



## **Test Report**

# **AIR-CAP3702P-A-K9**

## **Cisco Aironet 802.11ac Dual Band Access Points**

**FCC ID: LDK102087P**

**IC: 2461B-102087P**

Also covers:

AIR-CAP3702P-D-K9,

AIR-CAP3702P-N-K9,

AIR-CAP3702P-Z-K9,

**2400-2483.5 MHz**

**Against the following Specifications:**

**CFR47 Part 15.247**

**RSS210**

**Cisco Systems**

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San Jose, CA 95134



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## Section 1: Overview

### 1.1 Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

| Emission                    | Immunity |
|-----------------------------|----------|
| CFR47 Part 15.247<br>RSS210 | N/A      |

The specifications listed above represent actual tests performed to demonstrate compliance against the specifications and basic standards listed on the front cover of this report. This list is not a one to one match to the front cover for one or more of the following reasons.

1. Basic standards call up many different test phenomena specifications such as the 61000-4-X series. The basic standards define which elements and levels shall be applied from these specifications and as such it is not appropriate to list the individual specifications on the front cover.
2. A Standard listed on the front cover may be required in a particular country but is not appropriate for the particular technologies included in the equipment under test. E.g. You cannot test a DC product to the mains Harmonics requirements in EN61000-3-2. See section 3.2.
3. Test results against a particular standard or specification may be included in a different test report. See section 3.2 for an EDCS reference of this data.
4. Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
5. Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.
6. Testing may have been performed to an equivalent test that satisfies the requirements of the standards and specifications listed on the front cover of the report. See section 3.2.
7. Where radiated emissions testing has been performed to EN55022/CISPR22 the additional requirements of VCCI: V- 3/2006.04, EN55022: 1994 +A1/2 and CAN/CSA- CISPR 22-02 have also been evaluated unless otherwise stated.
8. Testing to the requirements of CFR47 Part 15 was performed against the CISPR22 limits. The results are therefore deemed satisfactory evidence of compliance with Industry Canada Interference Causing Equipment Standard ICES-003.
9. Where assessment has been performed to CISPR24, all the applicable test requirements may have not been covered. Refer to the results section for the tests performed.

#### Notes:

- 1) Where a specification listed on the front cover of this report has deviations from the basic standards listed above, the additional technical requirements of the specification were also assessed.
- 2) Where appropriate, Cisco may have substituted a later revision of a basic standard to those referenced in the specification on the front sheet of this test report. This decision was based upon improved test methodology and repeatability and/or where the newer revision represented a more stringent test.
- 3) Where relevant, testing has been carried out to the requirements of both EN and IEC Specifications. This was possible because of the similarities of the test methods involved and the Cisco EMC test procedures.



## **Section 2: Assessment Information**

### **2.1 General**

This report contains an assessment of an apparatus against Electromagnetic Compatibility Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:

|                      |                                      |
|----------------------|--------------------------------------|
| Temperature          | 15°C to 35°C (54°F to 95°F)          |
| Atmospheric Pressure | 860mbar to 1060mbar (25.4" to 31.3") |
| Humidity             | 10% to 75*%                          |

\*[Where applicable] For ESD testing the humidity limits used were 30% to 60% and for EFT/B tests the humidity limits used were 25% to 75%.
- e) All AC testing was performed at one or more of the following supply voltages:

|                     |
|---------------------|
| 110V 60 Hz (+/-20%) |
| 220V 50 Hz (+/-20%) |

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## **2.2 Date of testing**

22-May-2013 to 5-June-2013

## **2.3 Report Issue Date**

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## **2.4 Testing facilities**

This assessment was performed by:

### **Testing Laboratory**

|                         |                       |
|-------------------------|-----------------------|
| Cisco Systems, Inc.,    | Cisco Systems, Inc.   |
| 4125 Highlander Parkway | 170 West Tasman Drive |
| Richfield, OH 44286     | San Jose, CA 95134    |
| USA                     | USA                   |

### **Test Engineers**

James Nicholson

## **2.5 Equipment Assessed (EUT)**

AIR-SAP3702P-A-K9 Cisco Aironet 802.11ac Dual Band Access Point



## 2.6 EUT Description

The 3700 Series Cisco Aironet 802.11ac Dual Band Access Points support the following modes of operation. The modes are further defined in the radio Theory of Operation. The modes included in this report represent the worst case data for all modes.

Non HT-20, One Antenna, 6 to 54 Mbps  
 Non HT-20, Two Antennas, 6 to 54 Mbps  
 Non HT-20, Three Antennas, 6 to 54 Mbps  
 Non HT-20, Four Antennas, 6 to 54 Mbps

Non HT-20 Beam Forming, Two Antennas, 6 to 54 Mbps  
 Non HT-20 Beam Forming, Three Antennas, 6 to 54 Mbps  
 Non HT-20 Beam Forming, Four Antennas, 6 to 54 Mbps

HT-20, One Antenna, M0 to M7  
 HT-20, Two Antennas, M0 to M15  
 HT-20, Three Antennas, M0 to M23  
 HT-20, Four Antennas, M0 to M23

HT-20 STBC, Two Antennas, M0 to M7  
 HT-20 STBC, Three Antennas, M0 to M7  
 HT-20 STBC, Four Antennas, M0 to M7

HT-20 Beam Forming, Two Antennas, M0 to M15  
 HT-20 Beam Forming, Three Antennas, M0 to M23  
 HT-20 Beam Forming, Four Antennas, M0 to M23

The following antennas are supported by this product series.

The data included in this report represent the antennas in **bold** below.

| Part Number             | Antenna Type                                           | Antenna Gain (dBi) |
|-------------------------|--------------------------------------------------------|--------------------|
| AIR-ANT2524DB-R         | Dual-resonant black dipole                             | 2 / 4              |
| AIR-ANT2524DW-R         | Dual-resonant white dipole                             | 2 / 4              |
| AIR-ANT2524DG-R         | Dual-resonant gray dipole                              | 2 / 4              |
| AIR-ANT2524V4C-R        | Dual-resonant ceiling mount omni (4-pack)              | 2 / 4              |
| AIR-ANT2544V4M-R        | Dual-resonant omni (4-pack)                            | 4 / 4              |
| AIR-ANT2566P4W-R        | Dual-resonant "directional" antenna (4-pack)           | 6 / 6              |
| <b>AIR-ANT2513P4M-N</b> | Dual-resonant cross-pol "directional" antenna (4-pack) | 13 / 13            |
| AIR-ANT2534V4C-R        | Dual-resonant ceiling mount omni (4-pack)              | 3 / 4              |



## Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the "Justification for worst Case test Configuration" section of this report for further details on the selection of EUT samples.

### 4.1 Sample Details (Photographs of the test samples, where appropriate can be found in appendix H)

| Sample No. | Equipment Details | Part Number | Manufacturer  | Hardware Rev. | Firmware Rev. | Software Rev. | Serial Number |
|------------|-------------------|-------------|---------------|---------------|---------------|---------------|---------------|
| S01        | AIR-SAP3702P-A-K9 |             | Cisco Systems | NA            | NA            | NA            |               |
| S02        | AIR-PWR-B         | 341-0306-01 | Cisco Systems | NA            | NA            | NA            |               |

### 4.2 System Details

| System # | Description | Samples  |
|----------|-------------|----------|
| 1        | EUT         | S01, S02 |

### 4.3 Mode of Operation Details

| Mode# | Description             | Comments                |
|-------|-------------------------|-------------------------|
| 1     | Continuous Transmitting | Continuous Transmitting |

All tests in this report were performed as described in FCC KDB 662911 D01

**Appendix A: Emission Test Results**

**Testing Laboratory:** Cisco Systems, Inc., 4125 Highlander Parkway, Richfield, OH, USA

**Target Maximum Channel Power**

The following table details the maximum supported Total Channel Power for all operating modes.

| Operating Mode                       | Maximum Channel Power (dBm) |      |      |
|--------------------------------------|-----------------------------|------|------|
|                                      | Frequency (MHz)             |      |      |
|                                      | 2412                        | 2437 | 2462 |
| Legacy CCK, 1 to 11 Mbps             | 21                          | 21   | 21   |
| Non HT-20, 6 to 54 Mbps              | 19                          | 21   | 19   |
| Non HT-20 Beam Forming, 6 to 54 Mbps | 19                          | 21   | 19   |
| HT-20, M0 to M23                     | 19                          | 21   | 19   |
| HT-20 STBC, M0 to M7                 | 19                          | 21   | 19   |
| HT-20 Beam Forming, M0 to M23        | 19                          | 21   | 19   |



## Peak Output Power

15.247 / RSS-210 A8.4: The maximum conducted output power of the intentional radiator for systems using digital modulation in the 2400-2483.5 MHz band shall not exceed 1 Watt (30dBm). If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

The maximum supported antenna gain is 13dBi. The peak correlated gain for each mode is listed in the table below. See the Theory of Operation for details on the correlated gain for each mode.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

|                                             |                                                                   |
|---------------------------------------------|-------------------------------------------------------------------|
| Enable "Channel Power" function of analyzer |                                                                   |
| Center Frequency:                           | Frequency from table below                                        |
| Span:                                       | 20 MHz (must be greater than 26dB bandwidth, adjust as necessary) |
| Ref Level Offset:                           | Correct for attenuator and cable loss.                            |
| Reference Level:                            | 20 dBm                                                            |
| Attenuation:                                | 20 dB                                                             |
| Sweep Time:                                 | 100ms, Single sweep                                               |
| Resolution Bandwidth:                       | 1 MHz                                                             |
| Video Bandwidth:                            | 3 MHz                                                             |
| Detector:                                   | Sample                                                            |
| Trace:                                      | Trace Average 100 traces in Power Averaging Mode                  |
| Integration BW:                             | =26 dB BW from 26 dB Bandwidth Data                               |

After averaging 100 traces of the transmitter waveform on the spectrum analyzer, record the spectrum analyzer Channel Power.

The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units.



| Frequency (MHz) | Mode                                 | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 Max Power (dBm) | Tx 2 Max Power (dBm) | Tx 3 Max Power (dBm) | Tx 4 Max Power (dBm) | Total Tx Channel Power (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|--------------------------------------|----------|-------------------------------|----------------------|----------------------|----------------------|----------------------|------------------------------|-------------|-------------|
| 2412            | Legacy CCK, 1 to 11 Mbps             | 1        | 13                            | 14.3                 |                      |                      |                      | 14.3                         | 27          | 12.7        |
|                 | Legacy CCK, 1 to 11 Mbps             | 2        | 13                            | 14.3                 | 15.7                 |                      |                      | 18.1                         | 27          | 8.9         |
|                 | Legacy CCK, 1 to 11 Mbps             | 3        | 13                            | 14.3                 | 15.7                 | 14.8                 |                      | 19.7                         | 27          | 7.3         |
|                 | Legacy CCK, 1 to 11 Mbps             | 4        | 13                            | 14.3                 | 15.7                 | 14.8                 | 15.6                 | 21.2                         | 27          | 5.8         |
|                 | Non HT-20, 6 to 54 Mbps              | 1        | 13                            | 14.7                 |                      |                      |                      | 14.7                         | 27          | 12.3        |
|                 | Non HT-20, 6 to 54 Mbps              | 2        | 13                            | 13.6                 | 14.2                 |                      |                      | 16.9                         | 27          | 10.1        |
|                 | Non HT-20, 6 to 54 Mbps              | 3        | 13                            | 13.6                 | 14.2                 | 13.8                 |                      | 18.6                         | 27          | 8.4         |
|                 | Non HT-20, 6 to 54 Mbps              | 4        | 13                            | 12.6                 | 13.2                 | 12.8                 | 13.3                 | 19.0                         | 27          | 8.0         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 2        | 13                            | 13.6                 | 14.2                 |                      |                      | 16.9                         | 27          | 10.1        |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 3        | 16                            | 12.6                 | 13.2                 | 12.8                 |                      | 17.6                         | 27          | 9.4         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 4        | 16                            | 12.6                 | 13.2                 | 12.8                 | 13.3                 | 19.0                         | 27          | 8.0         |
|                 | HT-20, M0 to M7                      | 1        | 13                            | 14.1                 |                      |                      |                      | 14.1                         | 27          | 12.9        |
|                 | HT-20, M0 to M7                      | 2        | 13                            | 13.1                 | 14.1                 |                      |                      | 16.6                         | 27          | 10.4        |
|                 | HT-20, M8 to M15                     | 2        | 13                            | 13.1                 | 14.1                 |                      |                      | 16.6                         | 27          | 10.4        |
|                 | HT-20, M0 to M7                      | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20, M8 to M15                     | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20, M16 to M23                    | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20, M0 to M7                      | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |
|                 | HT-20, M8 to M15                     | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |
|                 | HT-20, M16 to M23                    | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |
|                 | HT-20 Beam Forming, M0 to M7         | 2        | 13                            | 13.1                 | 14.1                 |                      |                      | 16.6                         | 27          | 10.4        |
|                 | HT-20 Beam Forming, M8 to M15        | 2        | 13                            | 13.1                 | 14.1                 |                      |                      | 16.6                         | 27          | 10.4        |
|                 | HT-20 Beam Forming, M0 to M7         | 3        | 16                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20 Beam Forming, M8 to M15        | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20 Beam Forming, M16 to M23       | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20 Beam Forming, M0 to M7         | 4        | 16                            | 11.2                 | 11.9                 | 11.2                 | 11.9                 | 17.6                         | 27          | 9.4         |
|                 | HT-20 Beam Forming, M8 to M15        | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |
|                 | HT-20 Beam Forming, M16 to M23       | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |
|                 | HT-20 STBC, M0 to M7                 | 2        | 13                            | 13.1                 | 14.1                 |                      |                      | 16.6                         | 27          | 10.4        |
|                 | HT-20 STBC, M0 to M7                 | 3        | 13                            | 12.1                 | 13.1                 | 12.2                 |                      | 17.3                         | 27          | 9.7         |
|                 | HT-20 STBC, M0 to M7                 | 4        | 13                            | 12.1                 | 13.1                 | 12.2                 | 13.0                 | 18.6                         | 27          | 8.4         |

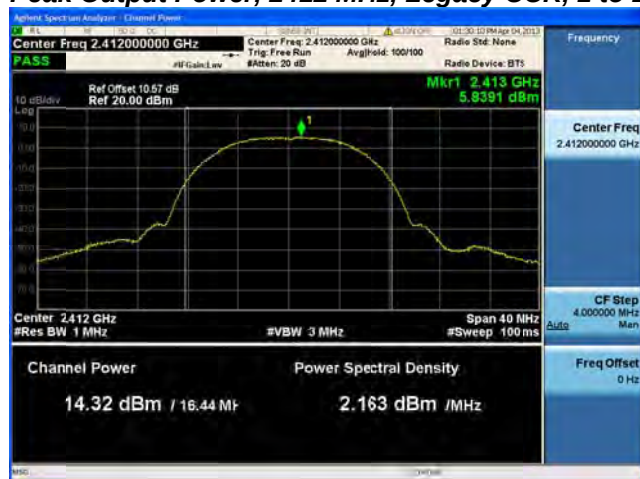


|      |                                      |   |    |             |             |             |             |      |    |      |
|------|--------------------------------------|---|----|-------------|-------------|-------------|-------------|------|----|------|
| 2437 | Legacy CCK, 1 to 11 Mbps             | 1 | 13 | <u>14.2</u> |             |             |             | 14.2 | 27 | 12.8 |
|      | Legacy CCK, 1 to 11 Mbps             | 2 | 13 | <u>14.2</u> | <u>15.5</u> |             |             | 17.9 | 27 | 9.1  |
|      | Legacy CCK, 1 to 11 Mbps             | 3 | 13 | <u>14.2</u> | <u>15.5</u> | <u>14.8</u> |             | 19.6 | 27 | 7.4  |
|      | Legacy CCK, 1 to 11 Mbps             | 4 | 13 | <u>14.2</u> | <u>15.5</u> | <u>14.8</u> | <u>15.6</u> | 21.1 | 27 | 5.9  |
|      | Non HT-20, 6 to 54 Mbps              | 1 | 13 | <u>14.4</u> |             |             |             | 14.4 | 27 | 12.6 |
|      | Non HT-20, 6 to 54 Mbps              | 2 | 13 | <u>14.4</u> | <u>15.6</u> |             |             | 18.1 | 27 | 8.9  |
|      | Non HT-20, 6 to 54 Mbps              | 3 | 13 | <u>14.4</u> | <u>15.6</u> | <u>14.6</u> |             | 19.7 | 27 | 7.3  |
|      | Non HT-20, 6 to 54 Mbps              | 4 | 13 | <u>14.4</u> | <u>15.6</u> | <u>14.6</u> | <u>15.5</u> | 21.1 | 27 | 5.9  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 13 | <u>14.4</u> | <u>15.6</u> |             |             | 18.1 | 27 | 8.9  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 16 | <u>14.4</u> | <u>15.6</u> | <u>14.6</u> |             | 19.7 | 27 | 7.3  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 16 | <u>14.4</u> | <u>15.6</u> | <u>14.6</u> | <u>15.5</u> | 21.1 | 27 | 5.9  |
|      | HT-20, M0 to M7                      | 1 | 13 | <u>14.2</u> |             |             |             | 14.2 | 27 | 12.8 |
|      | HT-20, M0 to M7                      | 2 | 13 | <u>14.2</u> | <u>15.4</u> |             |             | 17.9 | 27 | 9.1  |
|      | HT-20, M8 to M15                     | 2 | 13 | <u>14.2</u> | <u>15.4</u> |             |             | 17.9 | 27 | 9.1  |
|      | HT-20, M0 to M7                      | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20, M8 to M15                     | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20, M16 to M23                    | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20, M0 to M7                      | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20, M8 to M15                     | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20, M16 to M23                    | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20 Beam Forming, M0 to M7         | 2 | 13 | <u>14.2</u> | <u>15.4</u> |             |             | 17.9 | 27 | 9.1  |
|      | HT-20 Beam Forming, M8 to M15        | 2 | 13 | <u>14.2</u> | <u>15.4</u> |             |             | 17.9 | 27 | 9.1  |
|      | HT-20 Beam Forming, M0 to M7         | 3 | 16 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20 Beam Forming, M8 to M15        | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20 Beam Forming, M16 to M23       | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20 Beam Forming, M0 to M7         | 4 | 16 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20 Beam Forming, M8 to M15        | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20 Beam Forming, M16 to M23       | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |
|      | HT-20 STBC, M0 to M7                 | 2 | 13 | <u>14.2</u> | <u>15.4</u> |             |             | 17.9 | 27 | 9.1  |
|      | HT-20 STBC, M0 to M7                 | 3 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> |             | 19.6 | 27 | 7.4  |
|      | HT-20 STBC, M0 to M7                 | 4 | 13 | <u>14.2</u> | <u>15.4</u> | <u>14.7</u> | <u>15.2</u> | 20.9 | 27 | 6.1  |



|      |                                      |   |    |             |             |             |             |      |    |      |
|------|--------------------------------------|---|----|-------------|-------------|-------------|-------------|------|----|------|
| 2462 | Legacy CCK, 1 to 11 Mbps             | 1 | 13 | <u>14.6</u> |             |             |             | 14.6 | 27 | 12.4 |
|      | Legacy CCK, 1 to 11 Mbps             | 2 | 13 | <u>14.6</u> | <u>15.6</u> |             |             | 18.1 | 27 | 8.9  |
|      | Legacy CCK, 1 to 11 Mbps             | 3 | 13 | <u>14.6</u> | <u>15.6</u> | <u>15.0</u> |             | 19.9 | 27 | 7.1  |
|      | Legacy CCK, 1 to 11 Mbps             | 4 | 13 | <u>14.6</u> | <u>15.6</u> | <u>15.0</u> | <u>15.3</u> | 21.2 | 27 | 5.8  |
|      | Non HT-20, 6 to 54 Mbps              | 1 | 13 | <u>14.5</u> |             |             |             | 14.5 | 27 | 12.5 |
|      | Non HT-20, 6 to 54 Mbps              | 2 | 13 | <u>13.5</u> | <u>14.1</u> |             |             | 16.8 | 27 | 10.2 |
|      | Non HT-20, 6 to 54 Mbps              | 3 | 13 | <u>13.5</u> | <u>14.1</u> | <u>14.0</u> |             | 18.6 | 27 | 8.4  |
|      | Non HT-20, 6 to 54 Mbps              | 4 | 13 | <u>12.5</u> | <u>13.1</u> | <u>12.6</u> | <u>12.9</u> | 18.8 | 27 | 8.2  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 13 | <u>13.5</u> | <u>14.1</u> |             |             | 16.8 | 27 | 10.2 |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 16 | <u>12.5</u> | <u>13.1</u> | <u>12.6</u> |             | 17.5 | 27 | 9.5  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 16 | <u>12.5</u> | <u>13.1</u> | <u>12.6</u> | <u>12.9</u> | 18.8 | 27 | 8.2  |
|      | HT-20, M0 to M7                      | 1 | 13 | <u>13.3</u> |             |             |             | 13.3 | 27 | 13.7 |
|      | HT-20, M0 to M7                      | 2 | 13 | <u>12.4</u> | <u>12.9</u> |             |             | 15.7 | 27 | 11.3 |
|      | HT-20, M8 to M15                     | 2 | 13 | <u>12.4</u> | <u>12.9</u> |             |             | 15.7 | 27 | 11.3 |
|      | HT-20, M0 to M7                      | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20, M8 to M15                     | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20, M16 to M23                    | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20, M0 to M7                      | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |
|      | HT-20, M8 to M15                     | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |
|      | HT-20, M16 to M23                    | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |
|      | HT-20 Beam Forming, M0 to M7         | 2 | 13 | <u>12.4</u> | <u>12.9</u> |             |             | 15.7 | 27 | 11.3 |
|      | HT-20 Beam Forming, M8 to M15        | 2 | 13 | <u>12.4</u> | <u>12.9</u> |             |             | 15.7 | 27 | 11.3 |
|      | HT-20 Beam Forming, M0 to M7         | 3 | 16 | <u>11.4</u> | <u>11.5</u> | <u>11.5</u> |             | 16.2 | 27 | 10.8 |
|      | HT-20 Beam Forming, M8 to M15        | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20 Beam Forming, M16 to M23       | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20 Beam Forming, M0 to M7         | 4 | 16 | <u>11.4</u> | <u>11.5</u> | <u>11.5</u> | <u>11.7</u> | 17.5 | 27 | 9.5  |
|      | HT-20 Beam Forming, M8 to M15        | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |
|      | HT-20 Beam Forming, M16 to M23       | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |
|      | HT-20 STBC, M0 to M7                 | 2 | 13 | <u>12.4</u> | <u>12.9</u> |             |             | 15.7 | 27 | 11.3 |
|      | HT-20 STBC, M0 to M7                 | 3 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> |             | 17.3 | 27 | 9.7  |
|      | HT-20 STBC, M0 to M7                 | 4 | 13 | <u>12.4</u> | <u>12.9</u> | <u>12.4</u> | <u>12.7</u> | 18.6 | 27 | 8.4  |

**Peak Output Power, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

**Peak Output Power, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

## Peak Output Power, 2412 MHz, Legacy CCK, 1 to 11 Mbps



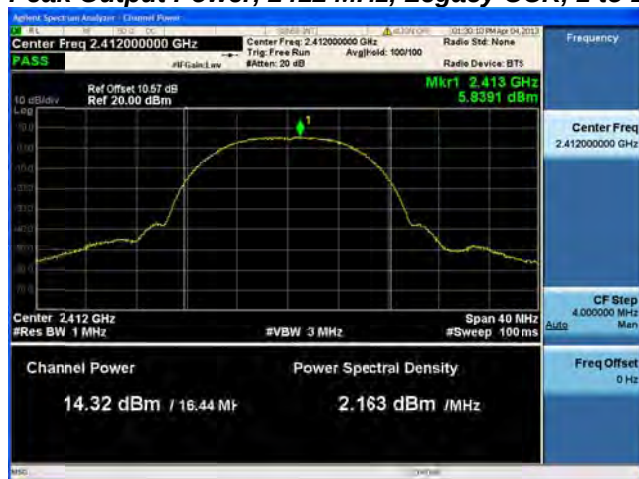
Antenna A



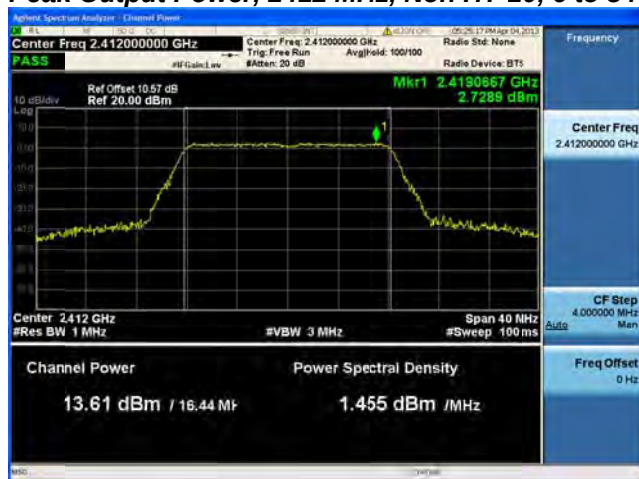
Antenna B

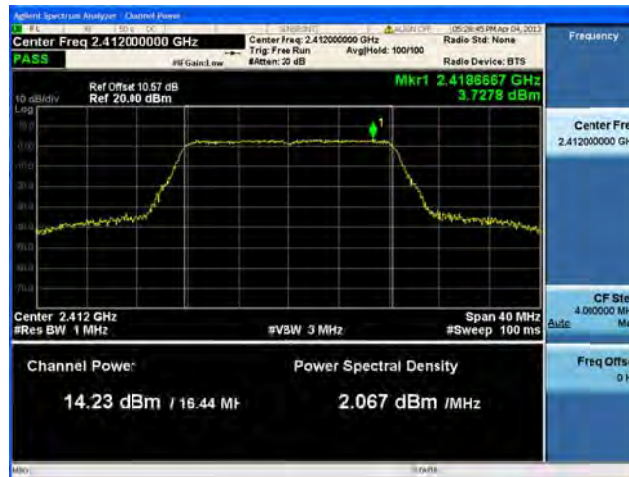


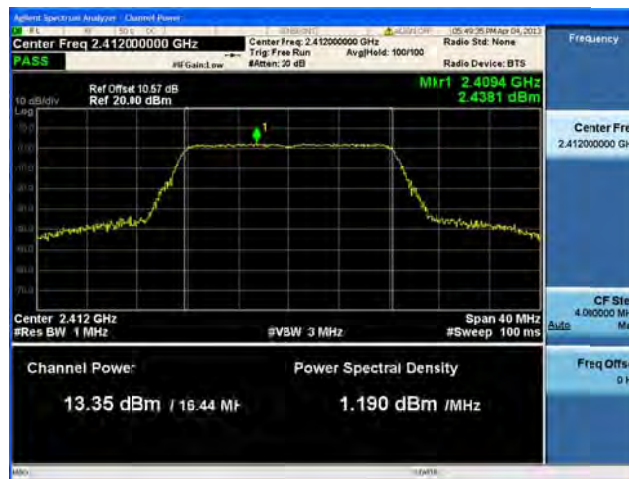
Antenna C

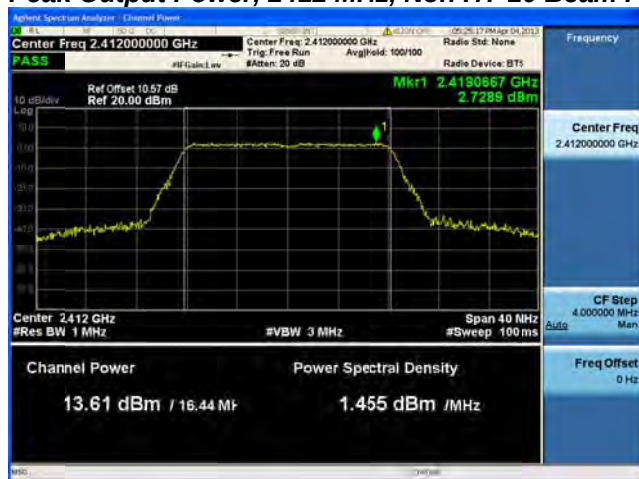
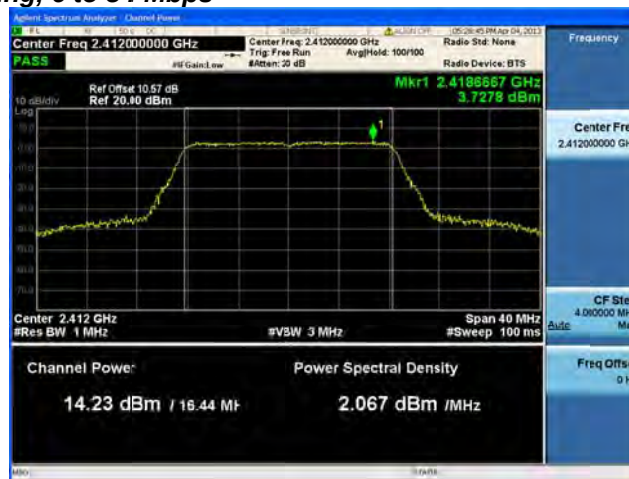
**Peak Output Power, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

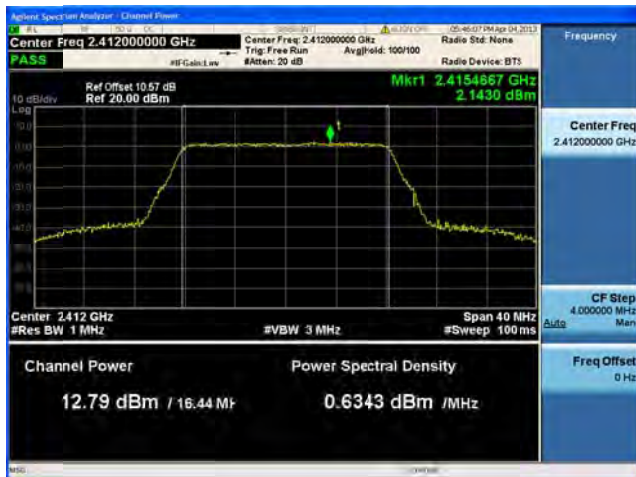
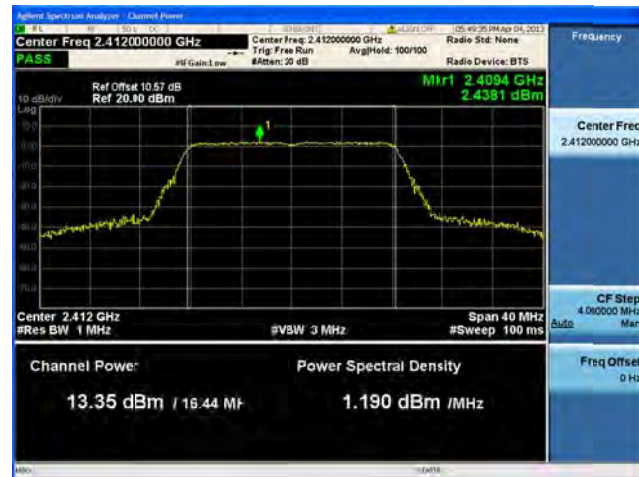
**Peak Output Power, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

**Peak Output Power, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

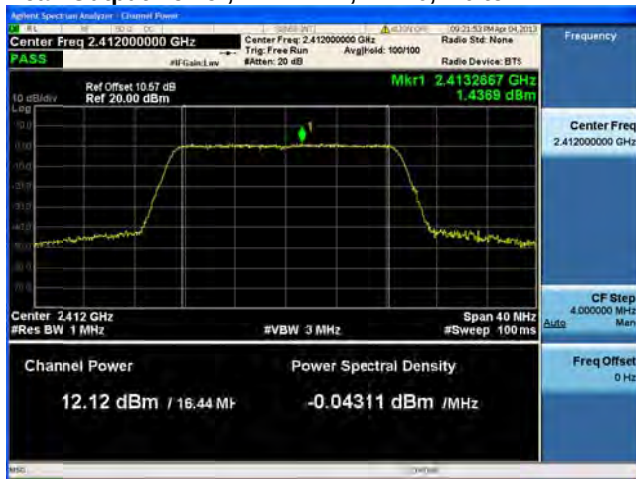
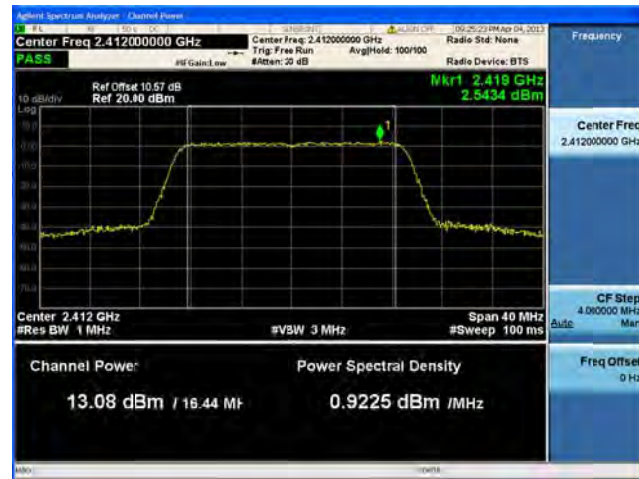
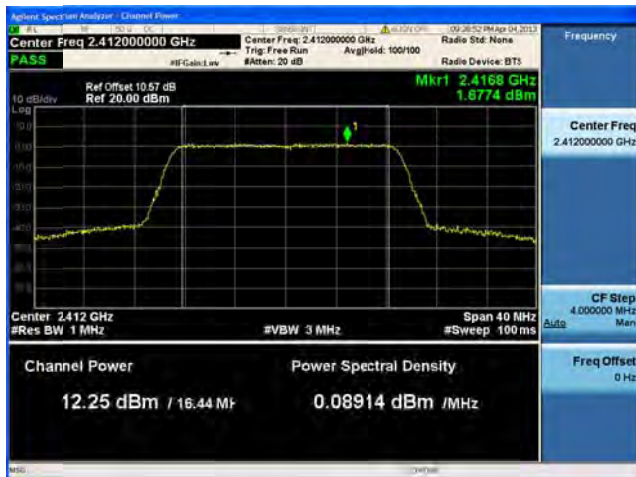
**Peak Output Power, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

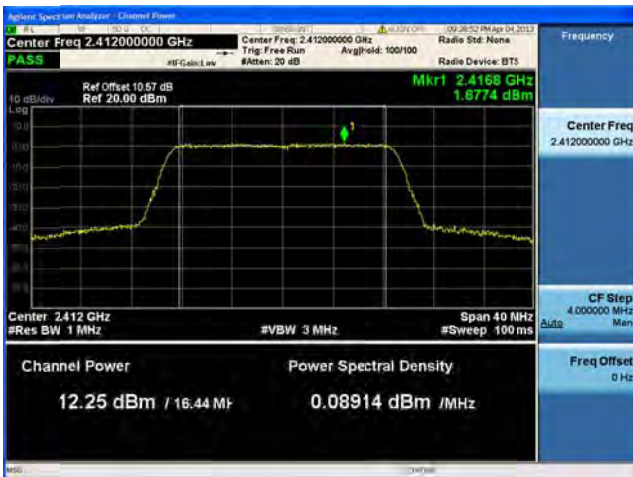
**Peak Output Power, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

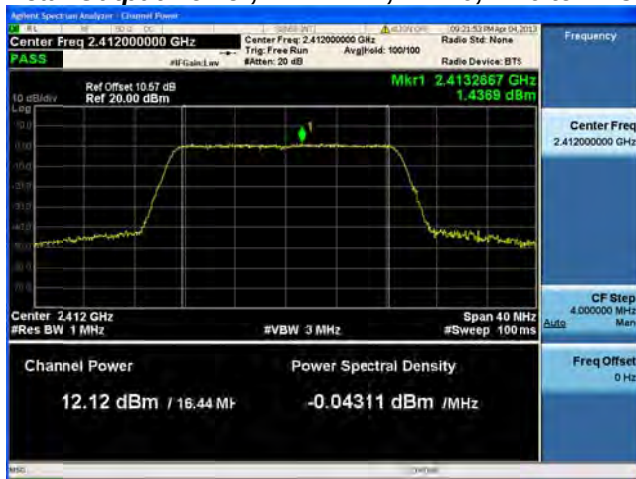
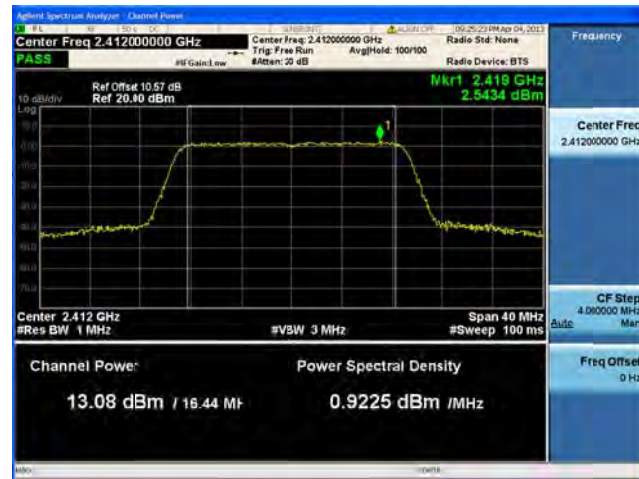
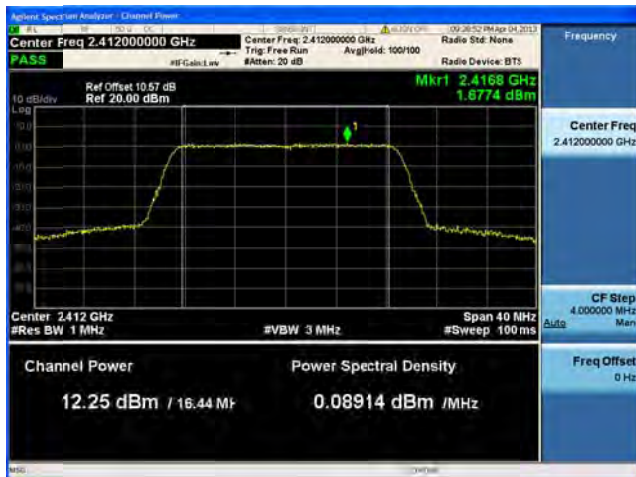
**Peak Output Power, 2412 MHz, HT-20, M0 to M7****Antenna A**

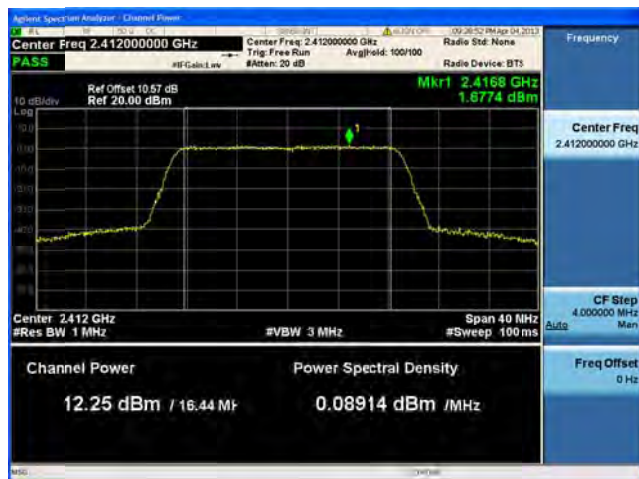
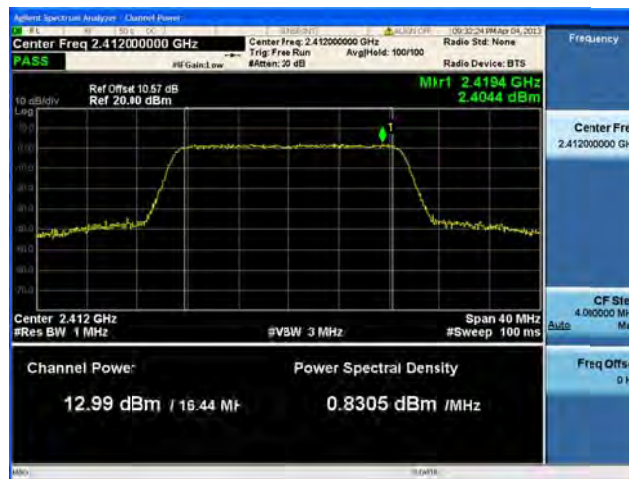
**Peak Output Power, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B**

**Peak Output Power, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B**

**Peak Output Power, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

Software: Spectrum Analyzer - Channel Power  
 1. 0.000000 0.000000 0.000000 0.000000  
 Center Freq 2.412000000 GHz  
 Center Freq 2.412000000 GHz  
 Trig: Free Run  
 AvgHold: 100/100  
 Radio Std: None  
 Radio Device: BT5  
 #F (Gain) Low  
 #F (Gain) Low  
 Ref Offset 10.57 dB  
 Ref 20.00 dBm  
 Mkr1 2.4132667 GHz  
 1.4369 dBm  
 10 dB/div  
 100 dB  
 90 dB  
 80 dB  
 70 dB  
 60 dB  
 50 dB  
 40 dB  
 30 dB  
 20 dB  
 10 dB  
 0 dB  
 Center 2.412 GHz  
 #Res BW 1 MHz  
 #VBW 3 MHz  
 Span 40 MHz  
 #Sweep 100 ms  
 Channel Power  
 12.12 dBm / 16.44 MHz  
 Power Spectral Density  
 -0.04311 dBm / MHz  
 Frequency  
 Center Freq  
 2.412000000 GHz  
 CF Step  
 4.000000 MHz  
 Mar  
 Auto  
 Freq Offset  
 0 Hz

Agilent Spectrum Analyzer - Channel Power

Center Freq 2.41200000 GHz

Radio Std: None

Radio Device: BTS

Center Freq: 2.41200000 GHz

Trig: Free Run

Avg/Hold: 100/100

#F Gain: 1.0

Ref Offset: 10.57 dB

Ref: 20.40 dBm

Wkr: 2.418 GHz

2.5434 dBm

Center 2.412 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power: 13.08 dBm / 18.44 MHz

Power Spectral Density: 0.9225 dBm / MHz

Active Spectrum Analyzer - Channel 1

Center Freq 2.412000000 GHz

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Center Freq: 2.412000000 GHz

Trig: Free Run

Avg: Hold: 100/100

Radio Std: None

Radio Device: BT5

Frequency

Center Freq 2.412000000 GHz

CF Step 4.000000 MHz

Span 40 MHz

Res BW 1 MHz

#VBW 3 MHz

Sweep 100 ms

Channel Power 12.25 dBm / 16.44 MHz

Power Spectral Density 0.08914 dBm / MHz

Freq Offset 0 Hz

Channel Power: 12.99 dBm / 18.44 MHz

Power Spectral Density: 0.8305 dBm / MHz

Center Freq: 2.412000000 GHz

Ref: 20.00 dBm

Ref Offset: 10.57 dB

Span: 40 MHz

Res BW: 1 MHz

Sweep: 100 ms

CF Step: 4.000000 MHz

Freq Offset: 0 Hz

Radio Std: None

Radio Device: BT5

Trig: Free Run

Avg/Hold: 100/100

#Gates: 20 dB

#F: Gain: 1.00

10.57 dBm

0.8305 dBm / MHz

2.4194 GHz

2.4044 dBm

2.418 2.420 MHz

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Software: Spectrum Analyzer - Channel Power  
 1. 2.412 GHz 2.41200000 GHz  
 Center Freq 2.412000000 GHz  
 Trig: Free Run AvgHold: 100/100  
 Radio Std: None  
 Radio Device: BT5  
 #F (Gain) Low  
 #F Offset 10.57 dB  
 Ref 20.00 dBm  
 Mkr1 2.4132667 GHz  
 1.4369 dBm  
 10 dB/div  
 100 dB  
 0 dB  
 -10 dB  
 -20 dB  
 -30 dB  
 -40 dB  
 -50 dB  
 -60 dB  
 -70 dB  
 -80 dB  
 Center 2.412 GHz  
 #Res BW 1 MHz  
 #VBW 3 MHz  
 Span 40 MHz  
 #Sweep 100 ms  
 Channel Power  
 12.12 dBm / 16.44 MHz  
 Power Spectral Density  
 -0.04311 dBm / MHz  
 Frequency  
 Center Freq  
 2.41200000 GHz  
 CF Step  
 4.000000 MHz  
 Mar  
 Auto  
 Freq Offset  
 0 Hz

Agilent Spectrum Analyzer - Channel Power

Center Freq 2.41200000 GHz

Center Freq: 2.412000000 GHz  
Trig: Free Run  
Avg/Hold: 100/100

Radio Std: None  
Radio Device: BTS

Ref Offs: 10.57 dB  
Ref: 20.40 dBm

Wkr1 2.418 GHz  
2.5434 dBm

Center 2.412 GHz  
#Res BW 1 MHz  
#VBW 3 MHz  
Span 40 MHz  
#Sweep 100 ms

Channel Power: 13.08 dBm / 18.44 MHz

Power Spectral Density: 0.9225 dBm / MHz

Active Spectrum Analyzer - Channel Power

Center Freq 2.41200000 GHz

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Center Freq: 2.412000000 GHz

Trig: Free Run

Avg: Hold: 100/100

Radio Std: None

Radio Device: BT5

Frequency

Center Freq 2.41200000 GHz

CF Step 4.000000 MHz

Span 40 MHz

Sweep 100 ms

Channel Power

Power Spectral Density

12.25 dBm / 16.44 MHz

0.08914 dBm / MHz

Freq Offset 0 Hz

Channel Power

Center Freq 2.412000000 GHz

Ref Offset 10.57 dB

Ref 20.40 dBm

10 dBm

0.0

-10.0

-20.0

-30.0

-40.0

-50.0

-60.0

-70.0

Center Freq 2.412 GHz

#Res BW 1 MHz

#VSW 3 MHz

Span 40 MHz

#Sweep 100 ms

M1 2.4194 GHz 2.4044 dBm

Power Spectral Density

12.99 dBm / 18.44 MHz

0.8305 dBm / MHz

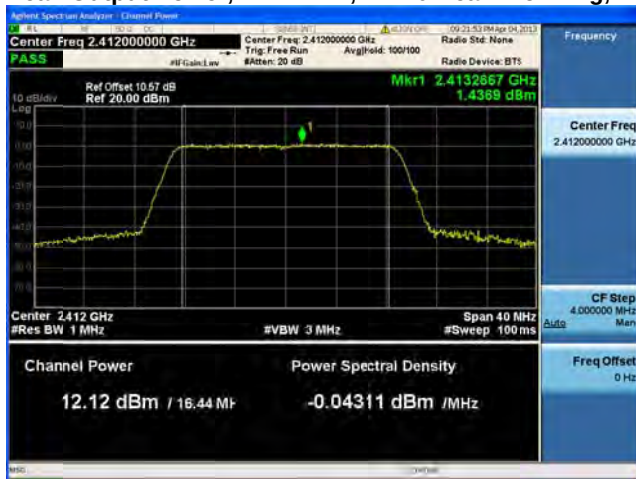
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**Peak Output Power, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

