4. 802.11G symbol rate is slightly lower at 54Mb/s 187.5KHz vs. 250KHz for 802.11N
- 5. The occupied channel bandwidth (using 20MHz) channels would be almost identical

Based on these parameters, I would agree that G testing would not be necessary, assuming that N testing was completed. The spectral content would be almost identical.

#### 1.4 Configuration of Tested System

The Test Sample was tested per ANSI C63.4:2003, Methods of Measurement of Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz (2003) for FCC subpart B Digital equipment Verification requirements and per FCC KDB Publication number 558074 for Digital Transmission Systems Operating Under section 15.247. Also, FCC, KDB Publication No. 558074 was used as a test procedure guide.

A list of EUT and Peripherals is found in Table 1 below. A block diagram of the tested system is shown in Figure 1. Test configuration photographs are provided in separate Appendices.

#### 1.5 Test Facility

Testing was performed at US Tech's measurement facility at 3505 Francis Circle, Alpharetta, GA 30004. This site has been fully described and registered with the FCC. Its designation number is 186022. Additionally this site has also been fully described and submitted to Industry Canada (IC), and has been approved under file number 2982A-1.

#### 1.6 Related Submittal(s)/Grant(s)

The EUT will be used to wirelessly send/receive data. The transceiver presented in this report will be used with other like transceivers.

The EUT is subject to the following FCC Equipment Authorizations:

a) Certification of the transmitter (with modular approval), see test data presented herein.

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

b) Verification as a class B digital device.

This device is a final product and is not a sub component; other radio testing was done and is compiled in other reports in this submittal.

### Table 1. EUT and Peripherals

| PERIPHERAL<br>MANUFACTURER.       | MODEL<br>NUMBER | SERIAL<br>NUMBER      | FCC ID:                   | CABLES<br>P/D          |
|-----------------------------------|-----------------|-----------------------|---------------------------|------------------------|
| Home Gateway<br>WINK Inc<br>(EUT) | HUB             | Engineering<br>Sample | Pending: 2ACAJ-<br>WINK22 | 1.5 m U<br>Power cable |
| Antenna<br>See antenna details    |                 |                       |                           |                        |

#### 2 Tests and Measurements

#### 2.1 Test Equipment

The table below lists test equipment used to evaluate this product. Model numbers, serial numbers and their calibration status are included herein.

| TEST<br>INSTRUMENT              | MODEL<br>NUMBER      | MANUFACTURER        | SERIAL<br>NUMBER   | DATE OF<br>LAST<br>CALIBRATION |
|---------------------------------|----------------------|---------------------|--------------------|--------------------------------|
| SPECTRUM<br>ANALYZER            | E4407B               | AGILENT             | US41442935         | 11/8/2013                      |
| SPECTRUM<br>ANALYZER            | 8566B                | HEWLETT-<br>PACKARD | 2410A00109         | 2/03/2014                      |
| RF PREAMP<br>100 kHz to 1.3 GHz | 8447D                | HEWLETT-<br>PACKARD | 2944A06291         | 2/06/2014                      |
| LOOP<br>ANTENNA                 | SAS-<br>200/562      | A. H. Systems       | 142                | 9/12/2013<br>2 yr cycle        |
| BICONICAL<br>ANTENNA            | 3110B                | EMCO                | 9306-1708          | 7/02/2012<br>2 yr cycle        |
| LOG PERIODIC<br>ANTENNA         | 3146                 | EMCO                | 3110-3236          | 6/05/12<br>2 yr cycle          |
| HORN<br>ANTENNA                 | SAS-571              | A. H. Systems       | 605                | 7/23/2013<br>2 yr cycle        |
| HORN<br>ANTENNA                 | 3116                 | EMCO                | 9505-2255          | 8/9/2012<br>2 yr cycle         |
| PREAMP<br>1.0 GHz to 26.0 GHz   | 8449B                | HEWLETT-<br>PACKARD | 3008A00480         | 2/06/14                        |
| LISN                            | 8028-50-<br>TS24-BNC | Solar Electronics   | 910495 &<br>910496 | 3/19/2014                      |
| CALCULATION<br>PROGRAM          | N/A                  | N/A                 | Ver. 6.0           | N/A                            |

#### Table 2. Test Instruments

Note: The calibration interval of the above test instruments are 12 months unless stated otherwise and all calibrations are traceable to NIST/USA.

#### 2.2 Modifications to EUT Hardware

No physical modifications were made by US Tech in order to bring the EUT into compliance with FCC Part 15, Subpart C Intentional Radiator Limits for the transmitter portion of the EUT or the Subpart B Unintentional Radiator Limits (Receiver and Digital Device) Requirements.

During intentional radiation testing, the software setting for the output power was changed to bring the EUT into compliance with Part 15.247 limits.

#### 2.3 Number of Measurements for Intentional Radiators (15.31(m))

Measurements of intentional radiators or receivers shall be performed and reported for each band in which the device can be operated with the device operating at the number of frequencies in each band specified in Table 3 as follows:

| Frequency Range over which the device operates | Number of<br>Frequencies | Location in the<br>Range of operation        |
|--|--------------------------|--|
| 1 MHz or less                                  | 1                        | Middle                                       |
| 1 to 10 MHz                                    | 2                        | 1 near the top<br>1 near the bottom          |
| Greater than 10 MHz                            | 3                        | 1 near top<br>1 near middle<br>1 near bottom |

Because the EUT operates over 2.4 GHz to 2.4835 GHz, 3 test frequencies were used.

#### 2.4 Frequency Range of Radiated Measurements (Part 15.33)

#### 2.4.1 Intentional Radiator

The spectrum shall be investigated for the intentional radiator from the lowest RF signal generated in the EUT, without going below 9 kHz to the 10<sup>th</sup> harmonic of the highest fundamental frequency generated or 40 GHz, whichever is the lowest.

#### 2.4.2 Unintentional Radiator

For the digital device, an unintentional radiator, the frequency range shall be 30 MHz to 1000 MHz, or to the range specified in 2.4.1 above, whichever is the higher range of investigation.

#### 2.5 Measurement Detector Function and Bandwidth (CFR 15.35)

The radiated and conducted emissions limits shown herein are based on the following:

#### 2.5.1 Detector Function and Associated Bandwidth

On frequencies below 1000 MHz, the limits herein are based upon measurement equipment employing a CISPR Quasi-peak detector function and related measurement bandwidths (i.e. 9 kHz from 150 kHz to 30 MHz and 120 kHz from 30 MHz to 1000 MHz). Alternatively, measurements may be made with equipment employing a peak detector function as long as the same bandwidths specified for the Quasi-peak device are used.

#### 2.5.2 Corresponding Peak and Average Requirements

Above 1000 MHz, radiated limits are based on measuring instrumentation employing an average detector function. When average radiated emissions are specified there is also a corresponding Peak requirement, as measured using a peak detector, of 20 dB greater than the average limit. For all measurements above 1000 MHz the Resolution Bandwidth shall be at least 1 MHz.

#### 2.5.3 Pulsed Transmitter Averaging

When the radiated emissions limit is expressed as an average value, and the transmitter is pulsed, the measured field strength shall be determined by applying a Duty Cycle Correction Factor based upon dividing the total ON time during the first 100 ms period by 100 ms (or by the period if less than 100 ms). The duty cycle may also be expressed logarithmically in dB.

NOTE: If the transmitter was programmed to transmit at >98% duty cycle, then, wherever applicable (where the detection mode was AVG) the duty cycle factor calculated will be applied.

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

# 2.6 EUT Antenna Requirements (CFR 15.203)

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. Only the antenna(s) listed in Table 4 will be used with this module.

#### Table 4. Allowed Antenna(s)

| REPORT<br>REFERENCE | MANUFACTURER | TYPE OF<br>ANTENNA | MODEL | GAIN<br>dB <sub>i</sub> | TYPE OF<br>CONNECTOR |  |
|---------------------|--------------|--------------------|-------|-------------------------|----------------------|--|
| Antenna 1           | WINK INC     | 'F' Trace          | NA    | 2.3                     | Printed PCB          |  |

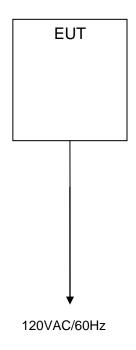


Figure 1. Test Configuration

#### 2.7 Restricted Bands of Operation (Part 15.205)

Only spurious emissions can fall in the frequency bands of CFR 15.205. The field strength of these spurious cannot exceed the limits of 15.209. Radiated harmonics and other Spurious are examined for this requirement see paragraph 2.10.

# 2.8 Transmitter Duty Cycle (CFR 35 (c))

The transmitter is capable of sending three types of transmissions. They are listed below, along with their pulse-width duration:

| ₩ Agil               | ent 09:05:55                           | 5 May 23,                              | 2014  |           |   | Marker                                 |
|----------------------|--|--|---|-----------|---|--|
|                      | <sup>:Bm</sup><br>Marker ∆<br>3.500000 |  | IB  | Cntr2 ∆   | –12.658 kHz<br>0.66 dB                            | <b>Select Marker</b><br>1 2 3 <u>4</u> |
| dB/                  | 0.66 dE                                | }                                      |   |           | . <u>I</u>  | Marker Trace<br>Auto 1 2 3             |
|                      | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ************************************** | and a second and a s |           |   | Readout,<br>Time                       |
|                      |  |  |   |           |   | Function,<br>Off                       |
| Res BW               |  |  | VBW 3 MHz   | Sweep 200 | Span 0 Hz<br>ms (401 pts)                         | Marker Table                           |
| Marke<br>1R          | er Trace<br>(1)                        | Type<br>Time                           | X Axis<br>129 mg  | 3         | Amplitude<br>-57.65 dBm                           | <u>On</u> Off                          |
| 1∆<br>2R<br>2∆<br>3R | (1)<br>(1)<br>(1)<br>(1)               | Time<br>Time<br>Time<br>Time           | 3.5 ms<br>140.5 ms<br>2.5 ms<br>156.5 ms  | 3<br>3    | 1.429 dB<br>-56.67 dBm<br>-0.422 dB<br>-56.96 dBm | Marker All Off                         |
| 30<br>4R<br>40       | (1)<br>(1)<br>(1)                      | Time<br>Time<br>Time                   | -4.5 ms<br>164 ms<br>3.5 ms   | 3         | -0.045 dB<br>-57.24 dBm<br>0.66 dB                | More<br>2 of 2                         |
|                      |  |  |   |           |   |  |

#### Figure 2. Duty Cycle 200ms Sweep

# Total Time On from Figure 2 = 2.25mS

# (14.0mS Total Time On)/(100mS FCC Standard) = 0.14 Numeric Duty Cycle Duty Cycle = 20 Log (.14) = -17.0dB

NOTE: The transmitter was programmed to transmit at >98% duty cycle, therefore wherever applicable (where the detection mode was AVG) the duty cycle factor calculated above will be applied.

#### 2.9 Intentional Radiator, Power Lines Conducted Emissions (CFR 15.207)

The power line conducted voltage emission measurements have been carried out in accordance with CFR 15.207, per ANSI C63.4:2003, Paragraph 7, with a spectrum analyzer connected to an LISN and the EUT placed into a continuous mode of transmission.

The worst-case results for conducted emissions were determined to be produced when the EUT was operating under continuous transmission. The worst case measurement occurred on the neutral line at 0.1646 MHz. The emission level was 6.3 dB from the applicable limit. All other emissions were at least 6.4 dB from the limit. Those results are given in the table following.

#### Table 5. Transmitter Power Line Conducted Emissions Test Data, Part 15.207 CONDUCTED EMISSIONS 150 kHz to 30 MHz Specification Requirement: Project No.: Tested By: Manufacturer: WINK Inc. FCC Part 15.207 14-0071 JCW Model: HUB Class B Corrected Avg Frequency Test Data LISN+CL Margin Detector Results Limits

| (MHz)                      | (dBuV)                       | (dB) | (dBuV) | (dBuV) | (dB) | Delector |  |  |
|----------------------------|------------------------------|------|--------|--------|------|----------|--|--|
| 120 VAC, 60 Hz, Phase Line |                              |      |        |        |      |          |  |  |
| 0.1512                     | 48.10                        | 1.40 | 49.50  | 55.9   | 6.4  | PK       |  |  |
| 0.5048                     | 40.80                        | 0.43 | 41.23  | 46.0   | 4.8  | PK       |  |  |
| 1.4560                     | 36.40                        | 0.36 | 36.76  | 46.0   | 9.2  | PK       |  |  |
| 5.1850                     | 31.40                        | 0.45 | 31.85  | 50.0   | 18.2 | PK       |  |  |
| 15.0700                    | 28.70                        | 0.66 | 29.36  | 50.0   | 20.6 | PK       |  |  |
| 28.1300                    | 27.90                        | 0.77 | 28.67  | 50.0   | 21.3 | PK       |  |  |
|                            | 120 VAC, 60 Hz, Neutral Line |      |        |        |      |          |  |  |
| 0.1646                     | 47.70                        | 1.24 | 48.94  | 55.2   | 6.3  | PK       |  |  |
| 0.5083                     | 31.60                        | 0.42 | 32.02  | 46.0   | 14.0 | PK       |  |  |
| 1.4320                     | 34.30                        | 0.35 | 34.65  | 46.0   | 11.3 | PK       |  |  |
| 5.0450                     | 32.10                        | 0.44 | 32.54  | 50.0   | 17.5 | PK       |  |  |
| 19.0200                    | 29.60                        | 0.61 | 30.21  | 50.0   | 19.8 | PK       |  |  |
| 22.5400                    | 27.90                        | 0.65 | 28.55  | 50.0   | 21.4 | PK       |  |  |

(\*)= Quasi-Peak limit used

#### SAMPLE CALCULATION at 0.1512 MHz:

| Magnitude of Measured Frequency | 48.10 | dBuV |
|---------------------------------|-------|------|
| + Cable Loss+ LISN Loss         | 1.40  | dB   |
| Corrected Result                | 49.50 | dBuV |

| Test Date: | May 9, 2014 |
|------------|-------------|
| Tested By  |             |
| Signature: | John Chym   |
|            |             |

Name: John C. Wynn

# 2.10 Intentional Radiator, Radiated Emissions (Antenna Conducted) (CFR 15.209, 15.247(d)) (IC RSS 210, A2.9 (a))

The EUT was put into a continuous-transmit mode of operation and tested per FCC KDB Publication 558074 for conducted out of band emissions emanating from the antenna port over the frequency range of 30 MHz to 25 GHz. A conducted scan was performed on the EUT to identify and record spurious signals that were related to the transmitter. Antenna Conducted Emissions of a significant magnitude that fell within restricted bands were then measured as radiated emissions on the OATS. The conducted emissions graphs are found in figures 4 through 30 below. The limit for antenna conducted power is 1 Watt (30 dBm) per 15.247 (b)(3).

For antenna conducted radiated measurements a short coax with a SMA connector was soldered to the board; also the trace antenna was disconnected. The EUT was set into a continuous transmission mode. The RBW of the measuring instrument was set equal to 100 kHz. The VBW was set to an equal or larger bandwidth, VBW >= RBW. Note if the device complies with the use of power option 2 the attenuation under this paragraph shall be 30 dB instead of 20 db.

