# Test Report

# AIR-CAP2602y-B-K9
# AIR-SAP2602y-B-K9
# AIR-AP2602y-UXK9

## Cisco Aironet 802.11n Dual Band Access Points
**FCC ID: LDK102080**

y = E (External Antenna) or I (Internal Antenna)

## 5150-5250 MHz

**Against the following Specifications:**

**CFR47 Part 15.407**

**Cisco Systems**
170 West Tasman Drive
San Jose, CA 95134

| | |
|---|---|
| | |
| **Author:** Jose Aguirre<br>**Tested By** | **Approved By:** Jim Nicolson<br>**Title:** Technical Leader, Engineering<br>**Revision:** 2 |

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## Section 1: Overview

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

| **Specifications:** |
| --- |
| CFR47 Part 15.407 |

Measurements were made in accordance with

- ANSI C63.10:2013
- KDB 789033 D02 General UNII Test Procedures New Rules v01
- KDB 662911 D01 Multiple Transmitter Output



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## 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*% |

e) All AC testing was performed at one or more of the following supply voltages:
110V 60 Hz (+/-20%)

### Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m



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Measurement Uncertainty Values

| | |
|---|---|
| voltage and power measurements | ± 2 dB |
| conducted EIRP measurements | ± 1.4 dB |
| radiated measurements | ± 3.2 dB |
| frequency measurements | ± 2.4 10-7 |
| temperature measurements | ± 0.54º |
| humidity measurements | ± 2.3% |
| DC and low frequency measurements | ± 2.5% |

Where relevant measurement uncertainty levels have been estimated for tests performed on the apparatus. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Radiated emissions (expanded uncertainty, confidence interval 95%)

| | |
|---|---|
| 30 MHz - 300 MHz | +/- 3.8 dB |
| 300 MHz - 1000 MHz | +/- 4.3 dB |
| 1 GHz - 10 GHz | +/- 4.0 dB |
| 10 GHz - 18GHz | +/- 8.2 dB |
| 18GHz - 26.5GHz | +/- 4.1 dB |
| 26.5GHz - 40GHz | +/- 3.9 dB |

Conducted emissions (expanded uncertainty, confidence interval 95%)

| | |
|---|---|
| 30 MHz – 40GHz | +/- 0.38 dB |

A product is considered to comply with a requirement if the nominal measured value is below the limit line. The product is considered to not be in compliance in case the nominal measured value is above the limit line.

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**2.2 Date of testing**

08-Aug-15 - 10-Oct-15

**2.3 Report Issue Date**

29-October-2015

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**2.4 Testing facilities**

This assessment was performed by:

**Testing Laboratory**

Cisco Systems, Inc.,
125 West Tasman Drive
San Jose, CA 95134, USA

**Registration Numbers for Industry Canada**

| Cisco System Site | Address | Site Identifier |
|---|---|---|
| Building P, 10m Chamber | 125 West Tasman Dr<br>San Jose, CA 95134 | Company #: 2461N-2 |
| Building P, 5m Chamber | 125 West Tasman Dr<br>San Jose, CA 95134 | Company #: 2461N-1 |
| Building I, 5m Chamber | 285 W. Tasman Drive<br>San Jose, California 95134 | Company #: 2461M-1 |

**Test Engineers**

Jose Aguirre

**2.5 Equipment Assessed (EUT)**

AIR-CAP2602E-B-K9



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### 2.6 EUT Description

The 2600 Cisco Aironet 802.11N Radio supports 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.

802.11n - Non HT-20, One Antenna, 6 to 54 Mbps
802.11n - Non HT-20, Two Antennas, 6 to 54 Mbps
802.11n - Non HT-20, Three Antennas, 6 to 54 Mbps
802.11n - Non HT-20, Four Antennas, 6 to 54 Mbps

802.11n - Non HT-20 Beam Forming, Two Antennas, 6 to 54 Mbps
802.11n - Non HT-20 Beam Forming, Three Antennas, 6 to 54 Mbps
802.11n - Non HT-20 Beam Forming, Four Antennas, 6 to 54 Mbps

802.11n - HT-20, One Antenna, M0 to M7
802.11n - HT-20, Two Antennas, M0 to M7
802.11n - HT-20, Two Antennas, M8 to M15
802.11n - HT-20, Three Antennas, M0 to M7
802.11n - HT-20, Three Antennas, M8 to M15
802.11n - HT-20, Three Antennas, M16 to M23
802.11n - HT-20, Four Antennas, M0 to M7
802.11n - HT-20, Four Antennas, M8 to M15
802.11n - HT-20, Four Antennas, M16 to M23

802.11n - HT-20 Beam Forming, Two Antennas, M0 to M7
802.11n - HT-20 Beam Forming, Two Antennas, M8 to M15
802.11n - HT-20 Beam Forming, Three Antennas, M0 to M7
802.11n - HT-20 Beam Forming, Three Antennas, M8 to M15
802.11n - HT-20 Beam Forming, Three Antennas, M16 to M23
802.11n - HT-20 Beam Forming, Four Antennas, M0 to M7
802.11n - HT-20 Beam Forming, Four Antennas, M8 to M15
802.11n - HT-20 Beam Forming, Four Antennas, M16 to M23

