

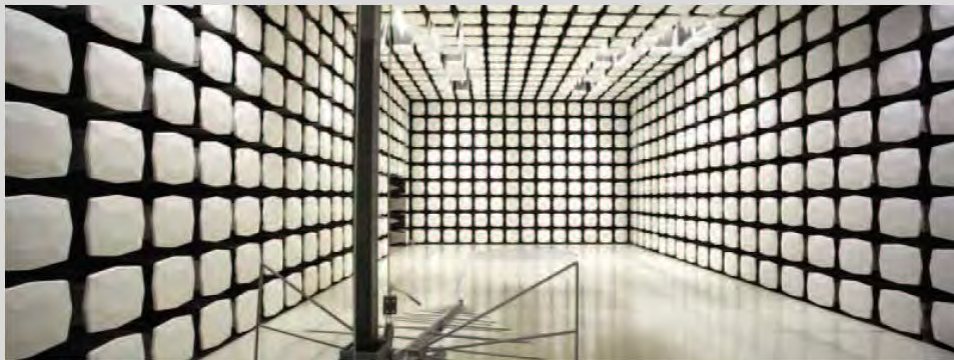


**Microsoft Corporation**  
**Model 1631**

**FCC 15.247:2014**

**FCC 15.207:2014**

**Report #: MCSO1698 PART 3 OF 7**



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – [www.nwemc.com](http://www.nwemc.com)

California – Minnesota – Oregon – New York – Washington

## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal.  | Interval (mo.) |
|---------------------------------|------------------|----------|-----|------------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

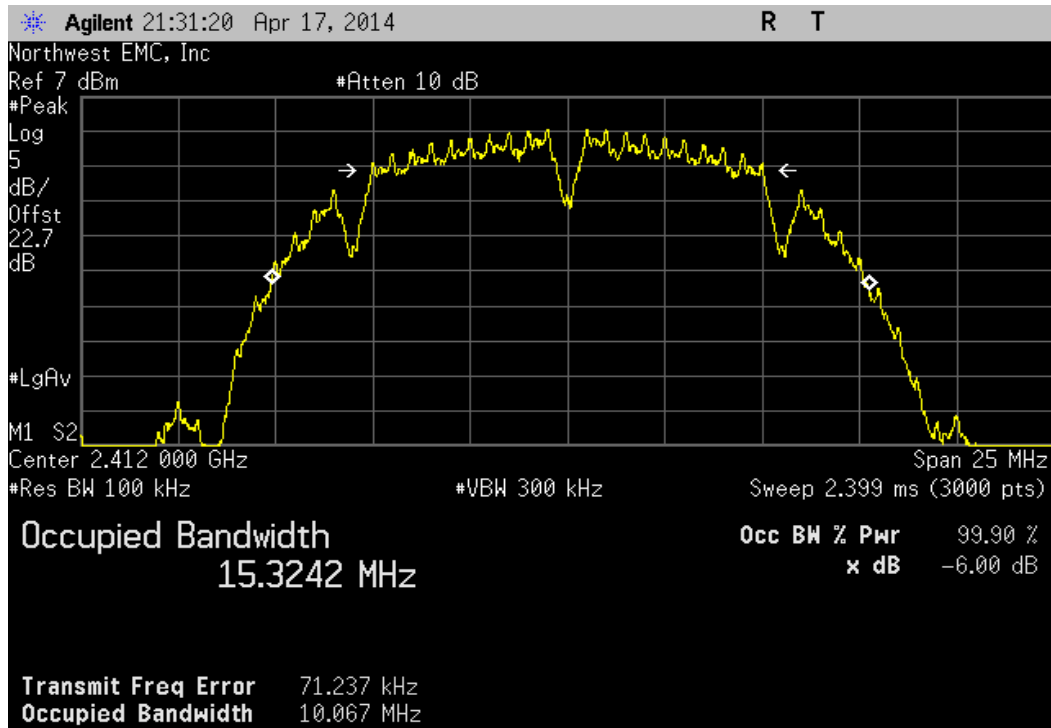
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |                           |                                                                                             |           |
|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |                           | Work Order: MCSO1698                                                                        |           |
| Serial Number: 006840341053                                                                            |                           | Date: 04/18/14                                                                              |           |
| Customer: Microsoft Corporation                                                                        |                           | Temperature: 22.3°C                                                                         |           |
| Attendees: None                                                                                        |                           | Humidity: 32%                                                                               |           |
| Project: None                                                                                          |                           | Barometric Pres.: 1014                                                                      |           |
| Tested by: Jared Ison                                                                                  |                           | Power: 110VAC/60Hz                                                                          |           |
|                                                                                                        |                           | Job Site: EV06                                                                              |           |
| TEST SPECIFICATIONS                                                                                    |                           | Test Method                                                                                 |           |
| FCC 15.247:2014                                                                                        |                           | ANSI C63.10:2009                                                                            |           |
| COMMENTS                                                                                               |                           |                                                                                             |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |                           |                                                                                             |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |                           |                                                                                             |           |
| None                                                                                                   |                           |                                                                                             |           |
| Configuration #                                                                                        | 6                         | Signature  |           |
|                                                                                                        |                           | Value                                                                                       | Limit     |
| Result                                                                                                 |                           |                                                                                             |           |
| 20 MHz                                                                                                 |                           |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |                           |                                                                                             |           |
| 802.11(b) 1 Mbps                                                                                       |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 10.067 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 10.047 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 10.086 MHz                                                                                  | > 500 kHz |
| 802.11(b) 11 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 10.039 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 9.68 MHz                                                                                    | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 9.541 MHz                                                                                   | > 500 kHz |
| 802.11(g) 6 Mbps                                                                                       |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.388 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.343 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.353 MHz                                                                                  | > 500 kHz |
| 802.11(g) 36 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.433 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.437 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.441 MHz                                                                                  | > 500 kHz |
| 802.11(g) 54 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.438 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.443 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.451 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS0                                                                                         |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 17.068 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 17.371 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 17.545 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS7                                                                                         |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 17.581 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 17.621 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 17.594 MHz                                                                                  | > 500 kHz |

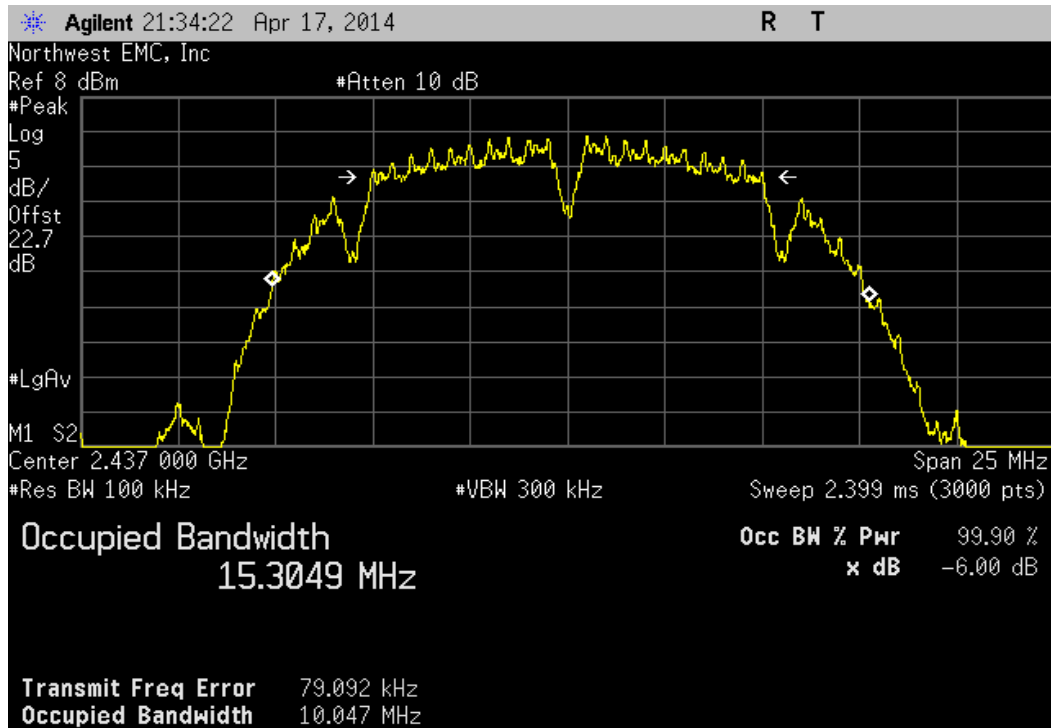
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 10.067 MHz | > 500 kHz | Pass   |



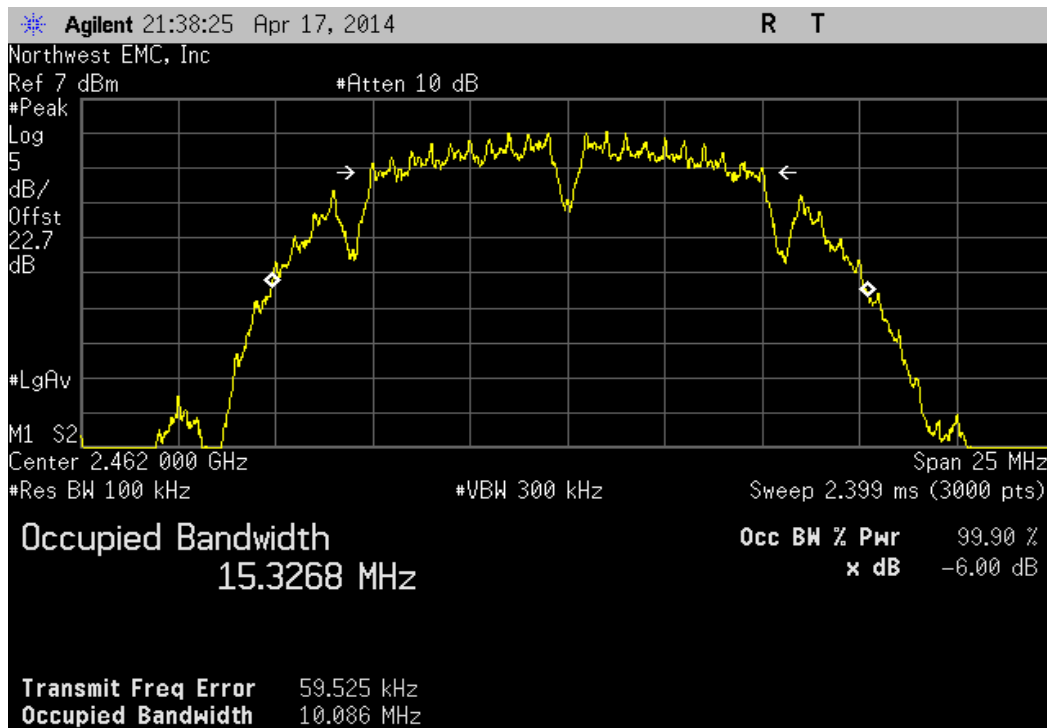
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 10.047 MHz | > 500 kHz | Pass   |



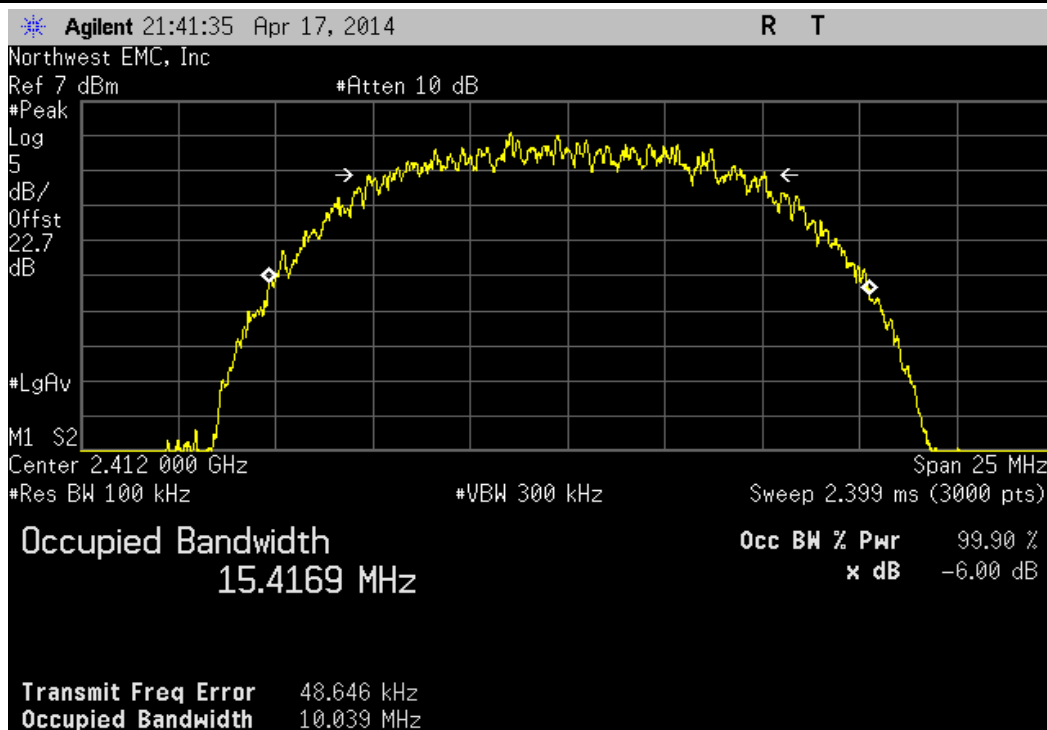
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 10.086 MHz | > 500 kHz | Pass   |



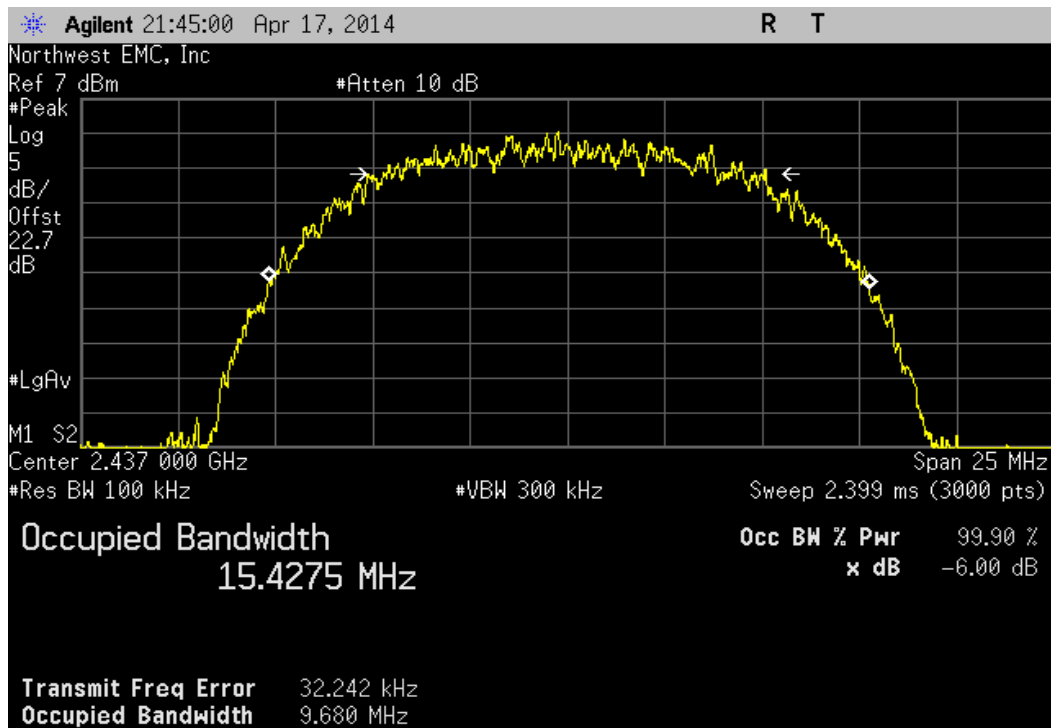
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 10.039 MHz | > 500 kHz | Pass   |



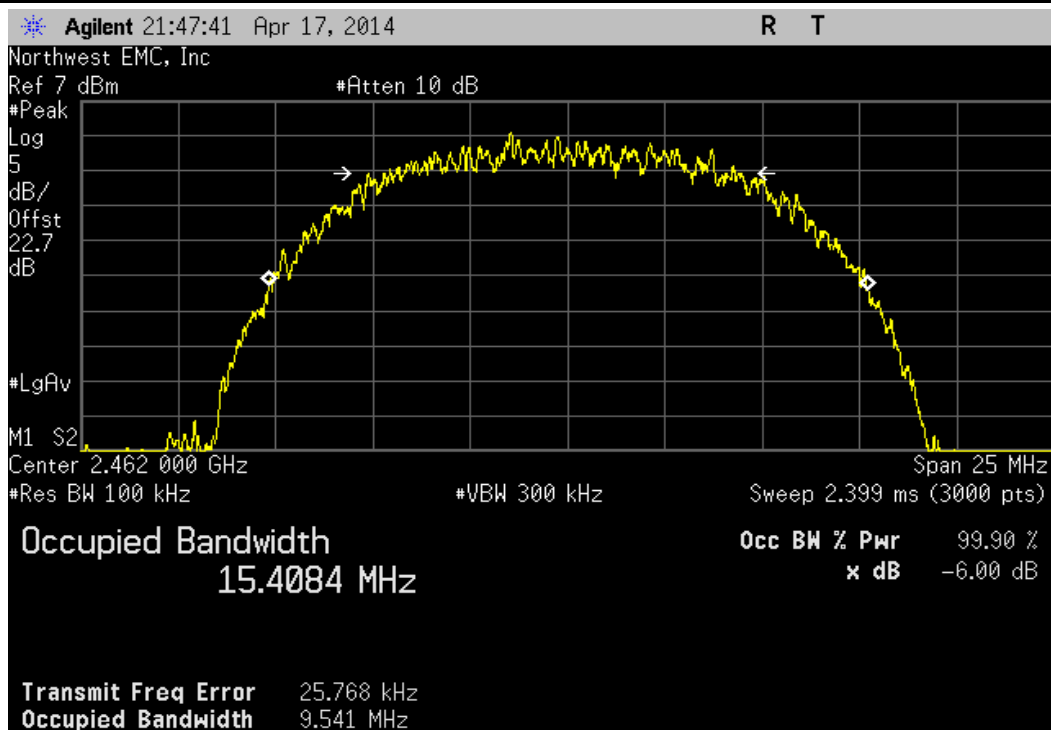
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value    | Limit     | Result |
|--|--|--|--|----------|-----------|--------|
|  |  |  |  | 9.68 MHz | > 500 kHz | Pass   |



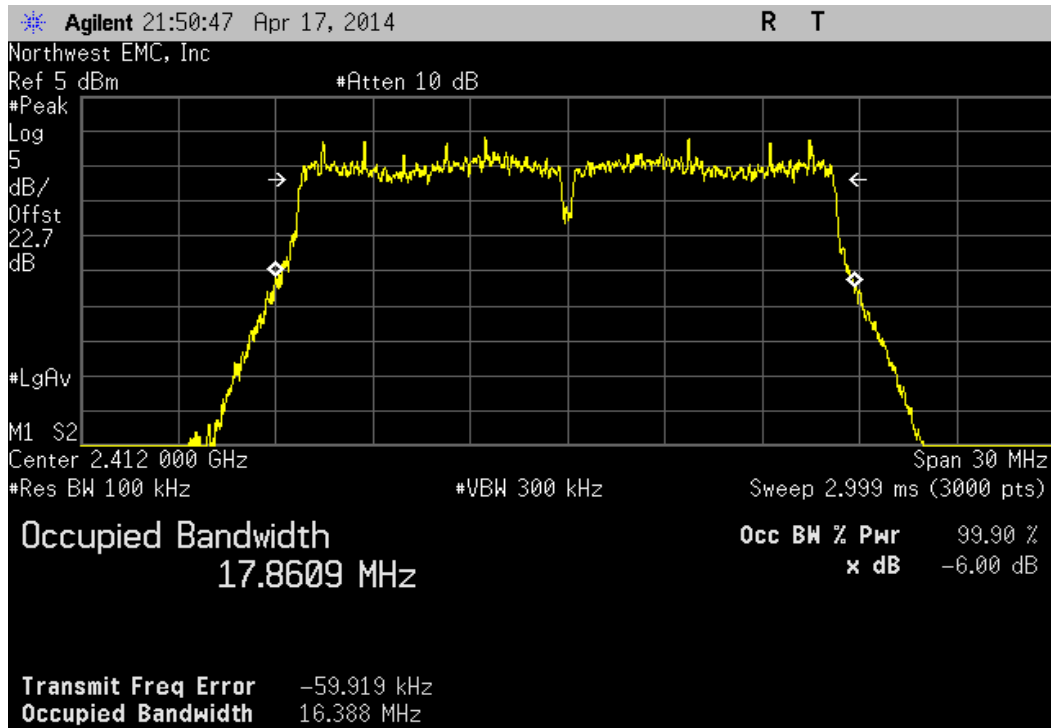
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value     | Limit     | Result |
|--|--|--|--|-----------|-----------|--------|
|  |  |  |  | 9.541 MHz | > 500 kHz | Pass   |



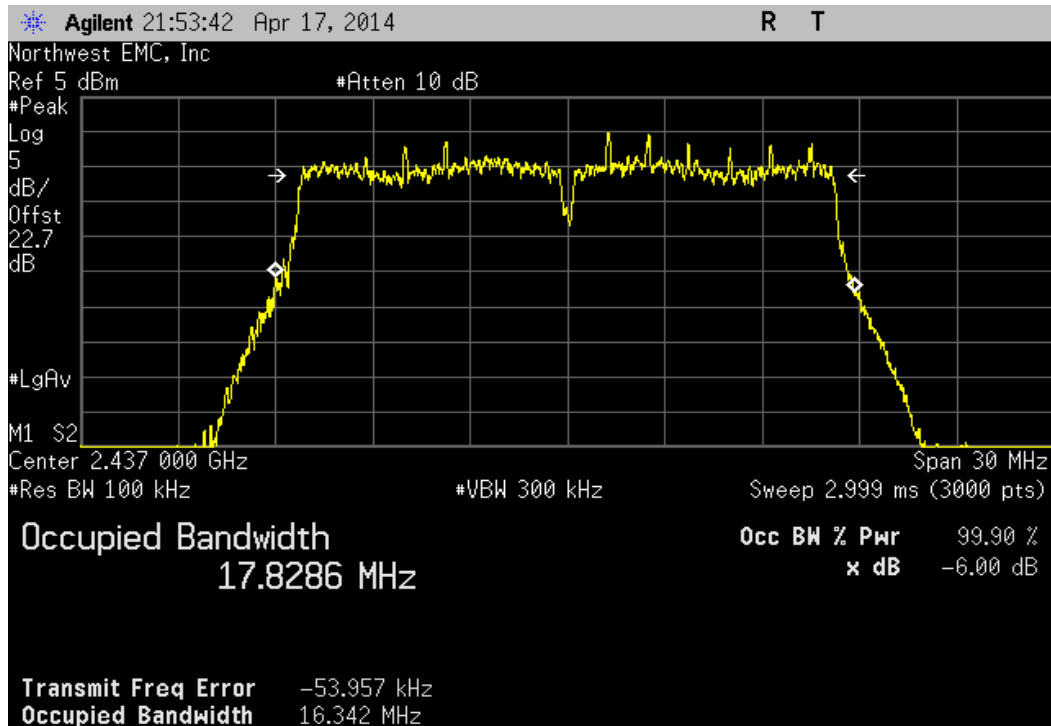
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.388 MHz | > 500 kHz | Pass   |



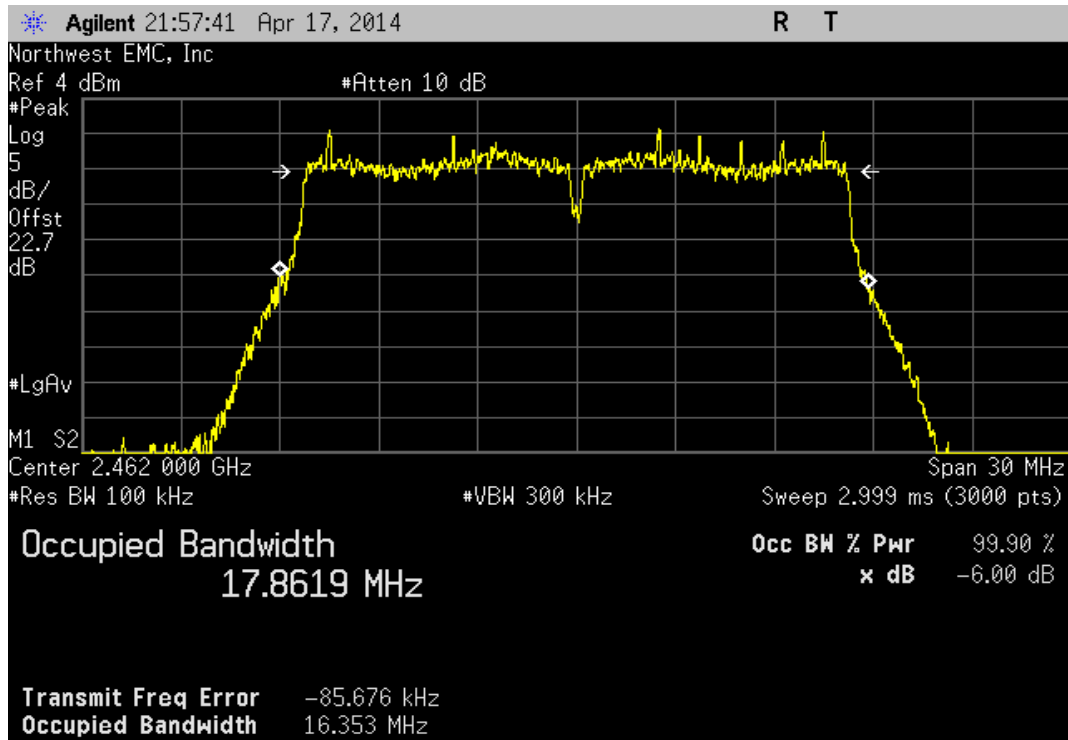
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.343 MHz | > 500 kHz | Pass   |



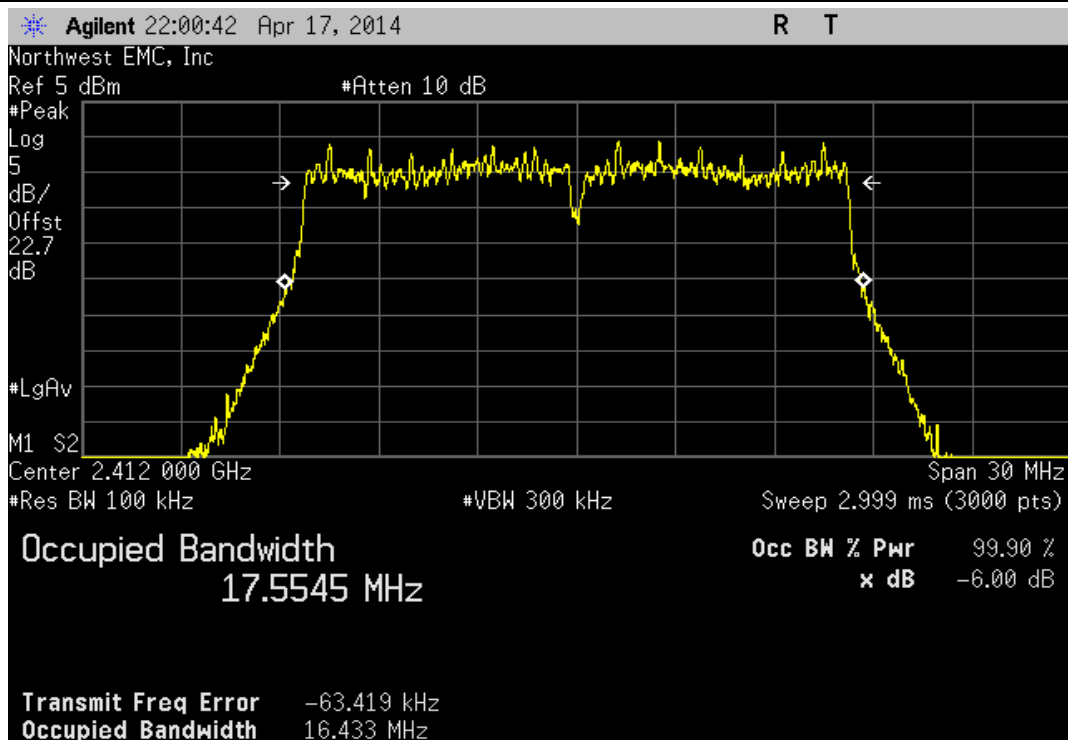
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.353 MHz | > 500 kHz | Pass   |



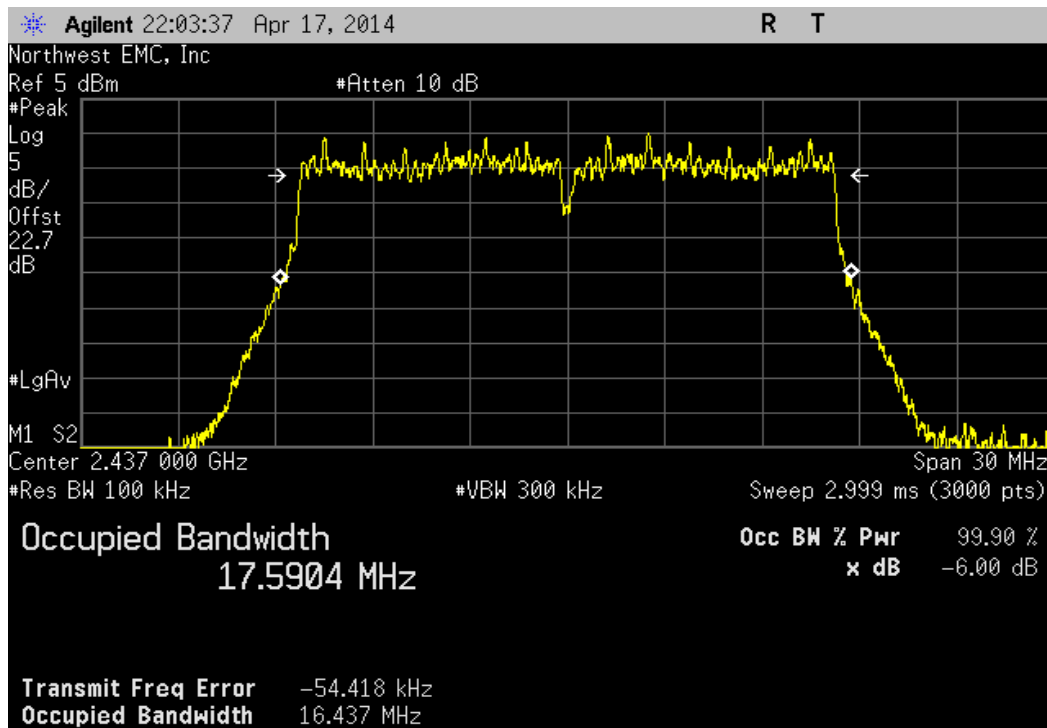
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.433 MHz | > 500 kHz | Pass   |



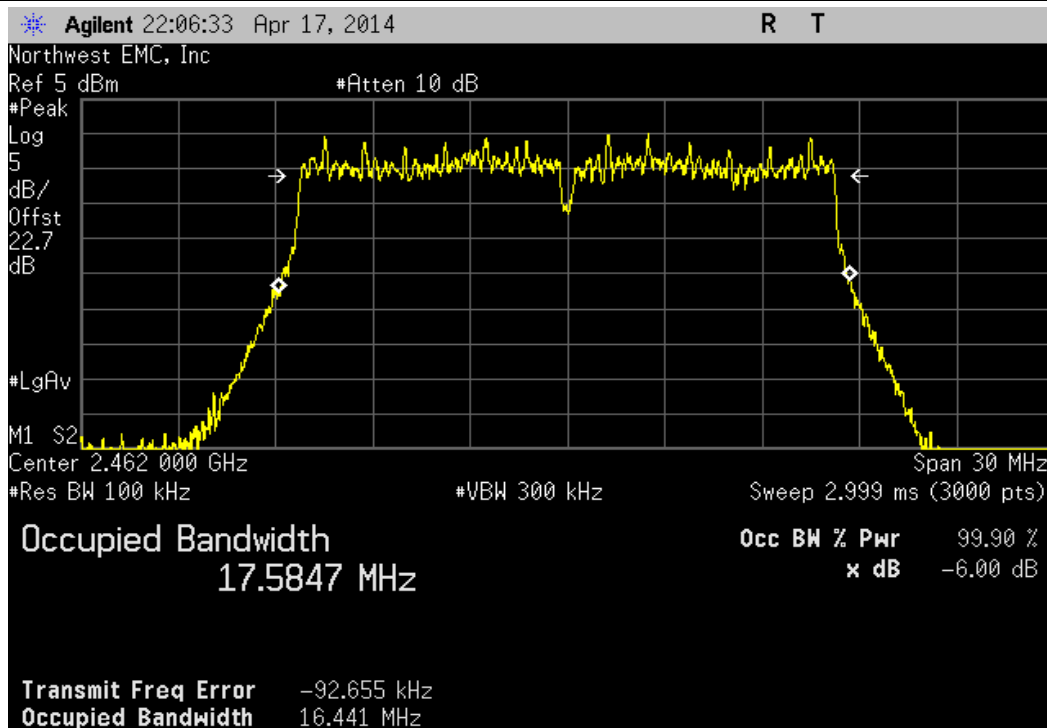
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.437 MHz | > 500 kHz | Pass   |



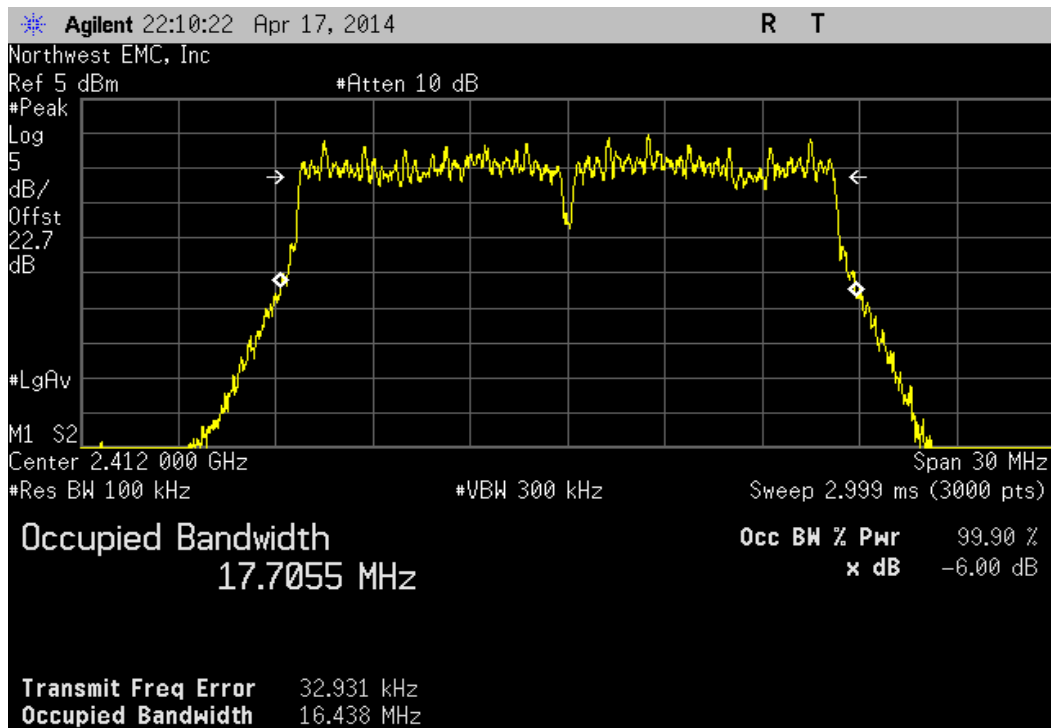
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.441 MHz | > 500 kHz | Pass   |



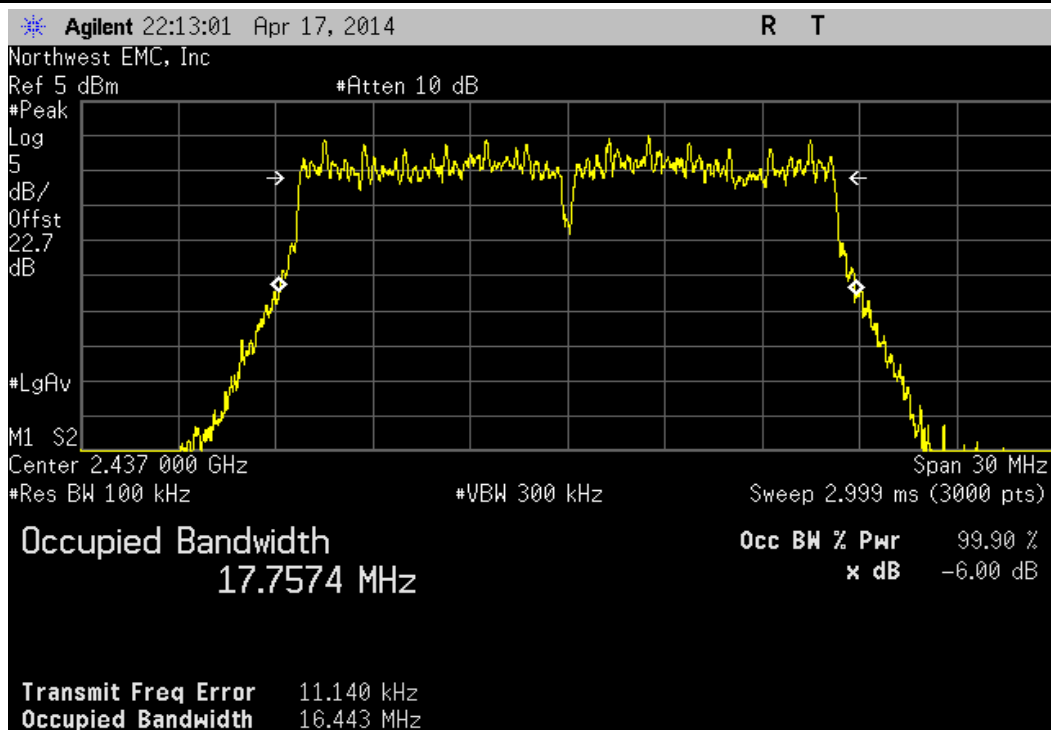
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.438 MHz | > 500 kHz | Pass   |



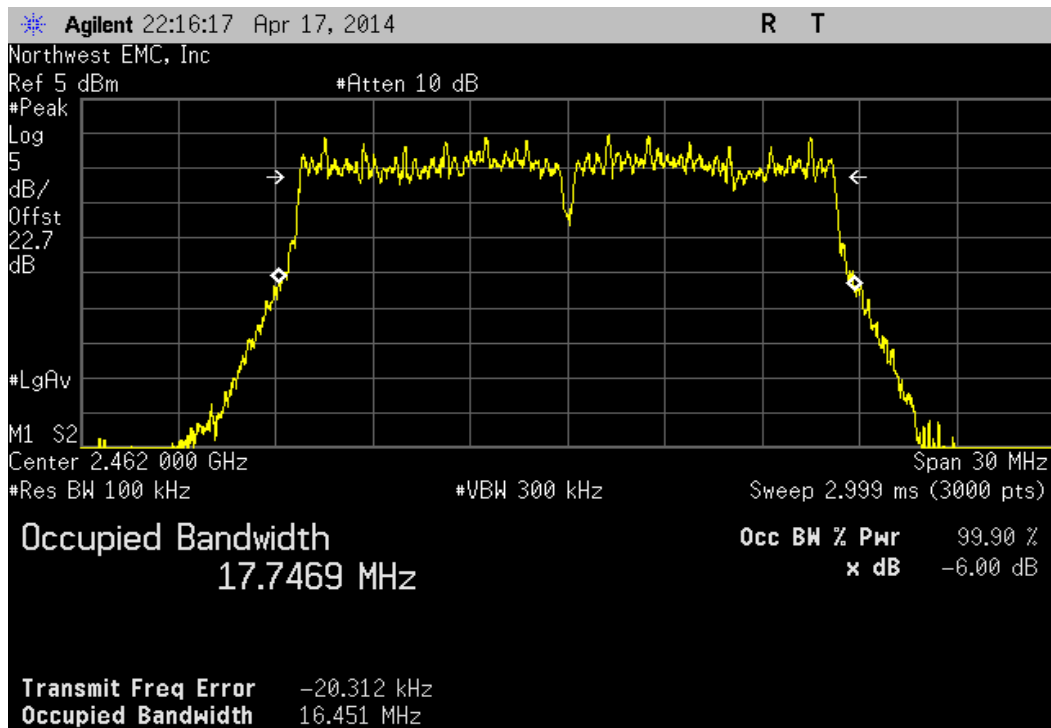
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.443 MHz | > 500 kHz | Pass   |



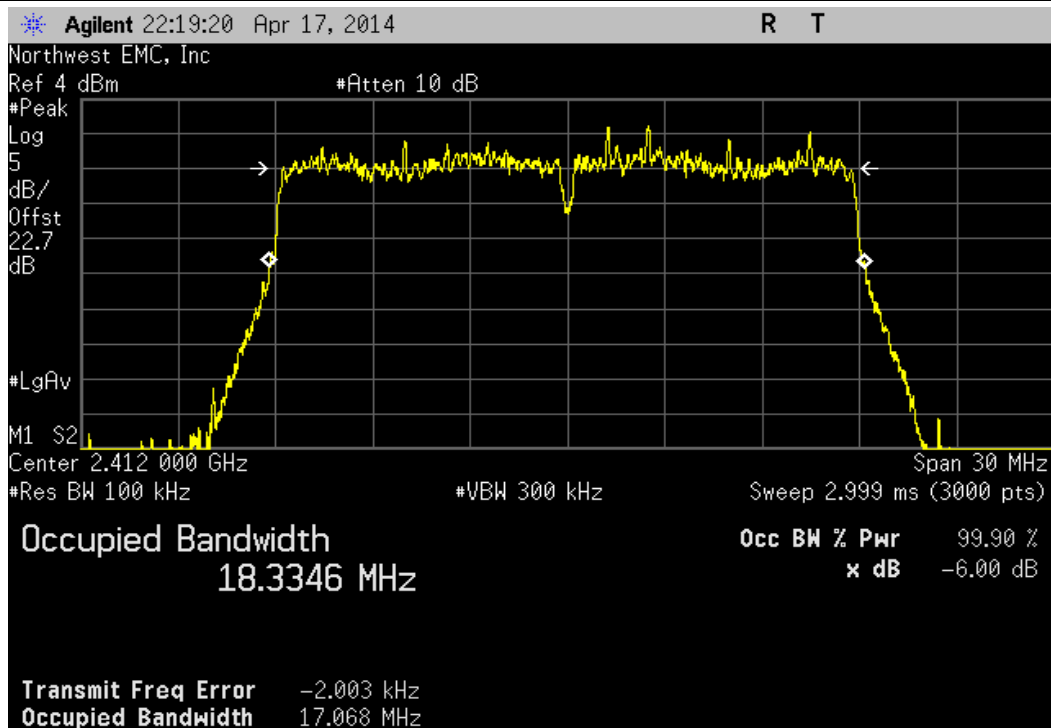
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.451 MHz | > 500 kHz | Pass   |



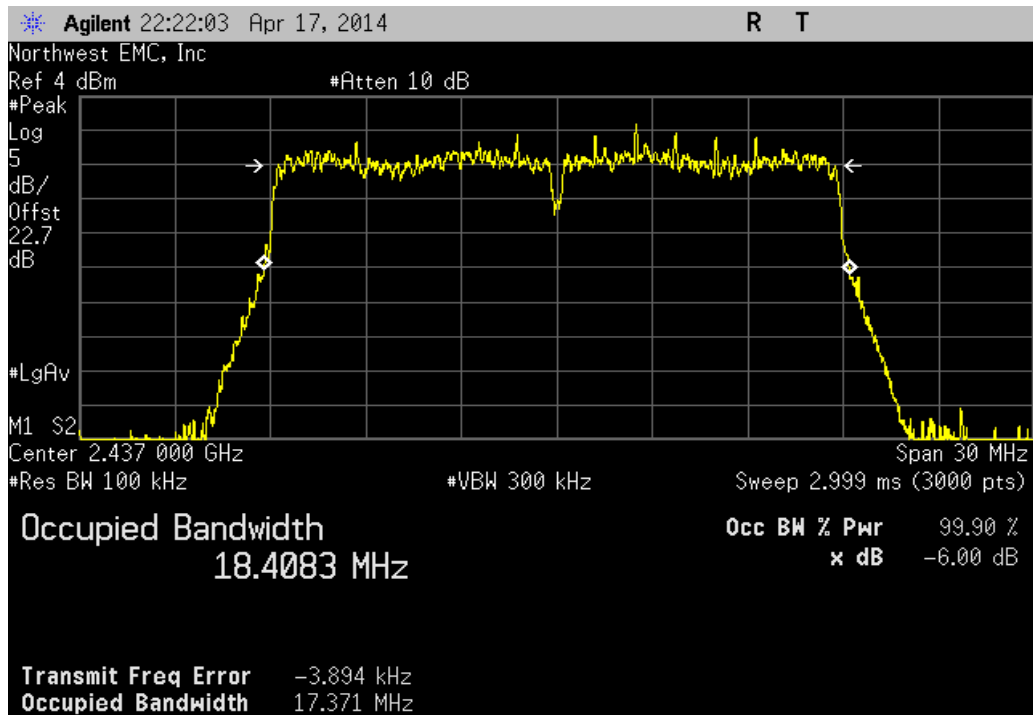
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.068 MHz | > 500 kHz | Pass   |



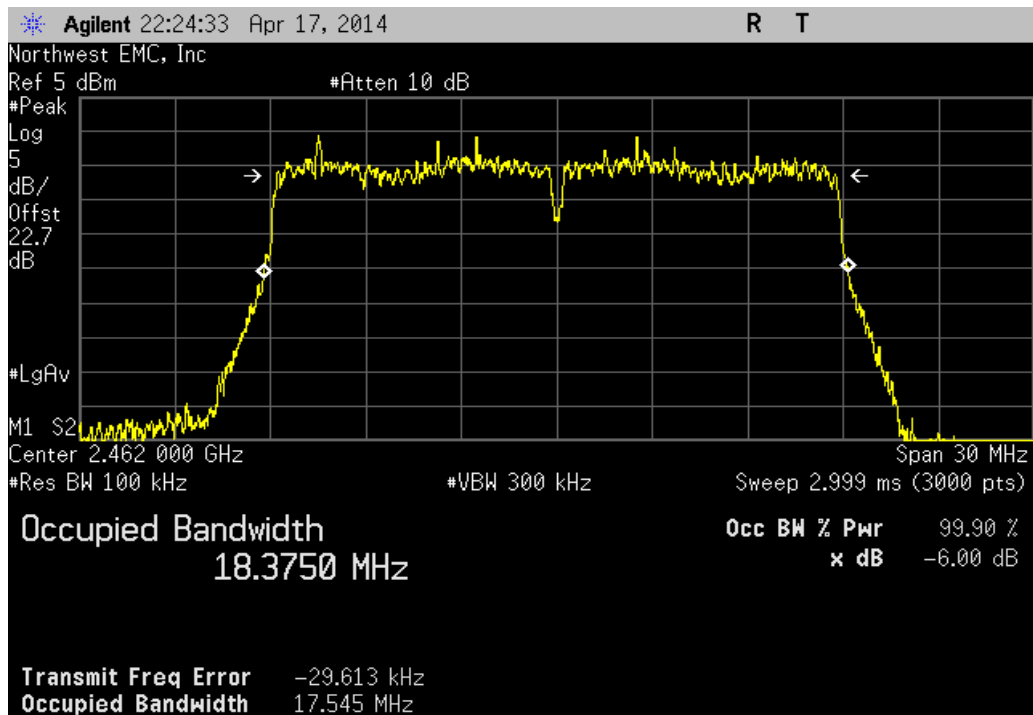
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.371 MHz | > 500 kHz | Pass   |



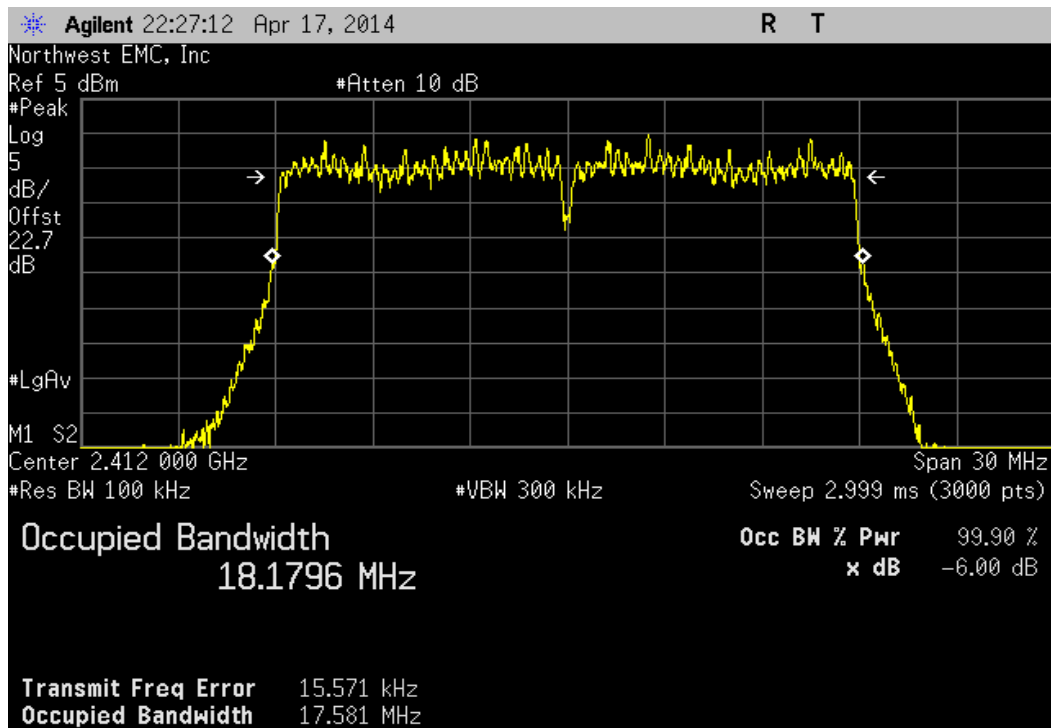
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.545 MHz | > 500 kHz | Pass   |



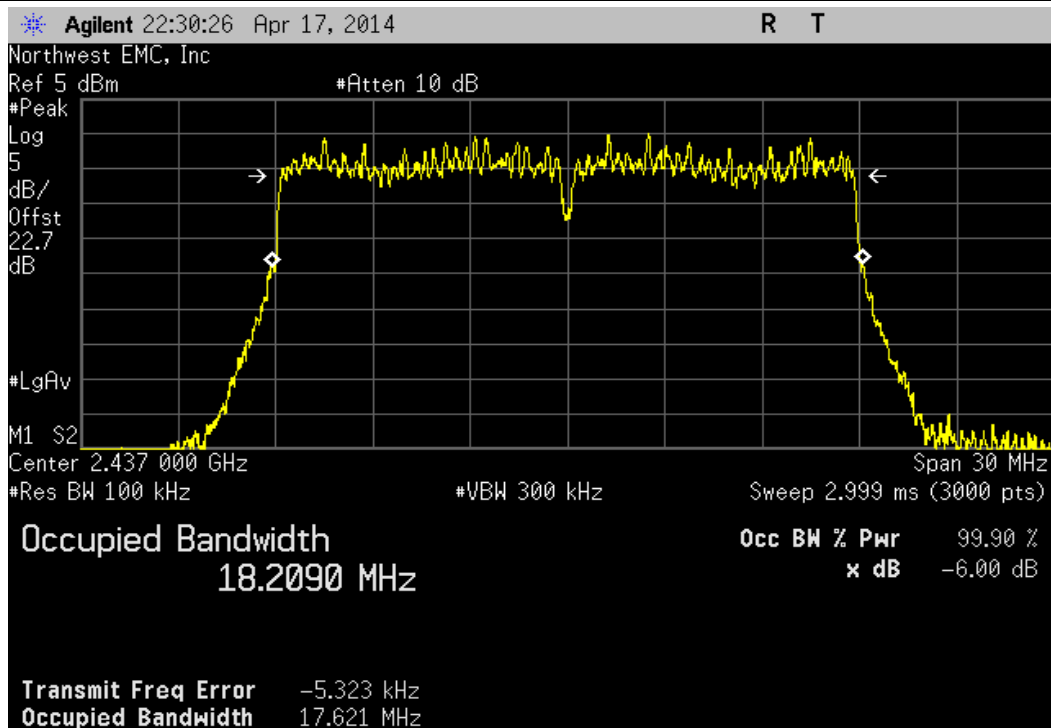
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.581 MHz | > 500 kHz | Pass   |



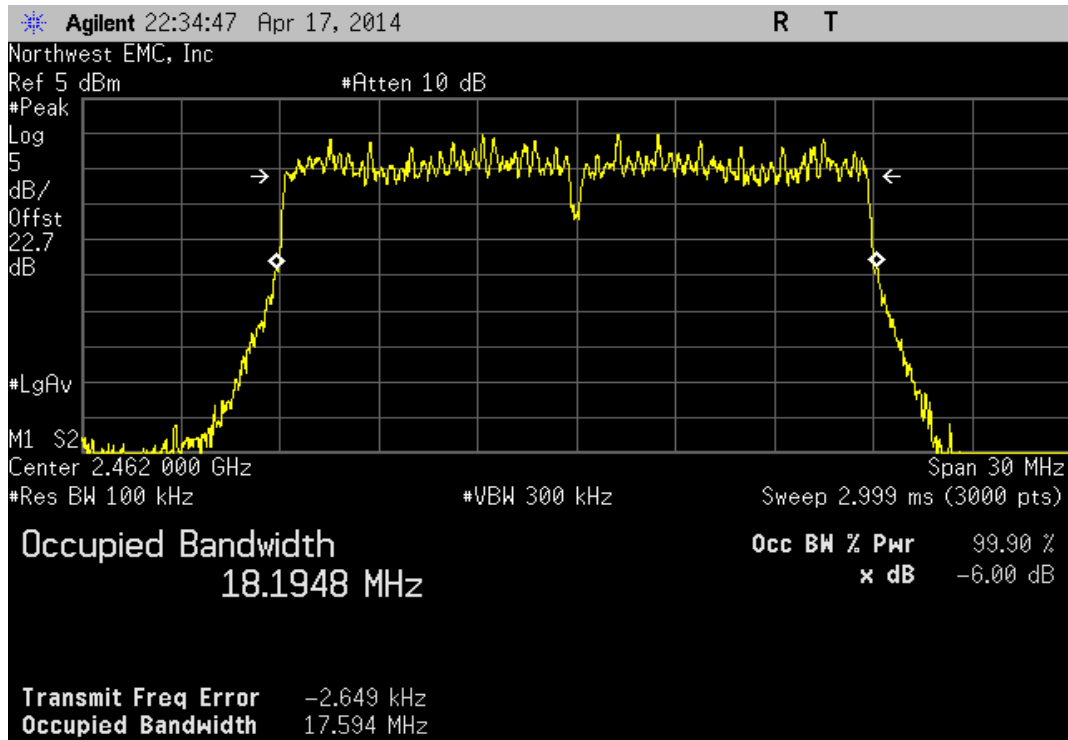
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.621 MHz | > 500 kHz | Pass   |



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.594 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal. | Interval (mo.) |
|---------------------------------|------------------|----------|-----|-----------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013 | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013 | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR       | 0              |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014  | 12             |
| Power Meter                     | Agilent          | N1913A   | SQR | 4/29/2013 | 36             |
| Power Sensor                    | Agilent          | E9300H   | SQO | 4/29/2013 | 36             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014 | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014 | 24             |