For Average Voltage measurements above 1 GHz, the emissions were measured using RBW = 1 MHz and VBW = 10 Hz. For a pulse-modulated transmitter, the EUT's average emissions are further modified by adding to them the worst-case duty cycle, determined by adding the EUT's total pulse widths (on time) over a 100 ms period and dividing by 100 ms.

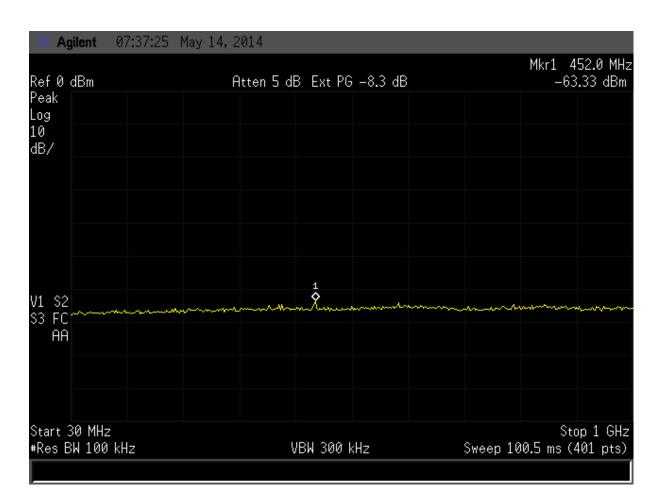


Figure 3. Antenna Conducted Emissions 802.11b Low, Part 1

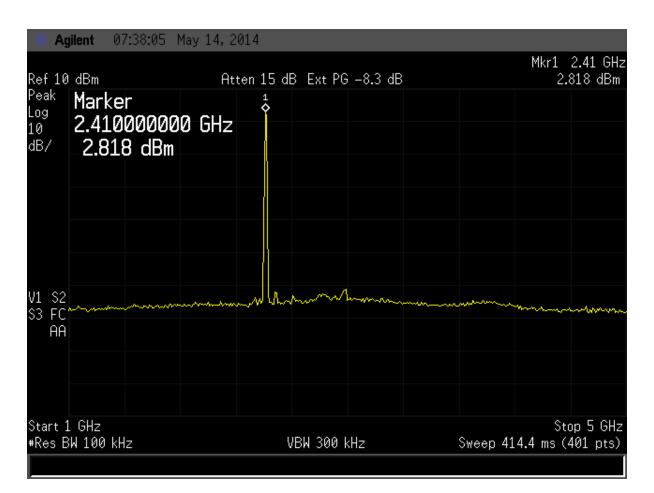


Figure 4. Antenna Conducted Emissions 802.11b Low, Part 2

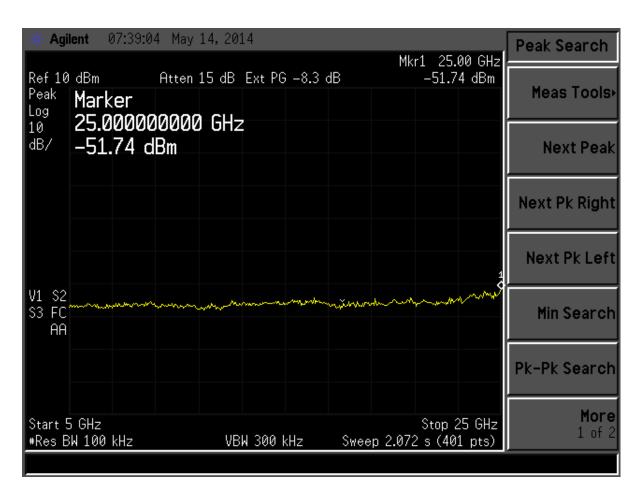


Figure 5. Antenna Conducted Emissions 802.11b Low, Part 3

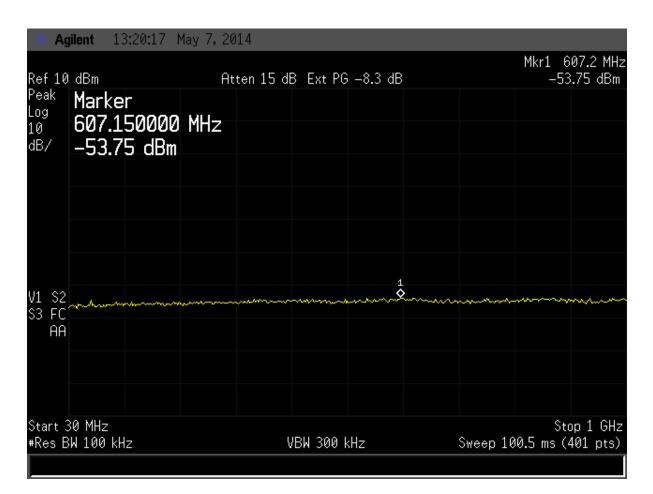


Figure 6. Antenna Conducted Emissions 802.11b Mid, Part 1

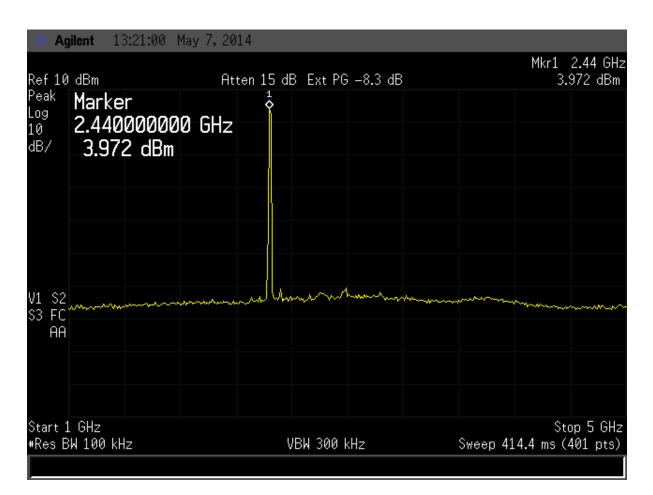


Figure 7. Antenna Conducted Emissions 802.11b Mid, Part 2

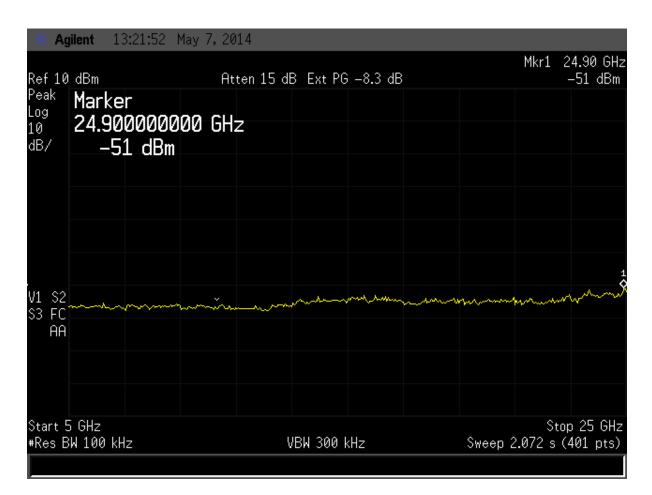


Figure 8. Antenna Conducted Emissions 802.11b Mid, Part 3

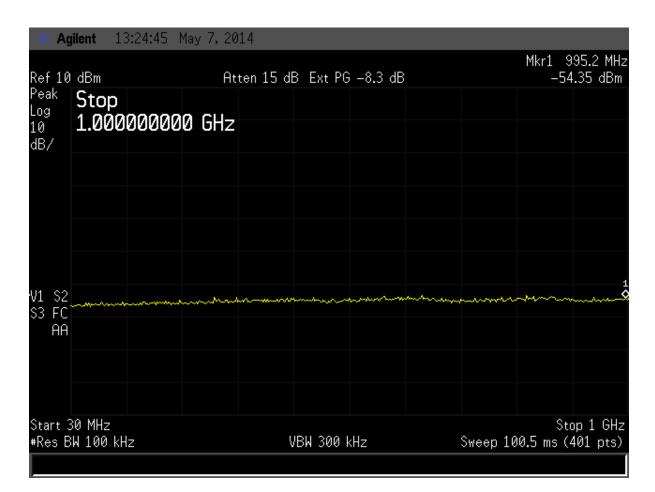


Figure 9. Antenna Conducted Emissions 802.11b High, Part 1

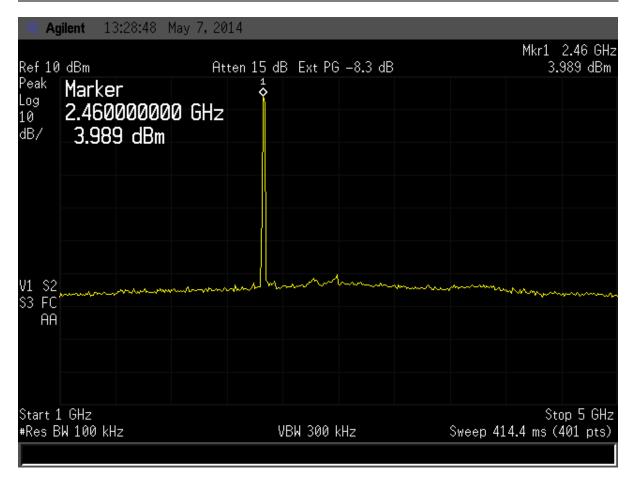


Figure 10. Antenna Conducted Emissions 802.11b High, Part 2

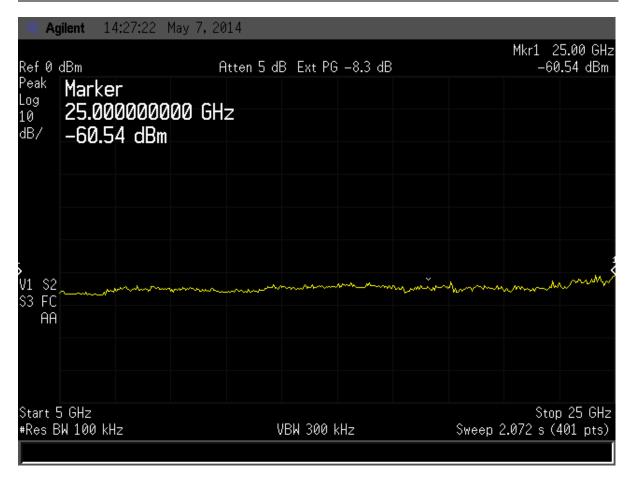


Figure 11. Antenna Conducted Emissions 802.11b High, Part 3

| 🔆 Agilent 14:25:15 May 7, 2014 |                                    |  |  |           |       |         |                              |                   |                      |
|--------------------------------|------------------------------------|--|--|-----------|-------|---------|------------------------------|-------------------|----------------------|
| Ref 0                          |                                    | A                                      | Atten 5 dB Ext PG -8.3 dB              |           |       |         | Mkr1 626.6 MHz<br>-63.48 dBm |                   |                      |
| Peak<br>Log<br>10<br>dB/       | Marker<br>626.550000<br>-63.48 dBm | MHz                                    |  |           |       |         |                              |                   |                      |
|                                |                                    |  |  |           |       |         |                              |                   |                      |
|                                |                                    |  |  |           |       |         |                              |                   |                      |
| V1 S2<br>S3 FC                 |                                    | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~ | man       | www.w | 1<br>\$ |                              | ~~~~~             |                      |
| AA                             |                                    |  |  |           |       |         |                              |                   |                      |
|                                |                                    |  |  |           |       |         |                              |                   |                      |
|                                | 30 MHz<br>3W 100 kHz               |  |  | /BW 300 k | (Hz   |         | Sweep 10                     | Sto<br>/)0.5 ms ( | op 1 GHz<br>401 pts) |
|                                |                                    |  |  |           |       |         |                              |                   |                      |