802.11n - HT-20 STBC, Two Antennas, M0 to M7
802.11n - HT-20 STBC, Three Antennas, M0 to M7
802.11n - HT-20 STBC, Four Antennas, M0 to M7

802.11n - Non HT-40 Duplicate, One Antenna, 6 to 54 Mbps
802.11n - Non HT-40 Duplicate, Two Antennas, 6 to 54 Mbps
802.11n - Non HT-40 Duplicate, Three Antennas, 6 to 54 Mbps
802.11n - Non HT-40 Duplicate, Four Antennas, 6 to 54 Mbps

802.11n - HT-40, One Antenna, M0 to M7
802.11n - HT-40, Two Antennas, M0 to M7
802.11n - HT-40, Two Antennas, M8 to M15
802.11n - HT-40, Three Antennas, M0 to M7
802.11n - HT-40, Three Antennas, M8 to M15
802.11n - HT-40, Three Antennas, M16 to M23
802.11n - HT-40, Four Antennas, M0 to M7
802.11n - HT-40, Four Antennas, M8 to M15
802.11n - HT-40, Four Antennas, M16 to M23

802.11n - HT-40 Beam Forming, Two Antennas, M0 to M7
802.11n - HT-40 Beam Forming, Two Antennas, M8 to M15
802.11n - HT-40 Beam Forming, Three Antennas, M0 to M7
802.11n - HT-40 Beam Forming, Three Antennas, M8 to M15
802.11n - HT-40 Beam Forming, Three Antennas, M16 to M23
802.11n - HT-40 Beam Forming, Four Antennas, M0 to M7
802.11n - HT-40 Beam Forming, Four Antennas, M8 to M15
802.11n - HT-40 Beam Forming, Four Antennas, M16 to M23



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802.11n - HT-40 STBC, Two Antennas, M0 to M7
802.11n - HT-40 STBC, Three Antennas, M0 to M7
802.11n - HT-40 STBC, Four Antennas, M0 to M7

The following antennas are supported by this product series.
The data included in this report represent the worst case data for all antennas.

| Frequency | Part Number | Antenna Type | Antenna Gain (dBi) |
|---|---|---|---|
| 2.4/5 GHz | 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 |
| | Internal | Omni-Directional | 4 / 4 |
| | AIR-ANT2544V4M-R | Dual-resonant omni (4-pack) | 4 / 4 |
| | AIR-ANT2566P4W-R | Dual-resonant "directional" antenna (4-pack) | 6 / 6 |



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## Section 3: Result Summary

### 3.1 Results Summary Table

**Conducted emissions**

| Basic Standard | Technical Requirements / Details | Result |
|---|---|---|
| FCC 15.407 | **99% & 26 dB Bandwidth:**<br>The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. There is no limit for 99% OBW.<br><br>The 26 dB emission is the width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission. | Pass |
| FCC 15.407 | **Output Power:**<br>**15.407:**<br>(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. 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. | Pass |
| FCC 15.407 | **Power Spectral Density:**<br>**15.407** The maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. | Pass |
| FCC 15.407 | **Conducted Spurious Emissions / Band-Edge:**<br>For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.25 GHz band shall not exceed an EIRP of -27dBm/MHz. | Pass |
| FCC 15.407<br>FCC 15.209<br>FCC 152.05 | **Restricted band:**<br>Unwanted emissions falling within the restricted bands, as defined in FCC 15.205 (a) must also comply with the radiated emission limits specified in FCC 15.209 (a). | Pass |



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**Radiated Emissions (General requirements)**

| Basic Standard | Technical Requirements / Details | Result |
|---|---|---|
| FCC 15.209<br>FCC 15.205 | **TX Spurious Emissions:**<br>Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the filed strength limits table in this section. | Pass |
| FCC 15.207 | **AC conducted Emissions:**<br>Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries. | Pass |

***** MPE calculation is recorded in a separate report



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## 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.

### 4.1 Sample Details

| Sample No. | Equipment Details | Manufacturer | Hardware Rev. | Firmware Rev. | Software Rev. | Serial Number |
|---|---|---|---|---|---|---|
| S01 | AIR-CAP2602E-B-K9 | Cisco Systems | P2 | AP3g2-K9-M X.153 | Cisco IOS 15.3 | FTX1911S1A7 |
| S02* | AIR-PWR-C | Meanwell | A0 | NA | NA | EB46E93226 |

(*) S02 are support equipment Power supplies for EUT S01

### 4.2 System Details

| System # | Description | Samples |
|---|---|---|
| 1 | AIR-CAP2602E-B-K9 | S01 |
| 2 | support equipment Power supplies | S02 |

### 4.3 Mode of Operation Details

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

All measurements were made in accordance with

- ANSI C63.10:2013
- KDB 789033 D02 General UNII Test Procedures New Rules v01
- KDB 662911 D01 Multiple Transmitter Output