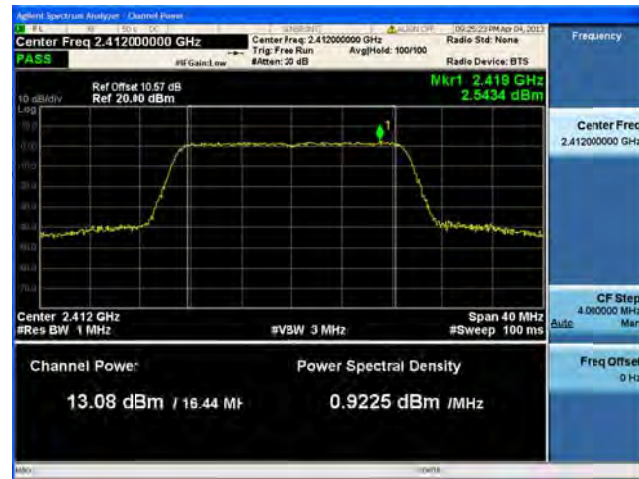
**Peak Output Power, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**



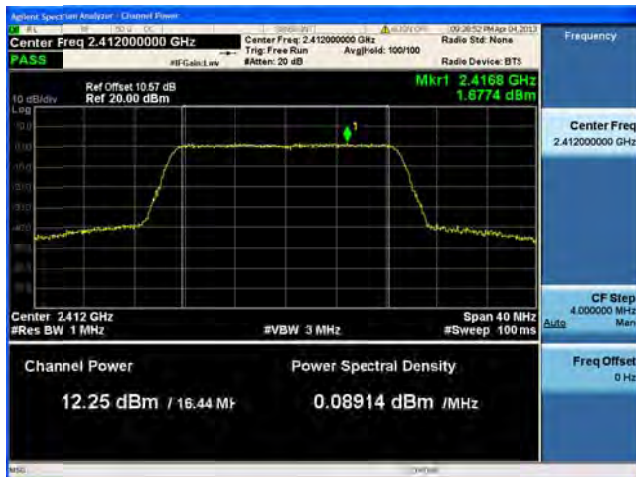
## Peak Output Power, 2412 MHz, HT-20 Beam Forming, M0 to M7



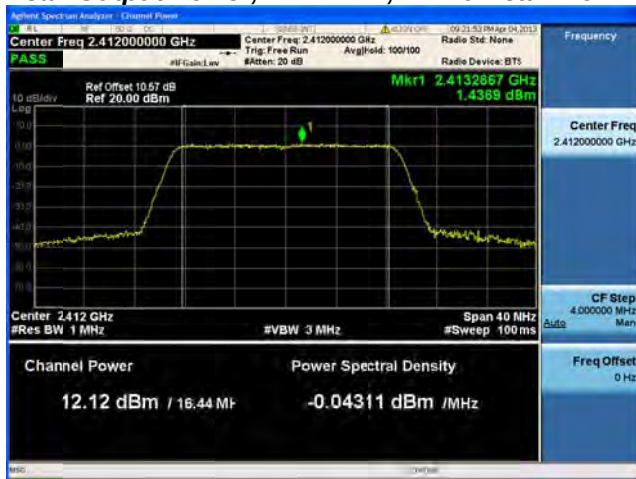
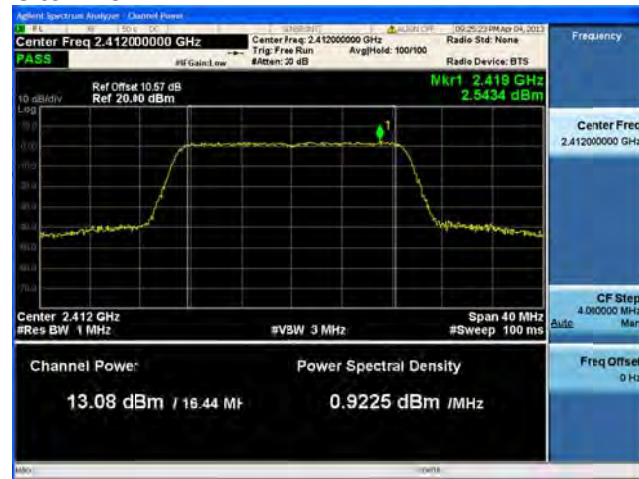
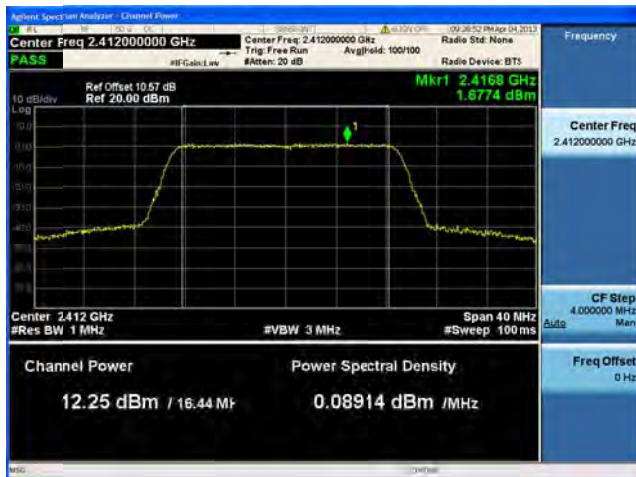
Antenna A

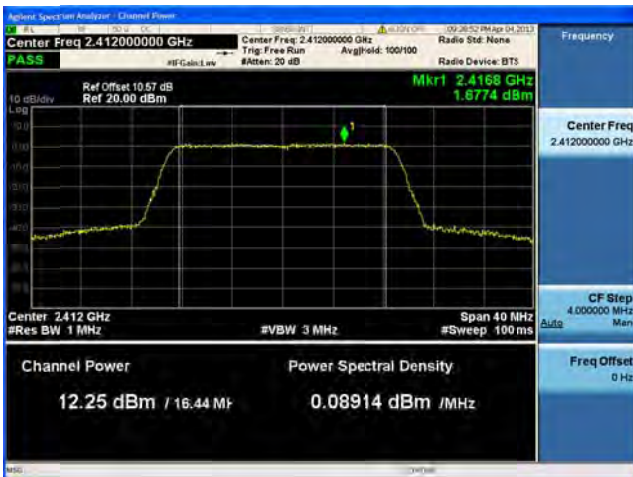


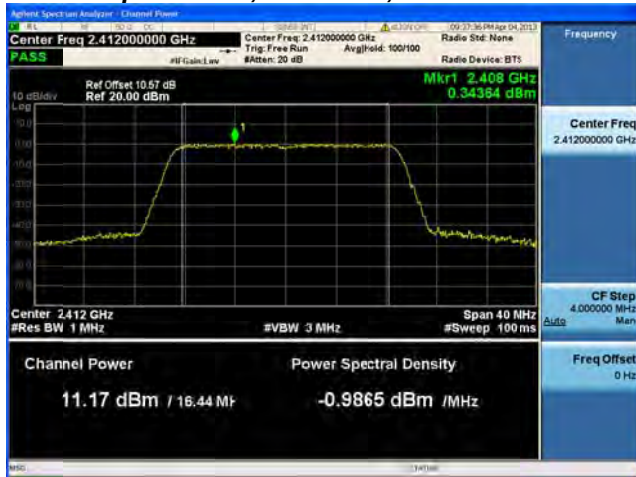
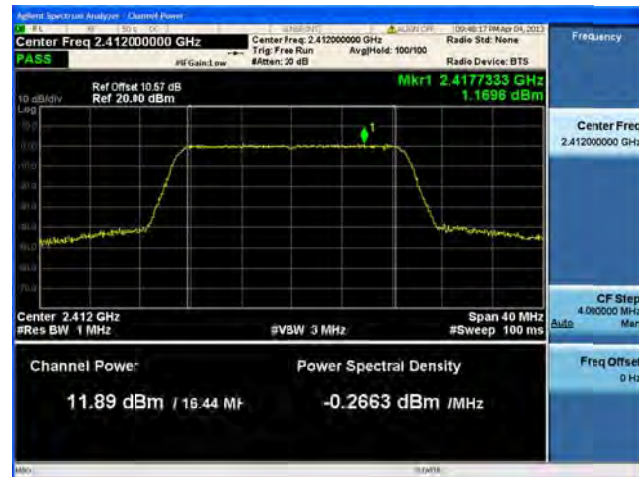
Antenna B



Antenna C

**Peak Output Power, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

The screenshot displays a Spectrum Analyzer interface with the following details:

- Top Panel:**
  - Left: "Ref Offset 10.57 dB", "Ref 20.00 dBm"
  - Center: "Center Freq 2.412000000 GHz", "Trig: Free Run", "#atten: 20 dB"
  - Right: "Radio Stn: None", "Radio Device: BT3"
- Main Display:**
  - Y-axis: "dBm" scale from -80 to 120.
  - X-axis: Frequency scale from 2.411 to 2.413 GHz.
  - Signal: A yellow trace showing a peak at 2.4132867 GHz with a power of 1.4369 dBm.
- Bottom Left Panel:**
  - Center 2.412 GHz
  - #Res BW 1 MHz
  - #VBW 3 MHz
- Bottom Right Panel:**
  - Span 40 MHz
  - #Sweep 100 ms
- Bottom Center Panel:**
  - Channel Power: 12.12 dBm / 16.44 MHz
  - Power Spectral Density: -0.04311 dBm / MHz
- Right Panel (Frequency):**
  - Center Freq: 2.412000000 GHz
  - CF Step: 4.000000 MHz
  - Audio: [Mute]
  - Freq Offset: 0 Hz

Active Spectrum Analyzer - Channel 1

Center Freq 2.41200000 GHz

Ref Offset 10.57 dB

Ref 20.40 dBm

Center Freq 2.41200000 GHz

Trig Free Run

Avg/Hold: 100/100

Radio Std: None

Wdr Device: BT5

13.08 dBm / 16.44 MHz

0.9225 dBm / MHz

Center Freq 2.41200000 GHz

CF Step 4.000000 MHz

Frequency Offset 0 Hz

Agilent Spectrum Analyzer - Channel Power

Center Freq 2.412000000 GHz

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Center Freq: 2.412000000 GHz

Trig: Free Run

AvgHold: 100/100

Radio Stn: None

Radio Device: BT3

#F Chain: Low

#BW 3 MHz

Span 40 MHz

#Res BW 1 MHz

#Sweep 100 ms

Channel Power

12.25 dBm / 16.44 MHz

Power Spectral Density

0.08914 dBm / MHz

Mkr1 2.4168 GHz

1.6774 dBm

Frequency

Center Freq

2.412000000 GHz

CF Step

4.000000 MHz

Auto

Man

Freq Offset

0 Hz

[illegible]

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The screenshot displays a Spectrum Analyzer interface with the following details:

- Top Panel:**
  - Left: "Ref Offset 10.57 dB", "Ref 20.00 dBm"
  - Center: "Center Freq 2.412000000 GHz", "Trig: Free Run", "#atten: 20 dB"
  - Right: "Radio Stn: None", "Radio Device: BT3"
- Main Display:**
  - Y-axis: "to dBmV" (range 60 to 120)
  - X-axis: Frequency (range 2.411 to 2.413 GHz)
  - Trace: A yellow line showing a signal with a peak at 2.4132867 GHz (labeled "Mkr1").
- Bottom Left Panel:**
  - Center 2.412 GHz
  - #Res BW 1 MHz
  - #VBW 3 MHz
- Bottom Right Panel:**
  - Span 40 MHz
  - #Sweep 100 ms
- Bottom Section:**
  - Channel Power: 12.12 dBm / 16.44 MHz
  - Power Spectral Density: -0.04311 dBm / MHz
- Right Panel (Frequency):**
  - Center Freq: 2.412000000 GHz
  - CF Step: 4.000000 MHz
  - Audio: [Mute]
  - Freq Offset: 0 Hz

Advent Spectrum Analyzer - Channel View

Center Freq 2.41200000 GHz

Ref Offset 10.57 dB  
Ref 20.00 dBm

Channel Power: 13.08 dBm / 16.44 MHz

Power Spectral Density: 0.9225 dBm / MHz

Center Freq 2.41200000 GHz

Res BW 1 MHz

Span 40 MHz

Sweep 100 ms

CF Step 4.000000 MHz

Freq Offset 0 Hz

Wkr1 2.418 GHz  
2.5434 dBm

Agilent Spectrum Analyzer - Channel Power

Center Freq 2.412000000 GHz

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Center Freq: 2.412000000 GHz

Trig: Free Run

AvgHold: 100/100

Radio Stn: None

Radio Device: BT3

#S/Gain: Low

#BW 3 MHz

Span 40 MHz

#Res BW 1 MHz

#Sweep 100 ms

Channel Power

12.25 dBm / 16.44 MHz

Power Spectral Density

0.08914 dBm / MHz

Frequency

Center Freq 2.412000000 GHz

CF Step 4.000000 MHz

Freq Offset 0 Hz

Adaptive Spectrum Analyzer - Channel Power

Center Freq: 2.41200000 GHz

Ref 10.57 dB

Ref 20.90 dBm

Center Freq: 2.41200000 GHz

Trig: Free Run

Avg/Hold: 100/H00

Radio Device: BT5

Frequency

Center Freq: 2.41200000 GHz

CF Step: 4.000000 MHz

CF Offset: 0 Hz

Channel Power: 12.99 dBm / 16.44 MHz

Power Spectral Density: 0.8305 dBm / MHz

Span 40 MHz

#Res BW 1 MHz

#Sweep 100 ms

#VBW 3 MHz

Mkr1 2.4194 GHz

2.4044 dBm

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**Peak Output Power, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

## Peak Output Power, 2412 MHz, HT-20 STBC, M0 to M7



Antenna A



Antenna B



Antenna C

Software: Spectrum Analyzer - Channel Power

Center Freq 2.412000000 GHz

Center Freq: 2.412000000 GHz

Radio Sts: None

Trig: Free Run

AvgHold: 100/100

Radio Device: BT3

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Mkr1 2.4132867 GHz

1.4369 dBm

Center 2.412 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power

Power Spectral Density

12.12 dBm / 16.44 MHz

-0.04311 dBm / MHz

Frequency

Center Freq

2.412000000 GHz

CF Step

4.000000 MHz

Audio

Freq Offset

0 Hz

Active Spectrum Analyzer - Channel 1

Center Freq 2.41200000 GHz

Res BW 1 MHz

Span 40 MHz

Sweep 100 ms

Channel Power: 13.08 dBm / 16.44 MHz

Power Spectral Density: 0.9225 dBm / MHz

Center Freq 2.41200000 GHz

Res BW 1 MHz

Span 40 MHz

Sweep 100 ms

Channel Power: 13.08 dBm / 16.44 MHz

Power Spectral Density: 0.9225 dBm / MHz

Vector Signal Analyzer - Channel Power

Center Freq 2.412000000 GHz

PASS

Ref Offset 10.57 dB

Ref 20.00 dBm

Center Freq: 2.412000000 GHz

Trig: Free Run

Avg/hold: 100/100

Radio Std: None

Radio Device: BTS

Frequency

Center Freq 2.412000000 GHz

CF Step 4.000000 MHz

Span 40 MHz

Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms

Channel Power 12.25 dBm / 16.44 MHz

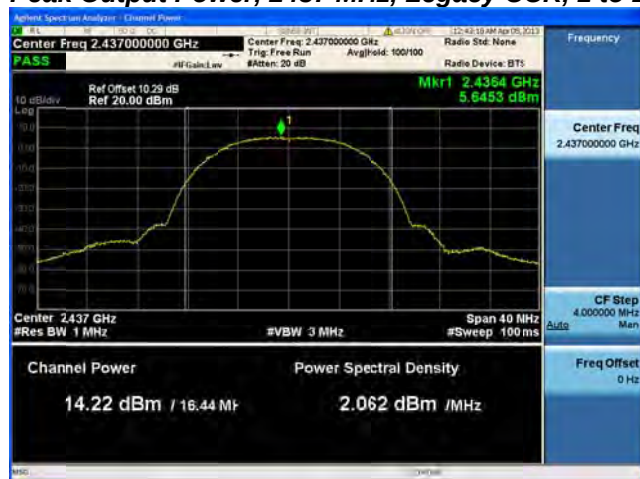
Power Spectral Density 0.08914 dBm / MHz

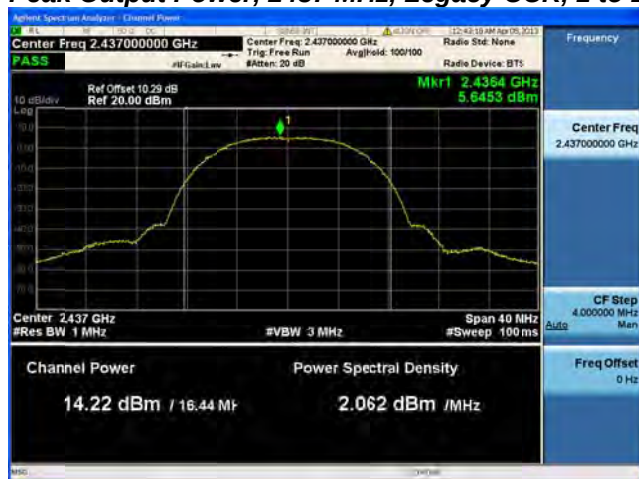
Freq Offset 0 Hz

**Channel Power:** 12.99 dBm / 16.44 MHz

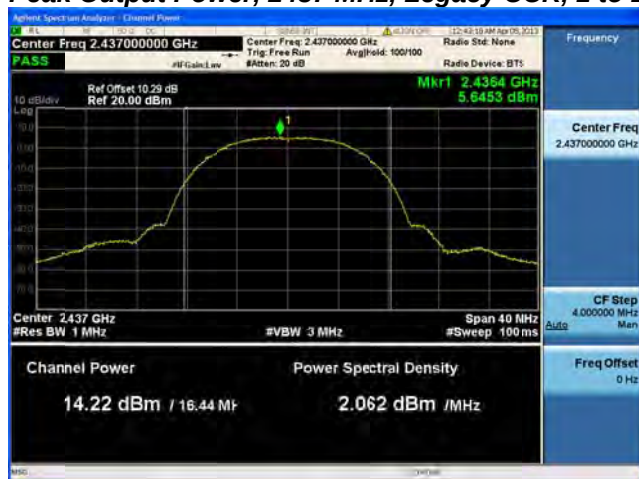
**Power Spectral Density:** 0.8305 dBm / MHz

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**Peak Output Power, 2437 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

**Peak Output Power, 2437 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

**Peak Output Power, 2437 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2437 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2437 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

**Peak Output Power, 2437 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

**Peak Output Power, 2437 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2437 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2437 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

## Peak Output Power, 2437 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps



Antenna A



Antenna B



Antenna C

**Peak Output Power, 2437 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2437 MHz, HT-20, M0 to M7****Antenna A**

**Peak Output Power, 2437 MHz, HT-20, M0 to M7****Antenna A****Antenna B**

**Peak Output Power, 2437 MHz, HT-20, M8 to M15****Antenna A****Antenna B**

## Peak Output Power, 2437 MHz, HT-20, M0 to M7



Antenna A



Antenna B



Antenna C

**Peak Output Power, 2437 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

The screenshot shows a Rohde & Schwarz Spectrum Analyzer interface. The main display is a frequency plot with a yellow trace showing a signal. A green cursor labeled 'Mkr1' is positioned at 2.4357333 GHz, with a corresponding frequency value of 3.6005 dBm. The plot has a grid and a scale of 10 dB/div. The signal is centered at 2.437 GHz with a resolution bandwidth of 1 MHz. The channel power is 14.22 dBm, and the power spectral density is 2.058 dBm/MHz. The display also shows various settings such as Center Freq, Span, and Sweep.

Top Bar: Rohde & Schwarz Spectrum Analyzer - Channel Power

Top Left: Center Freq 2.437000000 GHz, #F Span 1 MHz, #VBW 3 MHz, #Sweep 100 ms

Top Right: Center Freq 2.437000000 GHz, Trig: Free Run, AvgHold: 100/100, Radio Std: None, Radio Device: BT5

Left Panel: 10 dB/div, Ref Offset 10.29 dB, Ref 20.00 dBm

Right Panel: Frequency, Center Freq 2.437000000 GHz, CF Step 4.000000 MHz, Freq Offset 0 Hz

Bottom Panel: Channel Power 14.22 dBm / 16.44 MHz, Power Spectral Density 2.058 dBm / MHz

[illegible]

Active Spectrum Analyzer - Channel Power

Center Freq 2.437000000 GHz

PASS #F Gain: 1.00

Center Freq: 2.437000000 GHz

Trig: Free Run

Avg: Hold: 100/100

Radio Std: None

Mkr1: 2.438 GHz

4.1984 dBm

Ref Offset 10.29 dB

Ref 20.00 dBm

Log

Span 40 MHz

Center 2.437 GHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms

Channel Power

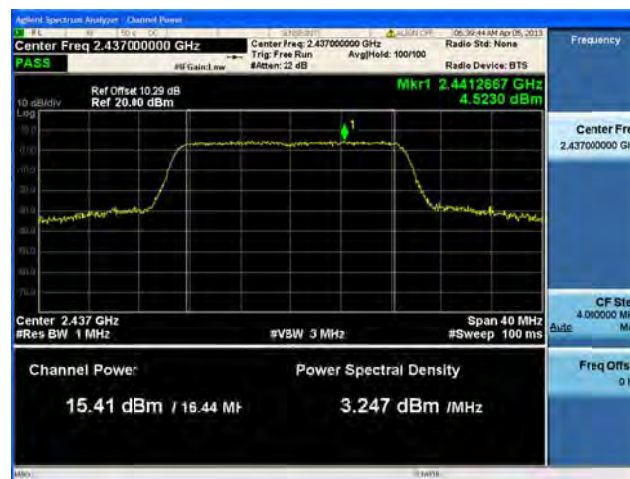
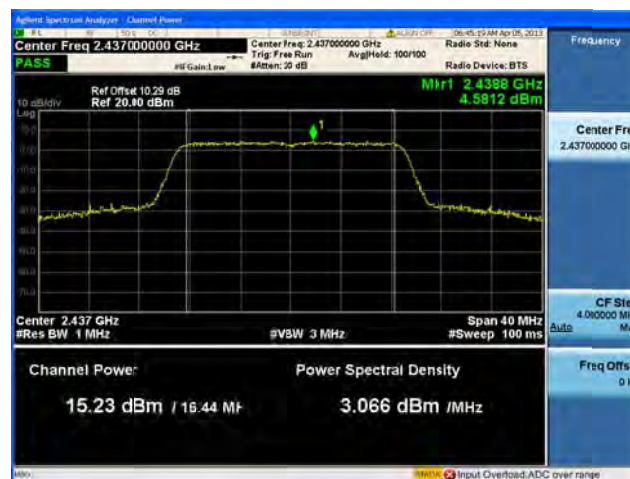
Power Spectral Density

14.70 dBm / 16.44 MHz

2.537 dBm / MHz

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**Peak Output Power, 2437 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2437 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

The screenshot shows a Rohde & Schwarz Spectrum Analyzer interface. The main display is a frequency plot with a yellow trace showing a signal. A green cursor labeled '1' points to a peak at 2.4357333 GHz. The plot has a grid and various measurement parameters displayed. The top status bar shows the center frequency as 2.437000000 GHz. The left panel shows the channel power as 14.22 dBm / 16.44 MHz. The bottom panel shows the power spectral density as 2.058 dBm / MHz. The right panel shows the frequency as 2.437000000 GHz. The top right corner shows the date and time as 05.36.50 AM Apr 05, 2013.

Software: Spectrum Analyzer - Element Power

Center Freq 2.437000000 GHz

Center Freq 2.437000000 GHz

Trig: Free Run

AvgHold: 100/100

Radio Std: None

Radio Device: BT5

Frequency

Center Freq 2.437000000 GHz

CF Step 4.000000 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power

Power Spectral Density

14.22 dBm / 16.44 MHz

2.058 dBm / MHz

Freq Offset 0 Hz

Agilent Spectrum Analyzer Channel Power

Center Freq 2.43700000 GHz

Ref Offset 10.29 dB

Ref 20.40 dBm

Center Freq: 2.437000000 GHz

Trig: Free Run

Avg: Hold: 100/100

Radio Std: None

Radio Device: BTS

Center Freq: 2.43700000 GHz

Span 40 MHz

#Res BW 1 MHz

#VSW 3 MHz

#Sweep 100 ms

Channel Power: 15.41 dBm / 18.44 MHz

Power Spectral Density: 3.247 dBm / MHz

Mkr1 2.4412667 GHz

4.5230 dBm

CF Step: 4.000000 MHz

Freq Offset: 0 Hz

[illegible][illegible]

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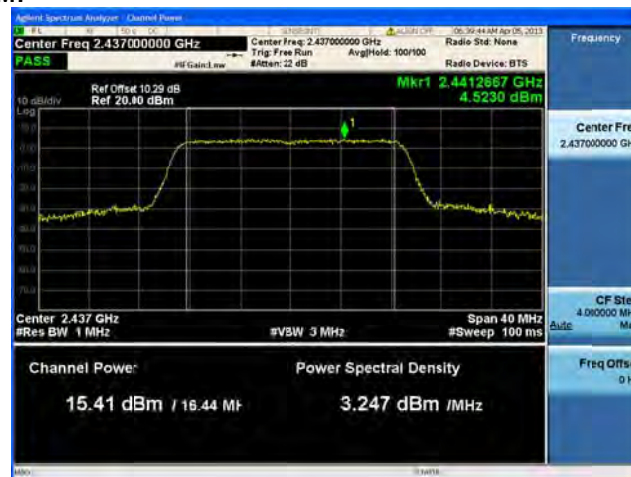
**Peak Output Power, 2437 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

**Peak Output Power, 2437 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**

## Peak Output Power, 2437 MHz, HT-20 Beam Forming, M0 to M7



Antenna A



Antenna B



Antenna C

[illegible][illegible]

Vector Signal Analyzer - Channel Power

Center Freq 2.437000000 GHz  
 Ref Offset 10.25 dB  
 Ref 20.00 dBm  
 Mkr1 2.438 GHz  
 4.1984 dBm

Center 2.437 GHz  
 Res BW 1 MHz  
 Span 40 MHz  
 Sweep 100 ms  
 VBW 3 MHz  
 Channel Power 14.70 dBm / 16.44 MHz  
 Power Spectral Density 2.537 dBm / MHz

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**Peak Output Power, 2437 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2437 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2437 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

Software: Spectrum Analyzer - Channel Power

Center Freq 2.437000000 GHz

Center Freq: 2.437000000 GHz

Trig: Free Run

AvgHold: 100/100

Radio Std: None

Radio Device: BT1

PASS

Ref Offset 10.29 dB

Ref 20.00 dBm

Mkr1 2.437333 GHz

3.6005 dBm

Center 2437 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power

Power Spectral Density

14.22 dBm / 16.44 MHz

2.058 dBm / MHz

Frequency

Center Freq 2.437000000 GHz

CF Step 4.000000 MHz

Freq Offset 0 Hz

[illegible][illegible]

**Center Freq** 2.437000000 GHz  
**Ref** 10.29 dB  
**Ref** 20.90 dBm  
**Center Freq** 2.437000000 GHz  
**Trig** Free Run  
**Avg** Hold: 100/100  
**Radio Stnd**: None  
**Radio Device**: BTS  
**IF Gain** Low  
**Attenu**: 20 dB  
**MHz1** 2.4388 GHz  
**4.5812 dBm**

**Center** 2.437 GHz  
**Res BW** 1 MHz  
**Span** 40 MHz  
**VBW** 3 MHz  
**Sweep** 100 ms

**Channel Power**: 15.23 dBm / 16.44 MHz  
**Power Spectral Density**: 3.066 dBm / MHz

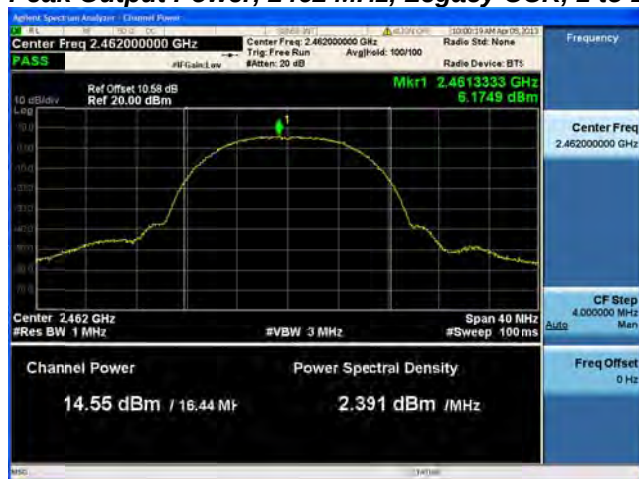
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**Peak Output Power, 2437 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

**Peak Output Power, 2437 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2437 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

**Peak Output Power, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

## Peak Output Power, 2462 MHz, Legacy CCK, 1 to 11 Mbps



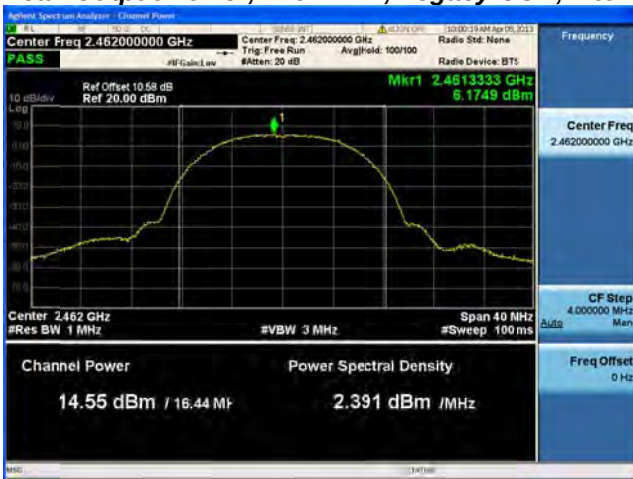
Antenna A



Antenna B



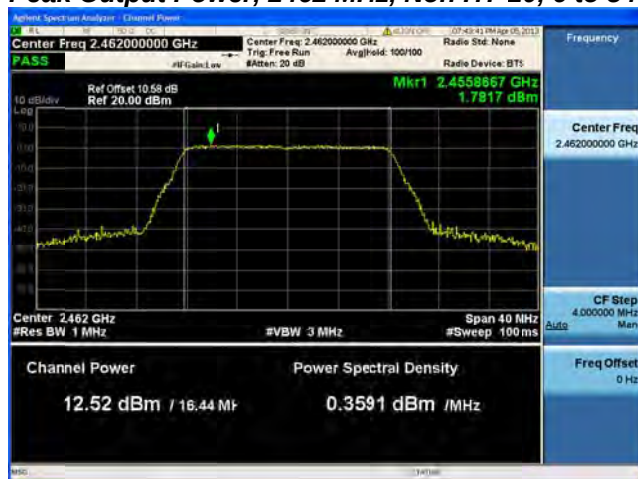
Antenna C

**Peak Output Power, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

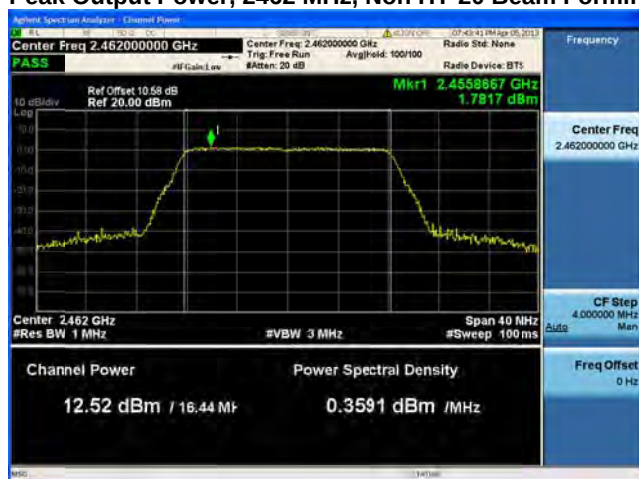
**Peak Output Power, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

**Peak Output Power, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

## Peak Output Power, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps



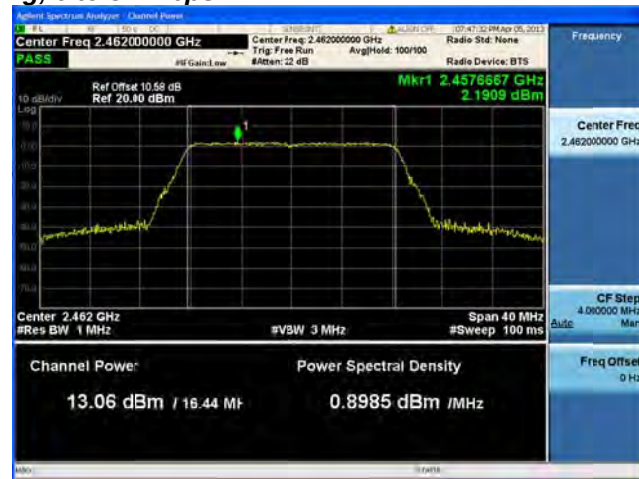
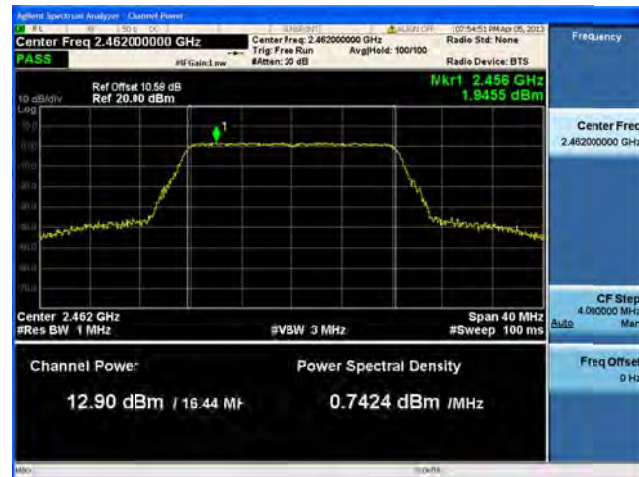
Antenna A



Antenna B



Antenna C

**Peak Output Power, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, HT-20, M0 to M7****Antenna A**

**Peak Output Power, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B**

**Peak Output Power, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B**

## Peak Output Power, 2462 MHz, HT-20, M0 to M7



Antenna A



Antenna B



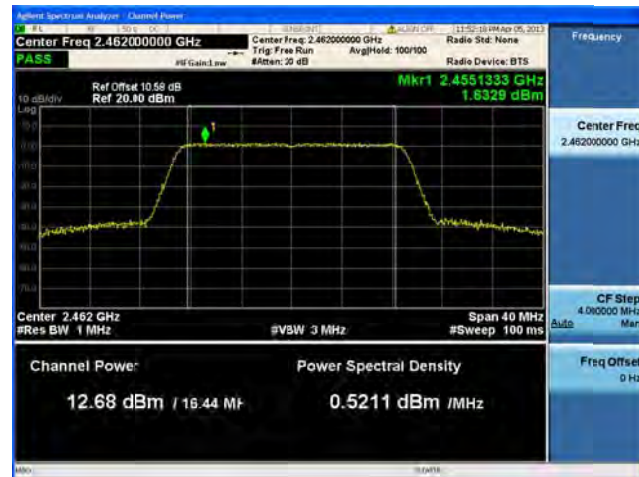
Antenna C

**Peak Output Power, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Peak Output Power, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

## Peak Output Power, 2462 MHz, HT-20 Beam Forming, M8 to M15



Antenna A



Antenna B

## Peak Output Power, 2462 MHz, HT-20 Beam Forming, M0 to M7



Antenna A



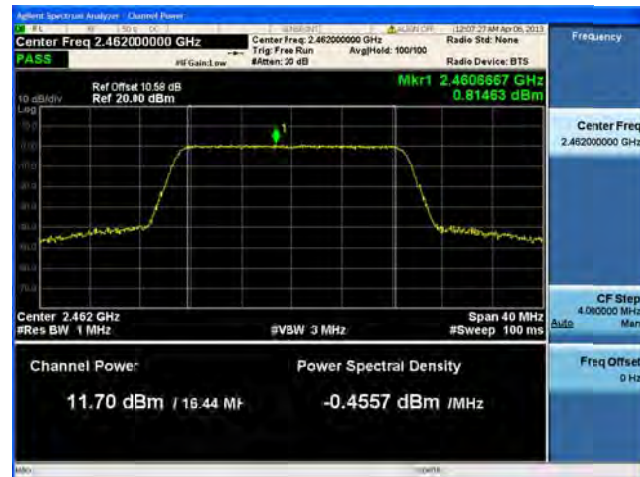
Antenna B



Antenna C

**Peak Output Power, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2462 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

**Peak Output Power, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

The screenshot displays a Vector Signal Analyzer (VSA) interface with the following components:

- Top Panel:**
  - Left: "Active Spectrum Analyzer - Channel Power" with a "PASS" status indicator.
  - Center: "Center Freq 2.462000000 GHz", "Trig: Free Run", "AvgHold: 100/100", and "#atten: 20 dB".
  - Right: "Radio Stn: None" and "Radio Device: BT5".
- Left Panel:**
  - Vertical scale: "10 dB/div".
  - Horizontal scale: "Ref Offset 10.58 dBm", "Ref 20.00 dBm".
- Main Display:** A plot of the signal spectrum showing a yellow trace with a peak at 2.4547333 GHz and 1.7508 dBm. The trace is labeled "Mkr1".
- Bottom Panel:**
  - Left: "Center 2.462 GHz", "#Res BW 1 MHz", "#VBW 3 MHz", and "#Sweep 100 ms".
  - Right: "Span 40 MHz".
- Right Panel:**
  - Top: "Frequency" section with "Center Freq 2.462000000 GHz".
  - Middle: "CF Step 4.000000 MHz" and "Auto" button.
  - Bottom: "Freq Offset 0 Hz".
- Bottom Readouts:**
  - Channel Power: 12.37 dBm / 16.44 MHz
  - Power Spectral Density: 0.2056 dBm / MHz

[illegible]

Vector Signal Analyzer - Channel Power

Center Freq 2.46200000 GHz  
 Ref Offset 10.58 dB  
 Ref 20.00 dBm

Center Freq: 2.46200000 GHz  
 Trig: Free Run  
 Avg/hold: 100/100  
 Radio Device: BT5

Frequency

Center Freq  
 2.46200000 GHz

CF Step  
 4.000000 MHz

Channel Power

Power Spectral Density

12.42 dBm / 16.44 MHz

0.2583 dBm / MHz

Span 40 MHz  
 #Res BW 1 MHz  
 #VBW 3 MHz  
 #Sweep 100 ms

Mkr1 2.463133 GHz  
 1.6938 dBm

Agilent Spectrum Analyzer - Channel Power

Center Freq: 2.462000000 GHz  
 Trig: Free Run  
 Avg/Hold: 100/100  
 Radio Std: None  
 Radio Device: BTS

Ref Freq: 10.56 dB  
 Ref: 20.80 dBm

Mkr1 2.4551333 GHz  
 1.6329 dBm

Center Freq: 2.46200000 GHz

CF Step: 4.000000 MHz

Span: 40 MHz  
 #Res BW: 1 MHz  
 #VBW: 3 MHz  
 #Sweep: 100 ms

Channel Power: 12.68 dBm / 16.44 MHz

Power Spectral Density: 0.5211 dBm / MHz

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The screenshot displays a Spectrum Analyzer interface with the following details:

- Top Bar:**
  - Left: "Ref Offset 10.58 dB", "Ref 20.00 dBm".
  - Center: "Center Freq: 2.462000000 GHz", "Trig: Free Run", "#atten: 20 dB".
  - Right: "Radio Sts: None", "Radio Device: BT5".
- Left Panel:**
  - Top: "PASS" in green.
  - Scale: "10 dB/div".
  - Frequency: "2.462000000 GHz".
- Main Display:**
  - A plot showing a signal trace with a peak at 2.462000000 GHz.
  - Peak label: "Mkr1 2.4547333 GHz 1.7508 dBm".
  - Grid lines are visible.
- Bottom Panel:**
  - Left: "Center 2.462 GHz", "#Res BW 1 MHz", "#VBW 3 MHz".
  - Right: "Span 40 MHz", "#Sweep 100 ms".
- Right Panel:**
  - Top: "Center Freq 2.462000000 GHz".
  - Middle: "CF Step 4.000000 MHz", "Auto", "Man".
  - Bottom: "Freq Offset 0 Hz".
- Bottom Status Bar:**
  - Left: "Channel Power 12.37 dBm / 16.44 MHz".
  - Right: "Power Spectral Density 0.2056 dBm / MHz".

Agilent Spectrum Analyzer - Channel 0001

Center Freq 2.46200000 GHz

Ref Offset 10.58 dB

Ref 20.40 dBm

Span 40 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms

Channel Power: 12.92 dBm / 16.44 MHz

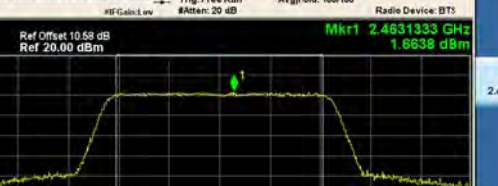
Power Spectral Density: 0.7561 dBm / MHz

Frequency

Center Freq 2.46200000 GHz

CF Step 4.000000 MHz

Freq Offset 0 Hz



Agilent Spectrum Analyzer - Channel Power

Center Freq 2.462000000 GHz

Center Freq: 2.462000000 GHz

Radio Std: None

Trig: Free Run

AvgMode: 100/100

Radio Device: BT3

#F Chain: Low

#F Chain: Low

Ref Offset 10.58 dB

Ref 20.00 dBm

10 dB/Div

100 MHz

Mkr1 2.4631333 GHz

1.6338 dBm

Center 2.462 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power

Power Spectral Density

12.42 dBm / 16.44 MHz

0.2583 dBm / MHz

Frequency

Center Freq 2.462000000 GHz

CF Step 4.000000 MHz

Freq Offset 0 Hz

Advent Spectral Analyzer - Channel Power

Center Freq 2.46200000 GHz

Ref 10.58 dB

Ref 20.90 dBm

Center Freq: 2.46200000 GHz

Trig: Free Run

Avg/Hold: 100/100

Radio Std: None

Radio Device: BTS

IF Gain: Low

#dB: 20 dB

Mkr1 2.4551333 GHz 1.6329 dBm

10 dB/div

Center 2.462 GHz

#Res BW 1 MHz

#VBW 3 MHz

Span 40 MHz

#Sweep 100 ms

Channel Power: 12.68 dBm / 16.44 MHz

Power Spectral Density: 0.5211 dBm / MHz

CF Step: 4.000000 MHz

Freq Offset: 0 Hz

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**Peak Output Power, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

## Peak Output Power, 2462 MHz, HT-20 STBC, M0 to M7



Antenna A



Antenna B



Antenna C

The screenshot displays a Spectrum Analyzer interface with the following details:

- Top Bar:**
  - Left: "Spectrum Analyzer - Channel Power"
  - Center: "0.000000 Hz" and "11:40:58 AM Apr 15, 2013"
  - Right: "Frequency"
- Measurement Area (Top):**
  - Center Freq: 2.462000000 GHz
  - Radio Sts: None
  - Trig: Free Run
  - AvgHold: 100/100
  - Radio Device: BT5
  - Buttons: "PASS" and "#Grid Low"
- Plot Area:**
  - Y-axis: "to dBmV" (range 10 to 140)
  - X-axis: Frequency (range 2.45 to 2.47 GHz)
  - Trace: A yellow signal trace showing a peak at 2.457333 GHz.
  - Annotations: "Ref Offset 10.58 dB", "Ref 20.00 dBm", "Mkr1 2.457333 GHz", "1.7508 dBm".
- Bottom Section:**
  - Center: 2.462 GHz, #Res BW 1 MHz, #VBW 3 MHz, Span 40 MHz, #Sweep 100 ms
  - Channel Power: 12.37 dBm / 16.44 MHz
  - Power Spectral Density: 0.2056 dBm / MHz
  - CF Step: 4.000000 MHz
  - Buttons: "Auto" and "Man"
  - Frequency Offset: 0 Hz

[illegible]

Active Spectrum Analyzer - Channel Power

Center Freq 2.462000000 GHz

PASS

Ref Offset 10.58 dB

Ref 20.00 dBm

Center Freq: 2.462000000 GHz

Trig: Free Run

Avg/vid: 100/100

Radio Std: None

Radio Device: BT5

Frequency

Center Freq 2.462000000 GHz

CF Step 4.000000 MHz

Span 40 MHz

#Res BW 1 MHz

#VBW 3 MHz

#Sweep 100 ms

Channel Power

Power Spectral Density

12.42 dBm / 16.44 MHz

0.2583 dBm / MHz

Freq Offset 0 Hz

Channel Power: 12.68 dBm / 16.44 MHz

Power Spectral Density: 0.5211 dBm / MHz

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## Power Spectral Density

15.247 / RSS-210 A8.2: For digitally modulated systems, the peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below.