### TEST DESCRIPTION

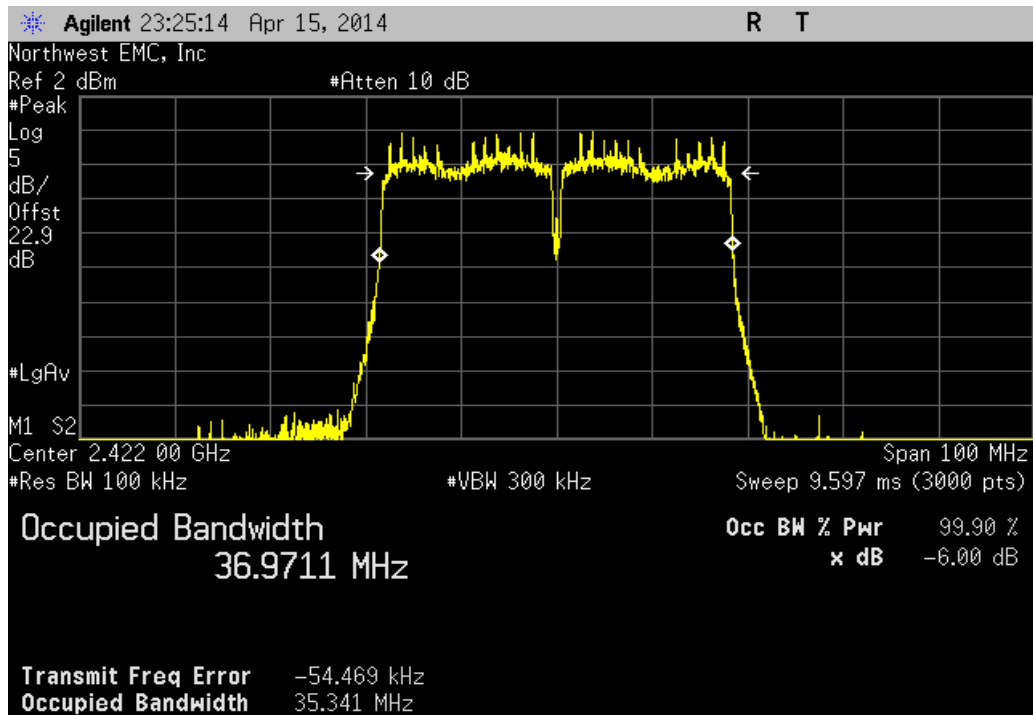
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |   |                                                                                             |           |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |           |
| Serial Number: 006840341053                                                                            |   | Date: 04/16/14                                                                              |           |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |           |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |           |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |           |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          |           |
|                                                                                                        |   | Job Site: EV06                                                                              |           |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |           |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |           |
| COMMENTS                                                                                               |   |                                                                                             |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |           |
| None                                                                                                   |   |                                                                                             |           |
| Configuration #                                                                                        | 6 | Signature  |           |
|                                                                                                        |   | Value                                                                                       | Limit     |
|                                                                                                        |   | Result                                                                                      |           |
| 40 MHz                                                                                                 |   |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                             |           |
| 802.11(n) MCS0                                                                                         |   |                                                                                             |           |
| 1/5 Low Channel, 2422 MHz                                                                              |   | 35.341 MHz                                                                                  | > 500 kHz |
| 4/8 Mid Channel, 2437 MHz                                                                              |   | 35.461 MHz                                                                                  | > 500 kHz |
| 7/11 High Channel, 2452 MHz                                                                            |   | 35.308 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS7                                                                                         |   |                                                                                             |           |
| 1/5 Low Channel, 2422 MHz                                                                              |   | 35.99 MHz                                                                                   | > 500 kHz |
| 4/8 Mid Channel, 2437 MHz                                                                              |   | 35.975 MHz                                                                                  | > 500 kHz |
| 7/11 High Channel, 2452 MHz                                                                            |   | 35.846 MHz                                                                                  | > 500 kHz |

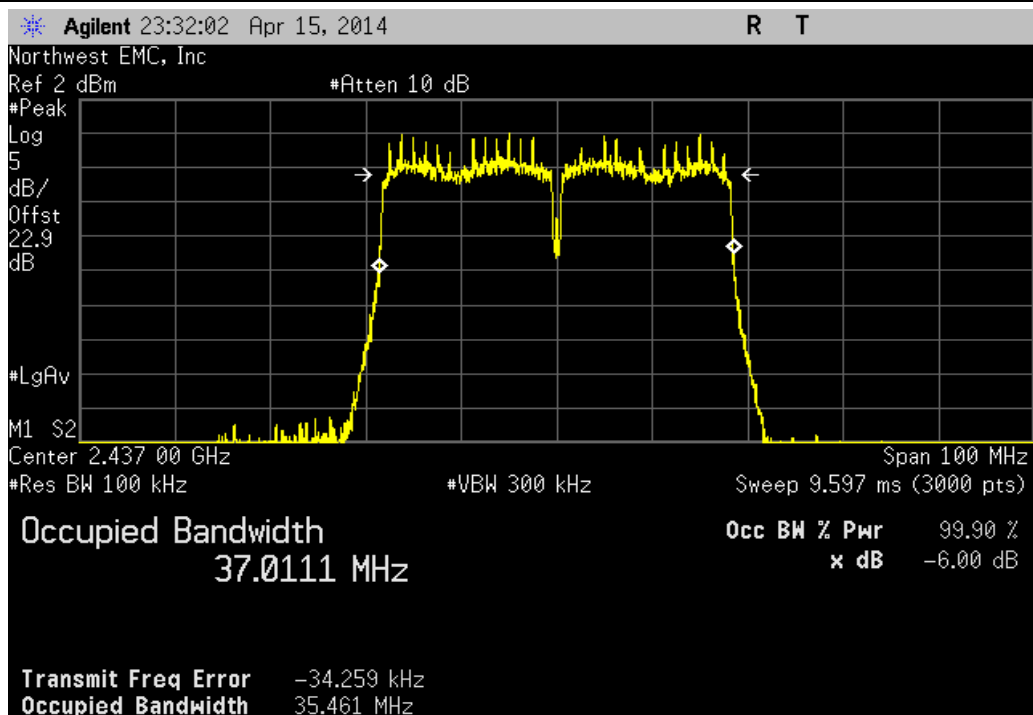
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 1/5 Low Channel, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.341 MHz | > 500 kHz | Pass   |



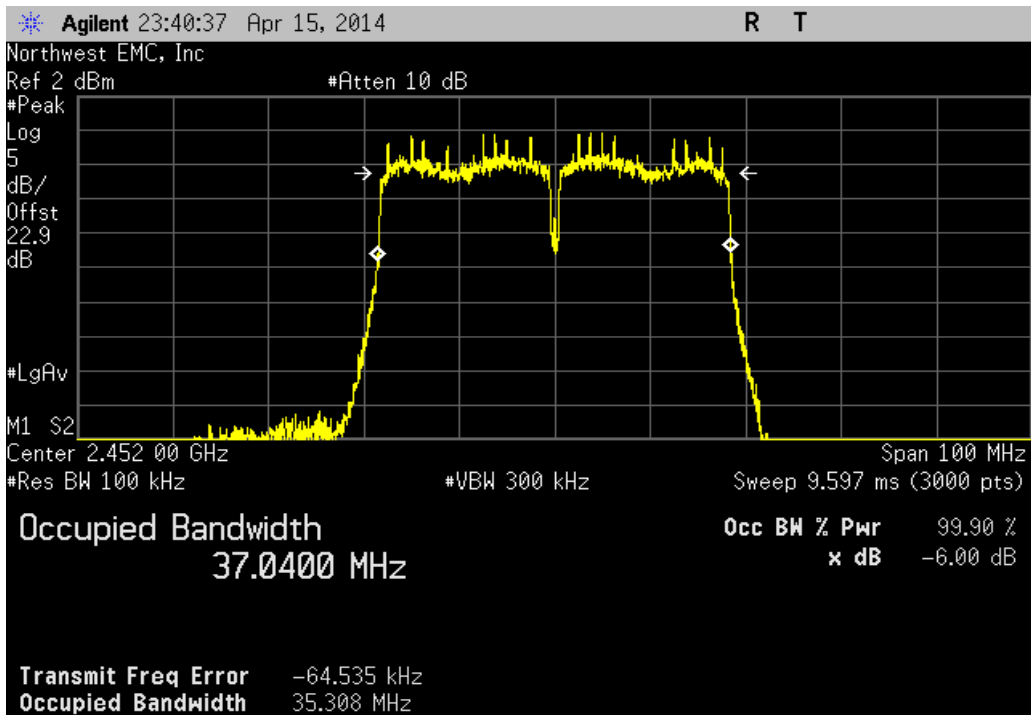
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 4/8 Mid Channel, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.461 MHz | > 500 kHz | Pass   |



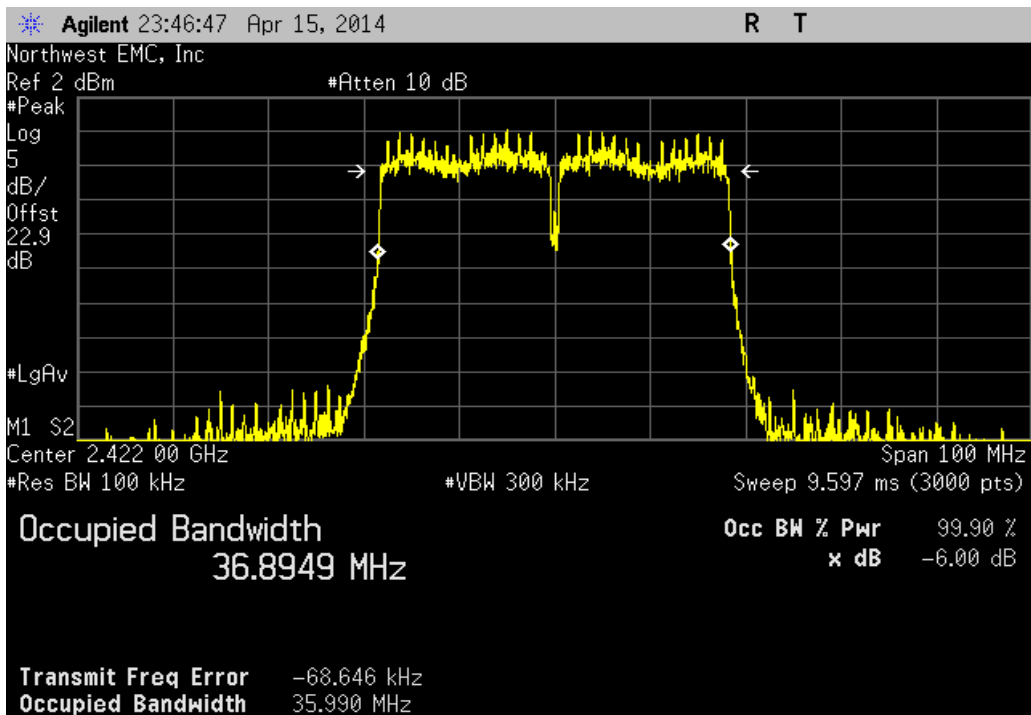
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 7/11 High Channel, 2452 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.308 MHz | > 500 kHz | Pass   |



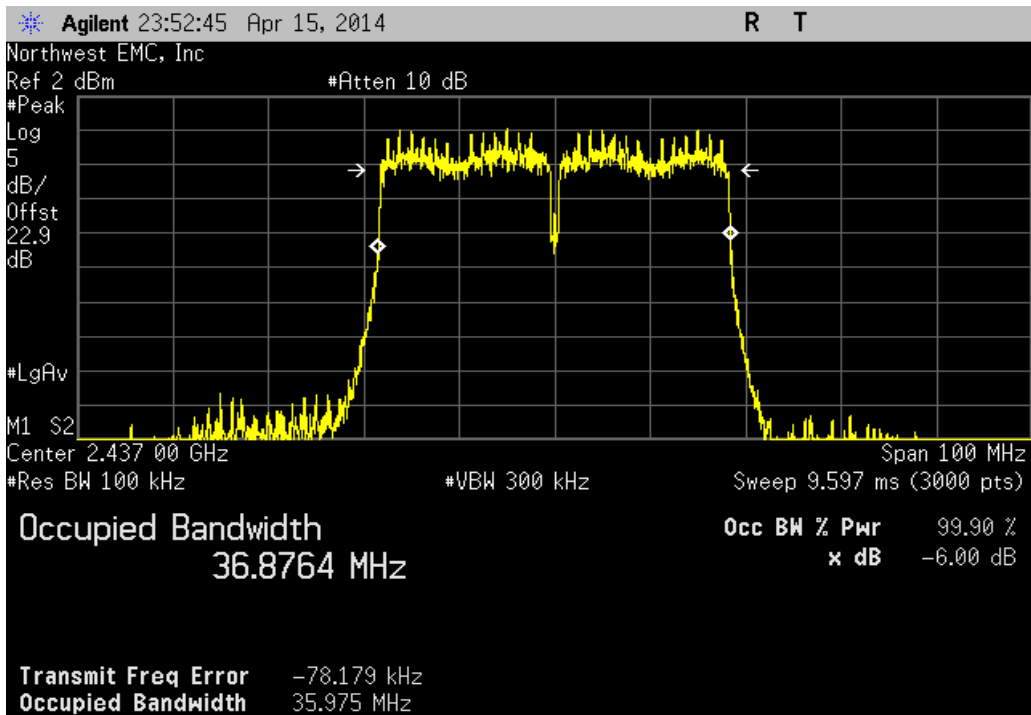
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 1/5 Low Channel, 2422 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 35.99 MHz | > 500 kHz | Pass   |



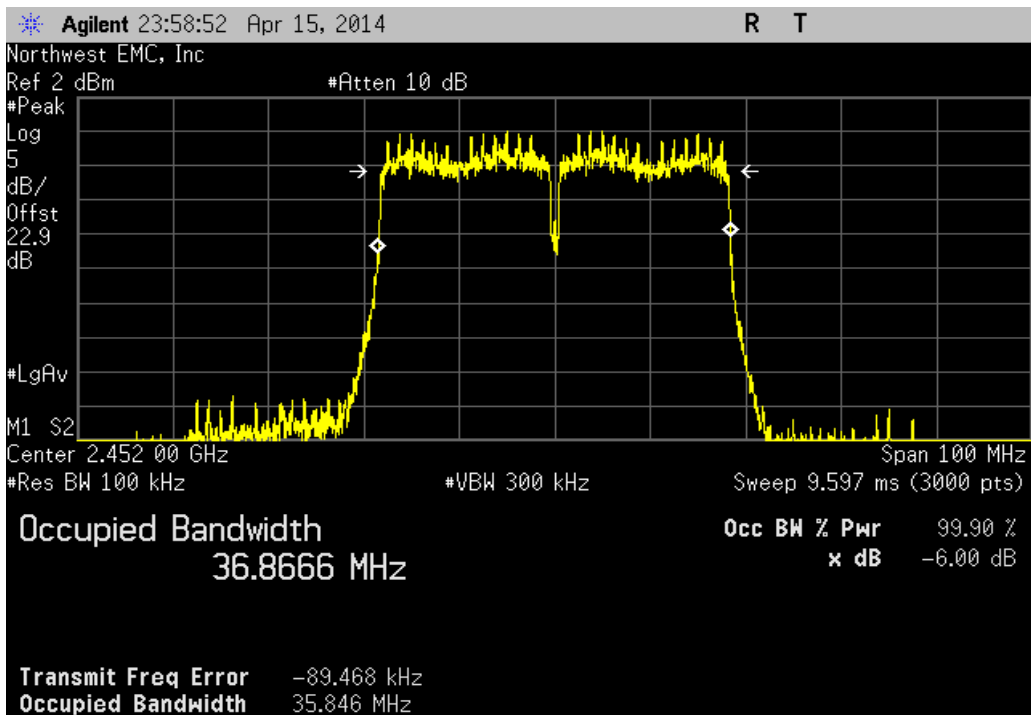
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 4/8 Mid Channel, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.975 MHz | > 500 kHz | Pass   |



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 7/11 High Channel, 2452 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.846 MHz | > 500 kHz | Pass   |



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| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.



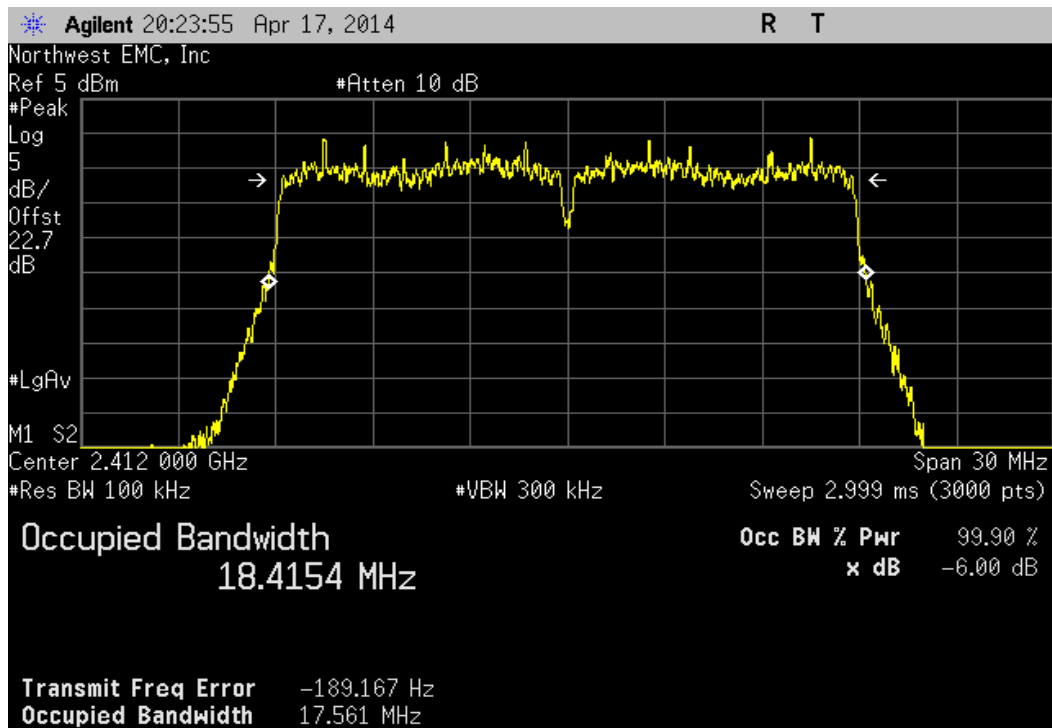
# OCCUPIED BANDWIDTH

XMIT 2013.08.15  
PsaTx 2013.10.23

|                                                                                                        |   |                                                                                   |           |
|--------------------------------------------------------------------------------------------------------|---|-----------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                              |           |
| Serial Number: 006840341053                                                                            |   | Date: 04/18/14                                                                    |           |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                               |           |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                     |           |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                            |           |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                |           |
|                                                                                                        |   | Job Site: EV06                                                                    |           |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                       |           |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                  |           |
| COMMENTS                                                                                               |   |                                                                                   |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                   |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                   |           |
| None                                                                                                   |   |                                                                                   |           |
| Configuration #                                                                                        | 6 |  |           |
|                                                                                                        |   | Value                                                                             | Limit     |
| Chain A                                                                                                |   |                                                                                   | Result    |
| 20 MHz                                                                                                 |   |                                                                                   |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                   |           |
| 802.11(n) MCS8                                                                                         |   |                                                                                   |           |
| Low Channel 1, 2412 MHz                                                                                |   | 17.561 MHz                                                                        | > 500 kHz |
| Mid Channel 6, 2437 MHz                                                                                |   | 17.553 MHz                                                                        | > 500 kHz |
| High Channel 11, 2462 MHz                                                                              |   | 17.461 MHz                                                                        | > 500 kHz |
| 802.11(n) MCS15                                                                                        |   |                                                                                   |           |
| Low Channel 1, 2412 MHz                                                                                |   | 17.564 MHz                                                                        | > 500 kHz |
| Mid Channel 6, 2437 MHz                                                                                |   | 17.546 MHz                                                                        | > 500 kHz |
| High Channel 11, 2462 MHz                                                                              |   | 17.611 MHz                                                                        | > 500 kHz |
| Chain B                                                                                                |   |                                                                                   |           |
| 20 MHz                                                                                                 |   |                                                                                   |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                   |           |
| 802.11(n) MCS8                                                                                         |   |                                                                                   |           |
| Low Channel 1, 2412 MHz                                                                                |   | 17.552 MHz                                                                        | > 500 kHz |
| Mid Channel 6, 2437 MHz                                                                                |   | 17.558 MHz                                                                        | > 500 kHz |
| High Channel 11, 2462 MHz                                                                              |   | 17.538 MHz                                                                        | > 500 kHz |
| 802.11(n) MCS15                                                                                        |   |                                                                                   |           |
| Low Channel 1, 2412 MHz                                                                                |   | 17.618 MHz                                                                        | > 500 kHz |
| Mid Channel 6, 2437 MHz                                                                                |   | 17.633 MHz                                                                        | > 500 kHz |
| High Channel 11, 2462 MHz                                                                              |   | 17.646 MHz                                                                        | > 500 kHz |

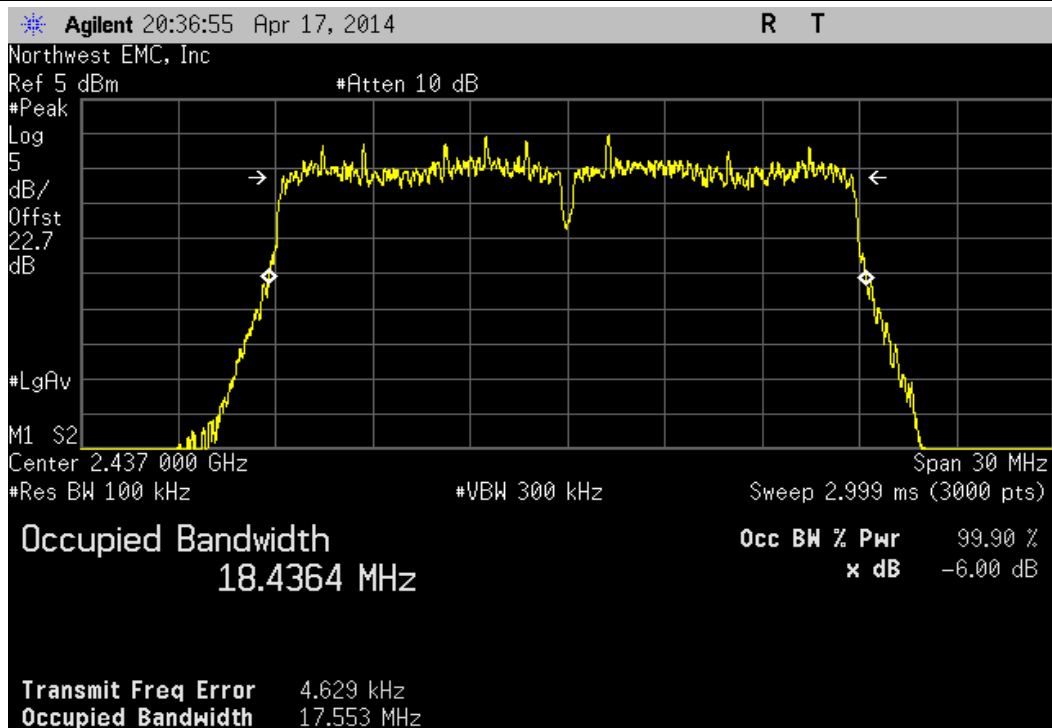
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.561 MHz | > 500 kHz | Pass   |



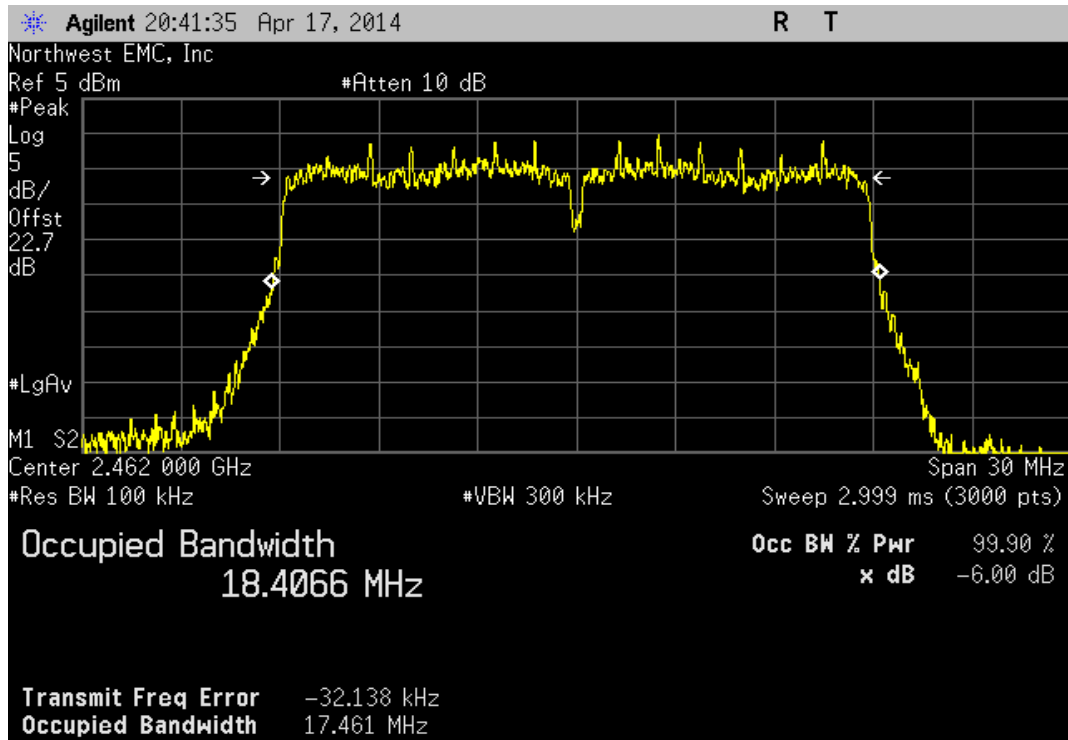
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.553 MHz | > 500 kHz | Pass   |



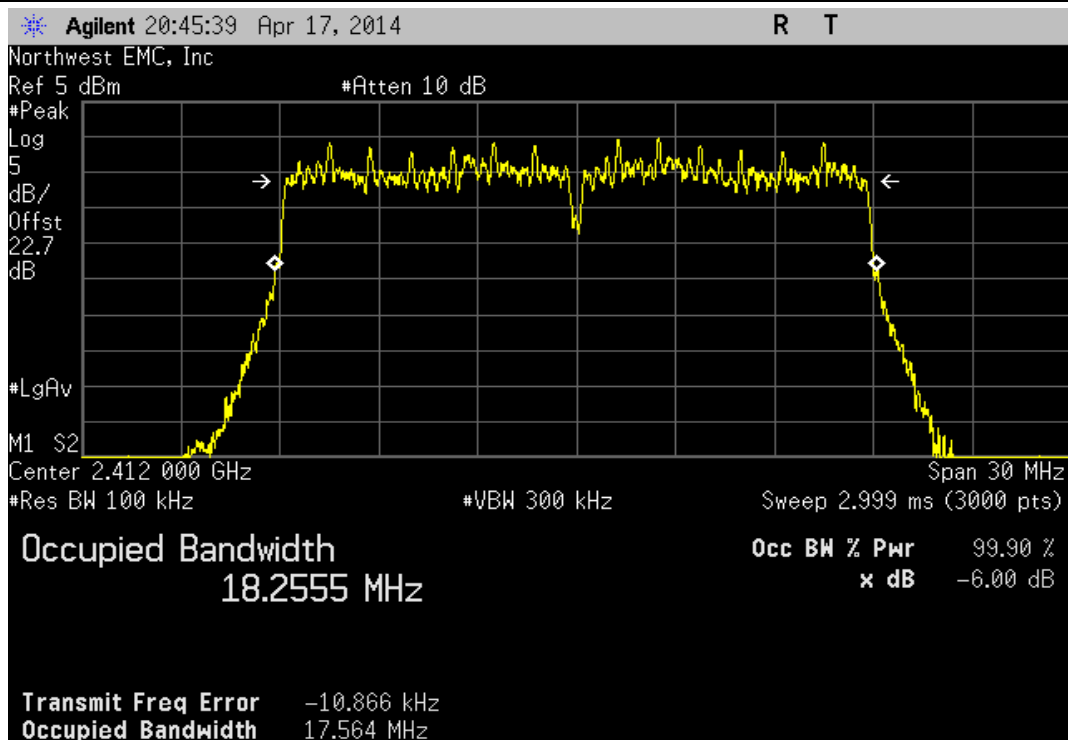
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.461 MHz | > 500 kHz | Pass   |



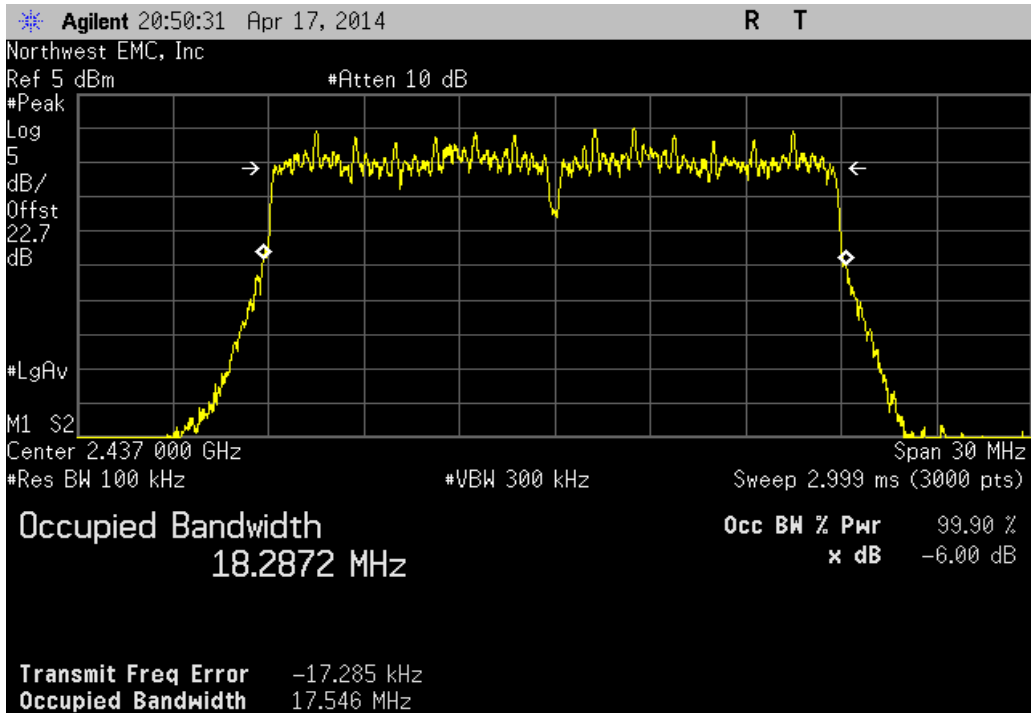
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.564 MHz | > 500 kHz | Pass   |



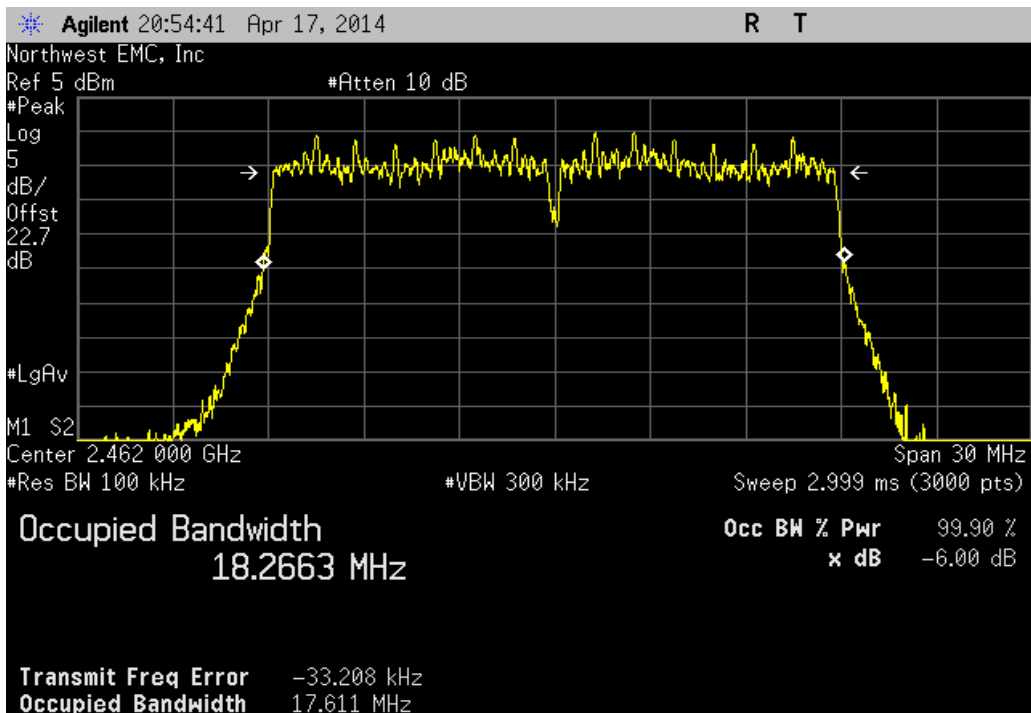
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Mid Channel 6, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.546 MHz | > 500 kHz | Pass   |



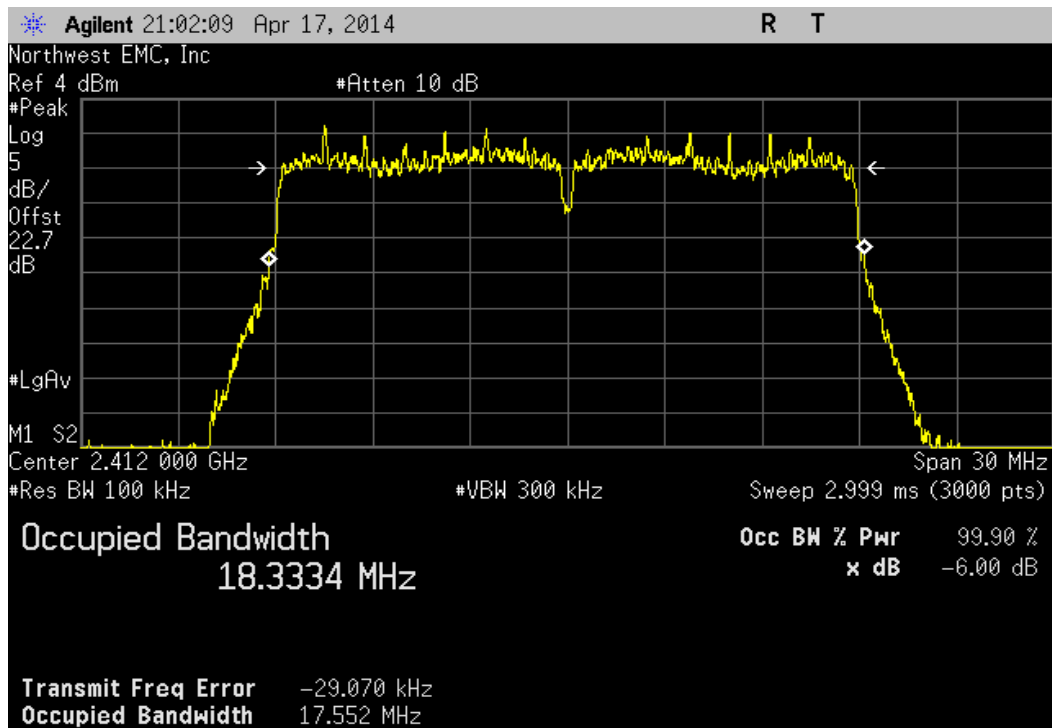
Chain A, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, High Channel 11, 2462 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.611 MHz | > 500 kHz | Pass   |



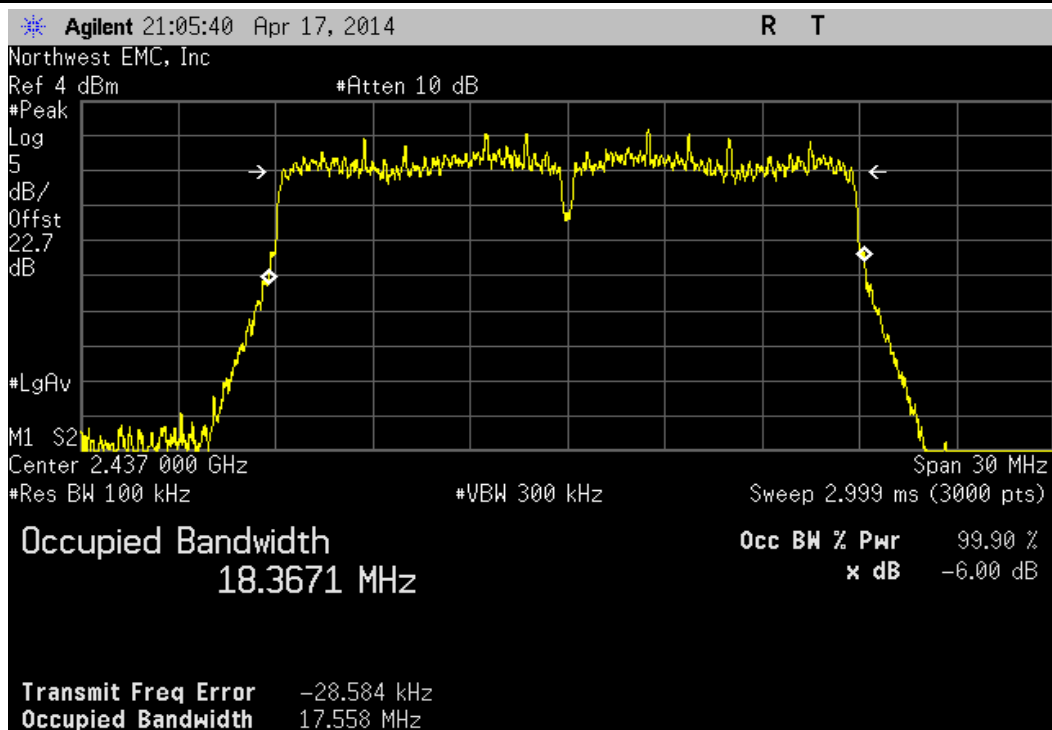
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.552 MHz | > 500 kHz | Pass   |



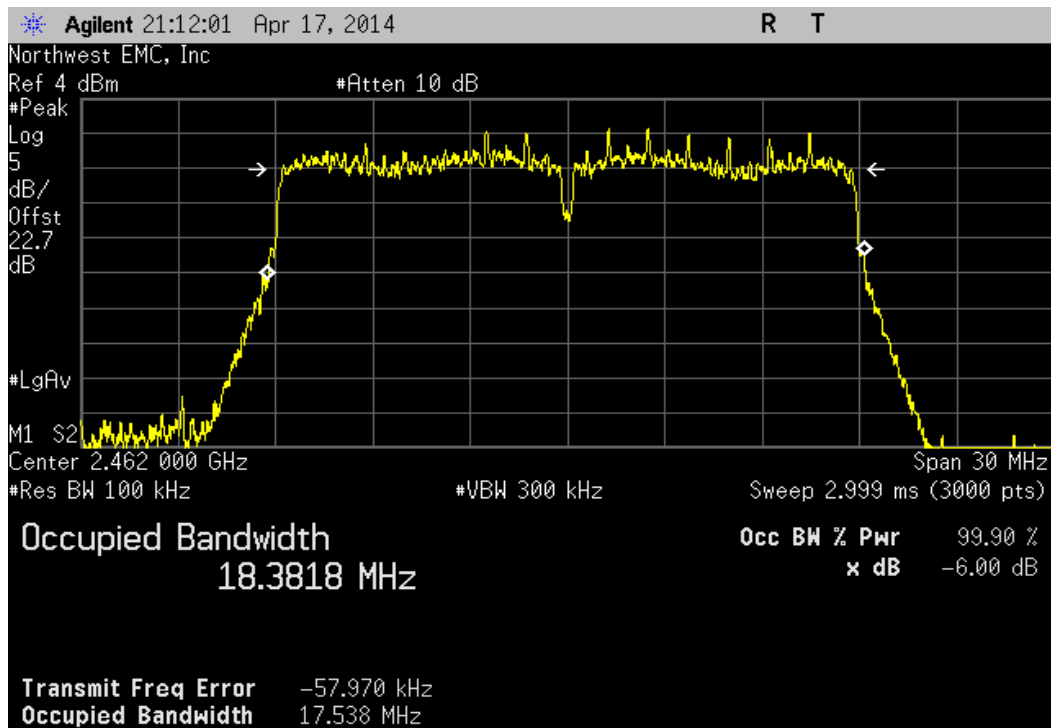
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.558 MHz | > 500 kHz | Pass   |



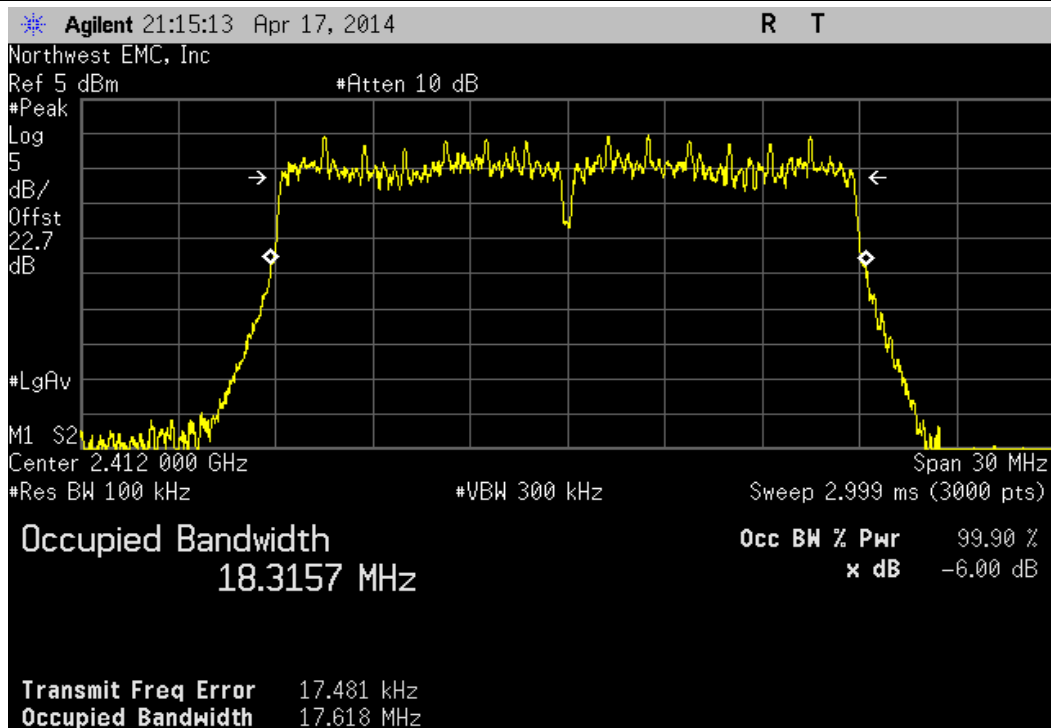
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.538 MHz | > 500 kHz | Pass   |



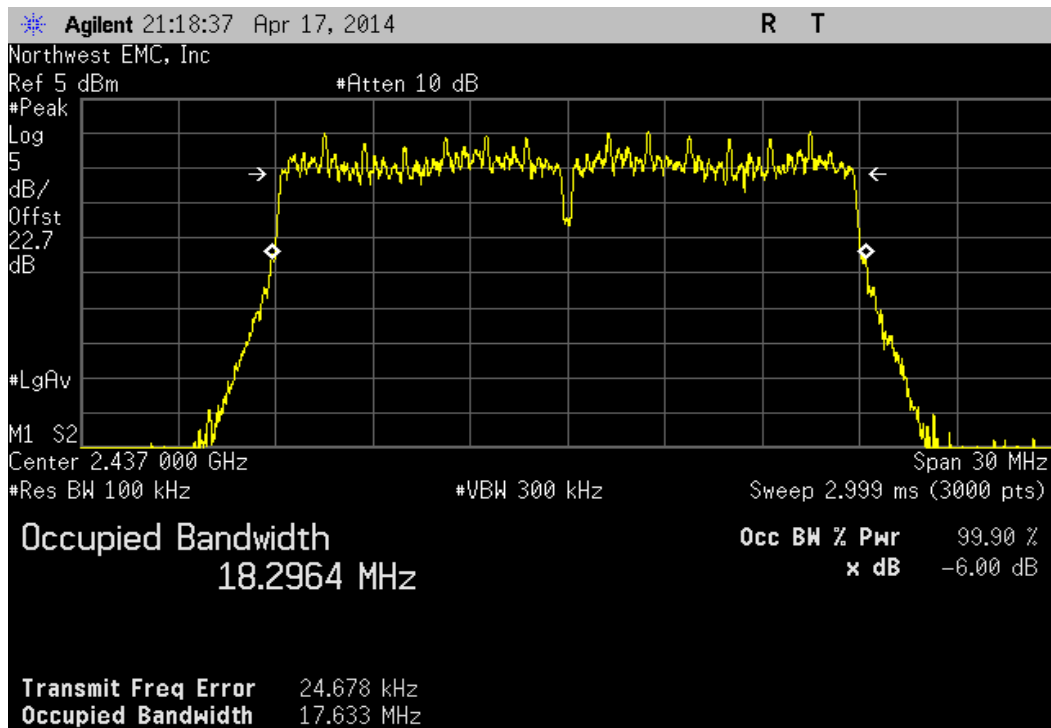
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.618 MHz | > 500 kHz | Pass   |



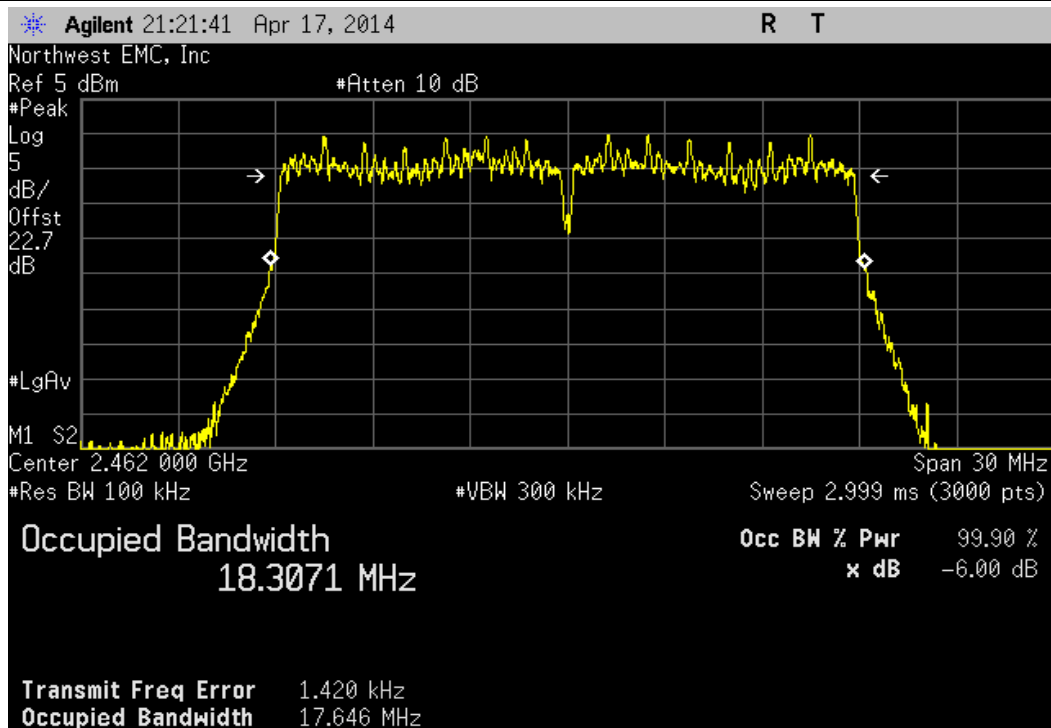
Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.633 MHz | > 500 kHz | Pass   |



Chain B, 20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.646 MHz | > 500 kHz | Pass   |



## Occupied Bandwidth

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal. | Interval (mo.) |
|---------------------------------|------------------|----------|-----|-----------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013 | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013 | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR       | 0              |
| Power Meter                     | Agilent          | N1913A   | SQR | 4/29/2013 | 36             |
| Power Sensor                    | Agilent          | E9300H   | SQO | 4/29/2013 | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014  | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014 | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014 | 24             |

### TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.



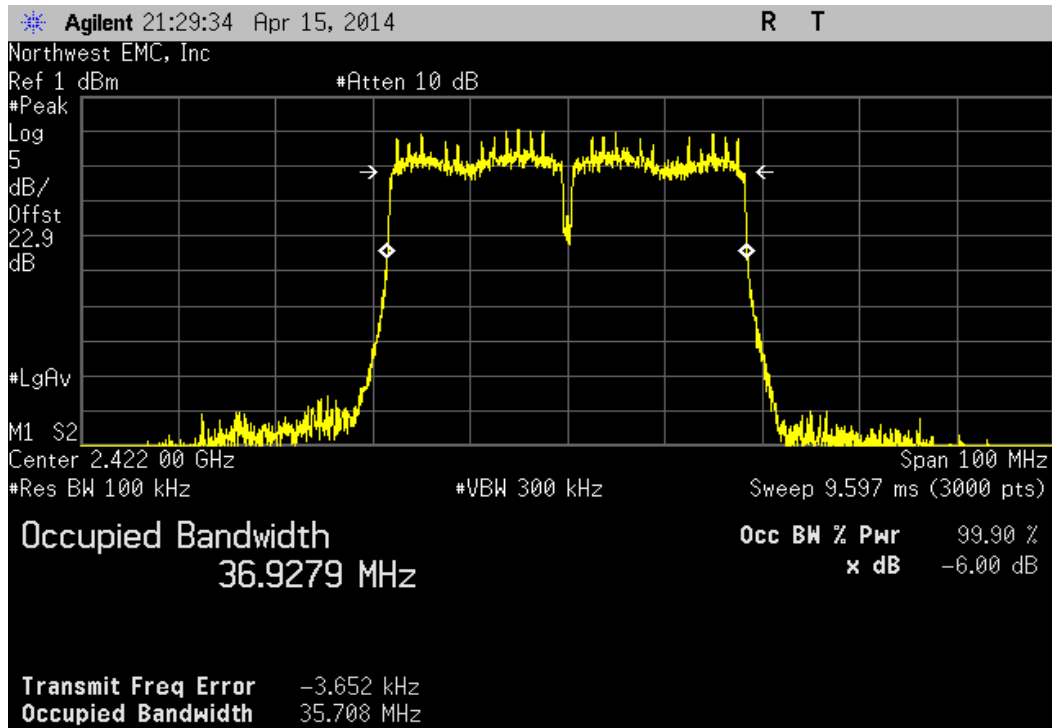
# Occupied Bandwidth

XMIT 2013.08.15  
PsaTx 2014.04.01

|                                                                                                        |   |                                                                                             |           |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |           |
| Serial Number: 006840341053                                                                            |   | Date: 04/16/14                                                                              |           |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |           |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |           |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |           |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          |           |
|                                                                                                        |   | Job Site: EV06                                                                              |           |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |           |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |           |
| COMMENTS                                                                                               |   |                                                                                             |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |           |
| None                                                                                                   |   |                                                                                             |           |
| Configuration #                                                                                        | 6 | Signature  |           |
|                                                                                                        |   | Value                                                                                       | Limit     |
| Chain A                                                                                                |   | Result                                                                                      |           |
| 40 MHz                                                                                                 |   |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                             |           |
| 802.11(n) MCS8                                                                                         |   |                                                                                             |           |
| Low Channel 1/5, 2422 MHz                                                                              |   | 35.708 MHz                                                                                  | > 500 kHz |
| Mid Channel 4/8, 2437 MHz                                                                              |   | 35.778 MHz                                                                                  | > 500 kHz |
| High Channel 7/11, 2452 MHz                                                                            |   | 35.516 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS15                                                                                        |   |                                                                                             |           |
| Low Channel 1/5, 2422 MHz                                                                              |   | 36.248 MHz                                                                                  | > 500 kHz |
| Mid Channel 4/8, 2437 MHz                                                                              |   | 36.297 MHz                                                                                  | > 500 kHz |
| High Channel 7/11, 2452 MHz                                                                            |   | 36.255 MHz                                                                                  | > 500 kHz |
| Chain B                                                                                                |   |                                                                                             |           |
| 40 MHz                                                                                                 |   |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                             |           |
| 802.11(n) MCS8                                                                                         |   |                                                                                             |           |
| Low Channel 1/5, 2422 MHz                                                                              |   | 35.317 MHz                                                                                  | > 500 kHz |
| Mid Channel 4/8, 2437 MHz                                                                              |   | 35.632 MHz                                                                                  | > 500 kHz |
| High Channel 7/11, 2452 MHz                                                                            |   | 35.345 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS15                                                                                        |   |                                                                                             |           |
| Low Channel 1/5, 2422 MHz                                                                              |   | 36.306 MHz                                                                                  | > 500 kHz |
| Mid Channel 4/8, 2437 MHz                                                                              |   | 35.66 MHz                                                                                   | > 500 kHz |
| High Channel 7/11, 2452 MHz                                                                            |   | 35.982 MHz                                                                                  | > 500 kHz |

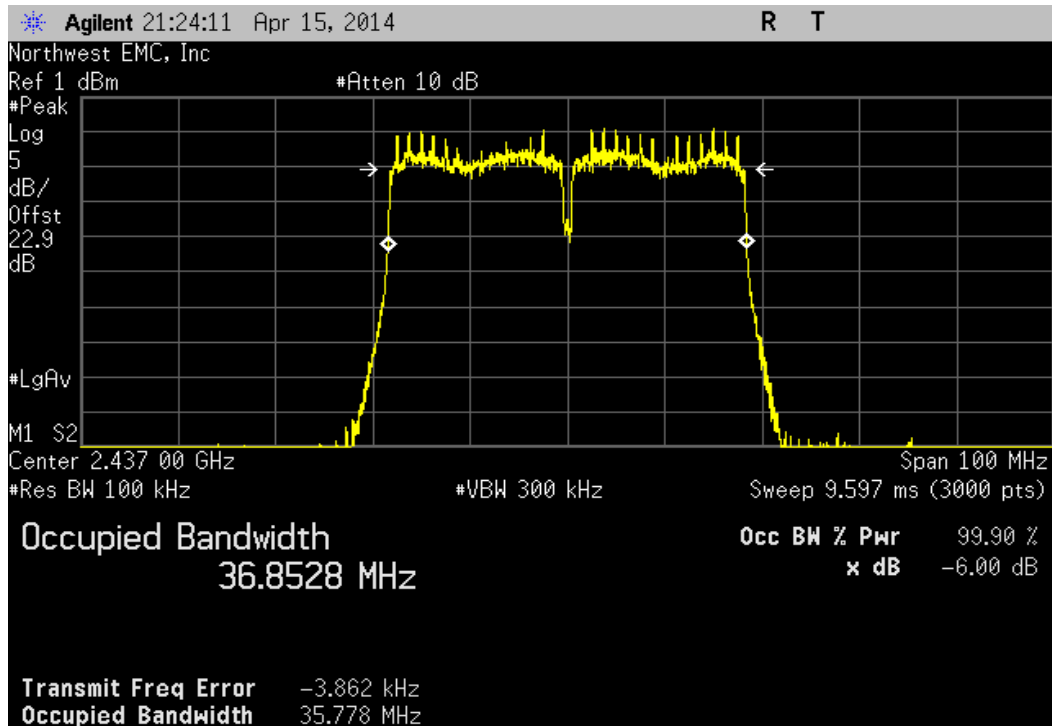
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1/5, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.708 MHz | > 500 kHz | Pass   |



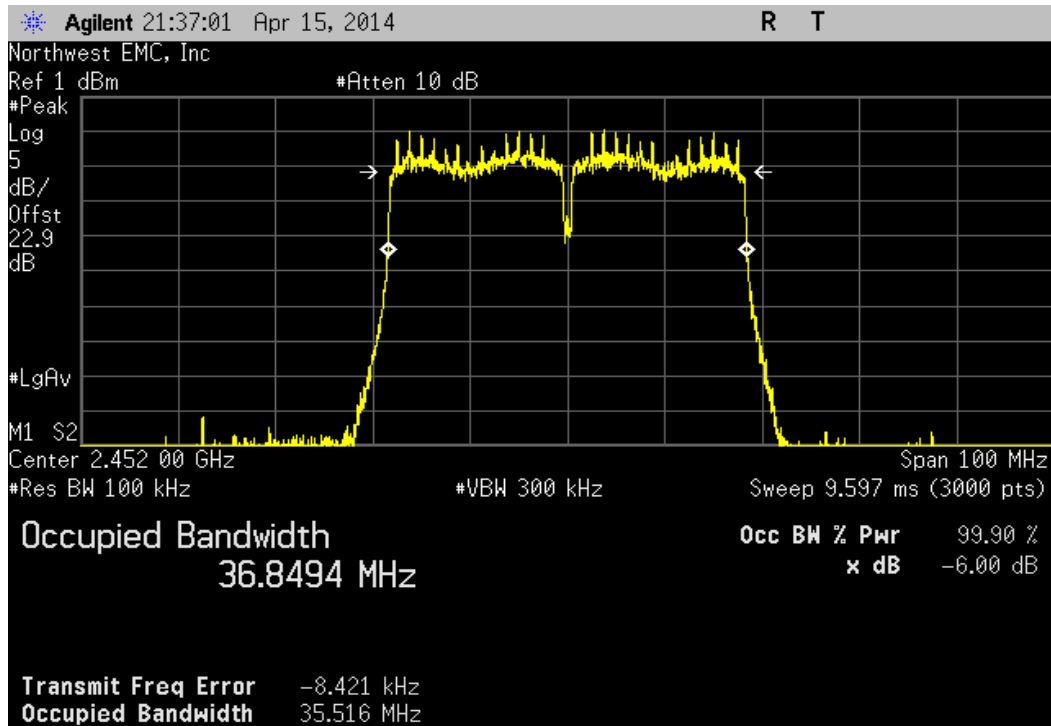
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Mid Channel 4/8, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.778 MHz | > 500 kHz | Pass   |