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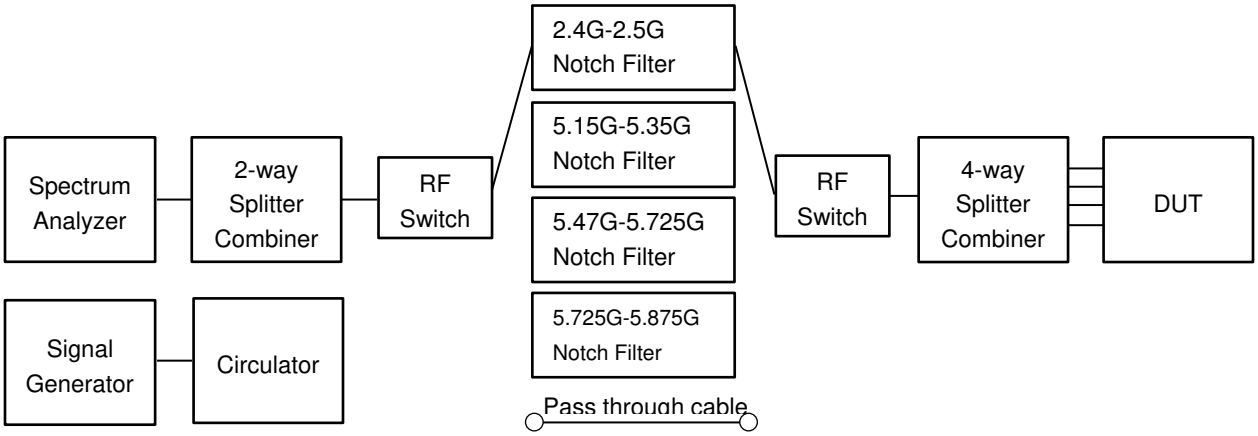
**Appendix A: Emission Test Results**

## Conducted Test Setup Diagram




## Target Maximum Channel Power

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

| | Maximum Channel Power (dBm) | |
|---|---|---|
| | Frequency (MHz) | |
| Operating Mode | 5180 | 5240 |
| Non HT-20, 6 to 54 Mbps | 17 | 22 |
| Non HT-20 Beam Forming, 6 to 54 Mbps | 14 | 22 |
| HT-20, M0 to M23, M0 to M9 1-0ss | 17 | 22 |
| HT-20 Beam Forming, M0 to M23, M0 to M9 1-0ss | 17 | 22 |
| HT-20 STBC, M0 to M7 | 17 | 22 |
| | 5190 | 5230 |
| Non HT-40, 6 to 54 Mbps | 13 | 21 |
| HT-40, M0 to M23, M0 to M9 1-0ss | 11 | 21 |
| HT-40 Beam Forming, M0 to M23, M0 to M9 1-0ss | 11 | 21 |
| HT-40 STBC, M0 to M7 | 11 | 21 |



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# A.1 99% and 26dB Bandwidth

**FCC 15.407** The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. There is no limit for 99% OBW.

The 26 dB emission is the width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.

## Test Procedure

**Ref.** ANSI C63.10: 2013 Section 6.9.3

| **99% BW and EBW (-26dB)**<br>Test Procedure |
|---|
| 1. Set the radio in the continuous transmitting mode.<br>2. Allow the trace to stabilize.<br>3. Setting the x-dB bandwidth mode to -26dB and OBW power function to 99% within the measurement set up function.<br>4. Select the automatic OBW measurement function of an instrument to perform bandwidth measurement.<br>5. Capture graphs and record pertinent measurement data. |

**Ref.** ANSI C63.10: 2013 Section 6.9.3

| **99% BW and EBW (-26dB)**<br>Test parameters |
|---|
| Span = 1.5 x to 5.0 times OBW<br>RBW = approx. 1% to 5% of the OBW<br>VBW ≥ 3 x RBW<br>Detector = Peak or where practical sample shall be used<br>Trace = Max. Hold |

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| **Tested By :**<br>Jose Aguirre | **Date of testing:**<br>08-Aug-15 - 10-Oct-15 |
|---|---|
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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| Frequency (MHz) | Mode | Data Rate (Mbps) | 26dB BW (MHz) | 99% BW (MHz) |
|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 6 | 21.8 | 18.8 |
| | HT-20, M0 to M23, M0 to M9 1-0ss | m0 | 21.6 | 18.7 |
| | | | | |
| 5190 | Non HT-40, 6 to 54 Mbps | 6 | 44.8 | 38.0 |
| | HT-40, M0 to M23, M0 to M9 1-0ss | m0 | 42.2 | 37.5 |
| | | | | |
| 5230 | Non HT-40, 6 to 54 Mbps | 6 | 76.9 | 44.5 |
| | HT-40, M0 to M23, M0 to M9 1-0ss | m0 | 72.8 | 38.2 |
| | | | | |
| 5240 | Non HT-20, 6 to 54 Mbps | 6 | 38.3 | 19.3 |
| | HT-20, M0 to M23, M0 to M9 1-0ss | m0 | 40.0 | 20.0 |