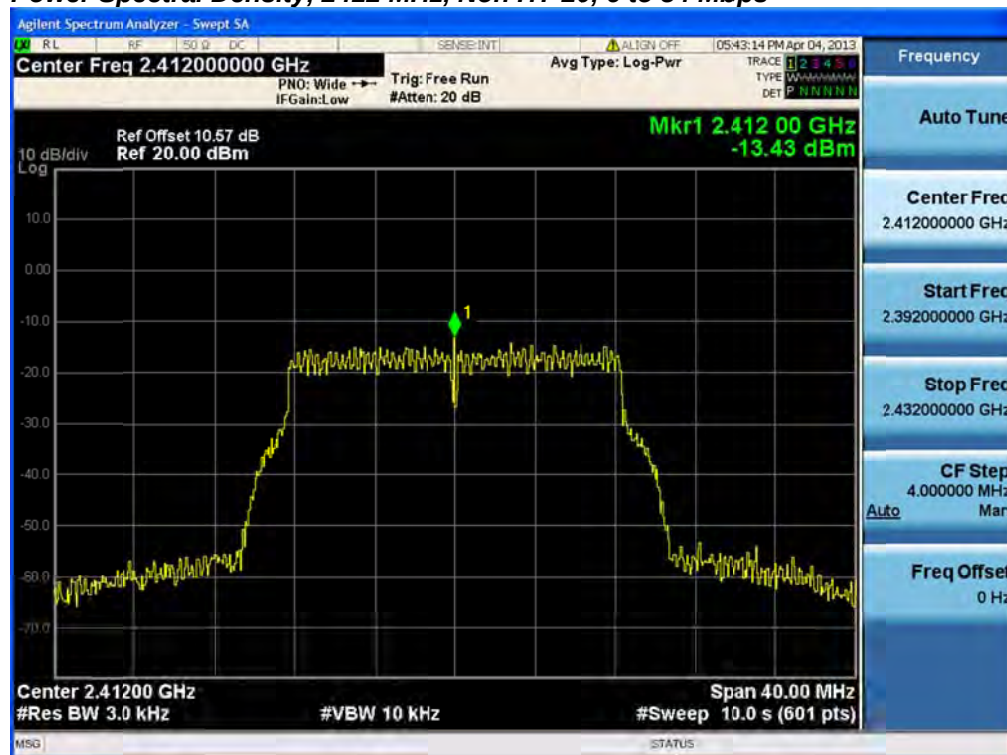
|                       |                                        |
|-----------------------|----------------------------------------|
| Center Frequency:     | Frequency from table below             |
| Span:                 | 20 MHz                                 |
| Ref Level Offset:     | Correct for attenuator and cable loss. |
| Reference Level:      | 20 dBm                                 |
| Attenuation:          | 20 dB                                  |
| Sweep Time:           | 10s                                    |
| Resolution Bandwidth: | 3 kHz                                  |
| Video Bandwidth:      | 10 kHz                                 |
| Detector:             | Peak                                   |
| Trace:                | Single                                 |
| Marker:               | Peak Search                            |

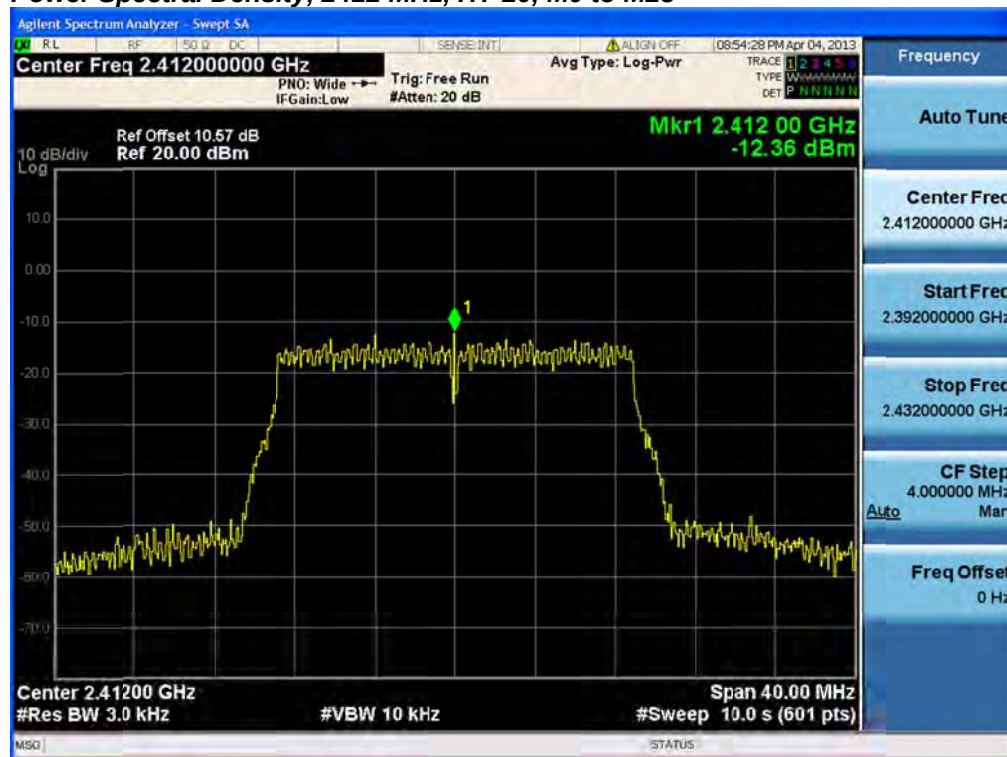
Record the Marker value.

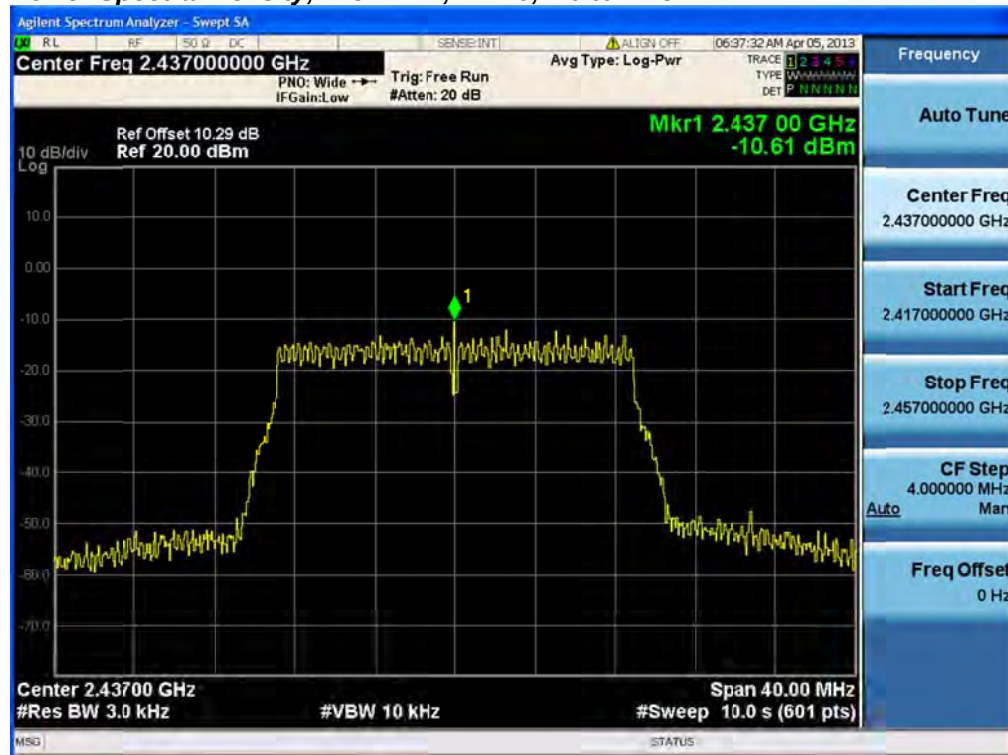
The “Measure and add  $10 \log(N)$  dB technique”, where N is the number of outputs, is used for measuring in-band Power Spectral Density. With this technique, spectrum measurements are performed at each output of the device, and the quantity  $10 \log(4)$  (or 6dB) is added to the worst case spectrum value before comparing to the emission limit.

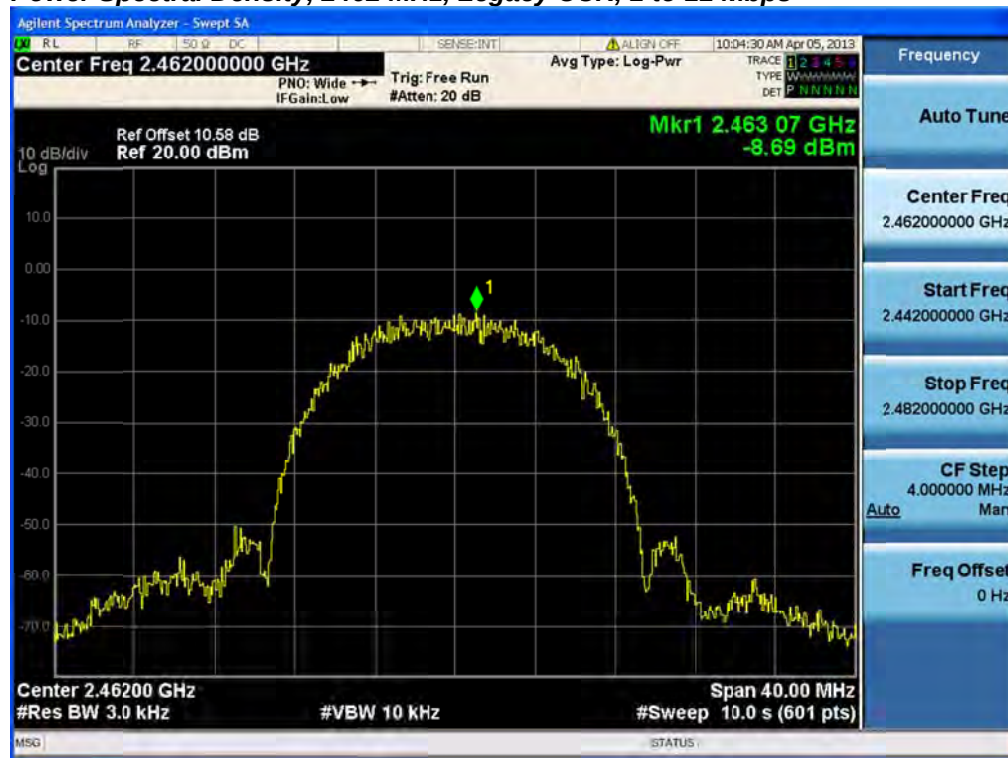


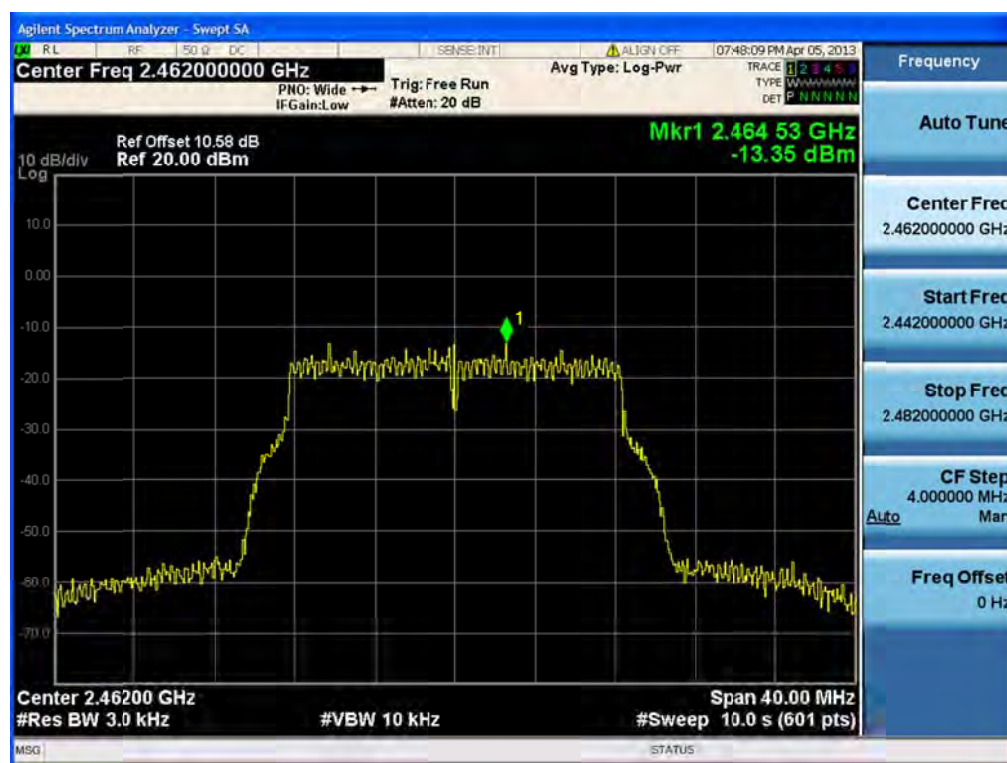
| Frequency (MHz) | Mode                     | Data Rate (Mbps) | PSD / Antenna (dBm/3kHz) | Total PSD (dBm/3kHz) | Limit (dBm/3kHz) | Margin (dB) |
|-----------------|--------------------------|------------------|--------------------------|----------------------|------------------|-------------|
| 2412            | Legacy CCK, 1 to 11 Mbps | 11               | <u>-8.7</u>              | -2.7                 | 8.0              | 10.7        |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>-13.4</u>             | -7.4                 | 8.0              | 15.4        |
|                 | HT-20, M0 to M23         | m0               | <u>-12.4</u>             | -6.4                 | 8.0              | 14.4        |
| 2437            | Legacy CCK, 1 to 11 Mbps | 11               | <u>-7.4</u>              | -1.4                 | 8.0              | 9.4         |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>-12.9</u>             | -6.9                 | 8.0              | 14.9        |
|                 | HT-20, M0 to M23         | m0               | <u>-10.6</u>             | -4.6                 | 8.0              | 12.6        |
| 2462            | Legacy CCK, 1 to 11 Mbps | 11               | <u>-8.7</u>              | -2.7                 | 8.0              | 10.7        |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>-13.3</u>             | -7.3                 | 8.0              | 15.3        |
|                 | HT-20, M0 to M23         | m0               | <u>-13.4</u>             | -7.4                 | 8.0              | 15.4        |

**Power Spectral Density, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Power Spectral Density, 2412 MHz, Non HT-20, 6 to 54 Mbps**

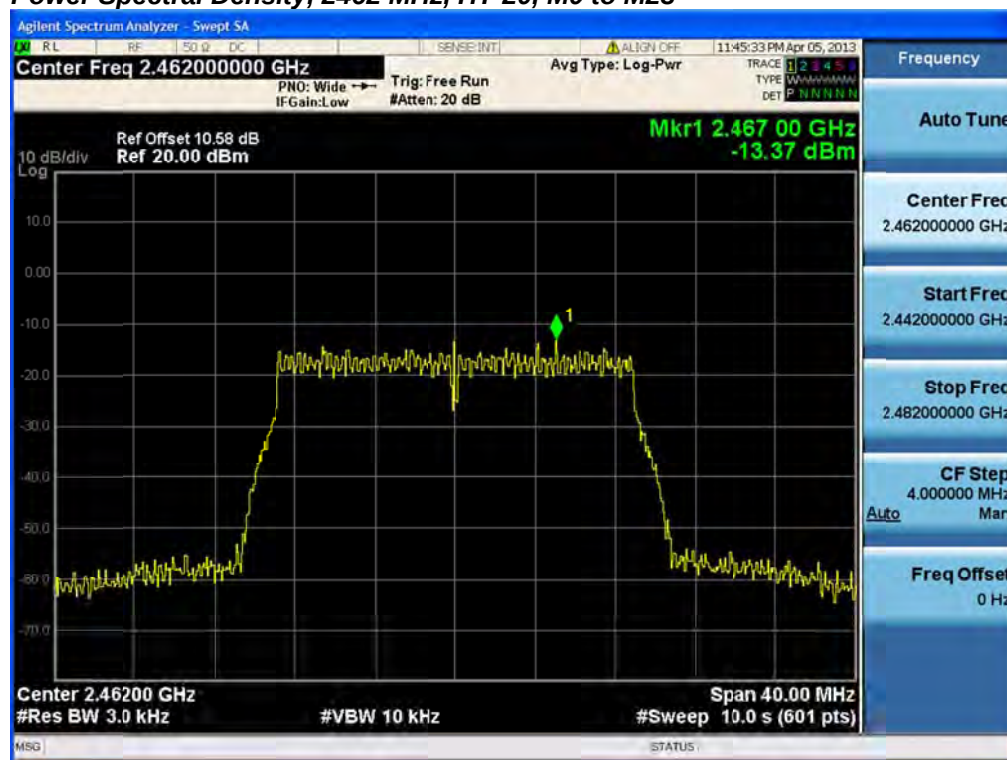
**Power Spectral Density, 2412 MHz, HT-20, M0 to M23****Power Spectral Density, 2437 MHz, Legacy CCK, 1 to 11 Mbps**

**Power Spectral Density, 2437 MHz, Non HT-20, 6 to 54 Mbps****Power Spectral Density, 2437 MHz, HT-20, M0 to M23**

**Power Spectral Density, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Power Spectral Density, 2462 MHz, Non HT-20, 6 to 54 Mbps**



Power Spectral Density, 2462 MHz, HT-20, M0 to M23





## Conducted Spurious Emissions

15.247 / RSS-210 A8.5: In any 100 kHz bandwidth outside the frequency band in which the digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 30 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer).

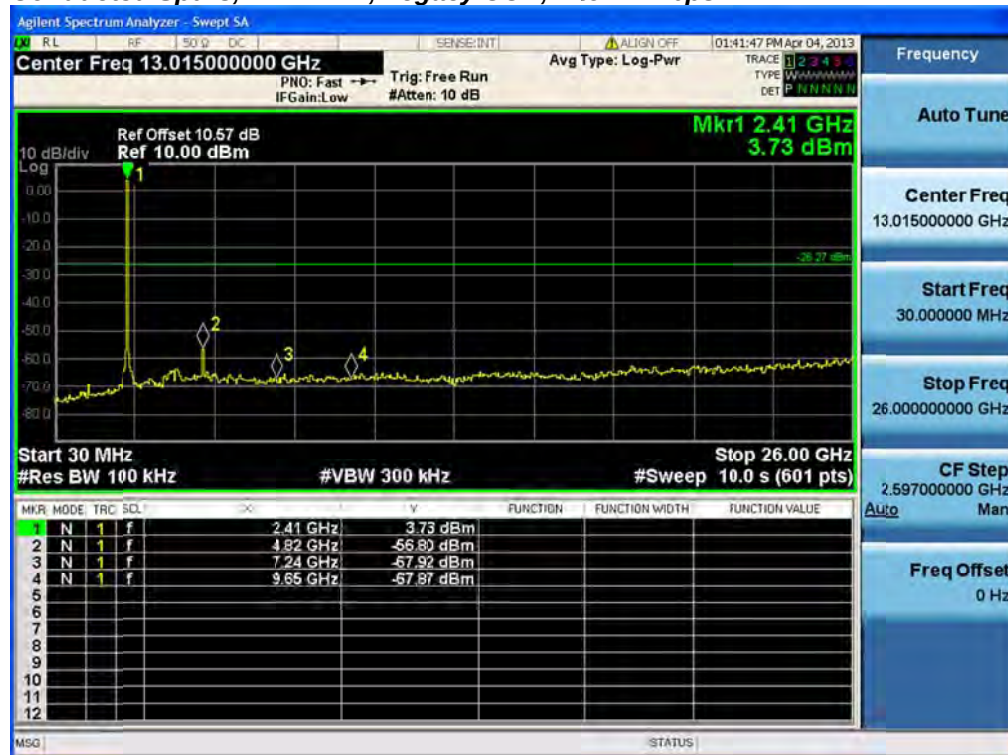
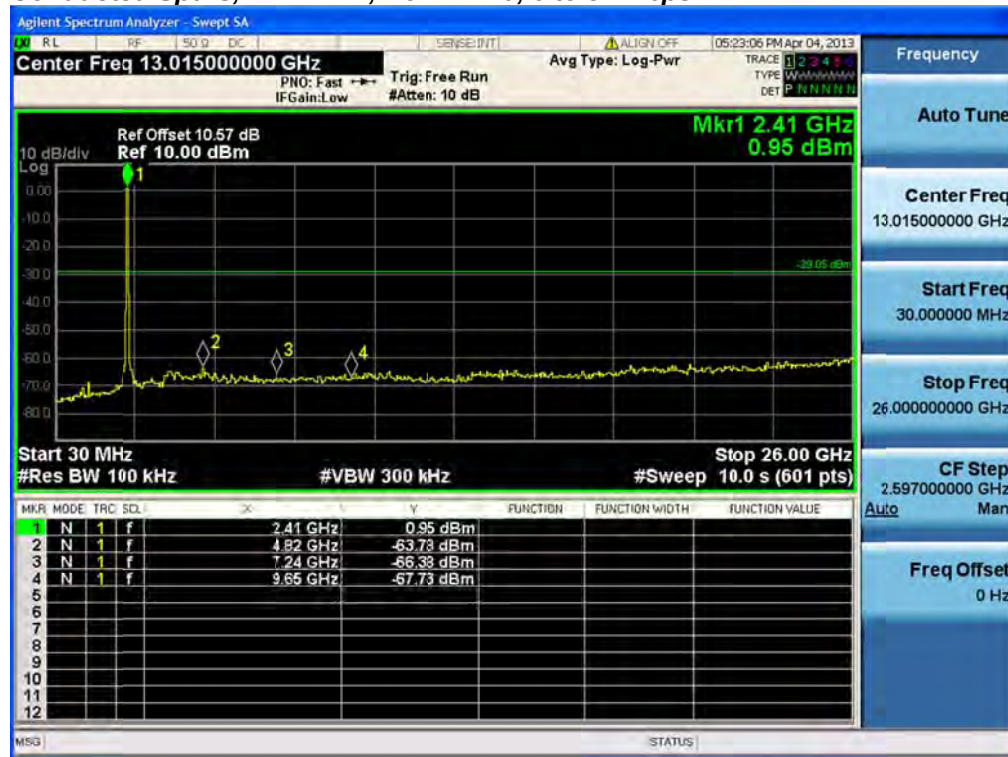
|                       |               |
|-----------------------|---------------|
| Span:                 | 30 MHz-26 GHz |
| Reference Level:      | 20 dBm        |
| Attenuation:          | 10 dB         |
| Sweep Time:           | 5s            |
| Resolution Bandwidth: | 100 kHz       |
| Video Bandwidth:      | 300 kHz       |
| Detector:             | Peak          |
| Trace:                | Single        |
| Marker:               | Peak          |

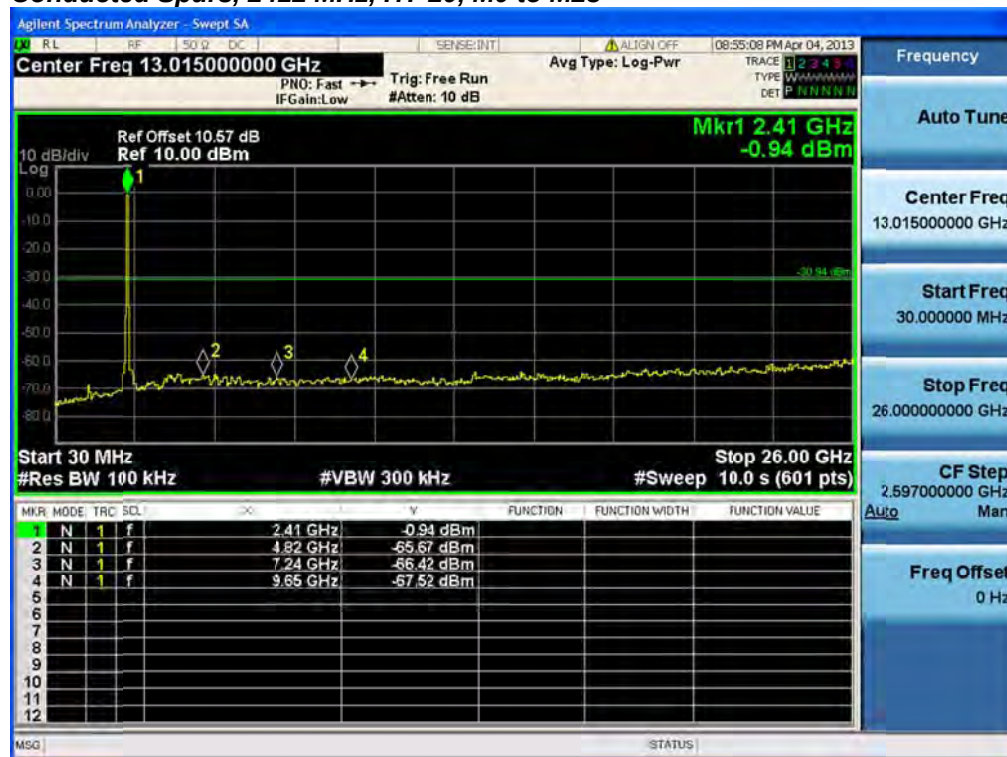
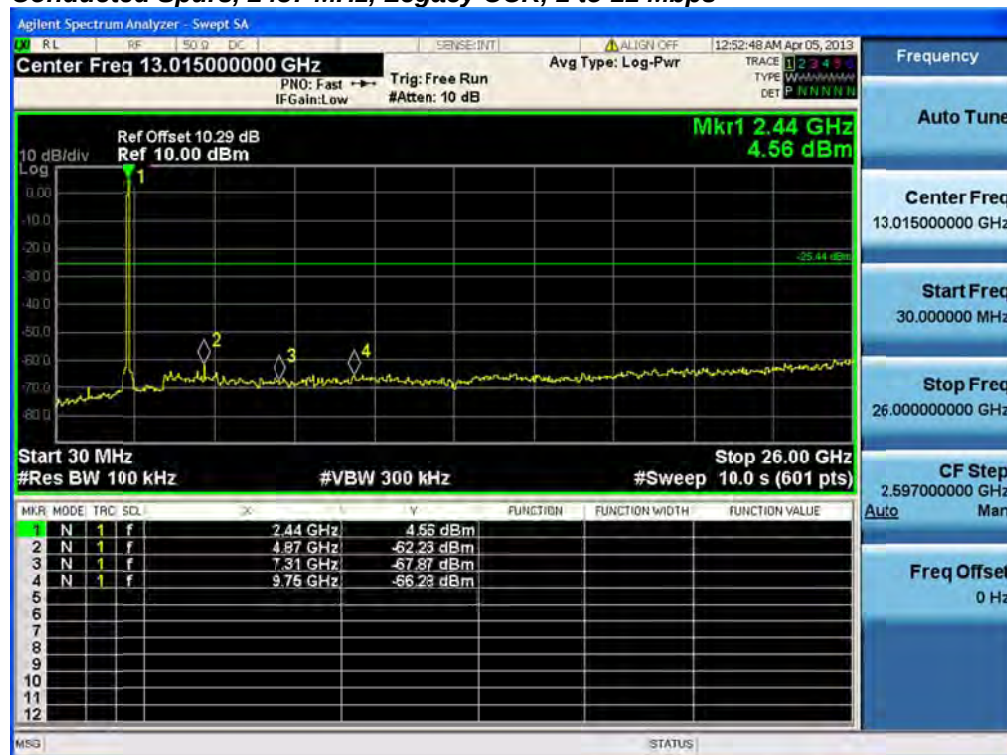
Record the marker waveform peak to spur difference

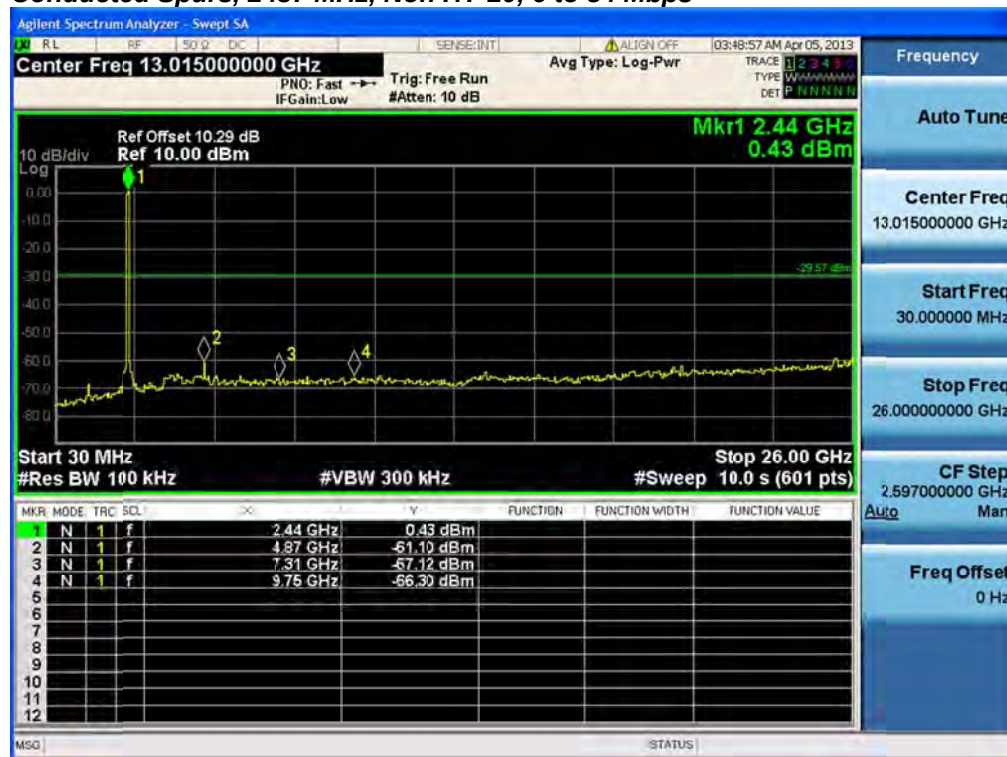
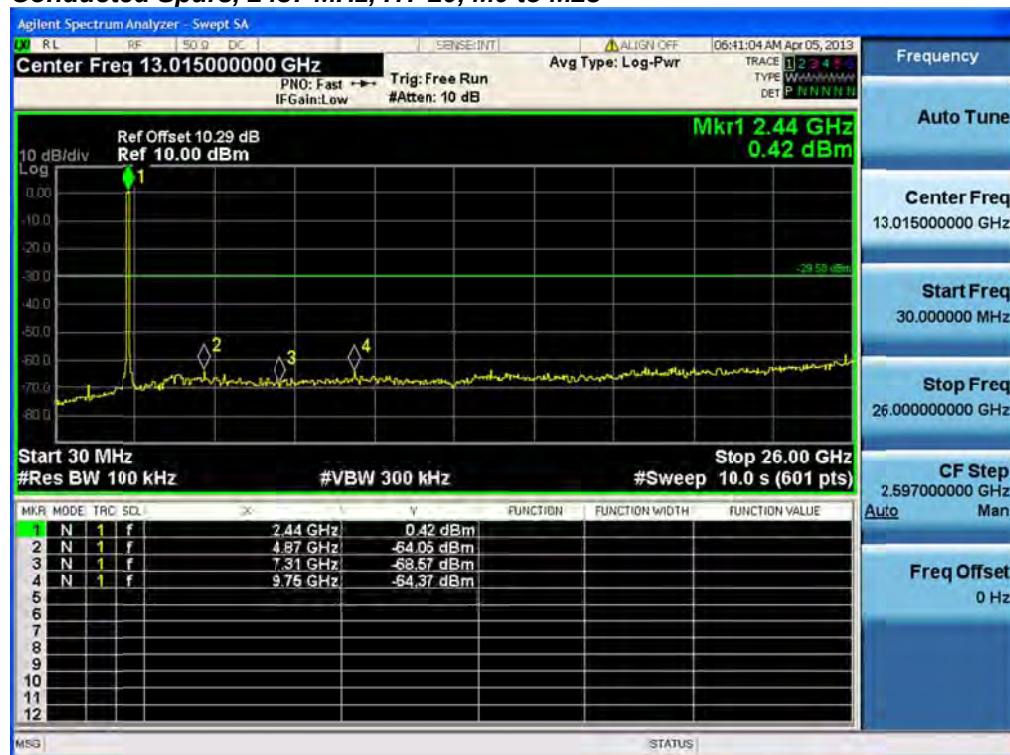
Out-of-band and spurious emissions tests are performed on each output individually without summing or adding  $10 \log(N)$  since the measurements are made relative to the in-band emissions on the individual outputs. The worst case output is recorded.

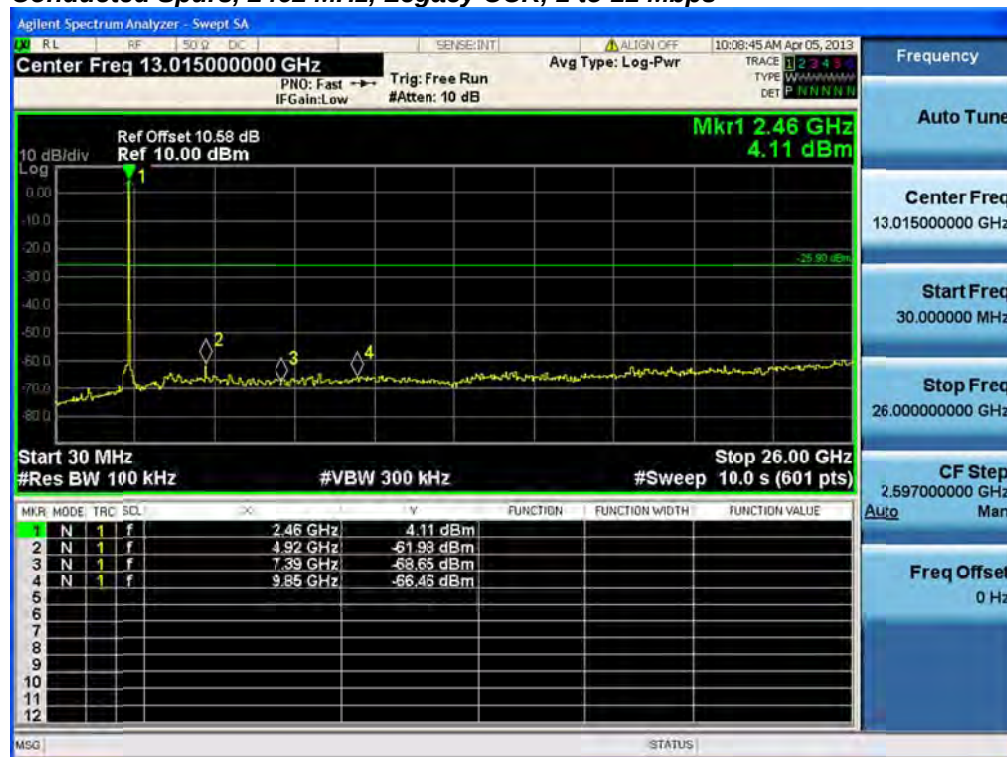
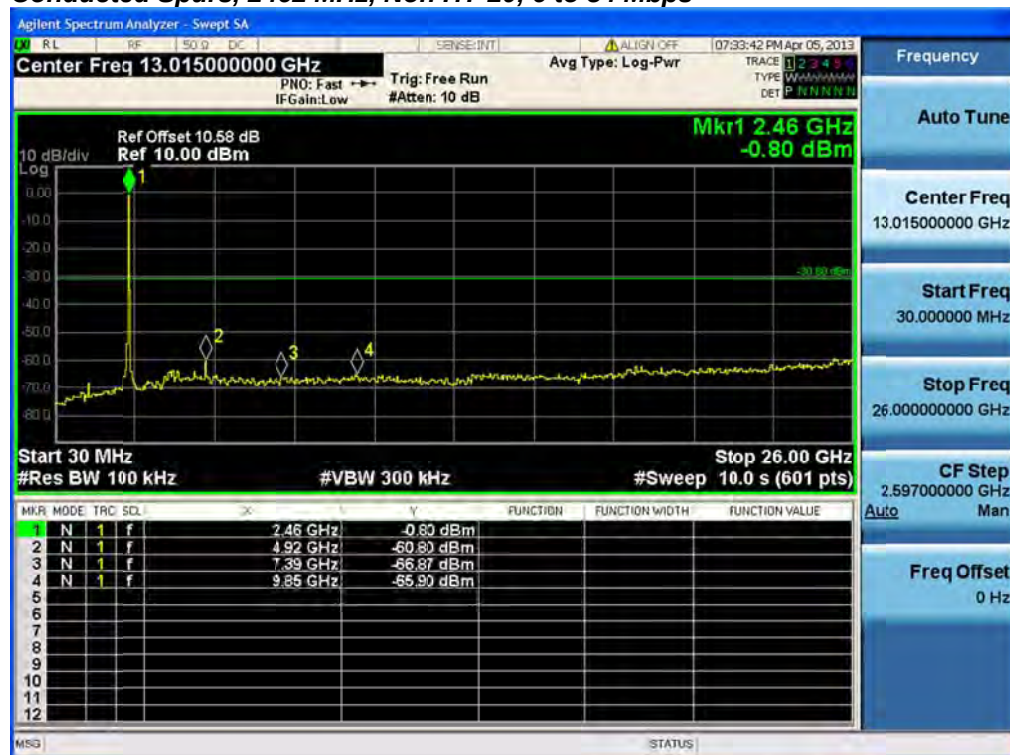


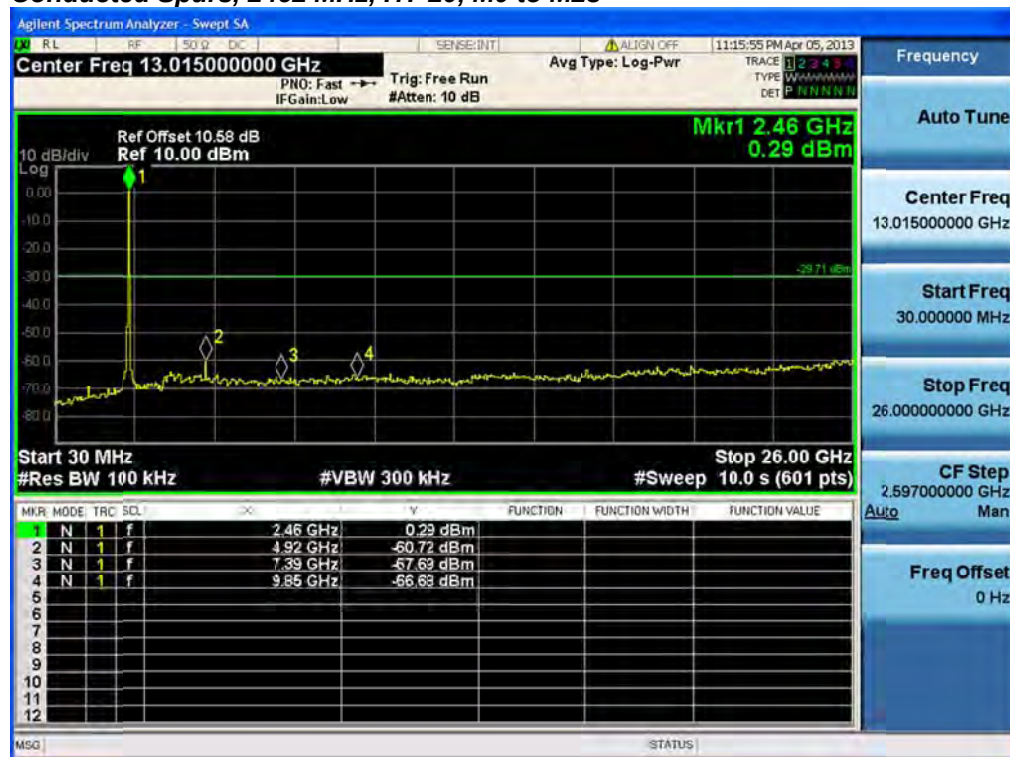
| Frequency (MHz) | Mode                     | Data Rate (Mbps) | Conducted Spurs Delta (MHz) | Limit (kHz) | Margin (MHz) |
|-----------------|--------------------------|------------------|-----------------------------|-------------|--------------|
| 2412            | Legacy CCK, 1 to 11 Mbps | 11               | <u>60.5</u>                 | 30          | 30.5         |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>64.7</u>                 | 30          | 34.7         |
|                 | HT-20, M0 to M23         | m0               | <u>64.7</u>                 | 30          | 34.7         |
|                 |                          |                  |                             |             |              |
| 2437            | Legacy CCK, 1 to 11 Mbps | 11               | <u>66.8</u>                 | 30          | 36.8         |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>61.5</u>                 | 30          | 31.5         |
|                 | HT-20, M0 to M23         | m0               | <u>64.5</u>                 | 30          | 34.5         |
|                 |                          |                  |                             |             |              |
| 2462            | Legacy CCK, 1 to 11 Mbps | 11               | <u>66.1</u>                 | 30          | 36.1         |
|                 | Non HT-20, 6 to 54 Mbps  | 6                | <u>60.0</u>                 | 30          | 30.0         |
|                 | HT-20, M0 to M23         | m0               | <u>61.0</u>                 | 30          | 31.0         |

**Conducted Spurs, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Conducted Spurs, 2412 MHz, Non HT-20, 6 to 54 Mbps**

**Conducted Spurs, 2412 MHz, HT-20, M0 to M23****Conducted Spurs, 2437 MHz, Legacy CCK, 1 to 11 Mbps**

**Conducted Spurs, 2437 MHz, Non HT-20, 6 to 54 Mbps****Conducted Spurs, 2437 MHz, HT-20, M0 to M23**

**Conducted Spurs, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Conducted Spurs, 2462 MHz, Non HT-20, 6 to 54 Mbps**

**Conducted Spurs, 2462 MHz, HT-20, M0 to M23**



## Conducted Bandedge

15.205 / RSS-210 2.7: Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Use the procedures in 718828 D01 DTS Meas Guidance v01 to substitute conducted measurements in place of radiated measurements.

Connect the antenna port(s) to the spectrum analyzer input. Place the radio in continuous transmit mode. Be sure to enter all losses between the transmitter output and the spectrum analyzer.

|                       |                                    |
|-----------------------|------------------------------------|
| Reference Level:      | 10 dBm                             |
| Attenuation:          | 4 dB                               |
| Sweep Time:           | Coupled                            |
| Resolution Bandwidth: | 1MHz                               |
| Video Bandwidth:      | 1 MHz for peak, 100 Hz for average |
| Detector:             | Peak                               |

Save 2 plots:    1) Average Plot (Vertical and Horizontal), Limit= -41.25 dBm eirp (54dBuV/m @3m)  
                     2) Peak plot (Vertical and Horizontal), Limit = -21.25 dBm eirp (74dBuV/m @3m)

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands.

The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units.