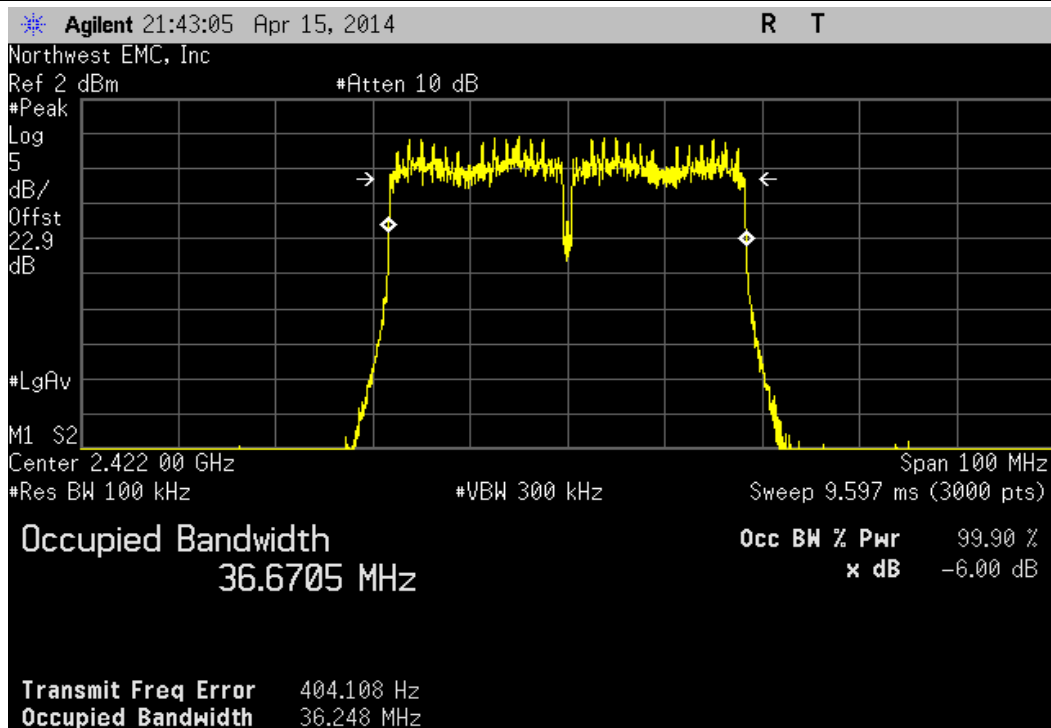
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 7/11, 2452 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.516 MHz | > 500 kHz | Pass   |



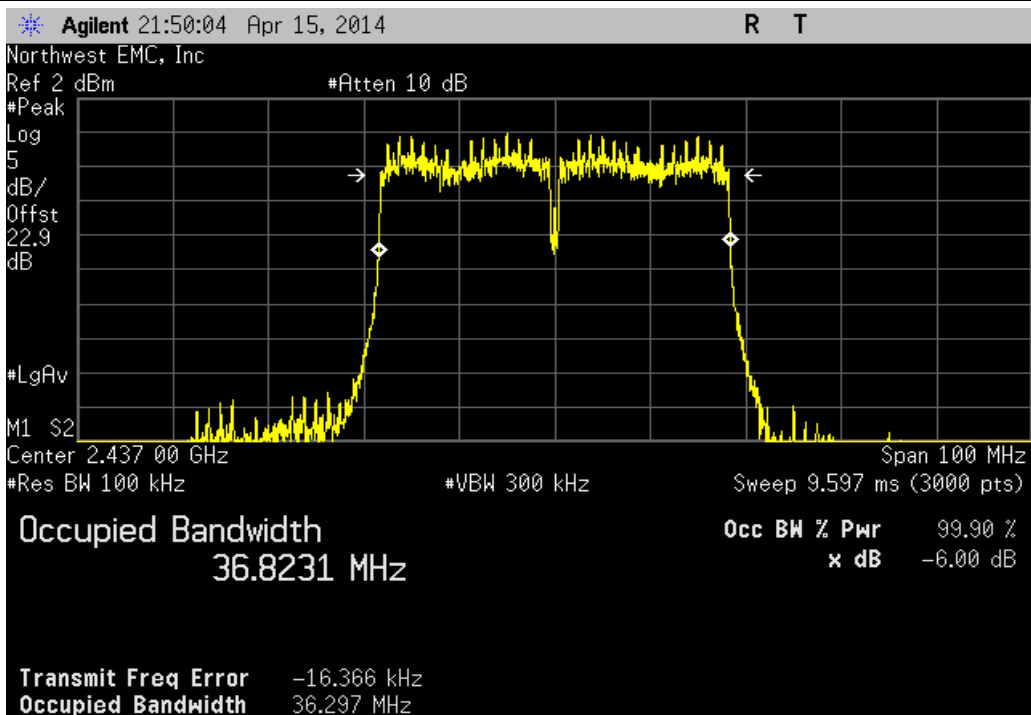
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Low Channel 1/5, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 36.248 MHz | > 500 kHz | Pass   |



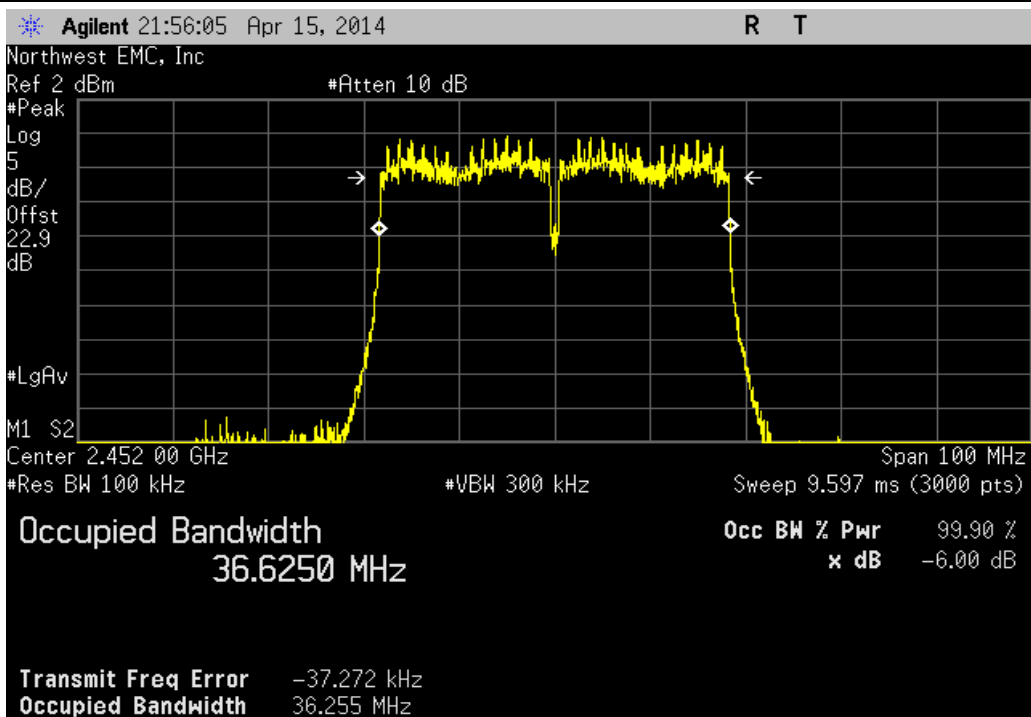
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Mid Channel 4/8, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 36.297 MHz | > 500 kHz | Pass   |



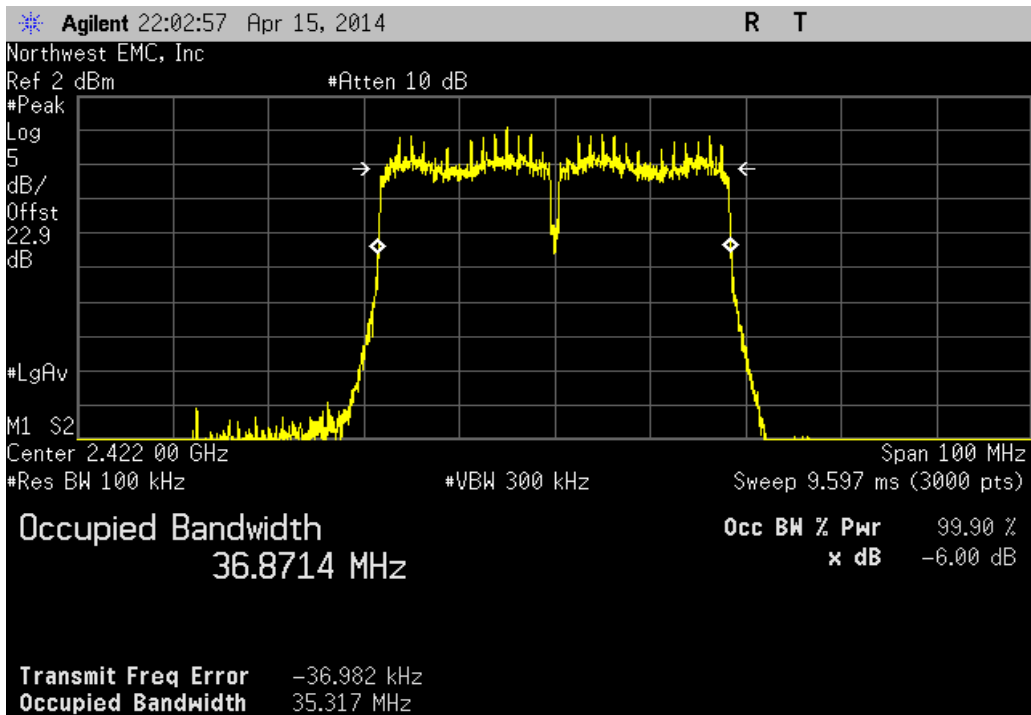
Chain A, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, High Channel 7/11, 2452 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 36.255 MHz | > 500 kHz | Pass   |



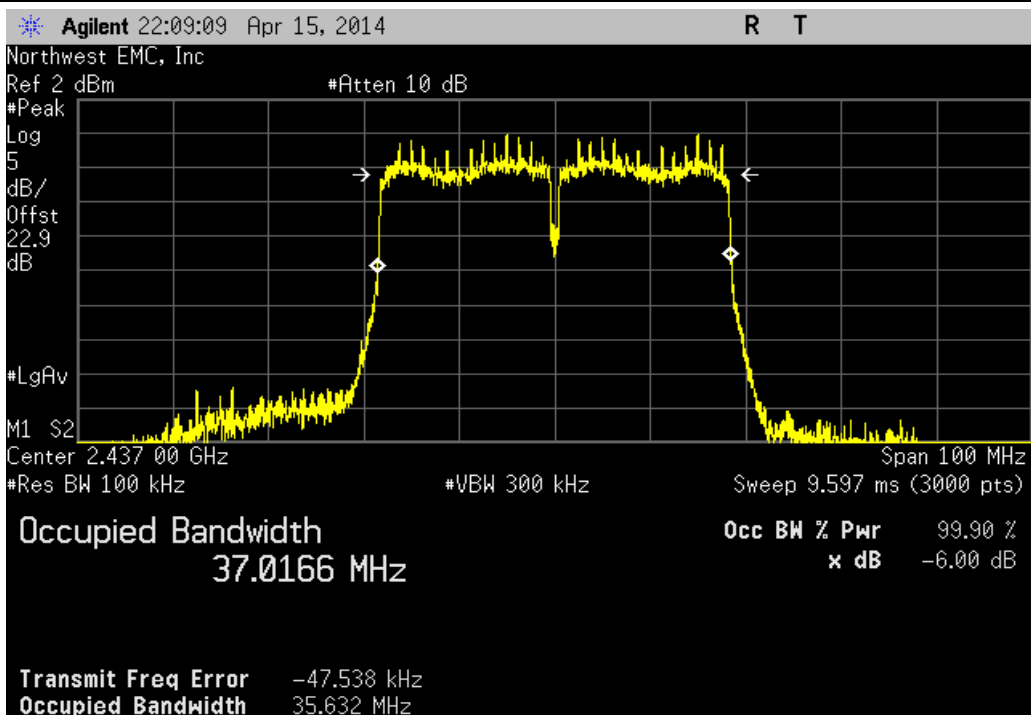
Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Low Channel 1/5, 2422 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.317 MHz | > 500 kHz | Pass   |



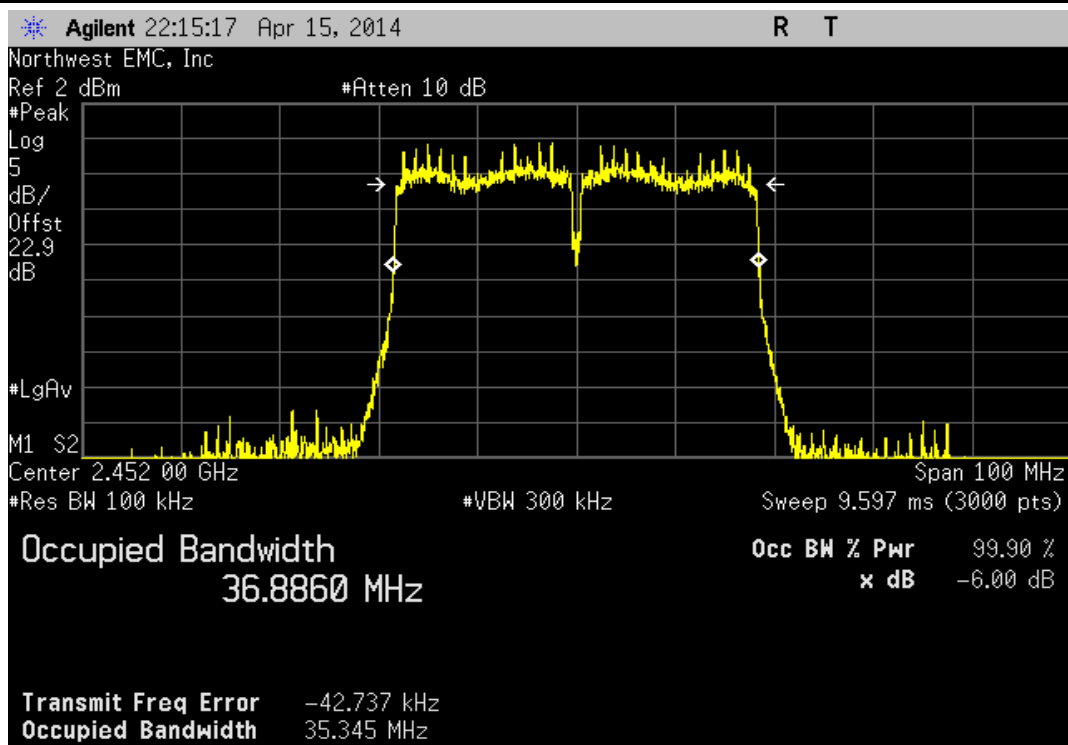
Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, Mid Channel 4/8, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.632 MHz | > 500 kHz | Pass   |



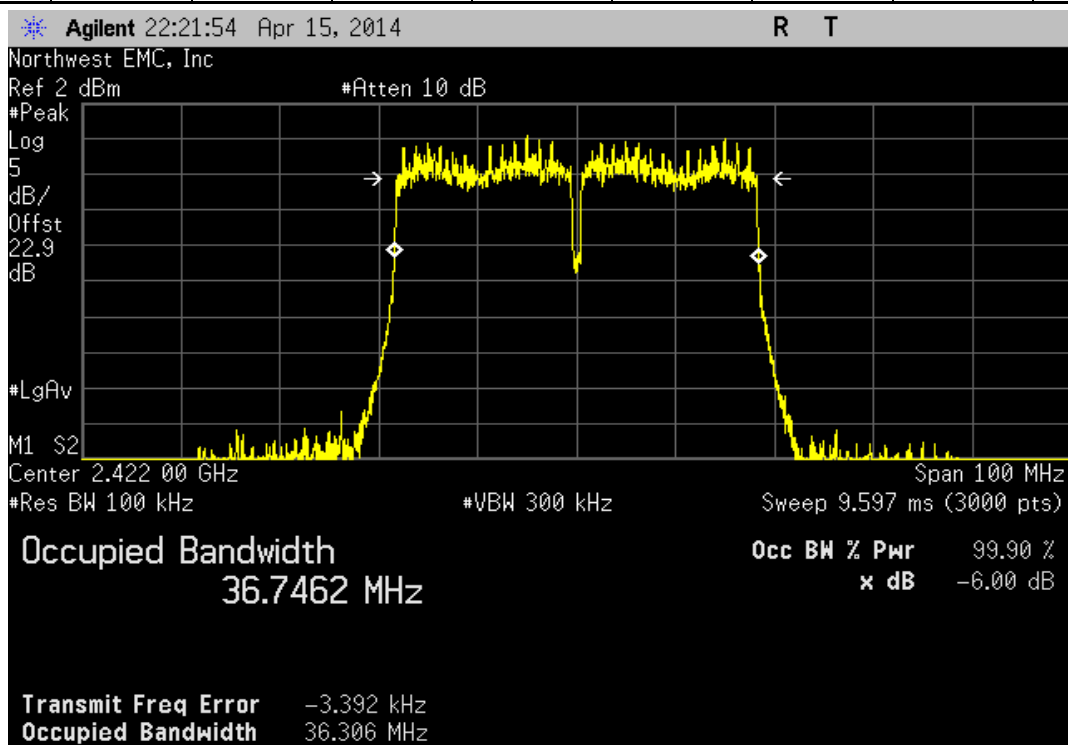
Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS8, High Channel 7/11, 2452 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.345 MHz | > 500 kHz | Pass   |



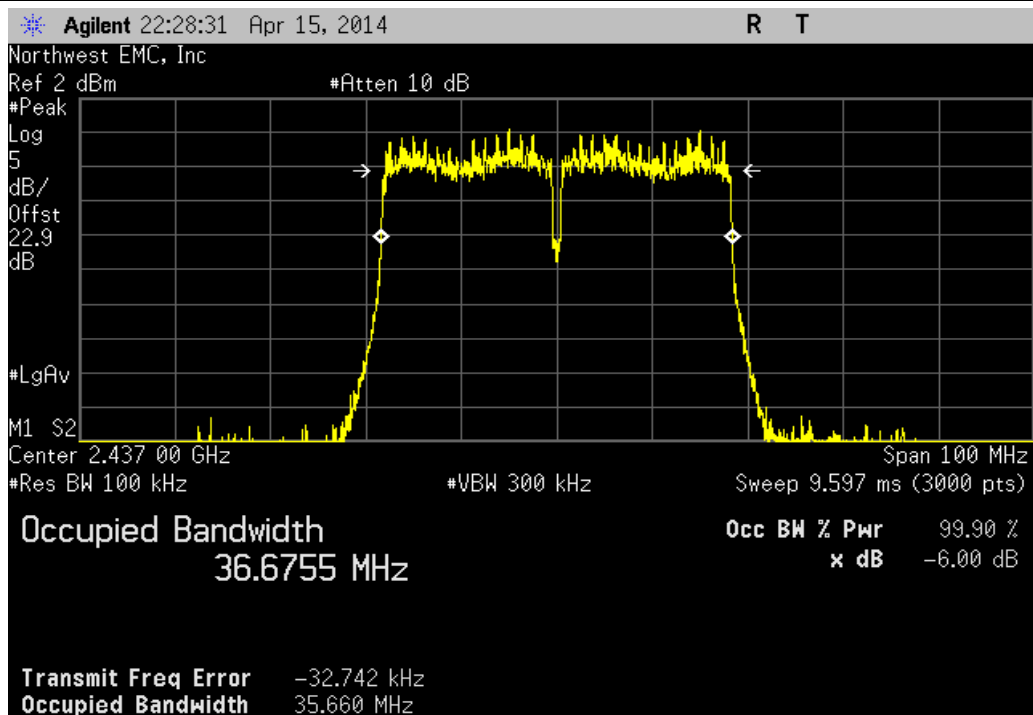
Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Low Channel 1/5, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 36.306 MHz | > 500 kHz | Pass   |



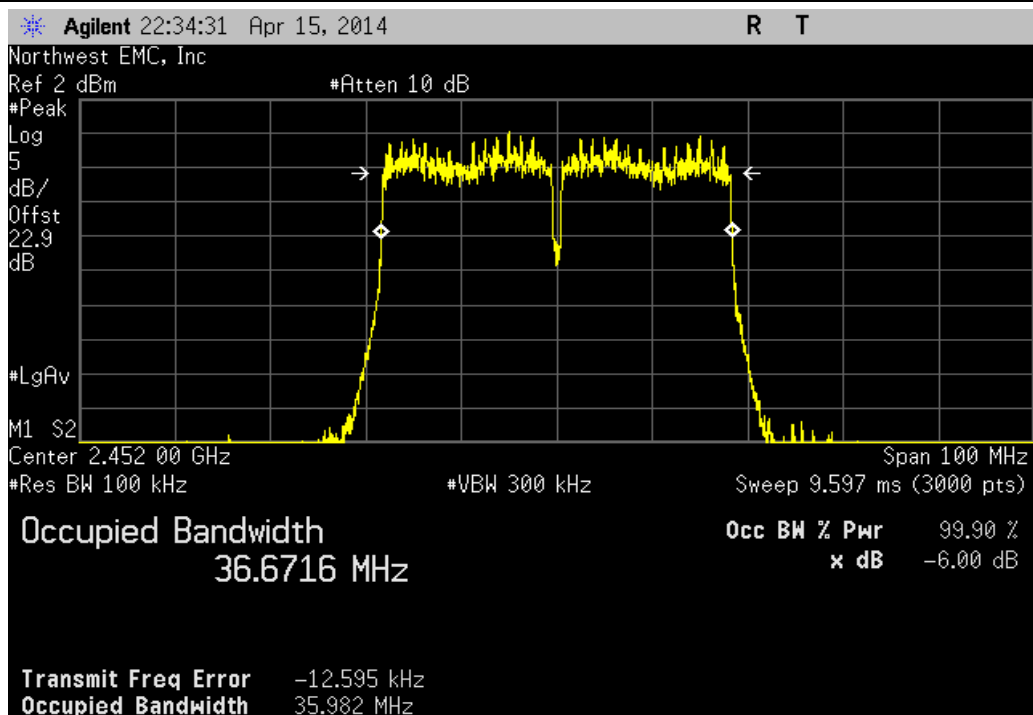
Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, Mid Channel 4/8, 2437 MHz

|  |  |  |  | Value     | Limit     | Result |
|--|--|--|--|-----------|-----------|--------|
|  |  |  |  | 35.66 MHz | > 500 kHz | Pass   |



Chain B, 40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS15, High Channel 7/11, 2452 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.982 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal.  | Interval (mo.) |
|---------------------------------|------------------|----------|-----|------------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.



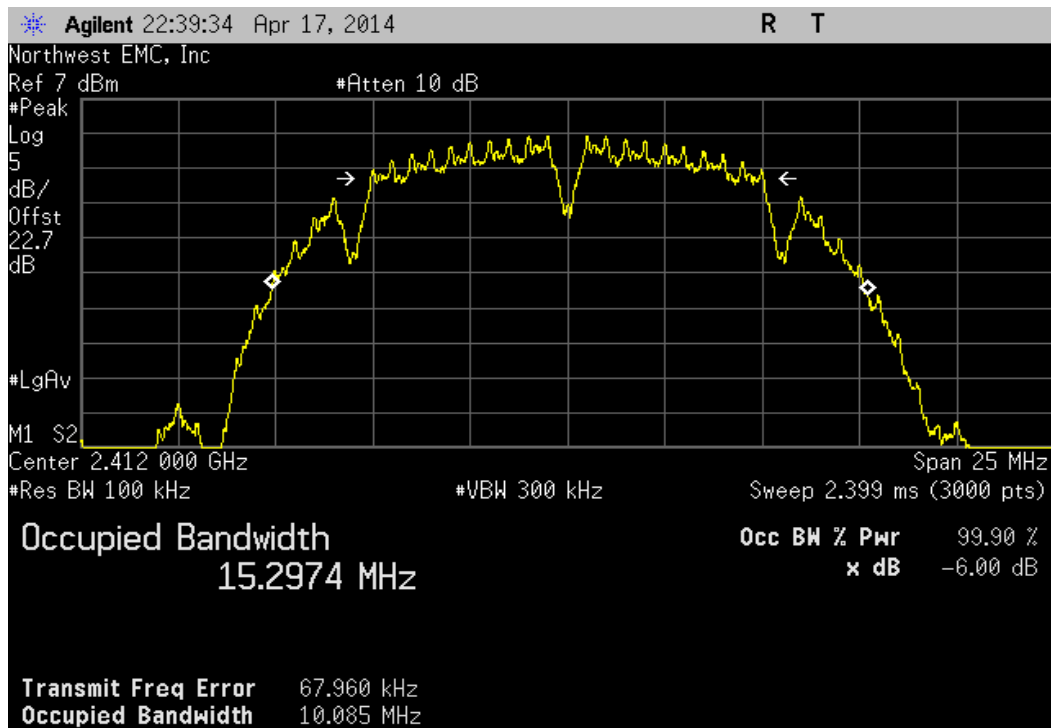
# OCCUPIED BANDWIDTH

XMIT 2013.08.15  
PsaTx 2013.10.23

|                                                                                                        |                           |                                                                                             |           |
|--------------------------------------------------------------------------------------------------------|---------------------------|---------------------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |                           | Work Order: MCSO1698                                                                        |           |
| Serial Number: 006840341053                                                                            |                           | Date: 04/18/14                                                                              |           |
| Customer: Microsoft Corporation                                                                        |                           | Temperature: 22.3°C                                                                         |           |
| Attendees: None                                                                                        |                           | Humidity: 32%                                                                               |           |
| Project: None                                                                                          |                           | Barometric Pres.: 1014                                                                      |           |
| Tested by: Jared Ison                                                                                  |                           | Power: 110VAC/60Hz                                                                          |           |
|                                                                                                        |                           | Job Site: EV06                                                                              |           |
| TEST SPECIFICATIONS                                                                                    |                           | Test Method                                                                                 |           |
| FCC 15.247:2014                                                                                        |                           | ANSI C63.10:2009                                                                            |           |
| COMMENTS                                                                                               |                           |                                                                                             |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |                           |                                                                                             |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |                           |                                                                                             |           |
| None                                                                                                   |                           |                                                                                             |           |
| Configuration #                                                                                        | 6                         | Signature  |           |
|                                                                                                        |                           | Value                                                                                       | Limit     |
| Result                                                                                                 |                           |                                                                                             |           |
| 20 MHz                                                                                                 |                           |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |                           |                                                                                             |           |
| 802.11(b) 1 Mbps                                                                                       |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 10.085 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 10.06 MHz                                                                                   | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 10.079 MHz                                                                                  | > 500 kHz |
| 802.11(b) 11 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 9.538 MHz                                                                                   | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 9.239 MHz                                                                                   | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 9.638 MHz                                                                                   | > 500 kHz |
| 802.11(g) 6 Mbps                                                                                       |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.364 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.376 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.35 MHz                                                                                   | > 500 kHz |
| 802.11(g) 36 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.443 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.449 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.425 MHz                                                                                  | > 500 kHz |
| 802.11(g) 54 Mbps                                                                                      |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 16.447 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 16.445 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 16.458 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS0                                                                                         |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 17.578 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 17.595 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 17.584 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS7                                                                                         |                           |                                                                                             |           |
|                                                                                                        | Low Channel 1, 2412 MHz   | 17.622 MHz                                                                                  | > 500 kHz |
|                                                                                                        | Mid Channel 6, 2437 MHz   | 17.629 MHz                                                                                  | > 500 kHz |
|                                                                                                        | High Channel 11, 2462 MHz | 17.532 MHz                                                                                  | > 500 kHz |

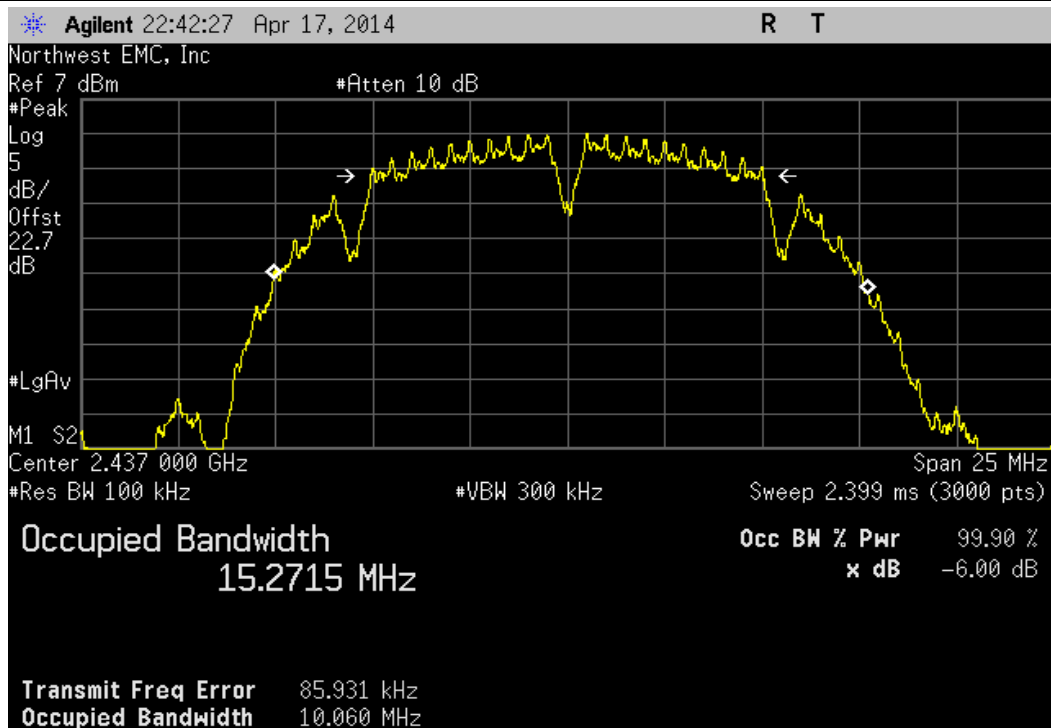
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 10.085 MHz | > 500 kHz | Pass   |



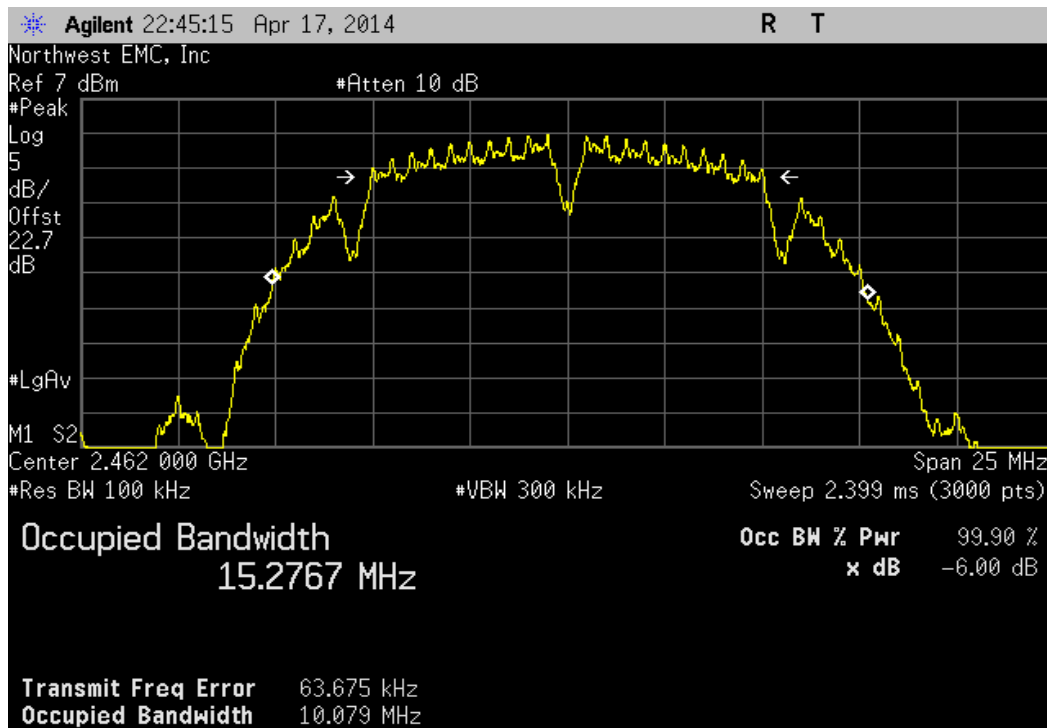
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 10.06 MHz | > 500 kHz | Pass   |



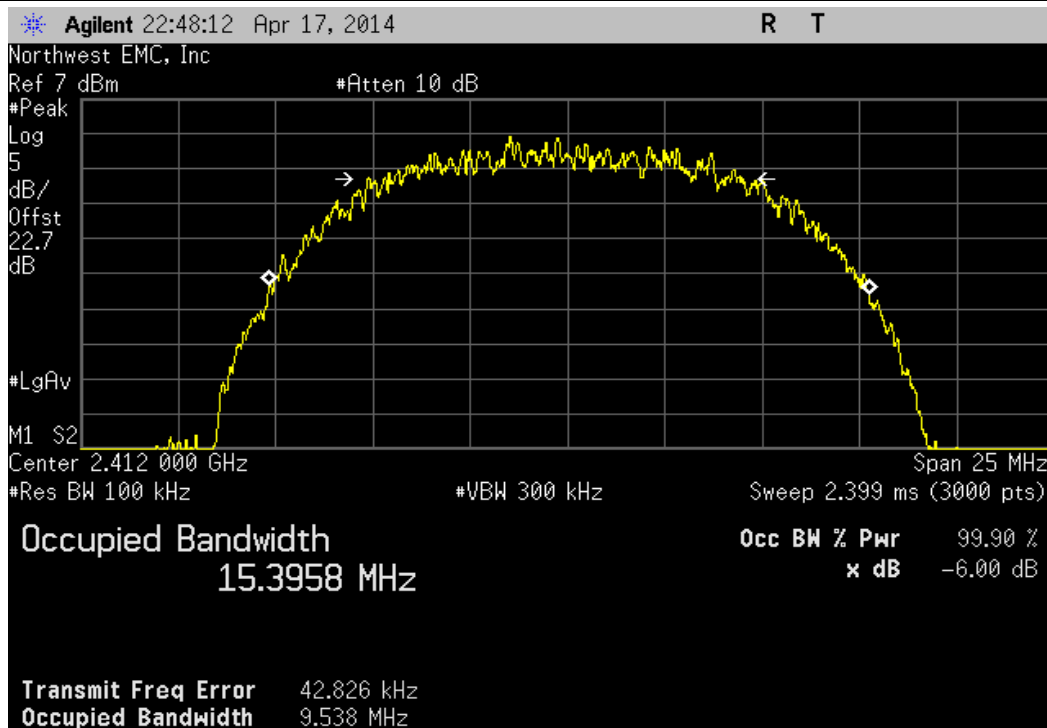
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 10.079 MHz | > 500 kHz | Pass   |



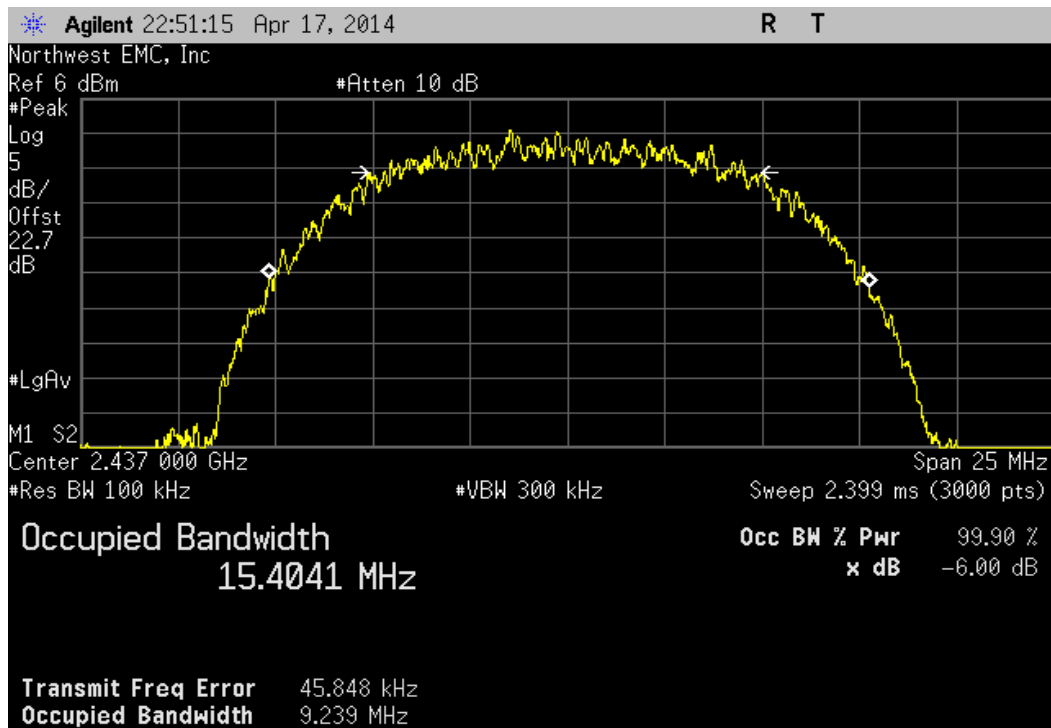
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 9.538 MHz | > 500 kHz | Pass   |



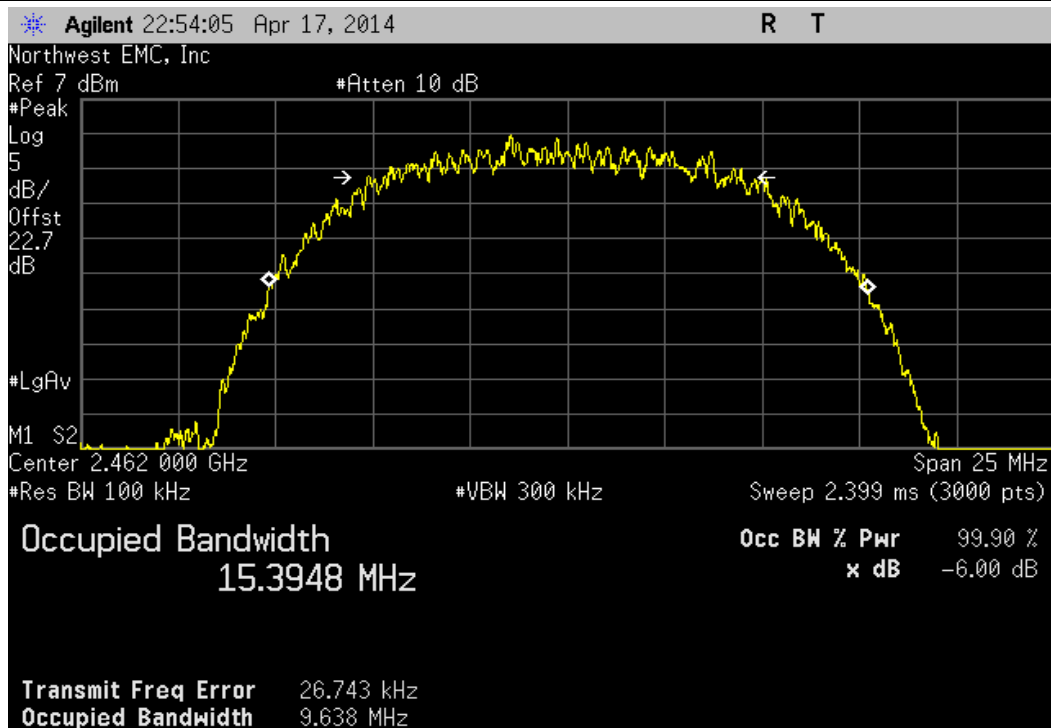
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value     | Limit     | Result |
|--|--|--|--|-----------|-----------|--------|
|  |  |  |  | 9.239 MHz | > 500 kHz | Pass   |



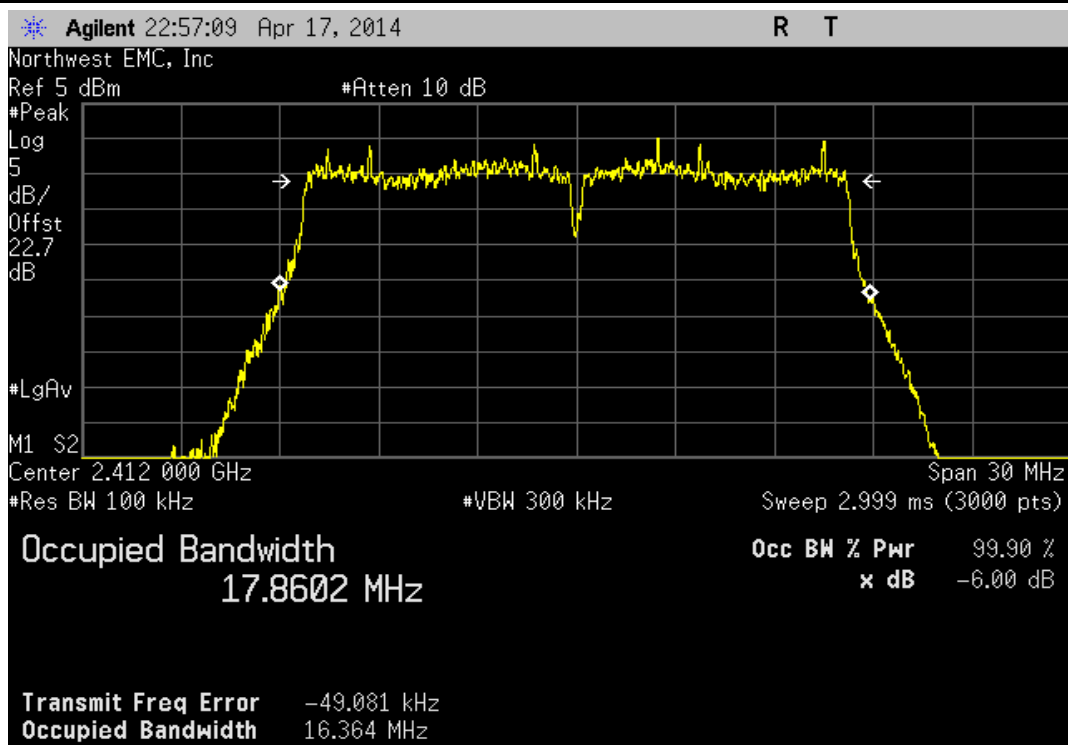
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value     | Limit     | Result |
|--|--|--|--|-----------|-----------|--------|
|  |  |  |  | 9.638 MHz | > 500 kHz | Pass   |



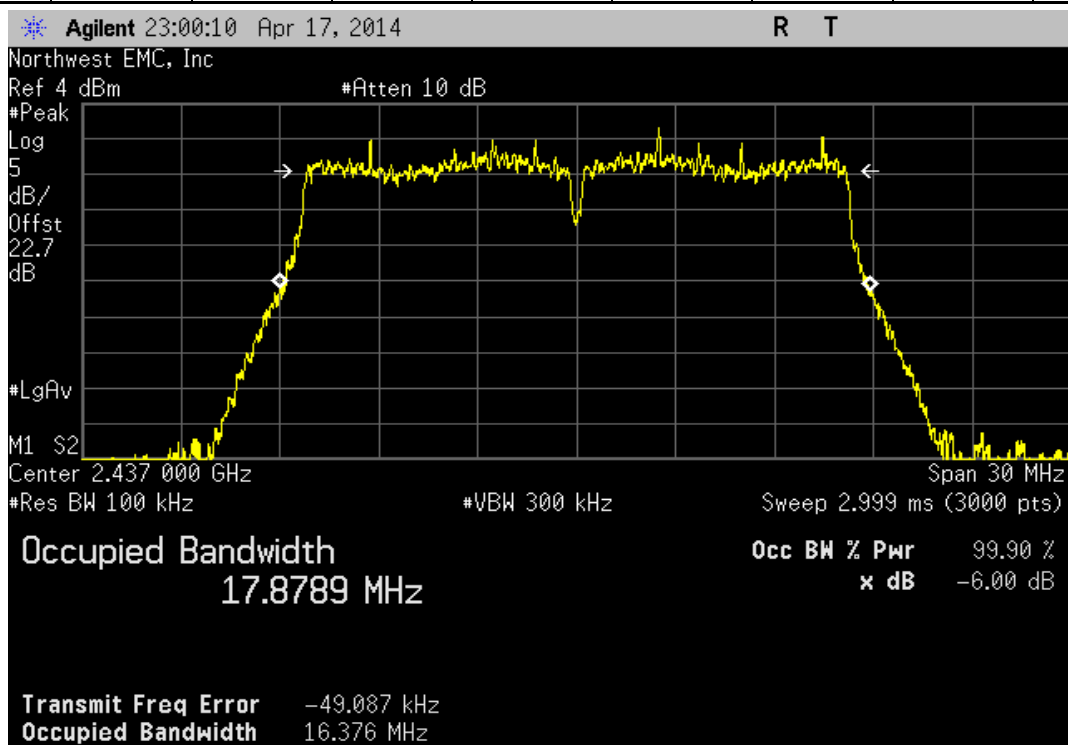
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz

|  | Value      | Limit     | Result |
|--|------------|-----------|--------|
|  | 16.364 MHz | > 500 kHz | Pass   |



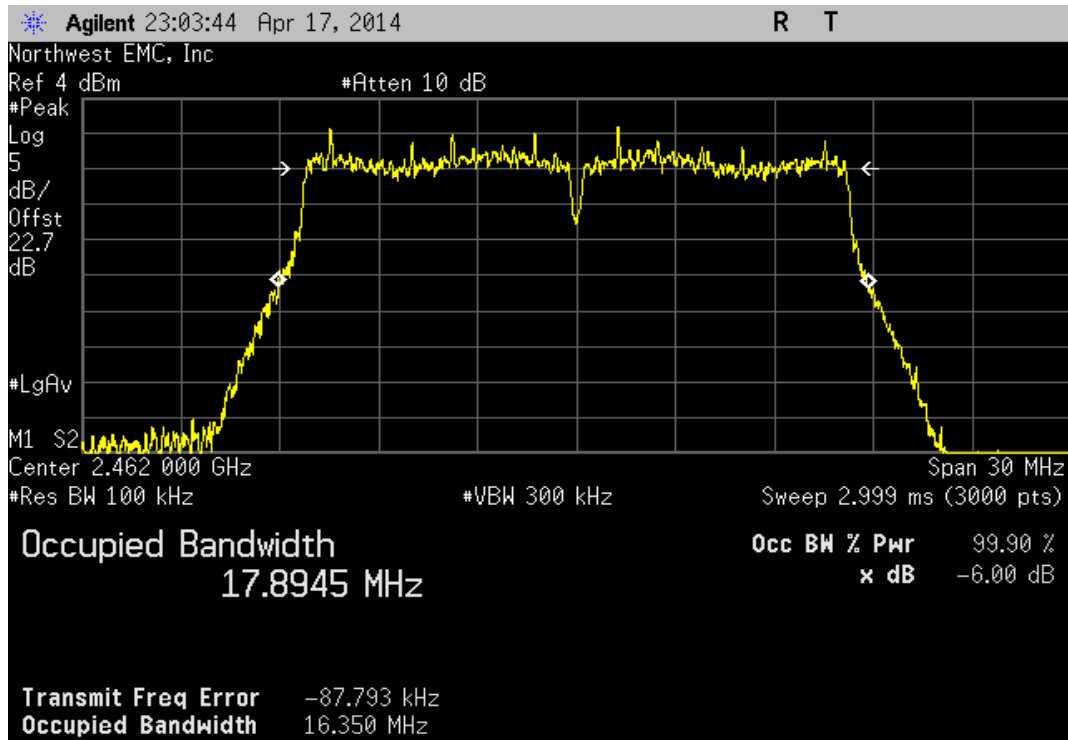
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz

|  | Value      | Limit     | Result |
|--|------------|-----------|--------|
|  | 16.376 MHz | > 500 kHz | Pass   |



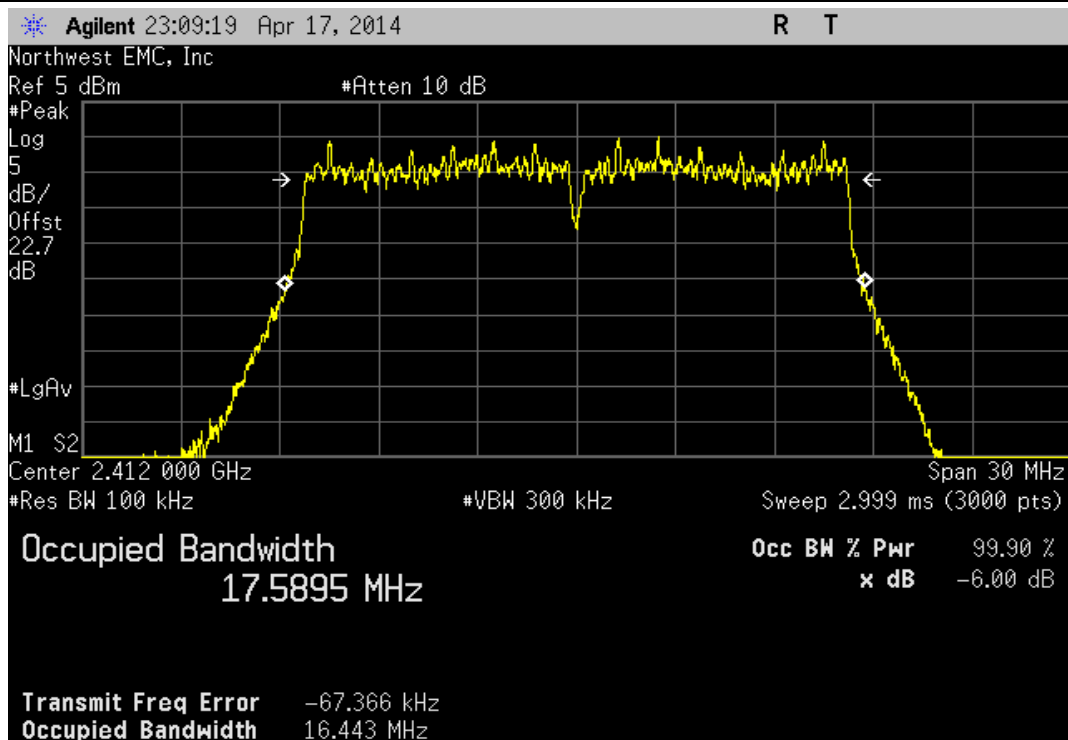
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value     | Limit     | Result |
|--|--|--|--|-----------|-----------|--------|
|  |  |  |  | 16.35 MHz | > 500 kHz | Pass   |



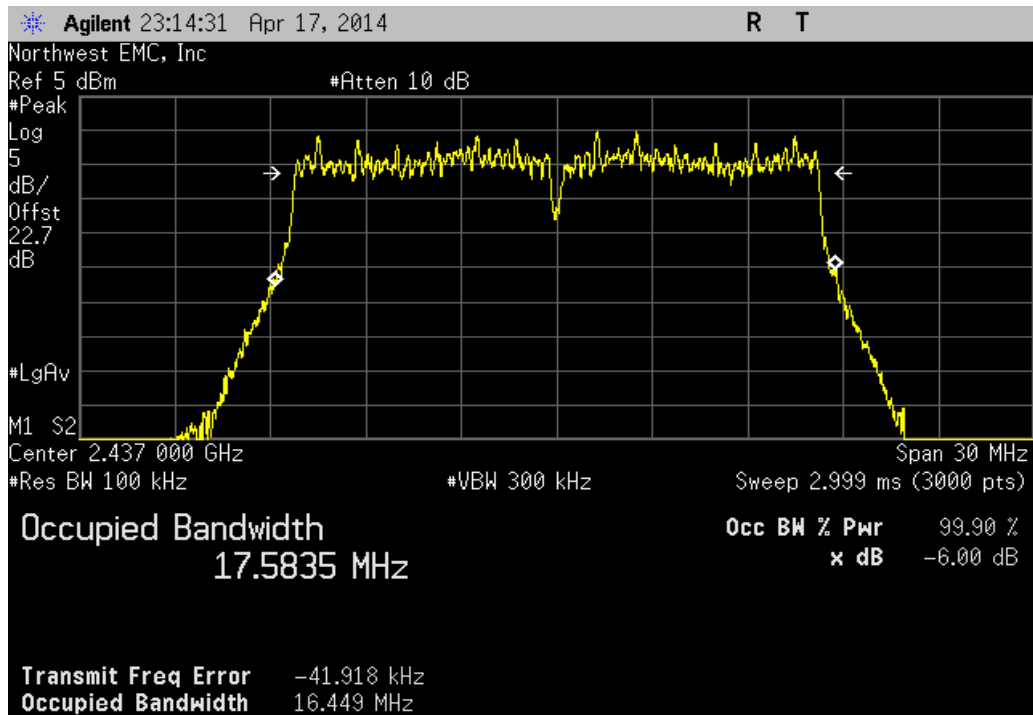
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.443 MHz | > 500 kHz | Pass   |



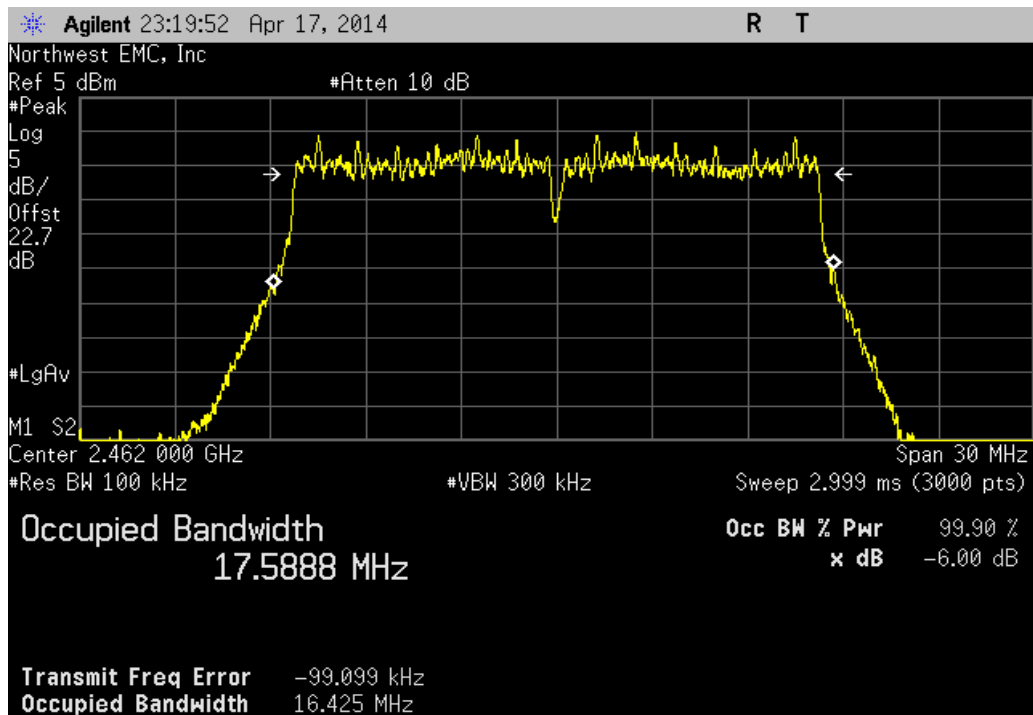
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.449 MHz | > 500 kHz | Pass   |