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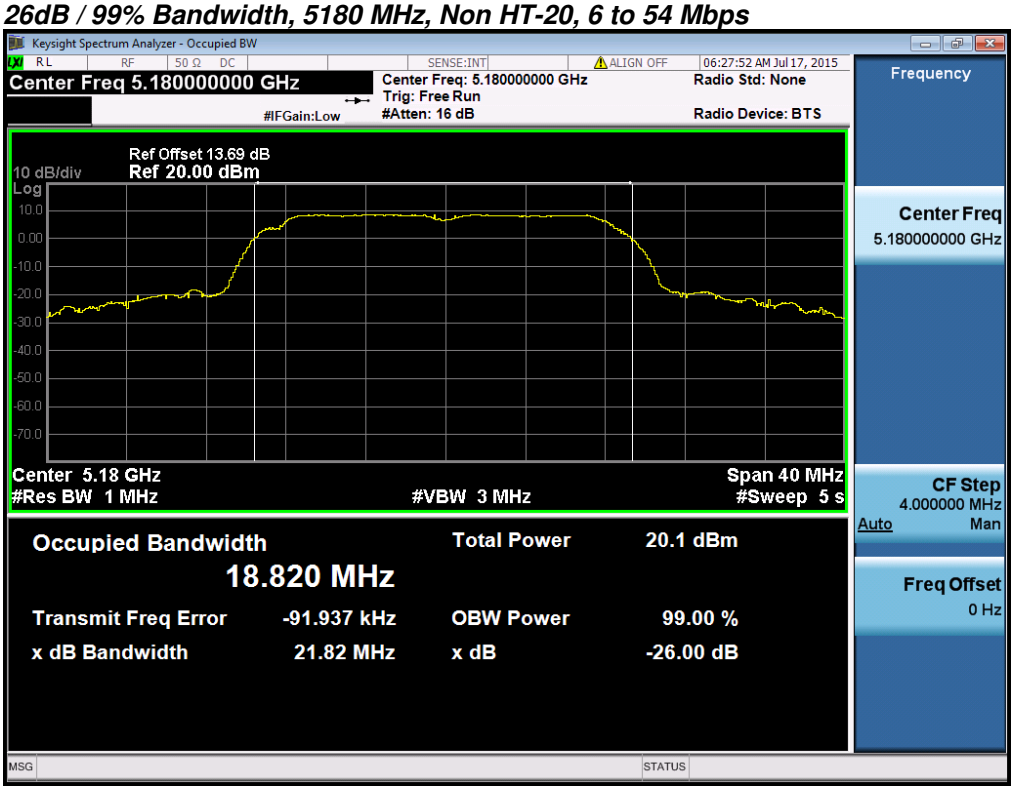
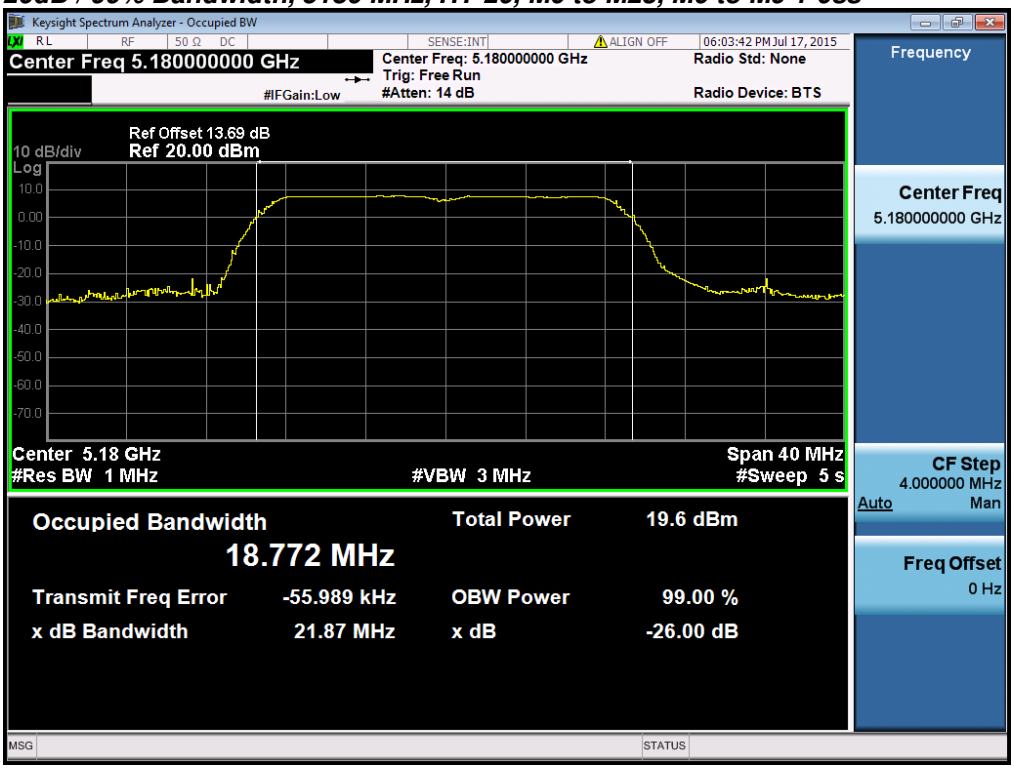
***26dB / 99% Bandwidth, 5180 MHz, Non HT-20, 6 to 54 Mbps***