This report represents the worst case data for all supported operating modes and antennas.



| Frequency (MHz) | Mode                                 | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 Bandedge Level (dBm) | Tx 2 Bandedge Level (dBm) | Tx 3 Bandedge Level (dBm) | Tx 4 Bandedge Level (dBm) | Total Tx Bandedge Level (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|--------------------------------------|----------|-------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------------|-------------|-------------|
| 2412            | Legacy CCK, 1 to 11 Mbps             | 1        | 13                            | <u>-71.2</u>              |                           |                           |                           | -58.2                         | -41.25      | 17.0        |
|                 | Legacy CCK, 1 to 11 Mbps             | 2        | 13                            | <u>-71.2</u>              | <u>-69.0</u>              |                           |                           | -54.0                         | -41.25      | 12.7        |
|                 | Legacy CCK, 1 to 11 Mbps             | 3        | 13                            | <u>-71.2</u>              | <u>-69.0</u>              | <u>-71.0</u>              |                           | -52.5                         | -41.25      | 11.3        |
|                 | Legacy CCK, 1 to 11 Mbps             | 4        | 13                            | <u>-71.2</u>              | <u>-69.0</u>              | <u>-71.0</u>              | <u>-70.2</u>              | -51.2                         | -41.25      | 10.0        |
|                 | Non HT-20, 6 to 54 Mbps              | 1        | 13                            | <u>-57.6</u>              |                           |                           |                           | -44.6                         | -41.25      | 3.3         |
|                 | Non HT-20, 6 to 54 Mbps              | 2        | 13                            | <u>-61.7</u>              | <u>-59.0</u>              |                           |                           | -44.1                         | -41.25      | 2.9         |
|                 | Non HT-20, 6 to 54 Mbps              | 3        | 13                            | <u>-61.7</u>              | <u>-59.0</u>              | <u>-60.7</u>              |                           | -42.5                         | -41.25      | 1.3         |
|                 | Non HT-20, 6 to 54 Mbps              | 4        | 13                            | <u>-65.0</u>              | <u>-63.4</u>              | <u>-63.5</u>              | <u>-62.8</u>              | -44.6                         | -41.25      | 3.3         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 2        | 13                            | <u>-61.7</u>              | <u>-59.0</u>              |                           |                           | -44.1                         | -41.25      | 2.9         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 3        | 16                            | <u>-65.0</u>              | <u>-63.4</u>              | <u>-63.5</u>              |                           | -43.1                         | -41.25      | 1.9         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 4        | 16                            | <u>-65.0</u>              | <u>-63.4</u>              | <u>-63.5</u>              | <u>-62.8</u>              | -41.6                         | -41.25      | 0.3         |
|                 | HT-20, M0 to M7                      | 1        | 13                            | <u>-58.1</u>              |                           |                           |                           | -45.1                         | -41.25      | 3.9         |
|                 | HT-20, M0 to M7                      | 2        | 13                            | <u>-61.7</u>              | <u>-57.8</u>              |                           |                           | -43.3                         | -41.25      | 2.1         |
|                 | HT-20, M8 to M15                     | 2        | 13                            | <u>-61.7</u>              | <u>-57.8</u>              |                           |                           | -43.3                         | -41.25      | 2.1         |
|                 | HT-20, M0 to M7                      | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20, M8 to M15                     | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20, M16 to M23                    | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20, M0 to M7                      | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |
|                 | HT-20, M8 to M15                     | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |
|                 | HT-20, M16 to M23                    | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |
|                 | HT-20 Beam Forming, M0 to M7         | 2        | 13                            | <u>-61.7</u>              | <u>-57.8</u>              |                           |                           | -43.3                         | -41.25      | 2.1         |
|                 | HT-20 Beam Forming, M8 to M15        | 2        | 13                            | <u>-61.7</u>              | <u>-57.8</u>              |                           |                           | -43.3                         | -41.25      | 2.1         |
|                 | HT-20 Beam Forming, M0 to M7         | 3        | 16                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -41.3                         | -41.25      | 0.0         |
|                 | HT-20 Beam Forming, M8 to M15        | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20 Beam Forming, M16 to M23       | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20 Beam Forming, M0 to M7         | 4        | 16                            | <u>-66.2</u>              | <u>-64.1</u>              | <u>-63.1</u>              | <u>-64.6</u>              | -42.3                         | -41.25      | 1.1         |
|                 | HT-20 Beam Forming, M8 to M15        | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |
|                 | HT-20 Beam Forming, M16 to M23       | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |
|                 | HT-20 STBC, M0 to M7                 | 2        | 13                            | <u>-61.7</u>              | <u>-57.8</u>              |                           |                           | -43.3                         | -41.25      | 2.1         |
|                 | HT-20 STBC, M0 to M7                 | 3        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              |                           | -44.3                         | -41.25      | 3.0         |
|                 | HT-20 STBC, M0 to M7                 | 4        | 13                            | <u>-64.4</u>              | <u>-61.1</u>              | <u>-61.4</u>              | <u>-61.7</u>              | -43.0                         | -41.25      | 1.7         |



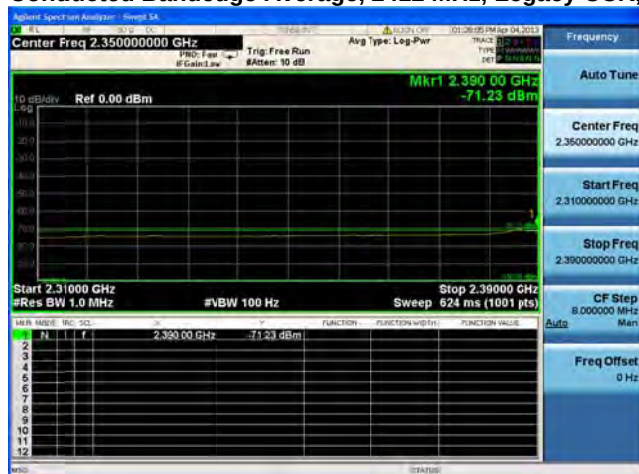
|      |                                      |   |    |              |              |              |              |       |        |      |
|------|--------------------------------------|---|----|--------------|--------------|--------------|--------------|-------|--------|------|
| 2462 | Legacy CCK, 1 to 11 Mbps             | 1 | 13 | <u>-71.8</u> |              |              |              | -58.8 | -41.25 | 17.6 |
|      | Legacy CCK, 1 to 11 Mbps             | 2 | 13 | <u>-71.8</u> | <u>-70.1</u> |              |              | -54.9 | -41.25 | 13.6 |
|      | Legacy CCK, 1 to 11 Mbps             | 3 | 13 | <u>-71.8</u> | <u>-70.1</u> | <u>-71.2</u> |              | -53.2 | -41.25 | 12.0 |
|      | Legacy CCK, 1 to 11 Mbps             | 4 | 13 | <u>-71.8</u> | <u>-70.1</u> | <u>-71.2</u> | <u>-71.1</u> | -52.0 | -41.25 | 10.7 |
|      | Non HT-20, 6 to 54 Mbps              | 1 | 13 | <u>-58.2</u> |              |              |              | -45.2 | -41.25 | 4.0  |
|      | Non HT-20, 6 to 54 Mbps              | 2 | 13 | <u>-62.2</u> | <u>-58.9</u> |              |              | -44.2 | -41.25 | 3.0  |
|      | Non HT-20, 6 to 54 Mbps              | 3 | 13 | <u>-62.2</u> | <u>-58.9</u> | <u>-59.6</u> |              | -42.2 | -41.25 | 1.0  |
|      | Non HT-20, 6 to 54 Mbps              | 4 | 13 | <u>-66.1</u> | <u>-63.4</u> | <u>-64.5</u> | <u>-62.7</u> | -45.0 | -41.25 | 3.7  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 13 | <u>-62.2</u> | <u>-58.9</u> |              |              | -44.2 | -41.25 | 3.0  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 16 | <u>-66.1</u> | <u>-63.4</u> | <u>-64.5</u> |              | -43.8 | -41.25 | 2.5  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 16 | <u>-66.1</u> | <u>-63.4</u> | <u>-64.5</u> | <u>-62.7</u> | -42.0 | -41.25 | 0.7  |
|      | HT-20, M0 to M7                      | 1 | 13 | <u>-60.1</u> |              |              |              | -47.1 | -41.25 | 5.9  |
|      | HT-20, M0 to M7                      | 2 | 13 | <u>-64.1</u> | <u>-61.5</u> |              |              | -46.6 | -41.25 | 5.3  |
|      | HT-20, M8 to M15                     | 2 | 13 | <u>-64.1</u> | <u>-61.5</u> |              |              | -46.6 | -41.25 | 5.3  |
|      | HT-20, M0 to M7                      | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20, M8 to M15                     | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20, M16 to M23                    | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20, M0 to M7                      | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |
|      | HT-20, M8 to M15                     | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |
|      | HT-20, M16 to M23                    | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |
|      | HT-20 Beam Forming, M0 to M7         | 2 | 13 | <u>-64.1</u> | <u>-61.5</u> |              |              | -46.6 | -41.25 | 5.3  |
|      | HT-20 Beam Forming, M8 to M15        | 2 | 13 | <u>-64.1</u> | <u>-61.5</u> |              |              | -46.6 | -41.25 | 5.3  |
|      | HT-20 Beam Forming, M0 to M7         | 3 | 16 | <u>-67.2</u> | <u>-65.6</u> | <u>-62.4</u> |              | -43.8 | -41.25 | 2.6  |
|      | HT-20 Beam Forming, M8 to M15        | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20 Beam Forming, M16 to M23       | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20 Beam Forming, M0 to M7         | 4 | 16 | <u>-67.2</u> | <u>-65.6</u> | <u>-62.4</u> | <u>-63.0</u> | -42.1 | -41.25 | 0.9  |
|      | HT-20 Beam Forming, M8 to M15        | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |
|      | HT-20 Beam Forming, M16 to M23       | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |
|      | HT-20 STBC, M0 to M7                 | 2 | 13 | <u>-64.1</u> | <u>-61.5</u> |              |              | -46.6 | -41.25 | 5.3  |
|      | HT-20 STBC, M0 to M7                 | 3 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> |              | -44.7 | -41.25 | 3.4  |
|      | HT-20 STBC, M0 to M7                 | 4 | 13 | <u>-64.1</u> | <u>-61.5</u> | <u>-62.1</u> | <u>-59.4</u> | -42.4 | -41.25 | 1.2  |

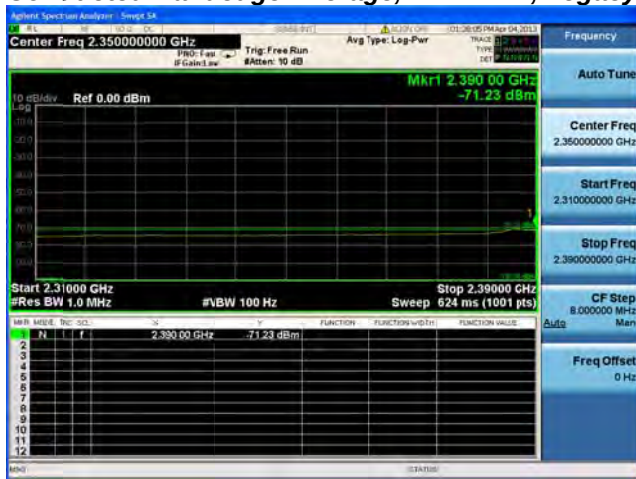
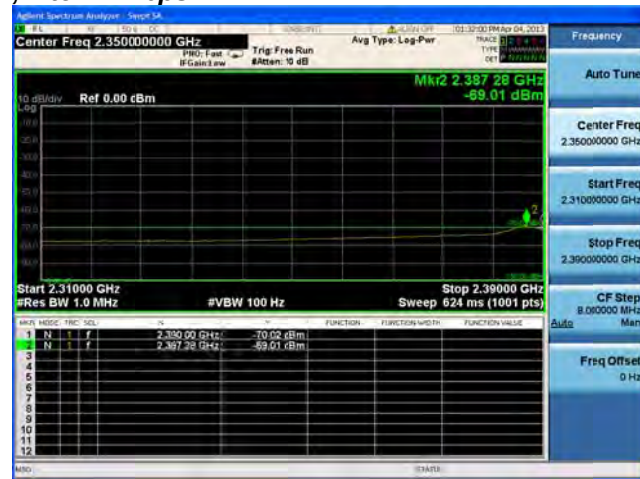


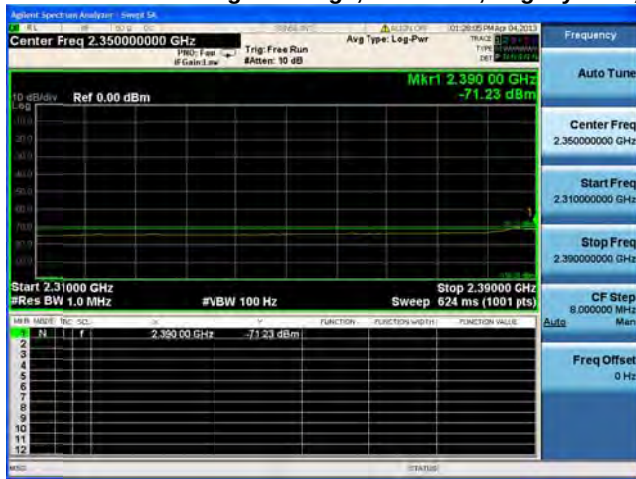
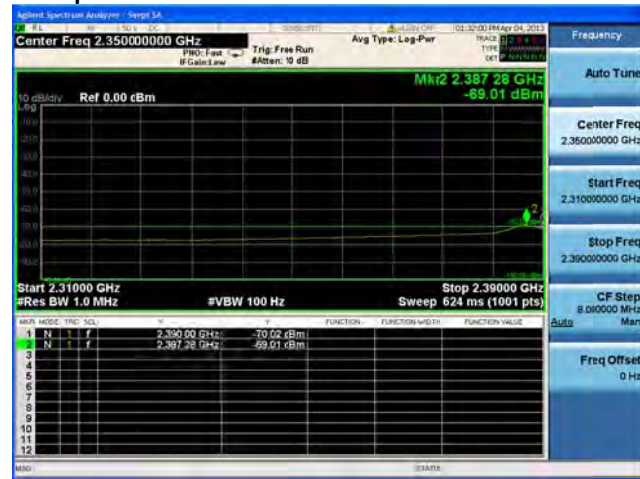
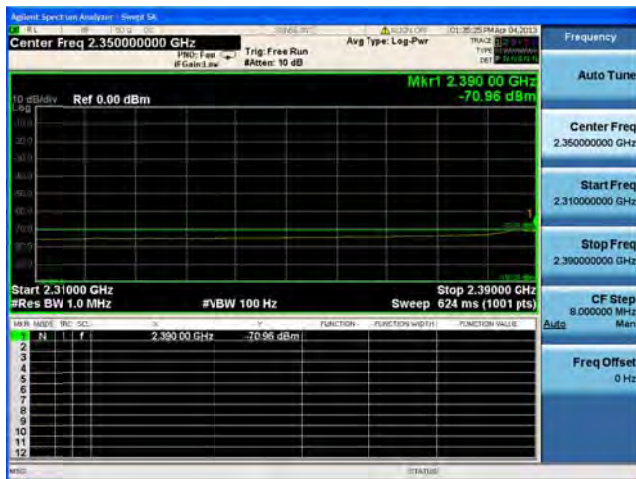
| Frequency (MHz) | Mode                                 | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 Bandedge Level (dBm) | Tx 2 Bandedge Level (dBm) | Tx 3 Bandedge Level (dBm) | Tx 4 Bandedge Level (dBm) | Total Tx Bandedge Level (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|--------------------------------------|----------|-------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-------------------------------|-------------|-------------|
| 2412            | Legacy CCK, 1 to 11 Mbps             | 1        | 13                            | <u>-60.6</u>              |                           |                           |                           | -47.6                         | -21.25      | 26.4        |
|                 | Legacy CCK, 1 to 11 Mbps             | 2        | 13                            | <u>-60.6</u>              | <u>-60.5</u>              |                           |                           | -44.5                         | -21.25      | 23.3        |
|                 | Legacy CCK, 1 to 11 Mbps             | 3        | 13                            | <u>-60.6</u>              | <u>-60.5</u>              | <u>-61.2</u>              |                           | -43.0                         | -21.25      | 21.7        |
|                 | Legacy CCK, 1 to 11 Mbps             | 4        | 13                            | <u>-60.6</u>              | <u>-60.5</u>              | <u>-61.2</u>              | <u>-59.3</u>              | -41.3                         | -21.25      | 20.1        |
|                 | Non HT-20, 6 to 54 Mbps              | 1        | 13                            | <u>-40.6</u>              |                           |                           |                           | -27.6                         | -21.25      | 6.4         |
|                 | Non HT-20, 6 to 54 Mbps              | 2        | 13                            | <u>-42.3</u>              | <u>-41.8</u>              |                           |                           | -26.0                         | -21.25      | 4.8         |
|                 | Non HT-20, 6 to 54 Mbps              | 3        | 13                            | <u>-42.3</u>              | <u>-41.8</u>              | <u>-44.3</u>              |                           | -24.9                         | -21.25      | 3.7         |
|                 | Non HT-20, 6 to 54 Mbps              | 4        | 13                            | <u>-45.3</u>              | <u>-43.8</u>              | <u>-48.6</u>              | <u>-44.0</u>              | -26.0                         | -21.25      | 4.8         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 2        | 13                            | <u>-42.3</u>              | <u>-41.8</u>              |                           |                           | -26.0                         | -21.25      | 4.8         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 3        | 16                            | <u>-45.3</u>              | <u>-43.8</u>              | <u>-48.6</u>              |                           | -24.7                         | -21.25      | 3.5         |
|                 | Non HT-20 Beam Forming, 6 to 54 Mbps | 4        | 16                            | <u>-45.3</u>              | <u>-43.8</u>              | <u>-48.6</u>              | <u>-44.0</u>              | -23.0                         | -21.25      | 1.8         |
|                 | HT-20, M0 to M7                      | 1        | 13                            | <u>-38.3</u>              |                           |                           |                           | -25.3                         | -21.25      | 4.1         |
|                 | HT-20, M0 to M7                      | 2        | 13                            | <u>-39.2</u>              | <u>-36.2</u>              |                           |                           | -21.4                         | -21.25      | 0.2         |
|                 | HT-20, M8 to M15                     | 2        | 13                            | <u>-39.2</u>              | <u>-36.2</u>              |                           |                           | -21.4                         | -21.25      | 0.2         |
|                 | HT-20, M0 to M7                      | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20, M8 to M15                     | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20, M16 to M23                    | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20, M0 to M7                      | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |
|                 | HT-20, M8 to M15                     | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |
|                 | HT-20, M16 to M23                    | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |
|                 | HT-20 Beam Forming, M0 to M7         | 2        | 13                            | <u>-39.2</u>              | <u>-36.2</u>              |                           |                           | -21.4                         | -21.25      | 0.2         |
|                 | HT-20 Beam Forming, M8 to M15        | 2        | 13                            | <u>-39.2</u>              | <u>-36.2</u>              |                           |                           | -21.4                         | -21.25      | 0.2         |
|                 | HT-20 Beam Forming, M0 to M7         | 3        | 16                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -22.7                         | -21.25      | 1.4         |
|                 | HT-20 Beam Forming, M8 to M15        | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20 Beam Forming, M16 to M23       | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20 Beam Forming, M0 to M7         | 4        | 16                            | <u>-46.3</u>              | <u>-46.0</u>              | <u>-44.5</u>              | <u>-44.8</u>              | -23.3                         | -21.25      | 2.1         |
|                 | HT-20 Beam Forming, M8 to M15        | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |
|                 | HT-20 Beam Forming, M16 to M23       | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |
|                 | HT-20 STBC, M0 to M7                 | 2        | 13                            | <u>-39.2</u>              | <u>-36.2</u>              |                           |                           | -21.4                         | -21.25      | 0.2         |
|                 | HT-20 STBC, M0 to M7                 | 3        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              |                           | -25.7                         | -21.25      | 4.4         |
|                 | HT-20 STBC, M0 to M7                 | 4        | 13                            | <u>-42.5</u>              | <u>-43.6</u>              | <u>-44.5</u>              | <u>-41.9</u>              | -24.0                         | -21.25      | 2.7         |

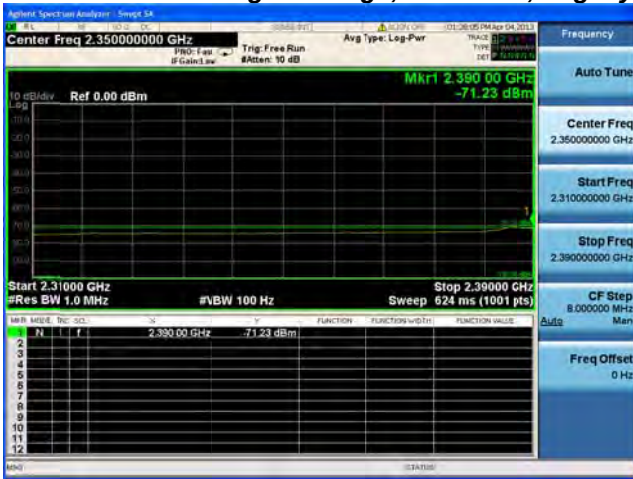
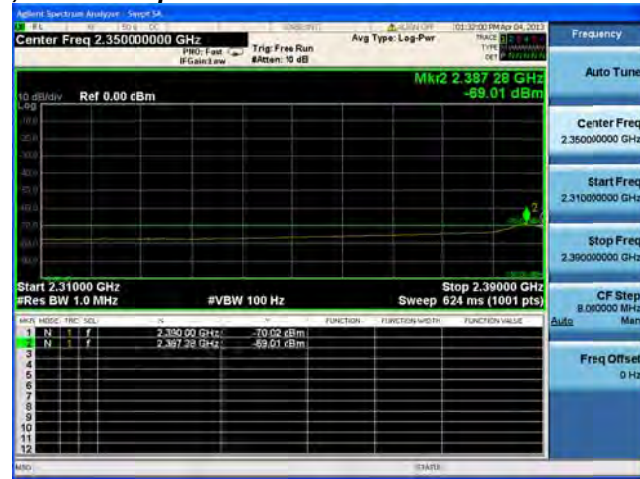
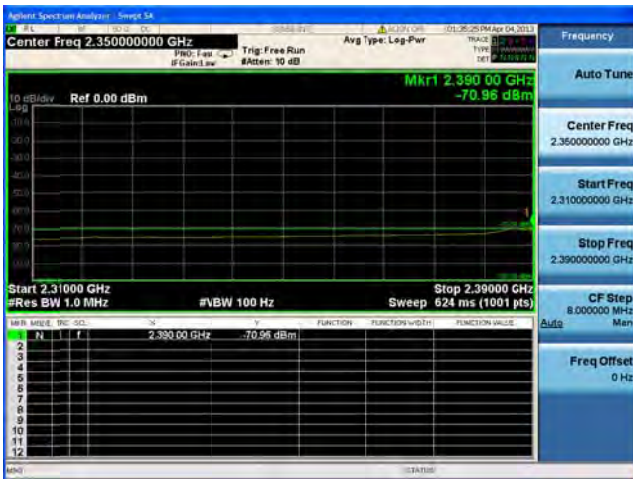
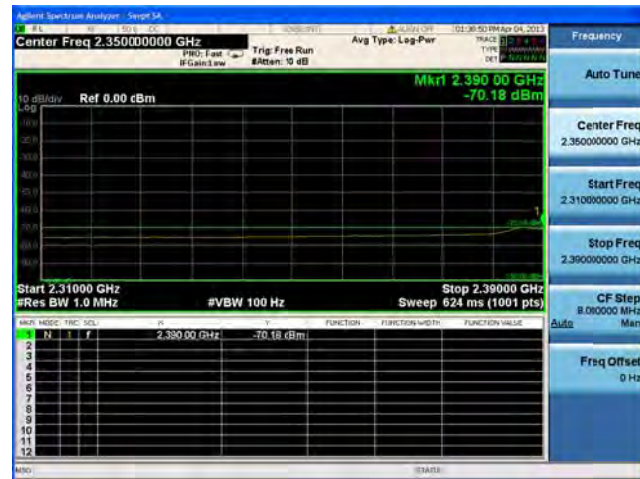


|      |                                      |   |    |              |              |              |              |       |        |      |
|------|--------------------------------------|---|----|--------------|--------------|--------------|--------------|-------|--------|------|
| 2462 | Legacy CCK, 1 to 11 Mbps             | 1 | 13 | <u>-61.2</u> |              |              |              | -48.2 | -21.25 | 27.0 |
|      | Legacy CCK, 1 to 11 Mbps             | 2 | 13 | <u>-61.2</u> | <u>-59.9</u> |              |              | -44.5 | -21.25 | 23.2 |
|      | Legacy CCK, 1 to 11 Mbps             | 3 | 13 | <u>-61.2</u> | <u>-59.9</u> | <u>-55.4</u> |              | -40.3 | -21.25 | 19.1 |
|      | Legacy CCK, 1 to 11 Mbps             | 4 | 13 | <u>-61.2</u> | <u>-59.9</u> | <u>-55.4</u> | <u>-59.6</u> | -39.4 | -21.25 | 18.1 |
|      | Non HT-20, 6 to 54 Mbps              | 1 | 13 | <u>-36.2</u> |              |              |              | -23.2 | -21.25 | 2.0  |
|      | Non HT-20, 6 to 54 Mbps              | 2 | 13 | <u>-44.8</u> | <u>-38.9</u> |              |              | -24.9 | -21.25 | 3.7  |
|      | Non HT-20, 6 to 54 Mbps              | 3 | 13 | <u>-44.8</u> | <u>-38.9</u> | <u>-42.4</u> |              | -23.6 | -21.25 | 2.3  |
|      | Non HT-20, 6 to 54 Mbps              | 4 | 13 | <u>-48.6</u> | <u>-43.3</u> | <u>-46.5</u> | <u>-40.9</u> | -24.8 | -21.25 | 3.6  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 13 | <u>-44.8</u> | <u>-38.9</u> |              |              | -24.9 | -21.25 | 3.7  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 16 | <u>-48.6</u> | <u>-43.3</u> | <u>-46.5</u> |              | -24.8 | -21.25 | 3.6  |
|      | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 16 | <u>-48.6</u> | <u>-43.3</u> | <u>-46.5</u> | <u>-40.9</u> | -21.8 | -21.25 | 0.6  |
|      | HT-20, M0 to M7                      | 1 | 13 | <u>-37.3</u> |              |              |              | -24.3 | -21.25 | 3.1  |
|      | HT-20, M0 to M7                      | 2 | 13 | <u>-42.7</u> | <u>-38.0</u> |              |              | -23.7 | -21.25 | 2.5  |
|      | HT-20, M8 to M15                     | 2 | 13 | <u>-42.7</u> | <u>-38.0</u> |              |              | -23.7 | -21.25 | 2.5  |
|      | HT-20, M0 to M7                      | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20, M8 to M15                     | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20, M16 to M23                    | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20, M0 to M7                      | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |
|      | HT-20, M8 to M15                     | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |
|      | HT-20, M16 to M23                    | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |
|      | HT-20 Beam Forming, M0 to M7         | 2 | 13 | <u>-42.7</u> | <u>-38.0</u> |              |              | -23.7 | -21.25 | 2.5  |
|      | HT-20 Beam Forming, M8 to M15        | 2 | 13 | <u>-42.7</u> | <u>-38.0</u> |              |              | -23.7 | -21.25 | 2.5  |
|      | HT-20 Beam Forming, M0 to M7         | 3 | 16 | <u>-46.9</u> | <u>-43.6</u> | <u>-39.3</u> |              | -21.4 | -21.25 | 0.2  |
|      | HT-20 Beam Forming, M8 to M15        | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20 Beam Forming, M16 to M23       | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20 Beam Forming, M0 to M7         | 4 | 16 | <u>-46.9</u> | <u>-43.6</u> | <u>-42.4</u> | <u>-45.7</u> | -22.3 | -21.25 | 1.0  |
|      | HT-20 Beam Forming, M8 to M15        | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |
|      | HT-20 Beam Forming, M16 to M23       | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |
|      | HT-20 STBC, M0 to M7                 | 2 | 13 | <u>-42.7</u> | <u>-38.0</u> |              |              | -23.7 | -21.25 | 2.5  |
|      | HT-20 STBC, M0 to M7                 | 3 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> |              | -22.7 | -21.25 | 1.4  |
|      | HT-20 STBC, M0 to M7                 | 4 | 13 | <u>-42.7</u> | <u>-38.0</u> | <u>-42.4</u> | <u>-40.8</u> | -21.5 | -21.25 | 0.3  |

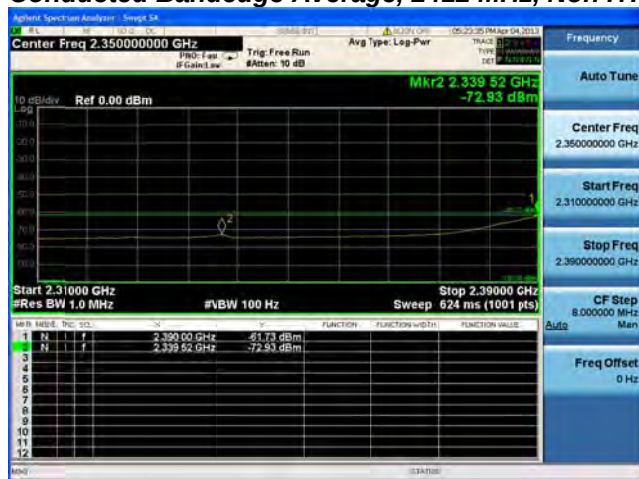
**Conducted Bandedge Average, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

**Conducted Bandedge Average, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

**Conducted Bandedge Average, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C**

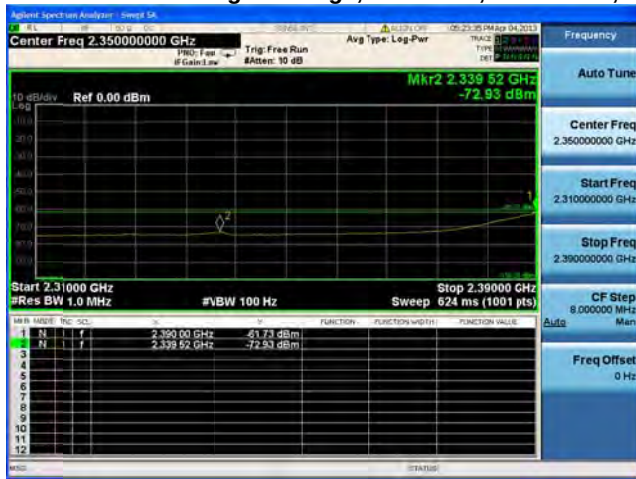
**Conducted Bandedge Average, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

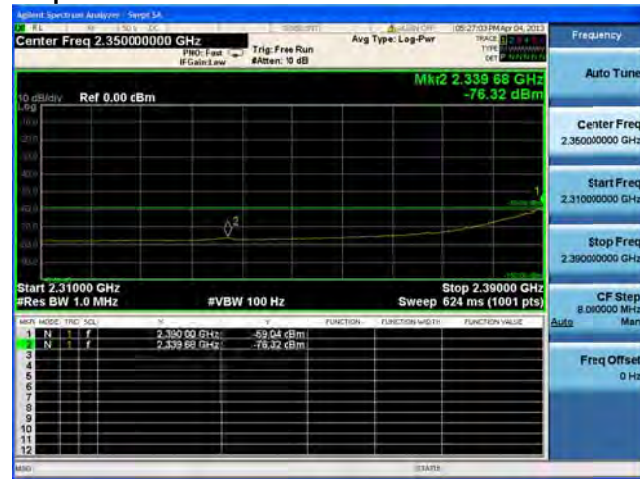
**Conducted Bandedge Average, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**



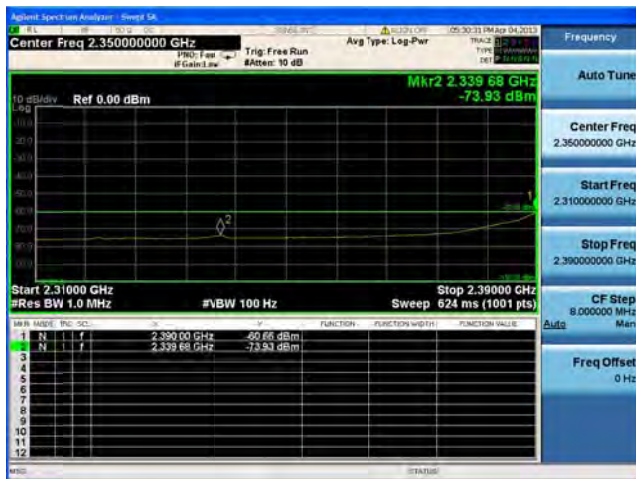
## Conducted Bandedge Average, 2412 MHz, Non HT-20, 6 to 54 Mbps



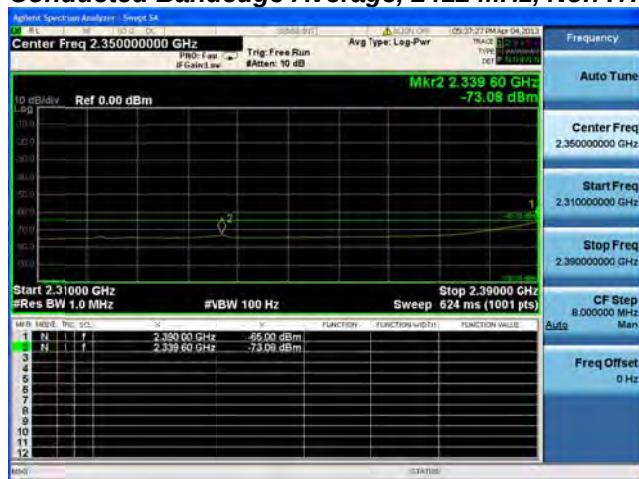
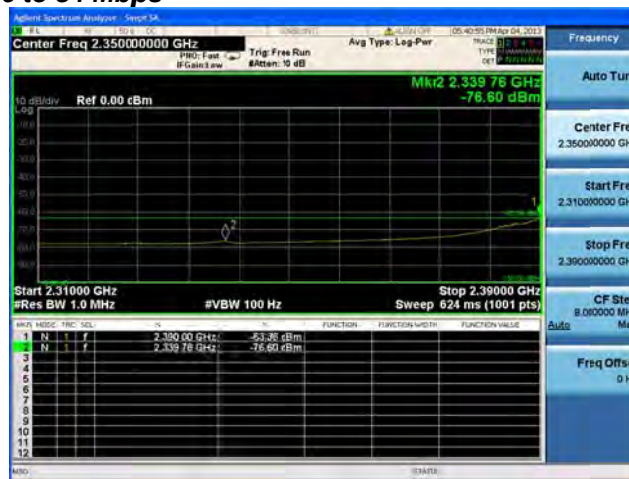
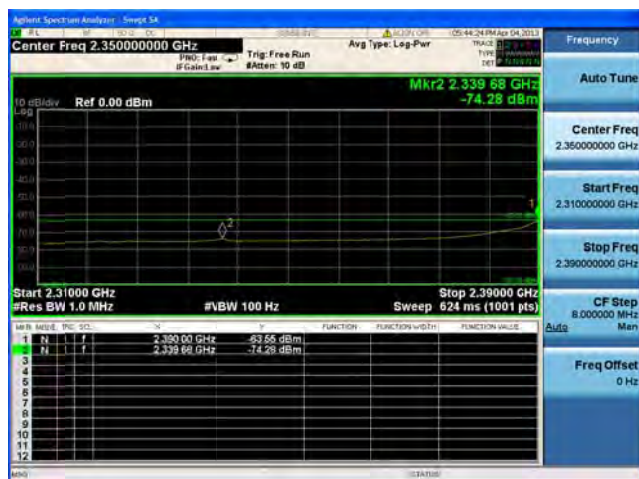
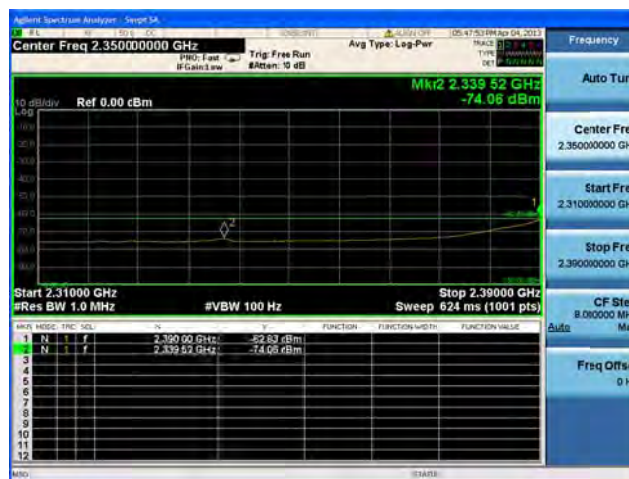
Antenna A

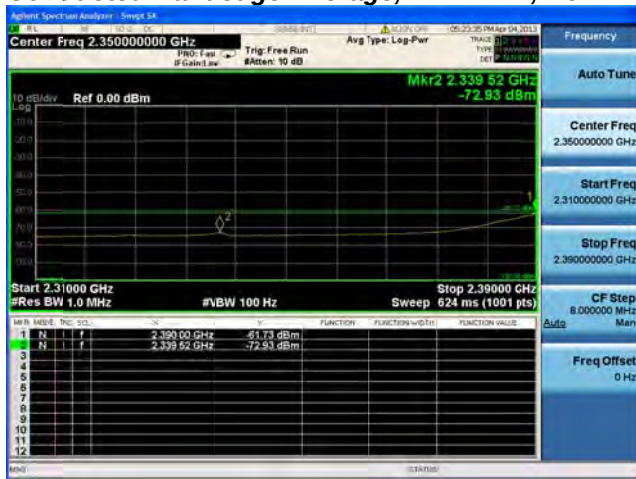


Antenna B

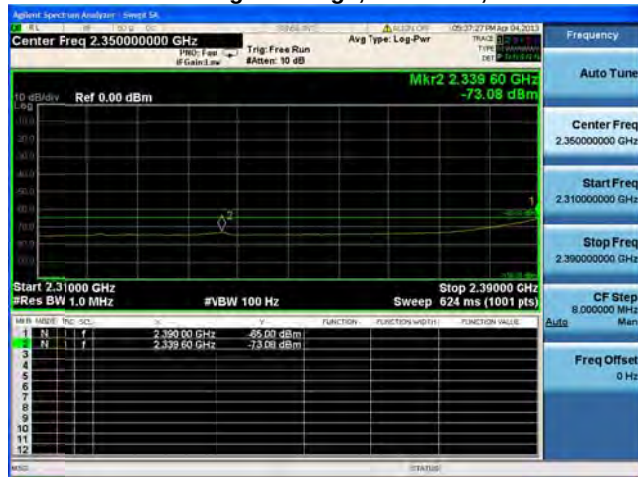


Antenna C

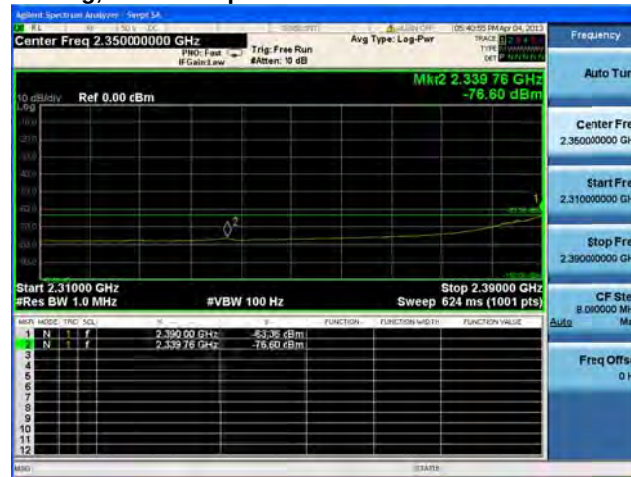
**Conducted Bandedge Average, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

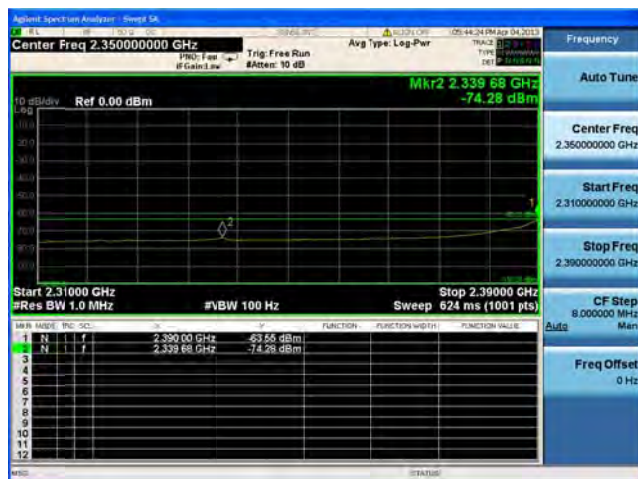
## Conducted Bandedge Average, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps



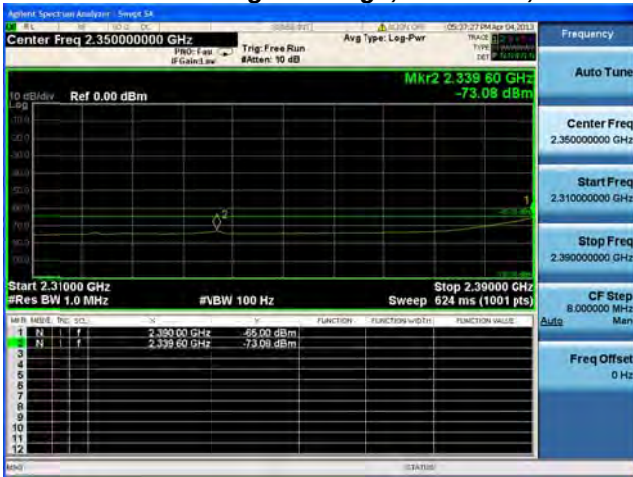
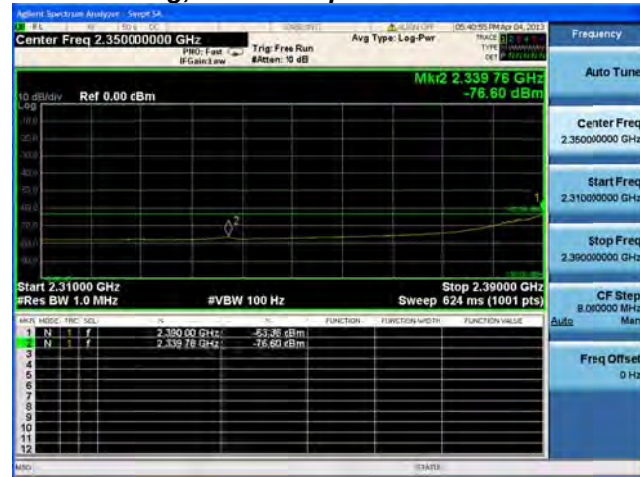
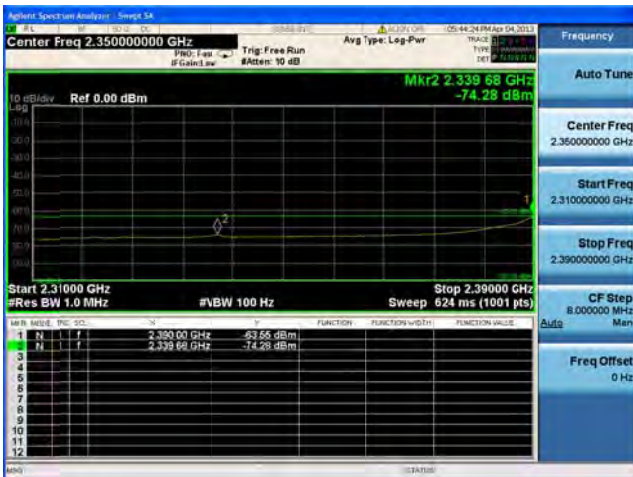
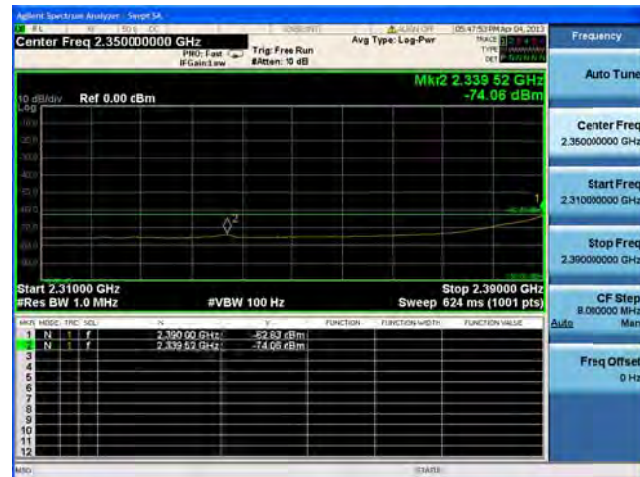
Antenna A

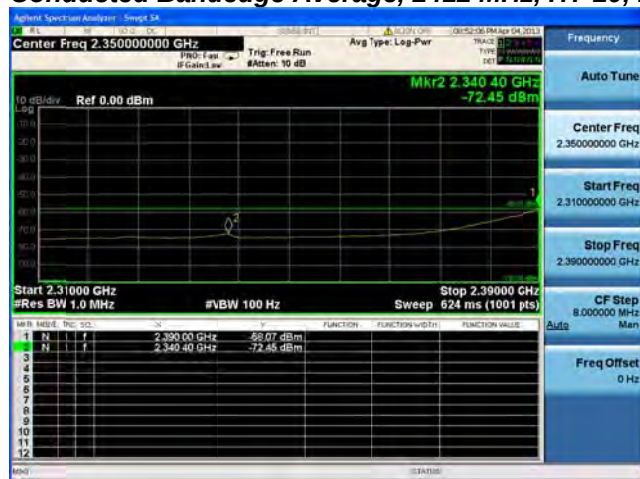


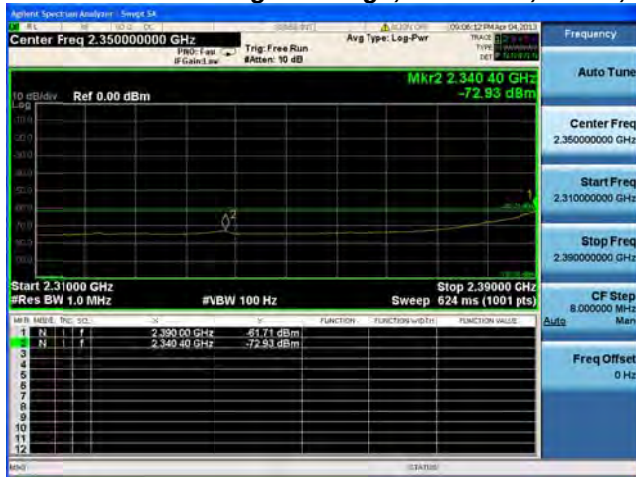
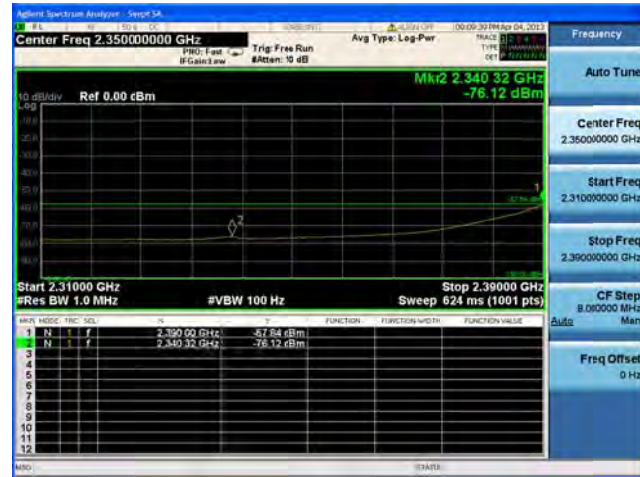
Antenna B



Antenna C

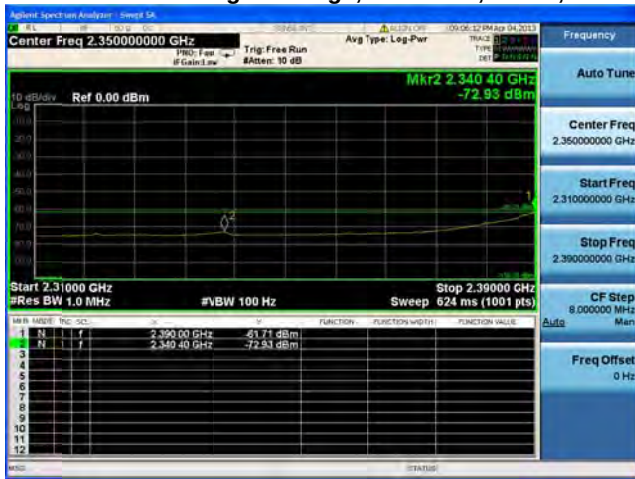
**Conducted Bandedge Average, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2412 MHz, HT-20, M0 to M7****Antenna A**

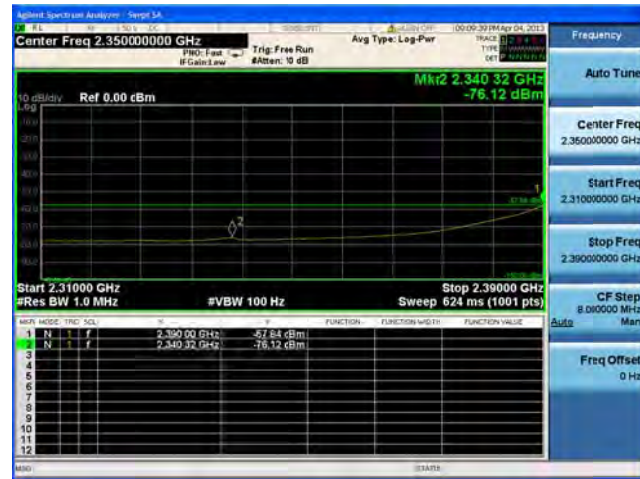
**Conducted Bandedge Average, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B**