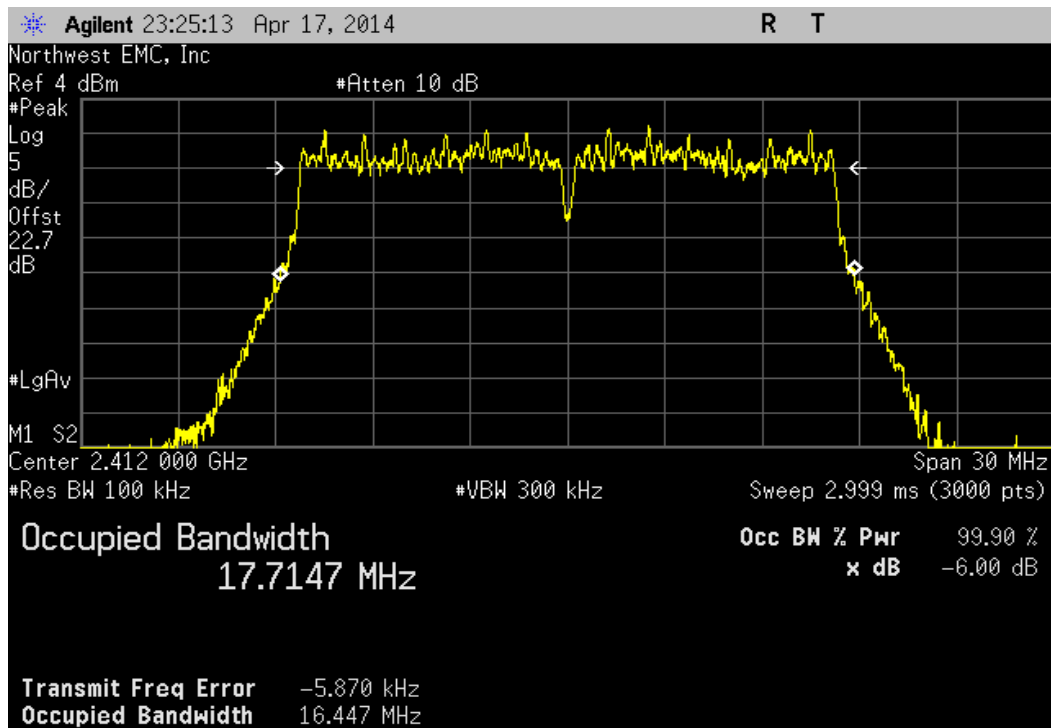
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.425 MHz | > 500 kHz | Pass   |



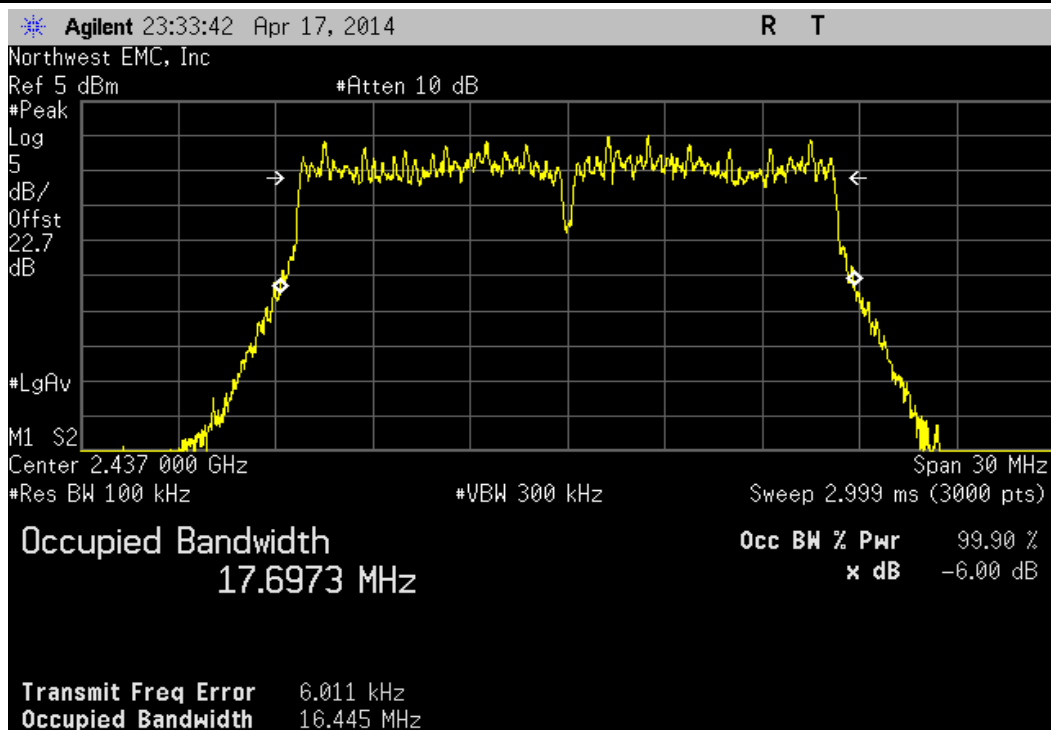
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.447 MHz | > 500 kHz | Pass   |



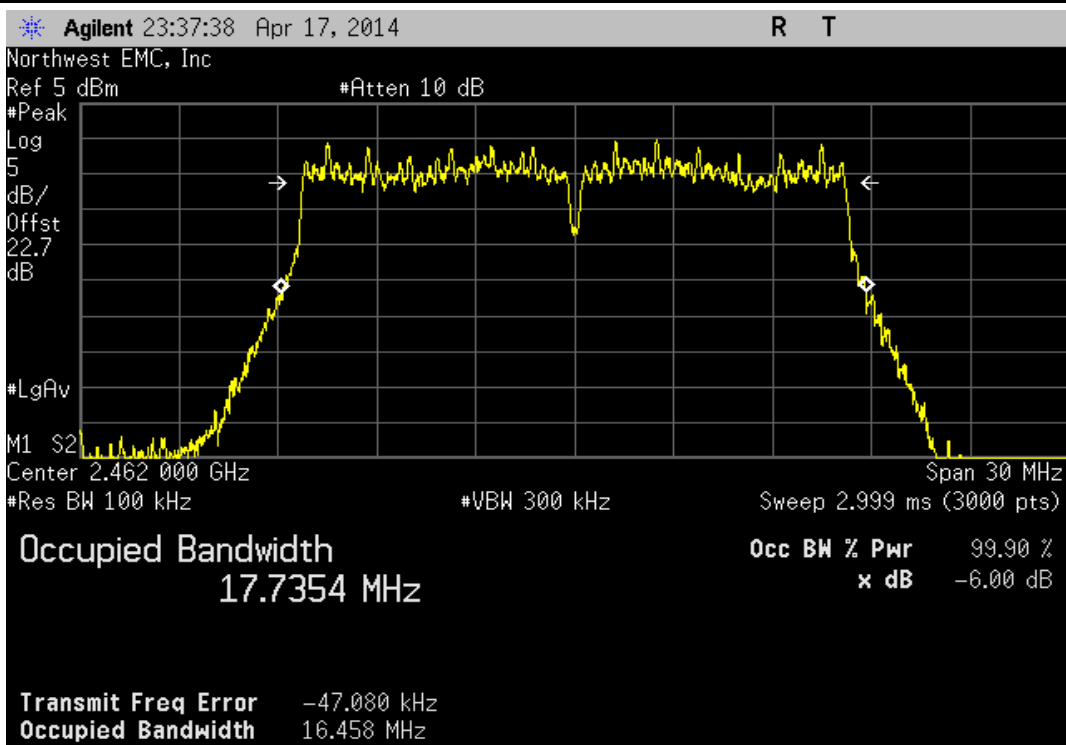
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.445 MHz | > 500 kHz | Pass   |



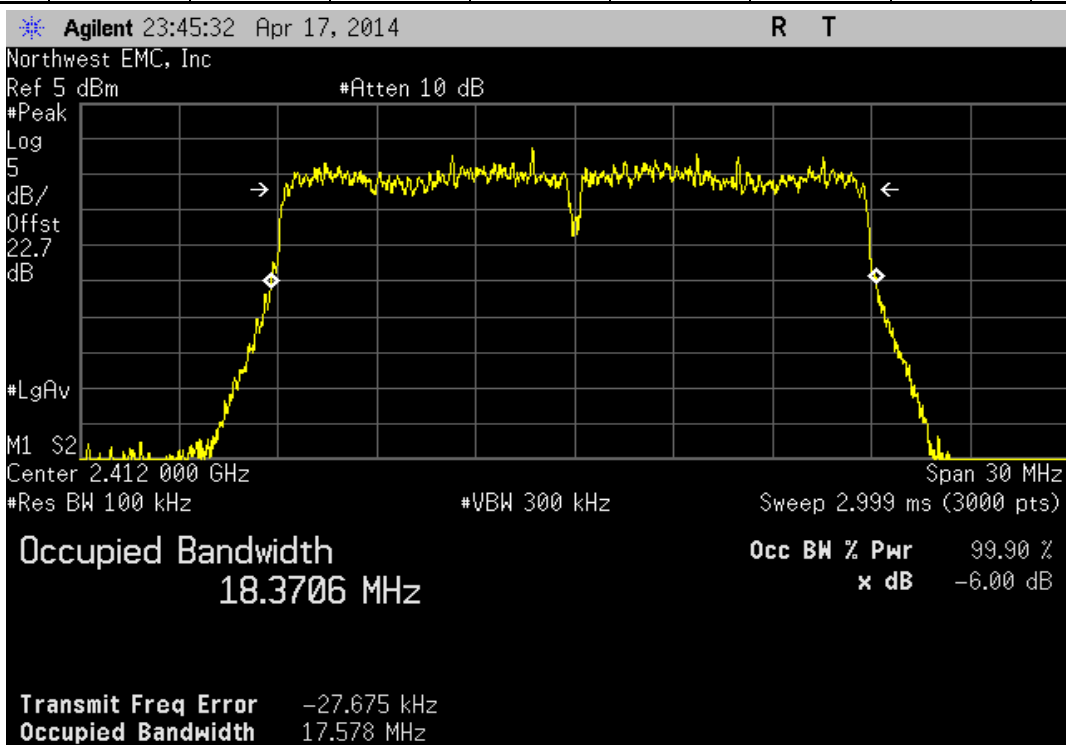
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 16.458 MHz | > 500 kHz | Pass   |



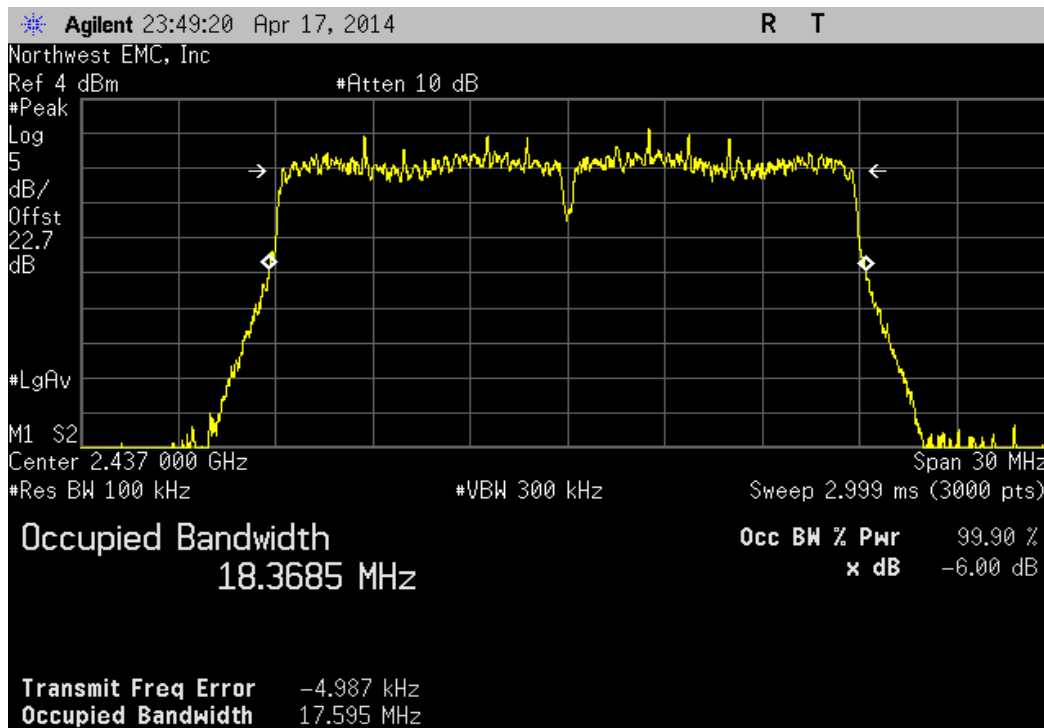
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.578 MHz | > 500 kHz | Pass   |



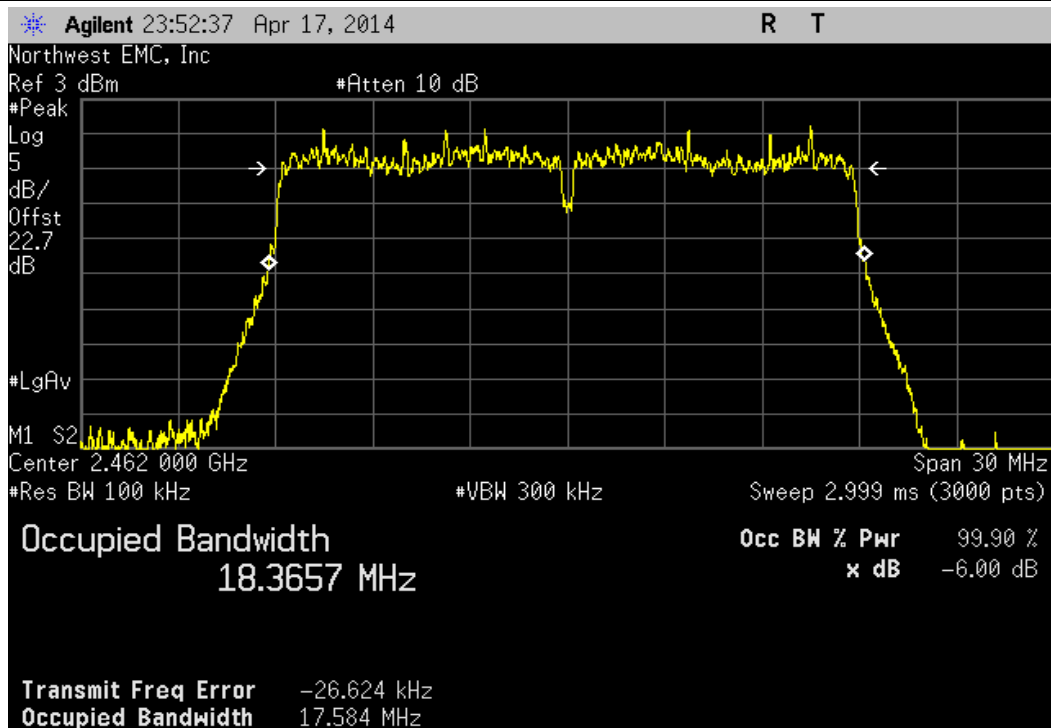
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.595 MHz | > 500 kHz | Pass   |



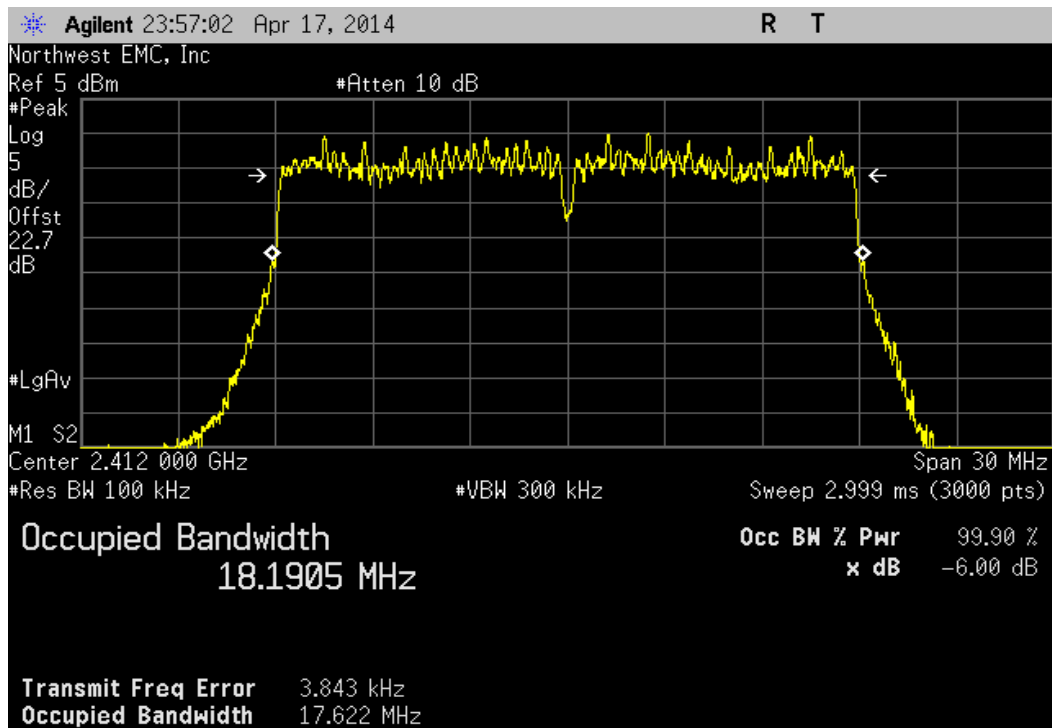
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.584 MHz | > 500 kHz | Pass   |



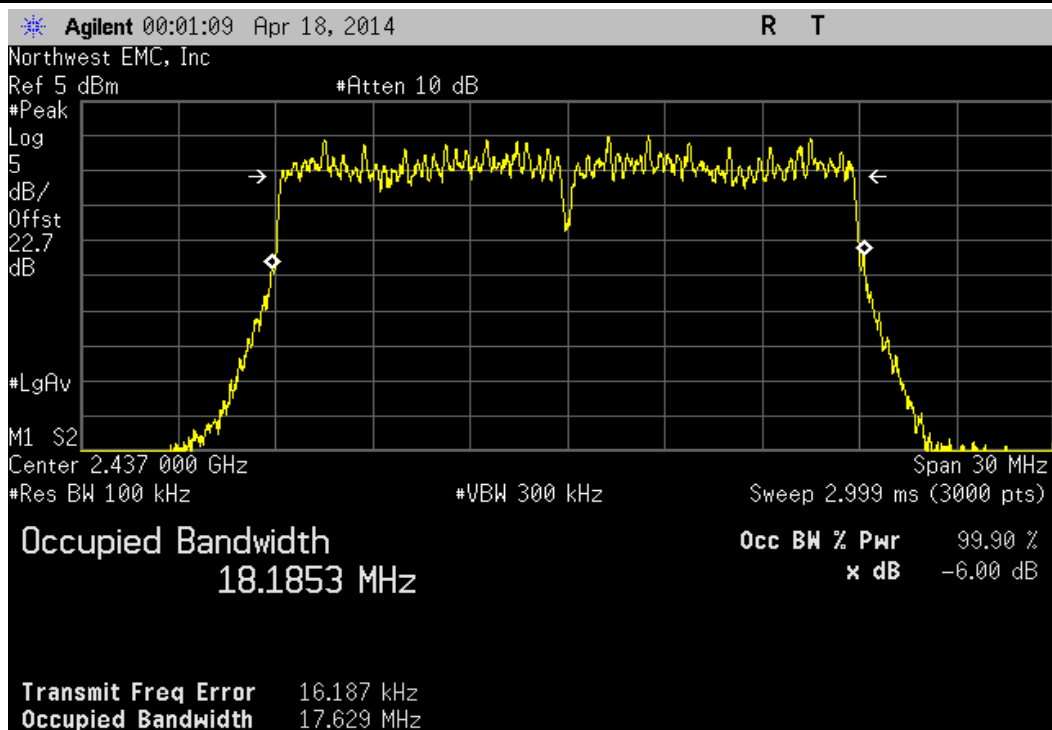
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.622 MHz | > 500 kHz | Pass   |



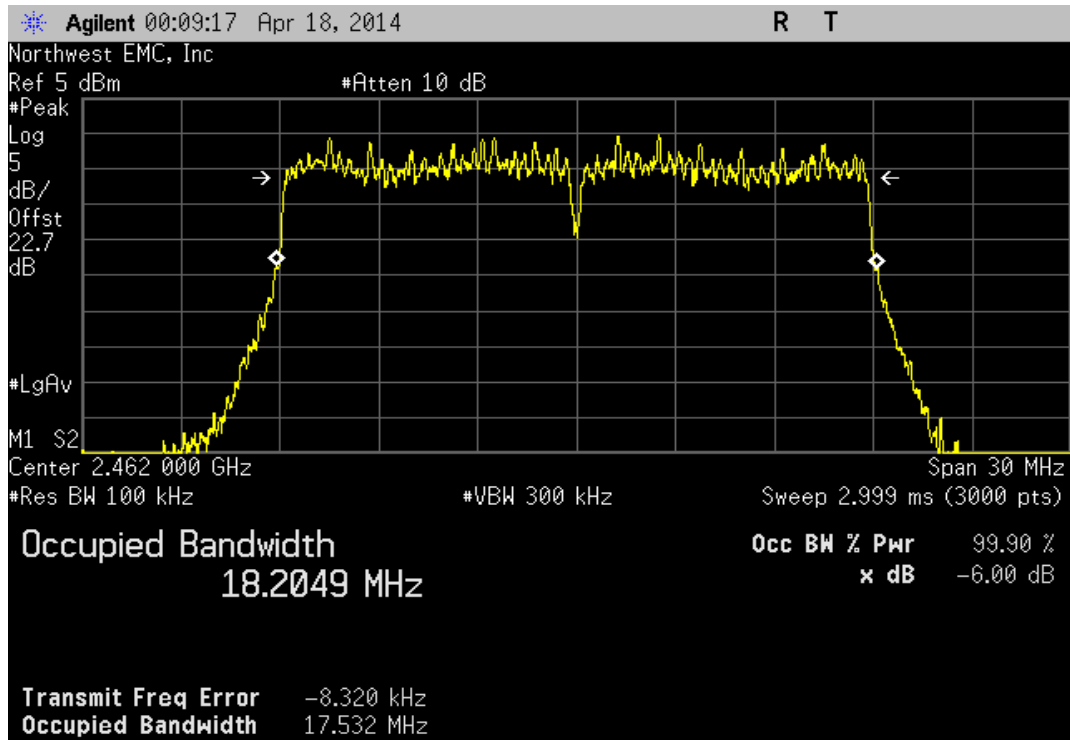
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 17.629 MHz | > 500 kHz | Pass   |



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz

|  | Value      | Limit     | Result |
|--|------------|-----------|--------|
|  | 17.532 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal. | Interval (mo.) |
|---------------------------------|------------------|----------|-----|-----------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013 | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013 | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR       | 0              |
| Power Meter                     | Agilent          | N1913A   | SQR | 4/29/2013 | 36             |
| Power Sensor                    | Agilent          | E9300H   | SQO | 4/29/2013 | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014  | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014 | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014 | 24             |

### TEST DESCRIPTION

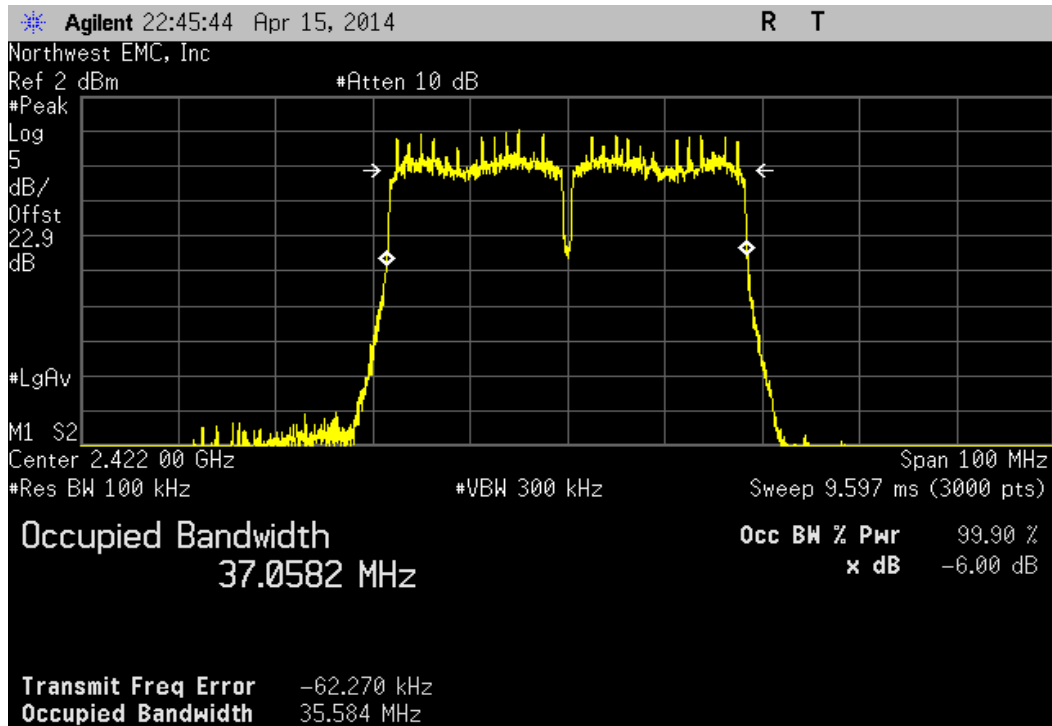
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |   |                                                                                             |           |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|-----------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |           |
| Serial Number: 006840341053                                                                            |   | Date: 04/16/14                                                                              |           |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |           |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |           |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |           |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          |           |
|                                                                                                        |   | Job Site: EV06                                                                              |           |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |           |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |           |
| COMMENTS                                                                                               |   |                                                                                             |           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |           |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |           |
| None                                                                                                   |   |                                                                                             |           |
| Configuration #                                                                                        | 6 | Signature  |           |
|                                                                                                        |   | Value                                                                                       | Limit     |
|                                                                                                        |   | Result                                                                                      |           |
| 40 MHz                                                                                                 |   |                                                                                             |           |
| 2400 MHz - 2483.5 MHz Band                                                                             |   |                                                                                             |           |
| 802.11(n) MCS0                                                                                         |   |                                                                                             |           |
| 1/5 Low Channel, 2422 MHz                                                                              |   | 35.584 MHz                                                                                  | > 500 kHz |
| 4/8 Mid Channel, 2437 MHz                                                                              |   | 35.481 MHz                                                                                  | > 500 kHz |
| 7/11 High Channel, 2452 MHz                                                                            |   | 35.199 MHz                                                                                  | > 500 kHz |
| 802.11(n) MCS7                                                                                         |   |                                                                                             |           |
| 1/5 Low Channel, 2422 MHz                                                                              |   | 35.968 MHz                                                                                  | > 500 kHz |
| 4/8 Mid Channel, 2437 MHz                                                                              |   | 36.023 MHz                                                                                  | > 500 kHz |
| 7/11 High Channel, 2452 MHz                                                                            |   | 35.952 MHz                                                                                  | > 500 kHz |

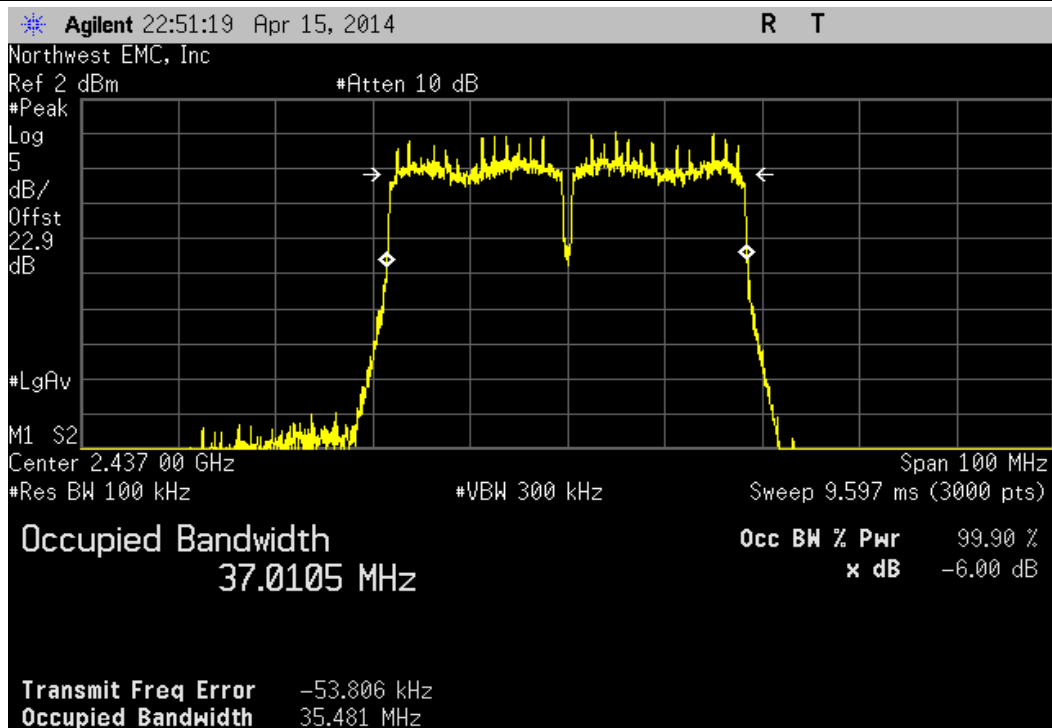
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 1/5 Low Channel, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.584 MHz | > 500 kHz | Pass   |



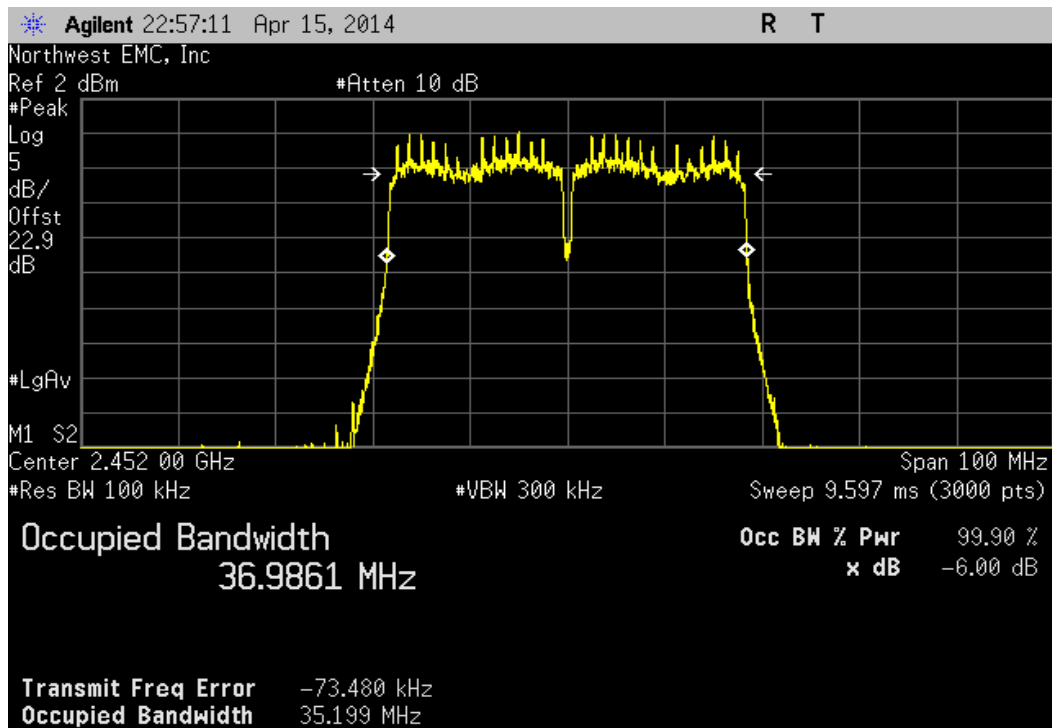
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 4/8 Mid Channel, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.481 MHz | > 500 kHz | Pass   |



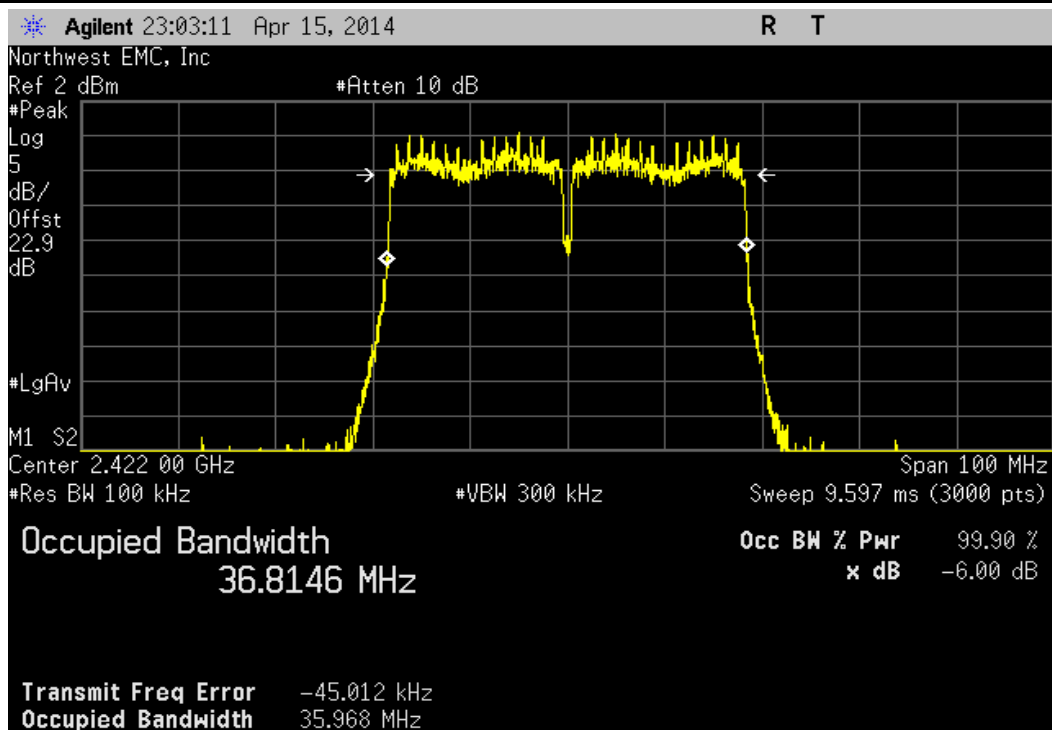
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, 7/11 High Channel, 2452 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.199 MHz | > 500 kHz | Pass   |



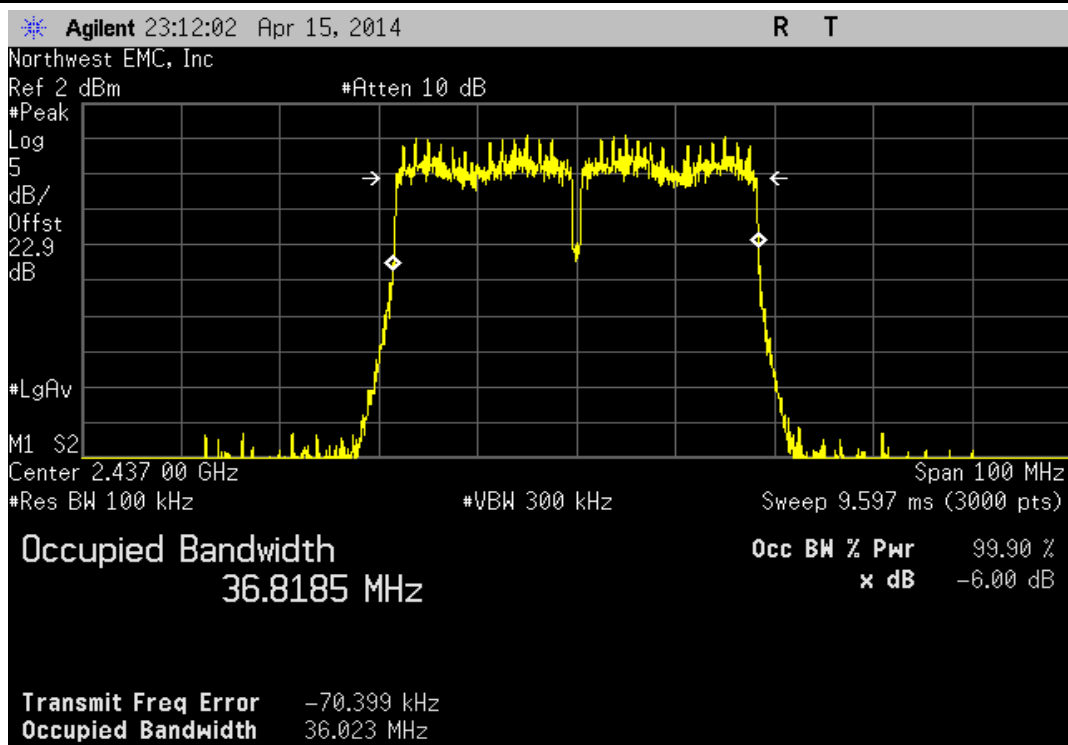
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 1/5 Low Channel, 2422 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.968 MHz | > 500 kHz | Pass   |



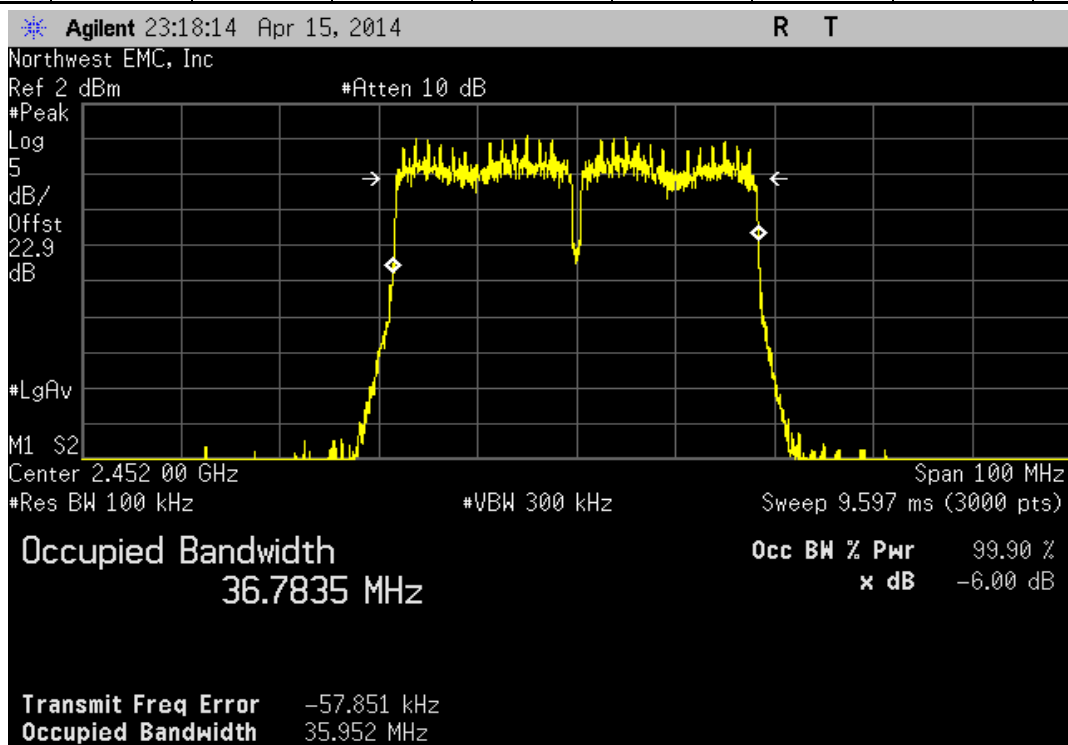
40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 4/8 Mid Channel, 2437 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 36.023 MHz | > 500 kHz | Pass   |



40 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, 7/11 High Channel, 2452 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.952 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal.  | Interval (mo.) |
|---------------------------------|------------------|----------|-----|------------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

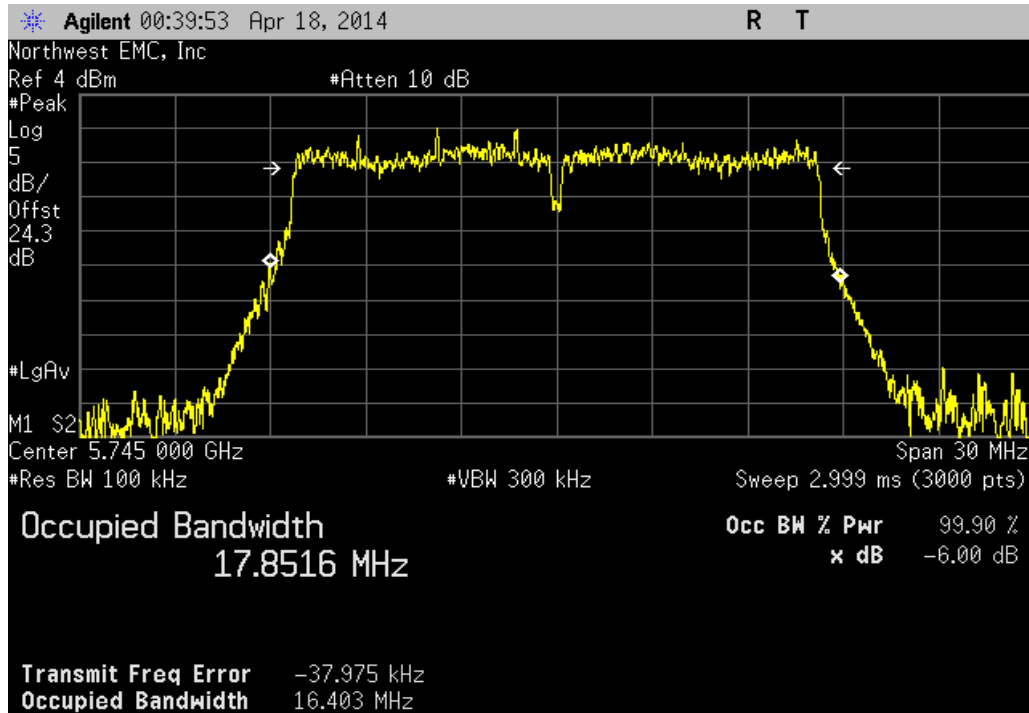
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |   |                                                                                             |                |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|----------------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |                |
| Serial Number: 006840341053                                                                            |   | Date: 04/23/14                                                                              |                |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |                |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |                |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |                |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          |                |
|                                                                                                        |   | Job Site: EV06                                                                              |                |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |                |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |                |
| COMMENTS                                                                                               |   |                                                                                             |                |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |                |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |                |
| None                                                                                                   |   |                                                                                             |                |
| Configuration #                                                                                        | 6 | Signature  |                |
|                                                                                                        |   | Value                                                                                       | Limit Result   |
| IEEE 802.11(a)                                                                                         |   |                                                                                             |                |
| 20 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| 6 Mbps                                                                                                 |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 16.403 MHz                                                                                  | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 16.496 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 16.381 MHz                                                                                  | > 500 kHz Pass |
| 36 Mbps                                                                                                |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 16.425 MHz                                                                                  | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 16.437 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 16.414 MHz                                                                                  | > 500 kHz Pass |
| 54 Mbps                                                                                                |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 16.423 MHz                                                                                  | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 16.459 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 16.441 MHz                                                                                  | > 500 kHz Pass |
| IEEE 802.11(n)                                                                                         |   |                                                                                             |                |
| 20 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| HT, MCS7                                                                                               |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 17.495 MHz                                                                                  | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 17.629 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 17.517 MHz                                                                                  | > 500 kHz Pass |
| 40 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| HT, MCS7                                                                                               |   |                                                                                             |                |
| Low Channel 149/153, 5745 M                                                                            |   | 35.601 MHz                                                                                  | > 500 kHz Pass |
| High Channel 157/161, 5785 M                                                                           |   | 35.887 MHz                                                                                  | > 500 kHz Pass |
| IEEE 802.11(ac)                                                                                        |   |                                                                                             |                |
| 20 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| VHT, MCS0                                                                                              |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 17.36 MHz                                                                                   | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 17.335 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 17.602 MHz                                                                                  | > 500 kHz Pass |
| VHT, MCS8                                                                                              |   |                                                                                             |                |
| Low Channel 149, 5745 M                                                                                |   | 17.572 MHz                                                                                  | > 500 kHz Pass |
| Mid Channel 157, 5785 M                                                                                |   | 17.516 MHz                                                                                  | > 500 kHz Pass |
| High Channel 165, 5825 M                                                                               |   | 17.502 MHz                                                                                  | > 500 kHz Pass |
| 40 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| VHT, MCS0                                                                                              |   |                                                                                             |                |
| Low Channel 149/153, 5745 M                                                                            |   | 36.106 MHz                                                                                  | > 500 kHz Pass |
| High Channel 157/161, 5785 M                                                                           |   | 35.521 MHz                                                                                  | > 500 kHz Pass |
| VHT, MCS9                                                                                              |   |                                                                                             |                |
| Low Channel 149/153, 5745 M                                                                            |   | 35.977 MHz                                                                                  | > 500 kHz Pass |
| High Channel 157/161, 5785 M                                                                           |   | 35.763 MHz                                                                                  | > 500 kHz Pass |
| 80 MHz                                                                                                 |   |                                                                                             |                |
| 5725 MHz - 5850 MHz Band                                                                               |   |                                                                                             |                |
| VHT, MCS0                                                                                              |   |                                                                                             |                |
| Low Channel 149/153/157,                                                                               |   | 76.369 MHz                                                                                  | > 500 kHz Pass |
| VHT, MCS9                                                                                              |   |                                                                                             |                |
| Low Channel 149/153/157,                                                                               |   | 76.336 MHz                                                                                  | > 500 kHz Pass |

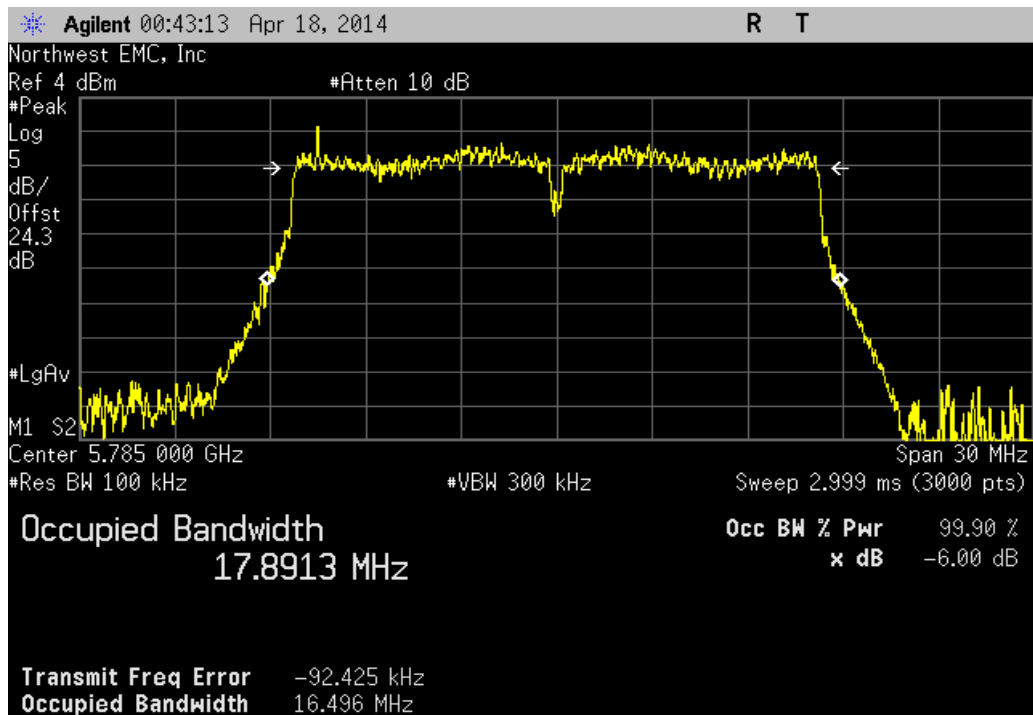
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.403 MHz | > 500 kHz | Pass   |



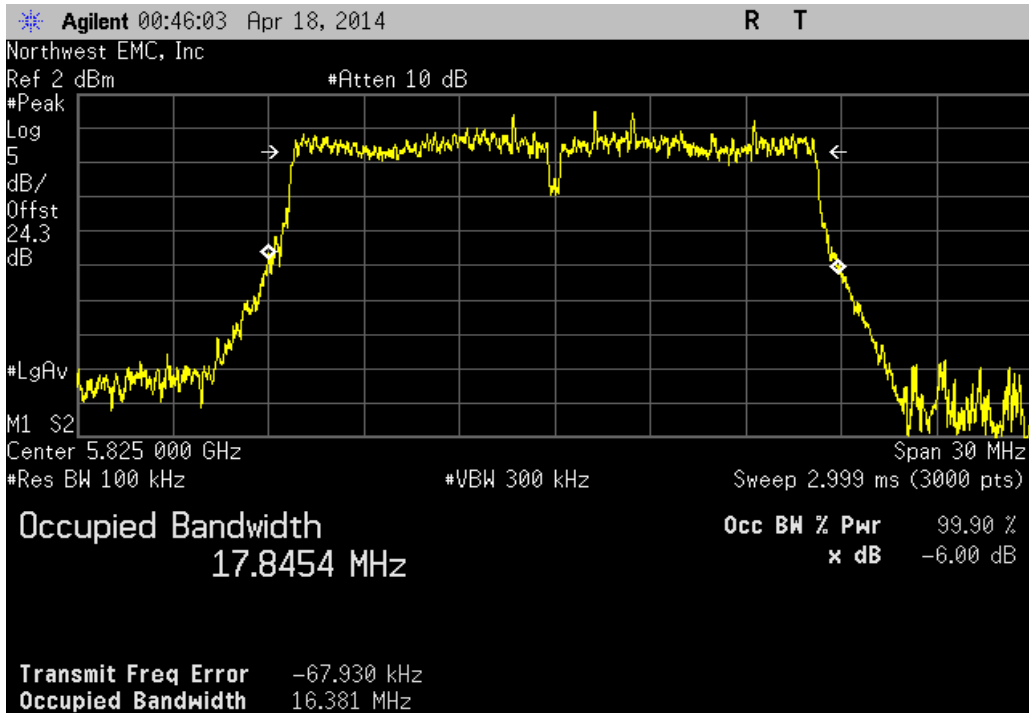
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.496 MHz | > 500 kHz | Pass   |



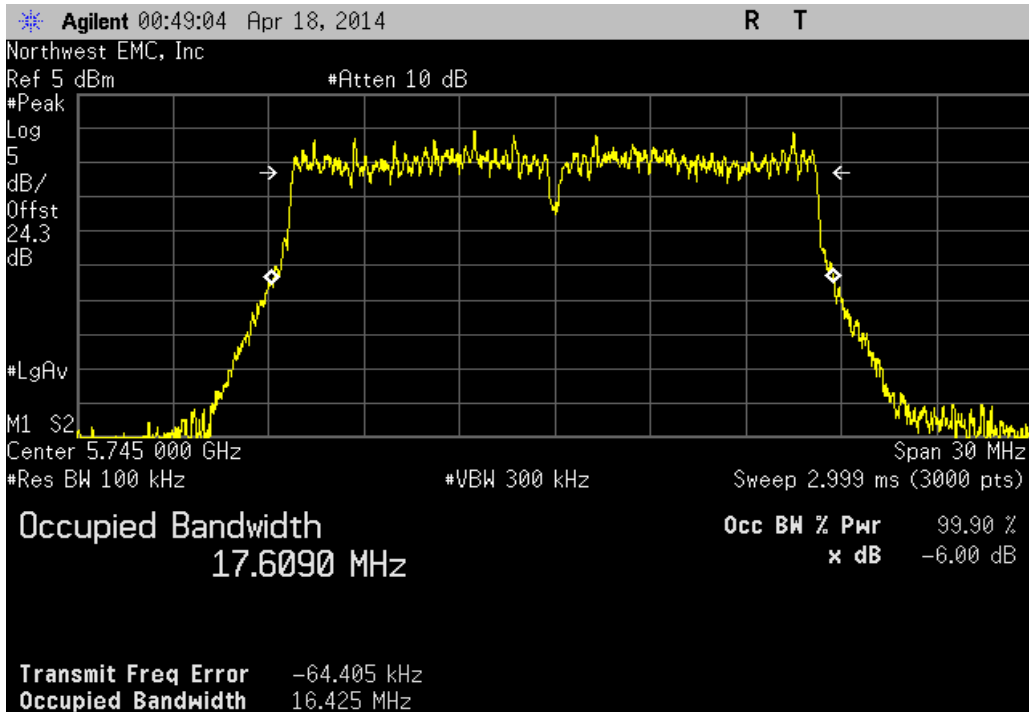
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.381 MHz | > 500 kHz | Pass   |



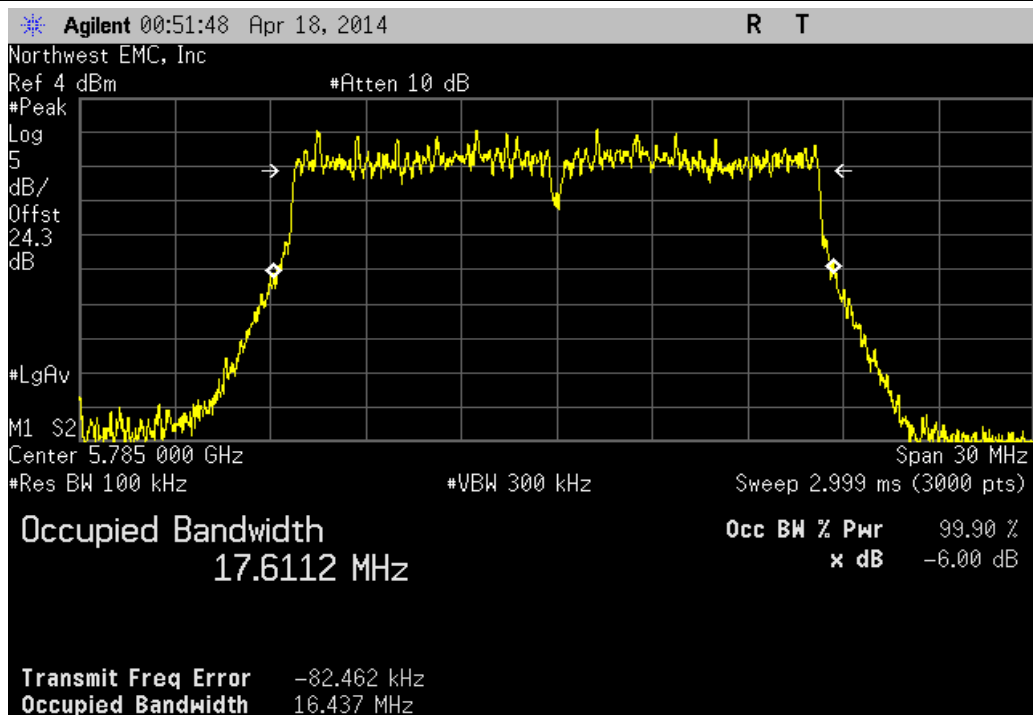
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.425 MHz | > 500 kHz | Pass   |



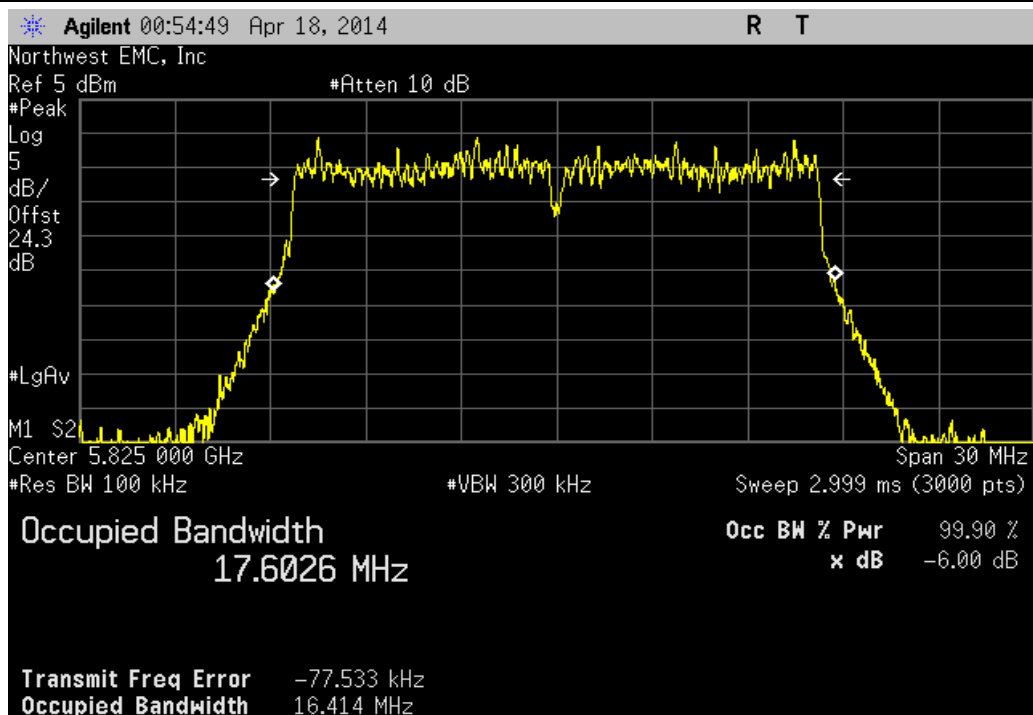
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.437 MHz | > 500 kHz | Pass   |