***26dB / 99% Bandwidth, 5180 MHz, HT-20, M0 to M23, M0 to M9 1-0ss***




***26dB / 99% Bandwidth, 5190 MHz, Non HT-40, 6 to 54 Mbps***



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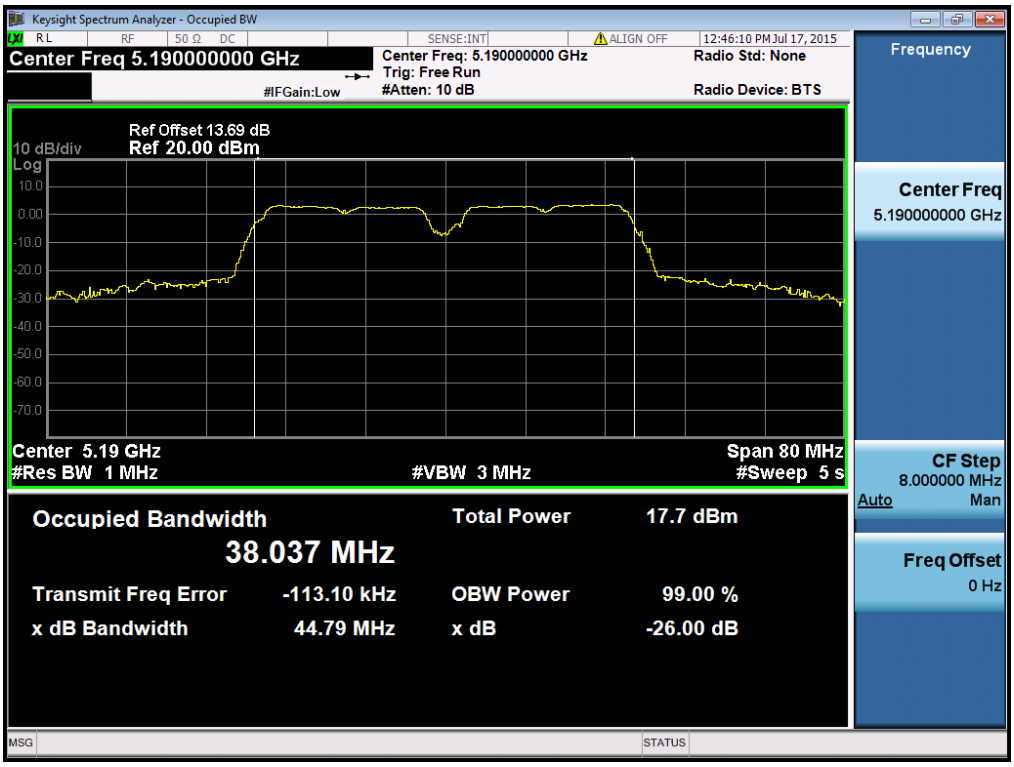
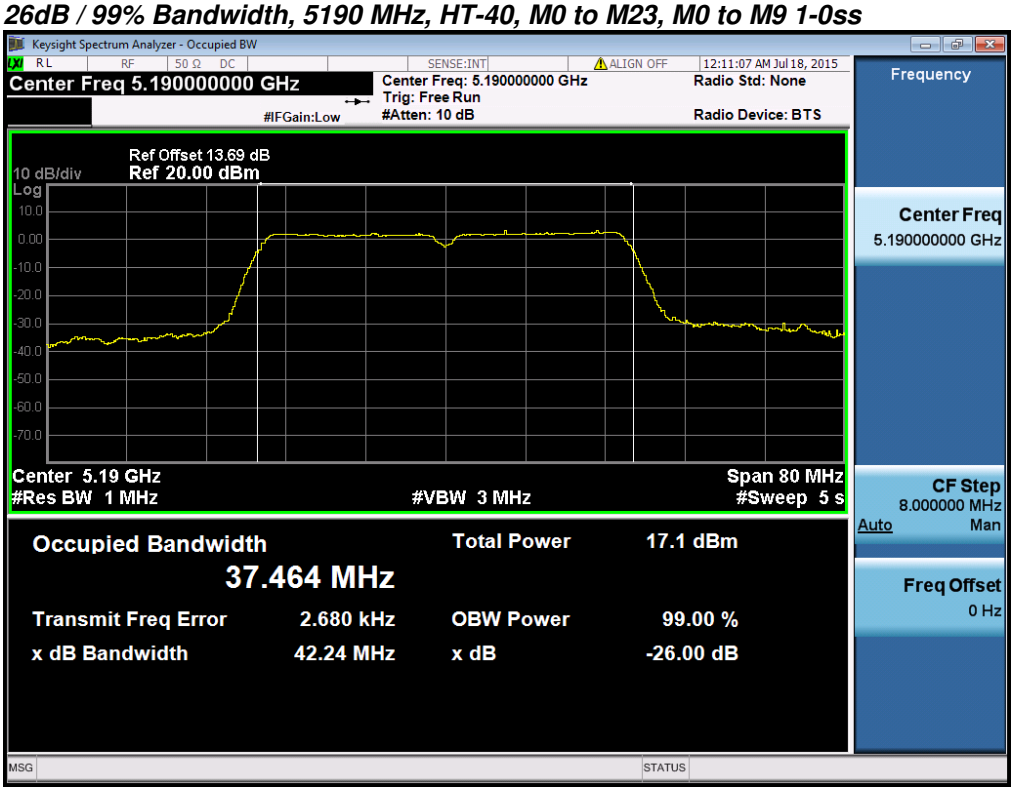