Figure 12. Antenna Conducted Emissions 802.11g Low, Part 1

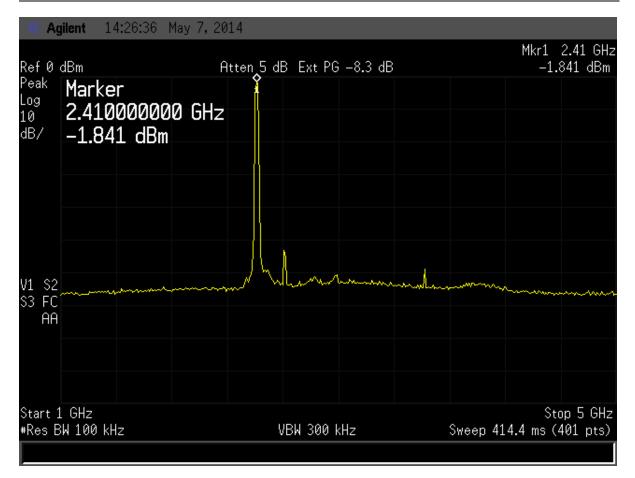


Figure 13. Antenna Conducted Emissions 802.11g Low, Part 2

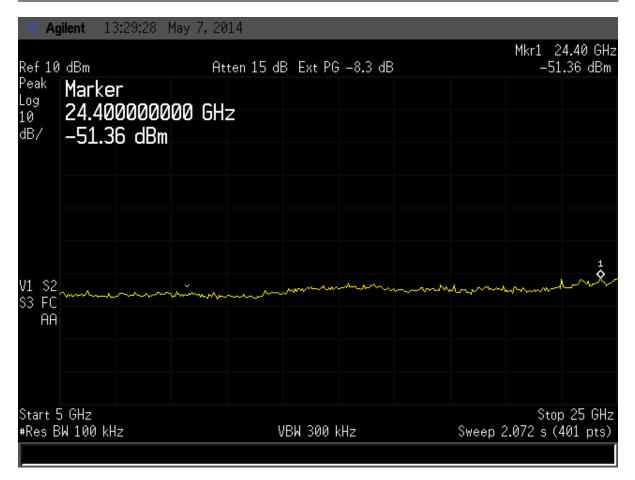


Figure 14. Antenna Conducted Emissions 802.11g Low, Part 3

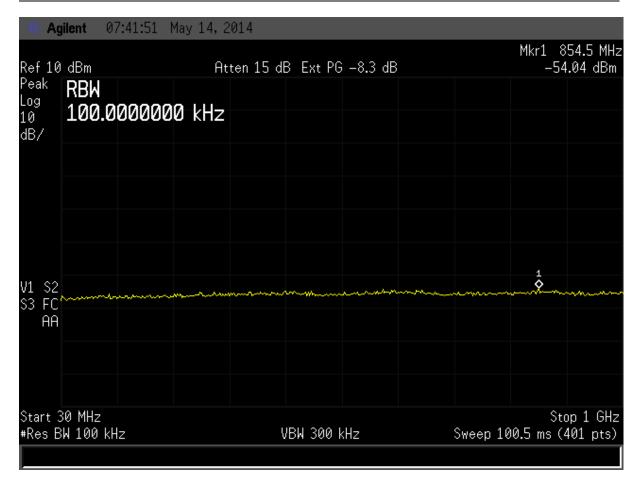


Figure 15. Antenna Conducted Emissions 802.11g Mid, Part 1

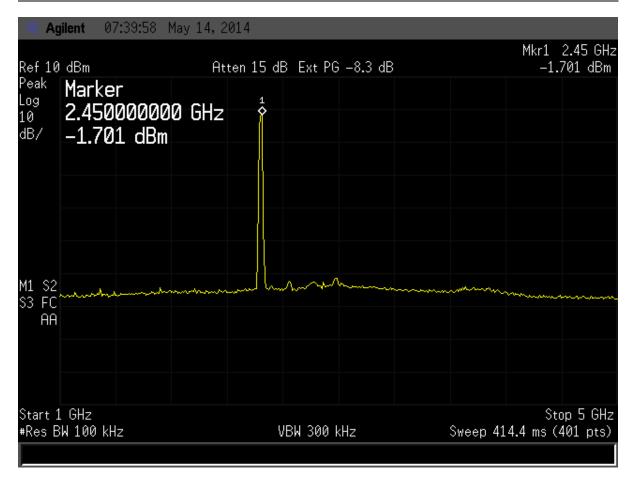


Figure 16. Antenna Conducted Emissions 802.11g Mid, Part 2

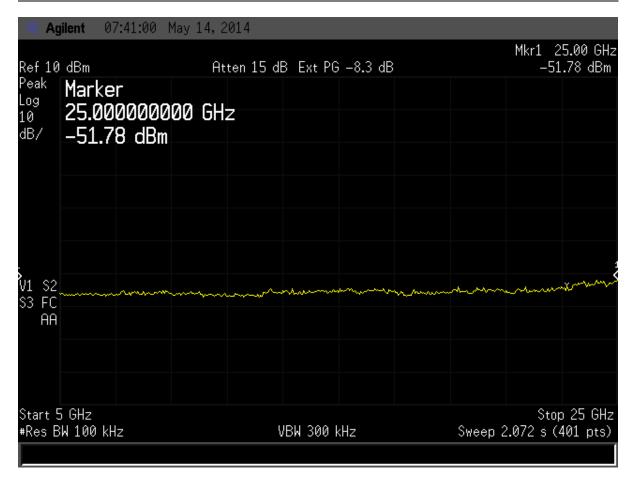


Figure 17. Antenna Conducted Emissions 802.11g Mid, Part 3

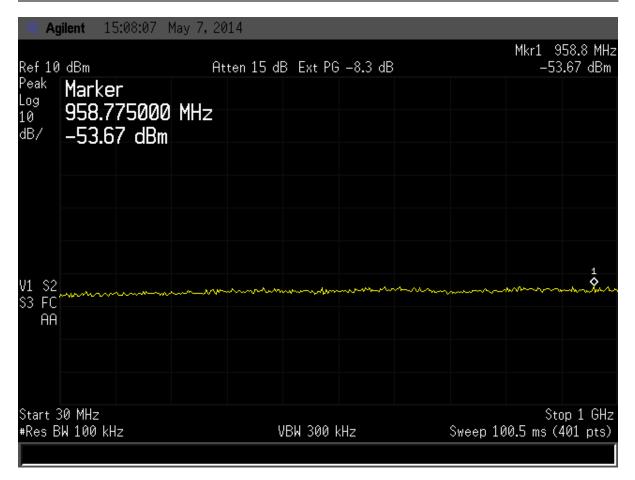


Figure 18. Antenna Conducted Emissions 802.11g High, Part 1

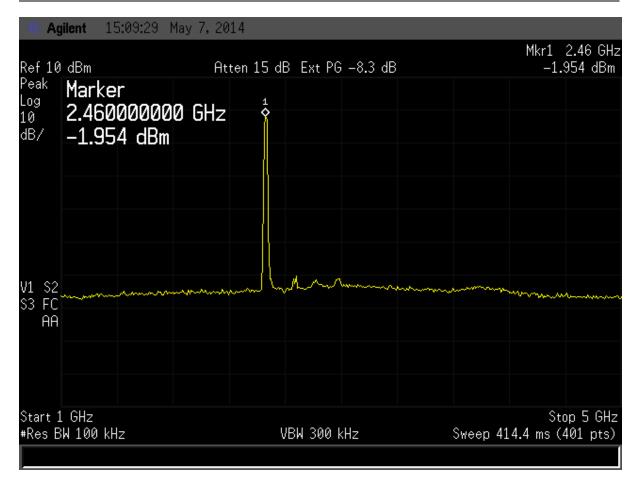


Figure 19. Antenna Conducted Emissions 802.11g High, Part 2

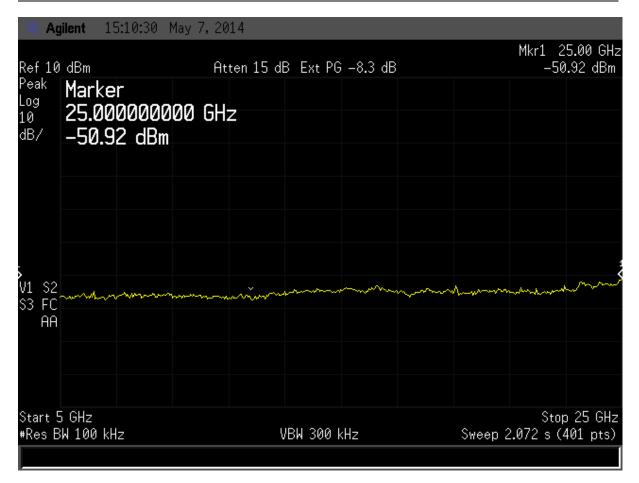


Figure 20. Antenna Conducted Emissions 802.11g High, Part 3

| * Agilent 12:43:4               | 9 Apr 23, 201 | 14                                       |                                    | Peak Search           |
|---------------------------------|---------------|--|------------------------------------|-----------------------|
| Ref 12 dBm<br>Peak<br>Log       | Atten 15 dB   | Ext PG -8.3 dB                           | Mkr1 910.3 MHz<br>-41.54 dBm       | Meas Tools•           |
| 10<br>dB/                       |               |  |                                    | Next Peak             |
| Marker                          | 00 MU-        |  |                                    | Next Pk Right         |
| 910.2750<br>-41.54 d            |               |  |                                    | Next Pk Left          |
| M1 S2<br>S3 FC<br>AA            |               | an a |                                    | Min Search            |
|                                 |               |  |                                    | Pk-Pk Search          |
| Start 30 MHz<br>#Res BW 100 kHz | VB            | W 300 kHz Swee                           | Stop 1 GHz<br>9 100.5 ms (401 pts) | <b>More</b><br>1 of 2 |

Figure 21. Antenna Conducted Emissions 802.11n Low, Part 1

| <b>Agilent</b> 12:45:21 Apr 23, 2014  | Peak Search   |
|---|---------------|
| Mkr1 2.42 G<br>Ref 12 dBm Atten 15 dB Ext PG -8.3 dB -2.944 dB<br>Peak<br>Log |               |
| 10<br>dB/   | Next Peak     |
| Marker<br>2.42000000 GHz  | Next Pk Right |
| -2.944 dBm  | Next Pk Left  |
| S3 FC   | Min Search    |
|   | Pk-Pk Search  |
| Start 1 GHz Stop 5 GH<br>#Res BW 100 kHz VBW 300 kHz Sweep 414.4 ms (401 pts  |               |

Figure 22. Antenna Conducted Emissions 802.11n Low, Part 2

| <b>Agilent</b> 12:45:57 Apr 23, 2014  | Peak Search   |
|---|---------------|
| Mkr1 25.00 GH:<br>Ref 12 dBm Atten 15 dB Ext PG -8.3 dB -48.93 dBm<br>Peak<br>Log |               |
| 10<br>dB/   | Next Peak     |
| Marker<br>25.00000000 GHz   | Next Pk Right |
| -48.93 dBm  | Next Pk Left  |
| V1 S2<br>S3 FC<br>AA  | Min Search    |
|   | Pk-Pk Search  |
| Start 5 GHz Stop 25 GHz<br>#Res BW 100 kHz VBW 300 kHz Sweep 2.072 s (401 pts)    |               |

Figure 23. Antenna Conducted Emissions 802.11n Low, Part 3

| 🔆 Agil                 | <b>lent</b> 13 <b>:</b> 3 | 32:39 Ap | r 23,20 | 14       |          |       |       |       |                  | Peak Search    |
|------------------------|---------------------------|----------|---------|----------|----------|-------|-------|-------|------------------|----------------|
| Ref 2 (<br>Peak<br>Log | dBm                       | Att      | en 5 dB | Ext PG   | 6 -8.3   | dB    | Mk    |       | ).3 MHz<br>2 dBm | Meas Tools•    |
| 10<br>dB/              |                           |          |         |          |          |       |       |       |                  | Next Peak      |
|                        | Marker                    |          | MI 1    |          |          |       |       |       | 1                | Next Pk Right  |
|                        | 910.27<br>-43.42          |          | MHZ     |          |          |       |       |       |                  | Next Pk Left   |
| V1 S2<br>S3 FC<br>AA   | Lon no de la              |          |         | <b>~</b> |          |       | h     | ,h.,, |                  | Min Search     |
|                        |                           |          |         |          |          |       |       |       |                  | Pk-Pk Search   |
| Start 3<br>#Res B      | 30 MHz<br>W 100 kHz       |          | VE      | W 300    | ∣<br>kHz | Sweep | 100.5 |       | 1 GHz<br>1 pts)  | More<br>1 of 2 |

Figure 24. Antenna Conducted Emissions 802.11n Mid, Part 1

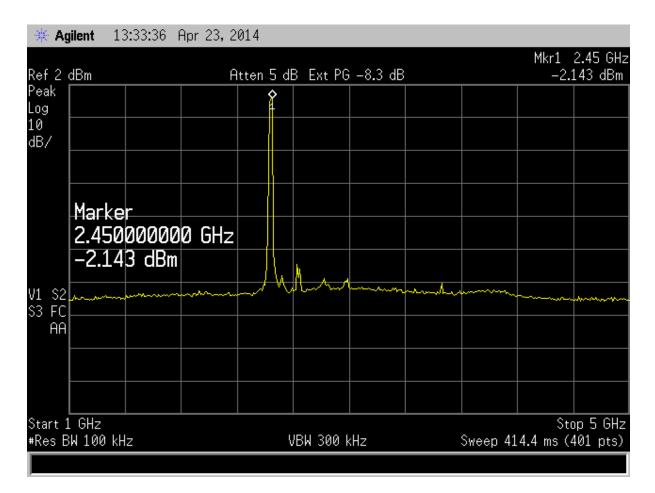


Figure 25. Antenna Conducted Emissions 802.11n Mid, Part 2

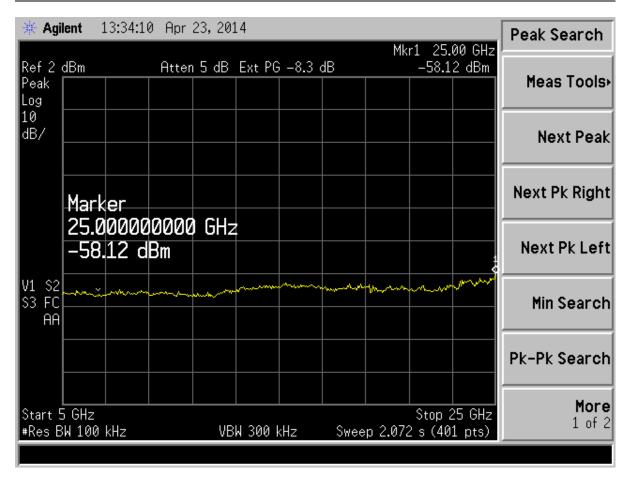


Figure 26. Antenna Conducted Emissions 802.11n Mid, Part 3

| 🔆 Agilent                 | 13:38:42           | Apr : | 23,201 | .4      |  |                                       |       |           |                  | Peak Search           |
|---------------------------|--------------------|-------|--------|---------|--|---------------------------------------|-------|-----------|------------------|-----------------------|
| Ref 2 dBm<br>Peak         |                    | Atten | 5 dB   | Ext PG  | 6 -8.3   | dB                                    | Mki   |           | ).3 MHz<br>1 dBm | Meas Tools•           |
| Log<br>10<br>dB/          |                    |       |        |         |  |                                       |       |           |                  | Next Peak             |
|                           | rker               | 00 M  |        |         |  |                                       |       |           | 1                | Next Pk Right         |
| -4                        | 0.2750(<br>3.71 de |       | ΗZ     |         |  |                                       |       |           |                  | Next Pk Left          |
| V1 S2<br>S3 FC<br>AA      |                    |       |        | ·       |  | · · · · · · · · · · · · · · · · · · · |       | adarrana. | l                | Min Search            |
|                           |                    |       |        |         |  |                                       |       |           |                  | Pk-Pk Search          |
| Start 30 MH<br>#Res BW 10 |                    |       | VB     | W 300 I | <hz< td=""><td>Sweep</td><td>100.5</td><td></td><td>1 GHz<br/>1 pts)</td><td><b>More</b><br/>1 of 2</td></hz<> | Sweep                                 | 100.5 |           | 1 GHz<br>1 pts)  | <b>More</b><br>1 of 2 |

Figure 27. Antenna Conducted Emissions 802.11n High, Part 1

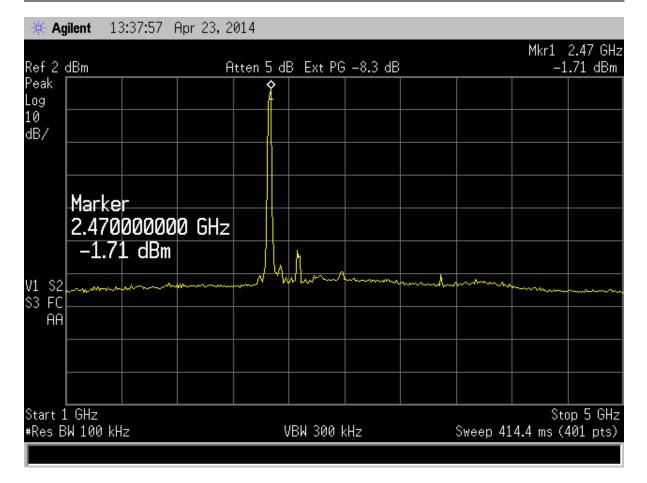


Figure 28. Antenna Conducted Emissions 802.11n High, Part 2

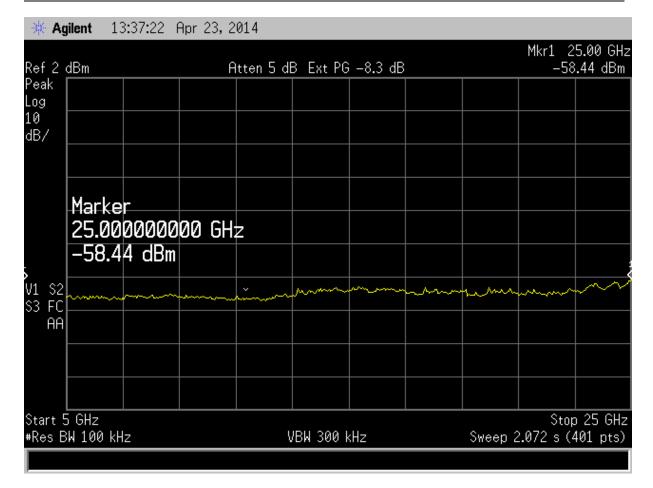


Figure 29. Antenna Conducted Emissions 802.11n High, Part 3

# 2.11 Intentional Radiator, Radiated Emissions (CFR 15.209, 15.247(d)) (IC RSS 210, A2.9 (a))

On the OATS, the EUT was mounted on top of a non-conductive table, 80 cm above the floor, by placing it in the X-Z plane along the Z axis with its bottom cover in parallel with the ground. The front of the EUT faced the measurement antenna located 3 meters away. Each signal measured was maximized by raising and lowering the receive antenna between 1 and 4 meters in height while monitoring the ever changing spectrum analyzer display (with channel A in the Clear-Write mode and channel B in the Max-Hold mode) for the largest signal visible. That exact antenna height where the signal was maximized was recorded for reproducibility purposes. Also, the EUT was rotated about its Y-axis while monitoring the Spectrum Analyzer display for maximum. The EUT azimuth was recorded for reproducibility purposes. The EUT was measured when both maxima were simultaneously satisfied.