## Conducted Bandedge Average, 2412 MHz, HT-20, M8 to M15

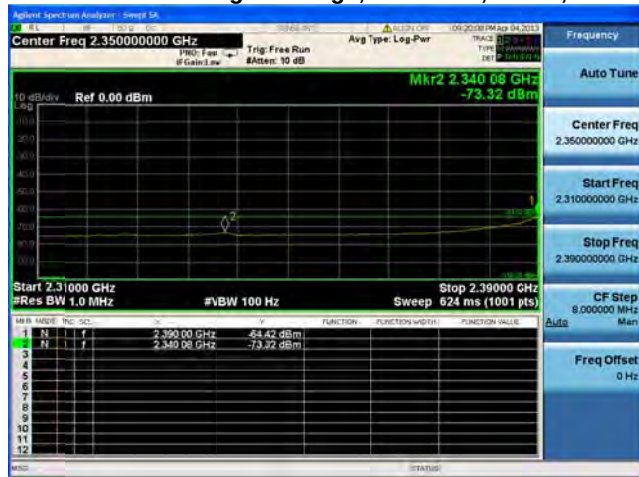


Antenna A

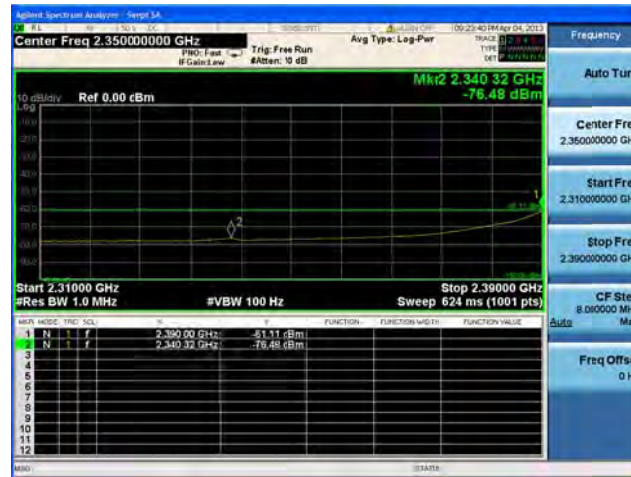


Antenna B

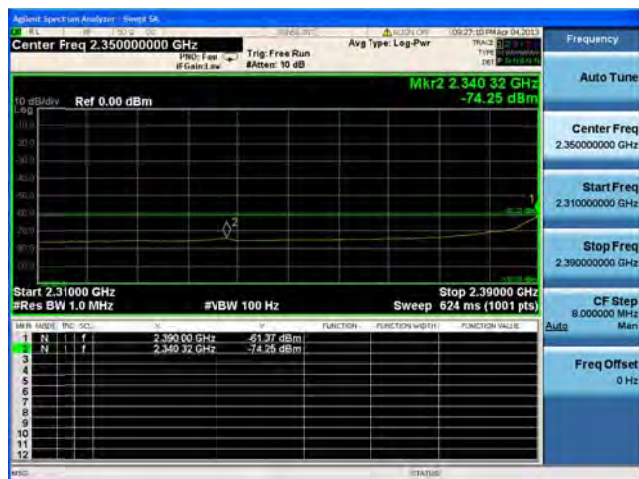
## Conducted Bandedge Average, 2412 MHz, HT-20, M0 to M7



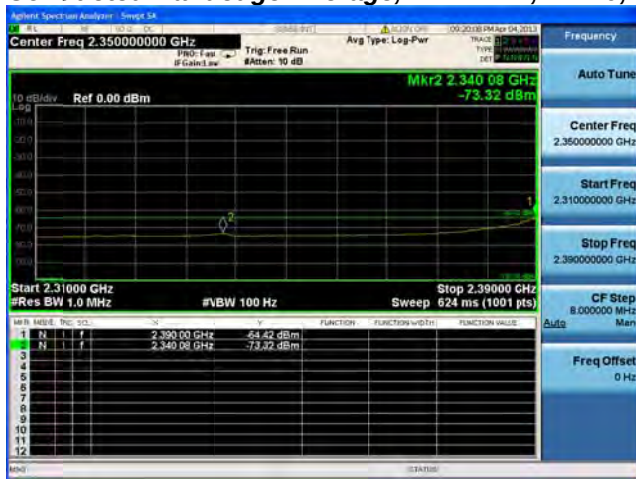
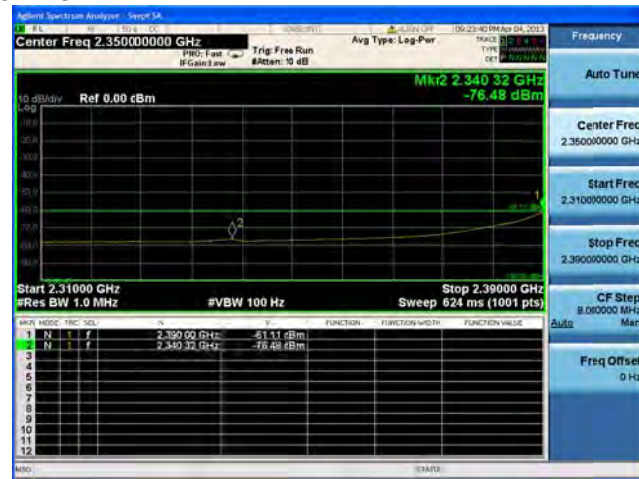
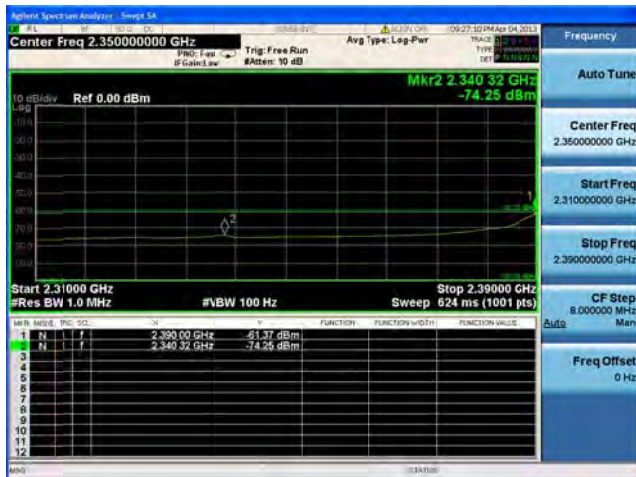
Antenna A

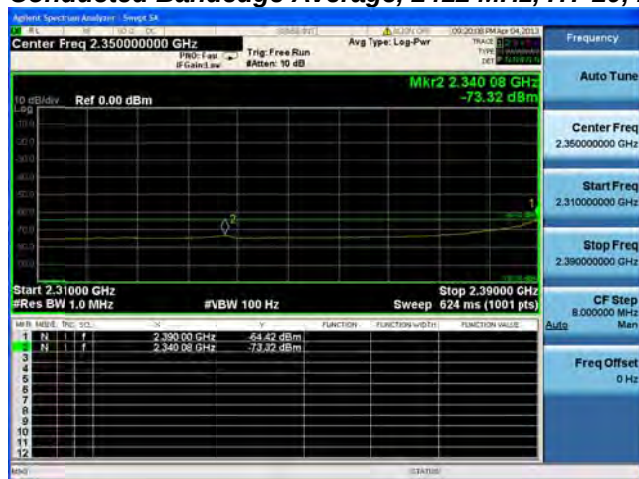
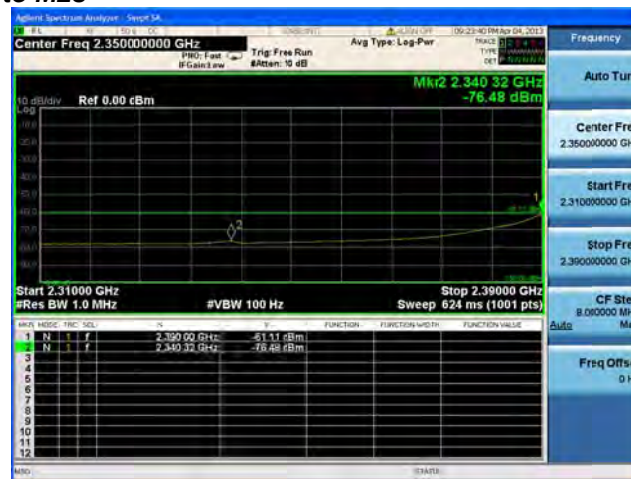
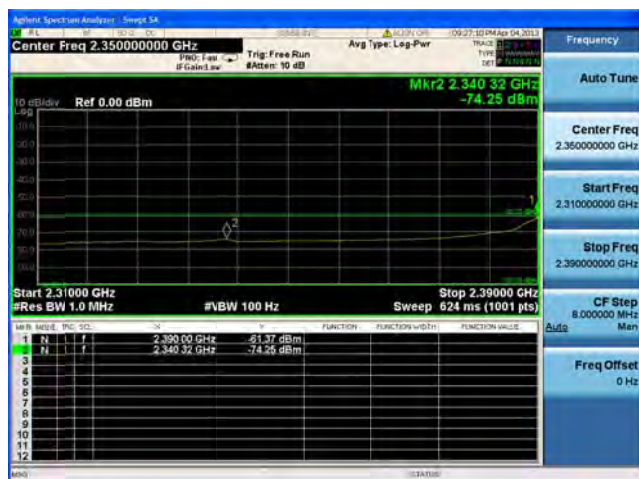


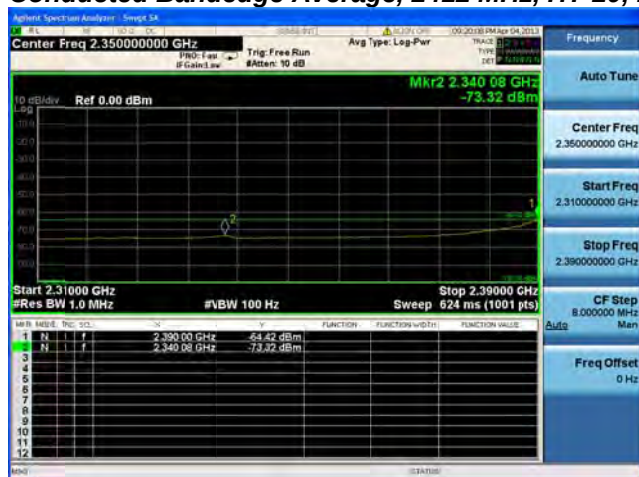
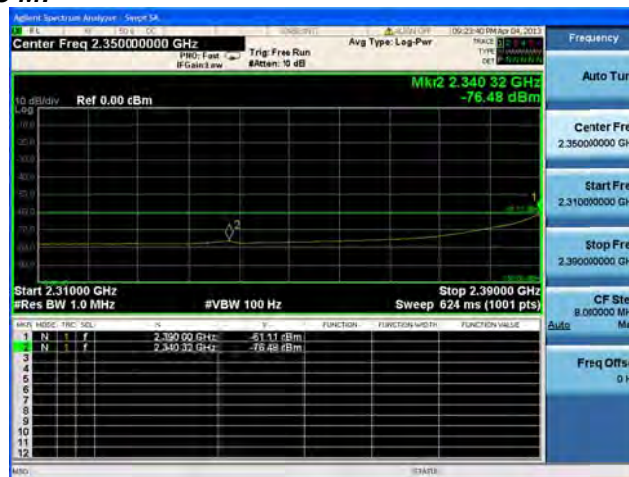
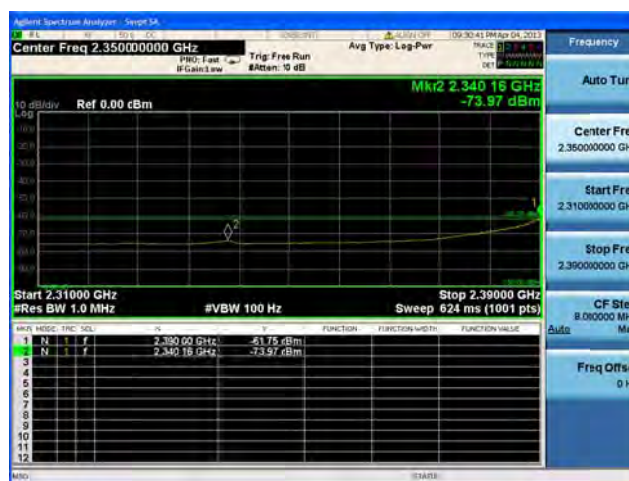
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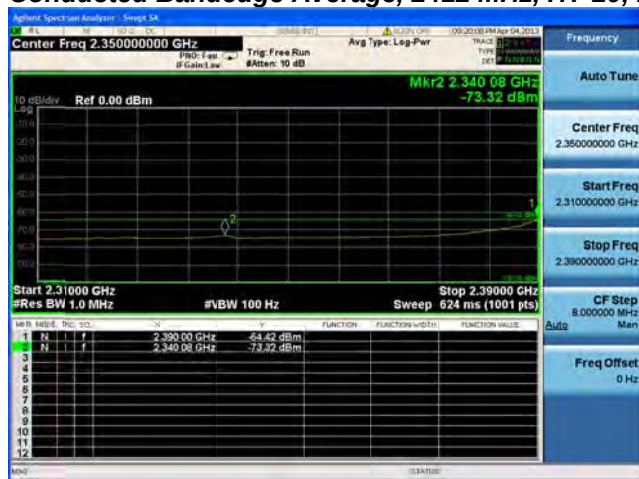
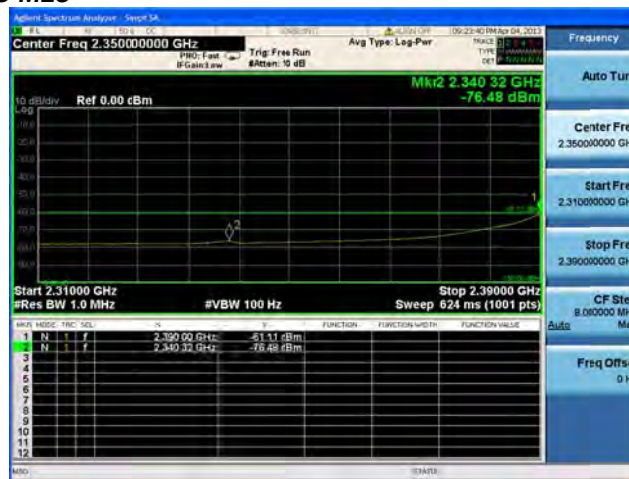
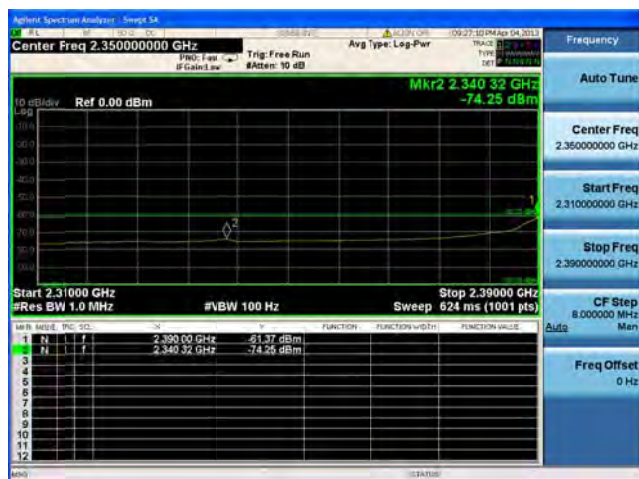
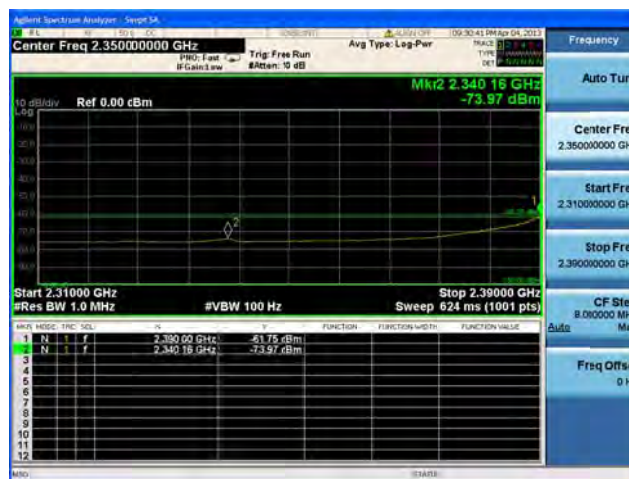


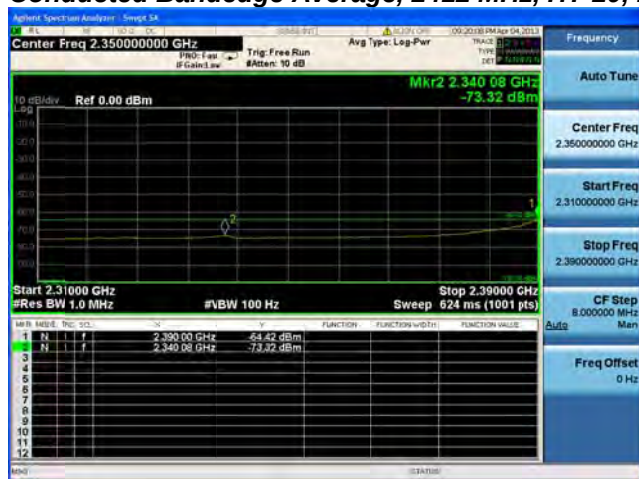
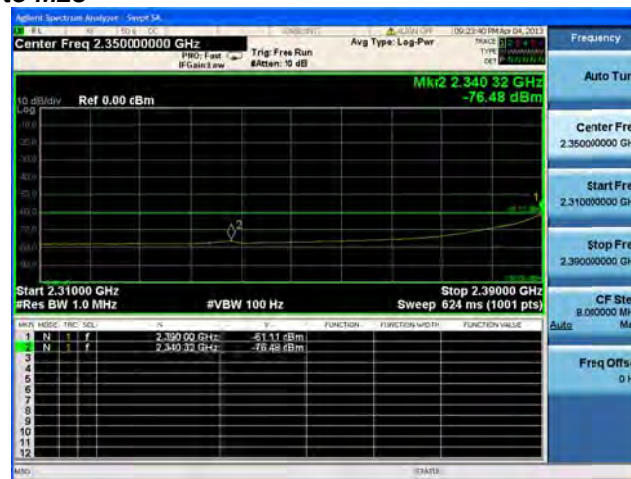
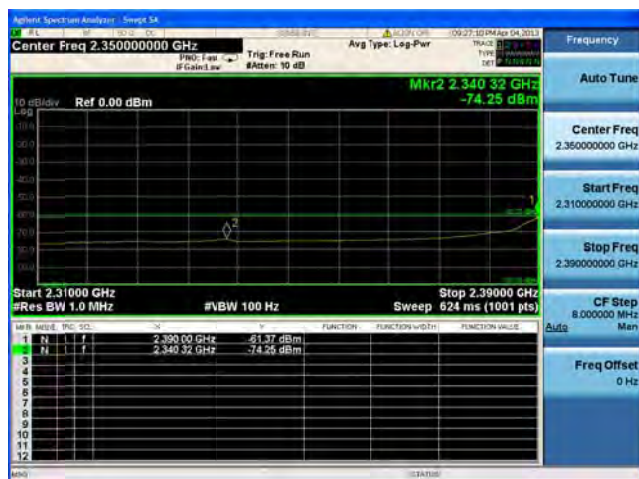
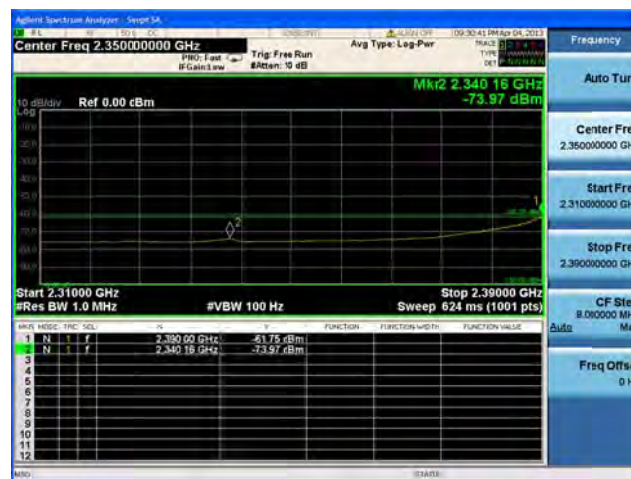
Antenna C

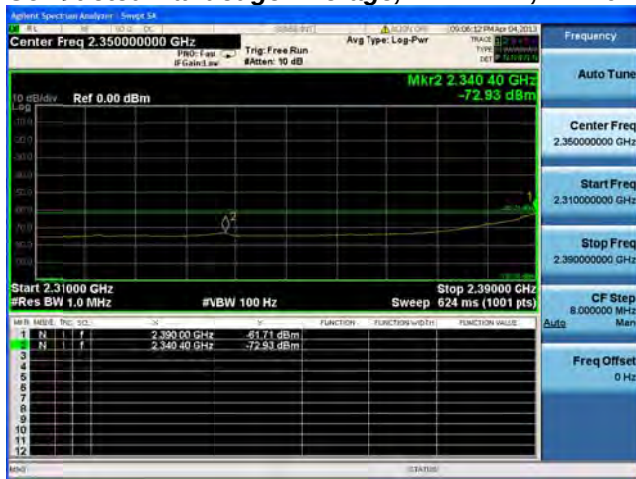
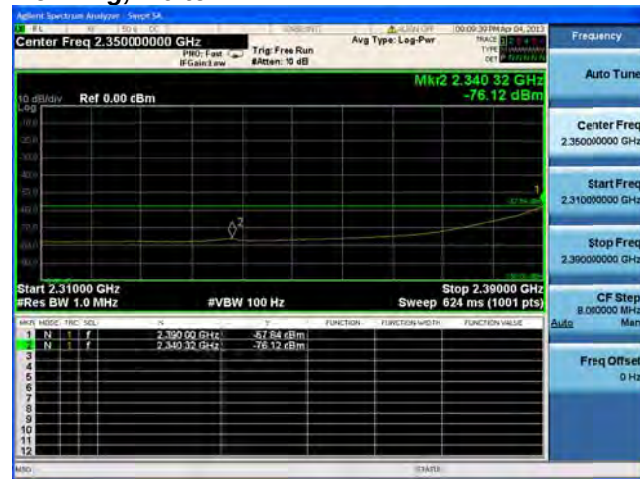
**Conducted Bandedge Average, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

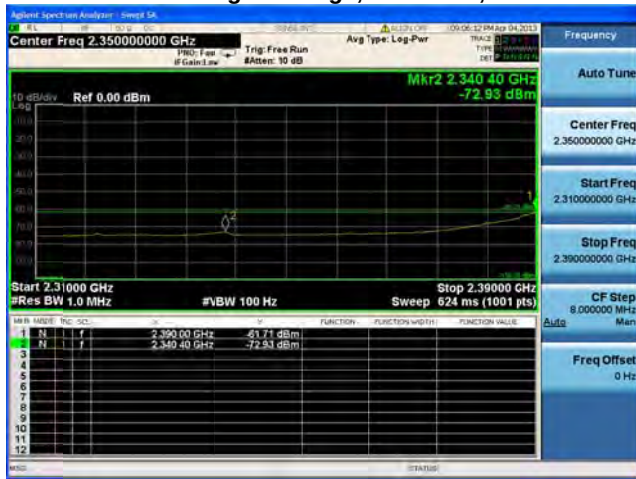
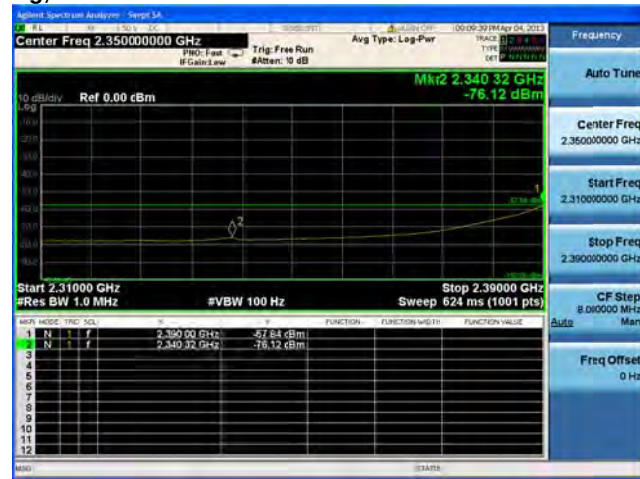
**Conducted Bandedge Average, 2412 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

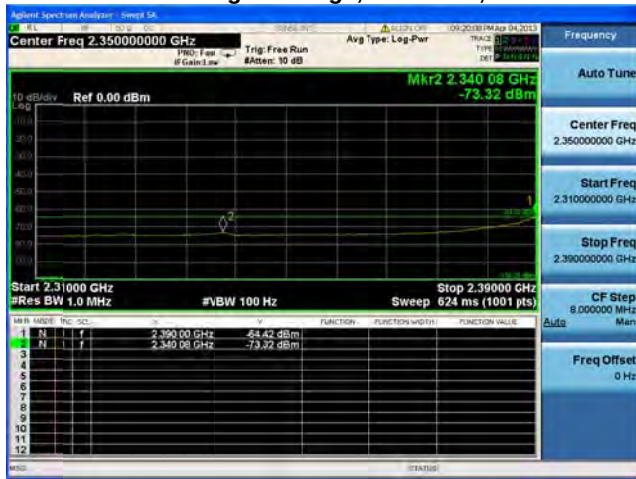
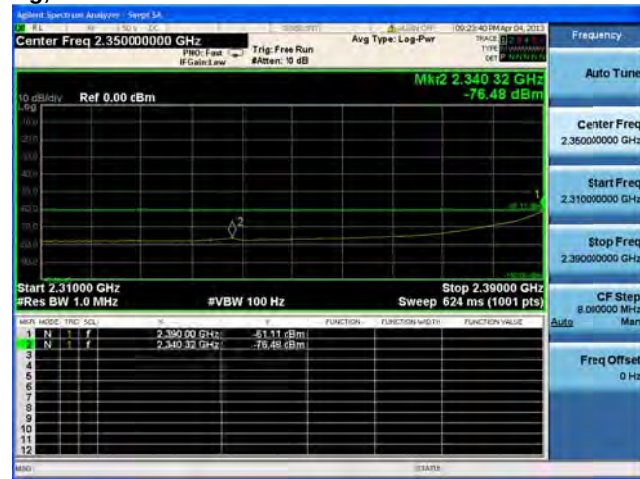
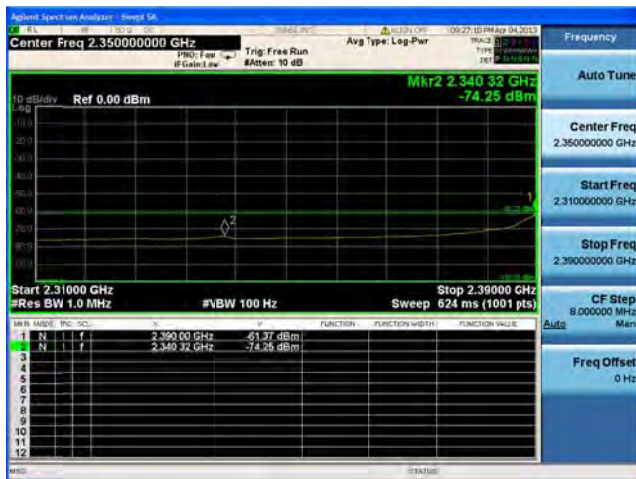
**Conducted Bandedge Average, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

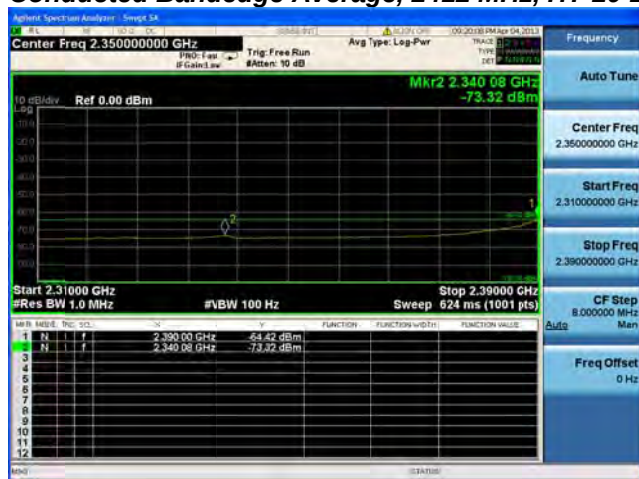
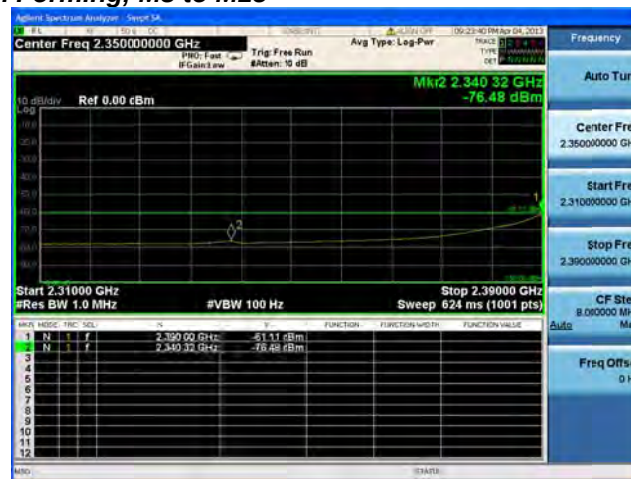
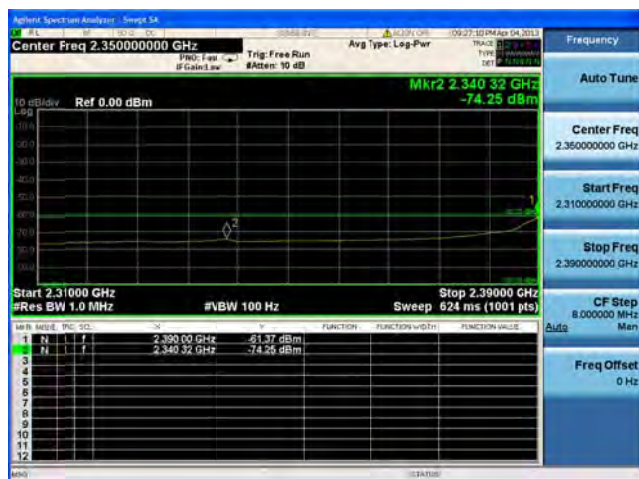
**Conducted Bandedge Average, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

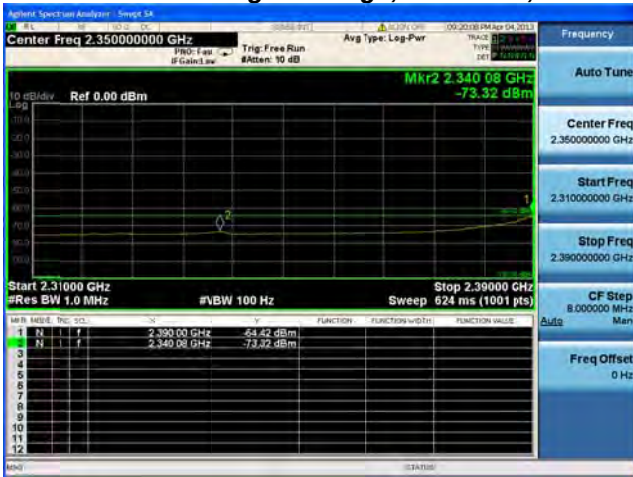
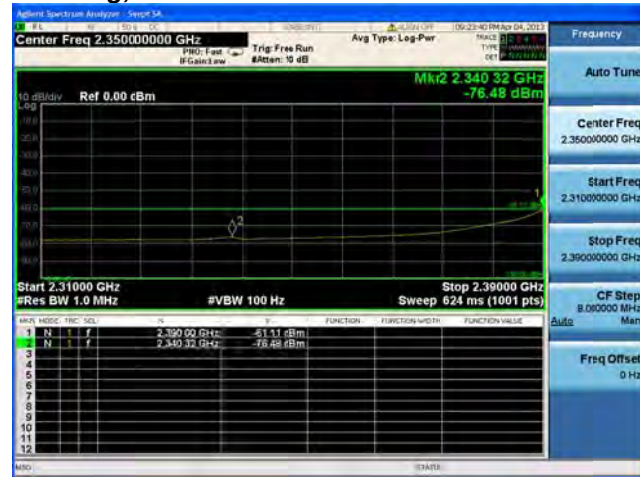
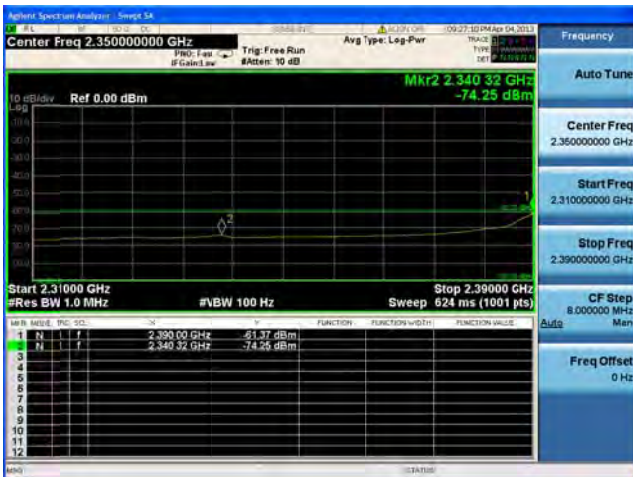
**Conducted Bandedge Average, 2412 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

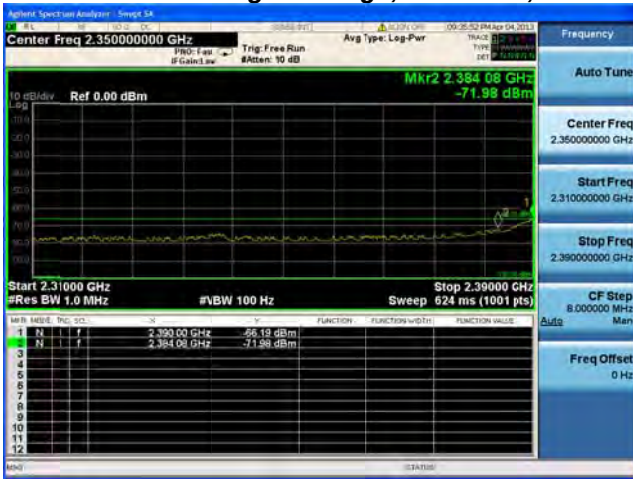
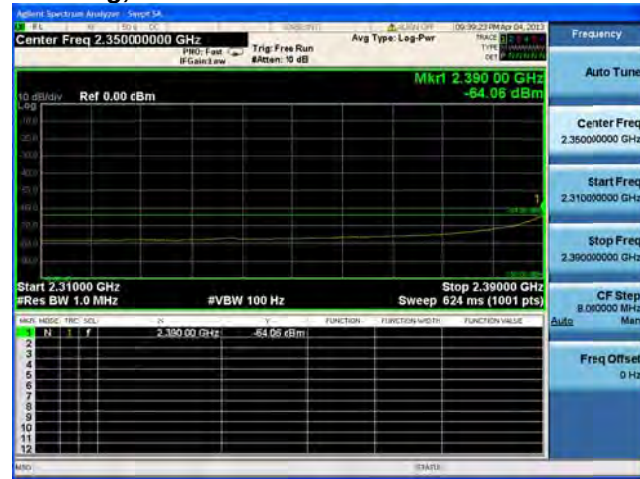
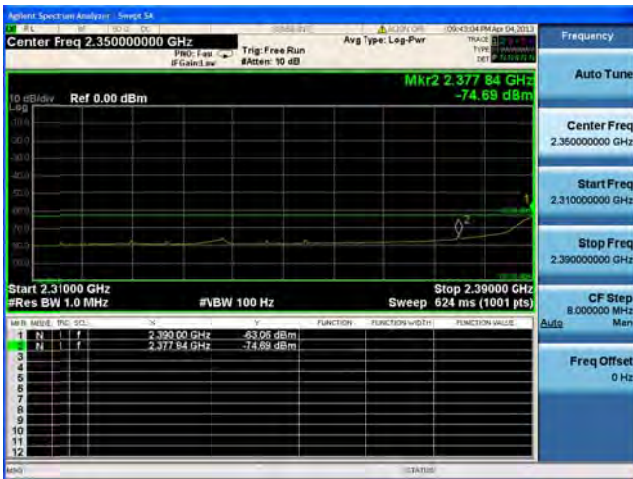
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

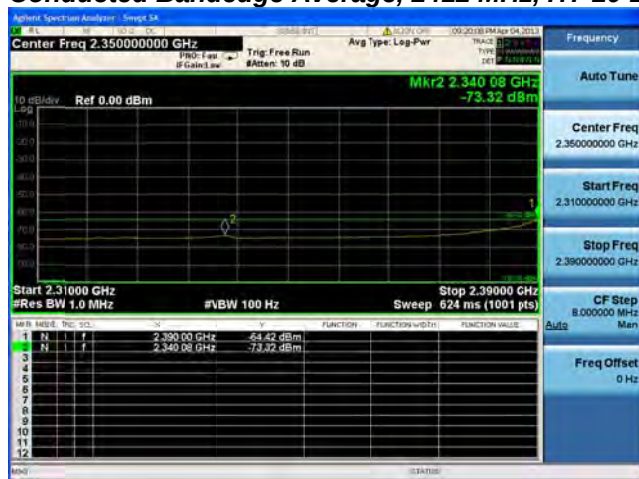
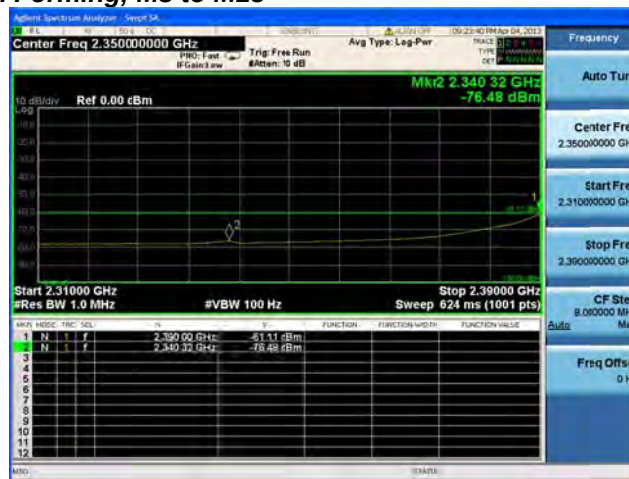
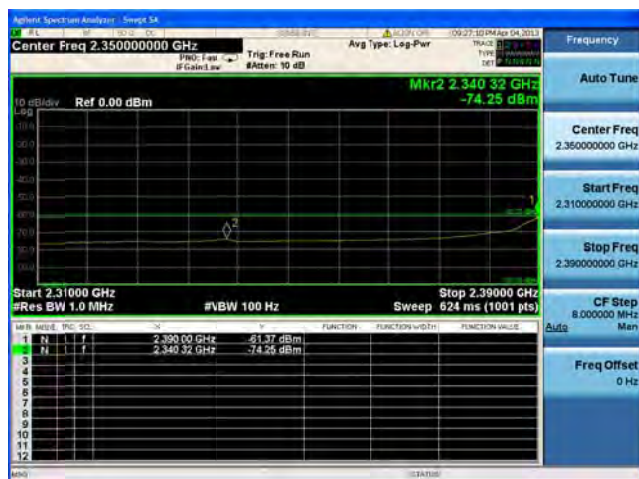
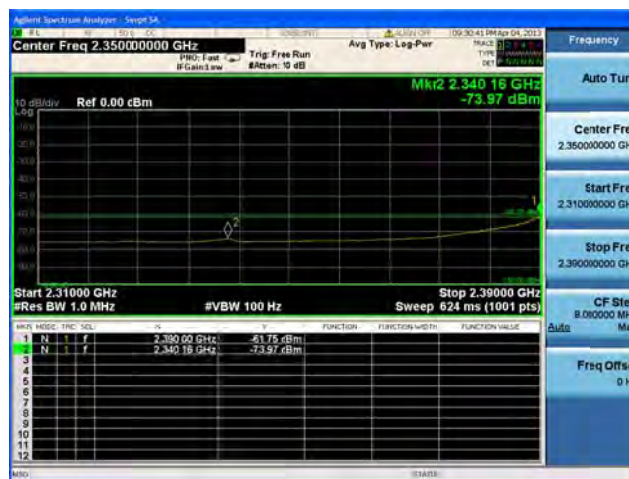
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**

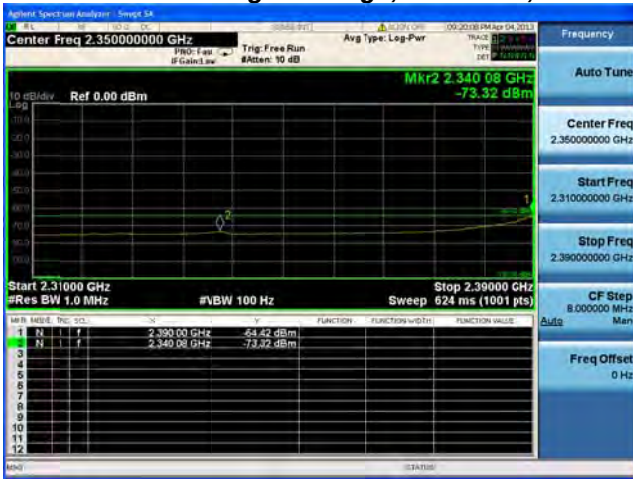
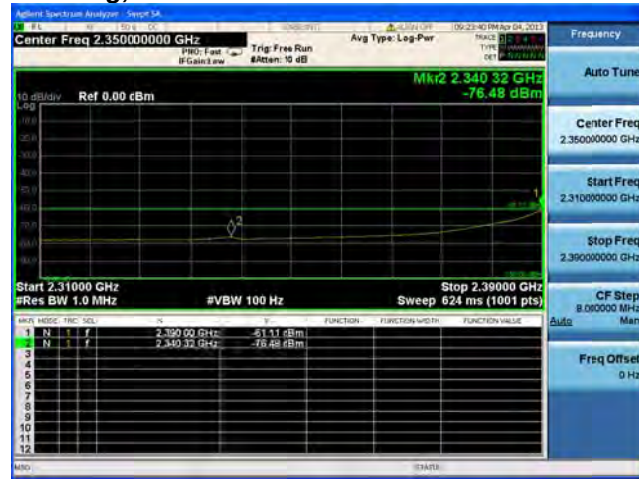
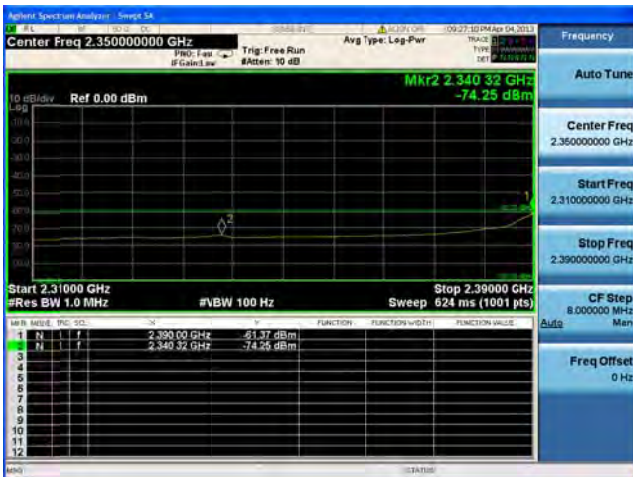
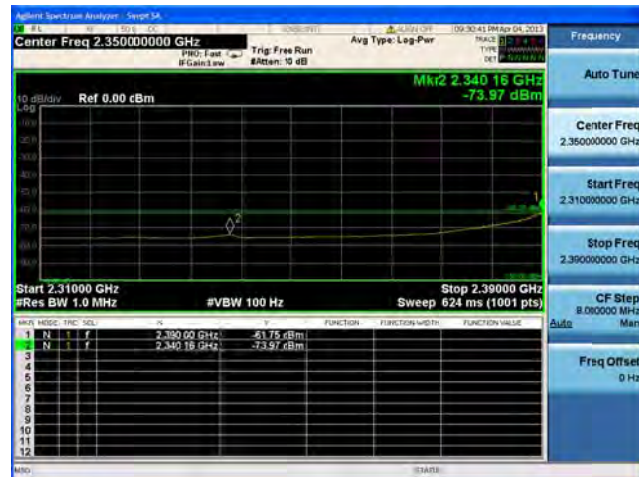
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C**

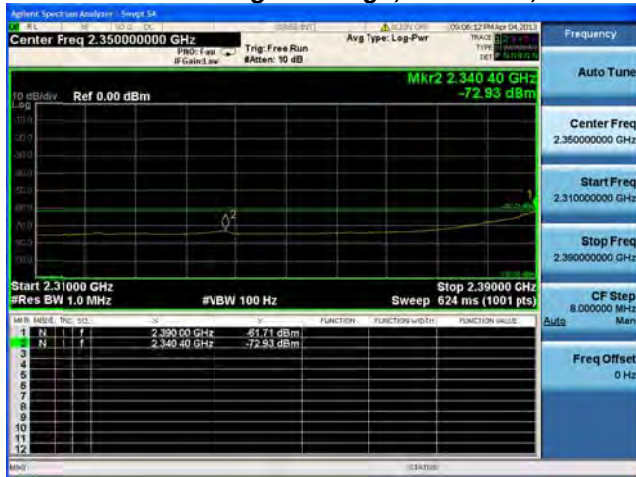
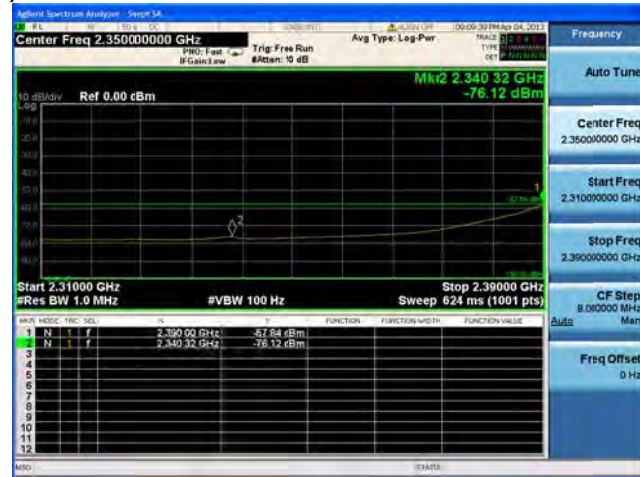
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

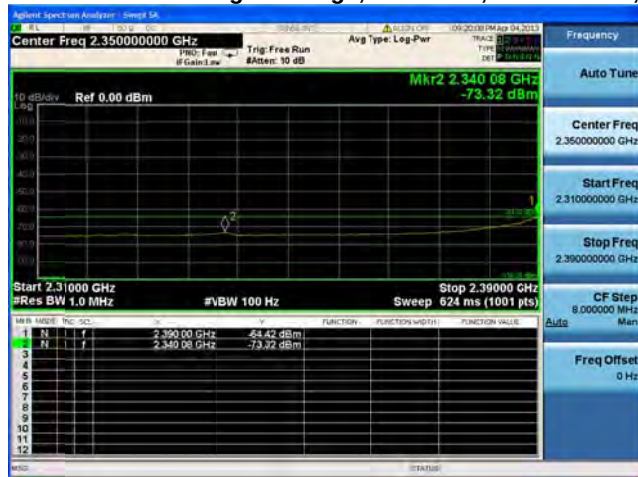
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