***26dB / 99% Bandwidth, 5190 MHz, HT-40, M0 to M23, M0 to M9 1-0ss***




***26dB / 99% Bandwidth, 5230 MHz, Non HT-40, 6 to 54 Mbps***



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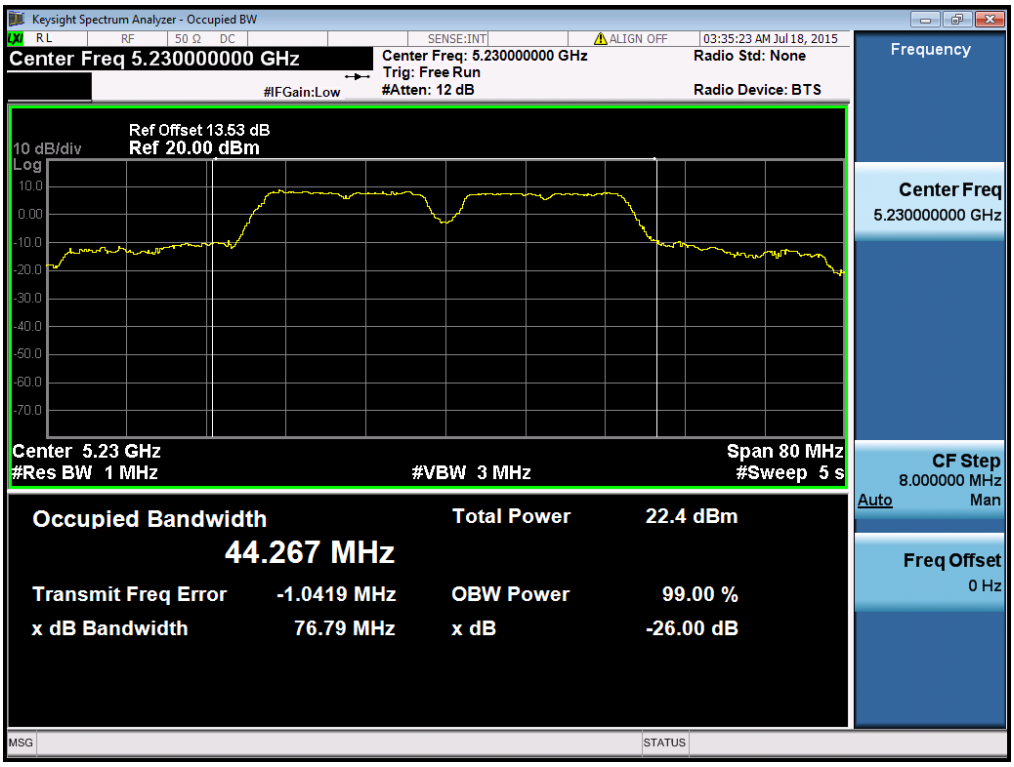
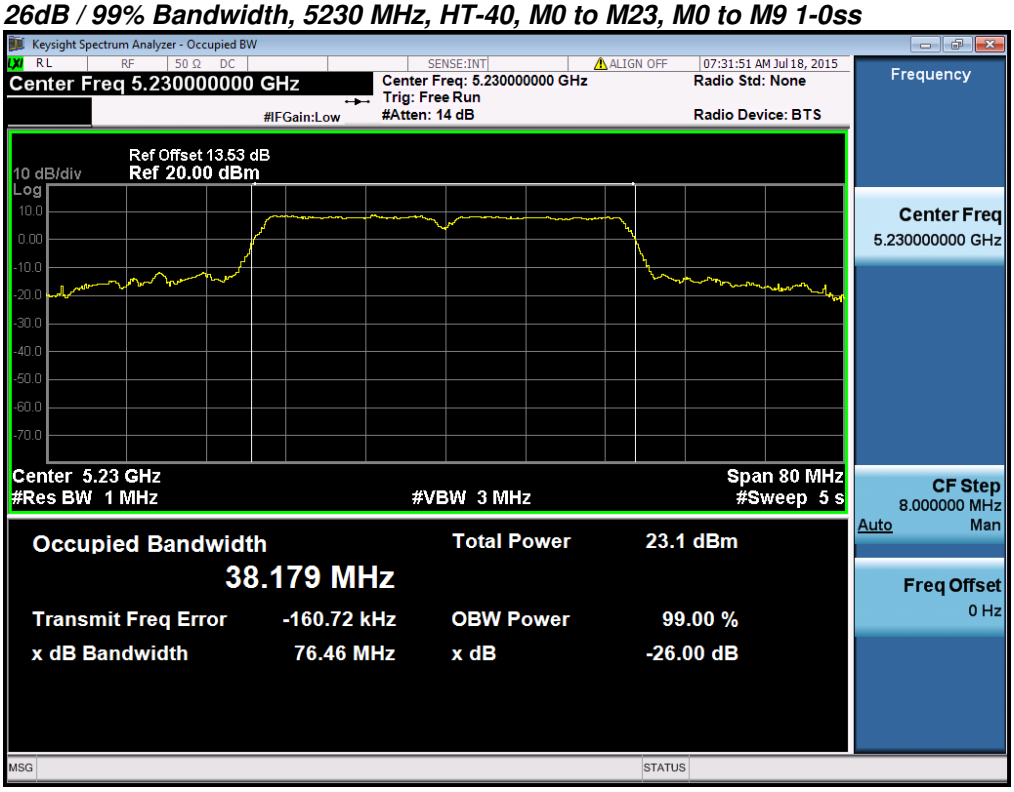