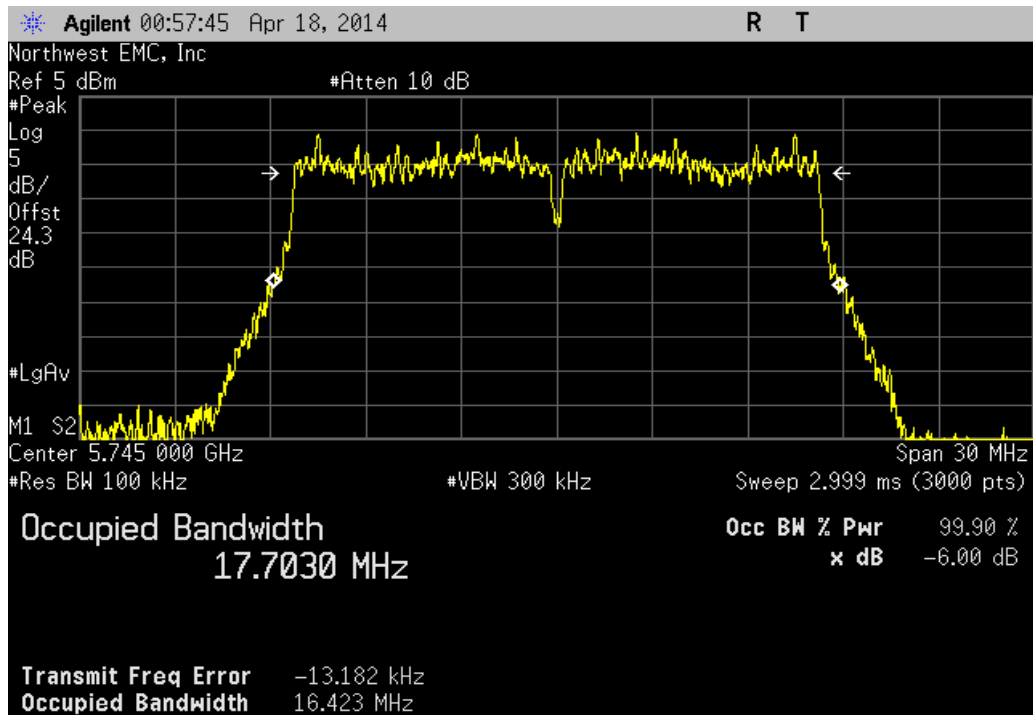
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.414 MHz | > 500 kHz | Pass   |



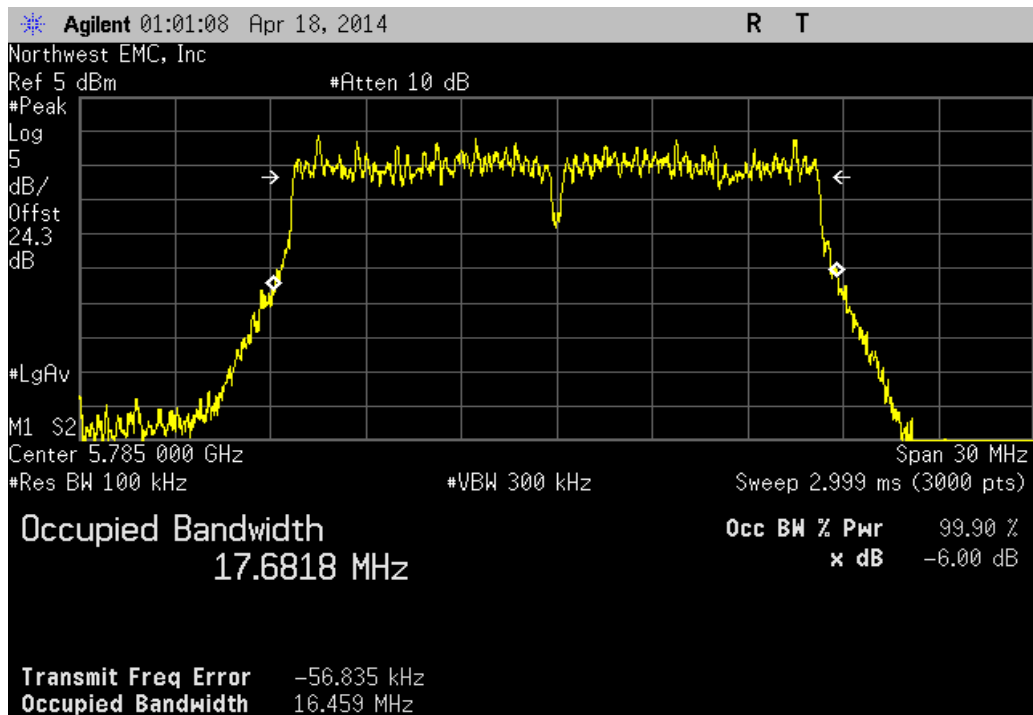
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.423 MHz | > 500 kHz | Pass   |



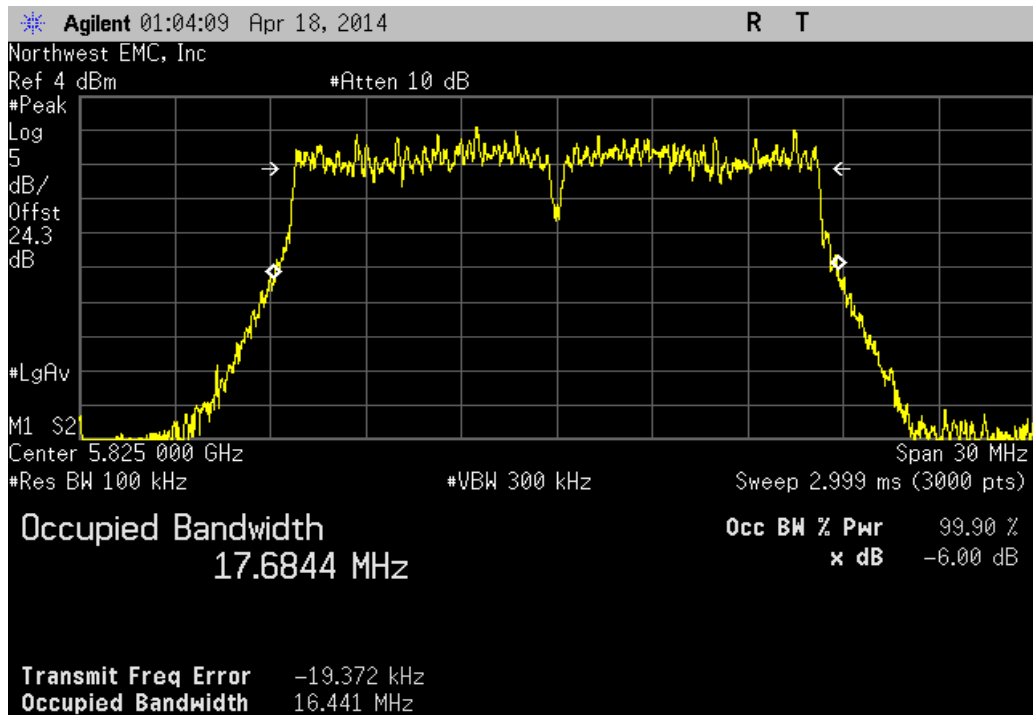
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.459 MHz | > 500 kHz | Pass   |



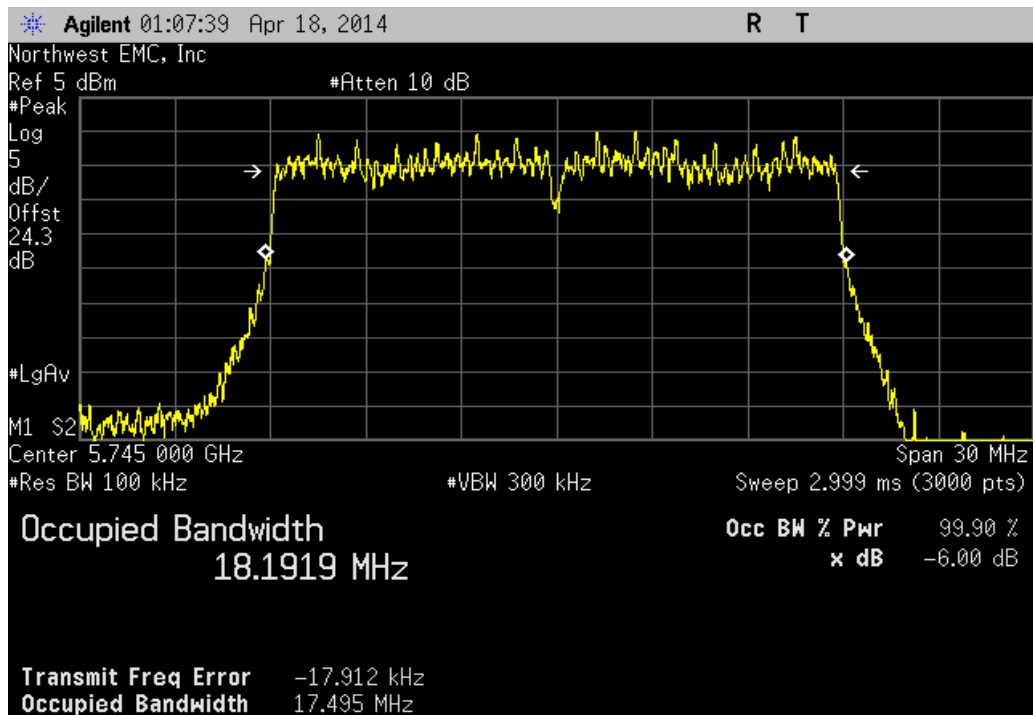
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.441 MHz | > 500 kHz | Pass   |



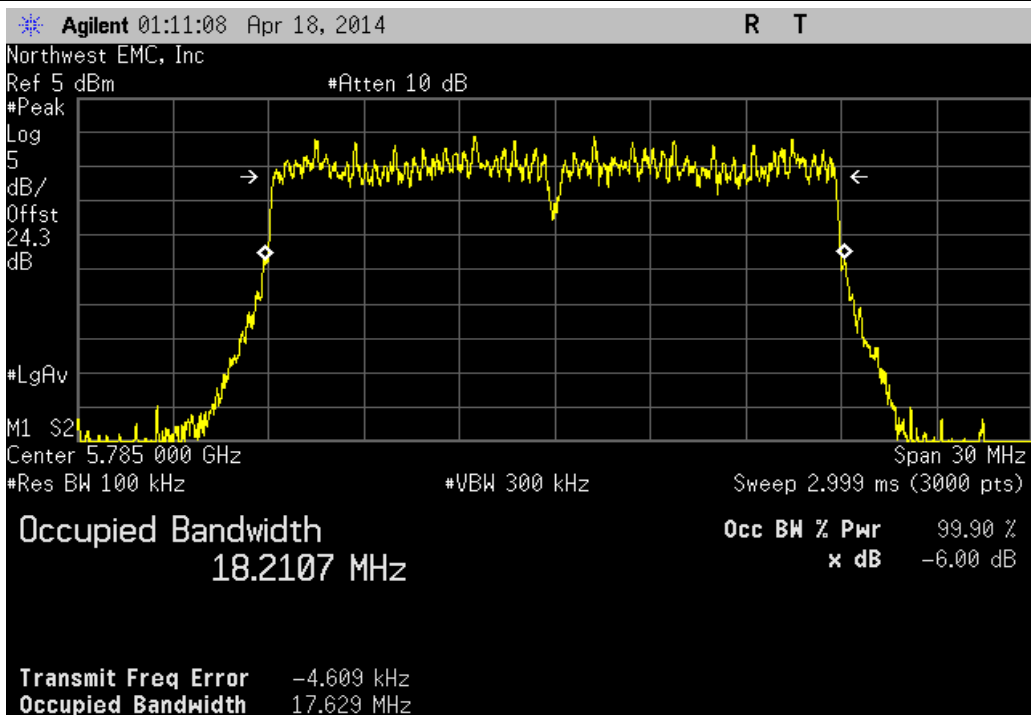
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.495 MHz | > 500 kHz | Pass   |



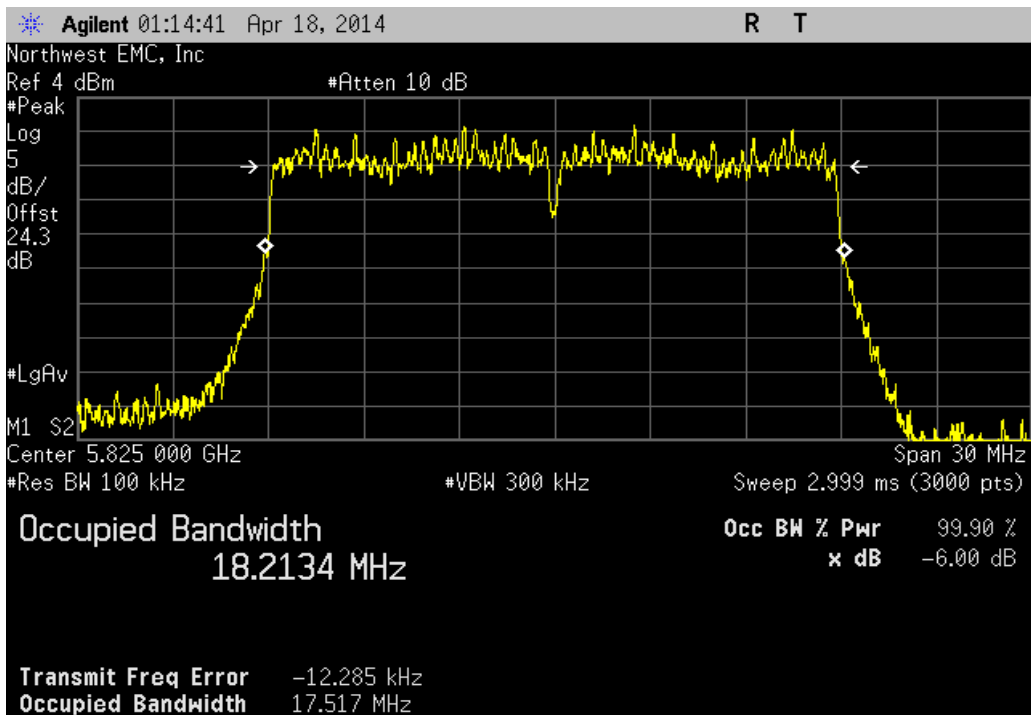
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.629 MHz | > 500 kHz | Pass   |



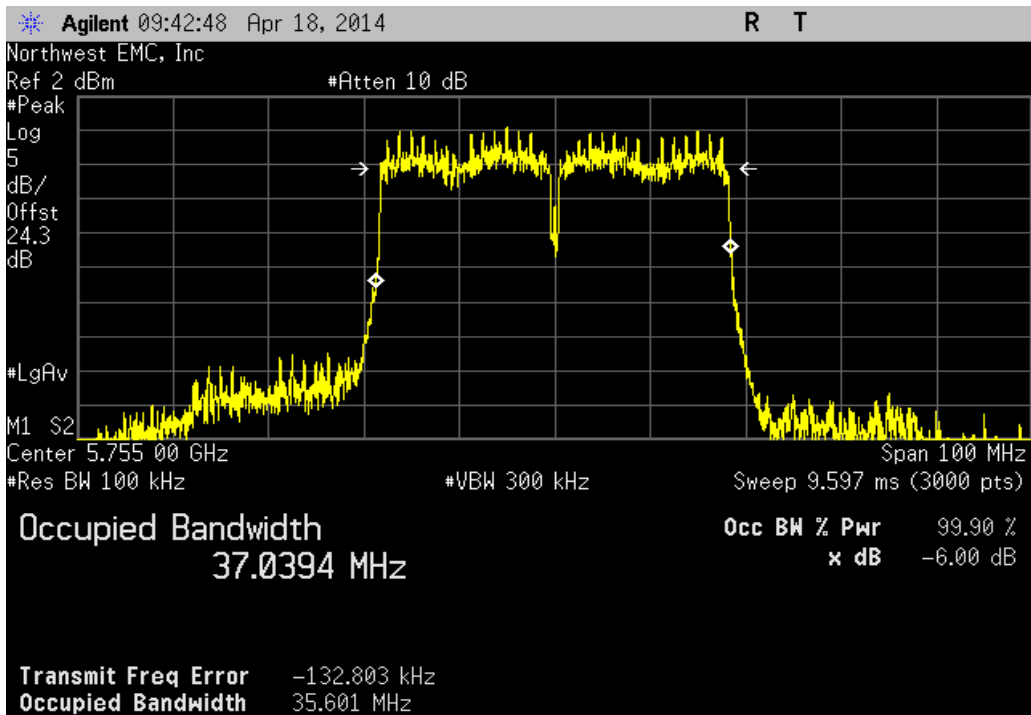
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.517 MHz | > 500 kHz | Pass   |



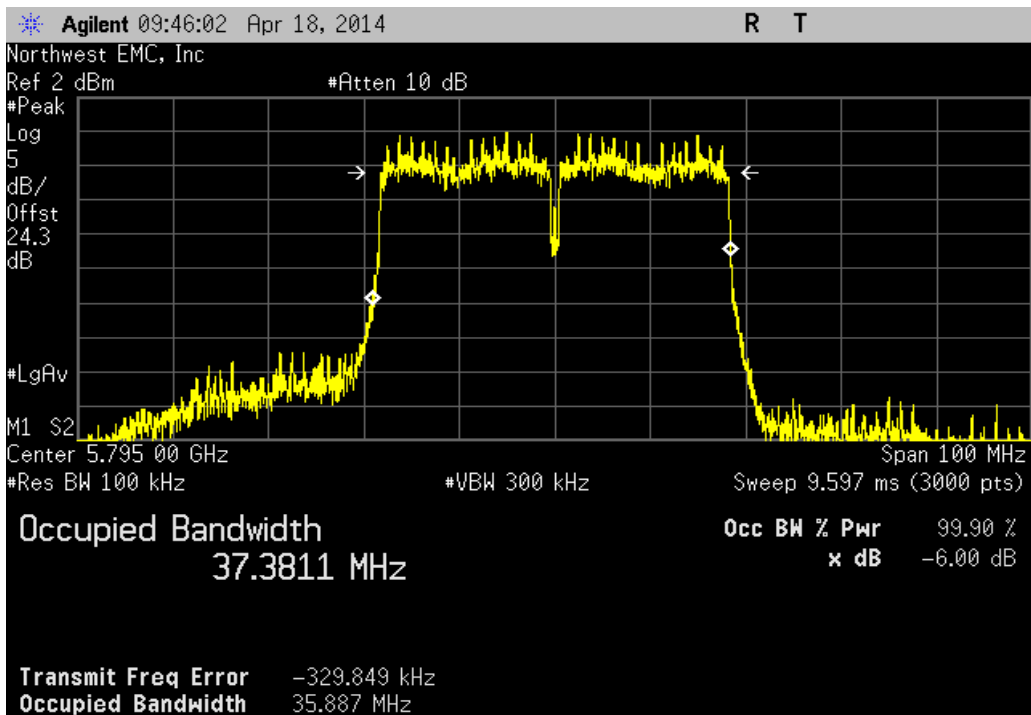
IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.601 MHz | > 500 kHz | Pass   |



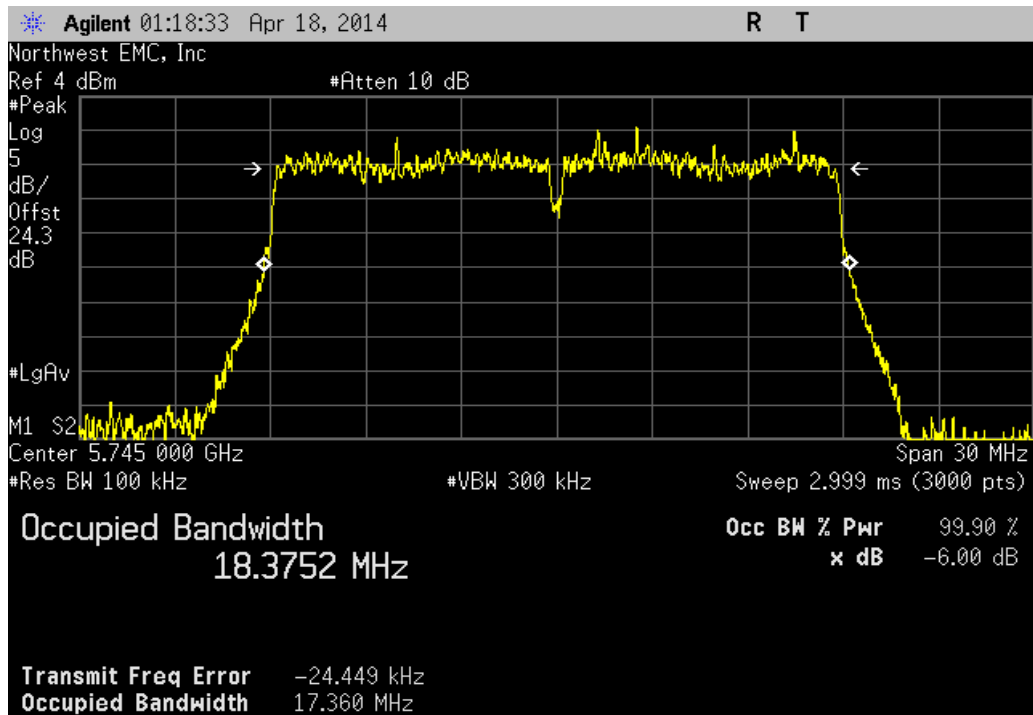
IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.887 MHz | > 500 kHz | Pass   |



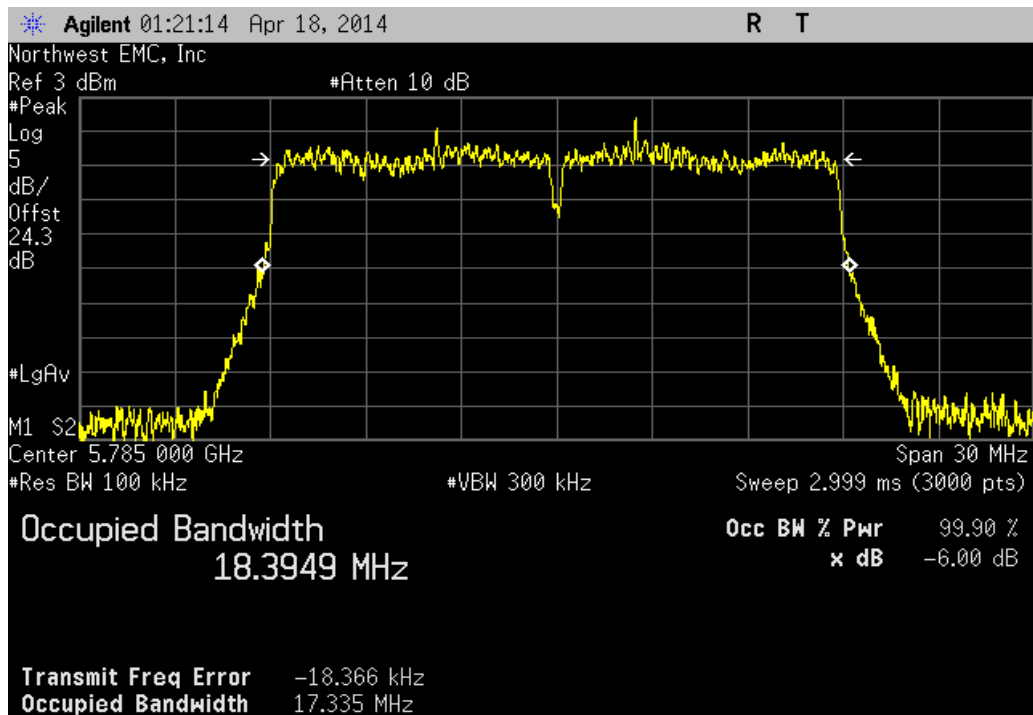
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149, 5745 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 17.36 MHz | > 500 kHz | Pass   |



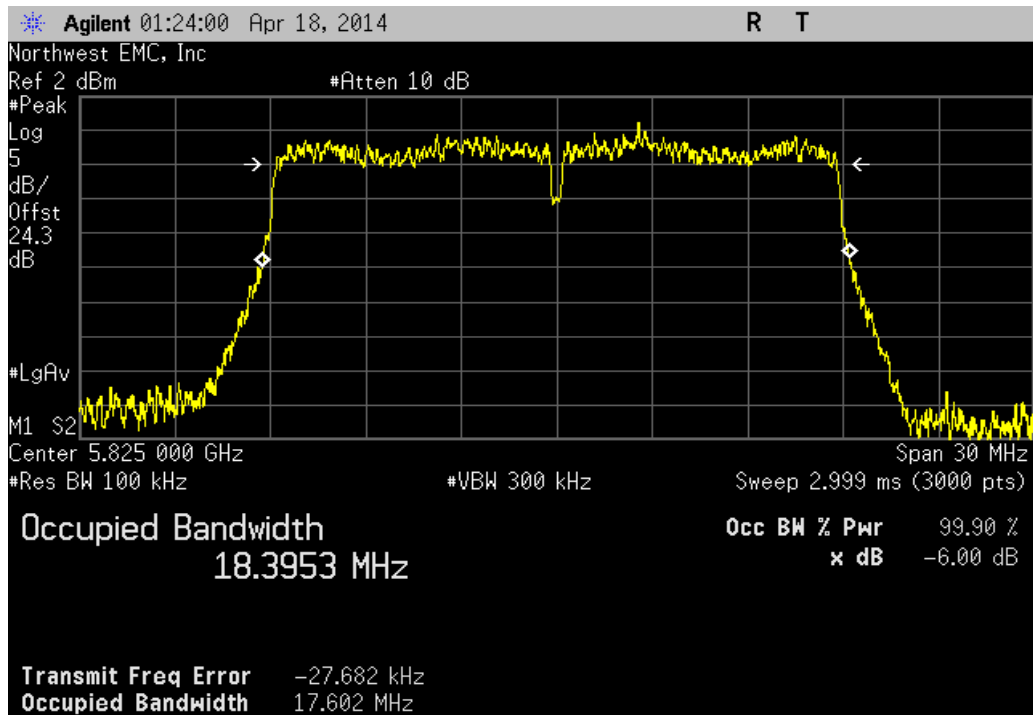
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.335 MHz | > 500 kHz | Pass   |



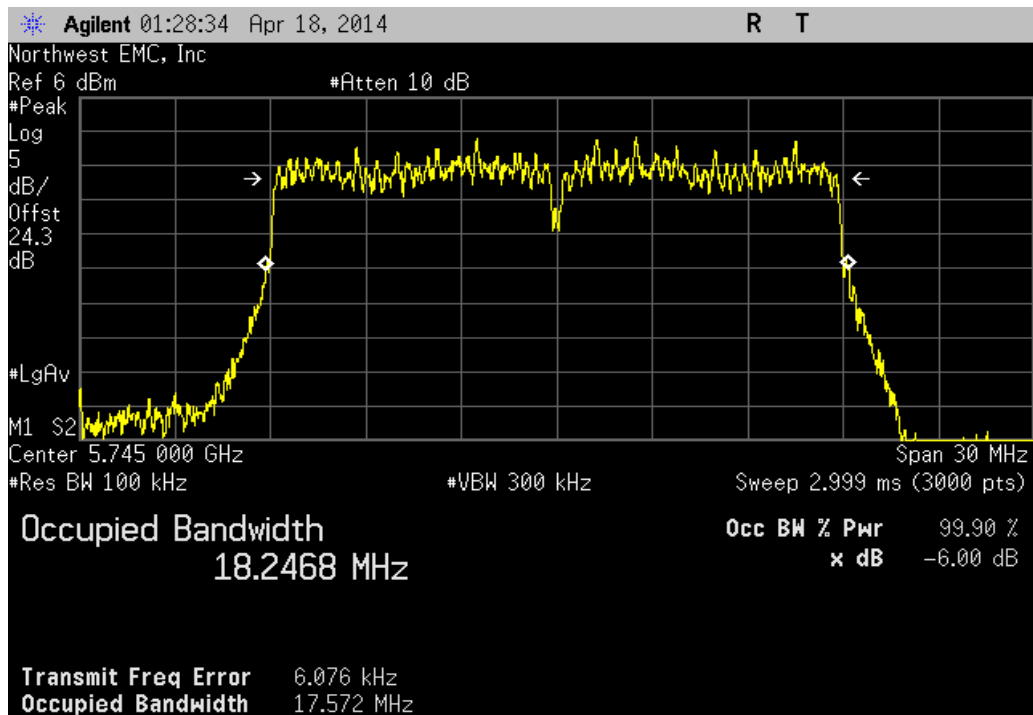
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.602 MHz | > 500 kHz | Pass   |



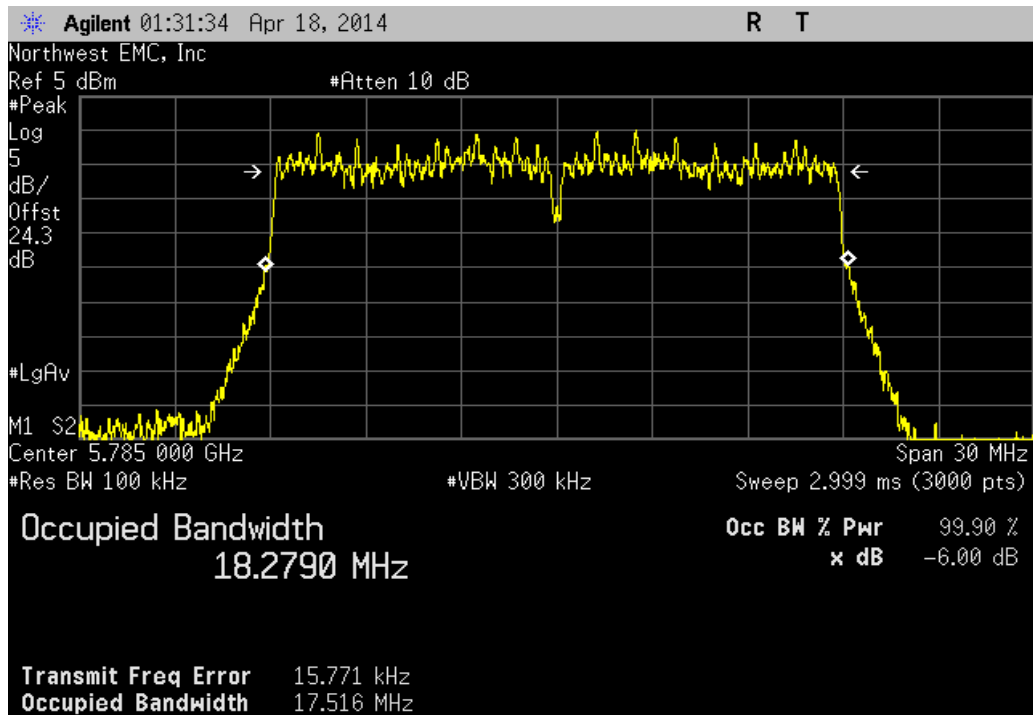
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.572 MHz | > 500 kHz | Pass   |



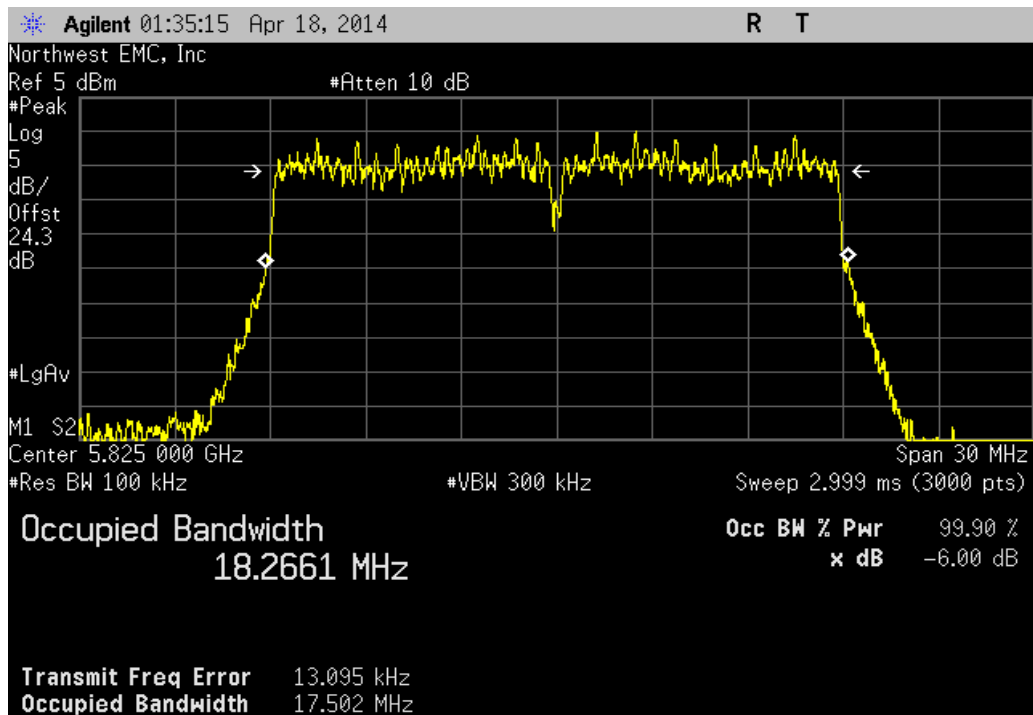
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.516 MHz | > 500 kHz | Pass   |



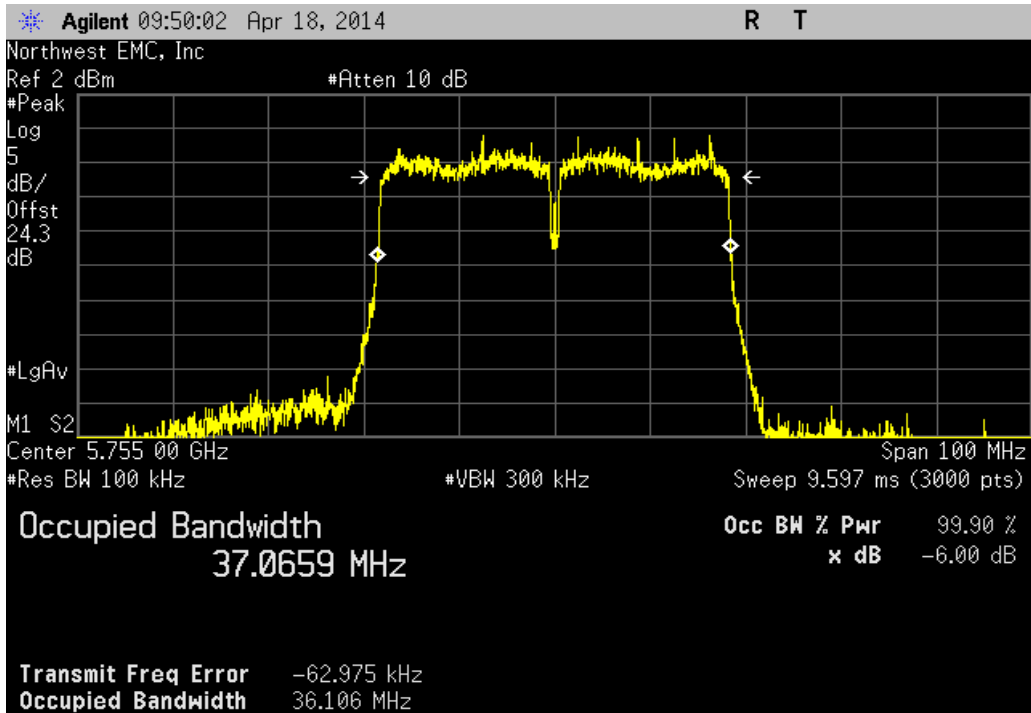
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.502 MHz | > 500 kHz | Pass   |



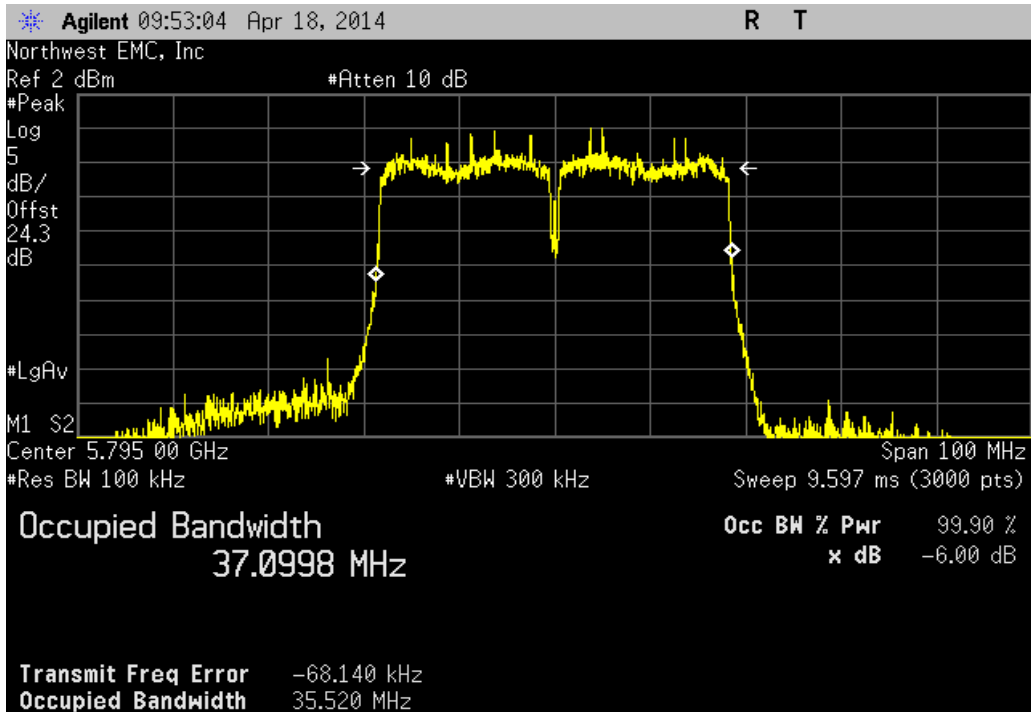
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 36.106 MHz | > 500 kHz | Pass   |



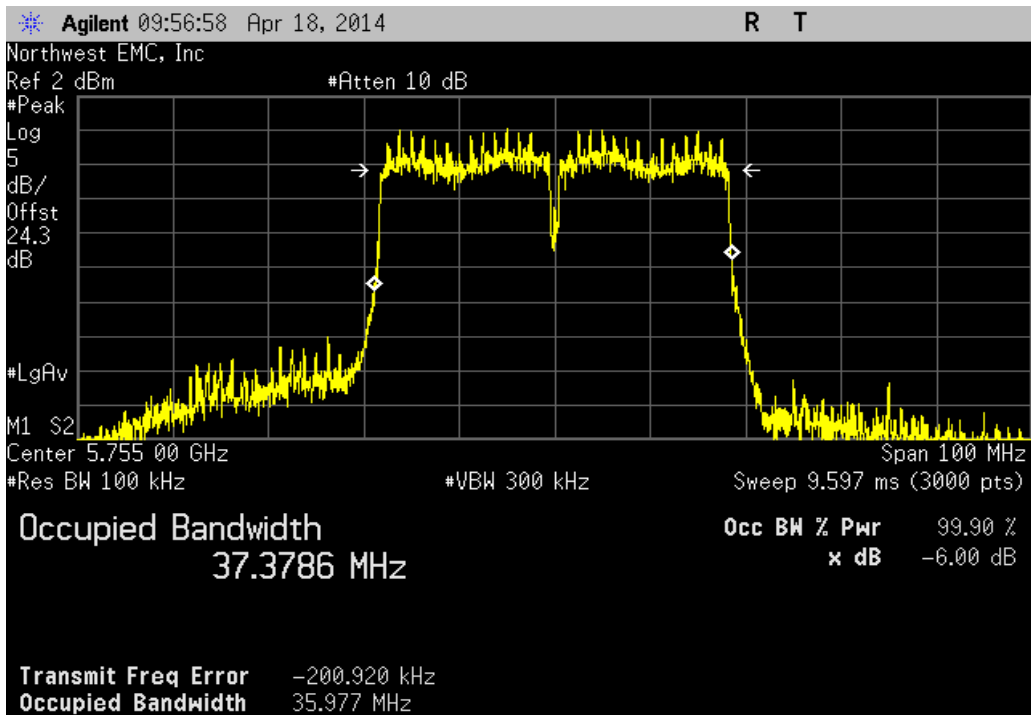
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.521 MHz | > 500 kHz | Pass   |



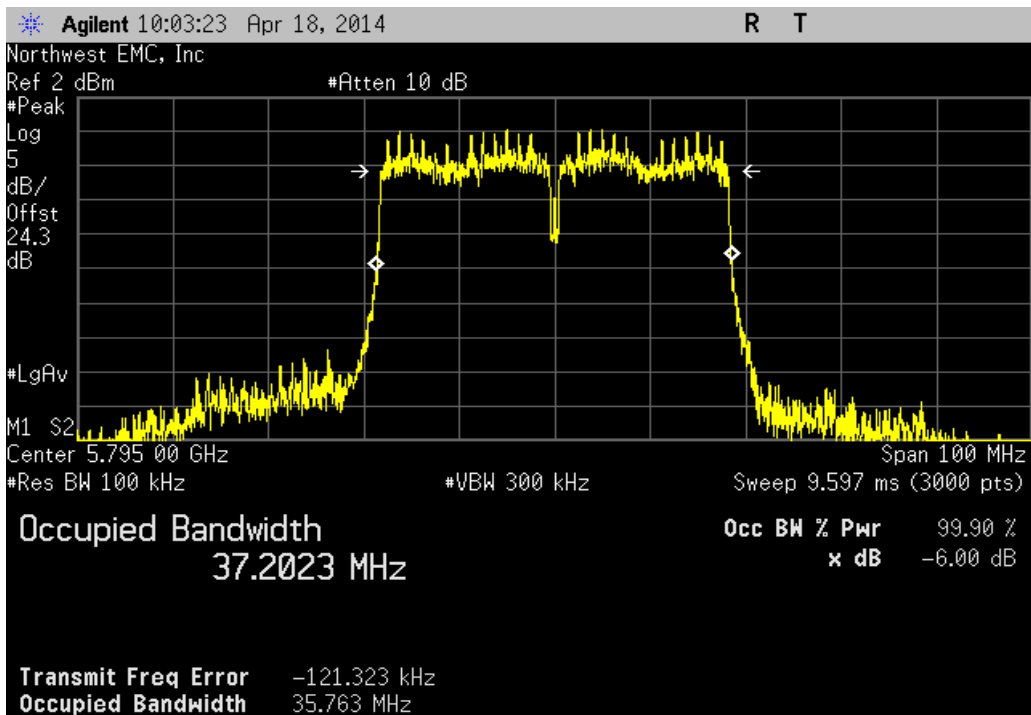
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.977 MHz | > 500 kHz | Pass   |



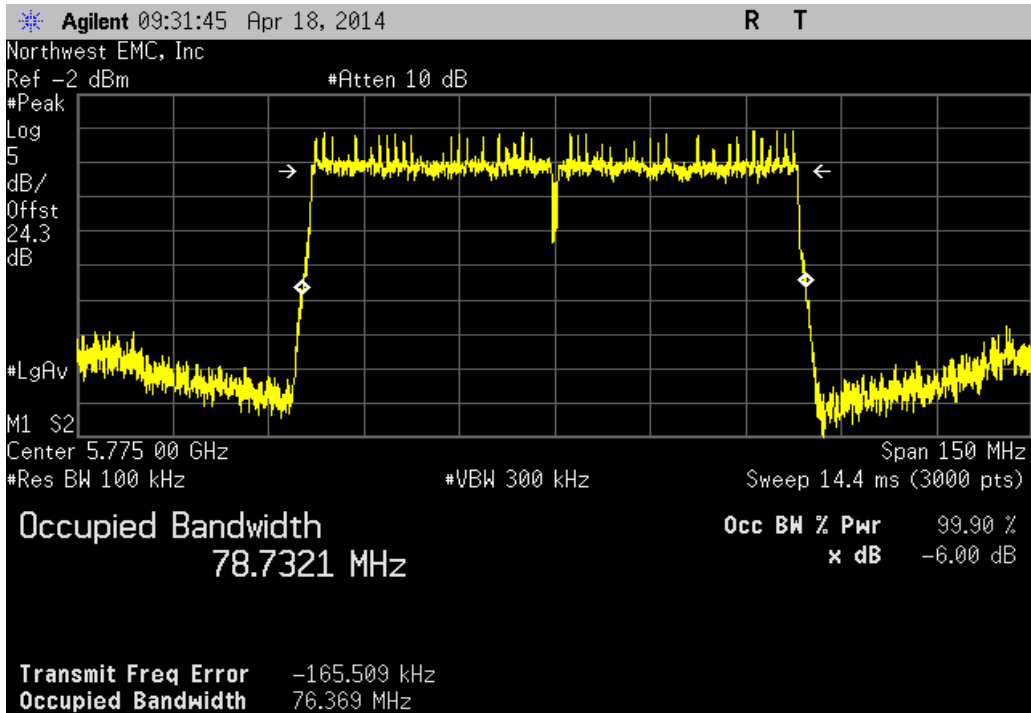
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.763 MHz | > 500 kHz | Pass   |



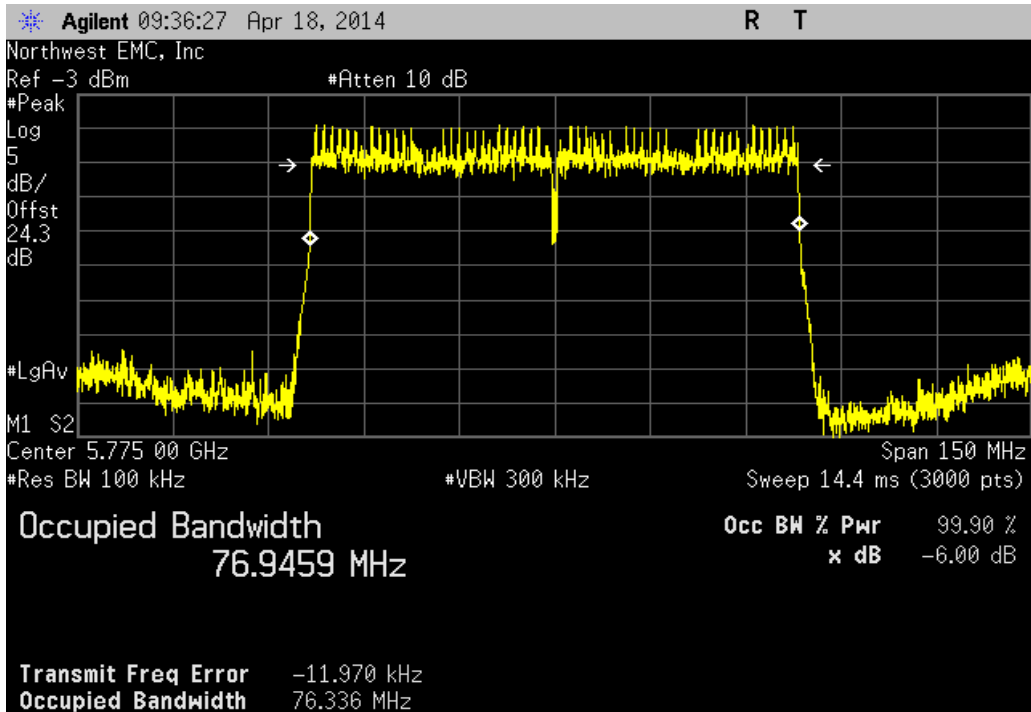
IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.369 MHz | > 500 kHz | Pass   |



IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.336 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal.  | Interval (mo.) |
|---------------------------------|------------------|----------|-----|------------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

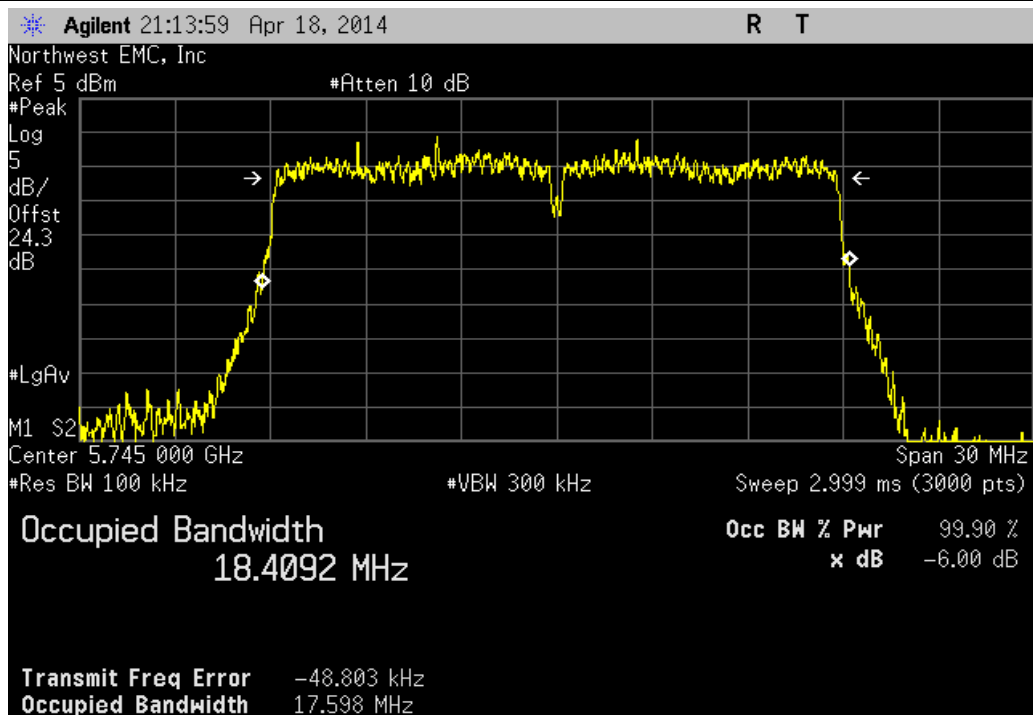
The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |   |                                                                                             |  |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|--|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |  |
| Serial Number: 006840341053                                                                            |   | Date: 04/23/14                                                                              |  |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |  |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |  |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |  |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          |  |
| Job Site: EV06                                                                                         |   |                                                                                             |  |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |  |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |  |
| COMMENTS                                                                                               |   |                                                                                             |  |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |  |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |  |
| None                                                                                                   |   |                                                                                             |  |
| Configuration #                                                                                        | 6 | Signature  |  |

|                          |                          |                          | Value                    | Limit                   | Result     |           |      |
|--------------------------|--------------------------|--------------------------|--------------------------|-------------------------|------------|-----------|------|
| A IEEE 802.11(n)         |                          |                          |                          |                         |            |           |      |
| 20 MHz                   | 5725 MHz - 5850 MHz Band | HT, MCS8                 |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.598 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | Mid Channel 157, 5785 M  | 17.307 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 165, 5825 M | 17.428 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | HT, MCS15                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.312 MHz               | > 500 kHz               | Pass       |           |      |
|                          | 40 MHz                   | 5725 MHz - 5850 MHz Band | HT, MCS8                 |                         |            |           |      |
|                          |                          |                          | Low Channel 149/153, 57  | 35.475 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | High Channel 157/161, 57 | 35.467 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | HT, MCS15                |                         |            |           |      |
| 5725 MHz - 5850 MHz Band | Low Channel 149/153, 57  | 35.198 MHz               | > 500 kHz                | Pass                    |            |           |      |
|                          | High Channel 157/161, 57 | 35.863 MHz               | > 500 kHz                | Pass                    |            |           |      |
|                          |                          |                          |                          |                         |            |           |      |
|                          |                          |                          |                          |                         |            |           |      |
| A IEEE 802.11(ac)        |                          |                          |                          |                         |            |           |      |
| 20 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.622 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | Mid Channel 157, 5785 M  | 17.369 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 165, 5825 M | 17.593 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | VHT, MCS8                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.571 MHz               | > 500 kHz               | Pass       |           |      |
|                          | 40 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0                |                         |            |           |      |
|                          |                          |                          | Low Channel 149/153, 57  | 34.788 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | High Channel 157/161, 57 | 35.544 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | VHT, MCS9                |                         |            |           |      |
|                          | 5725 MHz - 5850 MHz Band | Low Channel 149/153, 57  | 35.643 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 157/161, 57 | 35.918 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | 80 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0               |            |           |      |
|                          |                          |                          |                          | Low Channel 149/153/157 | 76.371 MHz | > 500 kHz | Pass |
| VHT, MCS9                |                          |                          |                          |                         |            |           |      |
| Low Channel 149/153/157  | 76.212 MHz               |                          |                          | > 500 kHz               | Pass       |           |      |
| B IEEE 802.11(n)         |                          |                          |                          |                         |            |           |      |
| 20 MHz                   | 5725 MHz - 5850 MHz Band | HT, MCS8                 |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.574 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | Mid Channel 157, 5785 M  | 17.489 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 165, 5825 M | 17.551 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | HT, MCS15                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.424 MHz               | > 500 kHz               | Pass       |           |      |
|                          | 40 MHz                   | 5725 MHz - 5850 MHz Band | HT, MCS8                 |                         |            |           |      |
|                          |                          |                          | Low Channel 149/153, 57  | 34.939 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | High Channel 157/161, 57 | 35.063 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | HT, MCS15                |                         |            |           |      |
| 5725 MHz - 5850 MHz Band | Low Channel 149/153, 57  | 35.396 MHz               | > 500 kHz                | Pass                    |            |           |      |
|                          | High Channel 157/161, 57 | 35.324 MHz               | > 500 kHz                | Pass                    |            |           |      |
|                          |                          |                          |                          |                         |            |           |      |
|                          |                          |                          |                          |                         |            |           |      |
| B IEEE 802.11(ac)        |                          |                          |                          |                         |            |           |      |
| 20 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.465 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | Mid Channel 157, 5785 M  | 17.645 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 165, 5825 M | 17.591 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | VHT, MCS8                |                          |                         |            |           |      |
|                          |                          | Low Channel 149, 5745 M  | 17.571 MHz               | > 500 kHz               | Pass       |           |      |
|                          | 40 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0                |                         |            |           |      |
|                          |                          |                          | Low Channel 149/153, 57  | 34.571 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | High Channel 157/161, 57 | 35.336 MHz              | > 500 kHz  | Pass      |      |
|                          |                          |                          | VHT, MCS9                |                         |            |           |      |
|                          | 5725 MHz - 5850 MHz Band | Low Channel 149/153, 57  | 35.486 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | High Channel 157/161, 57 | 35.324 MHz               | > 500 kHz               | Pass       |           |      |
|                          |                          | 80 MHz                   | 5725 MHz - 5850 MHz Band | VHT, MCS0               |            |           |      |
|                          |                          |                          |                          | Low Channel 149/153/157 | 76.335 MHz | > 500 kHz | Pass |
| VHT, MCS9                |                          |                          |                          |                         |            |           |      |
| Low Channel 149/153/157  | 75.219 MHz               |                          |                          | > 500 kHz               | Pass       |           |      |