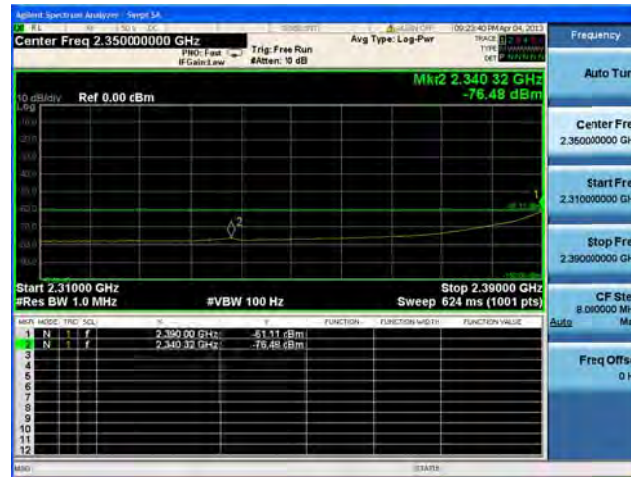
**Conducted Bandedge Average, 2412 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

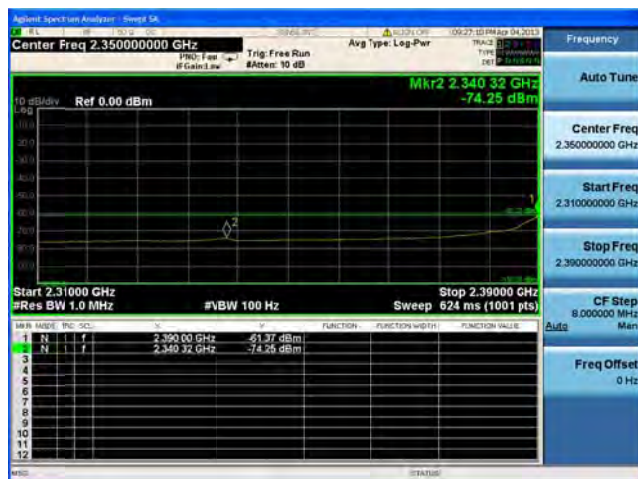
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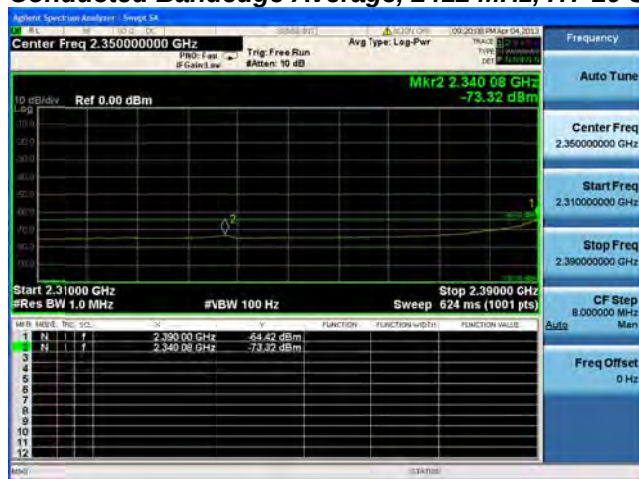
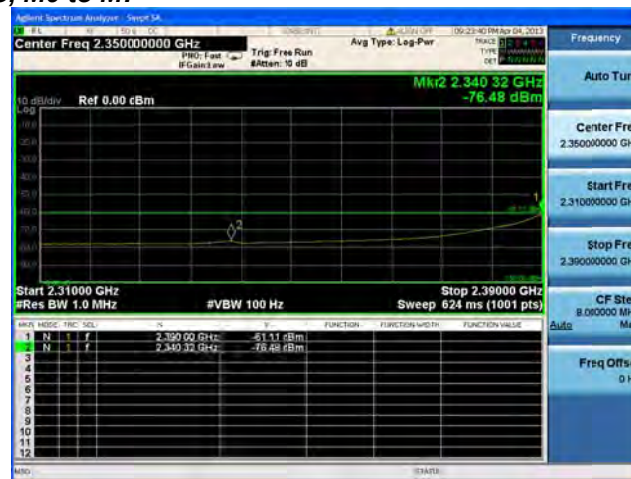
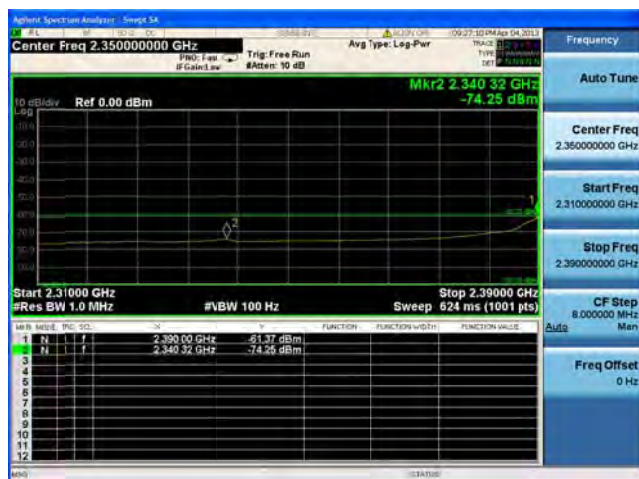
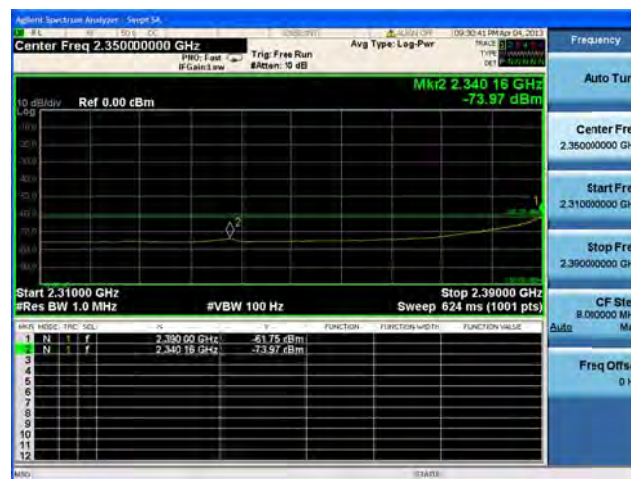
Antenna A

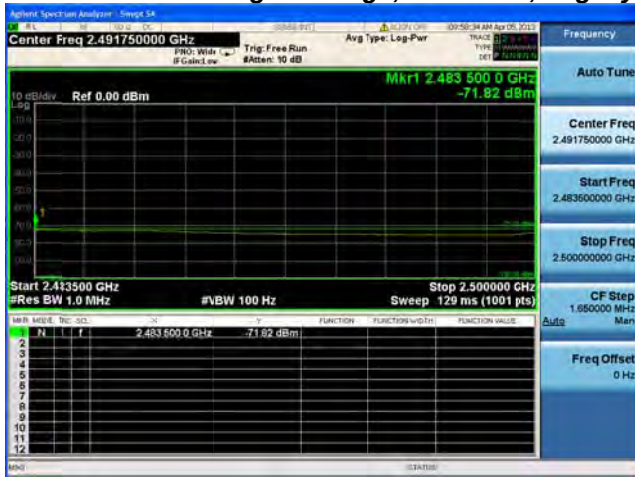


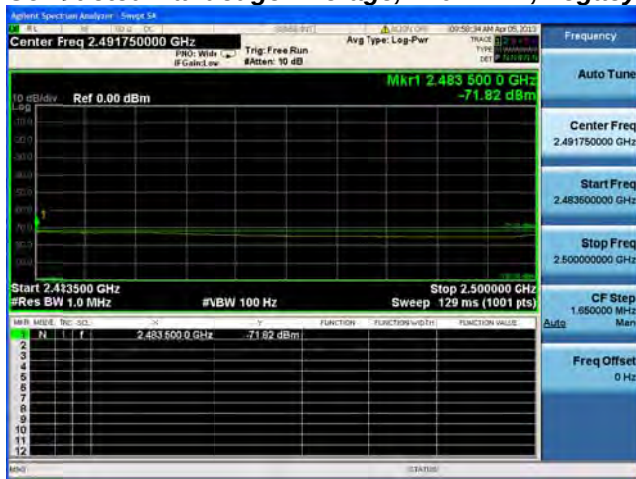
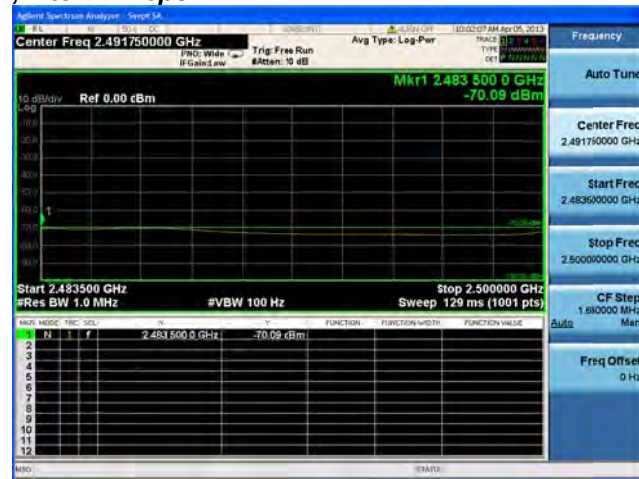
Antenna B

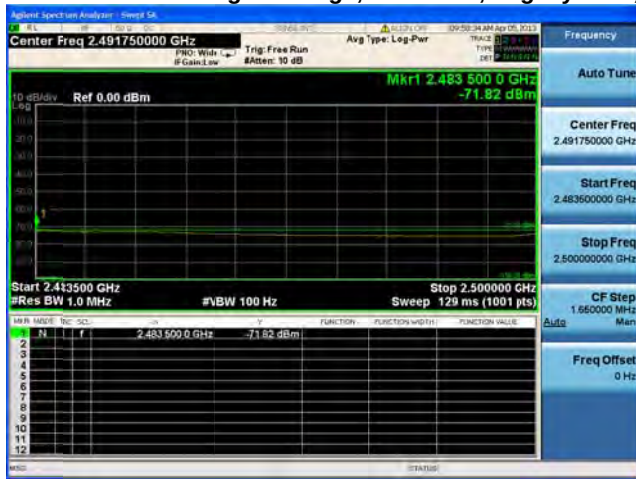
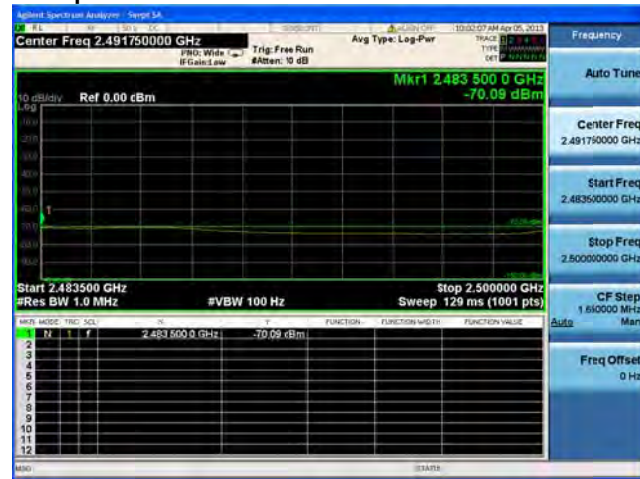
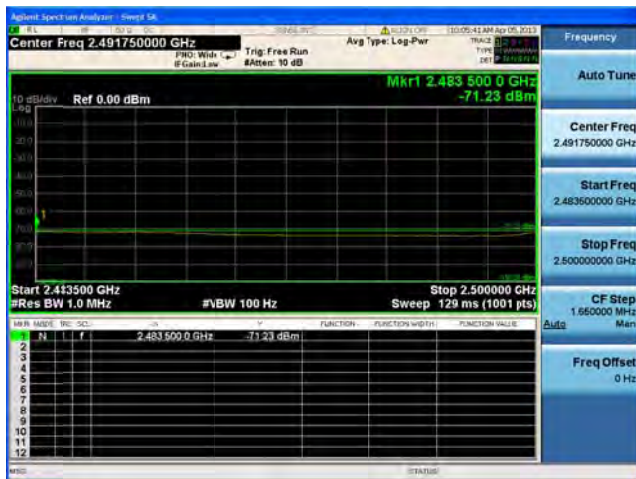


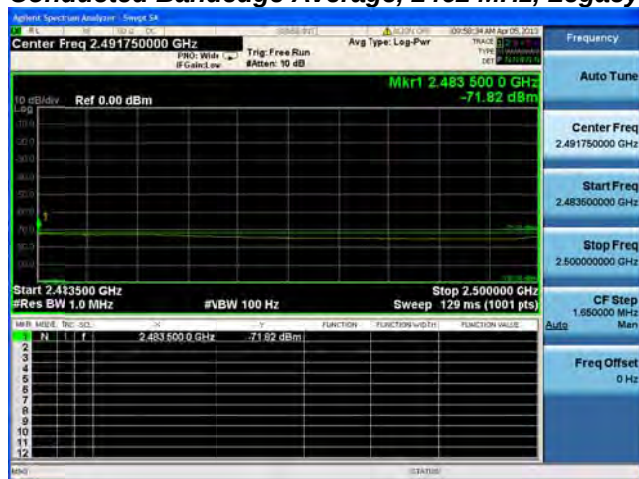
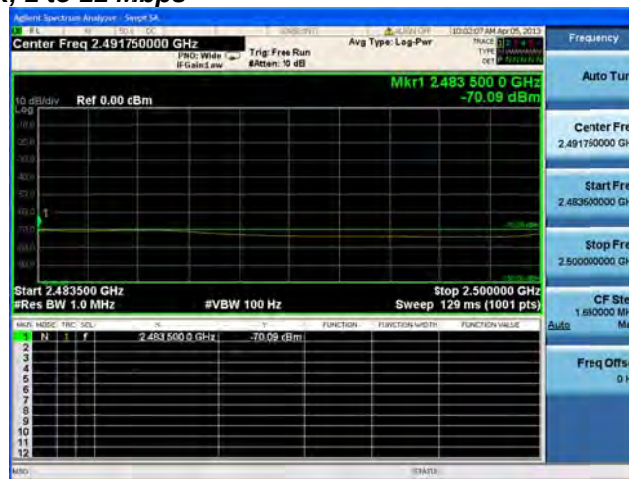
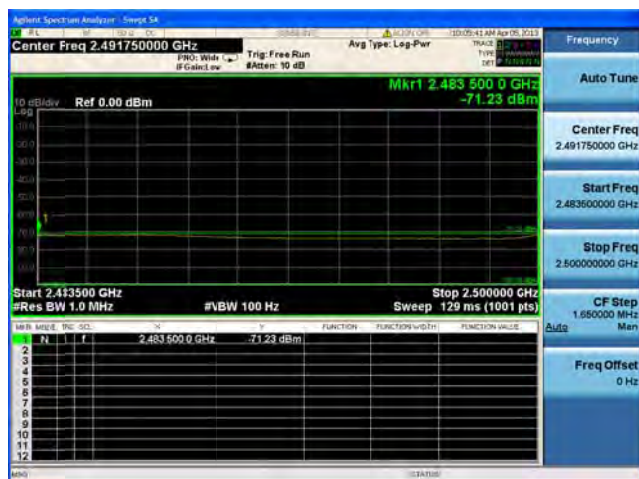
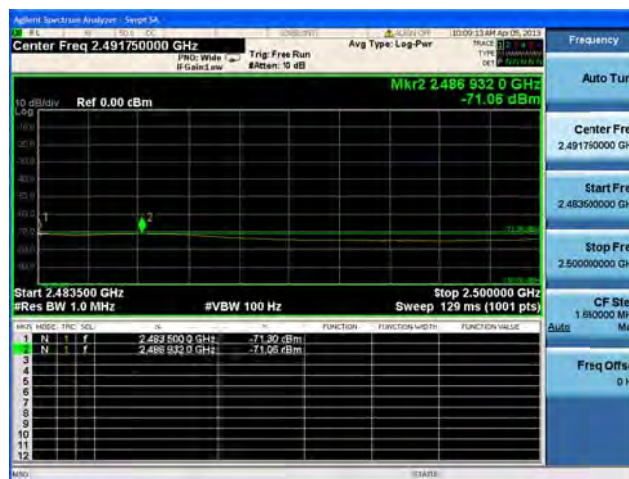
Antenna C

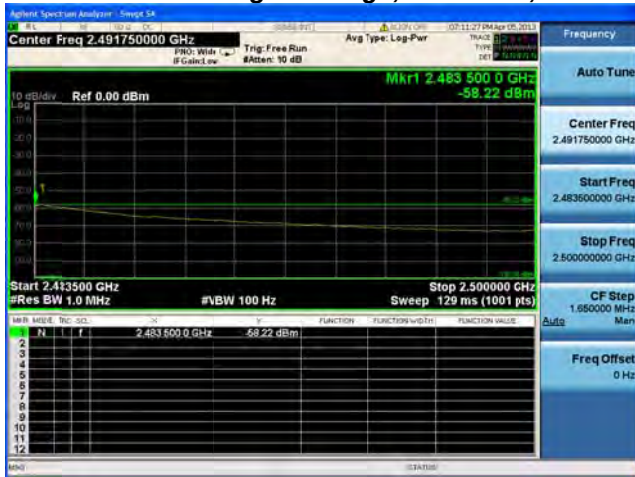
**Conducted Bandedge Average, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

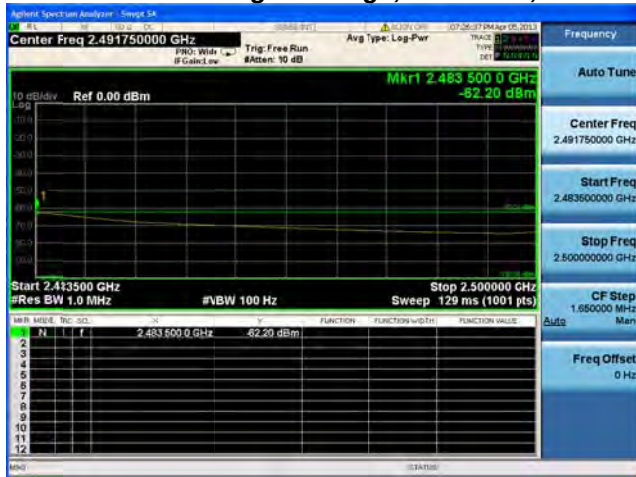
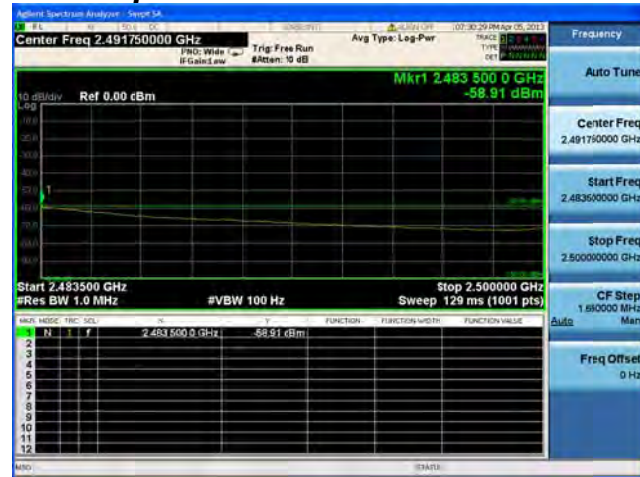
**Conducted Bandedge Average, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

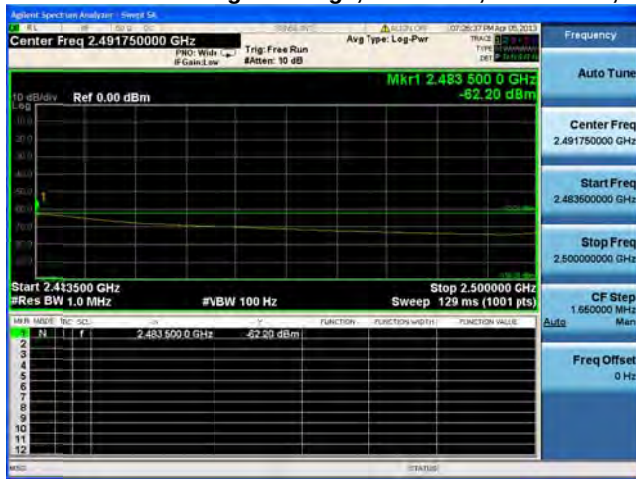
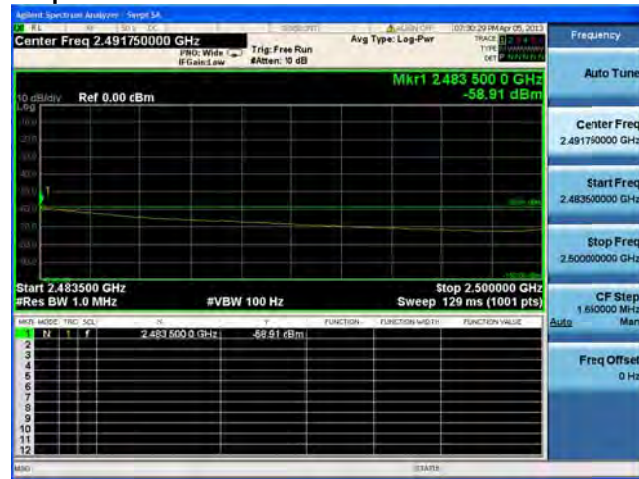
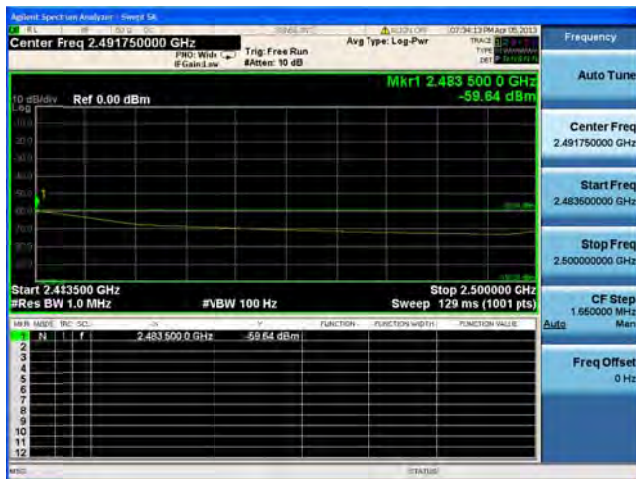
**Conducted Bandedge Average, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

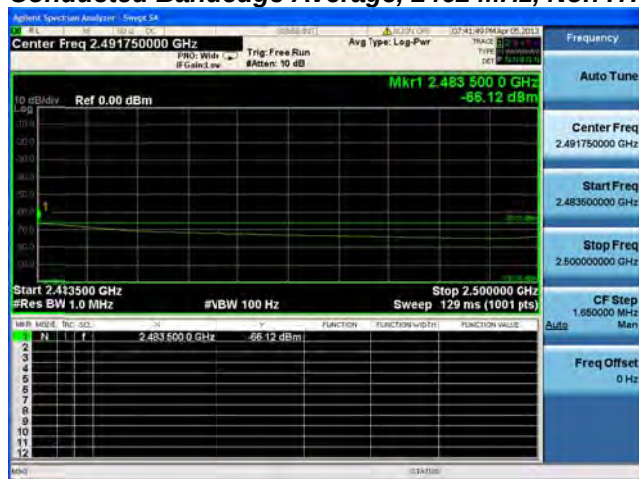
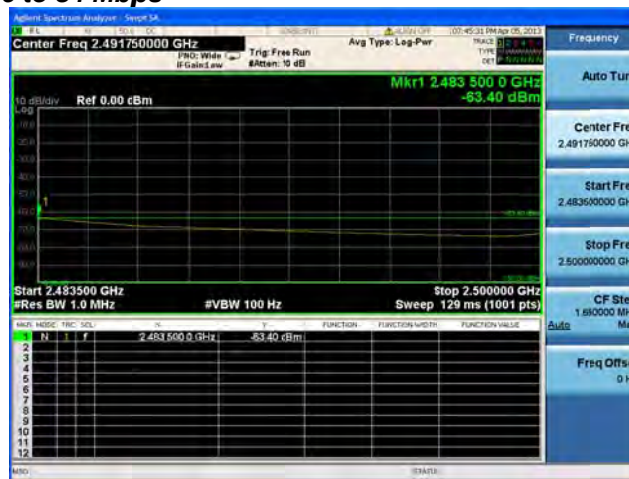
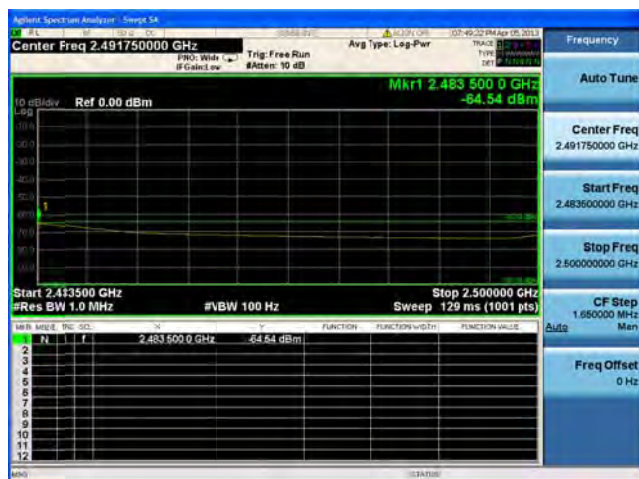
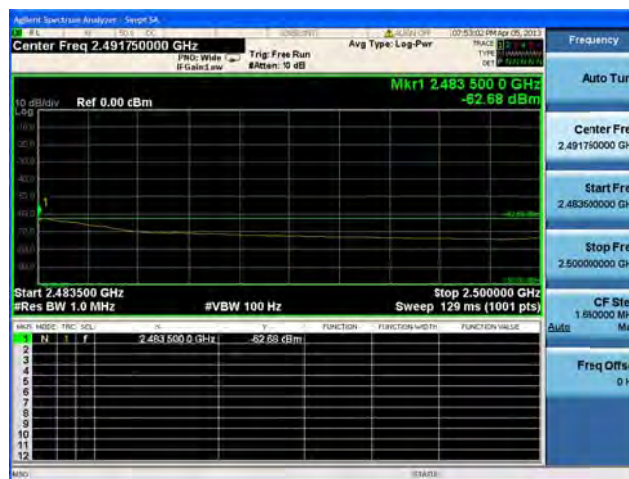
**Conducted Bandedge Average, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C**

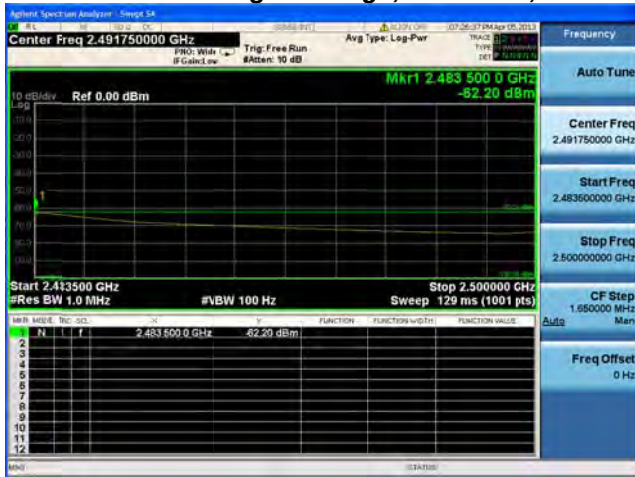
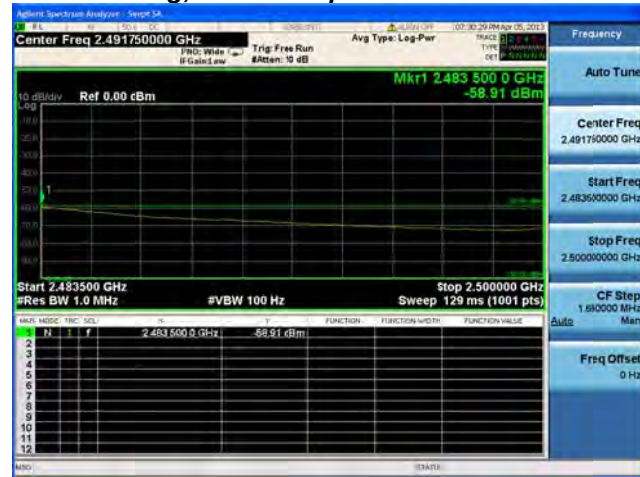
**Conducted Bandedge Average, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

**Conducted Bandedge Average, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

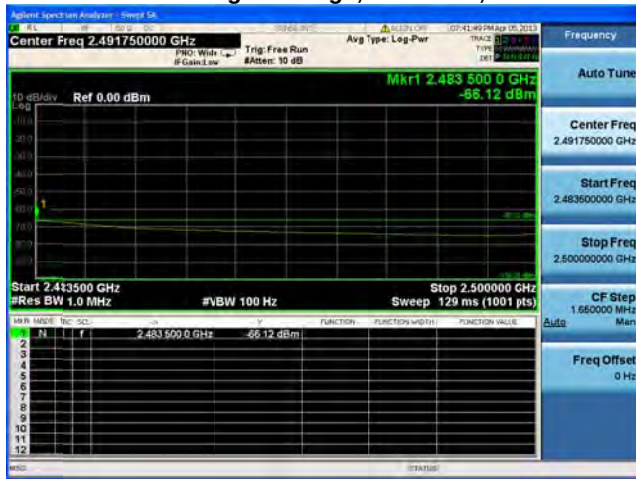
**Conducted Bandedge Average, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Average, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

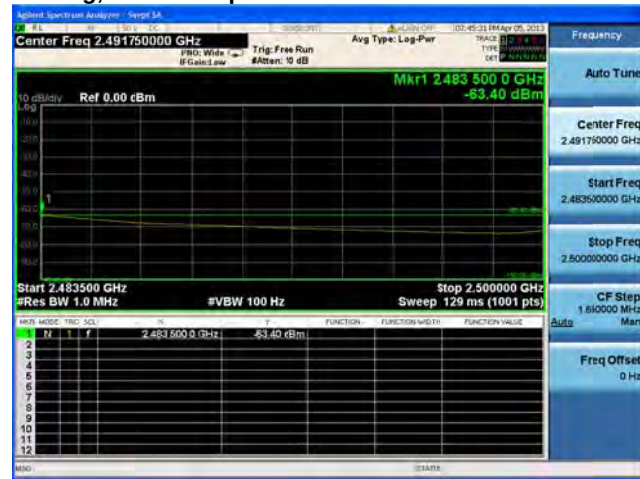
**Conducted Bandedge Average, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**



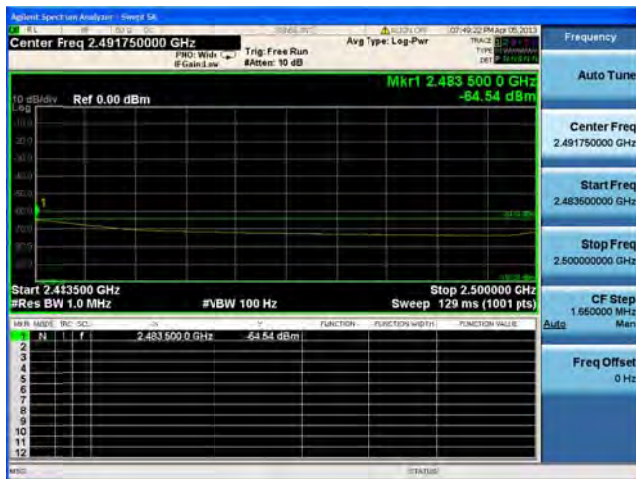
## Conducted Bandedge Average, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps



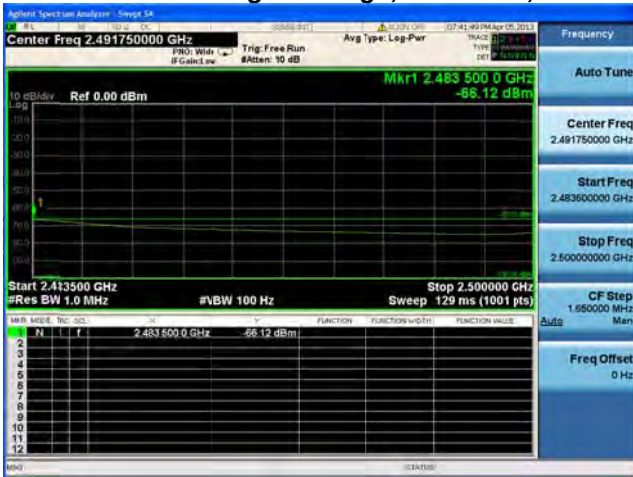
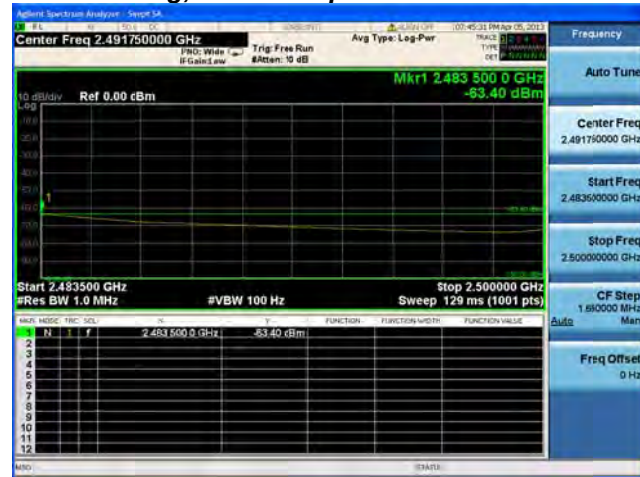
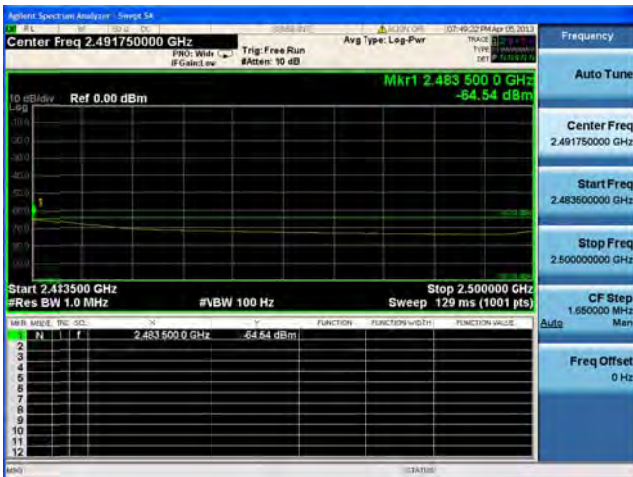
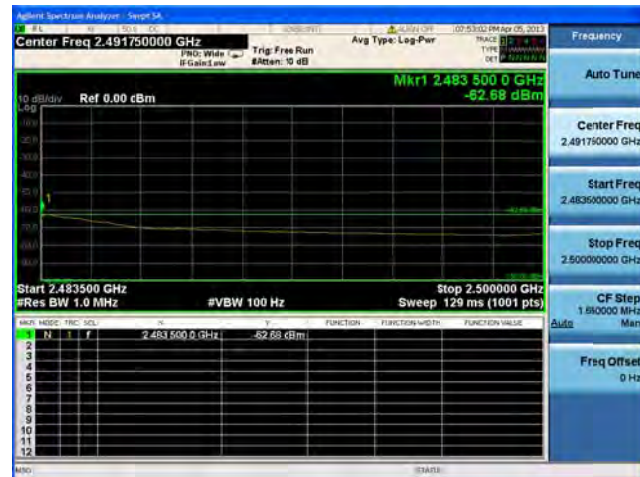
Antenna A



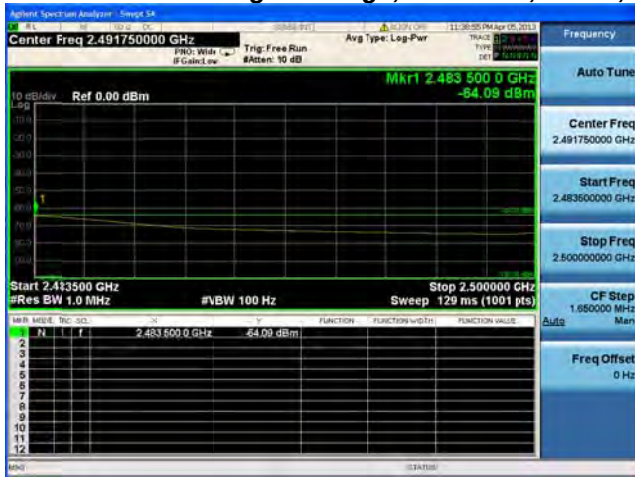
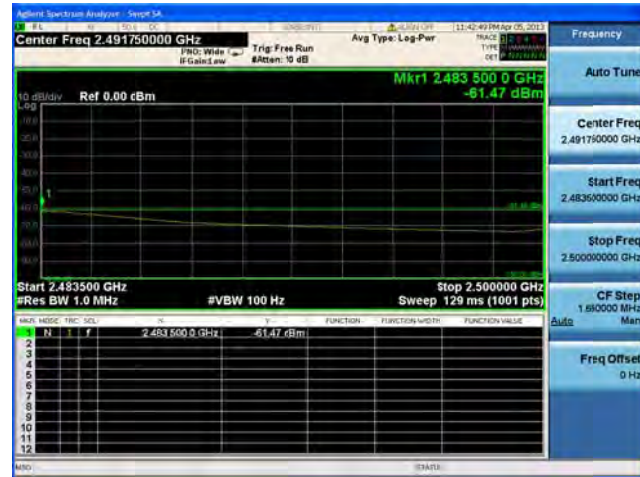
Antenna B



Antenna C

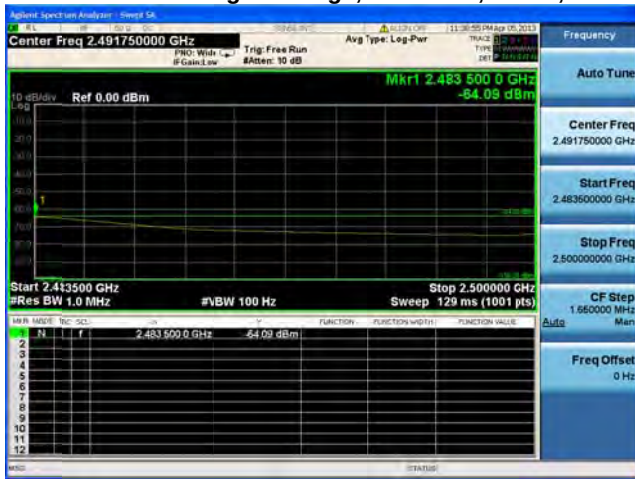
**Conducted Bandedge Average, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2462 MHz, HT-20, M0 to M7****Antenna A**

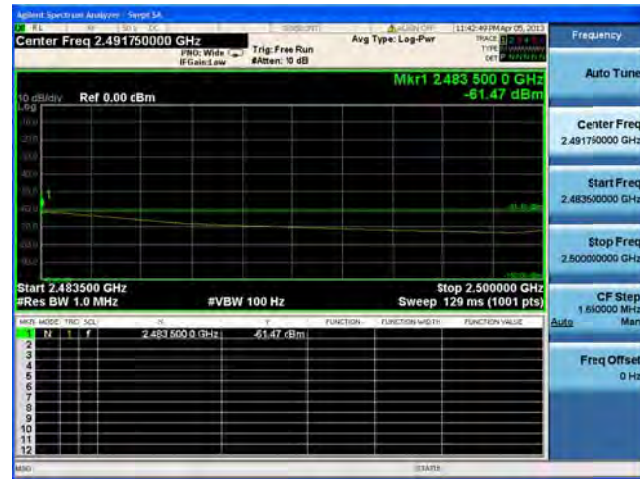
**Conducted Bandedge Average, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B**



## Conducted Bandedge Average, 2462 MHz, HT-20, M8 to M15

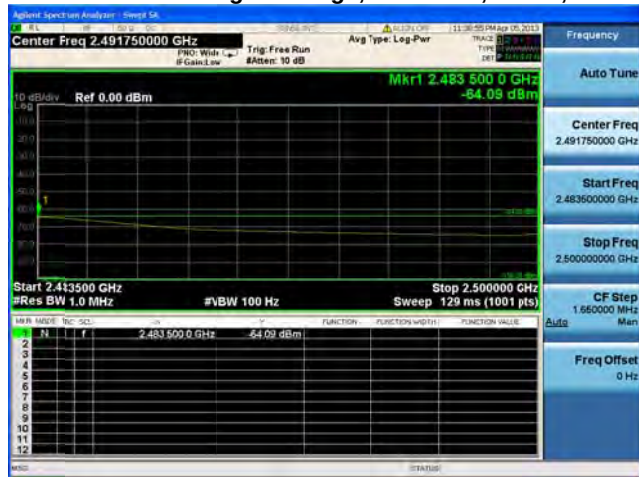


Antenna A

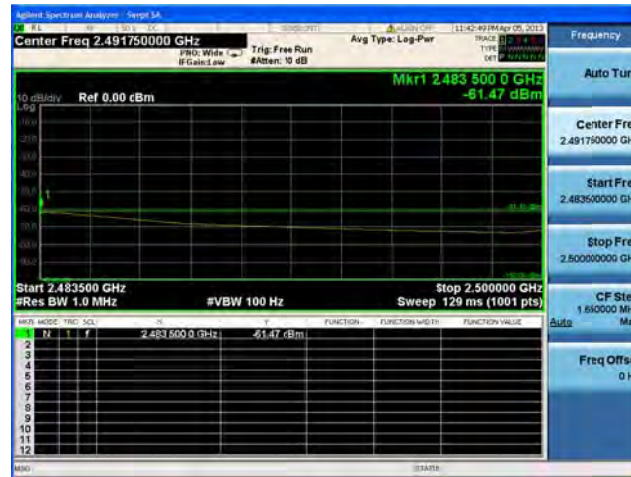


Antenna B

## Conducted Bandedge Average, 2462 MHz, HT-20, M0 to M7



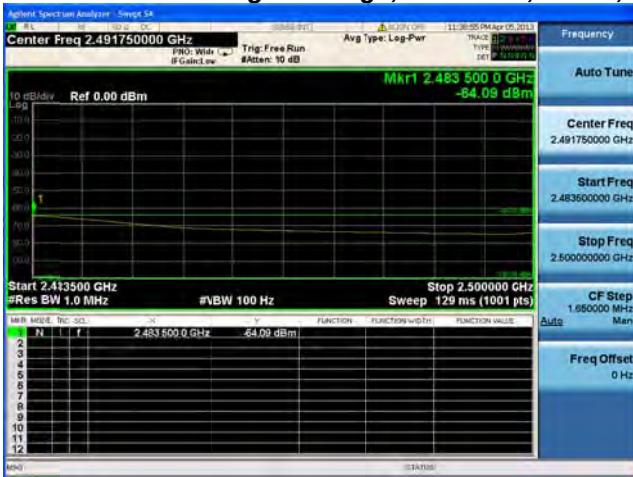
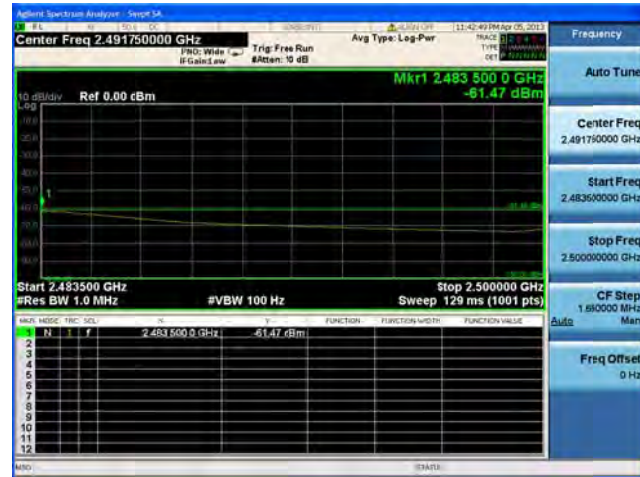
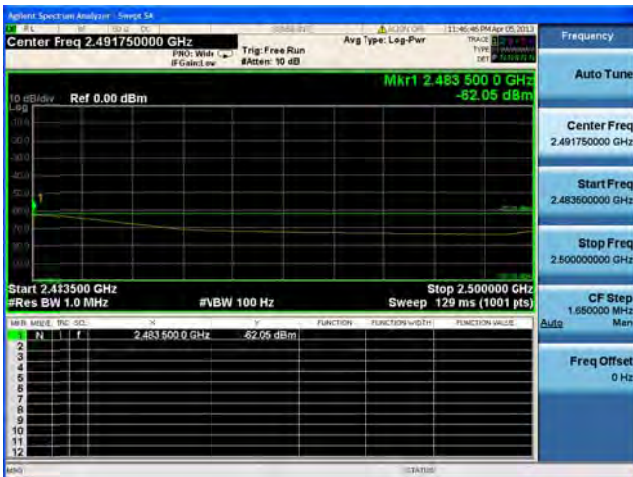
Antenna A

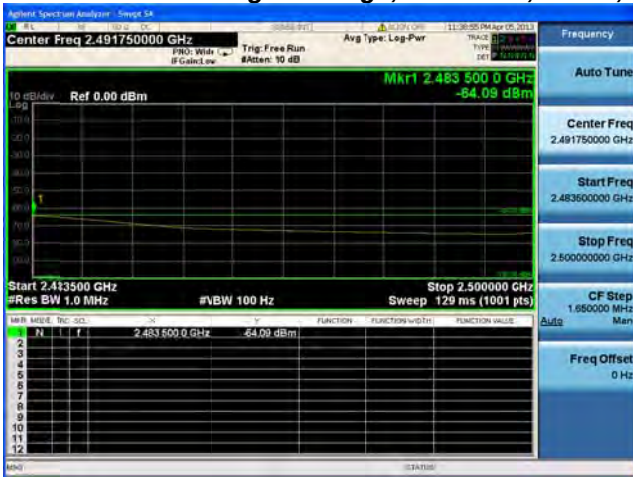
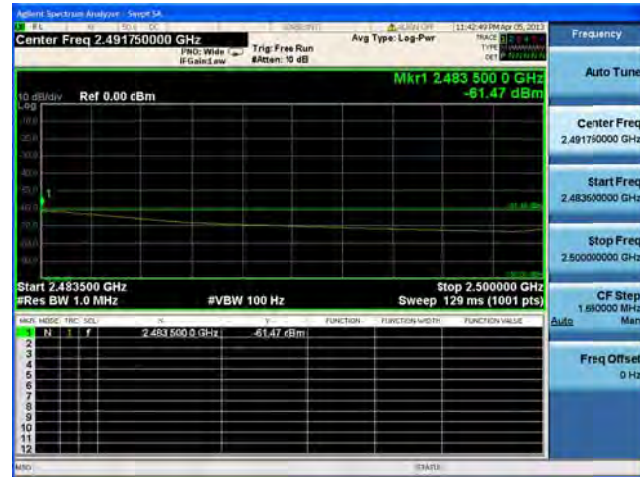
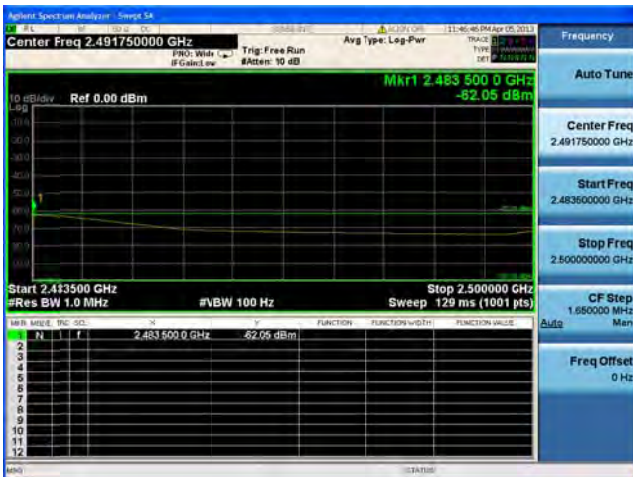