The test data is detailed below for this section. Several radiated emissions above 1 GHz were measured at a distance of 1 meter. The measured value at 1 meter was then extrapolated to the resultant at 3 meters using an inverse distance extrapolation factor of -20 dB/decade. There were no test failures.

|                     |   | dumontal a mar   |   | 1113310113, 0   |  | N   |  |
|---------------------|---|--|---|---|--|---|--|
| Test: FO            | CC Part 15,   | Para 15.247(d)   | Client: WI  | NK Inc.   |  |   |  |
| Project:            | 14-0071   |  | Model: HU   | B   |  |   |  |
| Test                | AF+CL-PA  | <b>Corrected Results</b>   | Limits  | Distance /  | Margin   | Detection   |  |
| Data                | (dB/m)  | (dBuV/m)   | (dBuV/m)  | Polarization  | (dB)   | Mode  |  |
| (dBuV)              |   |  |   |   |  |   |  |
| Low Channel - PEAK  |   |  |   |   |  |   |  |
| 78.38               | 31.88   | 110.26   |   | 3M/Vert.  |  | PK  |  |
| 49.14               | 10.99   | 60.13  | 74.0  | 3M/Vert.  | 13.9   | PK  |  |
|                     |   | Mid Channel -  | PEAK  |   |  |   |  |
| 75.79               | 31.98   | 107.77   |   | 3M/Vert.  |  | PK  |  |
| 49.17               | 12.09   | 61.26  | 74.0  | 3M/Vert.  | 12.7   | PK  |  |
| High Channel – PEAK |   |  |   |   |  |   |  |
| 77.46               | 31.83   | 109.29   |   | 3M/Vert.  |  | PK  |  |
| 50.07               | 12.66   | 62.73  | 74.0  | 3M/Vert.  | 11.3   | PK  |  |
|                     | Test: F(<br>Project:<br><b>Test</b><br><b>Data</b><br>(dBuV)<br>78.38<br>49.14<br>75.79<br>49.17<br>77.46 | Test: FCC Part 15,         Project: 14-0071         Test       AF+CL-PA         Data       (dB/m)         (dBuV)       31.88         49.14       10.99         75.79       31.98         49.17       12.09         77.46       31.83 | Test: FCC Part 15, Para 15.247(d)           Project: 14-0071         Corrected Results (dB/m) (dBuV)           Test Data (dB/m) (dB/m)         Corrected Results (dBuV/m)           (dBuV)         Corrected Results (dBuV/m)           Test (dB/m)         Else (dB uV/m)           (dBuV)         Corrected Results (dB uV/m)           (dBuV)         Else (dB uV/m)           Test (dB/m)         Else (dB uV/m)           (dB uV)         Else (dB uV/m)           Test (dB uV)         Else | Test: FCC Part 15, Para 15.247(d)         Client: WI           Project: 14-0071         Model: HU           Test Data (dB/m)         AF+CL-PA (dBuV/m)         Limits (dBuV/m)           (dB/w)         Corrected Results (dBuV/m)         Limits           (dB/w)         Corrected Results (dBuV/m)         Limits           78.38         31.88         110.26           49.14         10.99         60.13         74.0           75.79         31.98         107.77           49.17         12.09         61.26         74.0           High Channel – PEAK           77.46         31.83         109.29 | Test: FCC Part 15, Para 15.247(d)         Client: WINK Inc.           Project: 14-0071         Model: HUB           Test Data (dB/m) (dB/m)         Corrected Results (dBuV/m)         Limits (dBuV/m)         Distance / Polarization           78.38         31.88         110.26         3M/Vert.           49.14         10.99         60.13         74.0         3M/Vert.           75.79         31.98         107.77         3M/Vert.           49.17         12.09         61.26         74.0         3M/Vert.           High Channel – PEAK           77.46         31.83         109.29         3M/Vert. | Project: 14-0071         Model: HUB           Test Data (dB/m)         AF+CL-PA (dB/m)         Corrected Results (dBuV/m)         Limits (dBuV/m)         Distance / Polarization (dB)           (dBuV)         (dB/m)         (dBuV/m)         Image: Corrected Results (dBuV/m)         Distance / Polarization (dB)         Margin (dB)           78.38         31.88         110.26         3M/Vert.         13.9           49.14         10.99         60.13         74.0         3M/Vert.         13.9           75.79         31.98         107.77         3M/Vert.         12.7           75.79         31.98         107.77         3M/Vert.         12.7           49.17         12.09         61.26         74.0         3M/Vert.         12.7           77.46         31.83         109.29         3M/Vert         12.7 |  |

## Table 6. Peak Radiated Fundamental & Harmonic Emissions, 802.11b

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2412.00MHz:

| Magnitude of Measured Frequency              | 78.38  | dBuV   |
|--|--------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain | 31.88  | dB/m   |
| 1 meter to 3 meter extrapolation             | N/A    | dB     |
| Corrected Result                             | 110.26 | dBuV/m |

Test Date: May 8, 2014 Tested By Signature:

| Tested By:         | ested By: Test: FCC Part 15, Para 15.247(d) |         |                               |            | Client: WINK Inc.          |                |                   |  |  |
|--------------------|---|---------|-------------------------------|------------|----------------------------|----------------|-------------------|--|--|
| JW                 | Project:                                    | 14-0071 |                               | Model: HUB |                            |                |                   |  |  |
| Frequency<br>(MHz) | Test<br>Data<br>(dBuV)                      | + DC    | Corrected Results<br>(dBuV/m) |            | Distance /<br>Polarization | Margin<br>(dB) | Detection<br>Mode |  |  |
|                    | Low Channel – Average                       |         |                               |            |                            |                |                   |  |  |
| 2412.10            | 77.80                                       | 14.88   | 92.68                         |            | 3M/Vert.                   |                | AVG               |  |  |
| 7236.13            | 43.50                                       | -6.01   | 37.49                         | 54         | 3M/Vert.                   | 16.5           | AVG               |  |  |
|                    |   |         | Mid Channel –                 | Average    |                            |                |                   |  |  |
| 2442.10            | 74.98                                       | 14.98   | 89.96                         |            | 3M/Vert.                   |                | AVG               |  |  |
| 4885.50            | 41.70                                       | -4.91   | 36.79                         | 54         | 3M/Vert.                   | 17.2           | AVG               |  |  |
|                    | High Channel – Average                      |         |                               |            |                            |                |                   |  |  |
| 2462.13            | 76.78                                       | 14.83   | 91.61                         |            | 3M/Vert.                   |                | AVG               |  |  |
| 7386.00            | 43.94                                       | -4.34   | 39.60                         | 54         | 3M/Vert.                   | 14.4           | AVG               |  |  |

## Table 7. Average Radiated Fundamental & Harmonic Emissions, 802.11b

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for **peak** measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. All measurements are corrected with a -17dB duty. See section 2.8

5. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emissions were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2412.00MHz:

| Magnitude of Measured Frequency                           | 77.80 | dBuV   |
|---|-------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle | 14.88 | dB/m   |
| 1 meter to 3 meter extrapolation                          | N/A   | dB     |
| Corrected Result  | 92.68 | dBuV/m |

| Test Date: May 8, 2014 |   |
|------------------------|---|
| Tested By              |   |
| Tested By Shace Mym    | _ |

| Tested By:          | Test: FC               | CC Part 15, | Para 15.247(d)                | Client: WI | NK Inc.                    |                |                   |
|---------------------|------------------------|-------------|-------------------------------|------------|----------------------------|----------------|-------------------|
| JW                  | Project:               | 14-0071     |                               | Model: HUB |                            |                |                   |
| Frequency<br>(MHz)  | Test<br>Data<br>(dBuV) | (dB/m)      | Corrected Results<br>(dBuV/m) |            | Distance /<br>Polarization | Margin<br>(dB) | Detection<br>Mode |
|                     |                        |             | Low Channel -                 | - PEAK     |                            |                |                   |
| 2412.00             | 70.33                  | 31.78       | 102.11                        |            | 3M/Vert.                   |                | PK                |
| 4824.00             | 45.47                  | 4.30        | 49.77                         | 74.0       | 3M/Vert.                   | 24.2           | PK                |
|                     |                        |             | Mid Channel -                 | PEAK       |                            |                |                   |
| 2437.00             | 66.87                  | 31.88       | 98.75                         |            | 3M/Vert.                   |                | PK                |
| 4874.00             | 46.83                  | 4.19        | 51.02                         | 74.0       | 3M/Vert.                   | 23.0           | PK                |
| High Channel – PEAK |                        |             |                               |            |                            |                |                   |
| 2462.00             | 70.97                  | 31.73       | 102.70                        |            | 3M/Vert.                   |                | PK                |
| 4924.00             | 45.05                  | 4.30        | 49.35                         | 74.0       | 3M/Vert.                   | 24.6           | PK                |

## Table 8. Peak Radiated Fundamental & Harmonic Emissions, 802.11g

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emission were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2407.83MHz:

| Magnitude of Measured Frequency              | 70.33  | dBuV   |
|--|--------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain | 31.73  | dB/m   |
| 1 meter to 3 meter extrapolation             | NA     | dB     |
| Corrected Result                             | 102.70 | dBuV/m |

Test Date: April 28, 2014

Tested By Signature

|  | ciage    | Naulateu          | i unuamentai u           |           |              | 113, 004 | g         |
|--|----------|-------------------|--------------------------|-----------|--------------|----------|-----------|
| Tested By: Test: FCC Part 15, Para 15.247(d) |          | Client: WINK Inc. |                          |           |              |          |           |
| JW   | Project: | 14-0071           |                          | Model: HU | В            |          |           |
| Frequency                                    | Test     | AF+CL-PA          | <b>Corrected Results</b> | Limits    | Distance /   | Margin   | Detection |
| (MHz)  | Data     | - DC              | (dBuV/m)                 | (dBuV/m)  | Polarization | (dB)     | Mode      |
|  | (dBuV)   | (dB/m)            |                          |           |              |          |           |
| Low Channel – Average                        |          |                   |                          |           |              |          |           |
| 2412.00                                      | 52.23    | 14.78             | 67.01                    |           | 3M/Vert.     |          | AVG       |
| 4824.00                                      | 44.99    | -12.94            | 32.05                    | 54.0      | 3M/Vert.     | 18.9     | AVG       |
|  |          |                   | Mid Channel – A          | verage    |              |          |           |
| 2437.00                                      | 50.30    | 14.88             | 65.18                    |           | 3M/Vert.     |          | AVG       |
| 4874.00                                      | 45.19    | -12.81            | 32.38                    | 54.0      | 3M/Vert.     | 18.6     | AVG       |
|  |          |                   | High Channel –           | Average   |              |          |           |
| 2462.00                                      | 53.50    | 14.73             | 68.23                    |           | 3M/Vert.     |          | AVG       |
| 4924.00                                      | 45.05    | -12.70            | 32.35                    | 54.0      | 3M/Vert.     | 18.6     | AVG       |

# Table 9. Average Radiated Fundamental & Harmonic Emissions, 802.11g

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. All measurements are corrected with a -17dB duty. See section 2.8

5. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emission were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2407.83 MHz:

| Magnitude of Measured Frequency                           | 52.23 | dBuV   |
|---|-------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle | 14.78 | dB/m   |
| 1 meter to 3 meter extrapolation                          | N/A   | dB     |
| Corrected Result  | 67.01 | dBuV/m |

|                    |  |          |                          |           | ,            |        |           |
|--------------------|--|----------|--------------------------|-----------|--------------|--------|-----------|
| Tested By:         | Tested By: Test: FCC Part 15, Para 15.247(d) |          | Client: WINK Inc.        |           |              |        |           |
| JW                 | Project:                                     | 14-0071  |                          | Model: HU | B            |        |           |
| Frequency          | Test   | AF+CL-PA | <b>Corrected Results</b> | Limits    | Distance /   | Margin | Detection |
| (MHz)              | Data   | (dB/m)   | (dBuV/m)                 | (dBuV/m)  | Polarization | (dB)   | Mode      |
|                    | (dBuV)                                       |          |                          |           |              |        |           |
|                    |  |          | Low Channel -            | PEAK      |              |        |           |
| 2412.00            | 70.80  | 31.78    | 102.58                   |           | 3M/Vert.     |        | PK        |
| 4824.00            | 45.23  | 4.21     | 49.44                    | 74.0      | 3M/Vert.     | 24.6   | PK        |
| Mid Channel – PEAK |  |          |                          |           |              |        |           |
| 2442.00            | 68.71  | 31.88    | 100.59                   |           | 3M/Vert.     |        | PK        |
| 4884.00            | 44.89  | 4.19     | 49.08                    | 74.0      | 3M/Vert.     | 24.9   | PK        |
|                    |  |          | High Channel -           | - PEAK    |              |        |           |
| 2462.00            | 71.94  | 31.73    | 103.67                   |           | 3M/Vert.     |        | PK        |
| 4924.00            | 44.68  | 4.30     | 48.98                    | 74.0      | 3M/Vert.     | 25.0   | PK        |

#### Table 10. Peak Radiated Fundamental & Harmonic Emissions, 802.11n

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for peak measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emission were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2411.13 MHz:

| Magnitude of Measured Frequency              | 70.80  | dBuV   |
|--|--------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain | 31.78  | dB/m   |
| 1 meter to 3 meter extrapolation             | NA     | dB     |
| Corrected Result                             | 102.58 | dBuV/m |

Test Date: April 28, 2014 Tested By Signature

|                       | <b>T</b> Cluge                               |          | a Fundamental d          |           |              | 0113, 00 | /         |
|-----------------------|--|----------|--------------------------|-----------|--------------|----------|-----------|
| Tested By:            | Tested By: Test: FCC Part 15, Para 15.247(d) |          | Client: WINK Inc.        |           |              |          |           |
| JW                    | Project:                                     | 14-0071  |                          | Model: HU | В            |          |           |
| Frequency             | Test   | AF+CL-PA | <b>Corrected Results</b> |           |              |          | Detection |
| (MHz)                 | Data   | -DC      | (dBuV/m)                 | (dBuV/m)  | Polarization | (dB)     | Mode      |
|                       | (dBuV)                                       | (dB/m)   |                          |           |              |          |           |
| Low Channel – Average |  |          |                          |           |              |          |           |
| 2412.00               | 52.82  | 14.78    | 67.60                    |           | 3M/Vert.     |          | AVG       |
| 4824.00               | 44.99  | -12.94   | 32.05                    | 54.0      | 3M/Vert.     | 24.9     | AVG       |
|                       |  |          | Mid Channel – A          | verage    |              |          |           |
| 2442.00               | 51.82  | 14.88    | 66.70                    |           | 3M/Vert.     |          | AVG       |
| 4884.00               | 45.19  | -12.81   | 29.38                    | 54.0      | 3M/Vert.     | 24.6     | AVG       |
|                       | High Channel – Average                       |          |                          |           |              |          |           |
| 2462.00               | 54.59  | 14.73    | 69.32                    |           | 3M/Vert.     |          | AVG       |
| 4924.00               | 44.80  | -12.70   | 32.10                    | 54.0      | 3M/Vert.     | 24.9     | AVG       |

# Table 11. Average Radiated Fundamental & Harmonic Emissions, 802.11n

1. (\*) Falls within the restricted bands of CFR 15.205. Limits based on CFR15.209 & 20 dB relaxation for **peak** measurements of CFR 15.35.