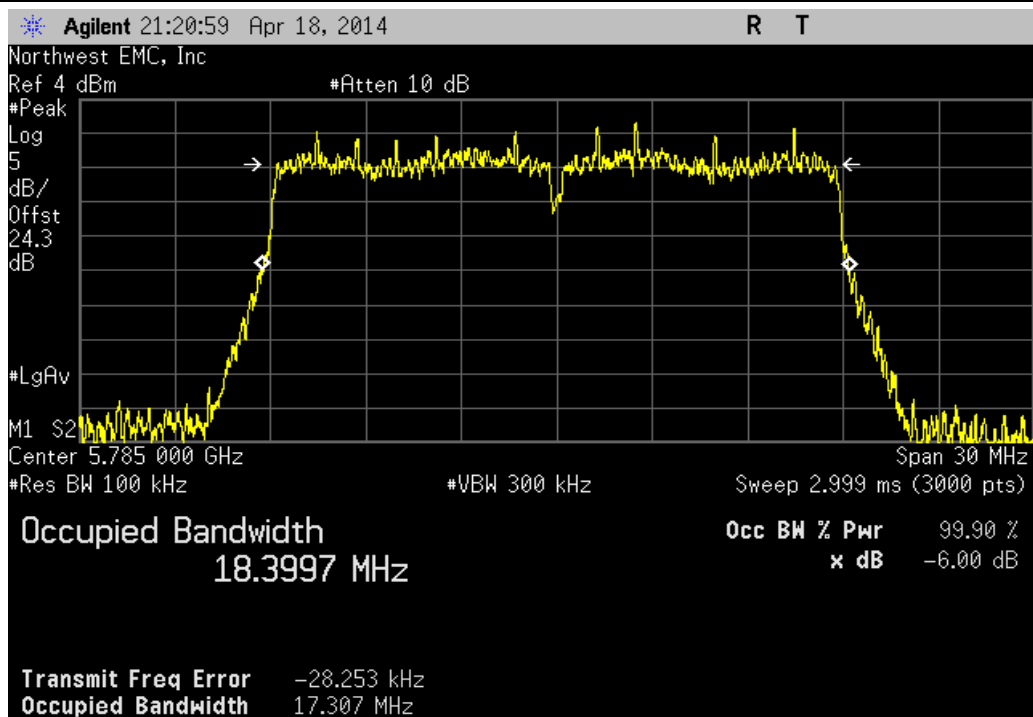
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.598 MHz | > 500 kHz | Pass   |



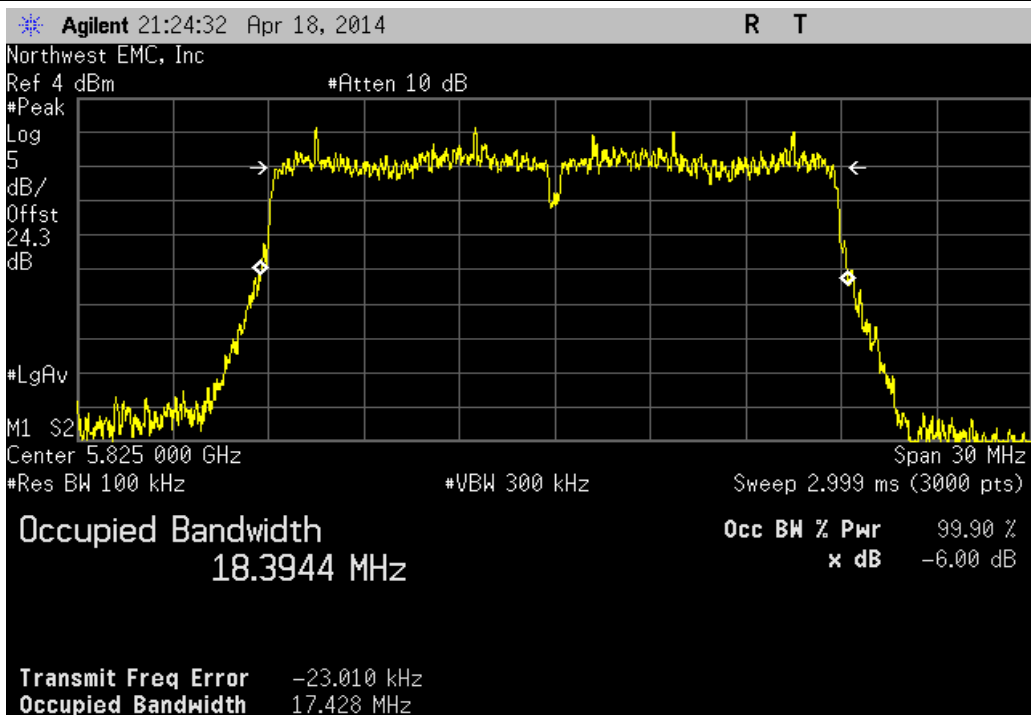
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.307 MHz | > 500 kHz | Pass   |



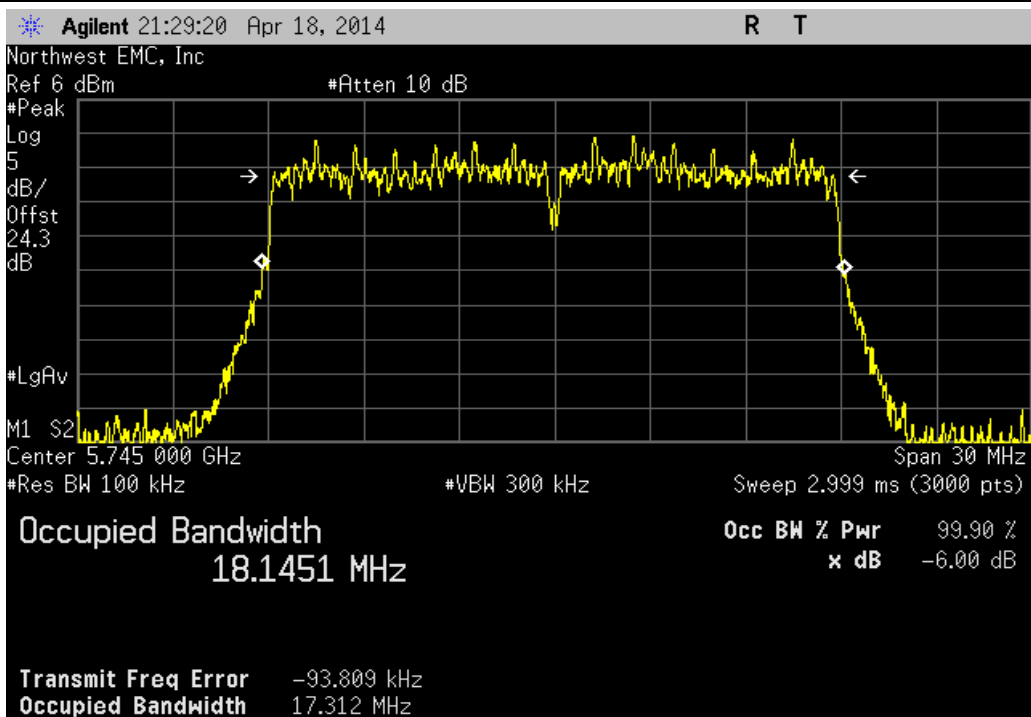
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.428 MHz | > 500 kHz | Pass   |



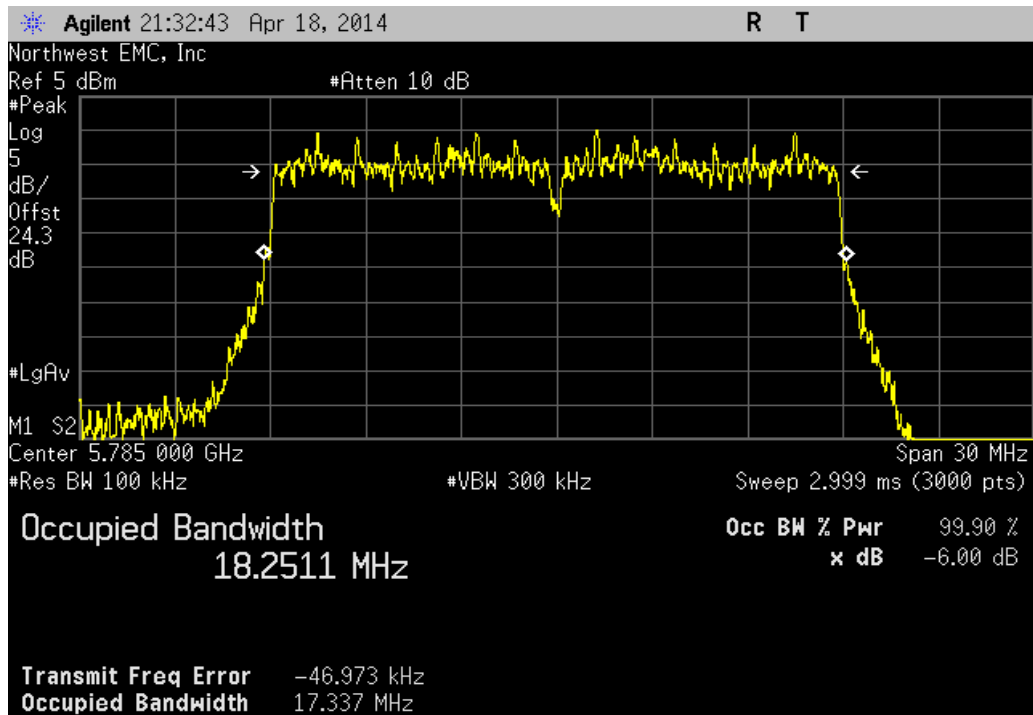
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.312 MHz | > 500 kHz | Pass   |



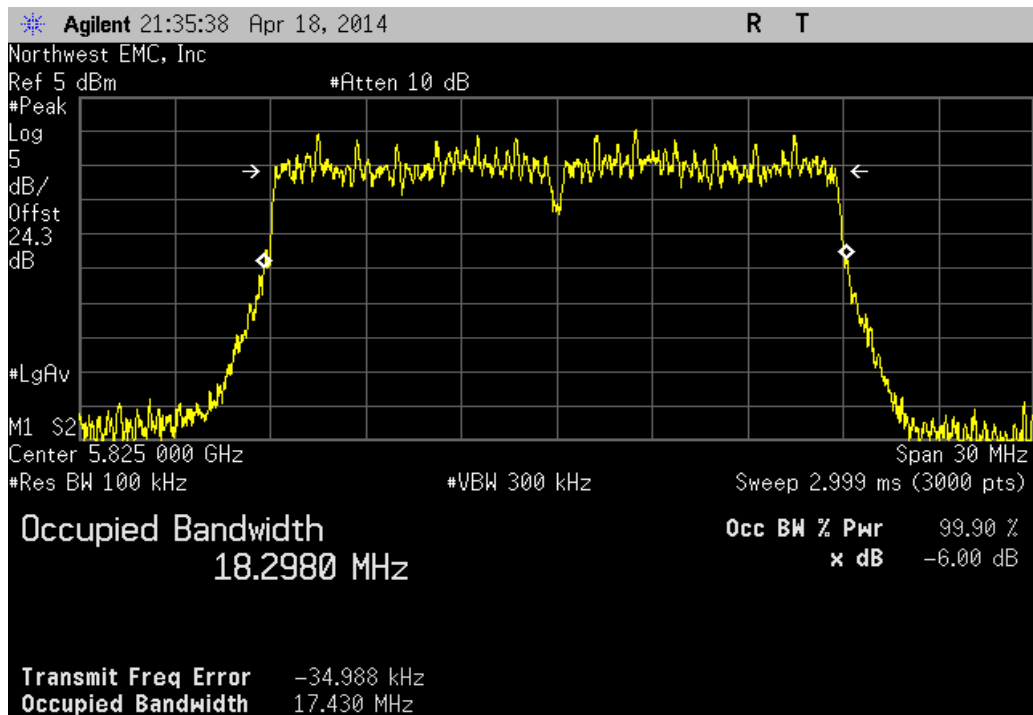
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.337 MHz | > 500 kHz | Pass   |



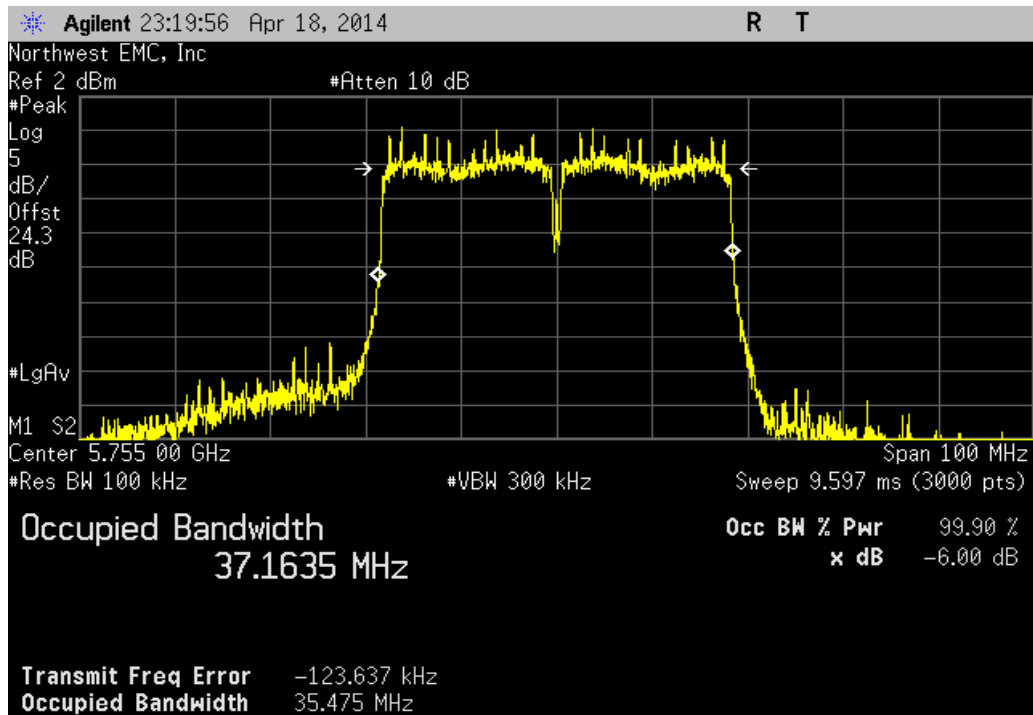
A IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, High Channel 165, 5825 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 17.43 MHz | > 500 kHz | Pass   |



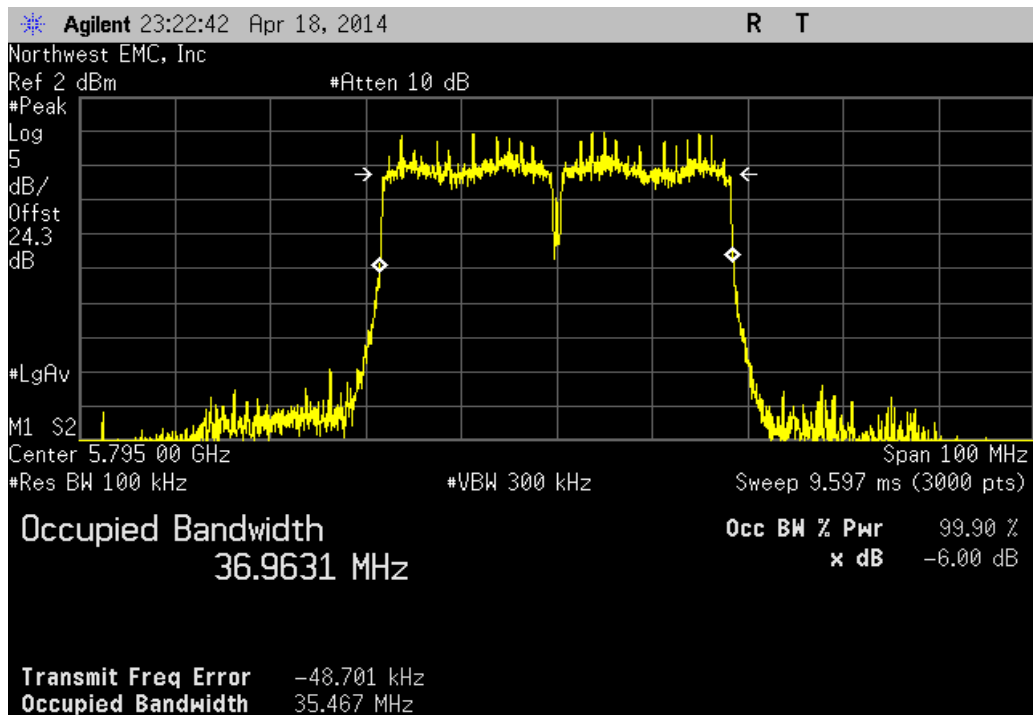
A IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Low Channel 149/153, 5755 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.475 MHz | > 500 kHz | Pass   |



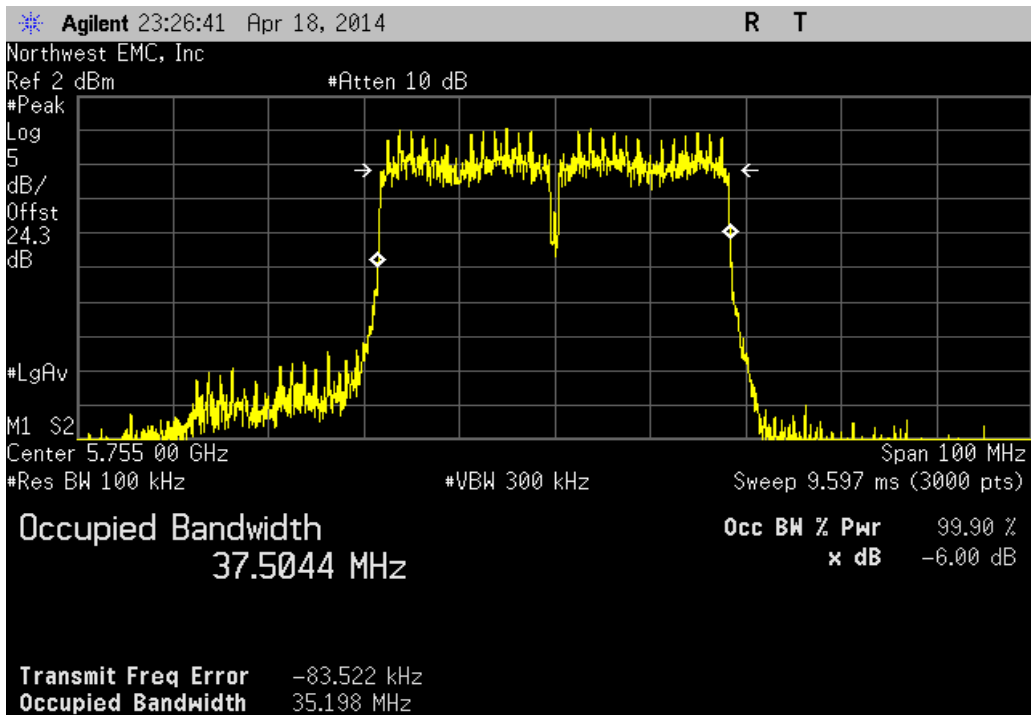
A IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, High Channel 157/161, 5795 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.467 MHz | > 500 kHz | Pass   |



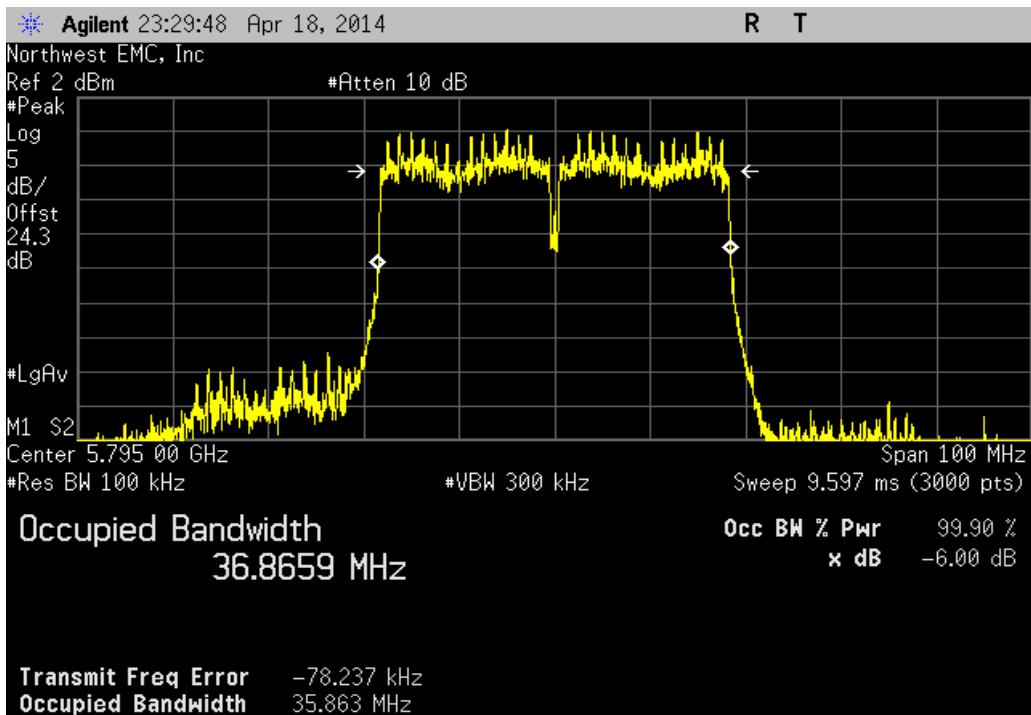
A IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.198 MHz | > 500 kHz | Pass   |



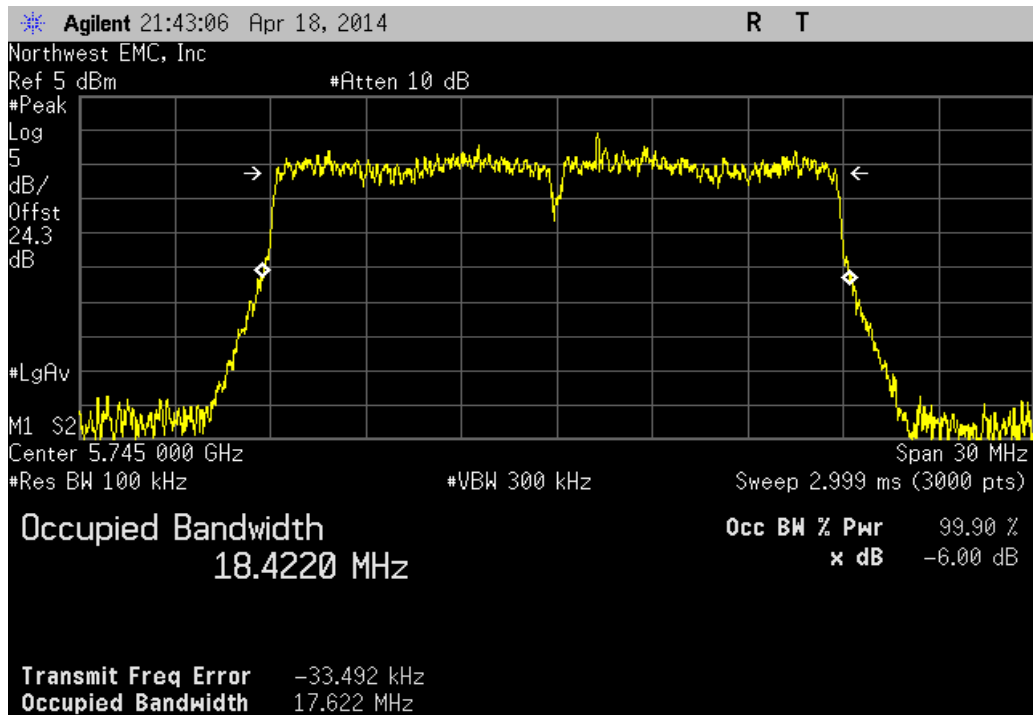
A IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.863 MHz | > 500 kHz | Pass   |



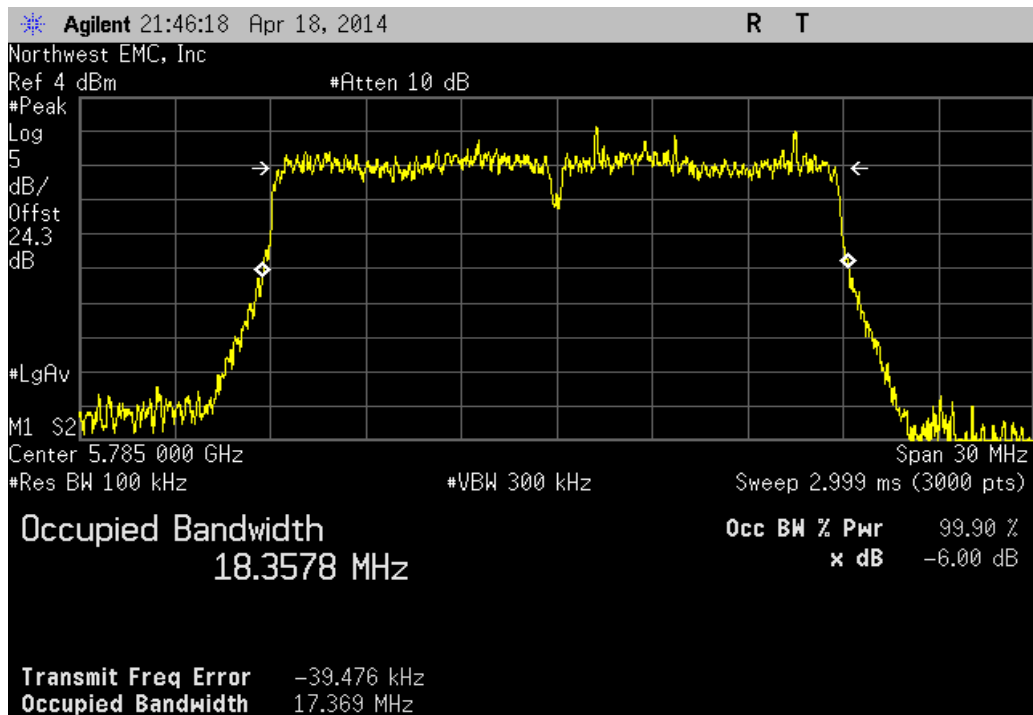
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.622 MHz | > 500 kHz | Pass   |



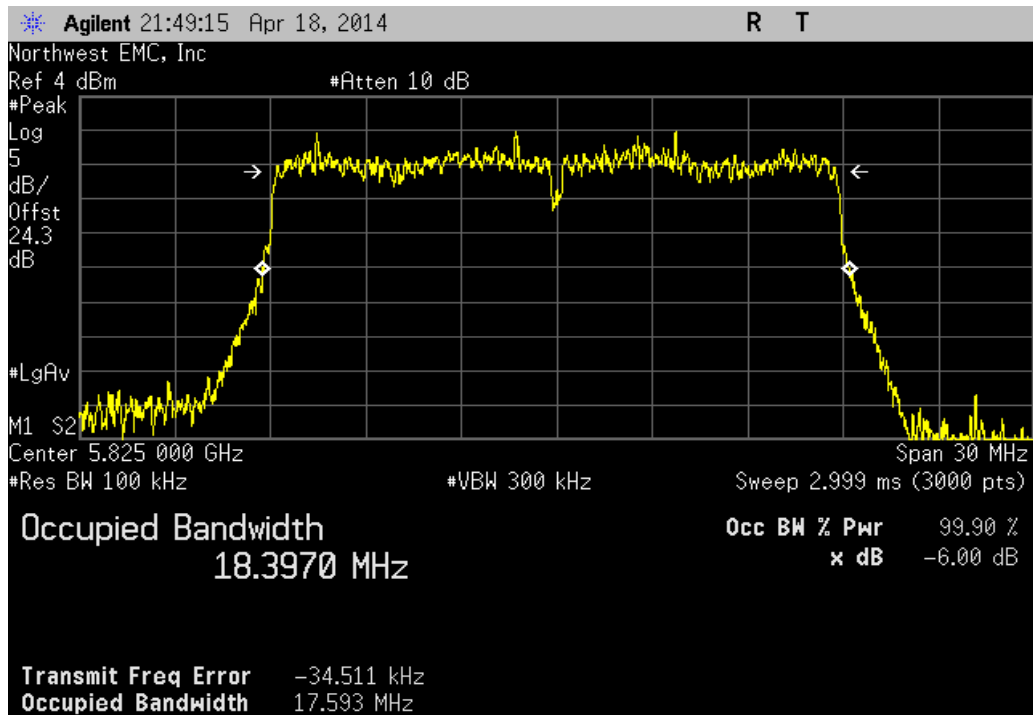
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.369 MHz | > 500 kHz | Pass   |



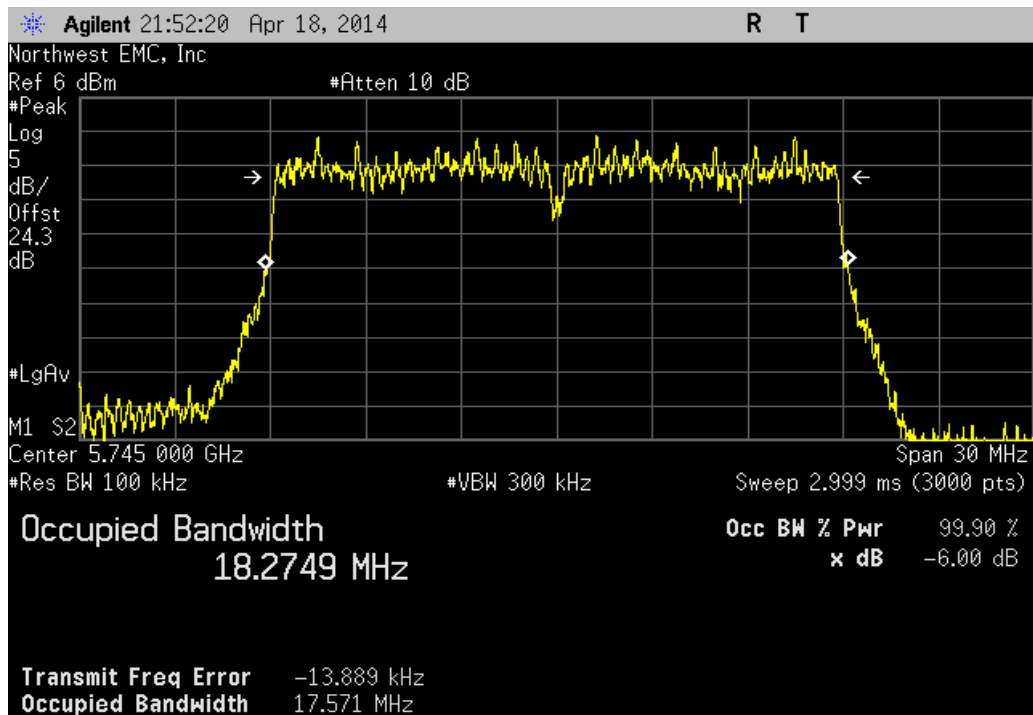
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.593 MHz | > 500 kHz | Pass   |



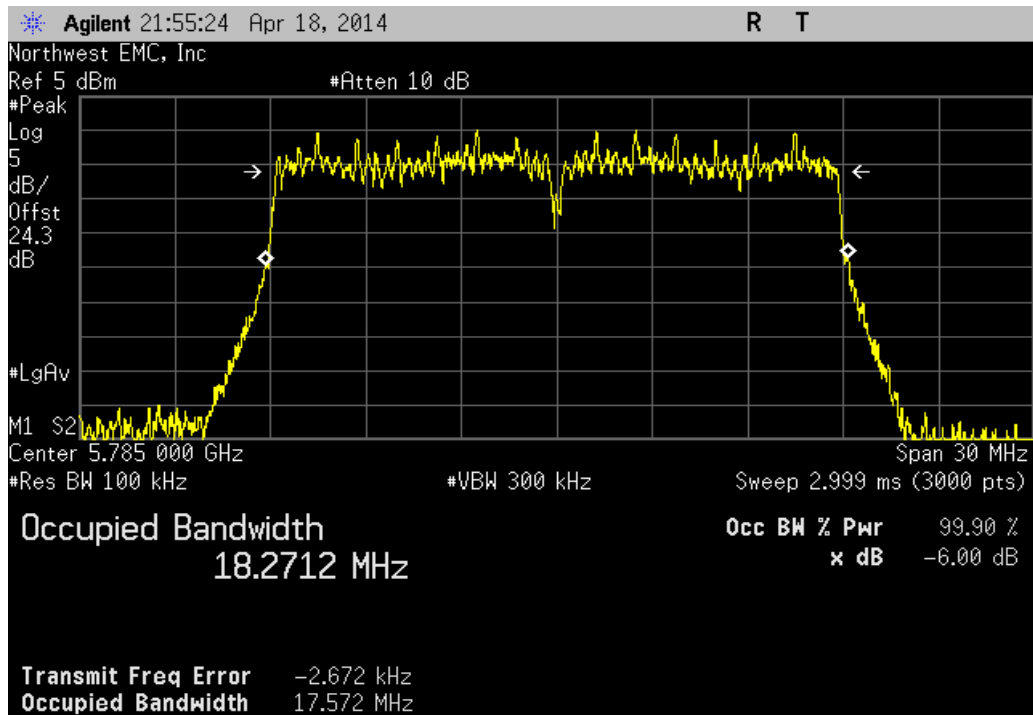
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.571 MHz | > 500 kHz | Pass   |



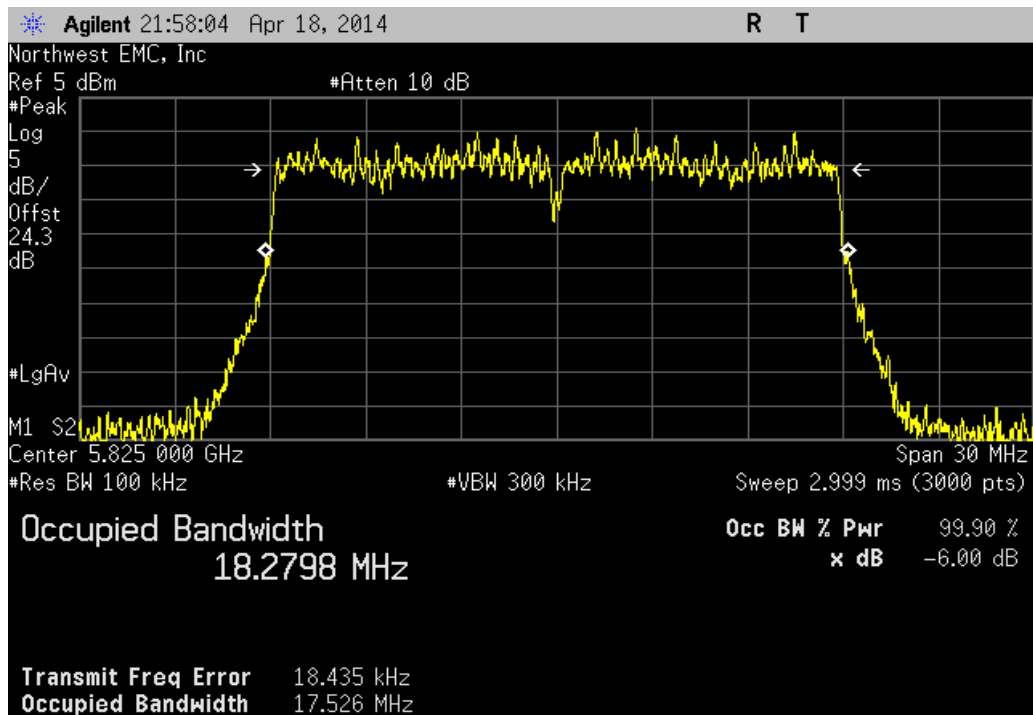
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.572 MHz | > 500 kHz | Pass   |



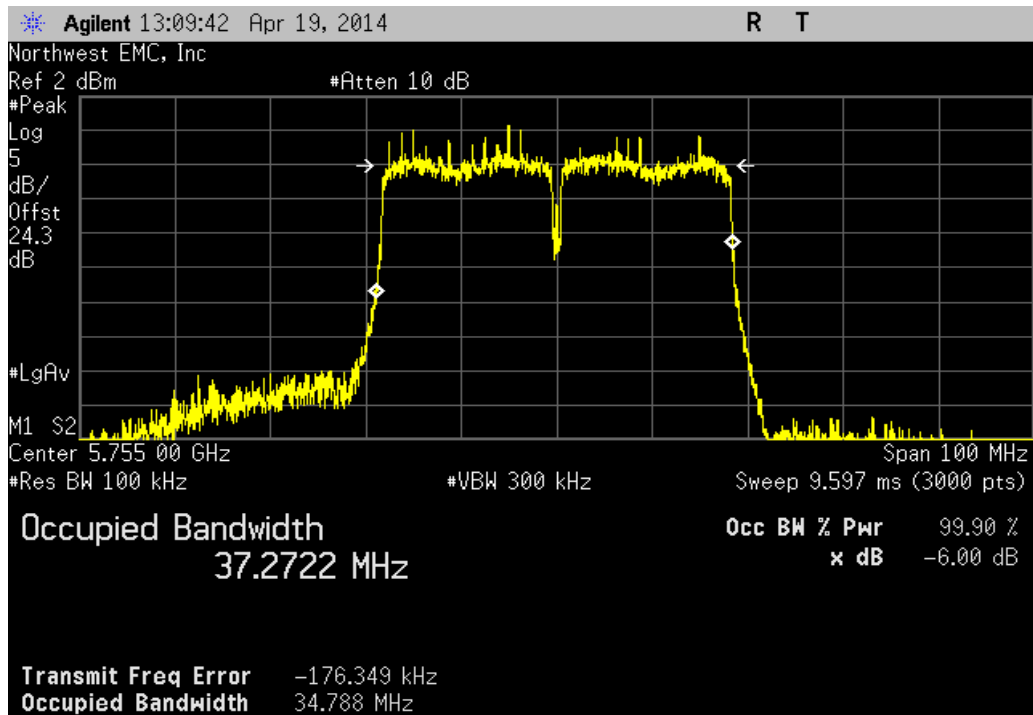
A IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.526 MHz | > 500 kHz | Pass   |



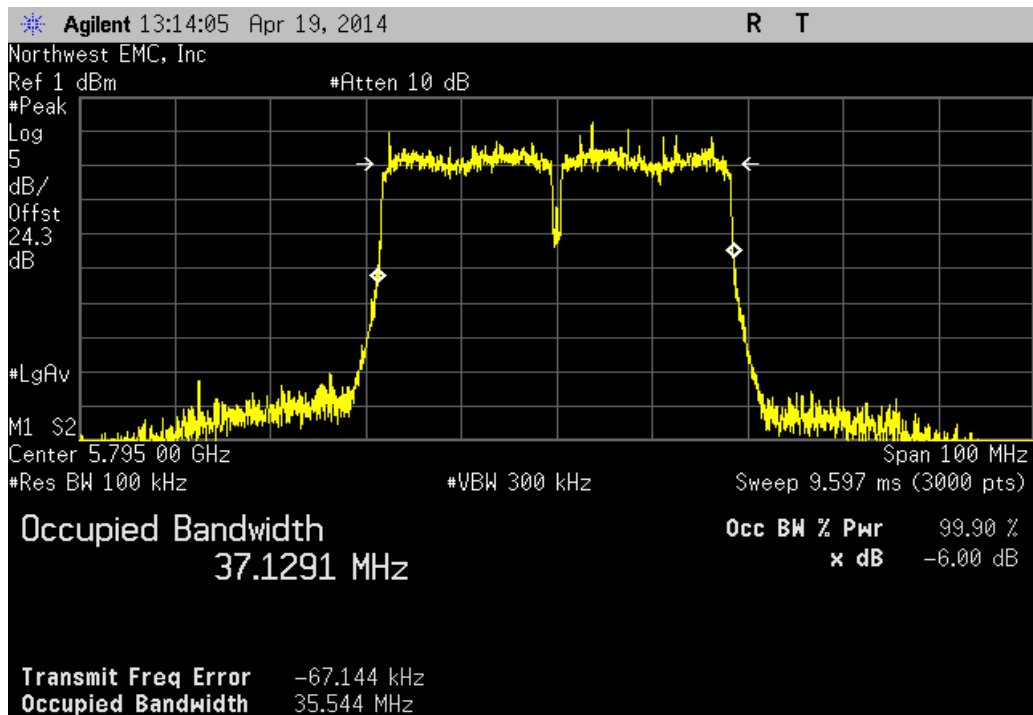
A IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 34.788 MHz | > 500 kHz | Pass   |



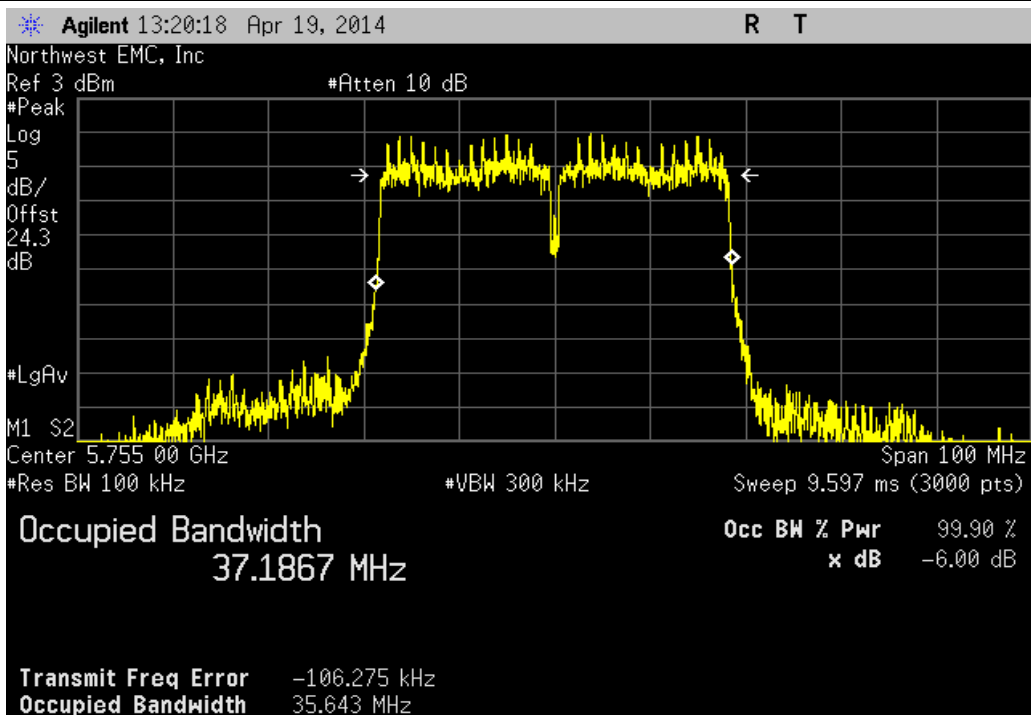
A IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.544 MHz | > 500 kHz | Pass   |



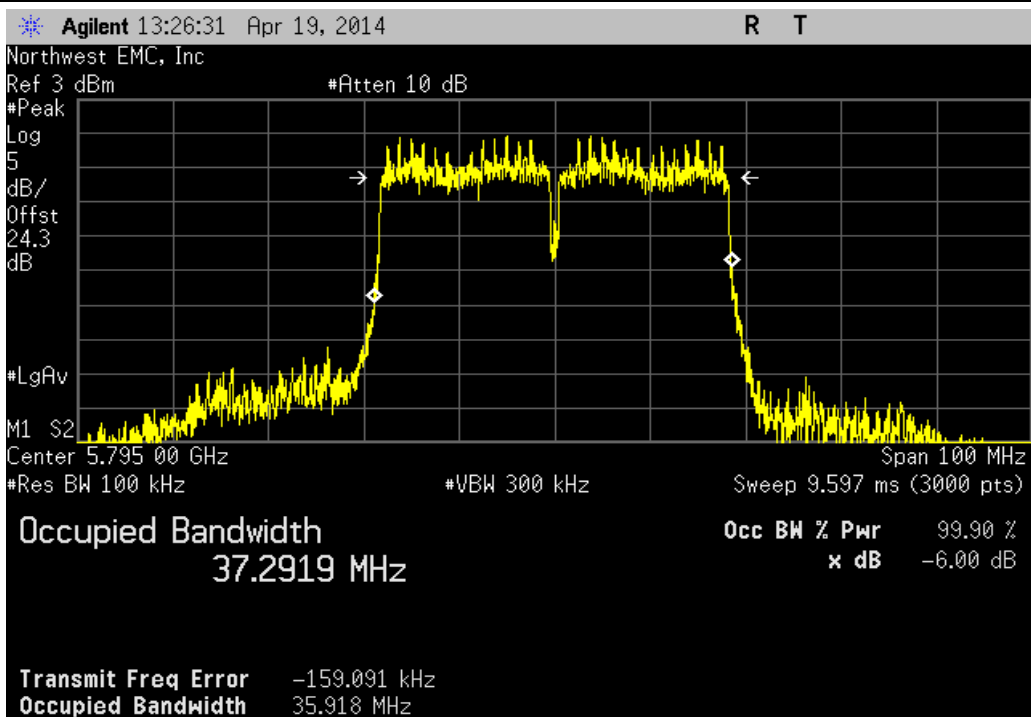
A IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153, 5755 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.643 MHz | > 500 kHz | Pass   |



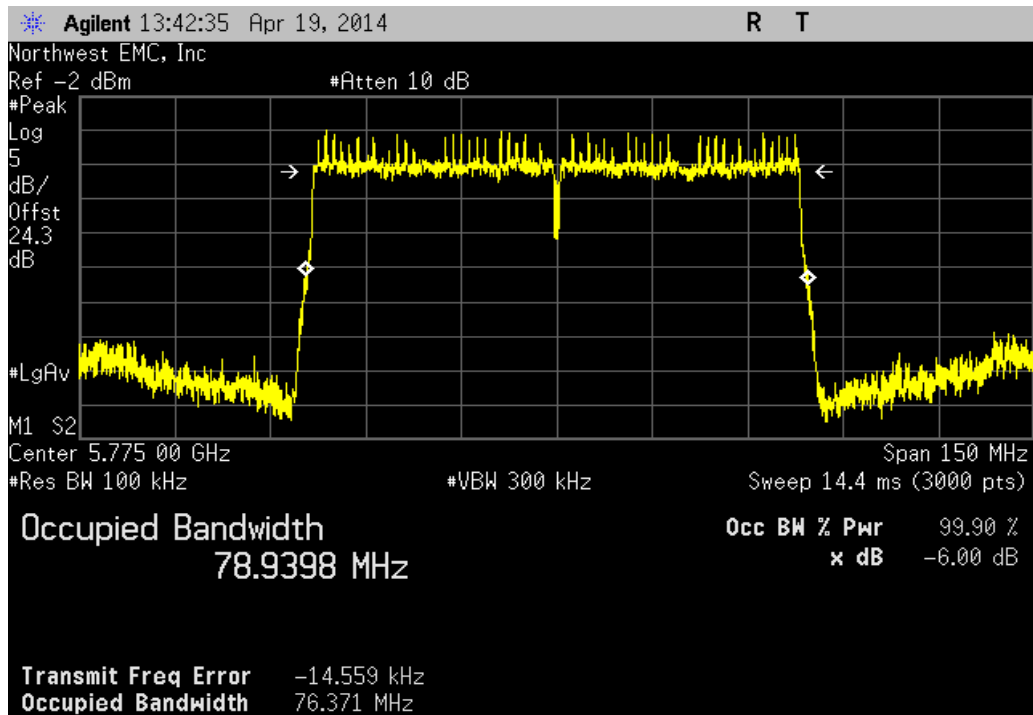
A IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, High Channel 157/161, 5795 MHz

|  |  |  |  | Value      | Limit     | Result |
|--|--|--|--|------------|-----------|--------|
|  |  |  |  | 35.918 MHz | > 500 kHz | Pass   |



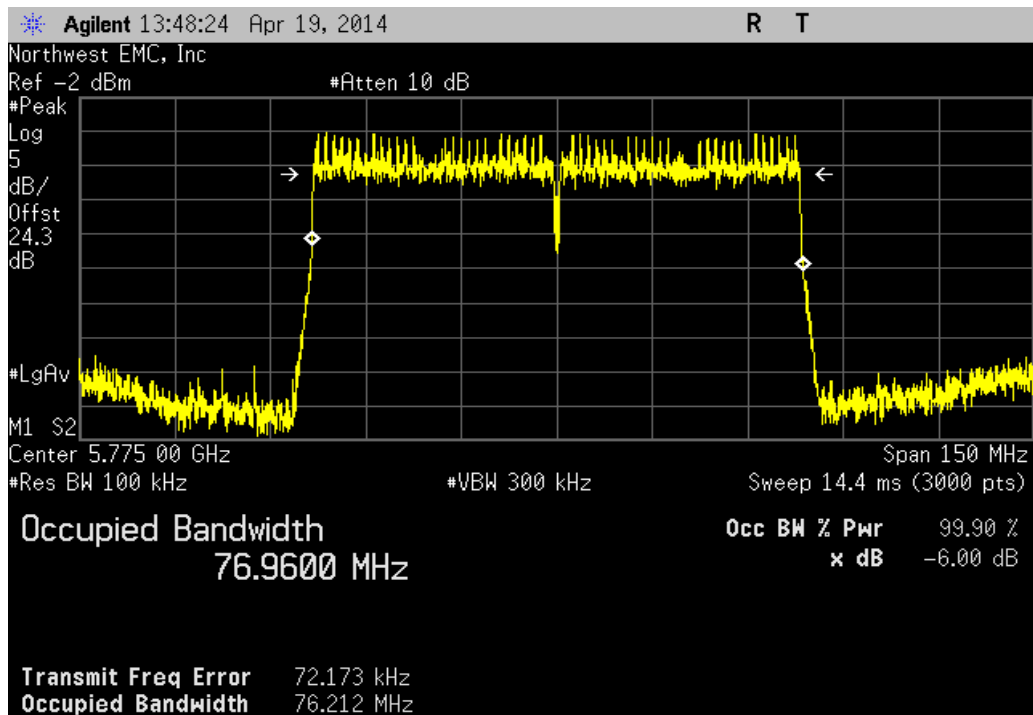
A IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.371 MHz | > 500 kHz | Pass   |



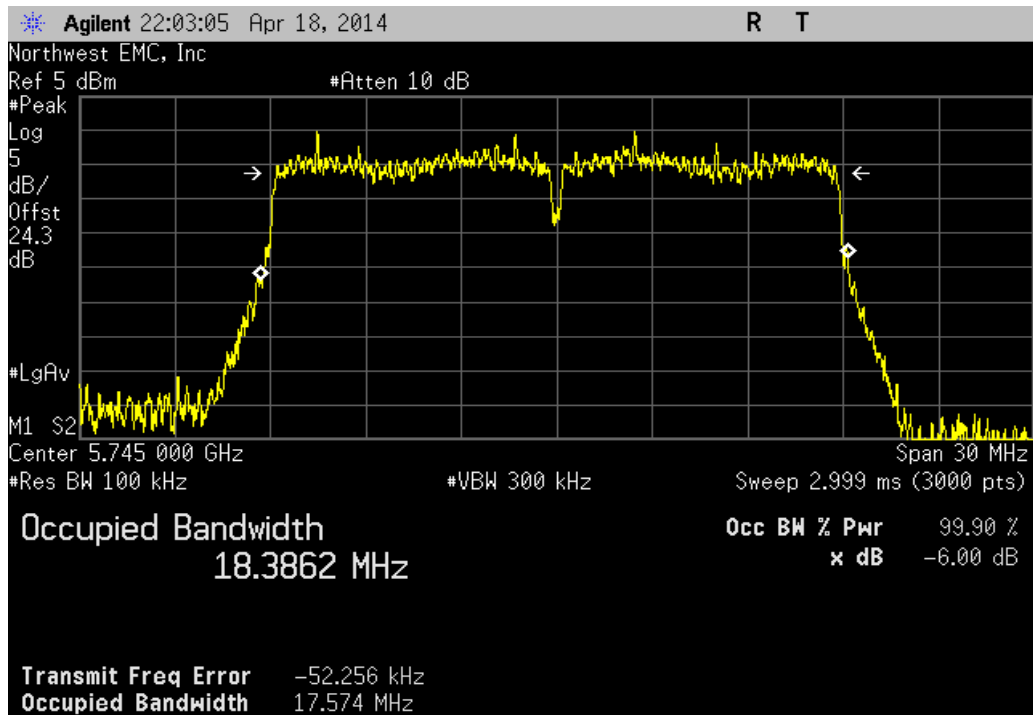
A IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.212 MHz | > 500 kHz | Pass   |



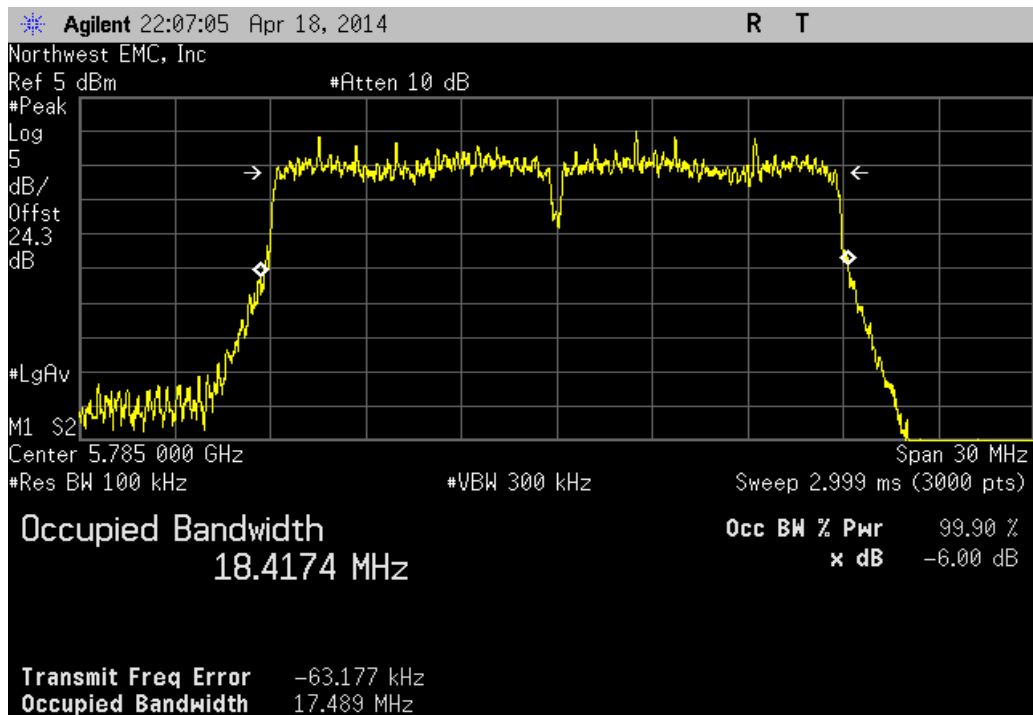
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.574 MHz | > 500 kHz | Pass   |



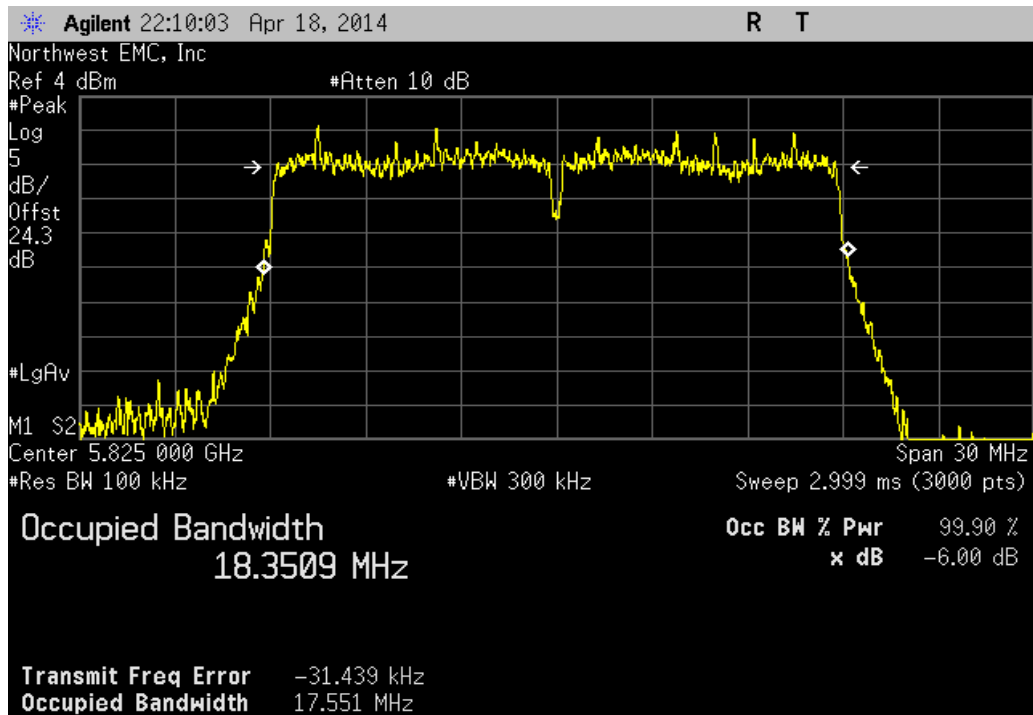
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.489 MHz | > 500 kHz | Pass   |