***26dB / 99% Bandwidth, 5230 MHz, HT-40, M0 to M23, M0 to M9 1-0ss***




***26dB / 99% Bandwidth, 5240 MHz, Non HT-20, 6 to 54 Mbps***



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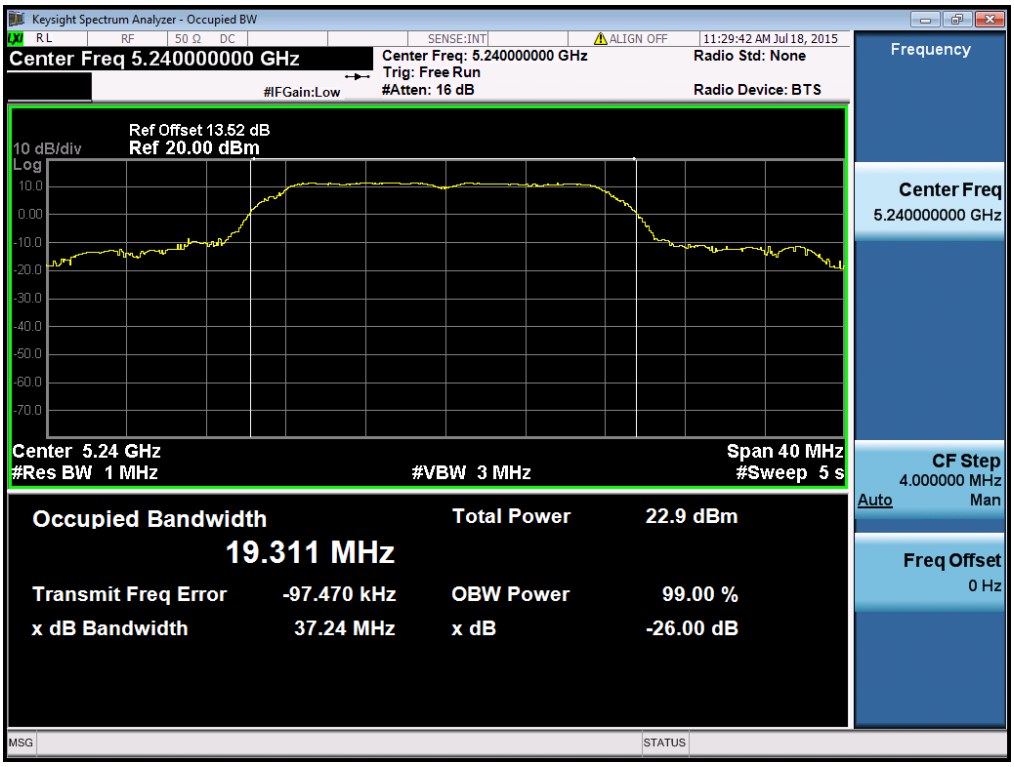
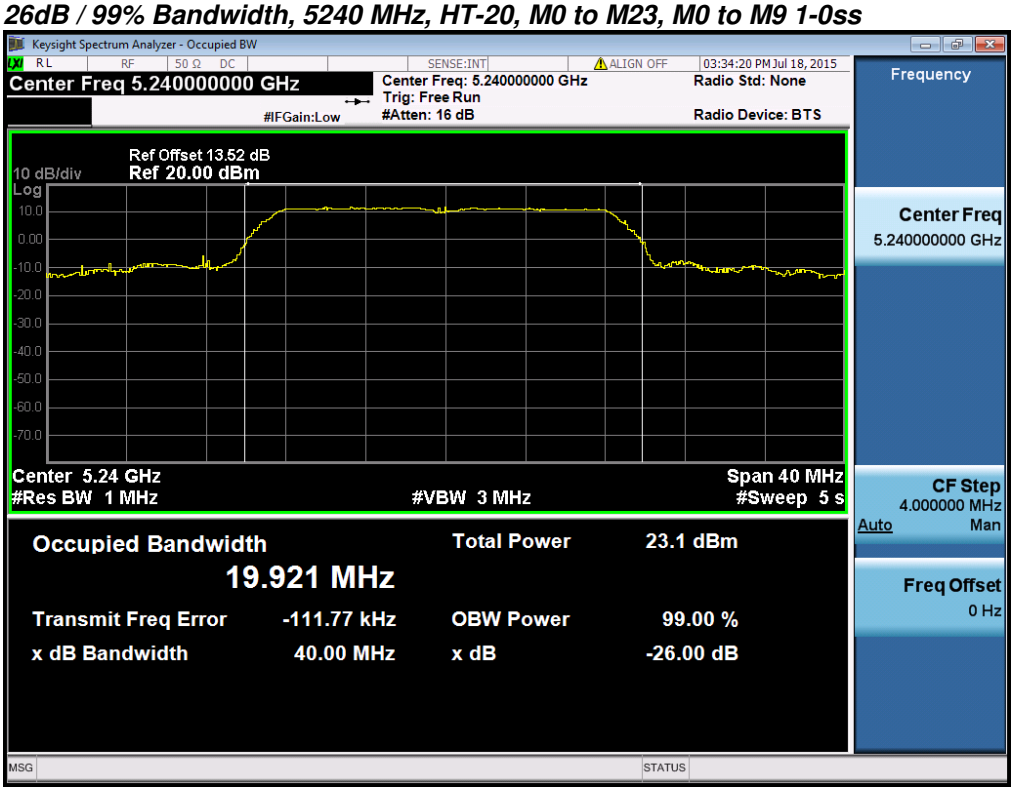