2. No other signals detected within 20 dB of specification limit. Harmonics investigated up to the 10<sup>th</sup> harmonic (25GHz using EMCO 3116 Horn Antenna)

3. (~)Measurements taken at 1 meter were extrapolated to 3 meter using a factor of (-9.5 dB).

4. All measurements are corrected with a -17dB duty. See section 2.8

5. The EUT was placed in three orthogonal positions and the transmitter was in constant broadcast mode, with a duty cycle of greater than 98%. The emission were measured with the receive antenna in vertical and horizontal polarizations. The data listed in the above table was worst case.

Sample Calculation at 2411.13MHz:

| Magnitude of Measured Frequency                           | 52.82 | dBuV   |
|---|-------|--------|
| +Antenna Factor + Cable Loss+ Amplifier Gain – Duty Cycle | 14.78 | dB/m   |
| 1 meter to 3 meter extrapolation                          | NA    | dB     |
| Corrected Result  | 67.60 | dBuV/m |

Test Date: April 28, 2014 Tested By Signature:

# 2.12 Band Edge Measurements – (CFR 15.247 (d))

Band Edge measurements are made following the guidelines in FCC KDB Publication No. 558074 with the EUT initially operating on the Lowest Channel and then operating on the Highest Channel within its band of operation. Antenna port conducted measurements are performed to demonstrate compliance with the requirement of 15.247(d) that all emissions outside of the band edges be attenuated by at least 20 dB when compared to its highest in-band value (contained in a 100 kHz band). Because these frequencies occur above 1000 MHz they have both a peak and average requirement.

To capture the band edge set the Spectrum Analyzer frequency span large enough (usually around 10 MHz) to capture the peak level of the emission operating on the channel closest to the band edge as well as any modulation products falling outside of the authorized band of operation. Conducted measurements are performed with RBW  $\geq$ 1% of the frequency span. In all cases, the VBW is set  $\geq$ RBW. See figure and calculations below for more detail.

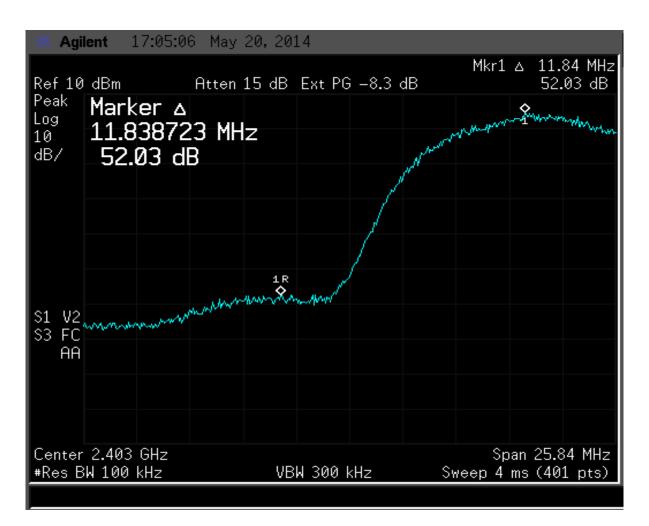


Figure 30. Band Edge Compliance – 802.11b – Low Channel Delta - Peak

(Lower band edge must be greater than 20 dB)

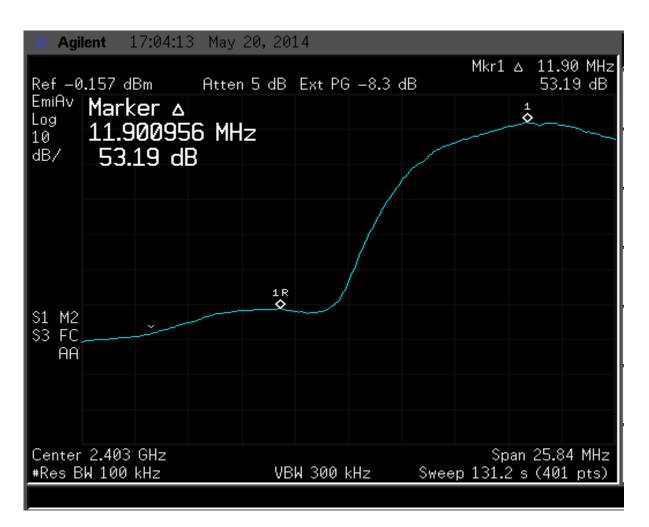


Figure 31. Band Edge Compliance – 802.11b – Low Channel Delta - Average

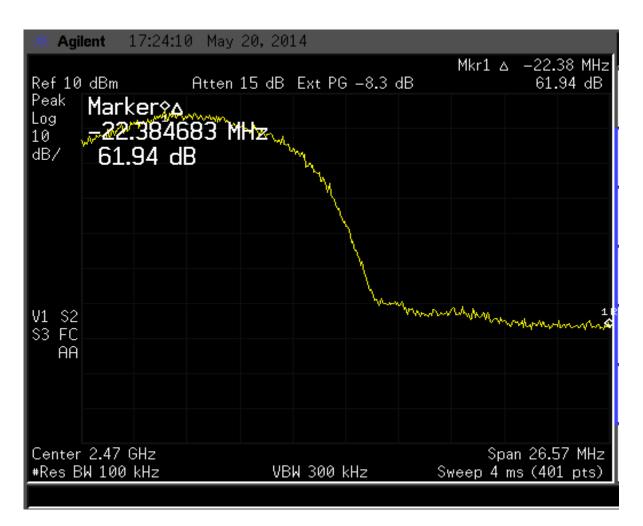


Figure 32. Band Edge Compliance – 802.11b – High Channel Delta – Peak

| 🗰 Agilent 17:27:2                                | 0 May 20, 2014                       |                                |
|--|--------------------------------------|--------------------------------|
|  | / Mkr1<br>Atten 10 dB Ext PG -8.3 dB | ∆ -21.92 MHz<br>61.2 dB        |
| EmiAv Marker A                                   |                                      |                                |
| <sup>10</sup> –21.919/<br><sup>dB/</sup> 61.2 df |                                      |                                |
|  |                                      |                                |
|  |                                      |                                |
|  |                                      |                                |
|  |                                      |                                |
| M1 S2<br>S3 FC                                   |                                      | 18                             |
| AA   |                                      | ¢                              |
|  |                                      |                                |
|  |                                      |                                |
| Center 2.47 GHz<br>#Res BW 100 kHz               |                                      | oan 26.57 MHz<br>9 s (401 pts) |
|  |                                      |                                |

Figure 33. Band Edge Compliance – 802.11b – High Channel Delta – Average

The limit for the average value of radiated emissions in a Restricted Band is 54 dBuV/m. To compute the average values of the band edge emissions, the duty cycle correction factor of -17.0 dB is applied to the values in the Corrected Results column. After this correction the EUT is found to have met the restrictions placed on average radiated emissions in Restricted Bands. The worst-case measurement is computed below.

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

Calculation of worst case 802.11b PEAK upper band edge measurement:

| High Channel Corrected Measured Value from Table 6<br>High Channel Band Edge Delta from Figure 33 | 109.29<br>-61.94 | dBuV<br>dB |
|---|------------------|------------|
| Calculated Result   | 47.35            | dBuV/m     |
| Average Limit + 20dB Relaxation for PEAK  | 74.00            | dBuV/m     |
| Calculated Result   | -52.36           | dBuV/m     |
| Band Edge Margin  | 26.65            | dBuV/m     |
| Calculation of worst case 802.11b AVERAGE upper band edge   | measuren         | nent:      |
| High Channel Corrected Measured Value from Table 7  | 88.61            | dBuV       |
| High Channel Band Edge Delta from Figure 34   | -61.20           | dB         |
| Calculated Result   | 27.41            | dBuV/m     |
|   |                  |            |
| Peak Limit  | 54.00            | dBuV/m     |
| Calculated Result   | -26.52           | dBuV/m     |
| Band Edge Margin  | 26.59            | dBuV/m     |

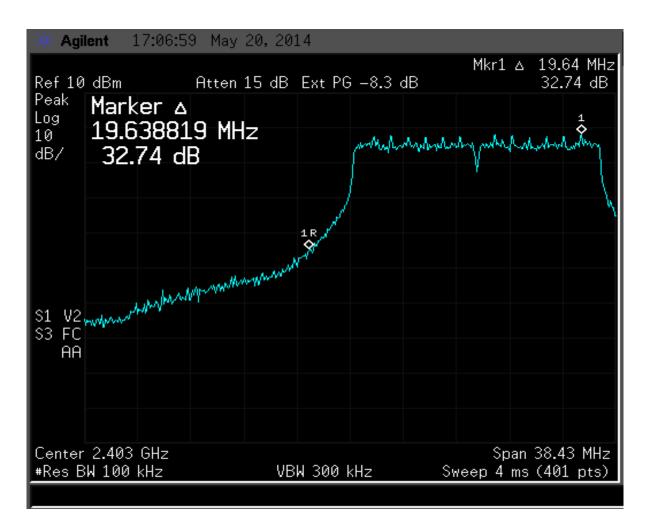


Figure 34. Band Edge Compliance – 802.11g – Low Channel Delta - Peak

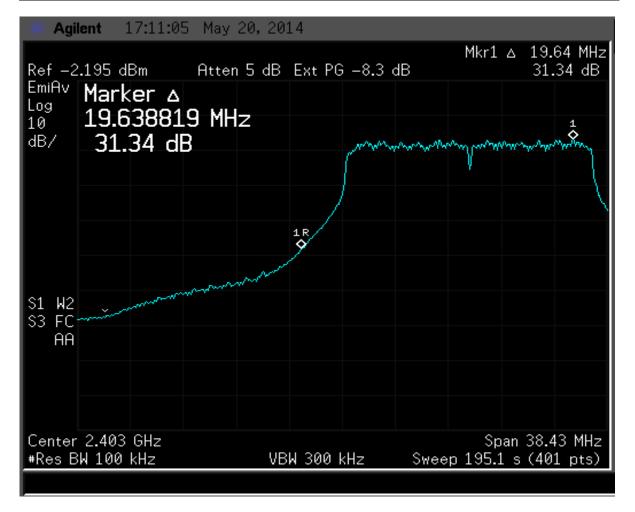


Figure 35. Band Edge Compliance – 802.11g – Low Channel Delta - Average

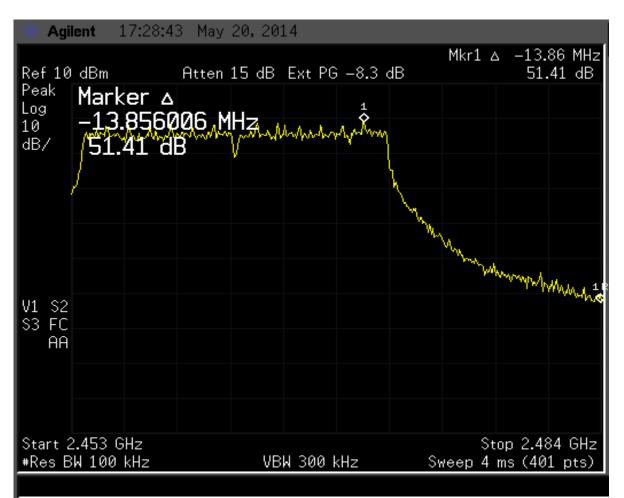


Figure 36. Band Edge Compliance – 802.11g – High Channel Delta – Peak

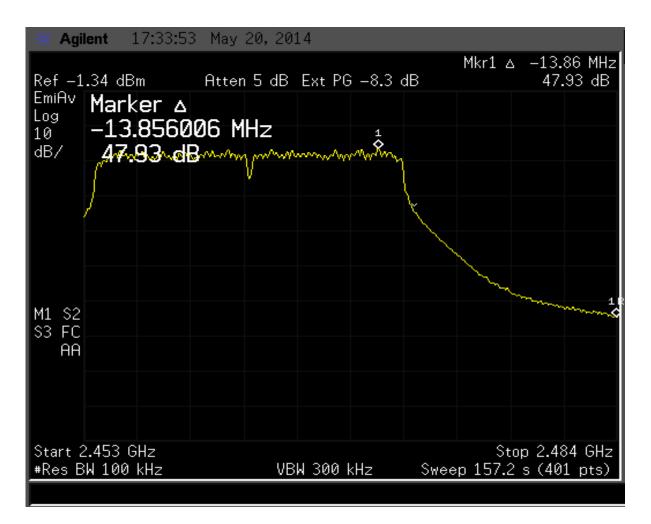


Figure 37. Band Edge Compliance – 802.11g – High Channel Delta – Average

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

Calculation of worst case 802.11g PEAK upper band edge measurement:

| High Channel Corrected Measured Value from Table 8  | 102.70                 | dBuV                 |
|---|------------------------|----------------------|
| High Channel Band Edge Delta from Figure 37   | -51.41                 | dB                   |
|   | -                      |                      |
| Calculated Result   | 51.29                  | dBuV/m               |
|   |                        |                      |
| Average Limit + 20dB Relaxation for PEAK  | 74.00                  | dBuV/m               |
| Calculated Result   | -51.29                 | dBuV/m               |
| Band Edge Margin  |                        | dBuV/m               |
| Dana Lago Margin  | 20.71                  | abav/m               |
| Calculation of worst case 802.11g AVERAGE upper band edge   | e measuren             | nent:                |
|   |                        |                      |
| High Channel Corrected Measured Value from Table 9  | 65.23                  | dBuV                 |
| 5   | 65.23<br>-47.93        |                      |
| High Channel Corrected Measured Value from Table 9<br><u>High Channel Band Edge Delta from Figure 38</u><br>Calculated Result | -47.93                 | dBuV<br>dB<br>dBuV/m |
| High Channel Band Edge Delta from Figure 38   | <u>-47.93</u><br>17.30 | dB                   |

| Peak Limit        | 54.00 dBu <sup>v</sup> |
|-------------------|------------------------|
| Calculated Result | -17.30 dBu             |
| Band Edge Margin  | 36.70 dBu <sup>v</sup> |
|                   |                        |