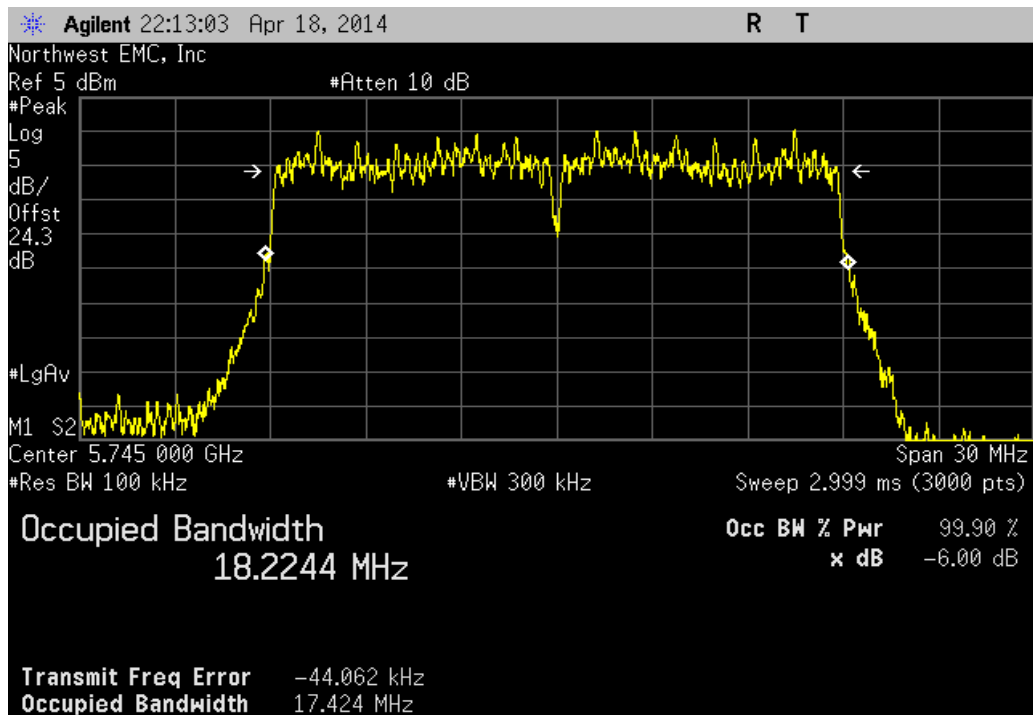
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.551 MHz | > 500 kHz | Pass   |



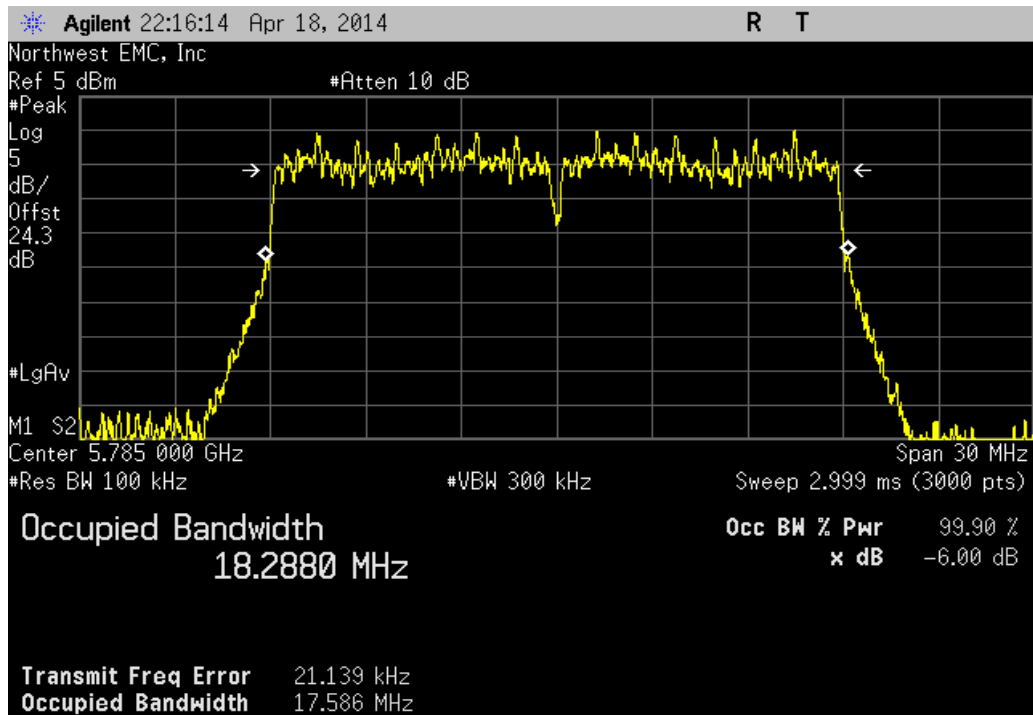
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.424 MHz | > 500 kHz | Pass   |



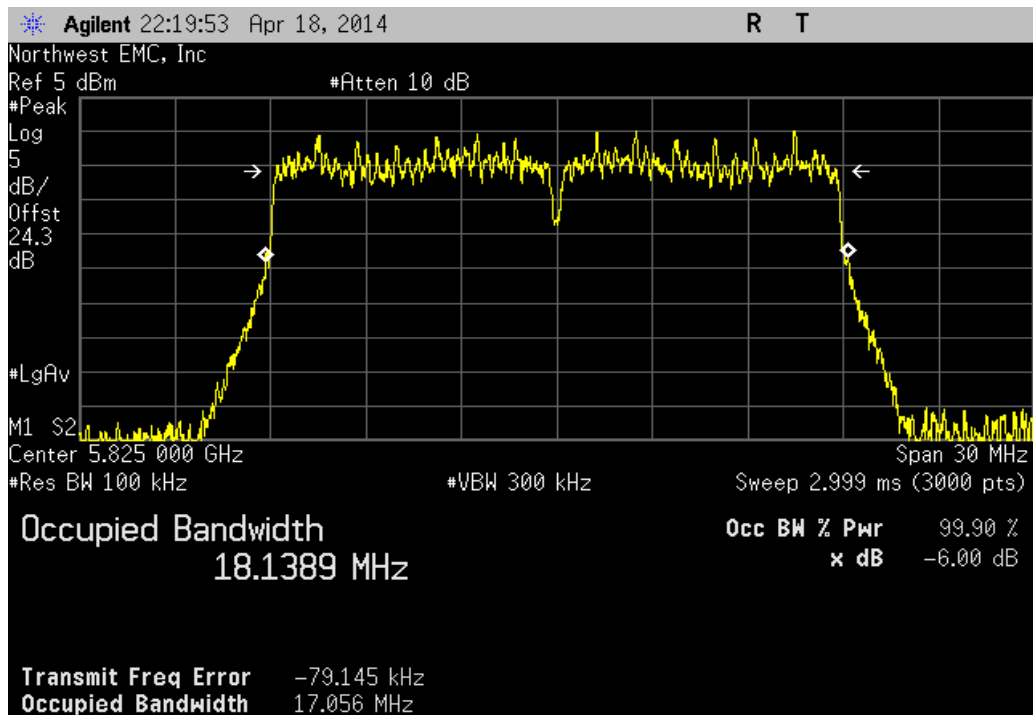
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.586 MHz | > 500 kHz | Pass   |



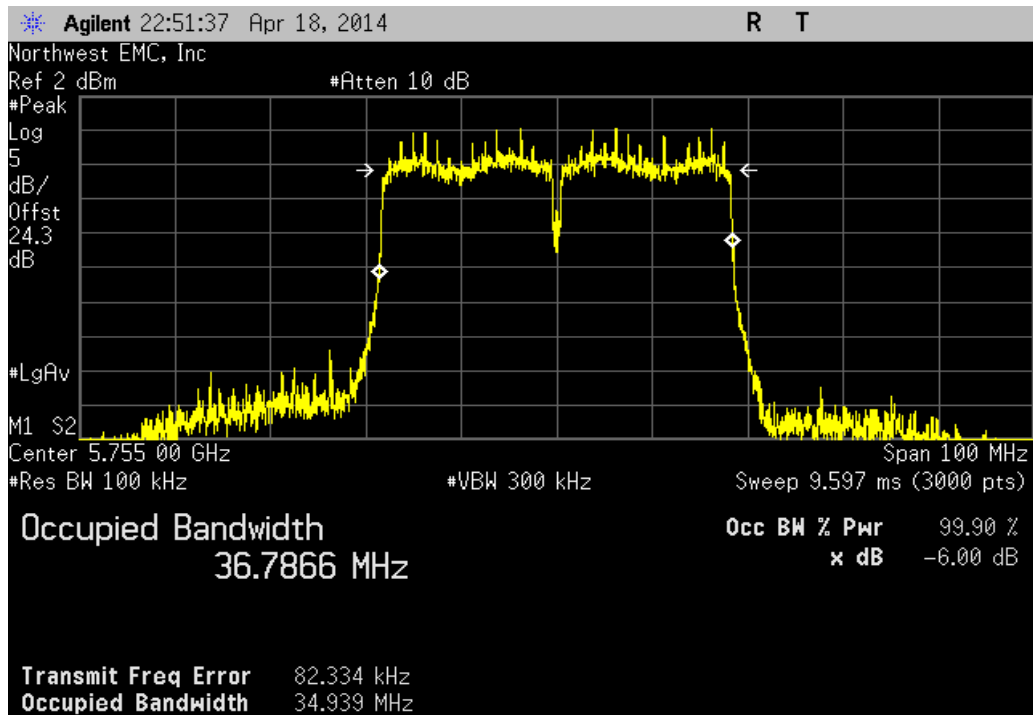
B IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.056 MHz | > 500 kHz | Pass   |



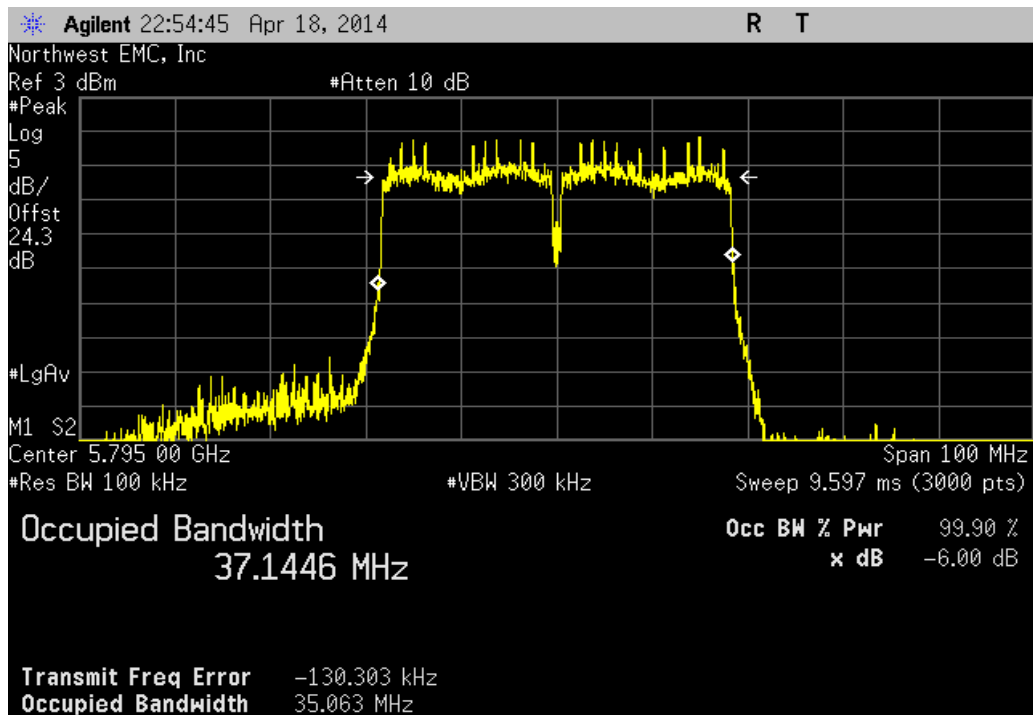
B IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 34.939 MHz | > 500 kHz | Pass   |



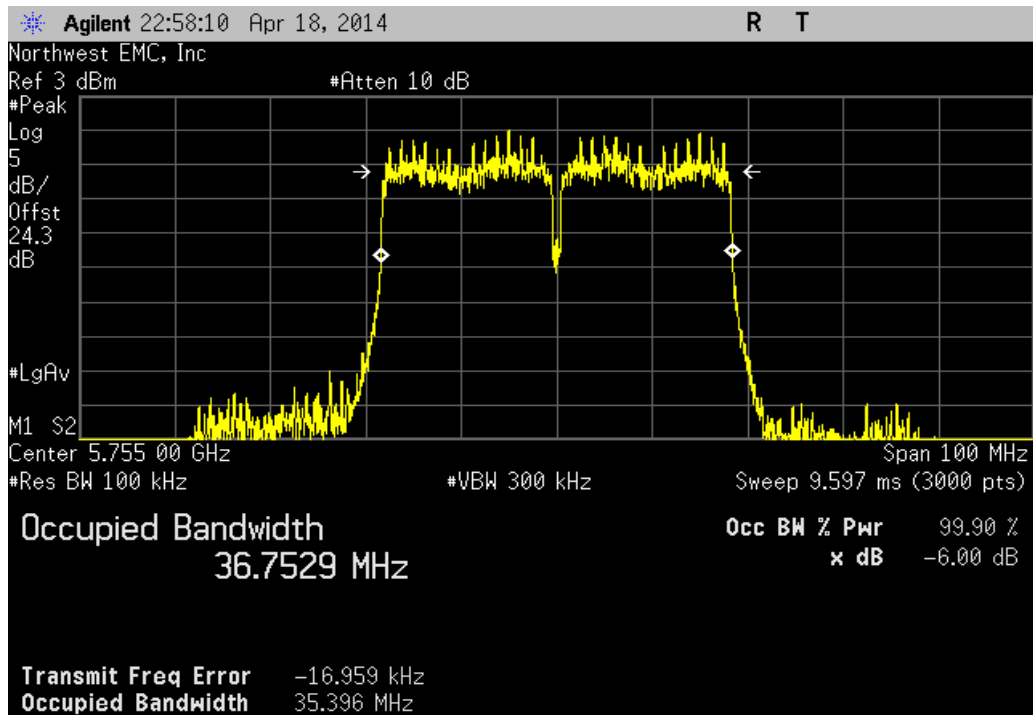
B IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS8, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.063 MHz | > 500 kHz | Pass   |



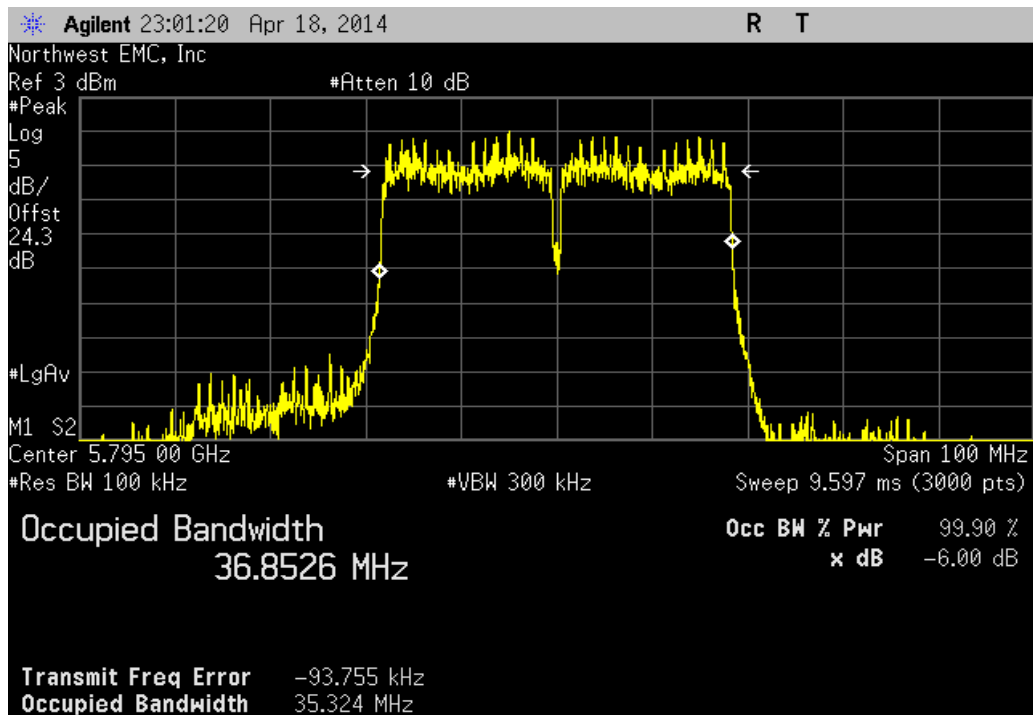
B IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.396 MHz | > 500 kHz | Pass   |



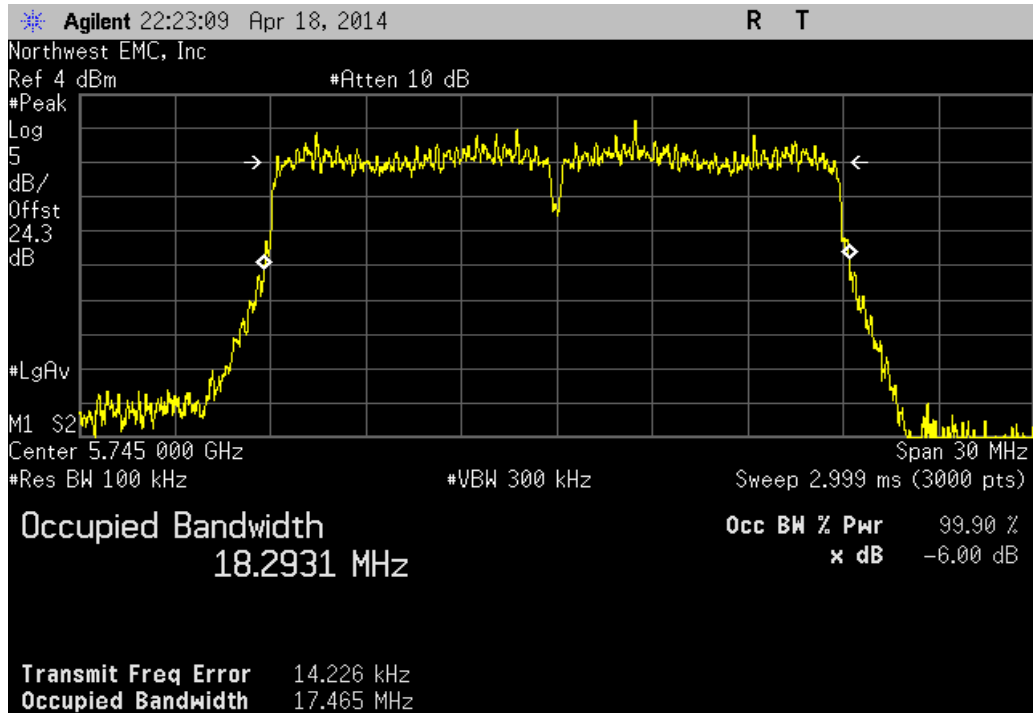
B IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS15, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.324 MHz | > 500 kHz | Pass   |



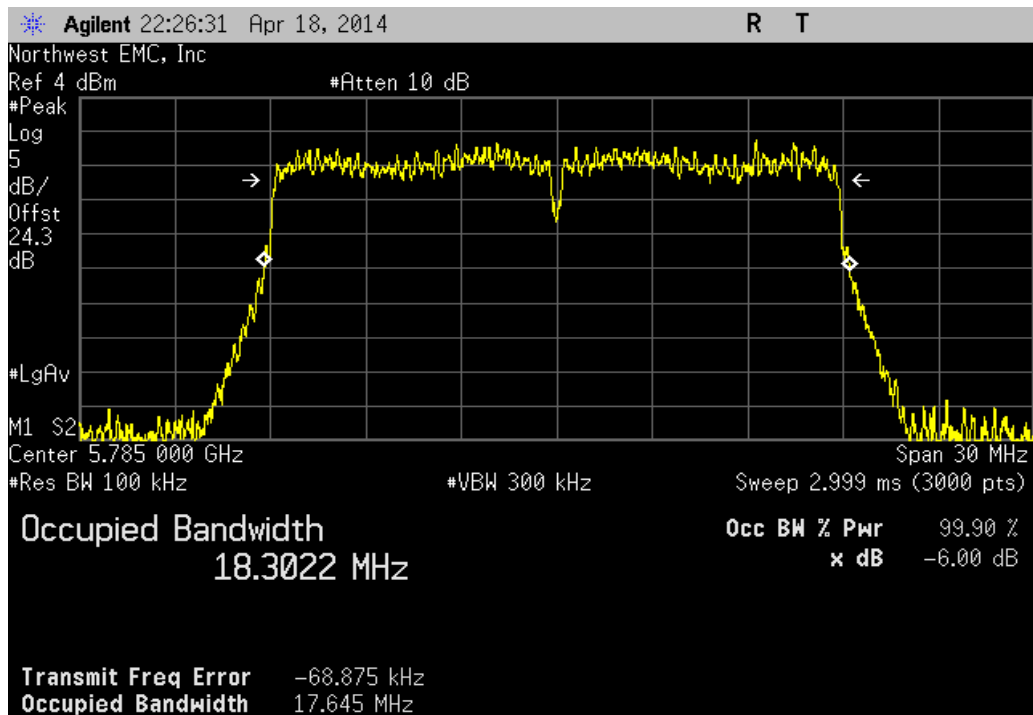
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.465 MHz | > 500 kHz | Pass   |



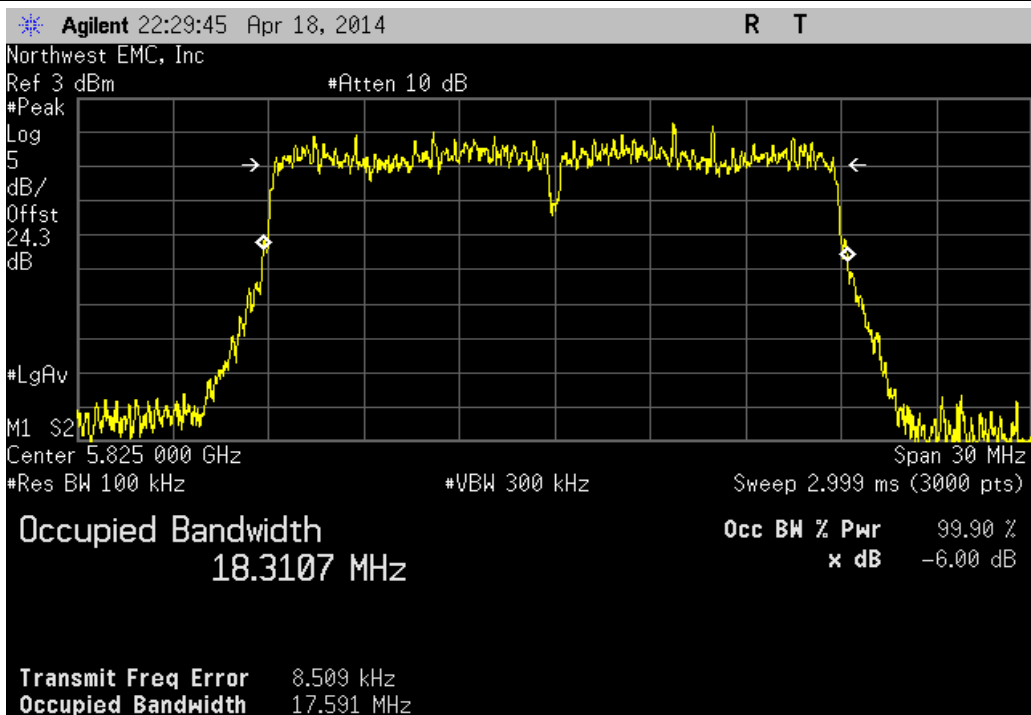
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.645 MHz | > 500 kHz | Pass   |



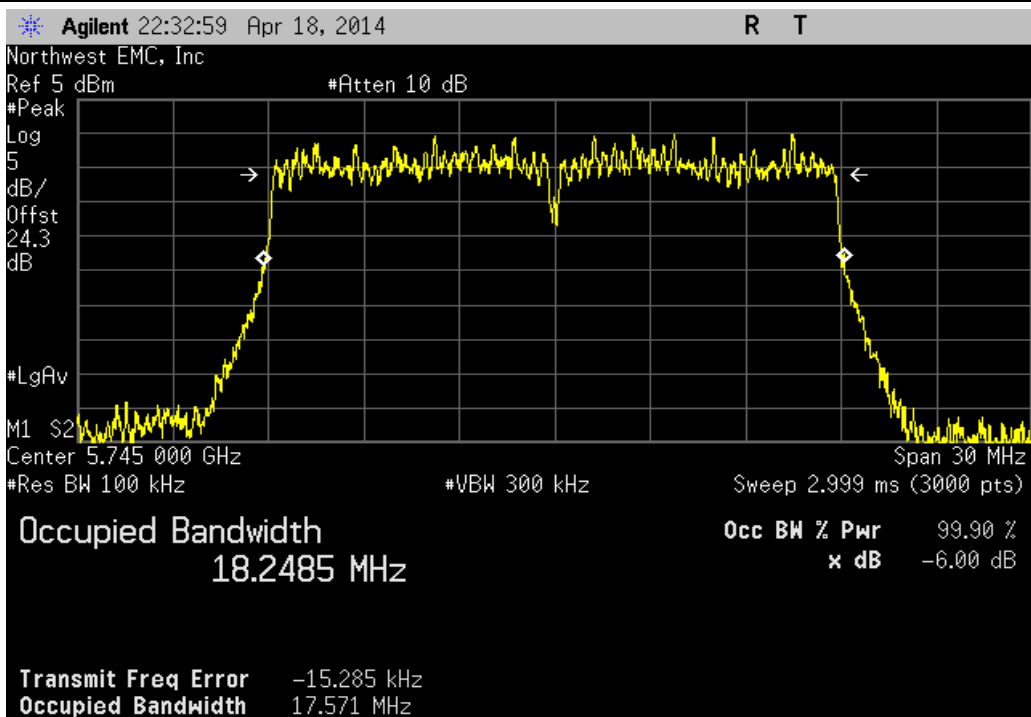
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.591 MHz | > 500 kHz | Pass   |



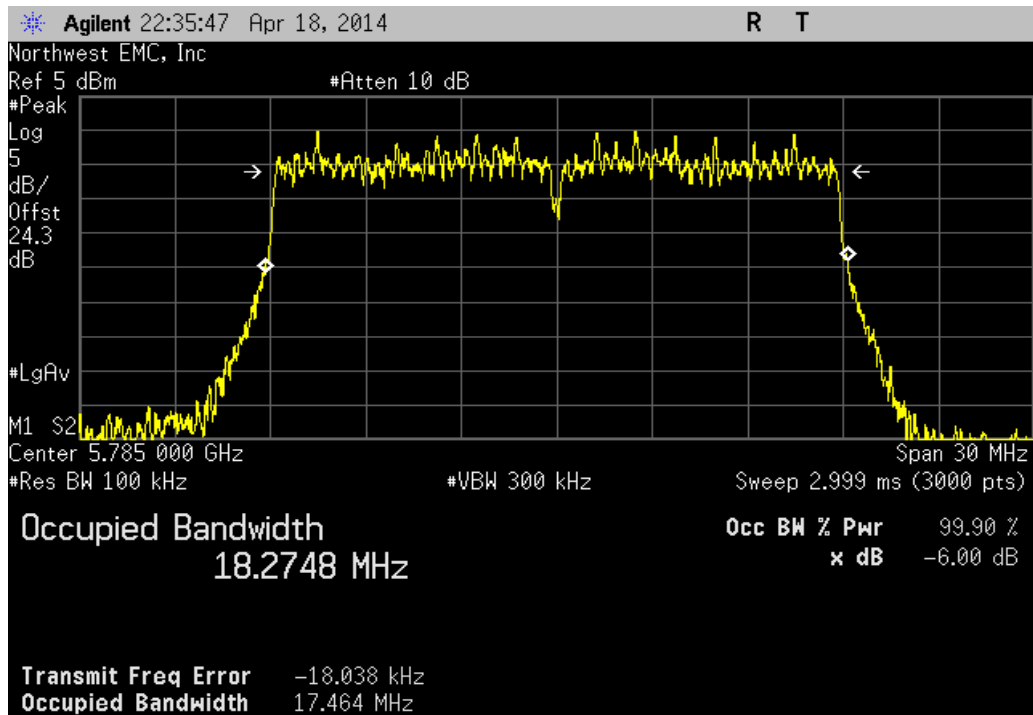
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.571 MHz | > 500 kHz | Pass   |



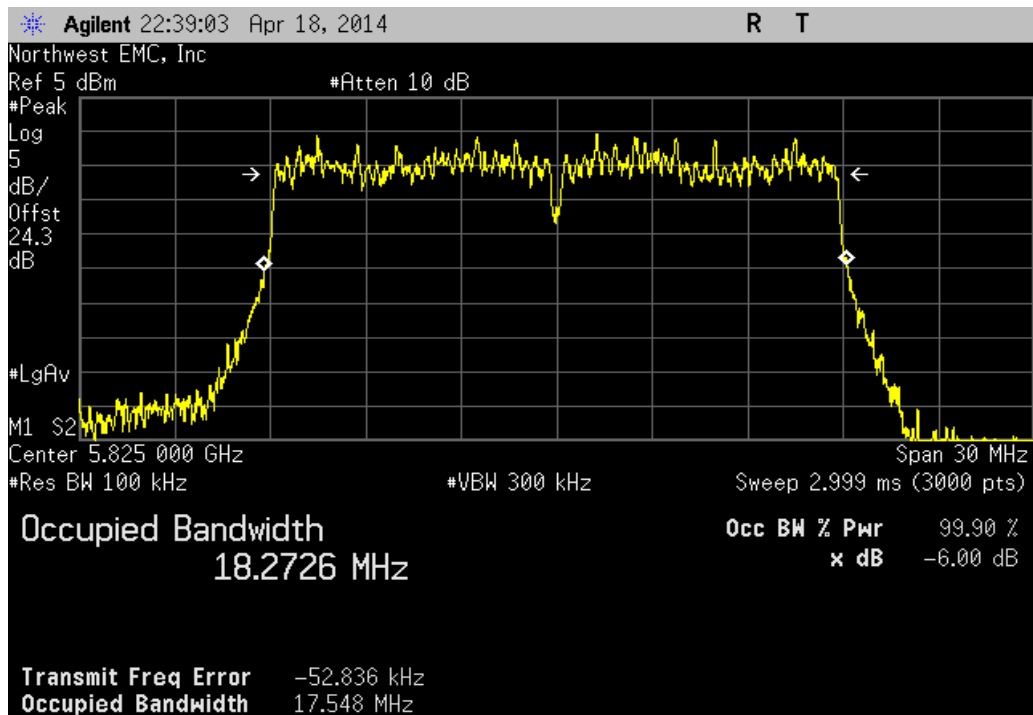
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.464 MHz | > 500 kHz | Pass   |



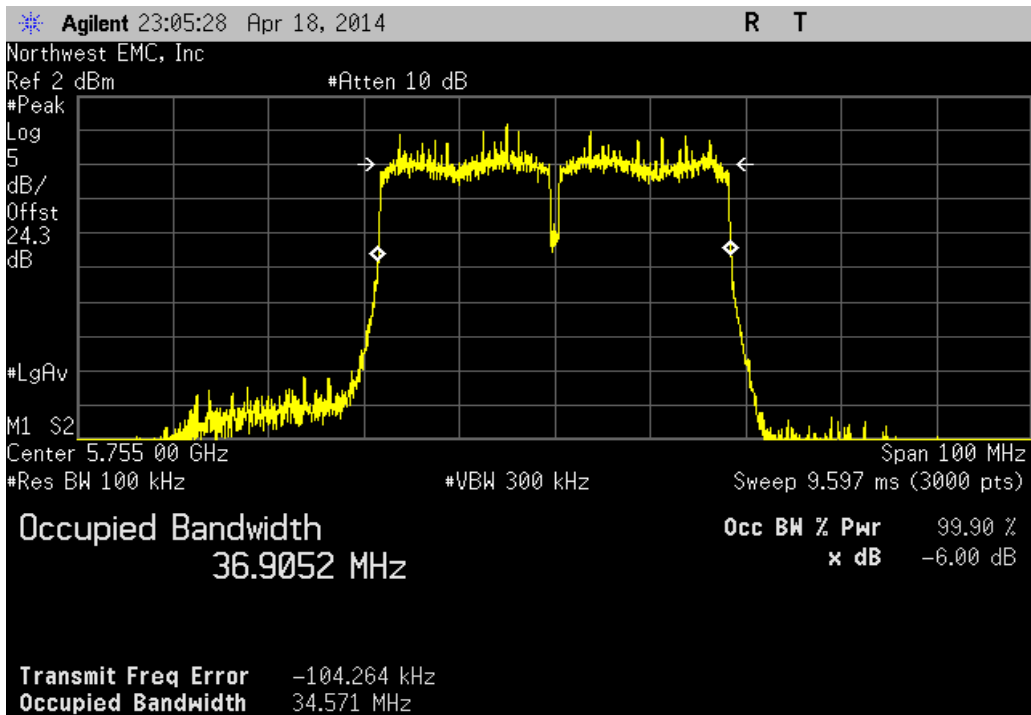
B IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.548 MHz | > 500 kHz | Pass   |



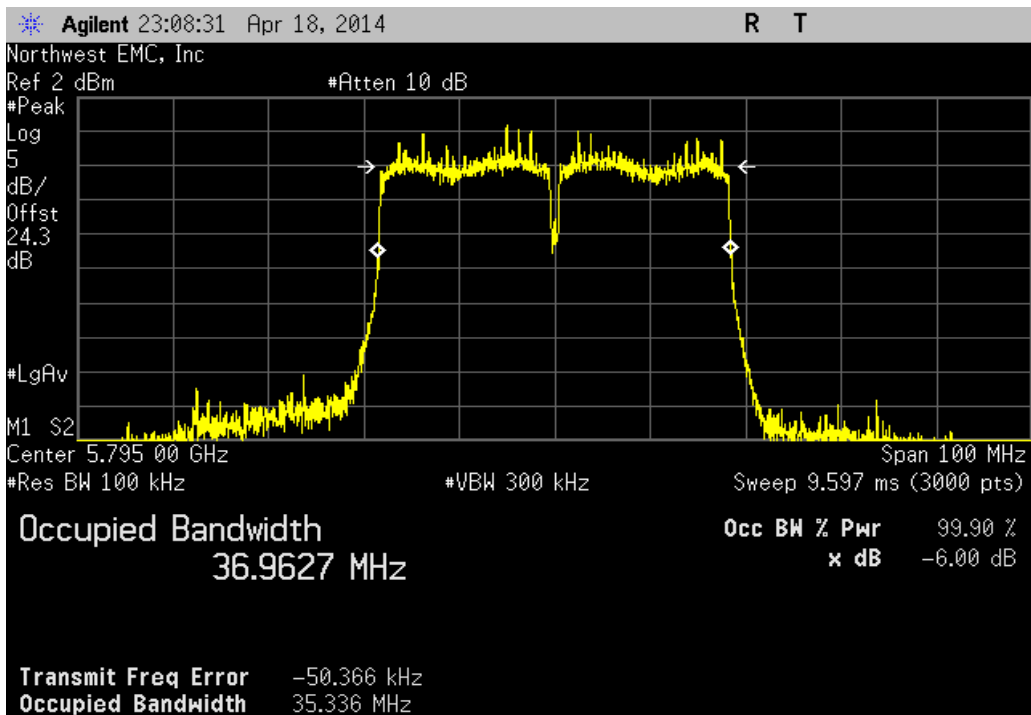
B IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 34.571 MHz | > 500 kHz | Pass   |



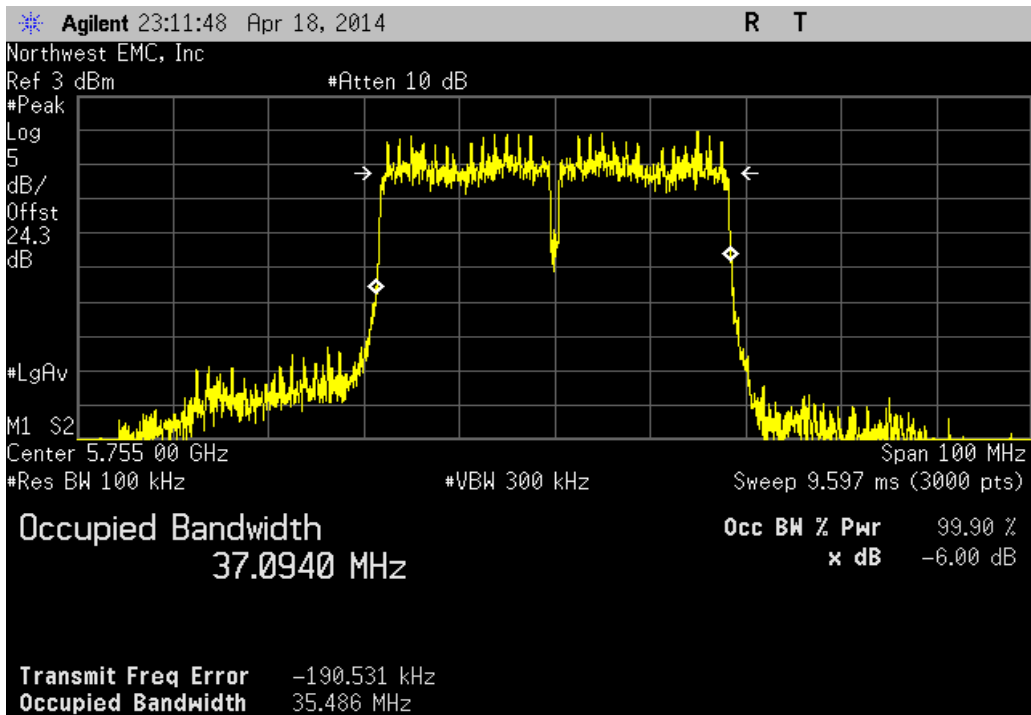
B IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.336 MHz | > 500 kHz | Pass   |



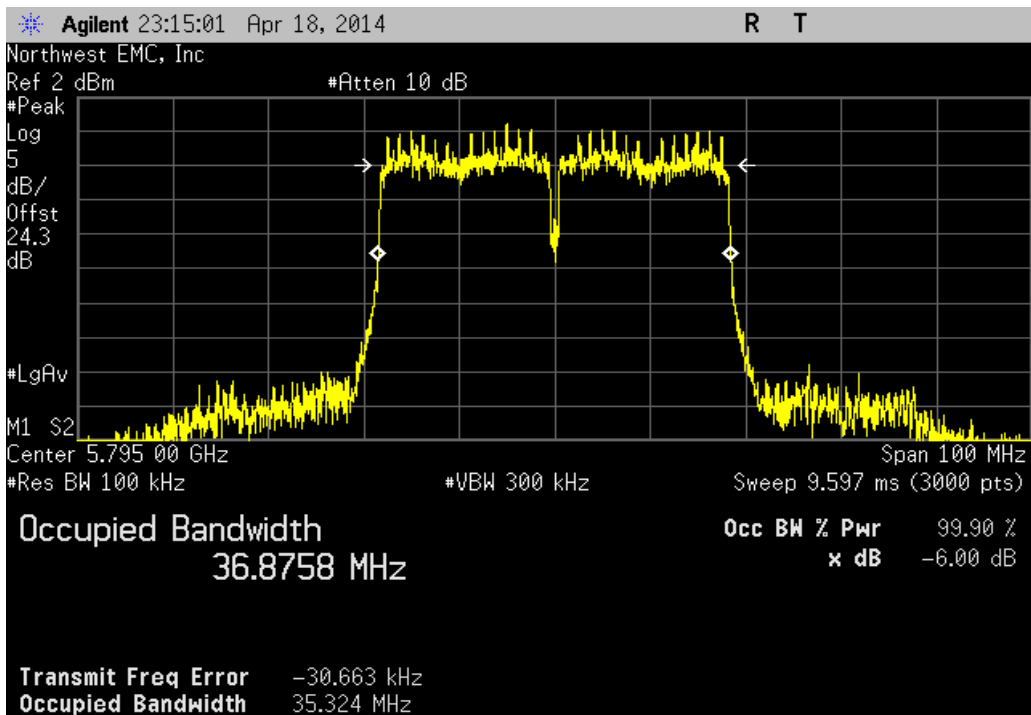
B IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.486 MHz | > 500 kHz | Pass   |



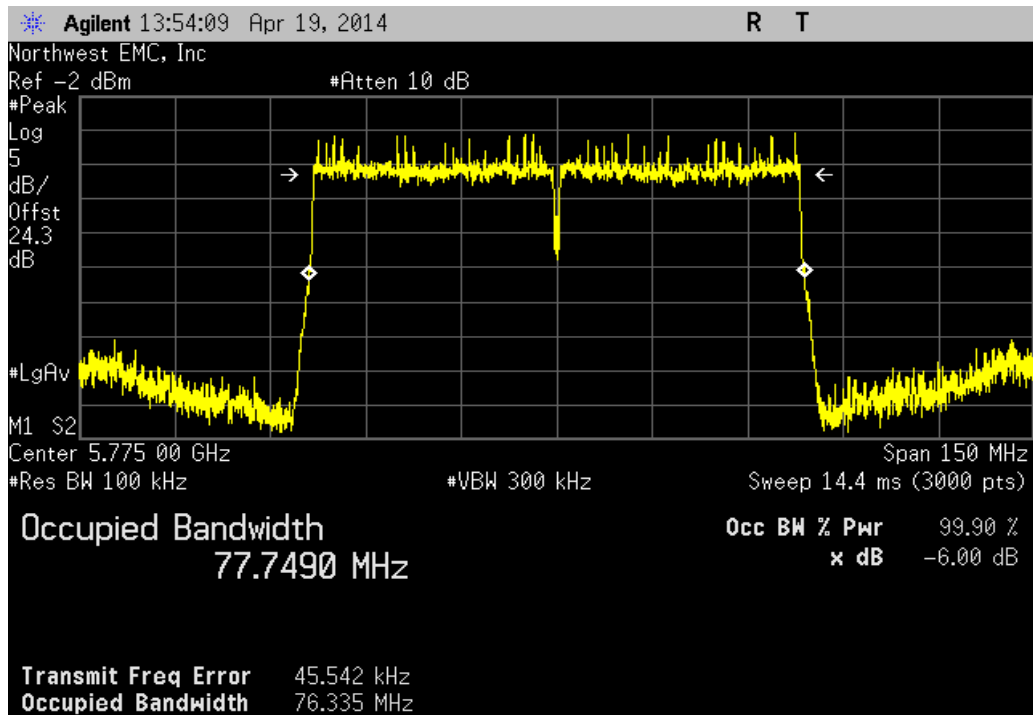
B IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.324 MHz | > 500 kHz | Pass   |



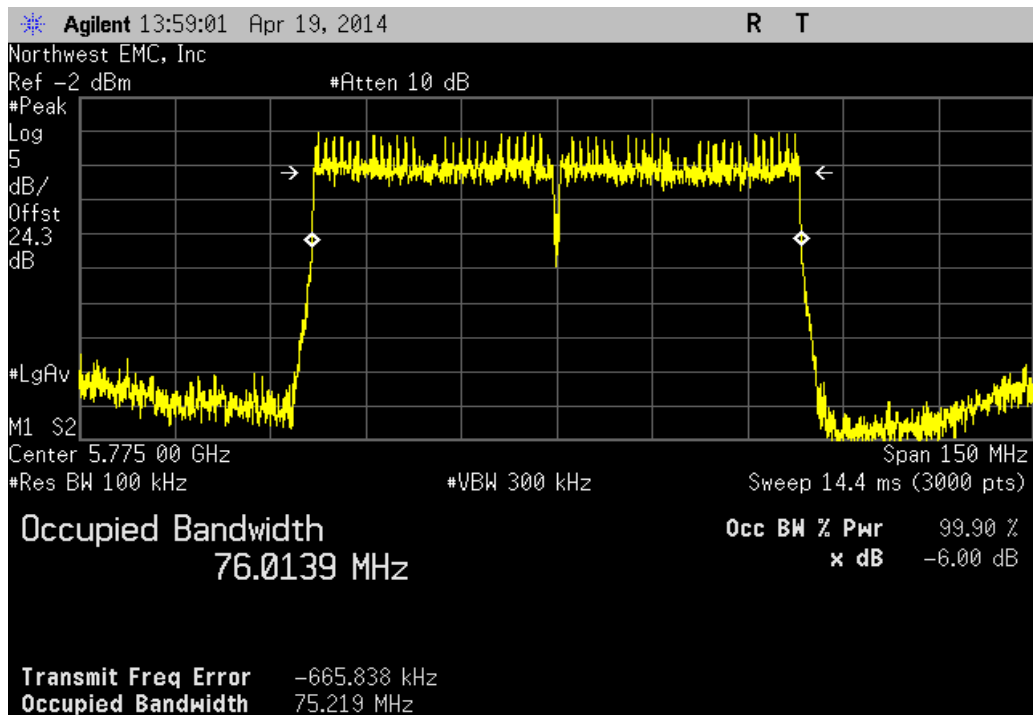
B IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.335 MHz | > 500 kHz | Pass   |



B IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 75.219 MHz | > 500 kHz | Pass   |



## OCCUPIED BANDWIDTH

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

### TEST EQUIPMENT

| Description                     | Manufacturer     | Model    | ID  | Last Cal.  | Interval (mo.) |
|---------------------------------|------------------|----------|-----|------------|----------------|
| 40GHz DC Block                  | Miteq            | DCB4000  | AMD | 5/16/2013  | 12             |
| Attenuator 20 dB, SMA M/F 26GHz | S.M. Electronics | SA26B-20 | AUY | 7/30/2013  | 12             |
| EV06 Direct Connect Cable       | ESM Cable Corp.  | TT       | ECA | NCR        | 0              |
| Power Meter                     | Gigatronics      | 8651A    | SPM | 11/26/2013 | 24             |
| Power Sensor                    | Gigatronics      | 80701A   | SPL | 7/8/2011   | 36             |
| Attenuator, 6dB                 | S.M. Electronics | 18N-06   | AWN | 2/3/2014   | 12             |
| MXG Analog Signal Generator     | Agilent          | N5181A   | TIG | 3/28/2014  | 36             |
| Spectrum Analyzer               | Agilent          | E4446A   | AAQ | 1/21/2014  | 24             |

### TEST DESCRIPTION

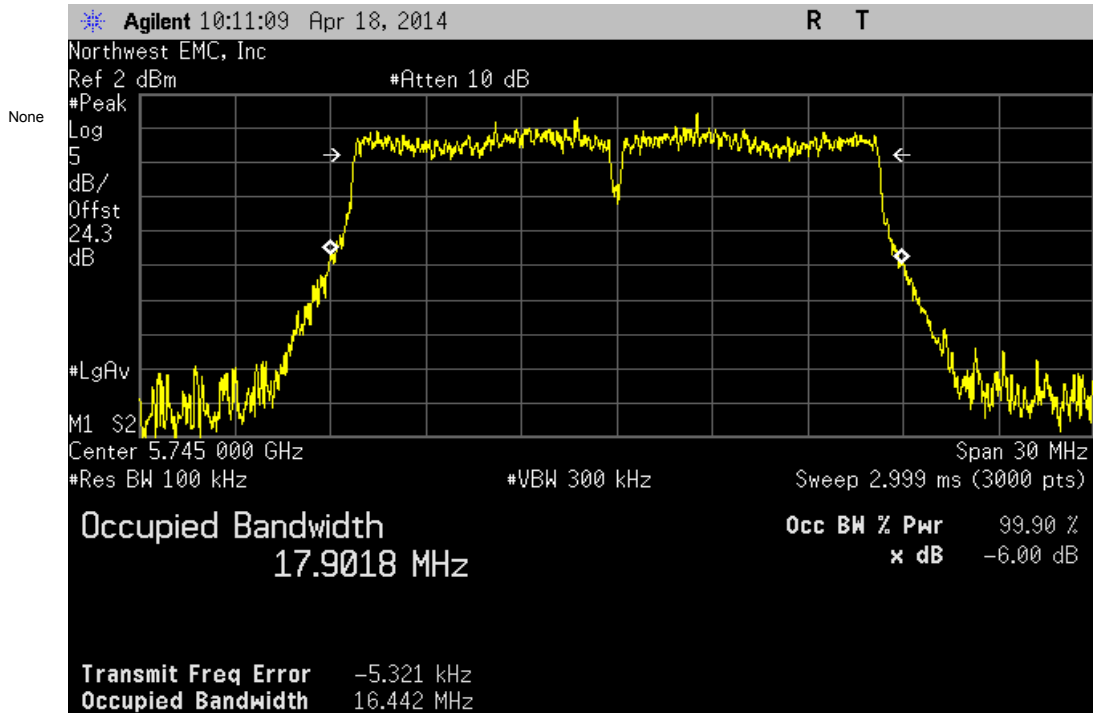
The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

The EUT was set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

|                                                                                                        |   |                                                                                             |                           |
|--------------------------------------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------|---------------------------|
| EUT: Model 1631                                                                                        |   | Work Order: MCSO1698                                                                        |                           |
| Serial Number: 006840341053                                                                            |   | Date: 04/23/14                                                                              |                           |
| Customer: Microsoft Corporation                                                                        |   | Temperature: 22.3°C                                                                         |                           |
| Attendees: None                                                                                        |   | Humidity: 32%                                                                               |                           |
| Project: None                                                                                          |   | Barometric Pres.: 1014                                                                      |                           |
| Tested by: Jared Ison                                                                                  |   | Power: 110VAC/60Hz                                                                          | Job Site: EV06            |
| TEST SPECIFICATIONS                                                                                    |   | Test Method                                                                                 |                           |
| FCC 15.247:2014                                                                                        |   | ANSI C63.10:2009                                                                            |                           |
| COMMENTS                                                                                               |   |                                                                                             |                           |
| Modes of operation tested were client provided. Reference power level table for channel power setting. |   |                                                                                             |                           |
| DEVIATIONS FROM TEST STANDARD                                                                          |   |                                                                                             |                           |
| None                                                                                                   |   |                                                                                             |                           |
| Configuration #                                                                                        | 6 | Signature  |                           |
|                                                                                                        |   | Value                                                                                       | Limit Result              |
| IEEE 802.11(a)                                                                                         |   |                                                                                             |                           |
| 20 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | 6 Mbps                                                                                      |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 16.442 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 16.457 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 16.526 MHz > 500 kHz Pass |
|                                                                                                        |   | 36 Mbps                                                                                     |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 16.429 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 16.359 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 16.341 MHz > 500 kHz Pass |
|                                                                                                        |   | 54 Mbps                                                                                     |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 16.445 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 16.4 MHz > 500 kHz Pass   |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 16.368 MHz > 500 kHz Pass |
| IEEE 802.11(n)                                                                                         |   |                                                                                             |                           |
| 20 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | HT, MCS7                                                                                    |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 17.449 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 17.543 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 17.563 MHz > 500 kHz Pass |
| 40 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | HT, MCS7                                                                                    |                           |
|                                                                                                        |   | Low Channel 149/153, 5745 M                                                                 | 35.814 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 157/161, 5785 M                                                                | 35.372 MHz > 500 kHz Pass |
| IEEE 802.11(ac)                                                                                        |   |                                                                                             |                           |
| 20 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | VHT, MCS0                                                                                   |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 17.409 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 17.506 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 17.589 MHz > 500 kHz Pass |
|                                                                                                        |   | VHT, MCS8                                                                                   |                           |
|                                                                                                        |   | Low Channel 149, 5745 M                                                                     | 17.575 MHz > 500 kHz Pass |
|                                                                                                        |   | Mid Channel 157, 5785 M                                                                     | 17.521 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 165, 5825 M                                                                    | 17.497 MHz > 500 kHz Pass |
| 40 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | VHT, MCS0                                                                                   |                           |
|                                                                                                        |   | Low Channel 149/153, 5745 M                                                                 | 35.395 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 157/161, 5785 M                                                                | 35.86 MHz > 500 kHz Pass  |
|                                                                                                        |   | VHT, MCS9                                                                                   |                           |
|                                                                                                        |   | Low Channel 149/153, 5745 M                                                                 | 35.692 MHz > 500 kHz Pass |
|                                                                                                        |   | High Channel 157/161, 5785 M                                                                | 35.754 MHz > 500 kHz Pass |
| 80 MHz                                                                                                 |   | 5725 MHz - 5850 MHz Band                                                                    |                           |
|                                                                                                        |   | VHT, MCS0                                                                                   |                           |
|                                                                                                        |   | Low Channel 149/153/157                                                                     | 76.292 MHz > 500 kHz Pass |
|                                                                                                        |   | VHT, MCS9                                                                                   |                           |
|                                                                                                        |   | Low Channel 149/153/157                                                                     | 76.266 MHz > 500 kHz Pass |

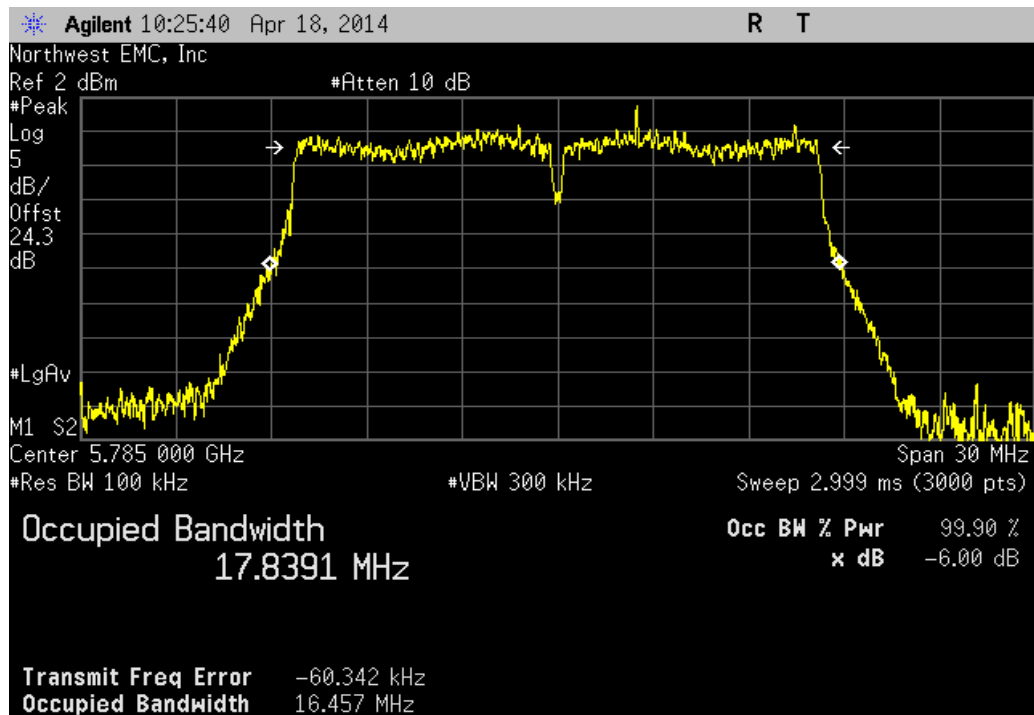
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.442 MHz | > 500 kHz | Pass   |



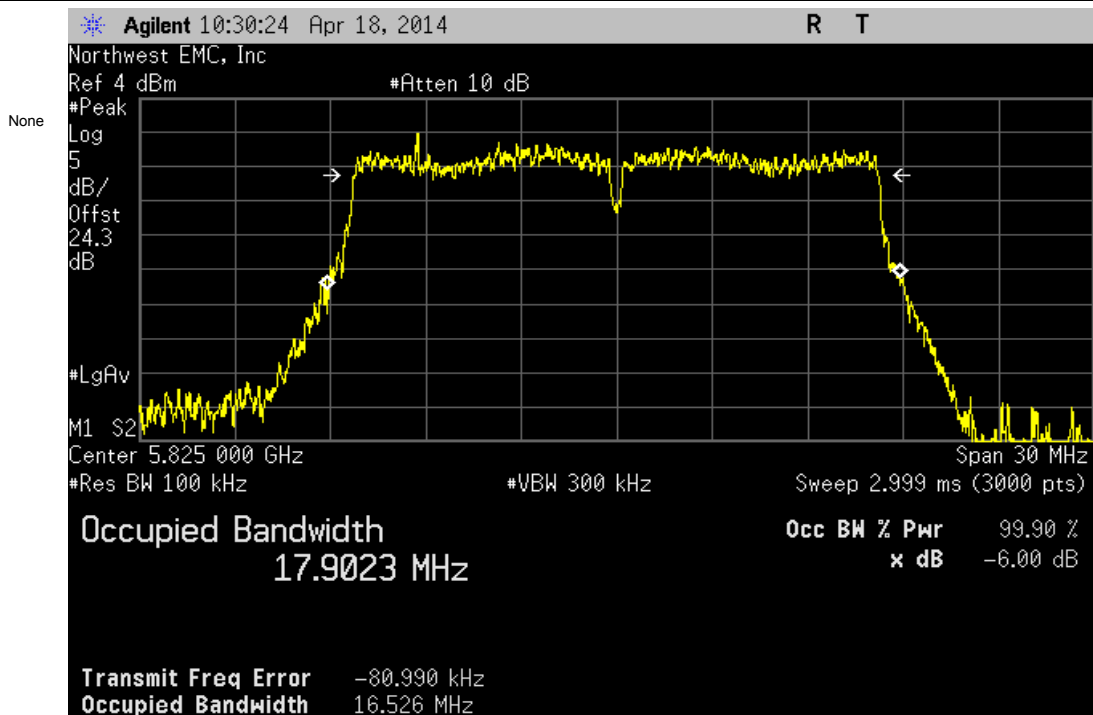
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.457 MHz | > 500 kHz | Pass   |