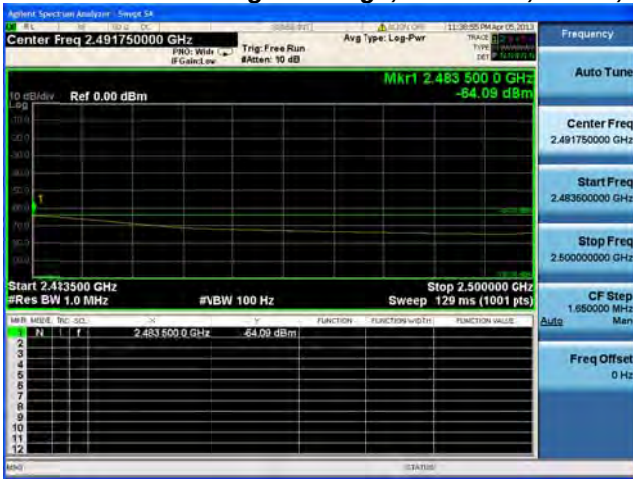
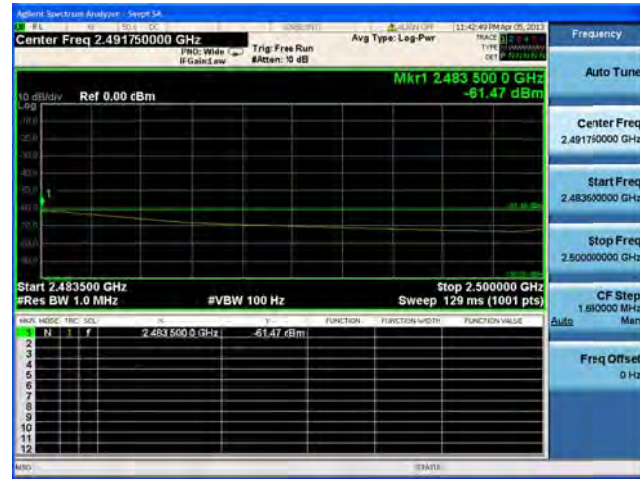
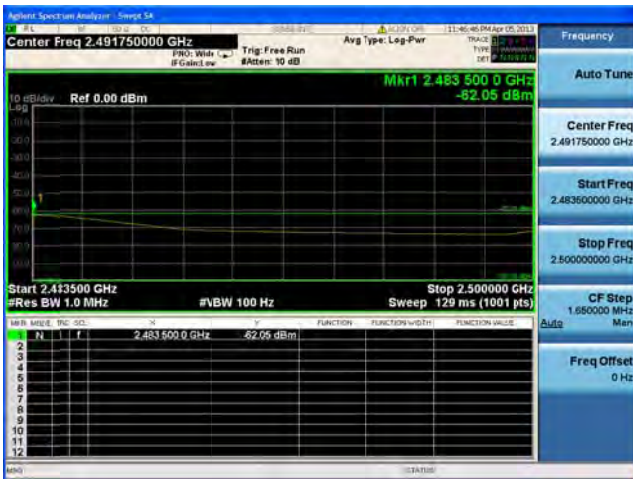
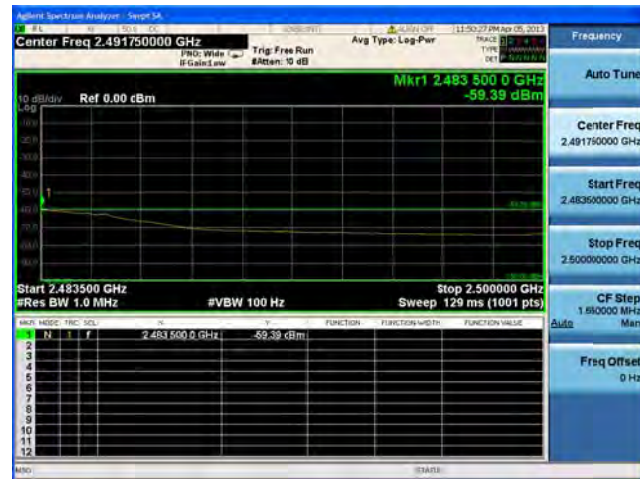
Antenna B

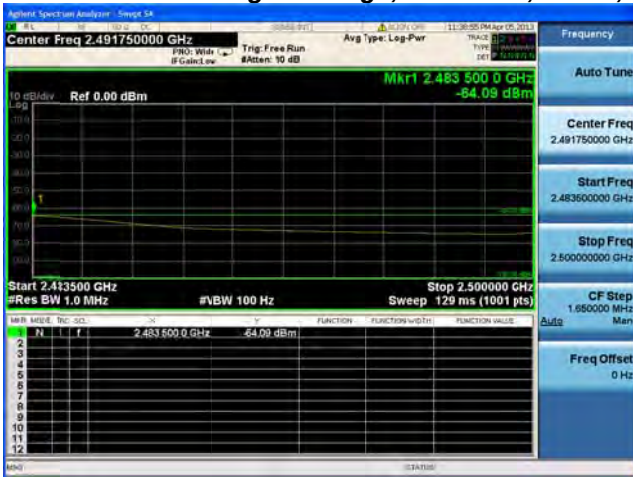
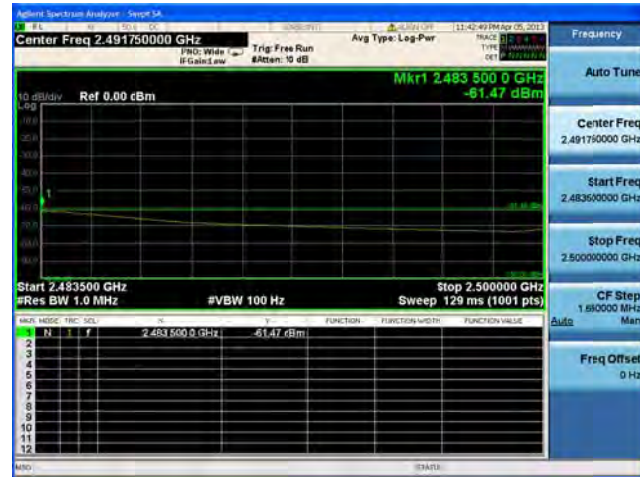
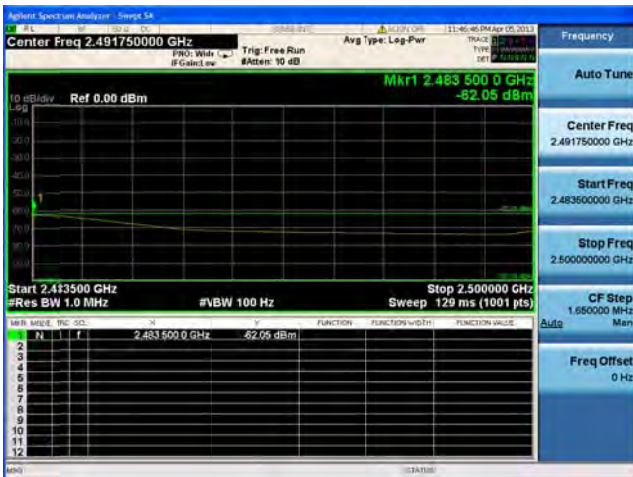
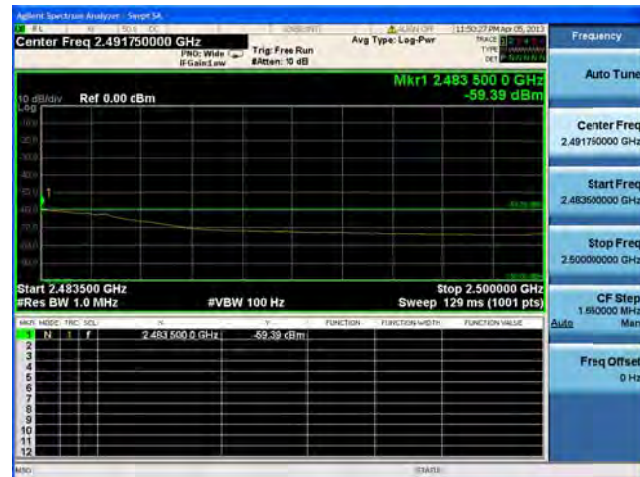


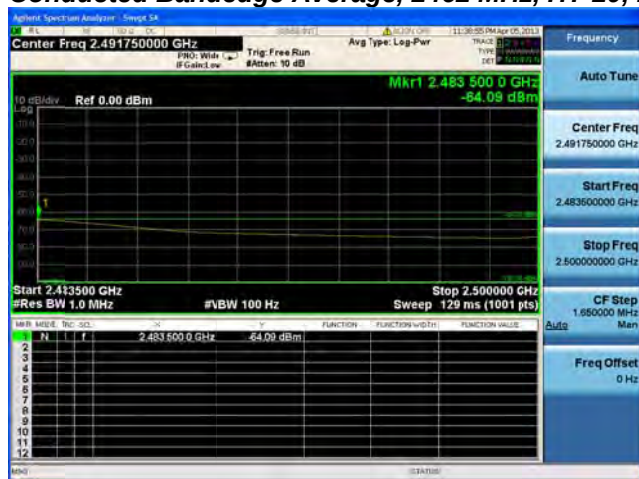
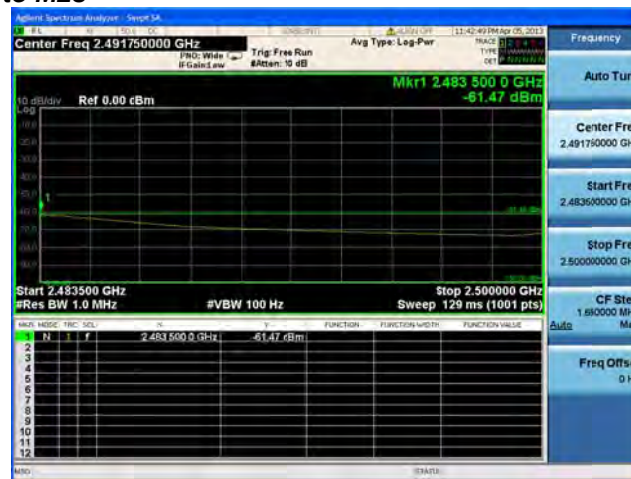
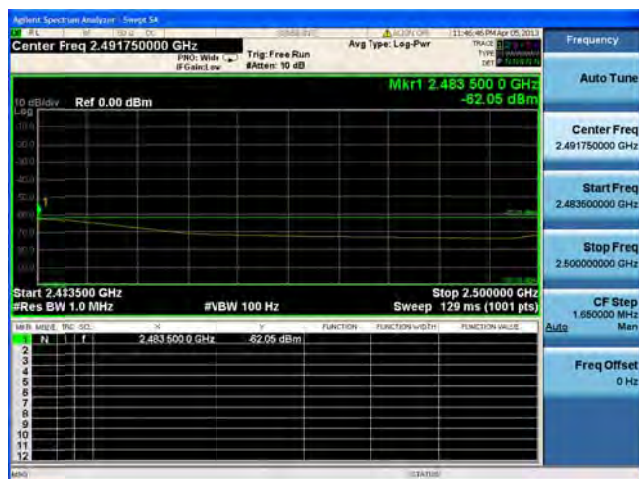
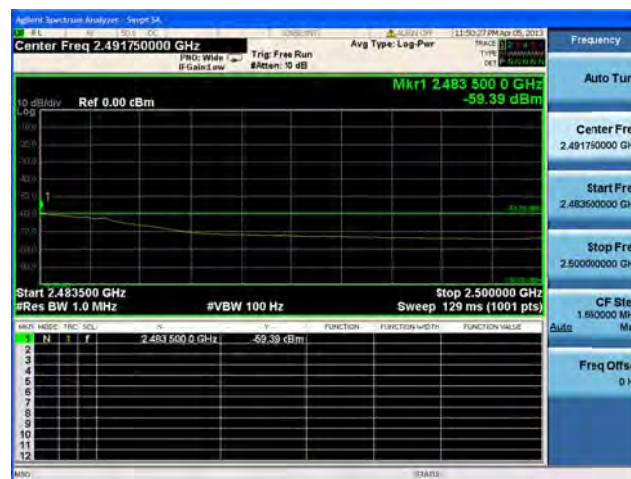
Antenna C

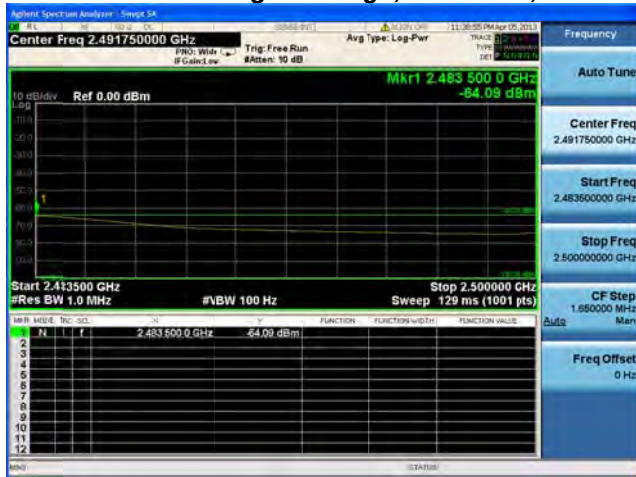
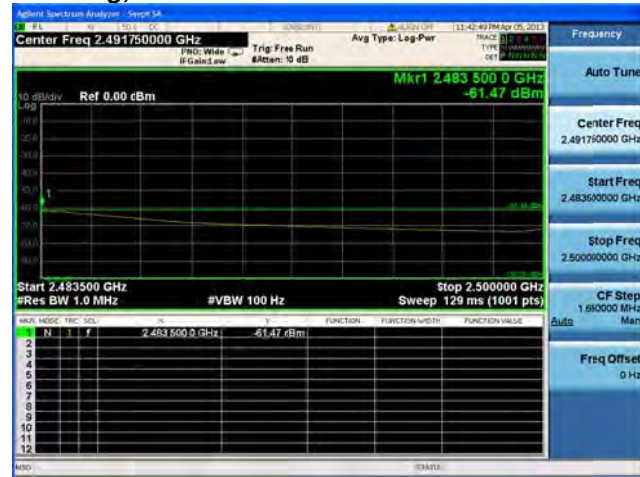
**Conducted Bandedge Average, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

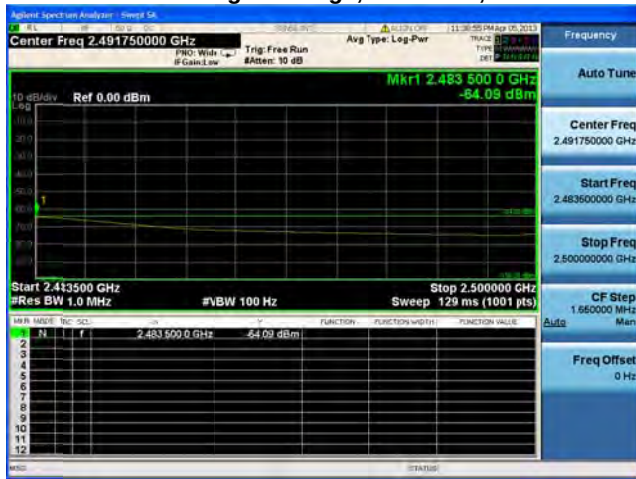
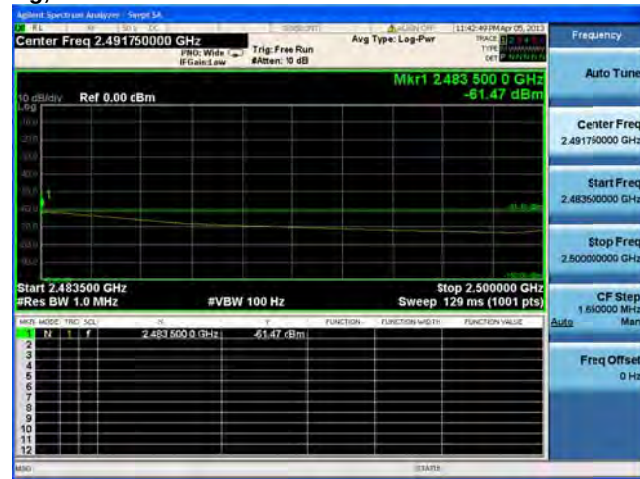
**Conducted Bandedge Average, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

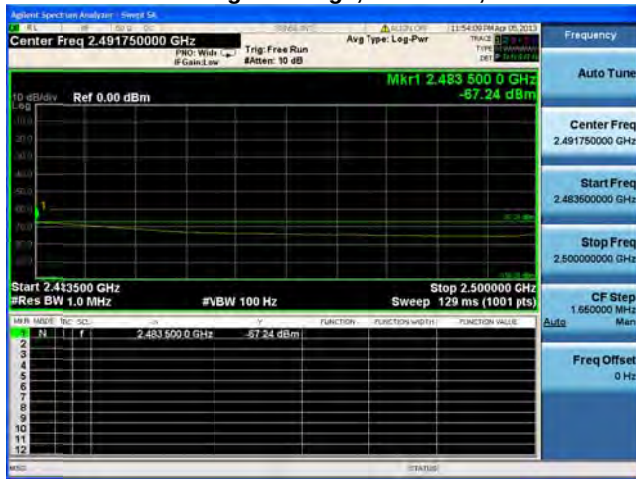
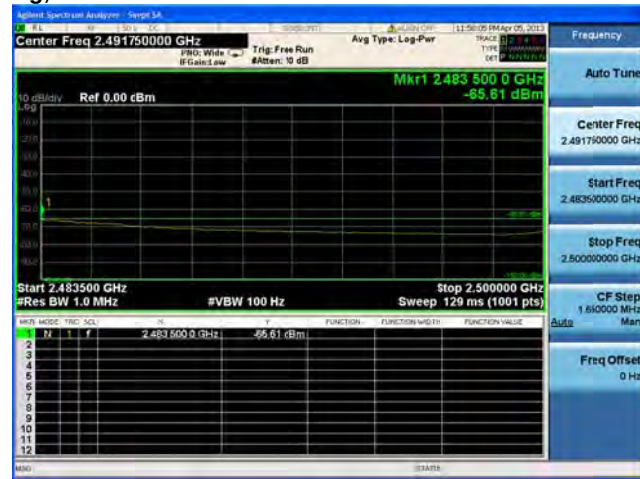
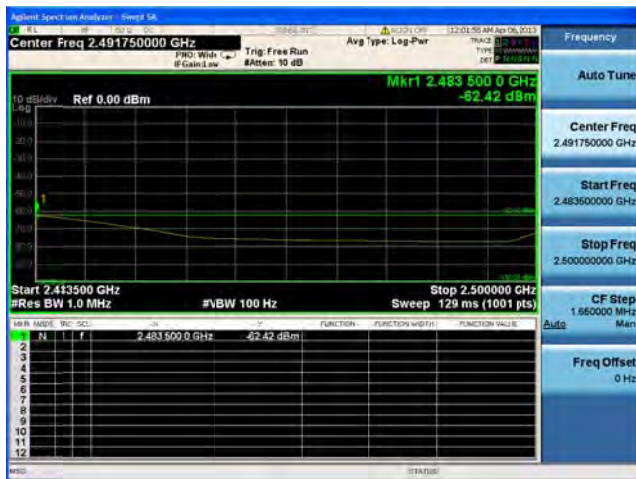
**Conducted Bandedge Average, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

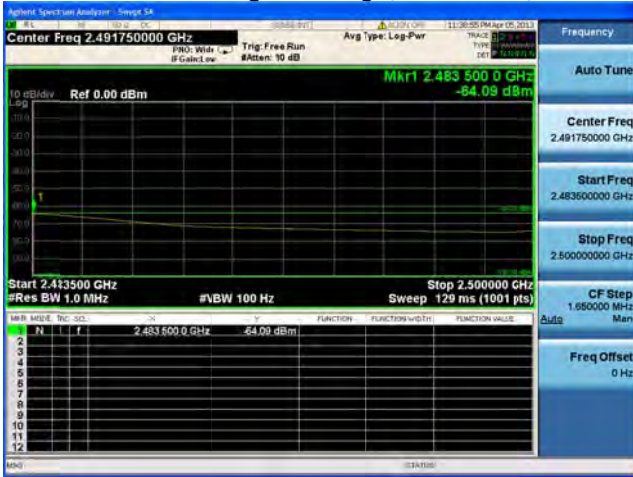
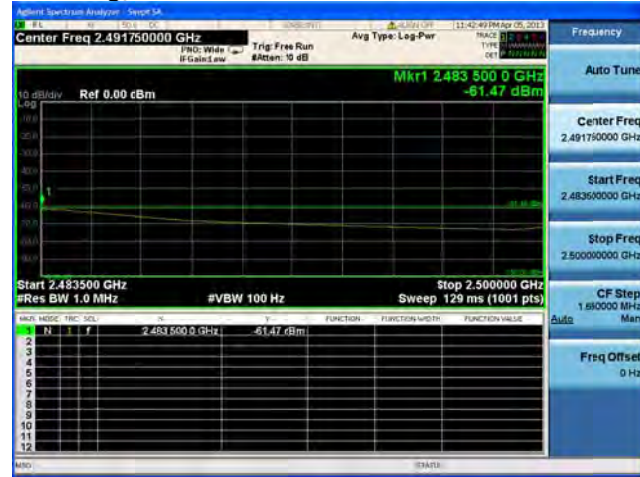
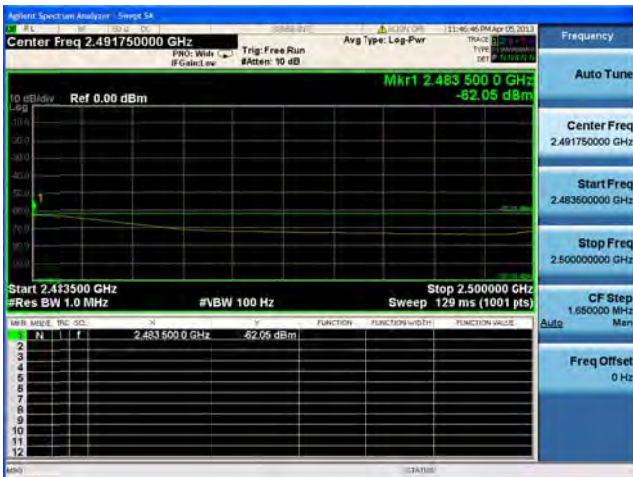
**Conducted Bandedge Average, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**

**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

The screenshot displays a Vector Spectrum Analyzer interface. The top status bar shows 'Vector Spectrum Analyzer', 'Sweep 54', and various system parameters like '11:38:55 PM Apr 05, 2013'. The main display area is a power spectrum plot with a green grid. The plot shows a signal at 2.483500 GHz with a power level of -64.09 dBm. The plot is labeled 'Mkr1 2.483 500 0 GHz -64.09 dBm'. The plot parameters include 'Center Freq 2.491750000 GHz', 'Start 2.483500000 GHz', 'Stop 2.500000000 GHz', 'Res BW 1.0 MHz', and '#VBW 100 Hz'. The plot is also labeled '10 dBdiv Ref 0.00 dBm'. The bottom of the plot shows a table with columns 'Mkr', 'Mkr1', 'Mkr2', 'Mkr3', 'Mkr4', 'Mkr5', 'Mkr6', 'Mkr7', 'Mkr8', 'Mkr9', 'Mkr10', 'Mkr11', 'Mkr12'. The table has 12 rows, with the first row containing the values '2.483 500 0 GHz' and '-64.09 dBm'. The right side of the interface shows a 'Frequency' panel with buttons for 'Auto Tune', 'Center Freq', 'Start Freq', 'Stop Freq', 'CF Step', 'Auto', and 'Freq Offset'.

Vector Spectrum Analyzer Sweep 54

11:38:55 PM Apr 05, 2013

Center Freq 2.491750000 GHz

Trig: Free Run

Avg Type: Log-Pwr

Trace 1: 2.483 500 0 GHz

TYPE: Power

UNIT: dBm

Frequency

Auto Tune

Center Freq 2.491750000 GHz

Start Freq 2.483500000 GHz

Stop Freq 2.500000000 GHz

CF Step 1.000000 MHz

Auto

Freq Offset 0 Hz

10 dBdiv Ref 0.00 dBm

Mkr1 2.483 500 0 GHz -64.09 dBm

Start 2.483500000 GHz

Stop 2.500000000 GHz

Res BW 1.0 MHz

#VBW 100 Hz

Sweep 129 ms (1001 pts)

| Mkr | Mkr1            | Mkr2       | Mkr3 | Mkr4 | Mkr5 | Mkr6 | Mkr7 | Mkr8 | Mkr9 | Mkr10 | Mkr11 | Mkr12 |
|-----|-----------------|------------|------|------|------|------|------|------|------|-------|-------|-------|
| 2   | 2.483 500 0 GHz | -64.09 dBm |      |      |      |      |      |      |      |       |       |       |
| 3   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 4   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 5   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 6   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 7   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 8   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 9   |                 |            |      |      |      |      |      |      |      |       |       |       |
| 10  |                 |            |      |      |      |      |      |      |      |       |       |       |
| 11  |                 |            |      |      |      |      |      |      |      |       |       |       |
| 12  |                 |            |      |      |      |      |      |      |      |       |       |       |

FUNCTION FUNCTION Wdth FUNCTION VALUE

MEAS

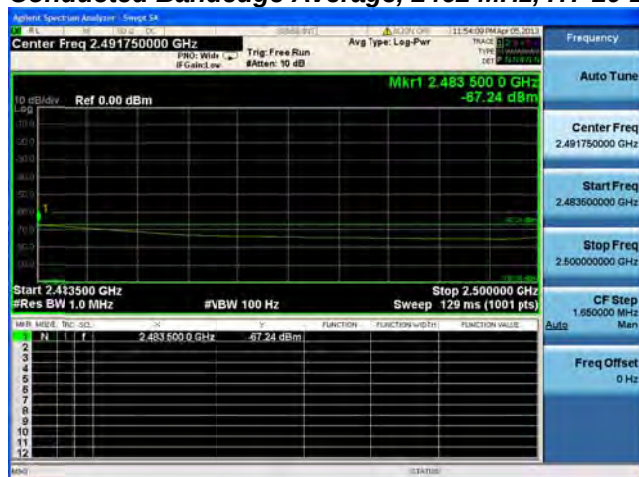
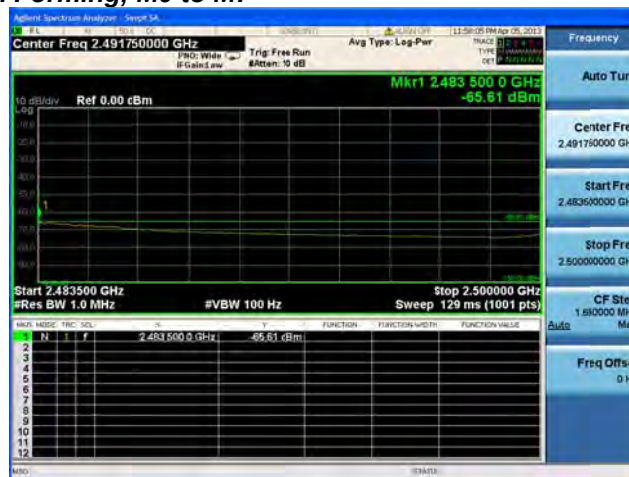
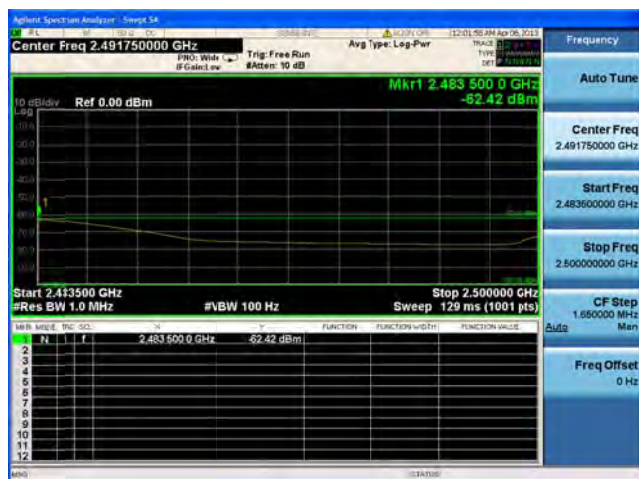
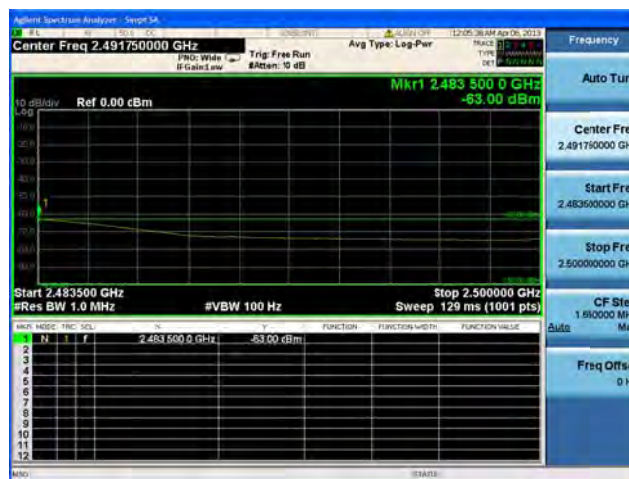
UNIT

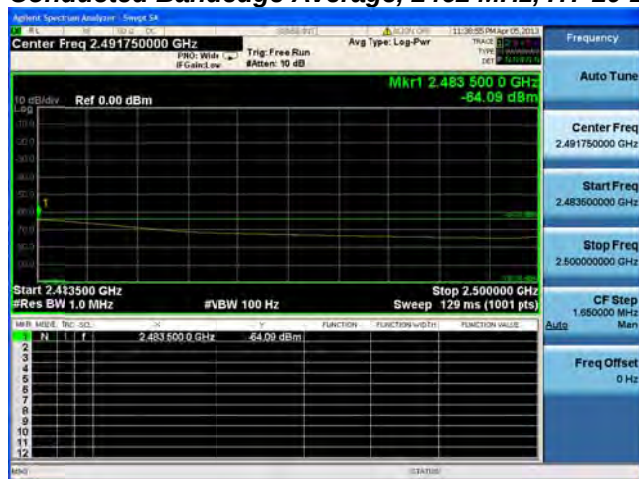
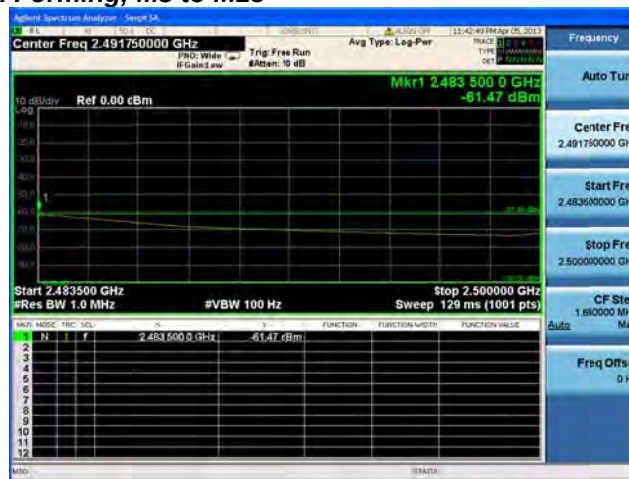
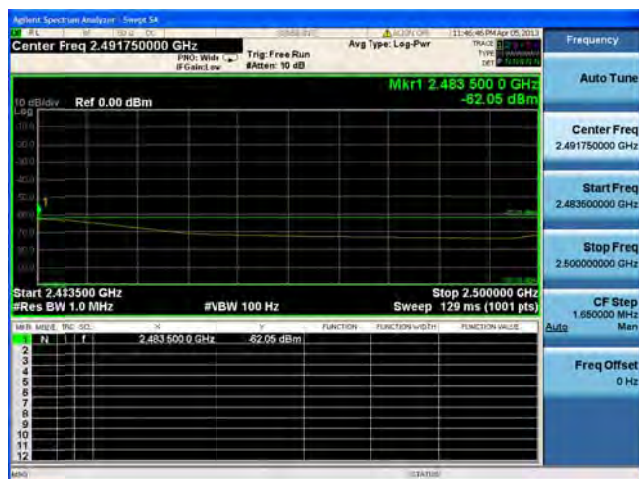
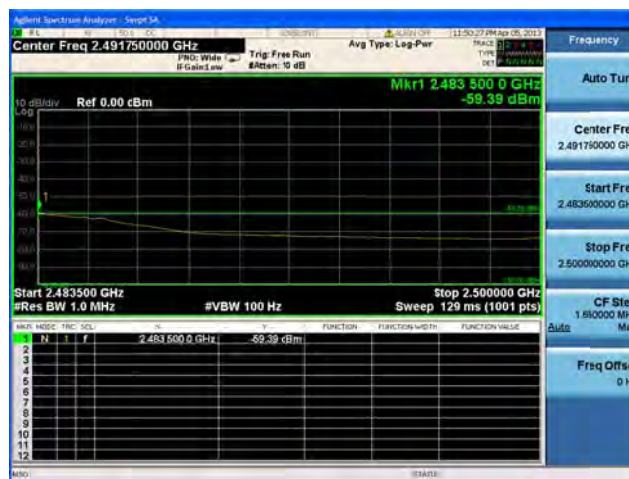
129 ms (1001 pts)

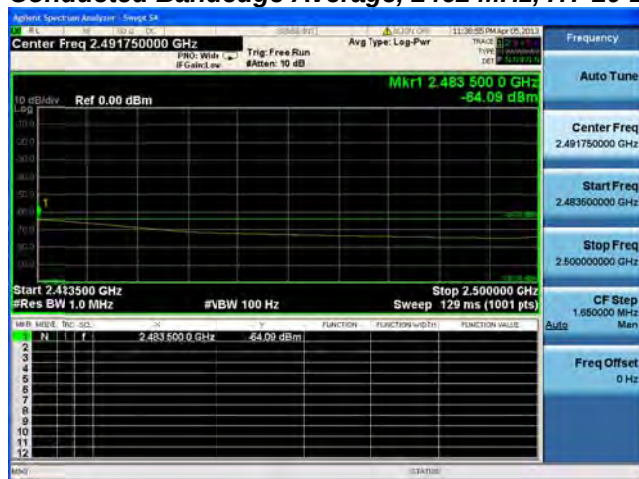
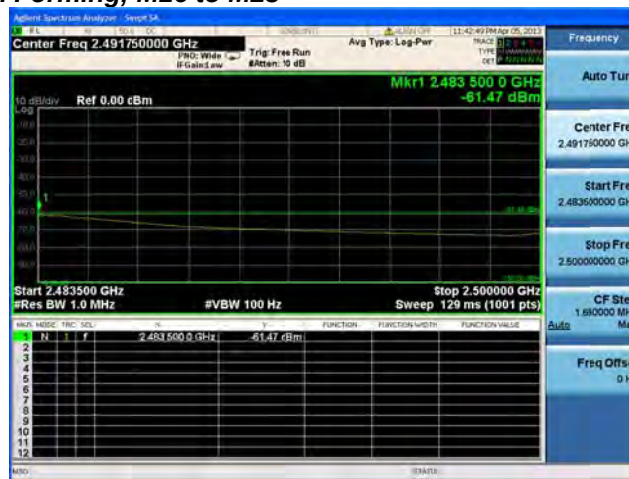
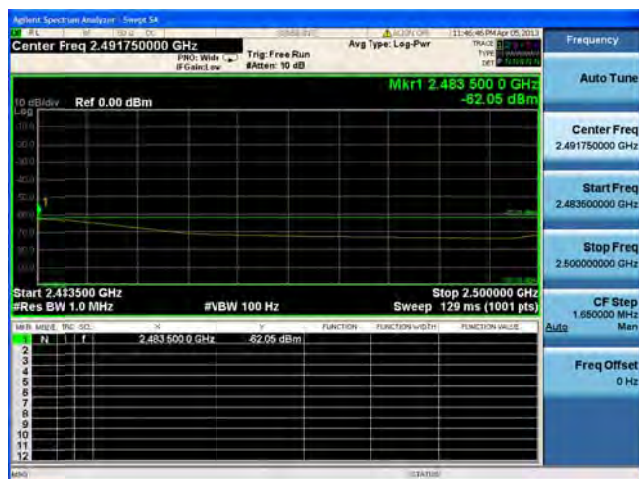
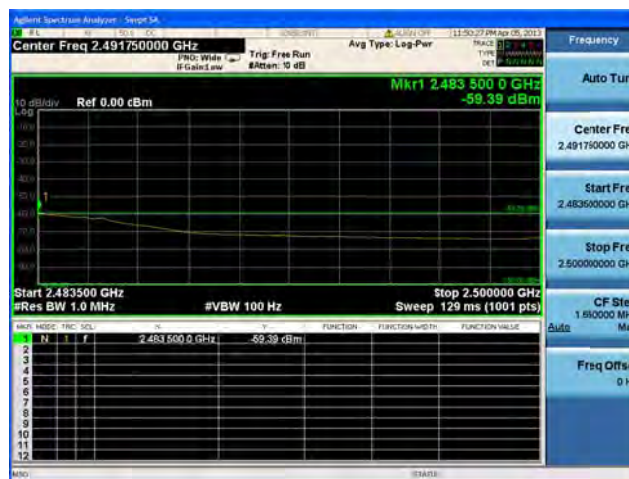
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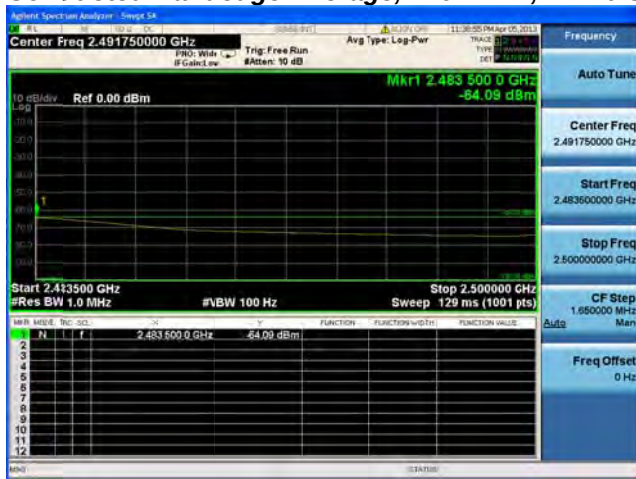
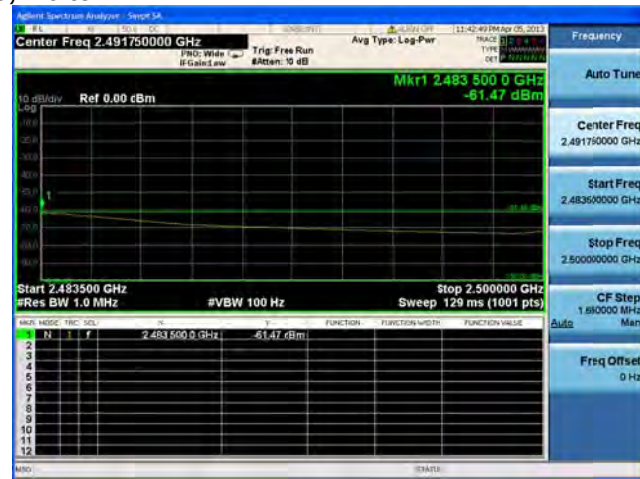
Center Freq 2.491750000 GHz  
 Avg Type: Log-Pwr  
 Mkr1 2.483 500 0 GHz -52.05 dBm  
 Start 2.413500 GHz  
 Res BW 1.0 MHz  
 Sweep 129 ms (1001 pts)  
 Stop 2.500000 GHz

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**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

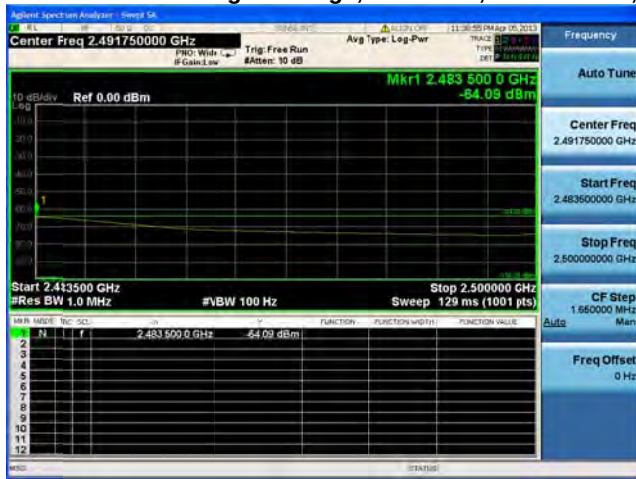
**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Average, 2462 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

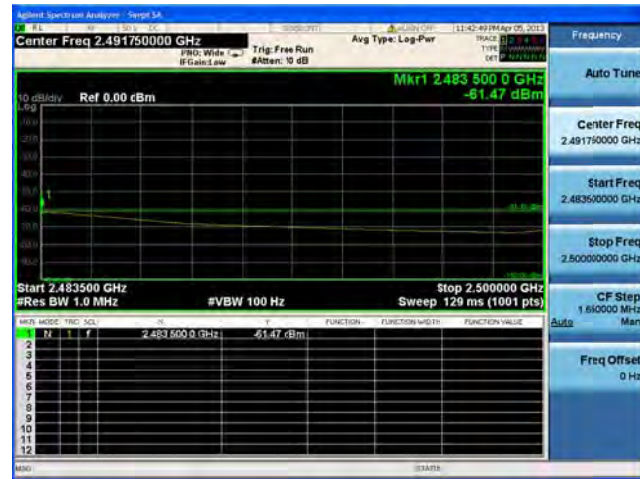
**Conducted Bandedge Average, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**



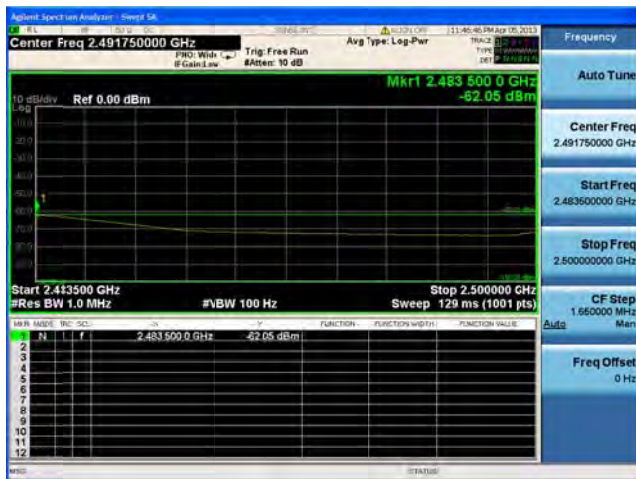
## Conducted Bandedge Average, 2462 MHz, HT-20 STBC, M0 to M7



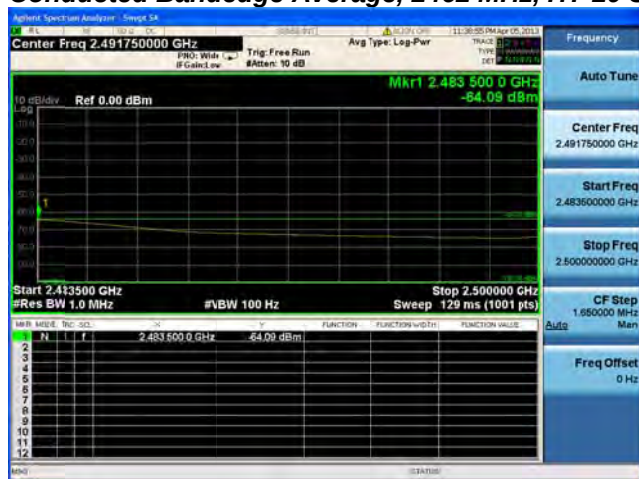
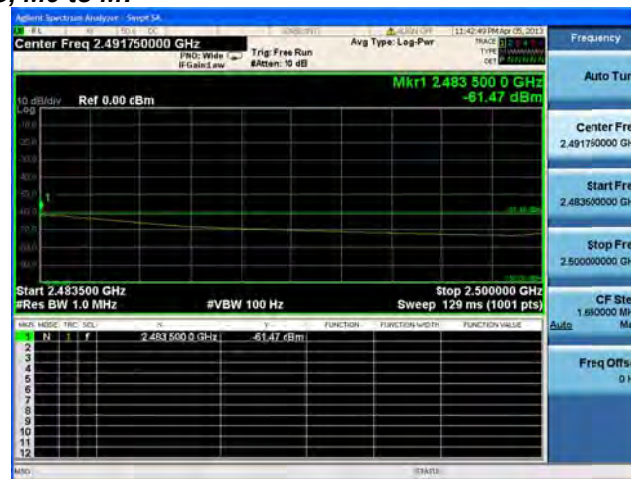
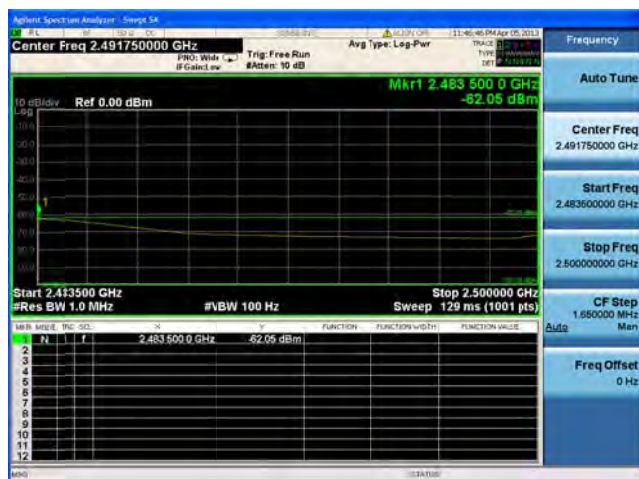
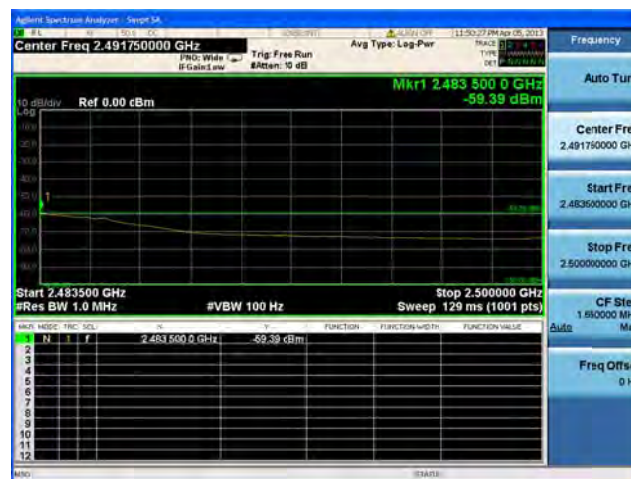
Antenna A