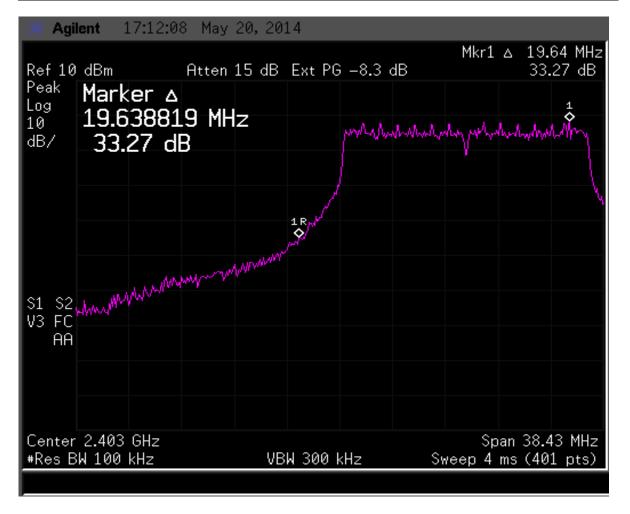


Figure 38. Band Edge Compliance – 802.11n – Low Channel Delta – Peak

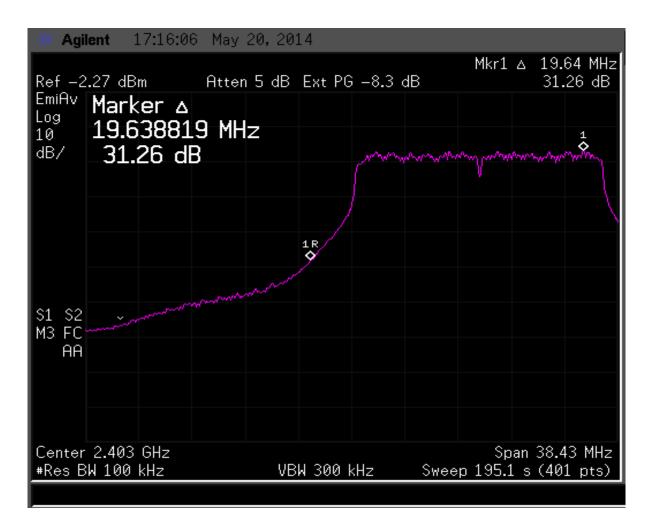


Figure 39. Band Edge Compliance – 802.11n – Low Channel Delta – Average

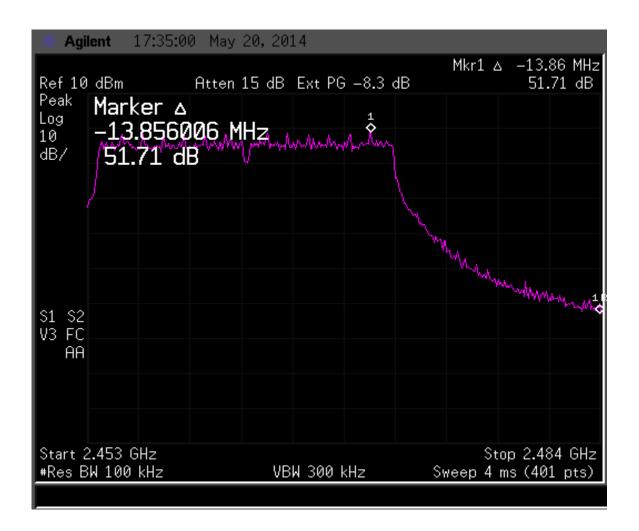


Figure 40. Band Edge Compliance – 802.11n – High Channel Delta – Peak

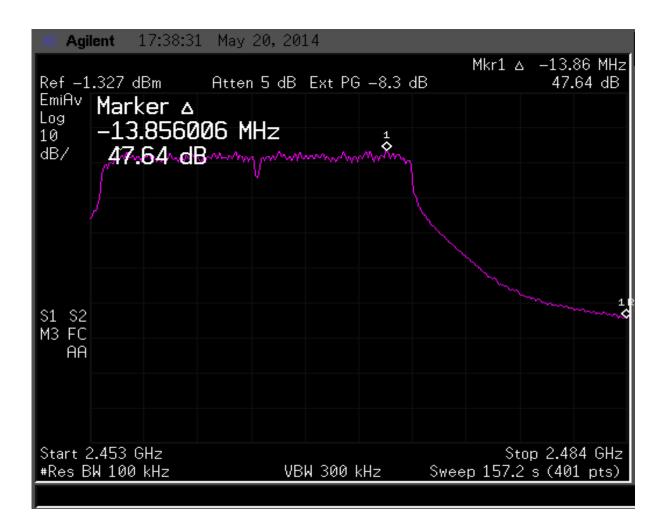


Figure 41. Band Edge Compliance – 802.11n – High Channel Delta – Average

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

Calculation of worst case 802.11n PEAK upper band edge measurement:

| High Channel Corrected Measured Value from Table 10 | 103.67 | dBuV   |
|---|--------|--------|
| High Channel Band Edge Delta from Figure 41         | -51.71 | dB     |
| Calculated Result                                   | 51.96  | dBuV/m |
| Average Limit + 20dB Relaxation for PEAK            | 74.00  | dBuV/m |
| Calculated Result                                   | -51.71 | dBuV/m |
| Band Edge Margin                                    | 22.04  | dBuV/m |

Calculation of worst case 802.11n AVERAGE upper band edge measurement:

| High Channel Corrected Measured Value from Table 11 | 66.32  | dBuV   |
|---|--------|--------|
| High Channel Band Edge Delta from Figure 42         | -47.64 | dB     |
| Calculated Result                                   | 19.00  | dBuV/m |
|   |        |        |
| Peak Limit  | 54.00  | dBuV/m |
| Calculated Result                                   | -19.00 | dBuV/m |
| Band Edge Margin                                    | 35.00  | dBuV/m |

| US Tech Test Report: | FCC Part 15 Certification/ RSS 210 |
|----------------------|------------------------------------|
| FCC ID:              | 2ACAJ-WINK22                       |
| Test Report Number:  | 14-0071                            |
| Issue Date:          | May 15, 2014                       |
| Customer:            | WINK INC.                          |
| Model:               | HUB                                |

# 2.13 Six (6) dB Bandwidth per CFR 15.247(a)(2),

The EUT antenna port was connected to a spectrum analyzer having a 50  $\Omega$  input impedance. Measurements were performed similar to the method of FCC, KDB Publication No. 558074 for a bandwidth of 6 dB. The RBW was set to approximately 1/100 of the manufacturers claimed RBW and with the VBW  $\geq$  RBW. The results of this test are given in the table below and Figures below.

## Table 12. Six (6) dB Bandwidth

| Frequency<br>(MHz) | 6 dB Bandwidth<br>(MHz) | Minimum FCC Bandwidth<br>(MHz) |
|--------------------|-------------------------|--------------------------------|
| 802.11b            |                         |                                |
| 2412               | 8.5                     | 0.5                            |
| 2442               | 8.4                     | 0.5                            |
| 2462               | 8.6                     | 0.5                            |
| 802.11g            |                         |                                |
| 2412               | 18.4                    | 0.5                            |
| 2442               | 18.1                    | 0.5                            |
| 2462               | 18.3                    | 0.5                            |
| 802.11n            |                         |                                |
| 2412               | 18.3                    | 0.5                            |
| 2442               | 18.1                    | 0.5                            |
| 2462               | 18.3                    | 0.5                            |

Test Date: May 7, 2014 Tested By Signature: \_\_\_\_\_\_

| <b># Agilent</b> 09:58:53                            | 2 May 21, 20                         | 14  |  | Marker  |
|--|--------------------------------------|---|--|---|
| Peak Marker ∆  | 1                                    | Ext PG –8.3 dB  | Mkr1 △ -8.5000 MHz<br>-0.287 dB                                | <b>Select Marker</b><br><u>1</u> 2 3 4                  |
| <sup>109</sup> –8.50000<br><sup>dB/</sup> –0.287 d   | B<br>B                               |   | 2R<br>\$   | Normal  |
| and Market   |                                      |   | whome  | Delta   |
|  |                                      |   |  | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.412 GHz<br>#Res BW 1 MHz                    | v                                    | BW 3 MHz  | Span 25 MHz<br>Sweep 4 ms (401 pts)                            | Span Pair   |
| Marker Trace<br>1R (1)<br>1Δ (1)<br>2R (1)<br>2Δ (1) | Type<br>Freq<br>Freq<br>Freq<br>Freq | X Axis<br>2.4164375 GHz<br>-8.5000 MHz<br>2.4195000 GHz<br>-14.6250 MHz | Amplitude<br>5.707 dBm<br>-0.287 dB<br>-8.321 dBm<br>-0.337 dB | Span <u>Center</u><br>Off                               |
|  |                                      |   |  | More<br>1 of 2  |

Figure 42. Six dB Bandwidth - 15.247 - Low Channel - 802.11b

| <b># Agilent</b> 08:14:05                            | 5 May 21,2                           | 2014  |  | Marker  |
|--|--------------------------------------|---|--|---|
| <sup>Peak</sup> Marker ∆                             | 1                                    | B Ext PG -8.3 d   | Mkr1 △ -8.3750 MHz<br>B -0.144 dB                              | <b>Select Marker</b><br><u>1</u> 2 3 4                  |
| <sup>109</sup> –8.37500<br><sup>dB/</sup> –0.144 d   |                                      |   | 2R<br>\$   | Normal  |
| hand the second                                      |                                      |   |  | Delta   |
|  |                                      |   |  | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.442 GHz<br>#Res BW 1 MHz                    |                                      | VBW 3 MHz   | Span 25 MHz<br>Sweep 4 ms (401 pts)                            | Span Pair   |
| Marker Trace<br>1R (1)<br>1Δ (1)<br>2R (1)<br>2Δ (1) | Type<br>Freq<br>Freq<br>Freq<br>Freq | X Axis<br>2.4464625 GHz<br>-8.3750 MHz<br>2.4495250 GHz<br>-14.6250 MHz | Amplitude<br>6.243 dBm<br>-0.144 dB<br>-7.808 dBm<br>-0.631 dB | Span <u>Center</u><br>Off<br>More<br>1 of 2             |
|  |                                      |   |  |   |

Figure 43. Six dB Bandwidth - 15.247 - Mid Channel - 802.11b

FCC Part 15 Certification/ RSS 210 2ACAJ-WINK22 14-0071 May 15, 2014 WINK INC. HUB

| Ref 20 dBm       Atten 25 dB       Ext PG -8.3 dB       -0.143 dB         Peak       Marker $\Delta$ 1       1R       1R       12       3         10       -14.550000 MHz       2R       2R       Marker Trace       2R         dB/       -0.143 dB       2R       Marker Trace       2R       Marker Trace       Marker Trace         Center 2.462 GHz       VBW 3 MHz       Sweep 4 ms (401 pts)       Marker Table       Marker Table       Marker Table         Marker Trace       Type       X Axis       Amplitude       Marker Table       Marker Table | 🔆 Agilent 08:05:50 Ma   | ay 21, 2014   |  | Marker  |
|--|---|---|--|---|
| Center 2.462 GHz Span 20 MHz<br>#Res BW 1 MHz VBW 3 MHz Sweep 4 ms (401 pts)<br>Marker Trace Type X Axis Amplitude   | Peak Marker △<br>Log -14.550000                                     | 1   | 1R   | Select Marker<br>1 <u>2</u> 3 4<br>Marker Trace                             |
| 1Δ       (1)       Freq       -8.55 MHz       -0.21 dB         2R       (1)       Freq       2.46950 GHz       -7.617 dBm         2Δ       (1)       Freq       -14.55 MHz       -0.143 dB   | <pre>#Res BW 1 MHz Marker Trace Ty 1R (1) F 1△ (1) F 2R (1) F</pre> | ype X Axis<br>req 2.46650 GHz<br>req –8.55 MHz<br>req 2.46950 GHz | Sweep 4 ms (401 pts)<br>Amplitude<br>6.529 dBm<br>-0.21 dB<br>-7.617 dBm | Off <sup>*</sup><br>Marker Table<br>Off<br>Marker All Off<br>More<br>2 of 2 |

Figure 44. Six dB Bandwidth - 15.247 - High Channel - 802.11b

| <b># Agilent</b> 09:48:                                 | 35 May 21, 2                 | :014   |   | Marker  |
|---|------------------------------|--|---|---|
| Ref 20 dBm<br>Peak<br>Log<br>10 -22.322<br>dB/ -12951 c | 500 MHz                      | 3 Ext PG –8.3 dB   | Mkr2 Δ -22.3125 MHz<br>-1.951 dB                              | Select Marker<br>1 <u>2</u> 3 4<br>Normal               |
|   |                              |  |   | Delta   |
|   |                              |  |   | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.412 GHz<br>#Res BW 1 MHz                       |                              | VBW 3 MHz  | Span 25 MHz<br>Sweep 4 ms (401 pts)                           | Span Pair   |
| Marker Trace<br>1R (2)<br>1Δ (2)<br>2R (2)<br>2Δ (2)    | Type<br>Freq<br>Freq<br>Freq | X Axis<br>2.4214375 GHz<br>-18.3750 MHz<br>2.4233750 GHz<br>-22.3125 MHz | Amplitude<br>1.362 dBm<br>-1.069 dB<br>-12.8 dBm<br>-1.951 dB | Span <u>Center</u><br>Off<br>More<br>1 of 2             |
|   |                              |  |   |   |

Figure 45. Six dB Bandwidth - 15.247 - Low Channel - 802.11g

| <b># Agilent</b> 08:11:34  | 4 May 21, 2          | 014                                     |                                     | Marker  |
|--|----------------------|---|-------------------------------------|---|
| Ref 20 dBm<br><sup>Peak</sup> <b>Marker 4</b><br>Log<br>10 <b>-18.0625</b> |                      | Ext PG -8.3 dB                          | Mkr1 △ -18.0625 MHz<br>1.288 dB     | <b>Select Marker</b><br><u>1</u> 2 3 4                  |
| <sup>10</sup> –18,0625<br><sup>dB/</sup> <u>1</u> ,288 dE                  |                      |   | 2R<br>Martine                       | Normal  |
|  |                      |   |                                     | Delta   |
|  |                      |   |                                     | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.442 GHz<br>#Res BW 1 MHz  |                      | VBW 3 MHz                               | Span 25 MHz<br>Sweep 4 ms (401 pts) | Span Pair   |
| Marker Trace<br>1R (2)<br>1∆ (2)   | Type<br>Freq<br>Freq | X Axis<br>2.4514625 GHz<br>-18.0625 MHz | Amplitude<br>2.484 dBm<br>1.288 dB  | Span <u>Center</u>                                      |
| 2R (2)<br>2∆ (2)   | Freq<br>Freq         | 2.4537125 GHz<br>-22.5625 MHz           | −12.39 dBm<br>−0.524 dB             | Off   |
|  |                      |   |                                     | More<br>1 of 2  |
|  |                      |   |                                     |   |

Figure 46. Six dB Bandwidth - 15.247 - Mid Channel - 802.11g

| <b># Agilent</b> 08:47:4                                | 5 May 21,2                           | 014  |   | Marker   |
|---|--------------------------------------|--|---|--|
| Ref 20 dBm<br>Peak<br>Log<br>10 -22.4375<br>dB/ 0.047 d | 500 MHz                              | 3 Ext PG –8.3 dB   | Mkr2 Δ -22.4375 MHz<br>0.047 dB                               | Select Marker<br>1 <u>2</u> 3 4<br>Normal        |
|   |                                      |  |   | Delta  |
|   |                                      |  |   | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref Delta |
| Center 2.462 GHz<br>#Res BW 1 MHz                       |                                      | VBW 3 MHz  | Span 25 MHz<br>Sweep 4 ms (401 pts)                           | Span Pair  |
| Marker Trace<br>1R (2)<br>1Δ (2)<br>2R (2)<br>2Δ (2)    | Type<br>Freq<br>Freq<br>Freq<br>Freq | X Axis<br>2.4713125 GHz<br>-18.2500 MHz<br>2.4733750 GHz<br>-22.4375 MHz | Amplitude<br>1.588 dBm<br>-0.127 dB<br>-11.88 dBm<br>0.047 dB | Span <u>Center</u><br>Off                        |
|   |                                      |  |   | More<br>1 of 2                                   |