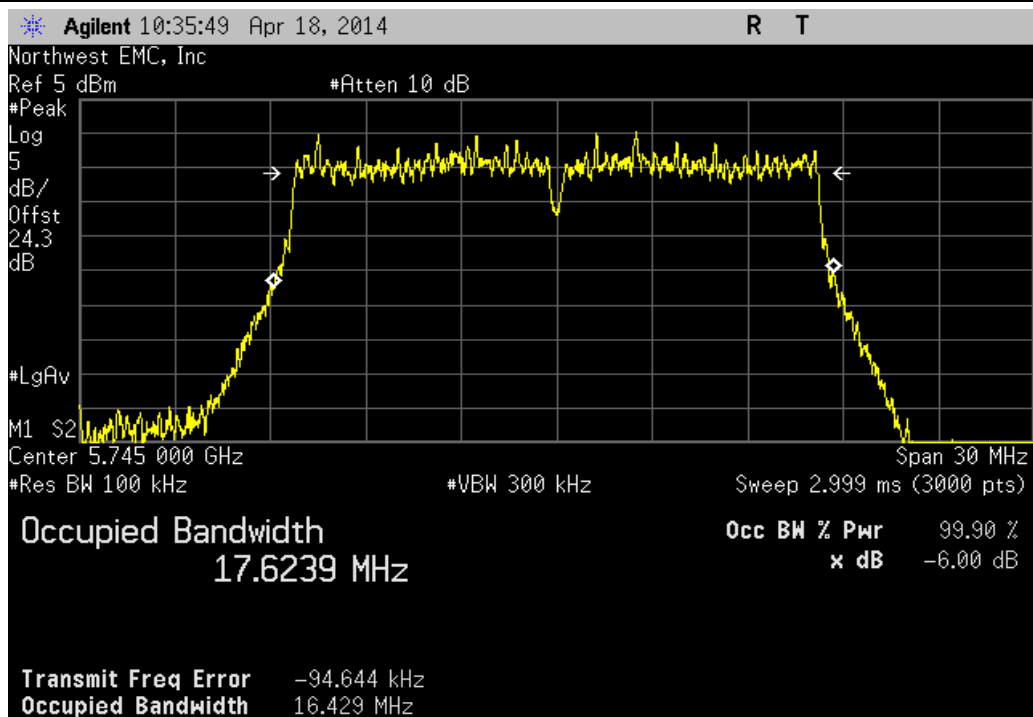
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 6 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.526 MHz | > 500 kHz | Pass   |



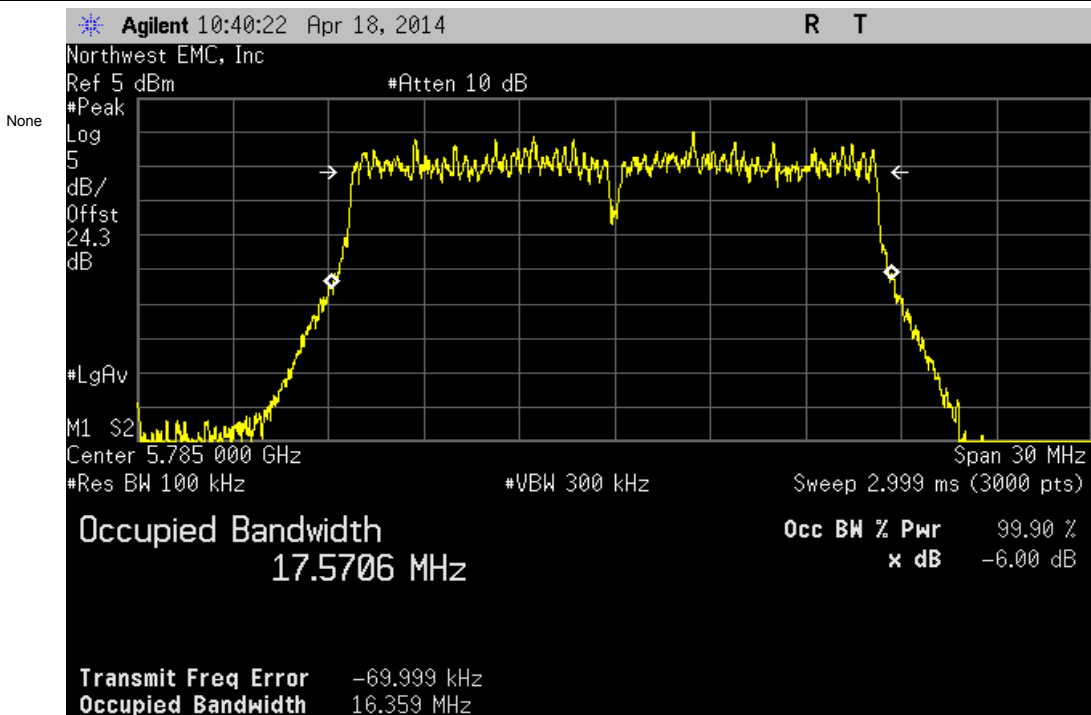
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.429 MHz | > 500 kHz | Pass   |



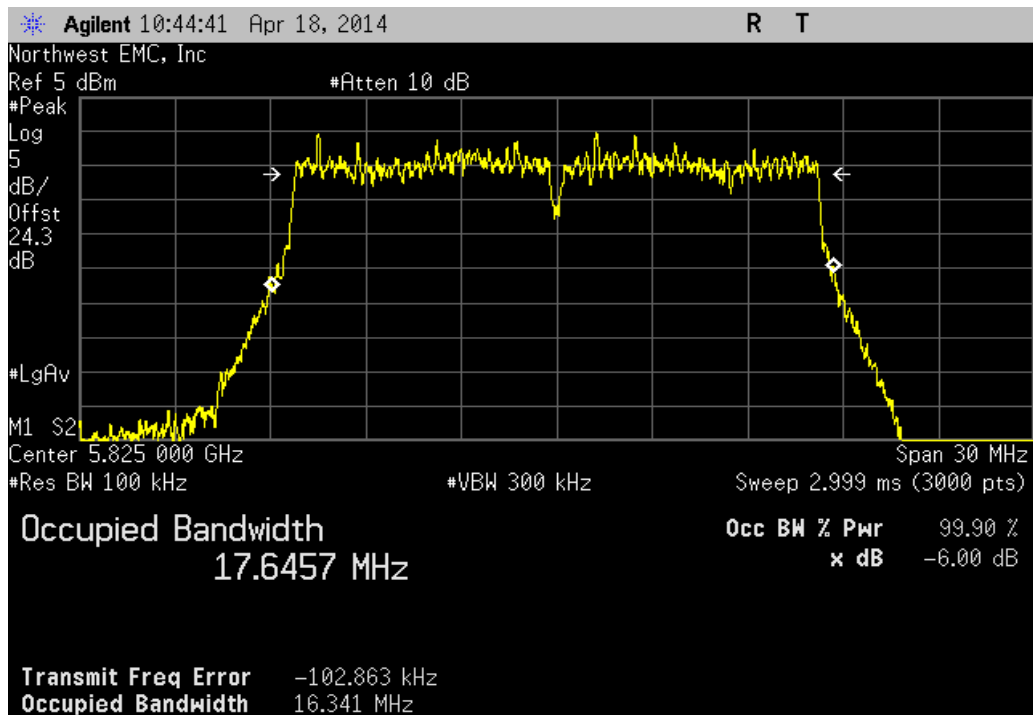
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.359 MHz | > 500 kHz | Pass   |



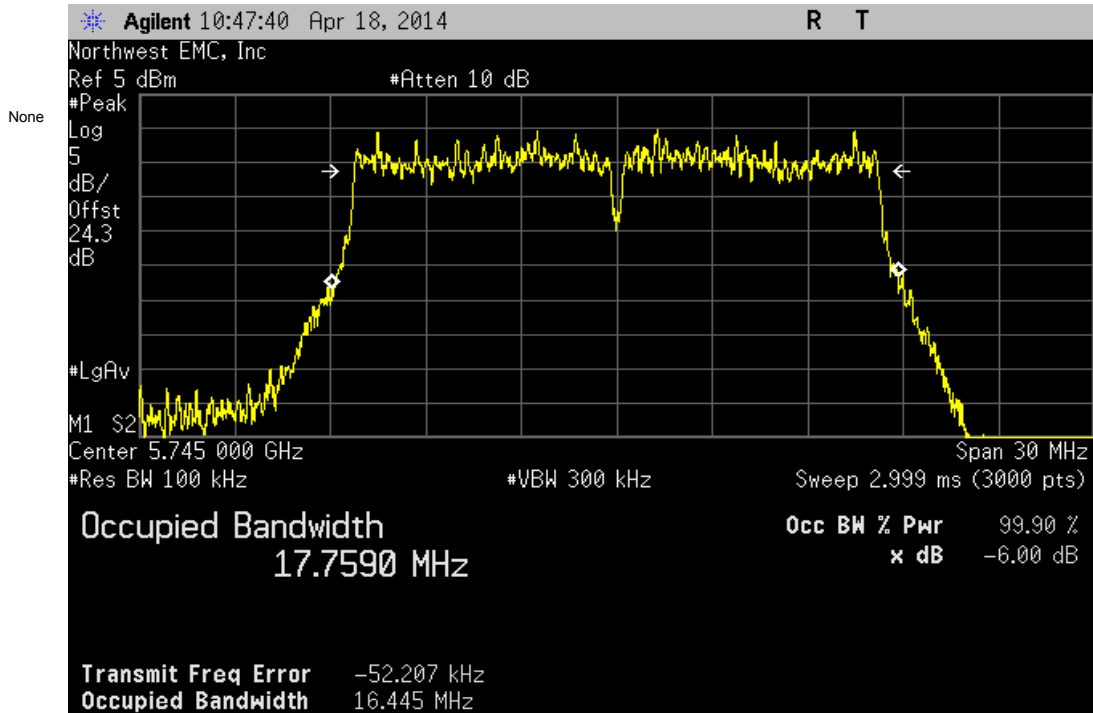
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 36 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.341 MHz | > 500 kHz | Pass   |



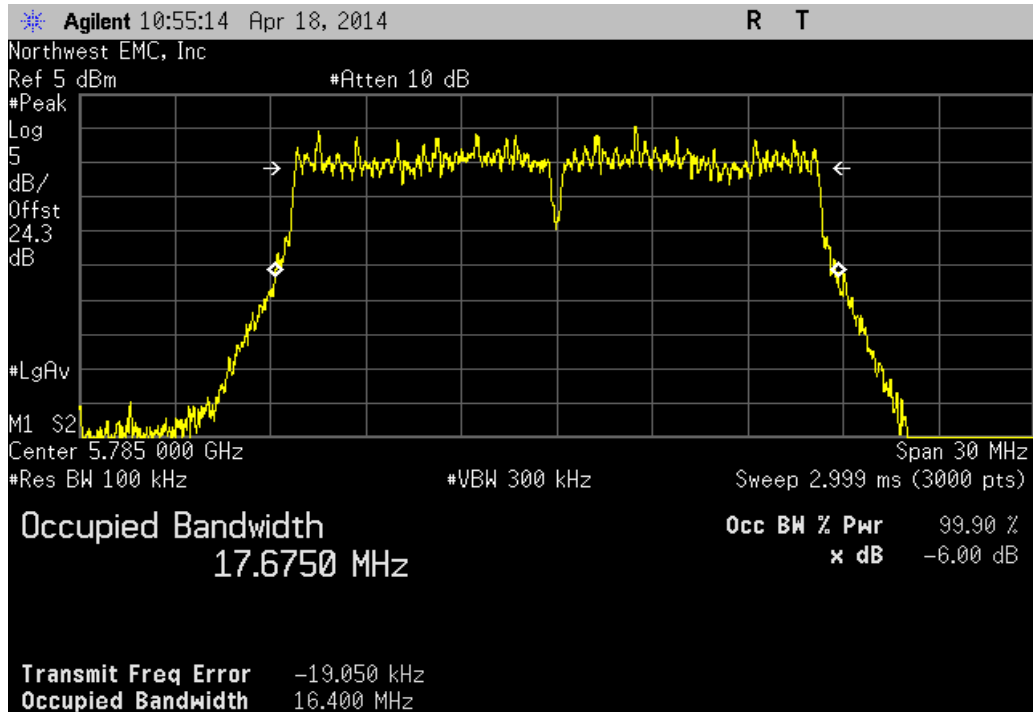
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.445 MHz | > 500 kHz | Pass   |



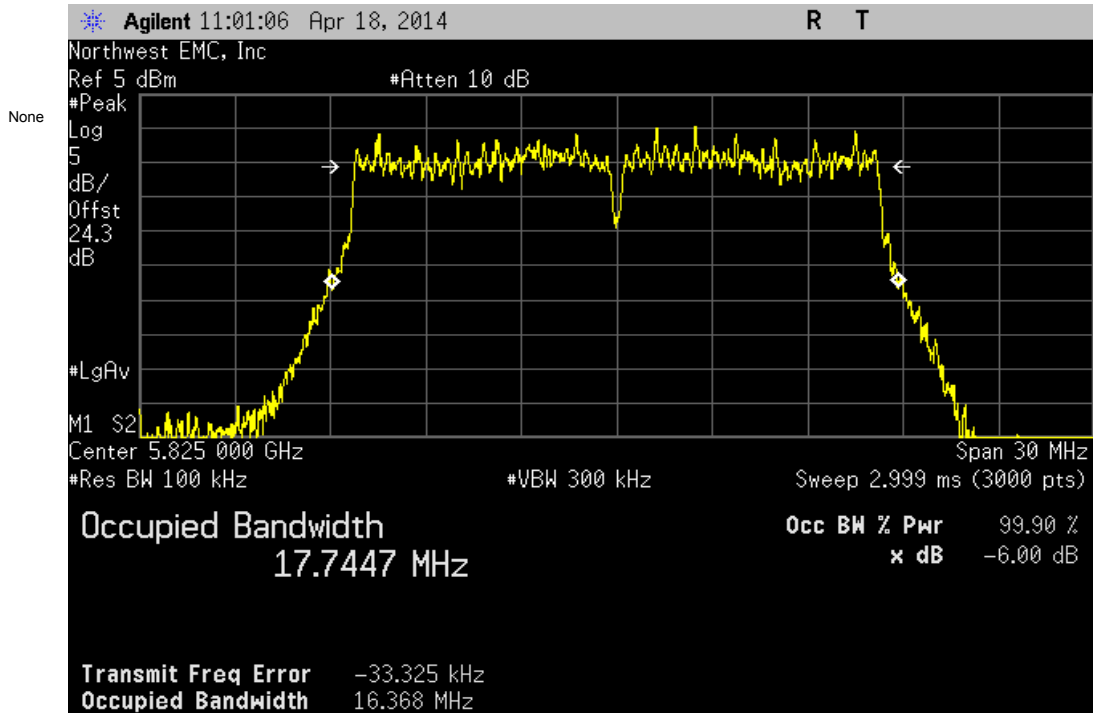
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, Mid Channel 157, 5785 MHz

| Value    | Limit     | Result |
|----------|-----------|--------|
| 16.4 MHz | > 500 kHz | Pass   |



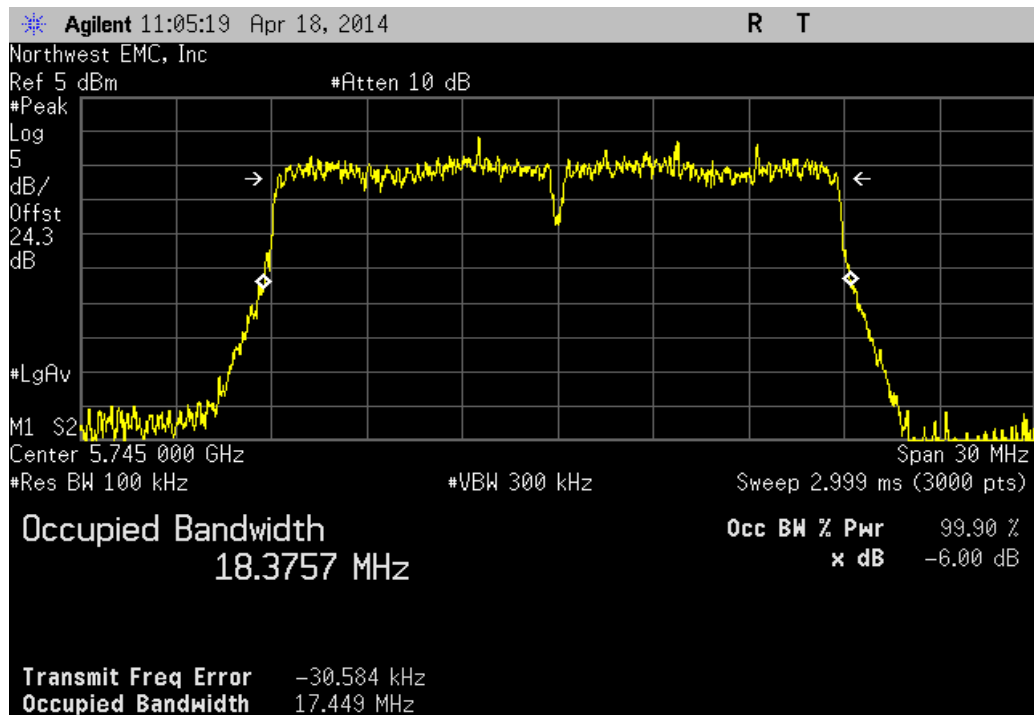
IEEE 802.11(a), 20 MHz, 5725 MHz - 5850 MHz Band, 54 Mbps, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 16.368 MHz | > 500 kHz | Pass   |



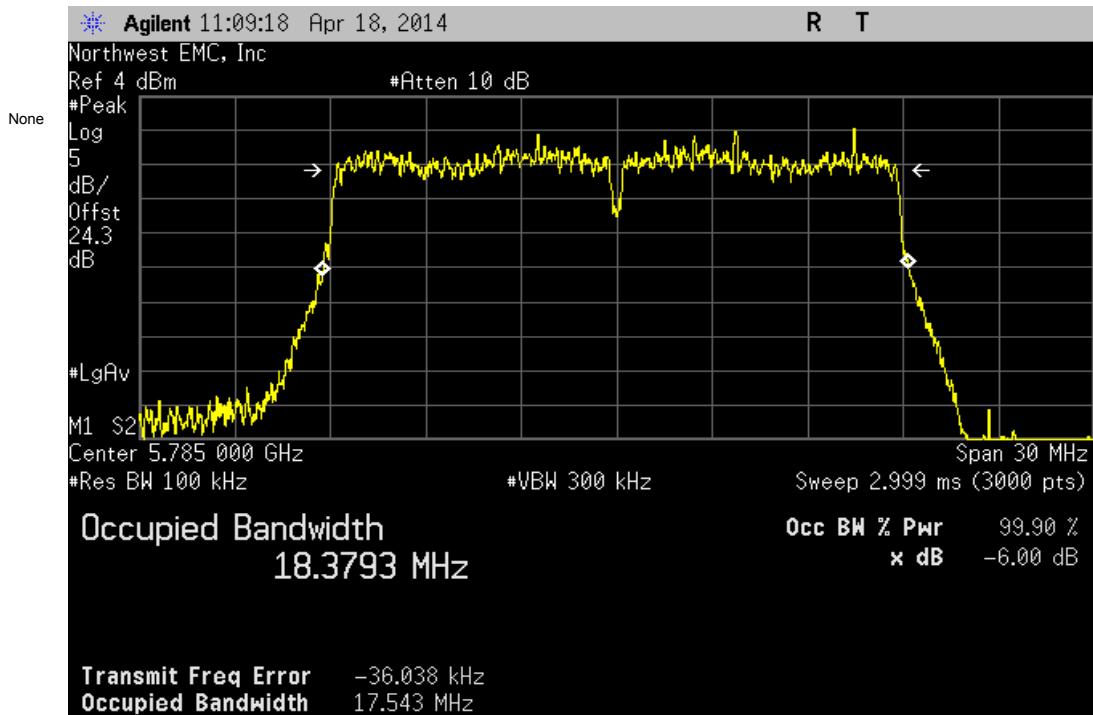
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.449 MHz | > 500 kHz | Pass   |



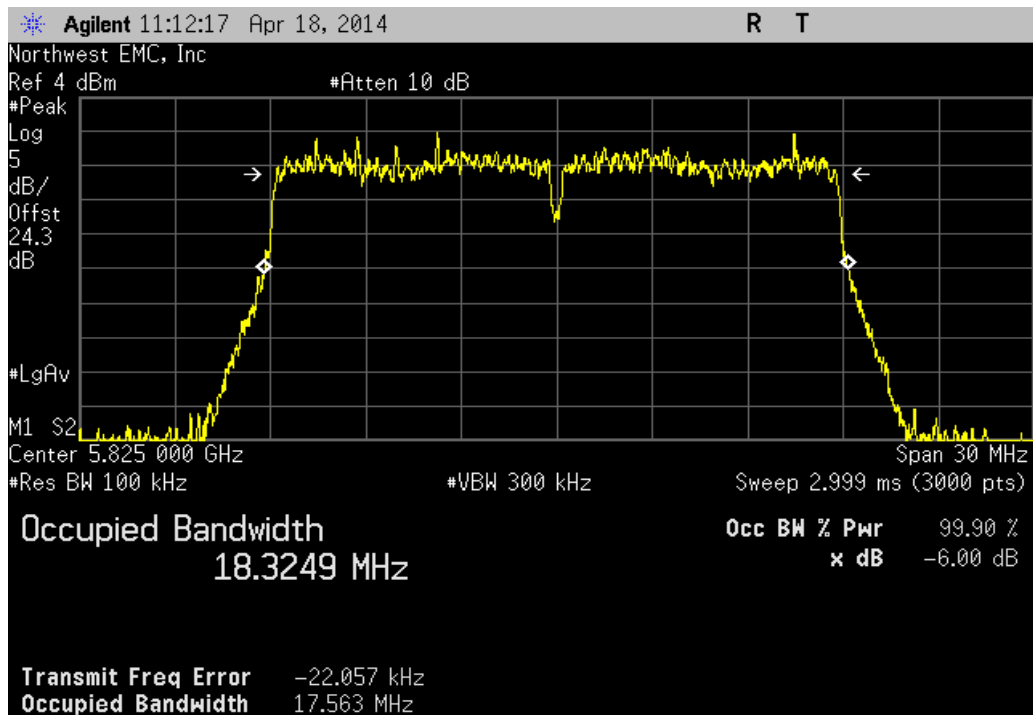
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.543 MHz | > 500 kHz | Pass   |



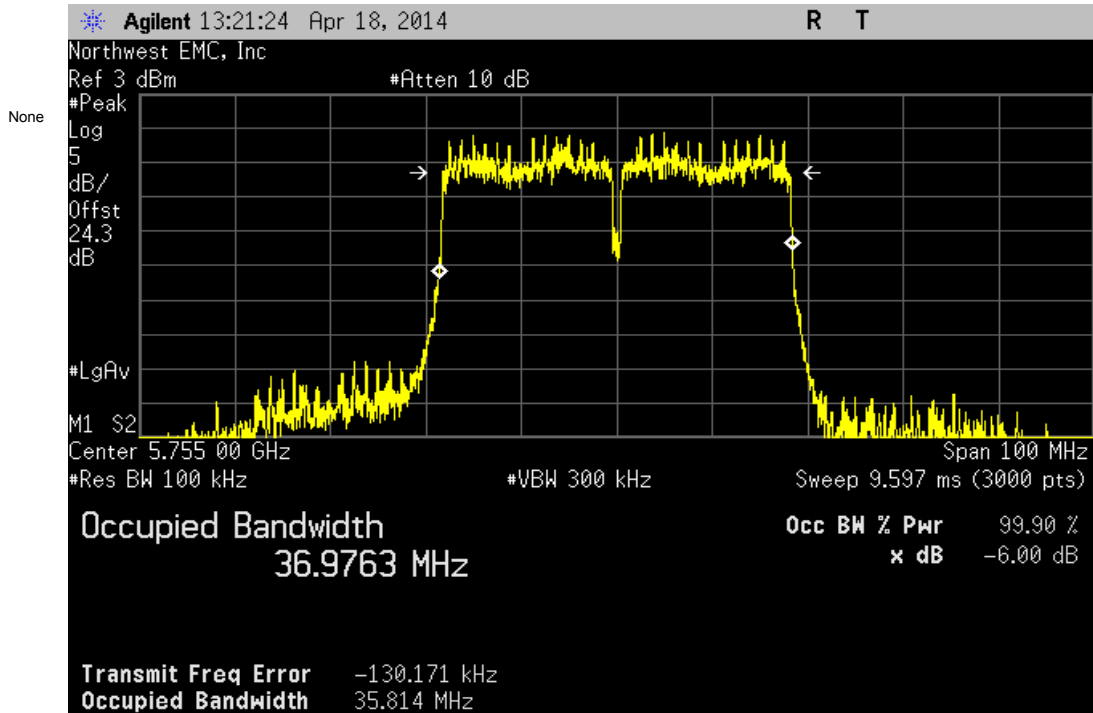
IEEE 802.11(n), 20 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.563 MHz | > 500 kHz | Pass   |



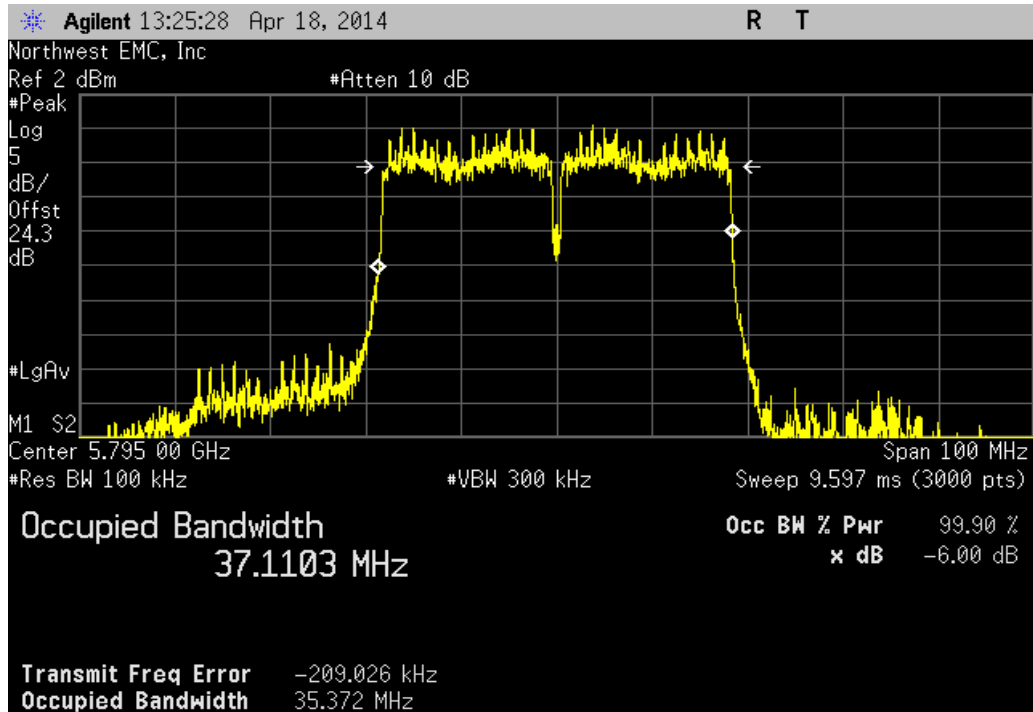
IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.814 MHz | > 500 kHz | Pass   |



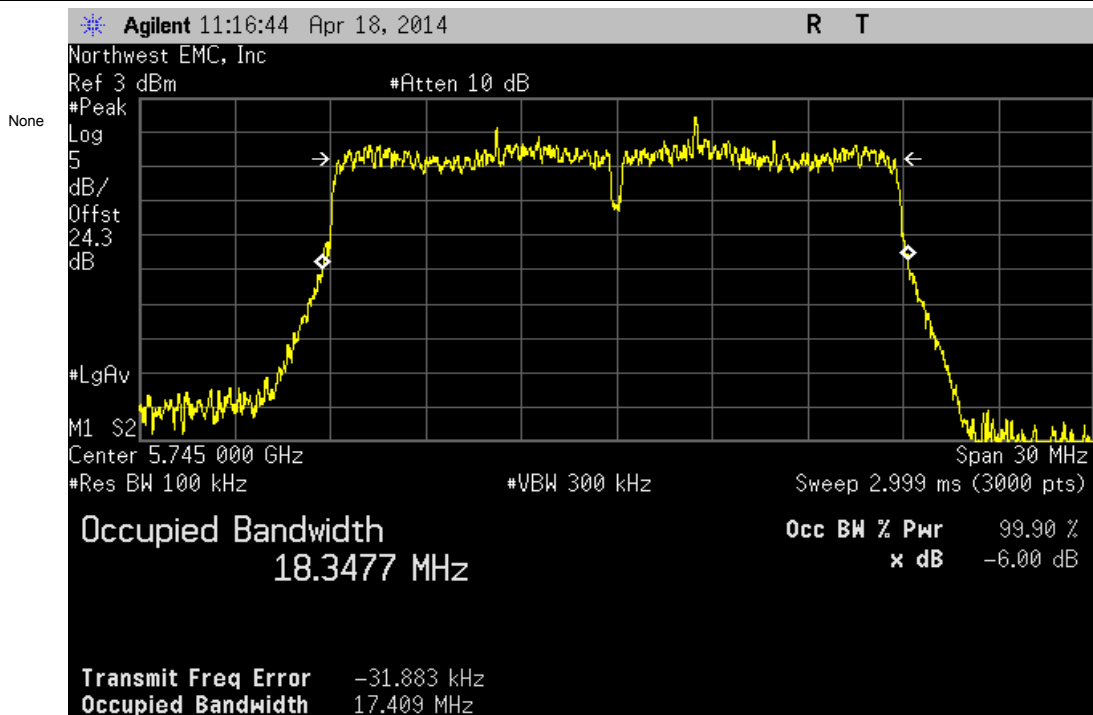
IEEE 802.11(n), 40 MHz, 5725 MHz - 5850 MHz Band, HT, MCS7, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.372 MHz | > 500 kHz | Pass   |



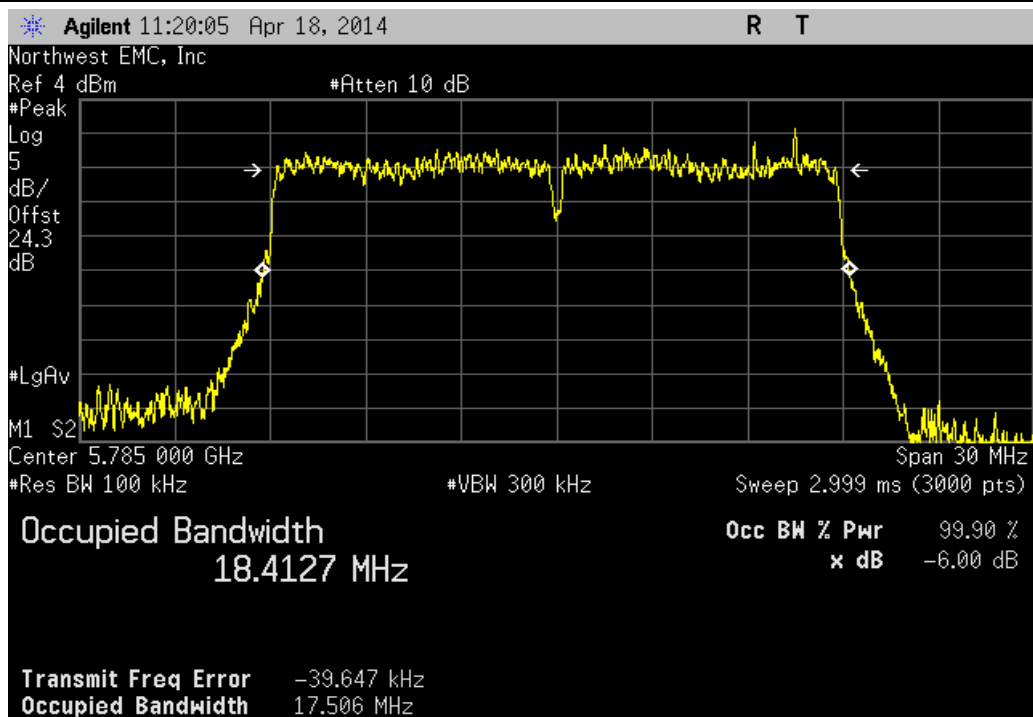
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.409 MHz | > 500 kHz | Pass   |



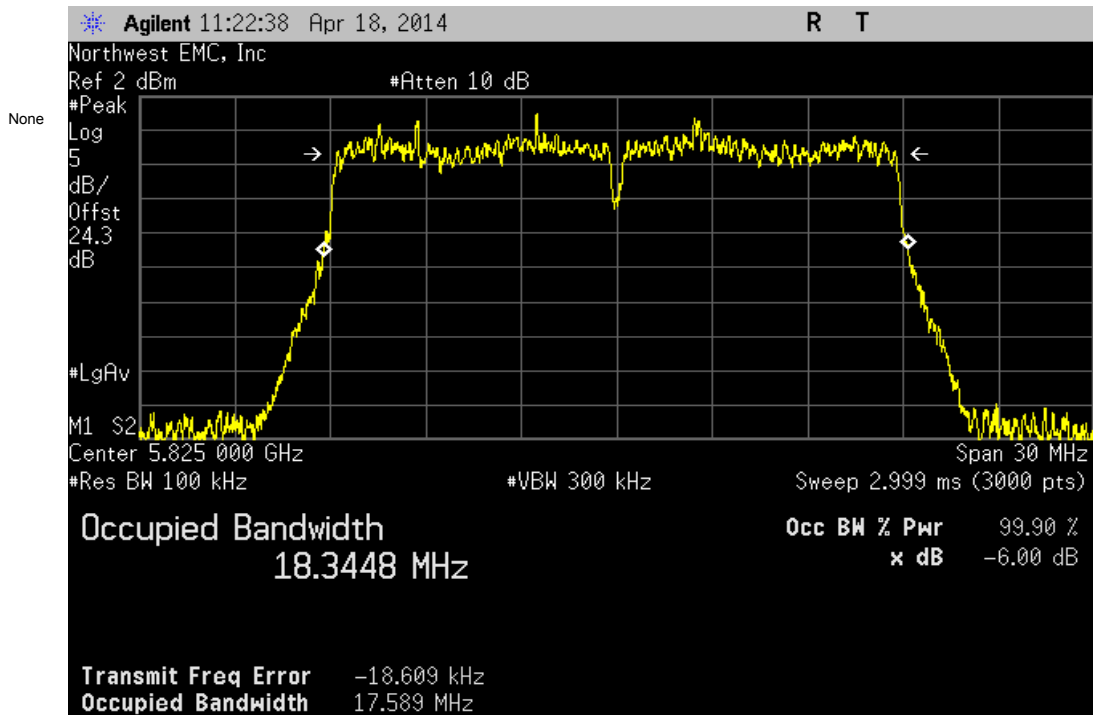
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.506 MHz | > 500 kHz | Pass   |



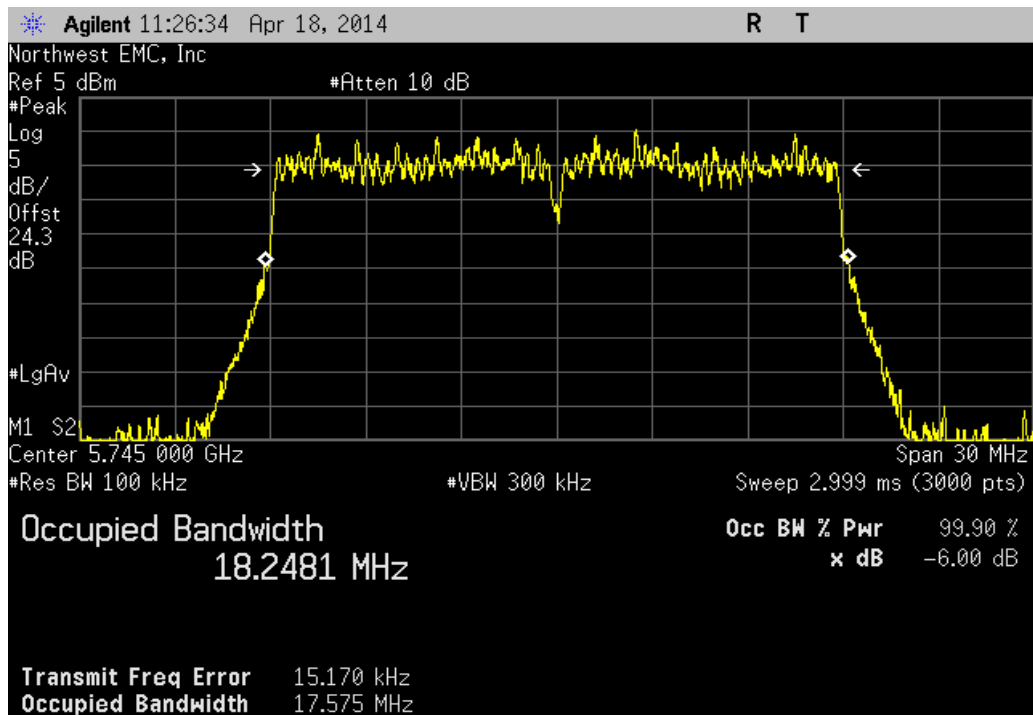
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.589 MHz | > 500 kHz | Pass   |



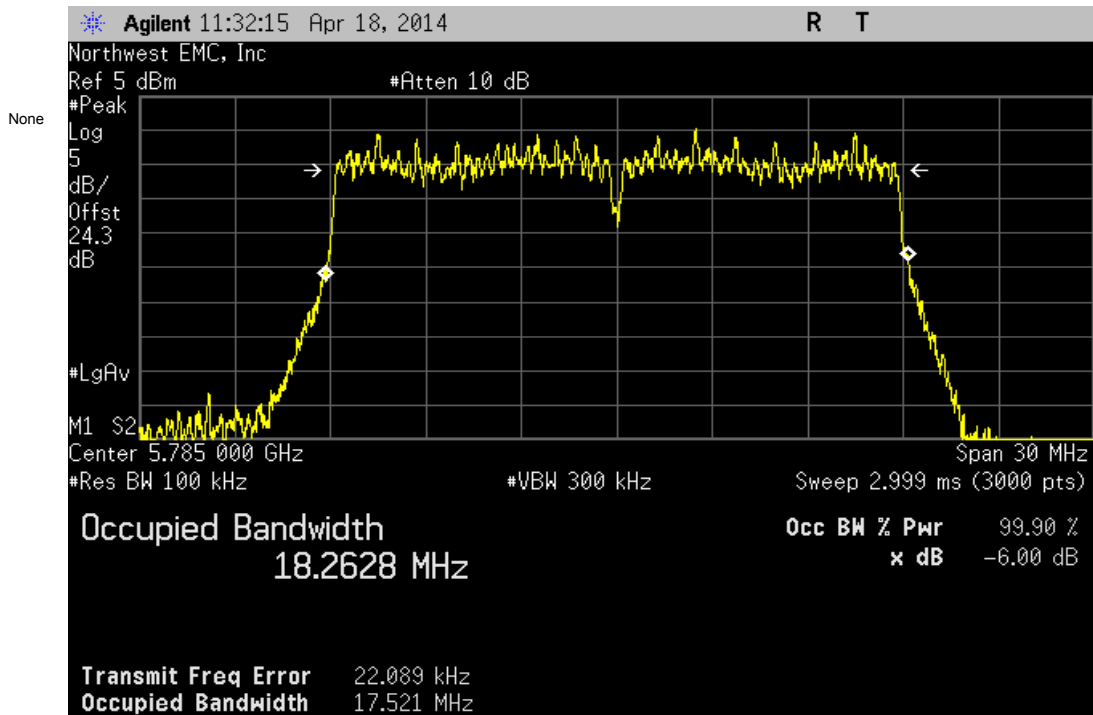
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Low Channel 149, 5745 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.575 MHz | > 500 kHz | Pass   |



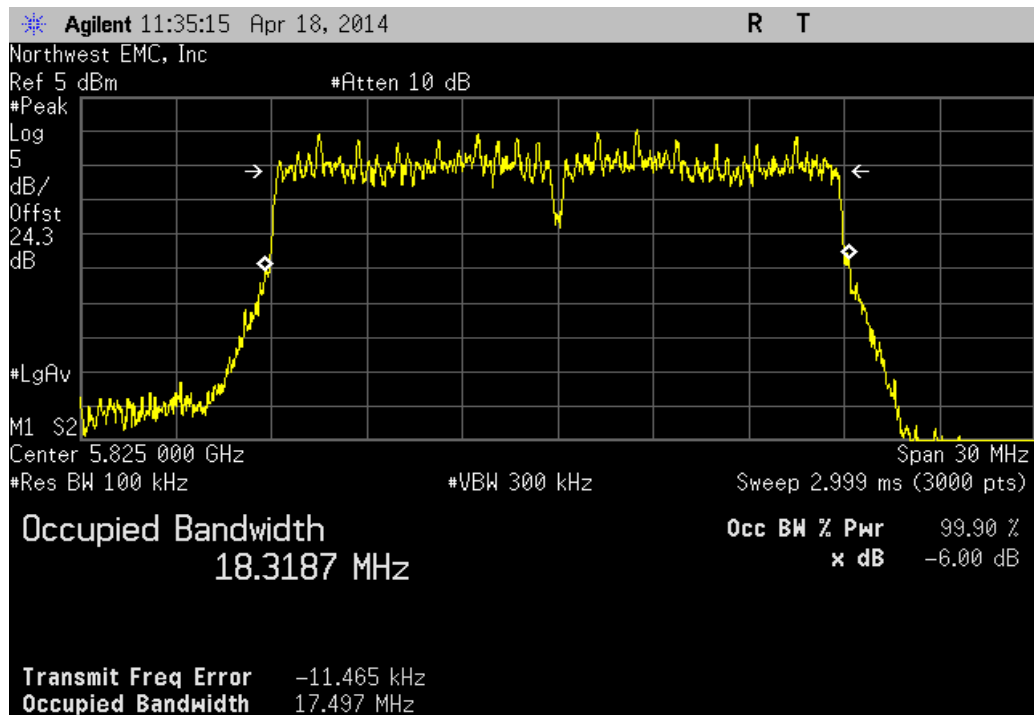
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, Mid Channel 157, 5785 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.521 MHz | > 500 kHz | Pass   |



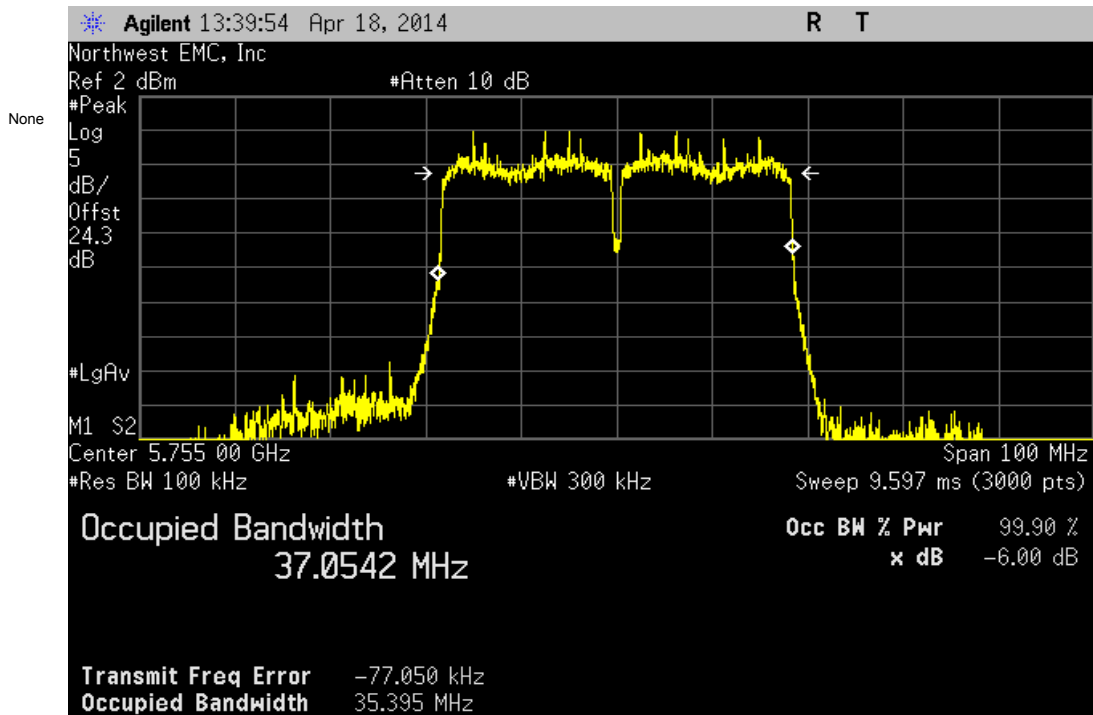
IEEE 802.11(ac), 20 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS8, High Channel 165, 5825 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 17.497 MHz | > 500 kHz | Pass   |



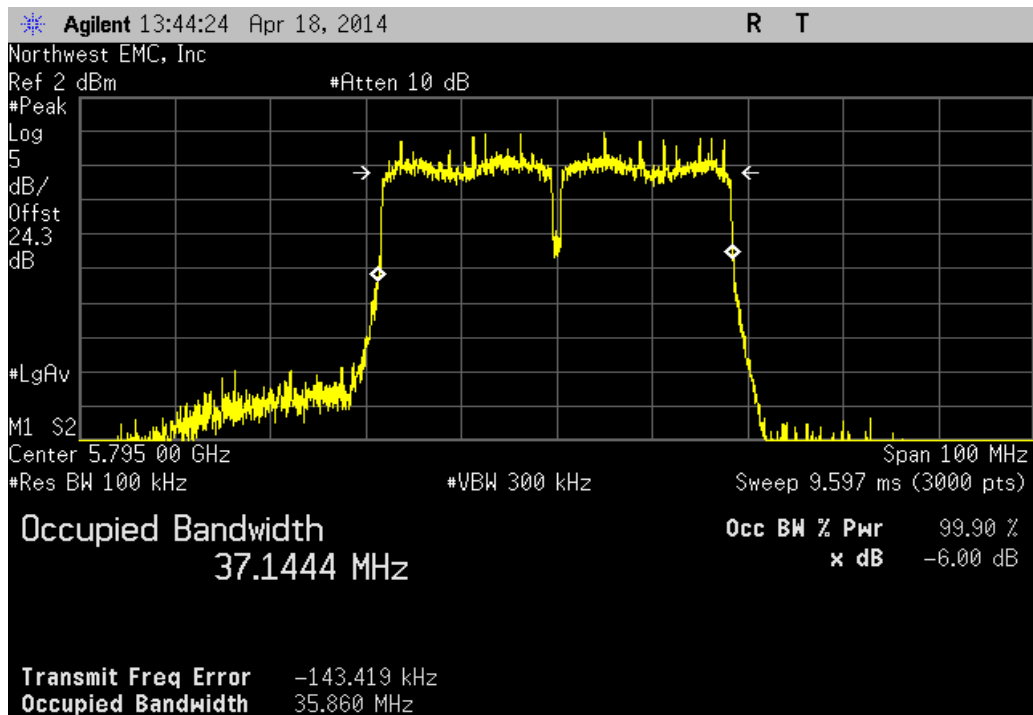
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.395 MHz | > 500 kHz | Pass   |



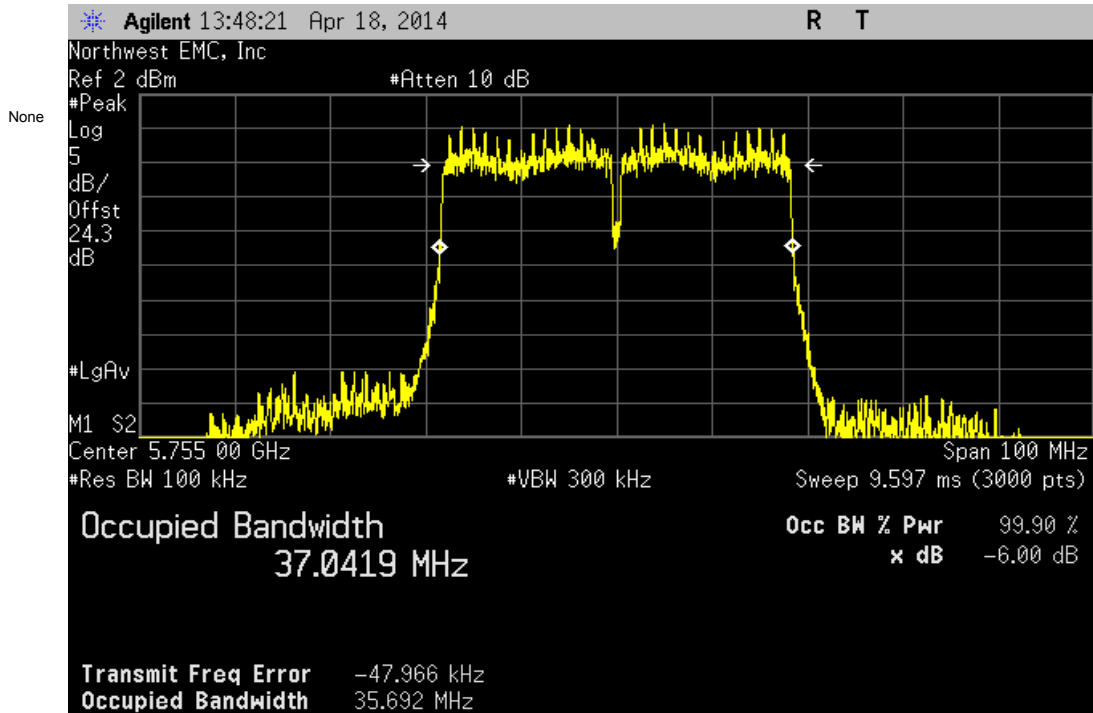
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, High Channel 157/161, 5795 MHz

| Value     | Limit     | Result |
|-----------|-----------|--------|
| 35.86 MHz | > 500 kHz | Pass   |



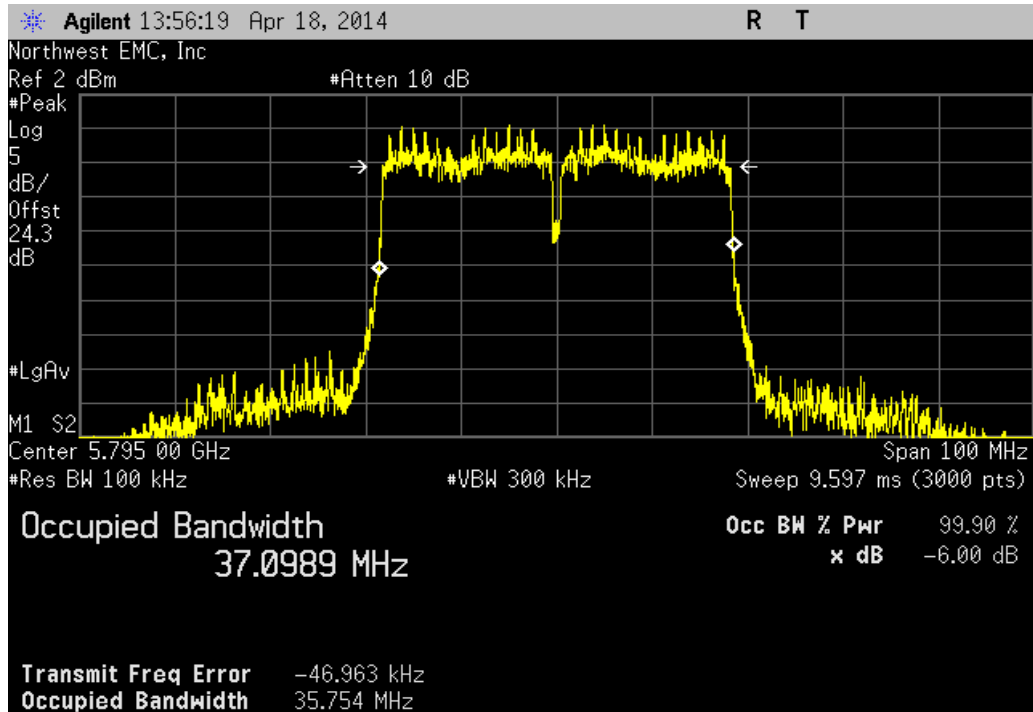
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153, 5755 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.692 MHz | > 500 kHz | Pass   |



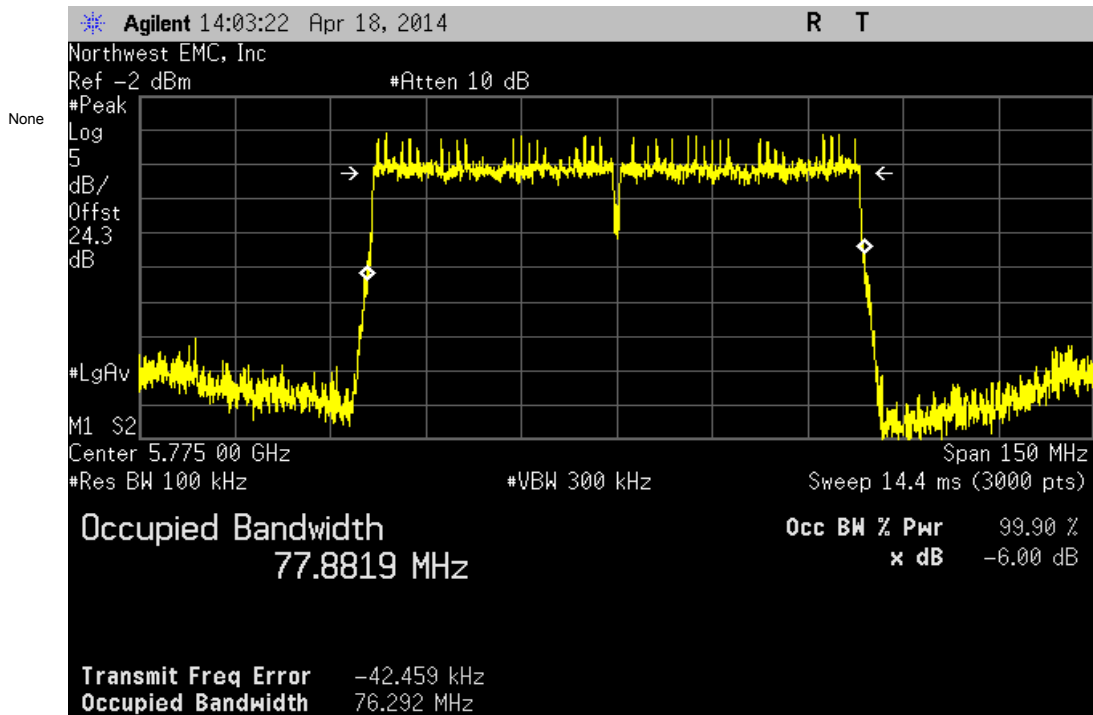
IEEE 802.11(ac), 40 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, High Channel 157/161, 5795 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 35.754 MHz | > 500 kHz | Pass   |



IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS0, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.292 MHz | > 500 kHz | Pass   |



IEEE 802.11(ac), 80 MHz, 5725 MHz - 5850 MHz Band, VHT, MCS9, Low Channel 149/153/157/161, 5775 MHz

| Value      | Limit     | Result |
|------------|-----------|--------|
| 76.266 MHz | > 500 kHz | Pass   |