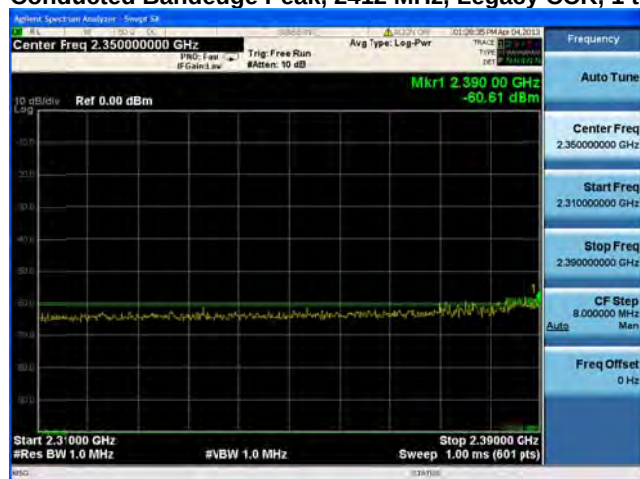


Antenna B

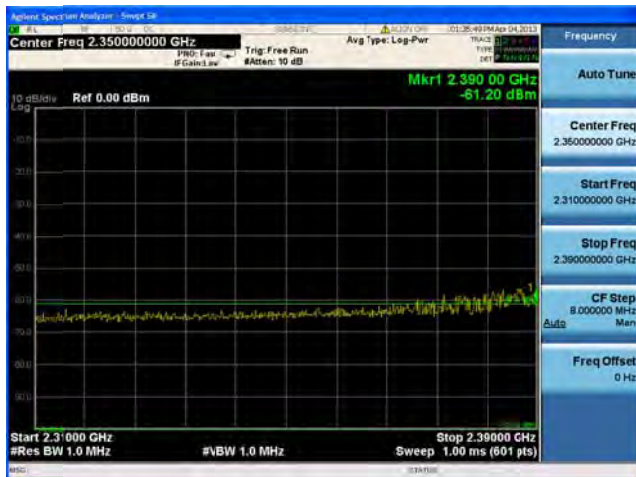


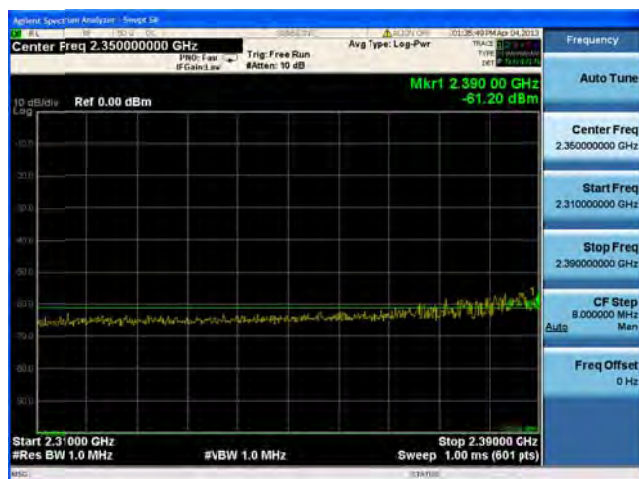
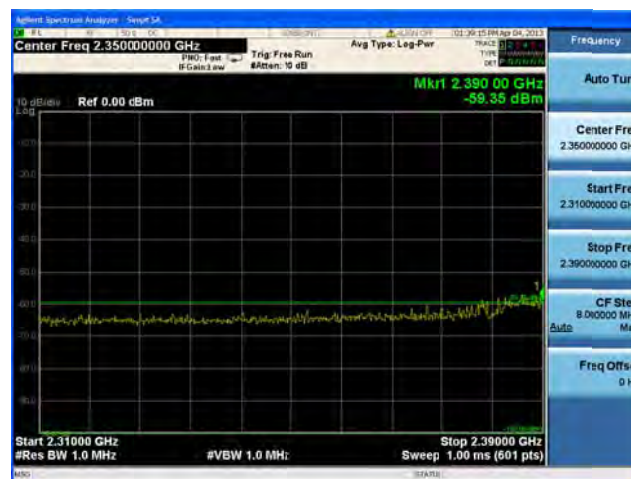
Antenna C

**Conducted Bandedge Average, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

**Conducted Bandedge Peak, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

**Conducted Bandedge Peak, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

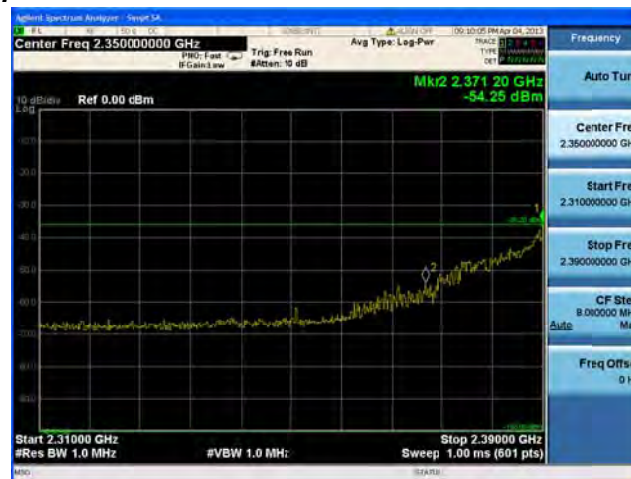
**Conducted Bandedge Peak, 2412 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

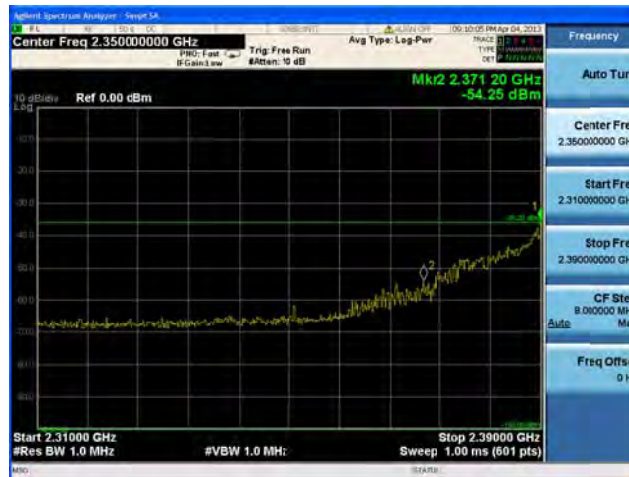
**Conducted Bandedge Peak, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M0 to M7****Antenna A**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C**

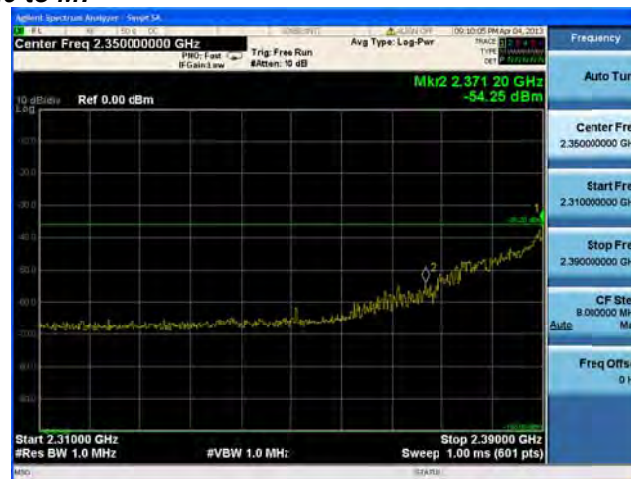
**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

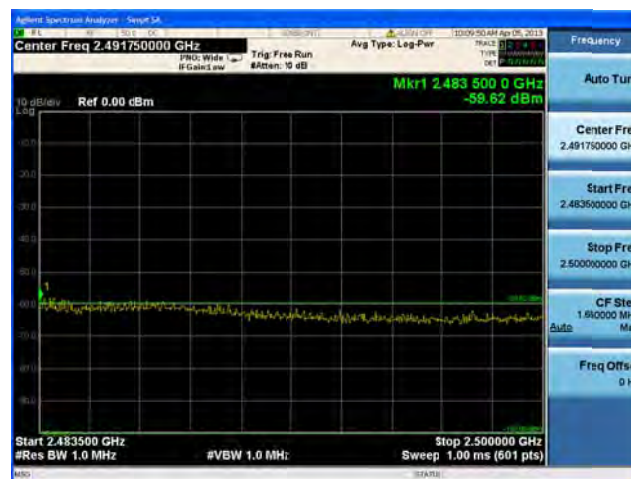
**Conducted Bandedge Peak, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2412 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A**

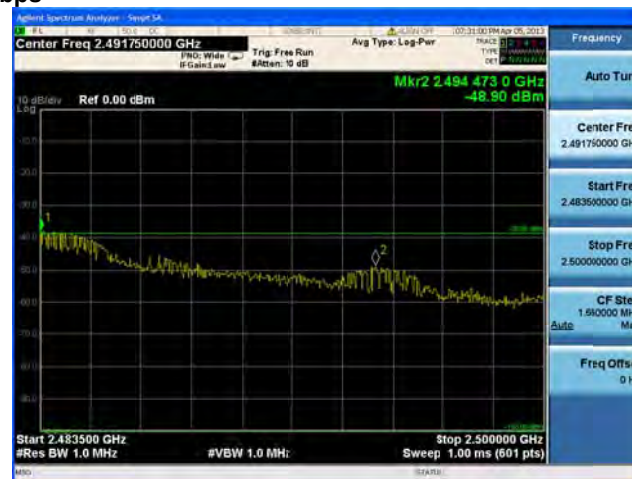
**Conducted Bandedge Peak, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B**

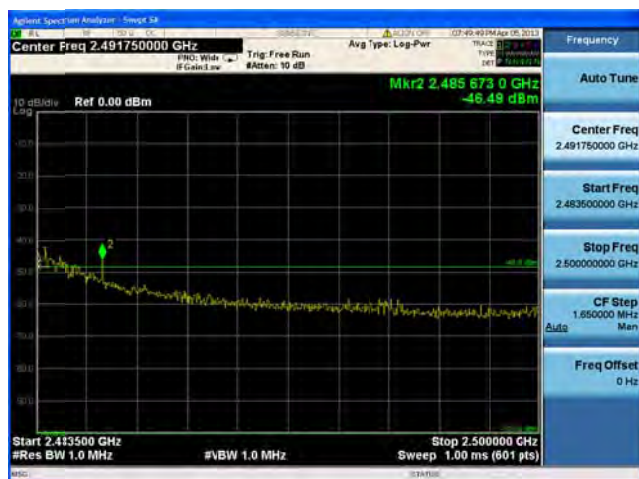
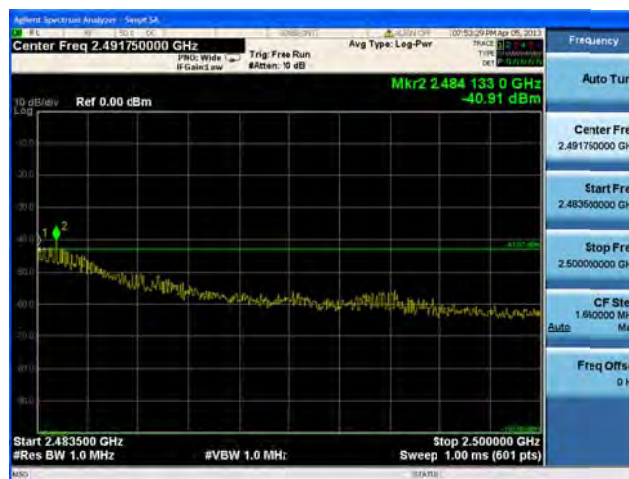
**Conducted Bandedge Peak, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, Legacy CCK, 1 to 11 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

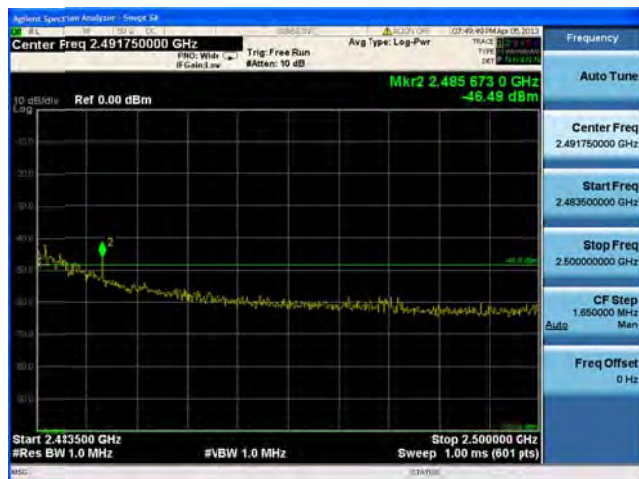
**Conducted Bandedge Peak, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A**

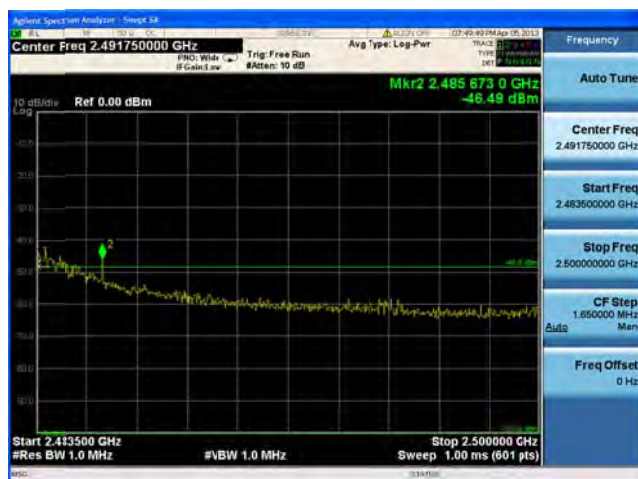
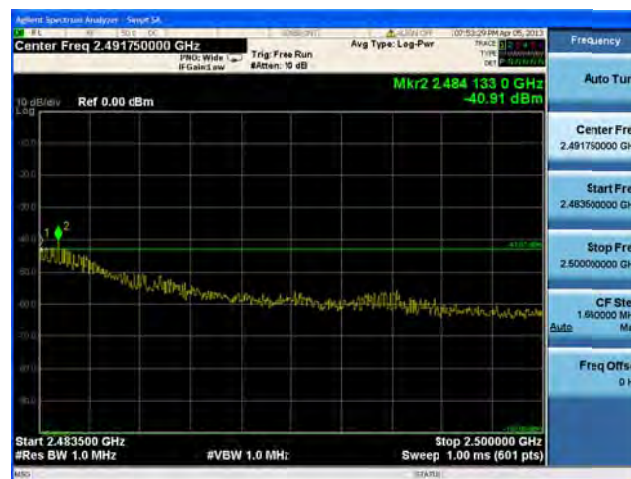
**Conducted Bandedge Peak, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B**

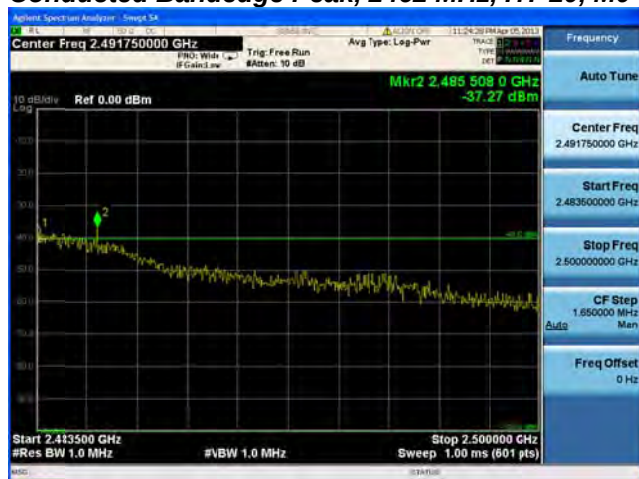
**Conducted Bandedge Peak, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, Non HT-20, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

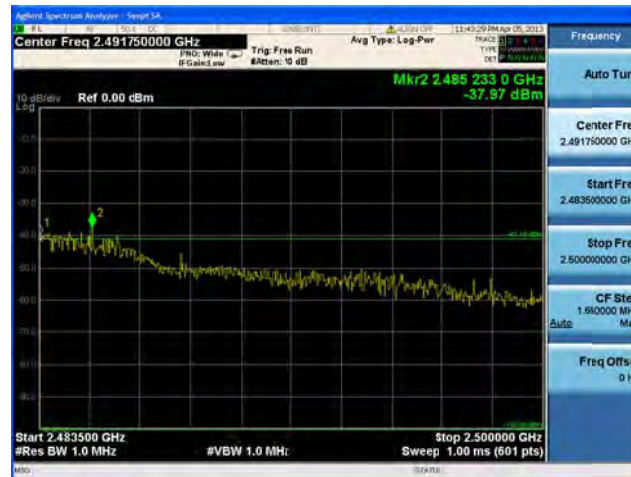
**Conducted Bandedge Peak, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B**

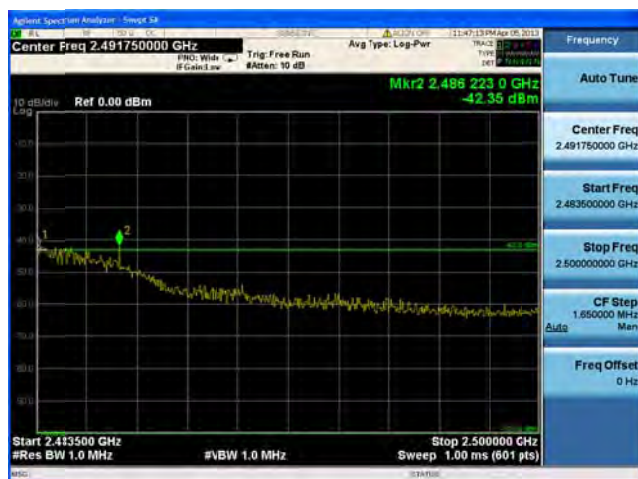
**Conducted Bandedge Peak, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C**

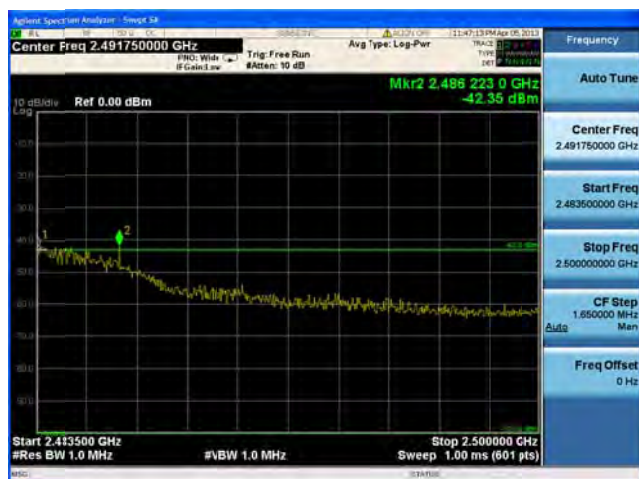
**Conducted Bandedge Peak, 2462 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps****Antenna A****Antenna B****Antenna C****Antenna D**

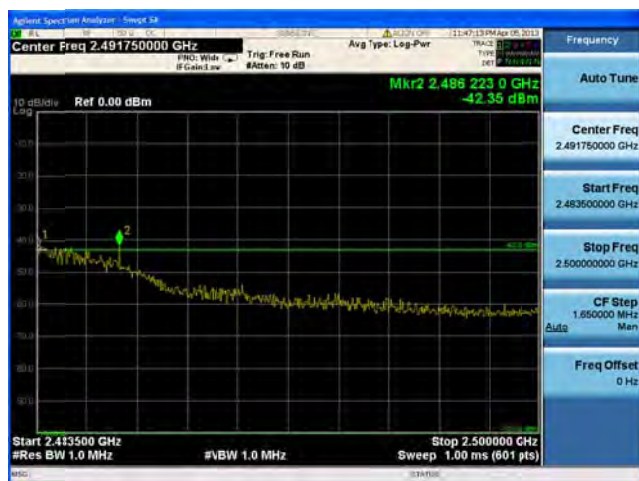
**Conducted Bandedge Peak, 2462 MHz, HT-20, M0 to M7****Antenna A**

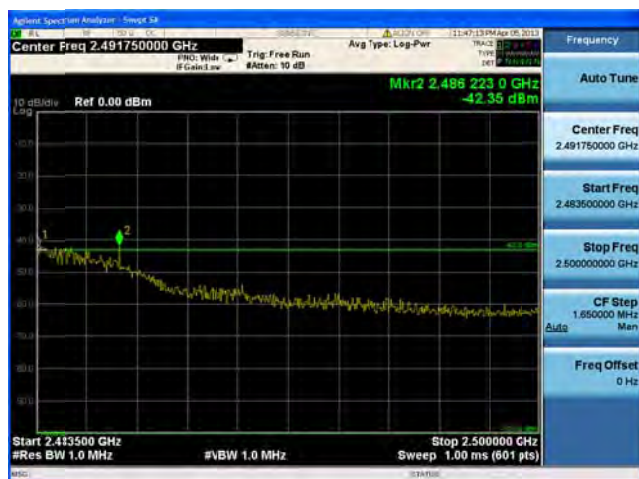
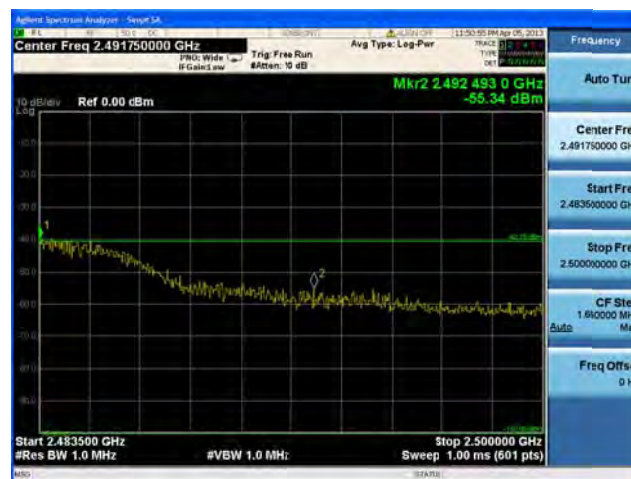
**Conducted Bandedge Peak, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B**

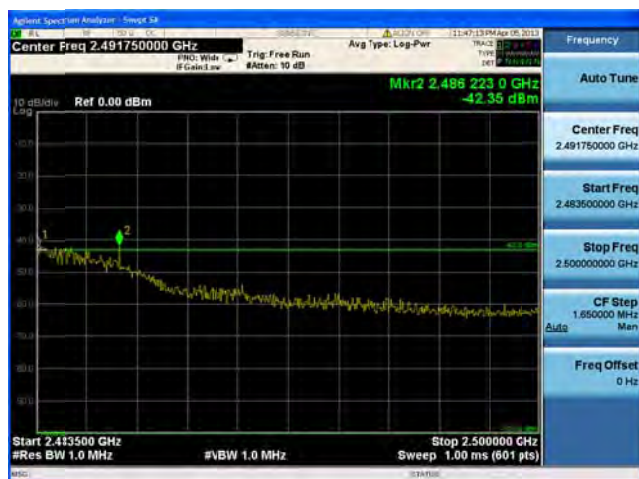
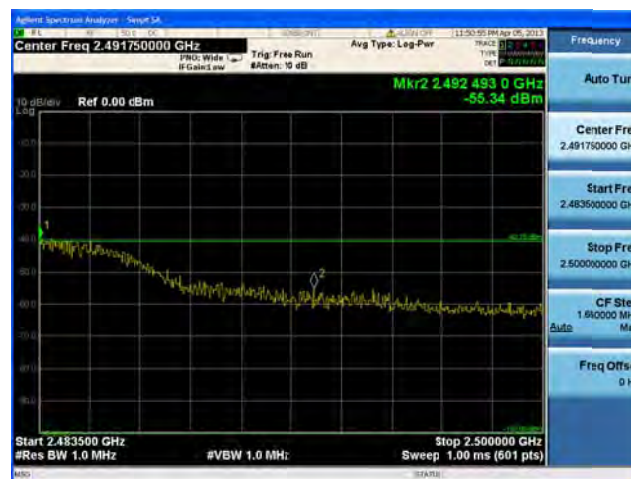
**Conducted Bandedge Peak, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B**

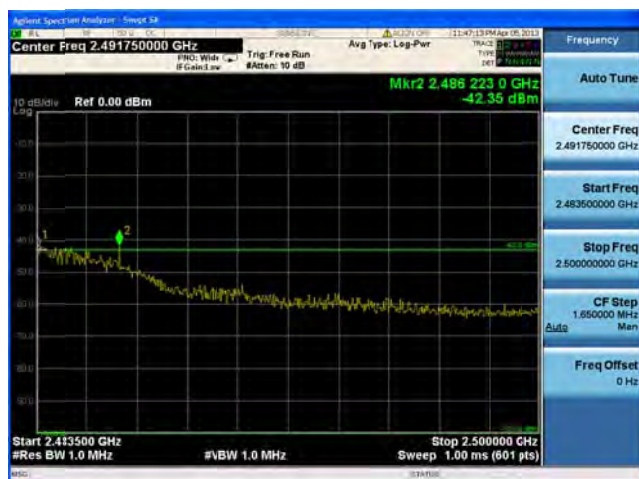
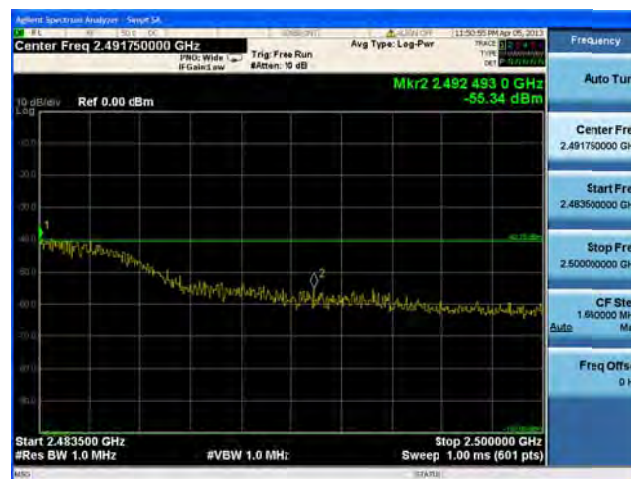
**Conducted Bandedge Peak, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C**

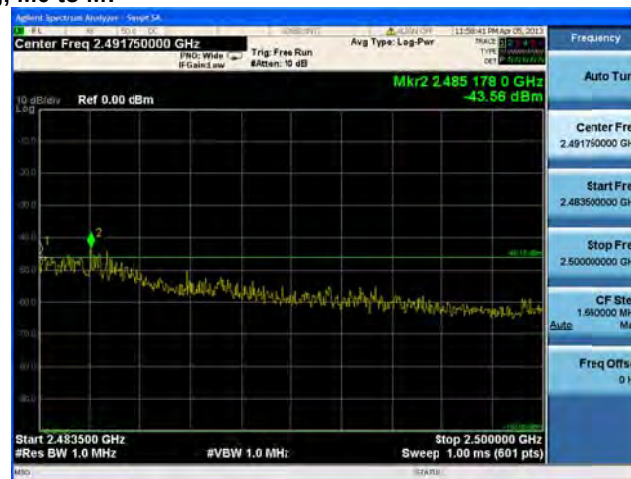
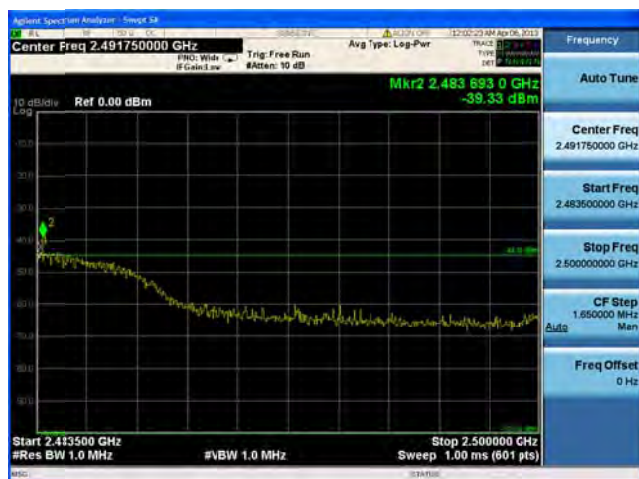
**Conducted Bandedge Peak, 2462 MHz, HT-20, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

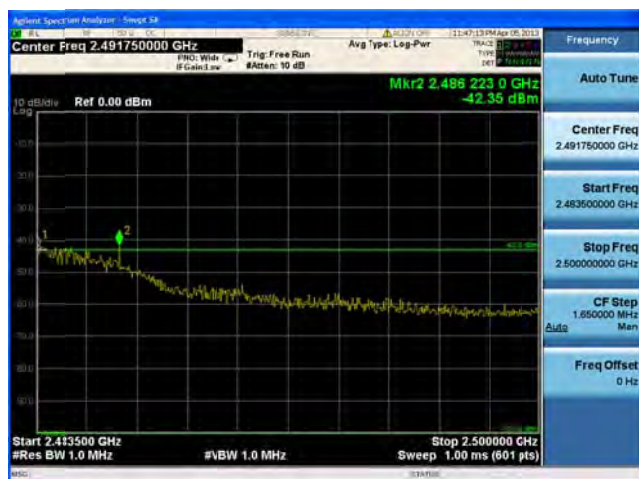
**Conducted Bandedge Peak, 2462 MHz, HT-20, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

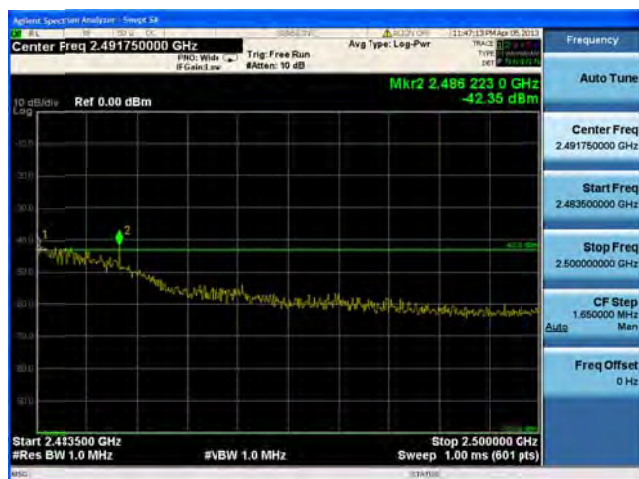
**Conducted Bandedge Peak, 2462 MHz, HT-20, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

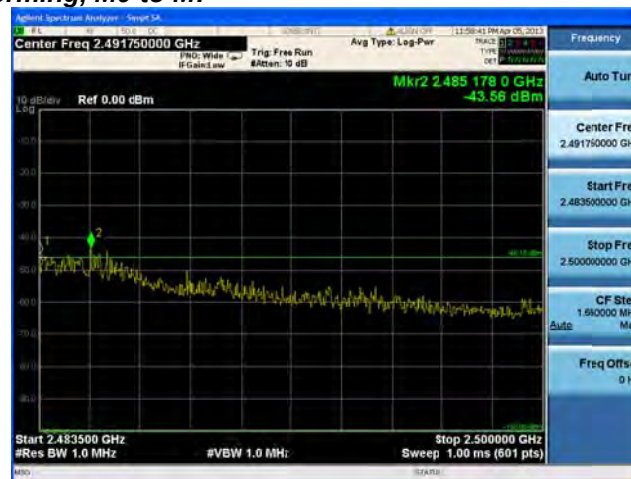
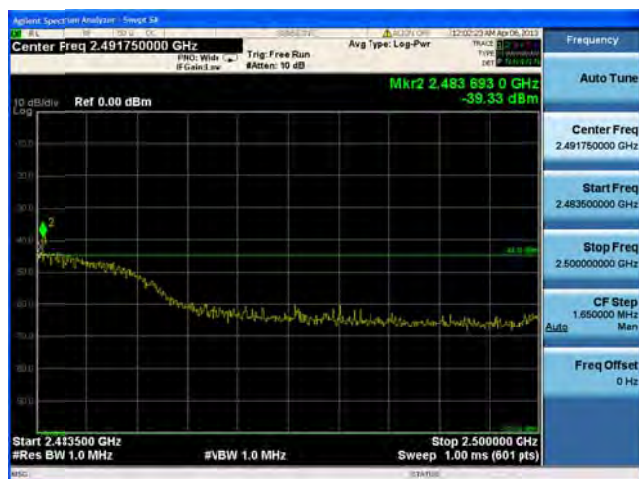
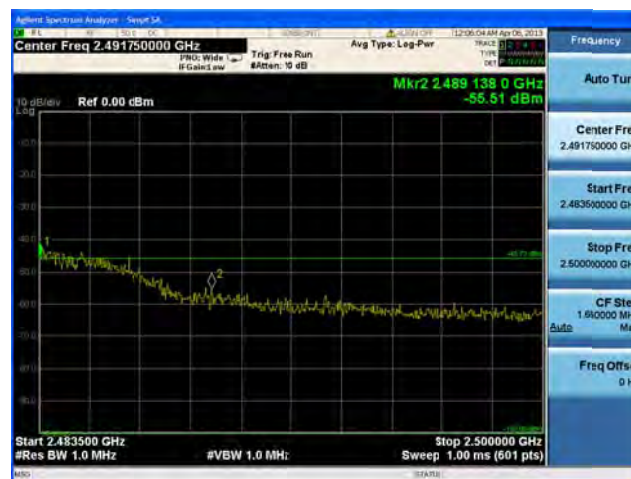
**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B**

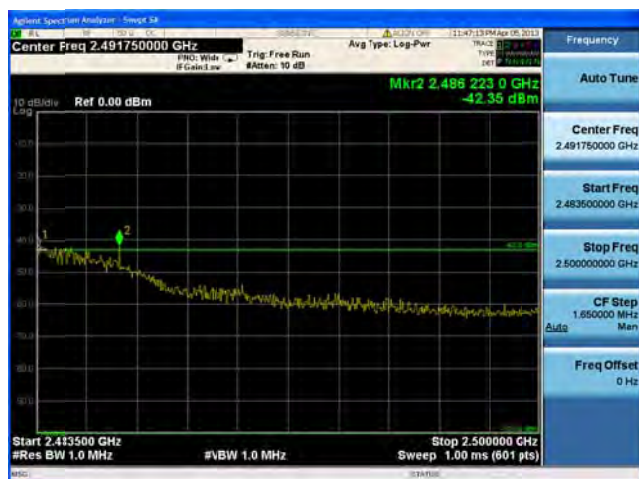
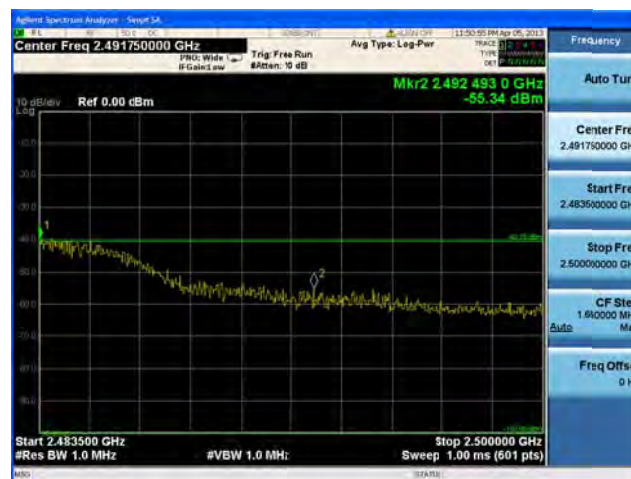
**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B**

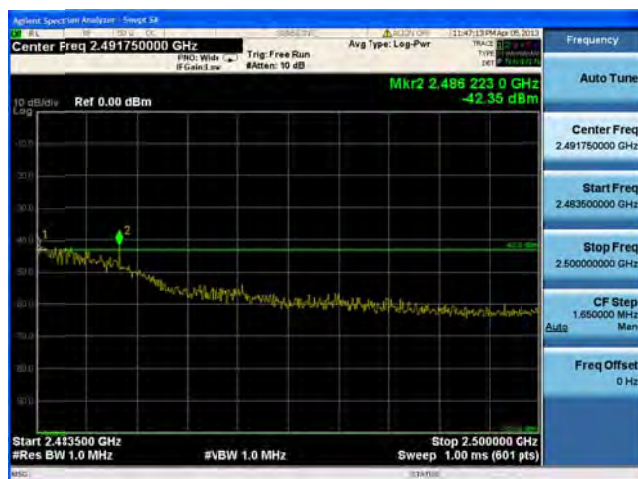
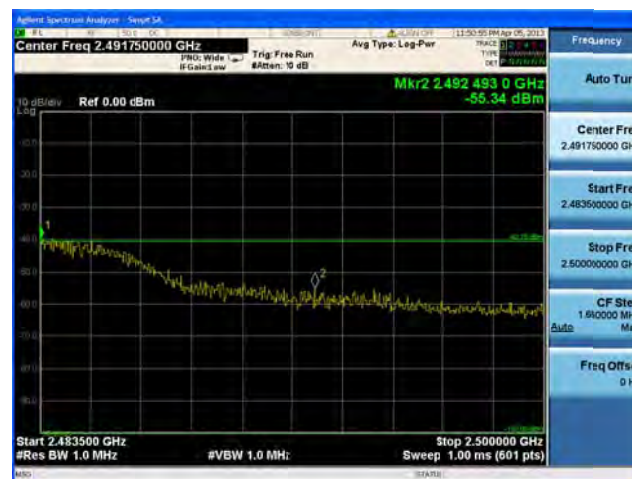
**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C**

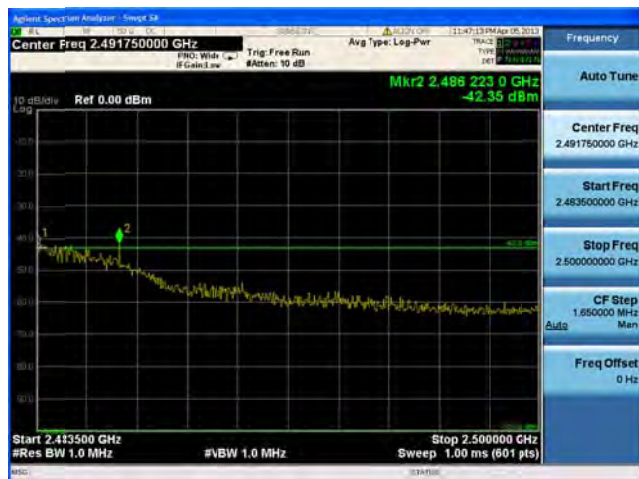
**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C**

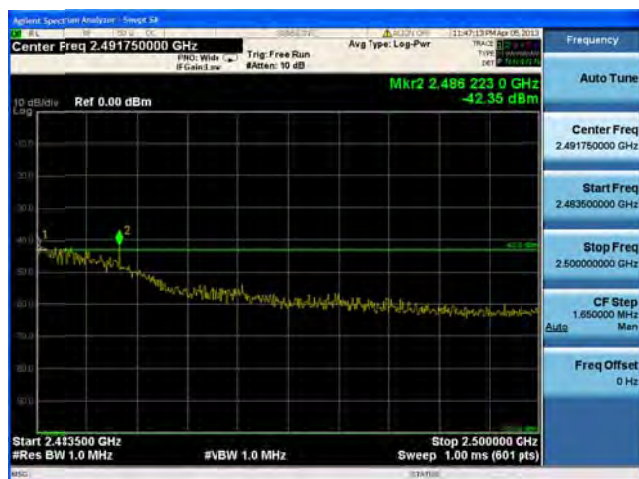
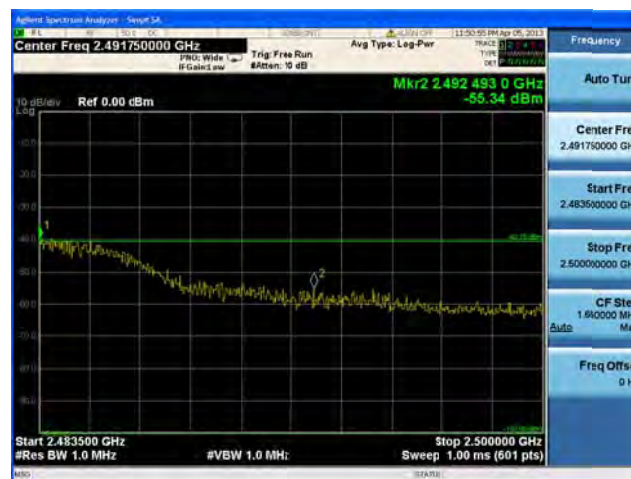
**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M8 to M15****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2462 MHz, HT-20 Beam Forming, M16 to M23****Antenna A****Antenna B****Antenna C****Antenna D**

**Conducted Bandedge Peak, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B**

**Conducted Bandedge Peak, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C**

**Conducted Bandedge Peak, 2462 MHz, HT-20 STBC, M0 to M7****Antenna A****Antenna B****Antenna C****Antenna D**

## Maximum Permissible Exposure (MPE) Calculations

15.247: U-NII devices are subject to the radio frequency radiation exposure requirements specified in Sec. 1.1307(b), Sec. 2.1091 and Sec. 2.1093 of this chapter, as appropriate. All equipment shall be considered to operate in a "general population/uncontrolled" environment. Applications for equipment authorization of devices operating under this section must contain a statement confirming compliance with these requirements for both fundamental emissions and unwanted emissions. Technical information showing the basis for this statement must be submitted to the Commission upon request.

Given

$$E = \sqrt{(30 \cdot P \cdot G)/d} \quad \text{and} \quad S = E^2/3770$$

where

E=Field Strength in Volts/meter

P=Power in Watts

G=Numeric Antenna Gain

d=Distance in meters

S=Power Density in mW/cm<sup>2</sup>

Combine equations and rearrange the terms to express the distance as a function of the remaining variables:

$$d = \sqrt{((30 \cdot P \cdot G)/(3770 \cdot S))}$$

Changing to units of power in mW and distance in cm, using:

$$P(\text{mW}) = P(\text{W})/1000 \quad d(\text{cm}) = 100 \cdot d(\text{m})$$

yields

$$d = 100 \cdot \sqrt{((30 \cdot (P/1000) \cdot G)/(3770 \cdot S))}$$

$$d = 0.282 \cdot \sqrt{(P \cdot G/S)}$$

where

d=Distance in cm

P=Power in mW

G=Numeric Antenna Gain

S=Power Density in mW/cm<sup>2</sup>

Substituting the logarithmic form of power and gain using:

$$P(\text{mW}) = 10^{(P(\text{dBm})/10)} \quad G(\text{numeric}) = 10^{(G(\text{dBi})/10)}$$

yields

$$d = 0.282 \cdot 10^{((P+G)/20)} / \sqrt{S} \quad \text{Equation (1)}$$

and

$$S = ((0.282 \cdot 10^{((P+G)/20)})/d)^2 \quad \text{Equation (2)}$$

where

d=MPE distance in cm

P=Power in dBm

G=Antenna Gain in dBi

S=Power Density in mW/cm<sup>2</sup>



Equation (1) and the measured peak power are used to calculate the MPE distance. Note that for mobile or fixed location transmitters such as an access point, the minimum separation distance is 20 cm even if the calculations indicate that the MPE distance may be less.

$S=1\text{mW/cm}^2$  maximum. The highest supported antenna gain is 13 dBi (16dBi with beamforming). Using the peak power levels recorded in the test report along with Equation 1 above, the MPE distances are calculated as follows.

| Frequency (GHz) | Power Density (mW/cm <sup>2</sup> ) | Peak Transmit Power (dBm) | Antenna Gain (dBi) | MPE Distance (cm) | Limit (cm) | Margin (cm) |
|-----------------|-------------------------------------|---------------------------|--------------------|-------------------|------------|-------------|
| 2.4             | 1                                   | 21.1                      | 16                 | 20.20             | 20         | -0.20       |

#### MPE Calculations

To maintain compliance, installations will assure a separation distance of at least 20cm. Installations utilizing antennas with gain greater than 10 dBi will assure a separation distance of at least 21 cm

Using Equation 2, the MPE levels (s) at 20 cm are calculated as follows:

| Frequency (GHz) | MPE Distance (cm) | Peak Transmit Power (dBm) | Antenna Gain (dBi) | Power Density (mW/cm <sup>2</sup> ) | Limit (mW/cm <sup>2</sup> ) | Margin (mW/cm <sup>2</sup> ) |
|-----------------|-------------------|---------------------------|--------------------|-------------------------------------|-----------------------------|------------------------------|
| 2.4             | 20                | 21.1                      | 16                 | 1.02                                | 1                           | -0.02                        |



## **Appendix C: Test Equipment/Software Used to perform the test**

| <b>Equip #</b> | <b>Manufacturer</b> | <b>Model</b> | <b>Description</b> | <b>Last Cal</b> | <b>Next Due</b> |
|----------------|---------------------|--------------|--------------------|-----------------|-----------------|
| CIS049381      | Agilent             | N9030A       | Spectrum Analyzer  | 28-Aug-12       | 28-Aug-13       |