Figure 47. Six dB Bandwidth - 15.247 - High Channel - 802.11g

| <b># Agilent</b> 09:50:5  | 1 May 21,            | 2014  |                                     | Marker  |
|---|----------------------|---|-------------------------------------|---|
| Ref 20 dBm<br><sup>Peak</sup> <b>Marker A</b><br>Log<br>10 <b>-22.437</b> 5 |                      |   | Mkr2 △ -22.4375 MHz<br>-0.031 dB    | <b>Select Marker</b><br>1 <u>2</u> 3 4                  |
| <sup>10</sup> –22.4975<br><sup>dB/</sup> –06031 d                           | B                    |   | Why 2R                              | Normal  |
|   |                      |   |                                     | Delta   |
|   |                      |   |                                     | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.412 GHz<br>#Res BW 1 MHz   |                      | VBW 3 MHz                                     | Span 25 MHz<br>Sweep 4 ms (401 pts) | Span Pair   |
| Marker Trace<br>1R (2)  | Type<br>Freq         | X Axis<br>2.4213750 GHz                       | Amplitude<br>0.861 dBm              | Span <u>Center</u>                                      |
| 1Δ (2)<br>2R (2)<br>2Δ (2)  | Freq<br>Freq<br>Freq | -18.3125 MHz<br>2.4235625 GHz<br>-22.4375 MHz | -0.68 dB<br>-12.9 dBm<br>-0.031 dB  | Off   |
|   |                      |   |                                     | More<br>1 of 2  |
|   |                      |   |                                     |   |

Figure 48. Six dB Bandwidth - 15.247 - Low Channel - 802.11n

| 🗰 Agilent 🛛 08:16:51 May 2   | 1,2014   |  | Marker  |
|--|--|--|---|
| Ref 20 dBm Atten 2<br><sup>Peak</sup> Marker △<br>Log<br>10 <b>-22.500000 MF</b> | 5 dB Ext PG -8.3 dB  | 1R   | Select Marker<br>1 <u>2</u> 3 4                         |
| dB/ <b>Ø.187 dB</b>  |  | M 2R   | Normal  |
|  |  |  | Delta   |
|  |  |  | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.442 GHz<br>#Res BW 1 MHz<br>Marker Trace Type                           | VBW 3 MHz<br>X Axis  | Span 25 MHz<br>Sweep 4 ms (401 pts)<br>Amplitude | <b>Span Pair</b><br>Span Center                         |
| 1R (3) Freq<br>1∆ (3) Freq<br>2R (3) Freq<br>2∆ (3) Freq                         | 2.4513375 GHz<br>-18.1250 MHz<br>2.4534625 GHz<br>-22.5000 MHz | 1.75 dBm<br>-0.091 dB<br>-12.59 dBm<br>0.187 dB  | Off   |
|  |  |  | More<br>1 of 2  |
|  |  |  |   |

Figure 49. Six dB Bandwidth - 15.247 - Mid Channel - 802.11n

| <b># Agilent</b> 08:24:3                                    | 4 May 21, 2                  | 014  |  | Marker   |
|---|------------------------------|--|--|--|
| Ref 20 dBm<br>Peak Marker A<br>Log -22.3750<br>dB/ -0.431 d | 100 MHz                      | 3 Ext PG -8.3 dB   | Mkr2 Δ -22.3750 MHz<br>-0.431 dB                 | Select Marker<br>1 <u>2</u> 3 4<br>Normal                                    |
|   |                              |  |  | Delta<br>Delta   |
| Center 2.462 GHz<br>#Res BW 1 MHz<br>Marker Trace           | Туре                         | VBW 3 MHz<br>X Axis  | Span 25 MHz<br>Sweep 4 ms (401 pts)<br>Amplitude | (Tracking Ref)<br><u>Ref Delta</u><br><b>Span Pair</b><br>Span <u>Center</u> |
| 1R (3)<br>1△ (3)<br>2R (3)<br>2△ (3)                        | Freq<br>Freq<br>Freq<br>Freq | 2.4713125 GHz<br>-18.2500 MHz<br>2.4734375 GHz<br>-22.3750 MHz | 1.588 dBm<br>-0.6 dB<br>-11.98 dBm<br>-0.431 dB  | Off<br>More  |
|   |                              |  |  | 1 of 2   |

Figure 50. Six dB Bandwidth - 15.247 - High Channel - 802.11n

#### 2.14 Maximum Peak Conducted Output Power (CFR 15.247 (b) (3))

For the HUB module, the transmitter was programmed to operate at a maximum output power across the bandwidth.

Peak power within the band 2400 MHz to 2483.5 MHz was measured per FCC KDB Publication 558074 as an Antenna Conducted test with a spectrum analyzer by connecting the spectrum analyzer directly, via a short RF cable, and attenuators to the antenna output terminals on the EUT. The spectrum analyzer was set for an impedance of 50  $\Omega$  with the RBW set greater than the 6 dB bandwidth of the EUT, and the VBW ≥ RBW. If the EUT bandwidth exceeds the RBW of the receiver, the procedures in KDB 558074 section 9.1.2 were followed. Peak antenna conducted output power is tabulated in the table below.

| Frequency of<br>Fundamental<br>(MHz) | Raw Test Data<br>dBm | Converted Data<br>(mW) | FCC Limit<br>(mW Maximum) |  |  |  |
|--------------------------------------|----------------------|------------------------|---------------------------|--|--|--|
|                                      | 802                  | .11b                   |                           |  |  |  |
| 2412.00                              | 11.71                | 14.83                  | 1000                      |  |  |  |
| 2442.00                              | 12.01                | 15.90                  | 1000                      |  |  |  |
| 2462.00                              | 12.35                | 17.18                  | 1000                      |  |  |  |
|                                      | 802.11g              |                        |                           |  |  |  |
| 2412.00                              | 8.19                 | 6.60                   | 1000                      |  |  |  |
| 2442.00                              | 8.47                 | 7.03                   | 1000                      |  |  |  |
| 2462.00                              | 7.90                 | 6.12                   | 1000                      |  |  |  |
|                                      | 802.11n              |                        |                           |  |  |  |
| 2412.00                              | 7.89                 | 6.15                   | 1000                      |  |  |  |
| 2442.00                              | 8.20                 | 6.61                   | 1000                      |  |  |  |
| 2462.00                              | 8.19                 | 6.59                   | 1000                      |  |  |  |

### Table 13. Peak Antenna Conducted Output Power per Part 15.247 (b) (3)

| Test Date: May 28, 2014 |  |
|-------------------------|--|
| Tested By               |  |
| Tested By Signature     |  |

Name: John Wynn

| ₩ Agilent 13:00:26 May 29, 2014           |   | Trace/View                   |
|---|---|------------------------------|
| <b>Ch Freq</b> 2.412 GHz<br>Channel Power | Trig Free                               | <b>Trace</b><br><u>1</u> 2 3 |
| Ref 20 dBm Atten 25 dB Ext I              | Mkr1 2.41200 GHz<br>PG –8.3 dB 9.67 dBm | Clear Write                  |
| #Avg<br>Log<br>10                         |   | Max Hold                     |
| dB/                                       |   | Min Hold                     |
| Center 2.412 GHz<br>#Res BW 1 MHz #VBW 3  | Span 20 MHz<br>MHz Sweep 8 ms (401 pts) | View                         |
| Channel Power                             | Power Spectral Density                  | Blank                        |
| 11.71 dBm /8.6000 MHz                     | -57.63 dBm/Hz                           | More<br>1 of 2               |
|   |   |                              |

### Figure 51. Peak Antenna Conducted Output Power, 802.11b Low Channel

| 🔆 Agilent 13:03:21 May 29, 2014   | Trace/View                   |
|---|------------------------------|
| Ch Freq 2.442 GHz Trig Free<br>Channel Power                                  | <b>Trace</b><br><u>1</u> 2 3 |
| Mkr1 2.44200 GHz<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB 8.236 dBm           | Clear Write                  |
| #Avg<br>Log<br>10   | Max Hold                     |
|   | Min Hold                     |
| Center 2.442 GHz Span 20 MHz<br>#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 pts) | View                         |
| Channel Power Power Spectral Density  | Blank                        |
| 12.01 dBm /8.6000 MHz -57.34 dBm/Hz   | <b>More</b><br>1 of 2        |
|   |                              |

Figure 52. Peak Antenna Conducted Output Power, 802.11b Mid Channel

| ₩ Agilent 13:05:41 May 29,               | 2014              |                                  | Trace/View                   |
|--|-------------------|----------------------------------|------------------------------|
| <b>Ch Freq</b> 2.462 GH<br>Channel Power | Z                 | Trig Free                        | <b>Trace</b><br><u>1</u> 2 3 |
| Ref 20 dBm Atten 25                      | dB Ext PG -8.3 dB | Mkr1 2.46200 GHz<br>10.46 dBm    | Clear Write                  |
| #Avg<br>Log<br>10                        |                   |                                  | Max Hold                     |
| dB/                                      |                   |                                  | Min Hold                     |
| Center 2.462 GHz<br>#Res BW 1 MHz        | #VBW 3 MHz Swee   | Span 20 MHz<br>ep 8 ms (401 pts) | View                         |
| Channel Power                            |                   | ectral Density                   | Blank                        |
| 12.35 dBm /8.6000                        | MHz -56.          | 99 dBm/Hz                        | <b>More</b><br>1 of 2        |
|  |                   |                                  |                              |

Figure 53. Peak Antenna Conducted Output Power, 802.11b High Channel

| <b>₩ Agilent</b> 12:54:03 May 29, 2014                              | Trace/View                   |
|---|------------------------------|
| Ch Freq 2.462 GHz Trig Free<br>Channel Power                        | <b>Trace</b><br><u>1</u> 2 3 |
| Mkr1 2.46193 GHz<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB 1.977 dBm | Clear Write                  |
| #Avg<br>Log<br>10   | Max Hold                     |
|   | Min Hold                     |
| Center 2.462 GHz Span 28.31 MHz #VBW 3 MHz Sweep 8 ms (401 pts)     | View                         |
| Channel Power Power Spectral Density                                | Blank                        |
| 8.19 dBm /18.4000 MHz -64.46 dBm/Hz                                 | More<br>1 of 2               |
|   |                              |

#### Figure 54. Peak Antenna Conducted Output Power, 802.11g Low Channel

| ₩ Agilent 12:55:19 May 29, 2014           |  | Marker  |
|---|--|---|
| <b>Ch Freq</b> 2.442 GHz<br>Channel Power | Trig Free                                | Select Marker<br><u>1</u> 234                           |
| Ref 20 dBm Atten 25 dB Ext                | Mkr1 2.44200 GH:<br>PG -8.3 dB 0.624 dBm | Normal  |
| #Avg<br>Log<br>10                         |  | Delta   |
| dB/                                       |  | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.442 GHz<br>#Res BW 1 MHz #VBW 3  | Span 28.31 MHz<br>Sweep 8 ms (401 pts)   | <b>Span Pair</b><br>Span <u>Center</u>                  |
| Channel Power                             | Power Spectral Density                   | Off   |
| 8.47 dBm /18.4000 MHz                     | 2 -64.18 dBm/Hz                          | More<br>1 of 2  |
|   |  |   |

Figure 55. Peak Antenna Conducted Output Power, 802.11g Mid Channel

| ₩ Agilent 12:56:53 May 29, 2014                                      | Trace/View                   |
|--|------------------------------|
| Ch Freq 2.412 GHz Trig Free<br>Channel Power                         | <b>Trace</b><br><u>1</u> 2 3 |
| Mkr1 2.41200 GH:<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB -0.187 dBm | Clear Write                  |
| #Avg   | Max Hold                     |
|  | Min Hold                     |
| Center 2.412 GHz Span 28.31 MHz #VBW 3 MHz Sweep 8 ms (401 pts)      | View                         |
| Channel Power Power Spectral Density                                 | Blank                        |
| 7.90 dBm /18.4000 MHz -64.75 dBm/Hz                                  | More<br>1 of 2               |
|  |                              |

Figure 56. Peak Antenna Conducted Output Power, 802.11g High Channel

| <b>₩ Agilent</b> 13:12:22 May 29, 2014  | Trace/View                   |
|---|------------------------------|
| Ch Freq 2.412 GHz Trig Free<br>Channel Power                                  | <b>Trace</b><br><u>1</u> 2 3 |
| Mkr1 2.412000 GHz<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB -0.265 dBm         | Clear Write                  |
| #Avg<br>Log<br>10   | Max Hold                     |
| dB/   | Min Hold                     |
| Center 2.412 GHz Span 30 MHz<br>#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 pts) | View                         |
| Channel Power Power Spectral Density  | Blank                        |
| 7.89 dBm /18.3000 MHz -64.73 dBm/Hz   | More<br>1 of 2               |
|   |                              |

### Figure 57. Peak Antenna Conducted Output Power, 802.11n Low Channel

| <b>Agilent</b> 13:13:21 May 29, 2014                                 | Trace/View      |
|--|-----------------|
| Ch Freq 2.442 GHz Trig   | Free Trace      |
| Mkr1 2.44200<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB -0.55          | 00 GHz<br>5 dBm |
| #Avg   | Max Hold        |
|  | Min Hold        |
| Center 2.442 GHz Span 34<br>#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 |                 |
| Channel Power Spectral Den   |                 |
| 8.20 dBm /18.3000 MHz -64.43 dBm/                                    | Hz More         |
|  |                 |

Figure 58. Peak Antenna Conducted Output Power, 802.11n Mid Channel

| <b>₩ Agilent</b> 13:11:11 May 29, 2014                                      | Marker  |
|---|---|
| Ch Freq 2.462 GHz Trig Free<br>Channel Power                                | <b>Select Marker</b><br><u>1</u> 2 3 4                  |
| Mkr1 2.462000 GF<br>Ref 20 dBm Atten 25 dB Ext PG -8.3 dB 0.565 dBr         | •   |
| #Avg<br>Log<br>10   | Delta   |
|   | <b>Delta Pair</b><br>(Tracking Ref)<br>Ref <u>Delta</u> |
| Center 2.462 GHz Span 30 MH<br>#Res BW 1 MHz #VBW 3 MHz Sweep 8 ms (401 pts | •   |
| Channel Power Power Spectral Density  | <b>-</b>  |
| 8.19 dBm /18.3000 MHz -64.44 dBm/Hz   | More<br>1 of 2  |
|   |   |

# Figure 59. Peak Antenna Conducted Output Power, 802.11n High Channel 2.15 Power Spectral Density (CFR 15.247(e)) (IC RSS 210 A8.5)

The transmitter was placed into a continuous mode of operation at all applicable frequencies. The measurements were performed per the procedures of FCC KDB Procedure 558074. The RBW was set to 3 kHz and the Video Bandwidth was set to  $\geq$  RBW. The trace capture time was set to (Span/3 kHz).

In accordance with 15.247 (e), the power spectral density shall be no greater than +8 dBm per any 3 kHz band.

The following results show that all are less than +8 dBm per 3 kHz band.

| Table 14. Power Spectral Dens | ity for Low, Mid and High Bands |
|-------------------------------|---------------------------------|
|-------------------------------|---------------------------------|

| Frequency Test Data Results FCC Limit |
|---------------------------------------|
|---------------------------------------|

| (MHz)     | (dBm/3 KHz) | (dBm/3 kHz) | (dBm/3 kHz) |  |  |  |  |  |
|-----------|-------------|-------------|-------------|--|--|--|--|--|
| 802.11b   |             |             |             |  |  |  |  |  |
| Low-2412  | -7.975      | -7.975      | +8.0        |  |  |  |  |  |
| Mid-2442  | -7.999      | -7.999      | +8.0        |  |  |  |  |  |
| High-2460 | -8.369      | -8.369      | +8.0        |  |  |  |  |  |
|           | 802         | 2.11g       |             |  |  |  |  |  |
| Low-2412  | -15.310     | -15.310     | +8.0        |  |  |  |  |  |
| Mid-2442  | -14.970     | -14.970     | +8.0        |  |  |  |  |  |
| High-2460 | -15.120     | -15.120     |             |  |  |  |  |  |
| 802.11n   |             |             |             |  |  |  |  |  |
| Low-2412  | -16.540     | -16.540     | +8.0        |  |  |  |  |  |
| Mid-2442  | -16.000     | -16.000     | +8.0        |  |  |  |  |  |
| High-2460 | -15.370     | -15.370     | +8.0        |  |  |  |  |  |

Test Date: May 21, 2014 Tested By Signature: \_\_\_\_\_\_

Name: John Wynn

|  | 🔆 Agilo          | ent (                      | 12:05:5   | 1 May | 21,203 | 14     |            |     | <b>M</b> 4 | 0 44 4            |               | Peak Sea | arch                  |
|--|------------------|----------------------------|-----------|-------|--------|--------|------------|-----|------------|-------------------|---------------|----------|-----------------------|
| 10     2.411553750/GHZ     1     Next Peak       dB/     -7.975 dBm     Next Peak       -7.975 dBm     Next Pt Right       -7.975 dBm     Next Pt Left       Next Pt Left     Next Pt Left       -7.975 dBm     Min Search       Marker     Trace       1     (1)       Freq     2.41155 GHz       -7.975 dBm     Pk-Pt Search       More | Peak 🛛           |                            | er        | Atten | 25 dB  | Ext PG | 6 -8.3     | dB  | MKrl       |                   |               | Meas T   | ools•                 |
| Center 2.412 GHz<br>#Res BW 3 kHz<br>1 (1) Freq 2.41155 GHz<br>Min Search<br>Pk-Pk Search<br>More  | 10               |                            |           |       | GHz    | \$     | apesparate | man | m          | many              |               | Next     | Peak                  |
| Center 2.412 GHz Span 12.75 MHz<br>#Res BW 3 kHz VBW 10 kHz Sweep 1.458 s (401 pts)<br>Marker Trace Type X Axis Amplitude<br>1 (1) Freq 2.41155 GHz -7.975 dBm<br>Pk-Pk Search<br>More   |                  |                            |           |       |        |        |            |     |            |                   |               | Next Pk  | Right                 |
| #Res BW 3 kHz       VBW 10 kHz       Sweep 1.458 s (401 pts)         Marker       Trace       Type       X Axis       Amplitude         1       (1)       Freq       2.41155 GHz       -7.975 dBm         Pk-Pk Search         More  |                  |                            |           |       |        |        |            |     |            |                   |               | Next Pl  | Left                  |
| Pk-Pk Search<br>More   | #Res Bl<br>Marke | <mark>vl3kH</mark><br>₂r T | Z<br>race |       |        | Х      | Axis       |     | p 1.458    | 3 s (40<br>Amplit | 1 pts)<br>ude | Min Se   | earch                 |
|  |                  |                            |           |       |        |        |            |     |            |                   |               | Pk-Pk Se | earch                 |
|  |                  |                            |           |       |        |        |            |     |            |                   |               |          | <b>More</b><br>1 of 2 |

## Figure 60. Peak Power Spectral Density - 802.11b - Low Channel

| <b>Agilent</b> 11:59:55 May 21, 2014  | Peak Search           |
|---|-----------------------|
| Mkr1         2.44188         GHz           Ref 20 dBm         Atten 25 dB         Ext PG - 8.3 dB         -7.999 dBm           Peak         Marker          | Meas Tools•           |
| <sup>10</sup> dB/ -7.999 dBm  | Next Peak             |
|   | Next Pk Right         |
|   | Next Pk Left          |
| Center 2.442 GHz Span 12 MHz<br>#Res BW 3 kHz VBW 10 kHz Sweep 1.372 s (401 pts)<br>Marker Trace Type X Axis Amplitude<br>1 (1) Freg 2.44188 GHz -7.999 dBm | Min Search            |
|   | Pk-Pk Search          |
|   | <b>More</b><br>1 of 2 |

Figure 61. Peak Power Spectral Density - 802.11b - Mid Channel

٦

| Peak Search     |                    |                  |         |          |                 | 4          | 21, 20. | o may | .2.00.4:    | ient .          | 🔆 Agi          |
|-----------------|--------------------|------------------|---------|----------|-----------------|------------|---------|-------|-------------|-----------------|----------------|
|                 | 155 GHz            |                  | Mkr1    |          |                 |            |         |       |             |                 |                |
|                 | 369 dBm            | -8.36            |         | В        | -8.3            | Ext PG     | 25 dB   | Atten |             | dBm             | Ref_20         |
| Meas Tools      |                    |                  |         |          |                 |            |         |       | er          | Mark            | Peak           |
|                 |                    |                  |         |          |                 |            | 6H-2    | 500   | 1578        | 2 /6            | Log            |
|                 |                    |                  |         |          |                 | \$         |         |       |             |                 | 10<br>JD7      |
| Next Peak       |                    | mm               | month   | OCCAMPLY | -,0.40,0,944    | ಹಕ್ಕಡಡೆದರು | mark    | Bm    | ea d        | <del>-8.3</del> | dB/            |
|                 | man for the second |                  |         |          |                 |            |         |       | A           | and the second  |                |
|                 | +                  |                  |         |          |                 |            |         |       |             | r               |                |
| 📙 Next Pk Right | +                  |                  |         |          |                 |            |         |       |             |                 |                |
|                 | +                  | <u> </u>         |         |          |                 |            |         |       |             |                 |                |
|                 |                    | <u> </u>         |         |          |                 |            |         |       |             |                 |                |
| 📔 Next Pk Left  |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 | 2.9 MHz            |                  |         |          |                 |            |         |       |             | 2.462           |                |
| Min Search      | 01 pts)            |                  | b 1.475 | Swee     |                 | d 10 k     |         |       |             | SW 3 kH         |                |
|                 |                    | Amplit<br>-8.369 |         |          | Axis<br>.55 GHz |            |         | Type  | race<br>(1) |                 | Mark           |
|                 | ) abiii            | -0.309           |         |          | .55 UHZ         | 2.40.      |         | Fred  | (1)         |                 | l <sup>⊥</sup> |
| 🛚 Pk-Pk Search  |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 |                    |                  |         |          |                 |            |         |       |             |                 |                |
| More            |                    |                  |         |          |                 |            |         |       |             |                 |                |
| 1 of 2          |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 |                    |                  |         |          |                 |            |         |       |             |                 |                |
|                 |                    |                  |         |          |                 |            |         |       |             |                 | 1              |

### 🔆 Agilent 12:06:45 May 21, 2014

Figure 62. Peak Power Spectral Density - 802.11b - High Channel

| 🔆 Agilent                              | 12:15:0                                 | 6 May        | 21,201     | L4                     |                       |      | ML1          | 0 41 00                                | 00.011-       | Peak Search    |
|--|---|--------------|------------|------------------------|-----------------------|------|--------------|--|---------------|----------------|
| una I                                  | rker                                    |              |            | Ext PG                 | 6 -8.3                | dB   | Mkr1         | 2.4133<br>-15.3                        | 1 dBm         | Meas Tools•    |
| 1-v                                    | 413380<br>. <del>5.31 d</del>           | 1 1          | uHz<br>mmm | hadder an start of the |                       |      | ىمەرمەرمەرمە | 4-4                                    |               | Next Peak      |
|  | and |              |            |                        |                       |      |              |  |               | Next Pk Right  |
|  |   |              |            |                        |                       |      |              |  |               | Next Pk Left   |
| Center 2.4<br>#Res BW 3<br>Marker<br>1 |   | Type<br>Freq |            |                        | Hz<br>Axis<br>380 GHz | Swee |              | 5pan 27<br>6 s (40<br>Amplit<br>-15.31 | 1 pts)<br>ude | Min Search     |
| -                                      |   |              |            | 2.120                  |                       |      |              | 10101                                  |               | Pk-Pk Search   |
|  |   |              |            |                        |                       |      |              |  |               | More<br>1 of 2 |

Figure 63. Peak Power Spectral Density - 802.11g - Low Channel

| <b>Agilent</b> 12:15:57         May 21, 2014           Mkr1         2.440482         GHz   | Peak Search           |
|--|-----------------------|
| Ref 20 dBm Atten 25 dB Ext PG -8.3 dB -14.97 dBm<br>Peak Marker  | Meas Tools            |
| <sup>10</sup> <b>2.440482000 GHz</b><br>dB/ <b>−14.97 dBm 1</b>  | Next Peak             |
|  | Next Pk Right         |
|  | Next Pk Left          |
| Center 2.442 GHz Span 27.6 MHz<br>#Res BW 3 kHz VBW 10 kHz Sweep 3.156 s (401 pts)<br>Marker Trace Type X Axis Amplitude<br>1 (2) Freq 2.440482 GHz -14.97 dBm | Min Search            |
|  | Pk-Pk Search          |
|  | <b>More</b><br>1 of 2 |

Figure 64. Peak Power Spectral Density - 802.11g - Mid Channel

| 🔆 Agi                         | lent           | 12:17:0       | 8 May        | 21,20 | 14                |                       |         | ML1       | 0 4704                                 | 07.00-                | Peak Search    |
|-------------------------------|----------------|---------------|--------------|-------|-------------------|-----------------------|---------|-----------|--|-----------------------|----------------|
| Ref 20<br>Peak<br>Log         | Mar            | 1             |              | 25 dB | Ext PG            | 6 -8.3                | dB      | Mkr1      |  | 87 GHz<br>2 dBm       | Meas Tools+    |
| 10<br>dB/                     |                | 70487<br>12 d | Bm           |       | <u>nananan</u> ta | anagari               | ممعمممك | an Agaada | 1<br>\$                                |                       | Next Peak      |
|                               | and the second | - Company     |              |       |                   |                       |         |           | -                                      | and the second second | Next Pk Right  |
|                               |                |               |              |       |                   |                       |         |           |  |                       | Next Pk Left   |
| Center<br>#Res B<br>Mark<br>1 | 3W 3 kł        |               | Type<br>Fred |       |                   | Hz<br>Axis<br>487 GHz |         |           | 5pan 27<br>6 s (40<br>Amplit<br>-15.12 | 1 pts)<br>ude         | Min Search     |
|                               |                | (2)           | rrec         | 4     | 2.470             | 407 0112              |         |           | -13.12                                 |                       | Pk-Pk Search   |
|                               |                |               |              |       |                   |                       |         |           |  |                       | More<br>1 of 2 |
|                               |                |               |              |       |                   |                       |         |           |  |                       |                |

Figure 65. Peak Power Spectral Density - 802.11g - High Channel

| 🔆 Agi                 | ilent    | 12:23:3 | 35 May                     | 21,20 | 14     |                       |           | ML1                                     | 0 41 71                                 | 00.011-       | Peak Search           |
|-----------------------|----------|---------|----------------------------|-------|--------|-----------------------|-----------|---|---|---------------|-----------------------|
| Ref 20<br>Peak<br>Log | Mark     | 1       |                            | 25 dB | Ext PG | 6 -8.3                | dB        | Mkr1                                    | 2.4171<br>-16.5                         | 4 dBm         | Meas Tools⊦           |
| 10<br>dB/             |          | 1       | 3000<br>1 <mark>18m</mark> |       |        |                       | 1<br>,\$, | annan ann ann ann ann ann ann ann ann a | *1                                      |               | Next Peak             |
|                       | - Marked | - And   |                            |       |        |                       |           |   | - Marine                                | Marine Marine | Next Pk Right         |
|                       |          |         |                            |       |        |                       |           |   |   |               | Next Pk Left          |
|                       |          |         | Type<br>Free               | !     |        | Hz<br>Axis<br>106 GHz |           |   | 6 s (40<br>6 s (40<br>Amplite<br>-16.54 | 1 pts)<br>ude | Min Search            |
| _                     |          | ~~~     |                            | •     |        |                       |           |   | 2010                                    |               | Pk-Pk Search          |
|                       |          |         |                            |       |        |                       |           |   |   |               | <b>More</b><br>1 of 2 |
|                       |          |         |                            |       |        |                       |           |   |   |               |                       |

Figure 66. Peak Power Spectral Density - 802.11n - Low Channel

| 🔆 Agilent 12:25:08 May   | / 21, 2014                                       |   | Peak Search    |
|--|--|---|----------------|
| Peak Marker  | 25 dB Ext PG -8.3 dB                             | Mkr1 2.435805 GHz<br>-16 dBm                                  | Meas Tools•    |
| <sup>10</sup> <b>2.435805000</b><br>dB/ <b>-16 dBm </b> 3          | - UHZ<br>sűkűzságák jánosáláp ordálaktárá connod | hadhadaa  | Next Peak      |
| annogen alter annogen alter  |  |   | Next Pk Right  |
|  |  |   | Next Pk Left   |
| Center 2.442 GHz<br>#Res BW 3 kHz<br>Marker Trace Typ<br>1 (2) Fre | e X Axis   | Span 27.6 MHz<br>ep 3.156 s (401 pts)<br>Amplitude<br>-16 dBm | Min Search     |
|  |  | 20 000  | Pk-Pk Search   |
|  |  |   | More<br>1 of 2 |

Figure 67. Peak Power Spectral Density - 802.11n - Mid Channel

| 🔆 Agilent 12:26:01 May 21, 2014   | Mkr1 2.467106 GHz  |
|---|--|
| Ref 20 dBm Atten 25 dB Ext PG -8.3 d<br>Peak Marker   |  |
| <sup>10</sup> 2.467106000 GHz<br><sup>dB/</sup> -15.37 dBm  | hander of the second se |
|   | Next Pk Right  |
|   | Next Pk Left   |
| Center 2.462 GHz<br>#Res BW 3 kHz VBW 10 kHz<br>Marker Trace Type X Axis<br>1 (2) Freg 2.467106 GHz | Span 27.6 MHz<br>Sweep 3.156 s (401 pts)<br>Amplitude<br>-15.37 dBm  |
|   | Pk-Pk Search   |
|   | More<br>1 of 2   |

Figure 68. Peak Power Spectral Density - 802.11n - High Channel