***26dB / 99% Bandwidth, 5240 MHz, HT-20, M0 to M23, M0 to M9 1-0ss***



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# A.2 Maximum Conducted Output Power/ Power Spectral Density

**15.407**
(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

## Test Procedure

**Ref.** KDB 789033 D02 General UNII Test Procedures New Rules v01
ANSI C63.10: 2013

| **Output Power**<br>Test Procedure |
|---|
| 1. Set the radio in the continuous transmitting mode at full power<br>2. Compute power by integrating the spectrum across the EBW (or alternatively entire 99% OBW) of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the EBW or the OBW band edges.<br>3. Capture graphs and record pertinent measurement data. |

**Ref.** KDB 789033 D02 General UNII Test Procedures New Rules v01
ANSI C63.10: 2013 section 12.3.2.2 Method SA-1

| **Output Power**<br>Test parameters |
|---|
| Span = >1.5 times the OBW<br>RBW = 1MHz<br>VBW ≥ 3 x RBW<br>Sweep = Auto couple<br>Detector = sample<br>Trace = Trace Average 100 |

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. (See ANSI C63.10 section 14.3.2.2)

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| **Tested By :**<br>Jose Aguirre | **Date of testing:**<br>08-Aug-15 - 10-Oct-15 |
|---|---|
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 1 | 6 | 14.3 | | | | 14.3 | 30.0 | 15.7 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | 11.8 | 13.0 | | | 15.5 | 30.0 | 14.5 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | 11.8 | 13.0 | 12.5 | | 17.2 | 30.0 | 12.8 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | 10.8 | 11.9 | 11.7 | 10.9 | 17.4 | 30.0 | 12.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | 10.8 | 11.9 | | | 14.4 | 27.0 | 12.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | 7.6 | 8.7 | 8.3 | | 13.0 | 25.2 | 12.2 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -4.9 | -2.9 | -3.6 | -4.3 | 2.2 | 24.0 | 21.8 |
| | HT-20, M0 to M7 | 1 | 6 | 13.7 | | | | 13.7 | 30.0 | 16.3 |
| | HT-20, M0 to M7 | 2 | 6 | 12.2 | 13.1 | | | 15.7 | 30.0 | 14.3 |
| | HT-20, M8 to M15 | 2 | 6 | 12.2 | 13.1 | | | 15.7 | 30.0 | 14.3 |
| | HT-20, M0 to M7 | 3 | 6 | 11.2 | 12.3 | 12.0 | | 16.6 | 30.0 | 13.4 |
| | HT-20, M8 to M15 | 3 | 6 | 11.2 | 12.3 | 12.0 | | 16.6 | 30.0 | 13.4 |
| | HT-20, M16 to M23 | 3 | 6 | 11.2 | 12.3 | 12.0 | | 16.6 | 30.0 | 13.4 |
| | HT-20, M0 to M7 | 4 | 6 | 10.2 | 11.1 | 10.8 | 10.3 | 16.6 | 30.0 | 13.4 |
| | HT-20, M8 to M15 | 4 | 6 | 10.2 | 11.1 | 10.8 | 10.3 | 16.6 | 30.0 | 13.4 |
| | HT-20, M16 to M23 | 4 | 6 | 10.2 | 11.1 | 10.8 | 10.3 | 16.6 | 30.0 | 13.4 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | 10.2 | 11.1 | | | 13.7 | 27.0 | 13.3 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | 12.2 | 13.1 | | | 15.7 | 30.0 | 14.3 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | 6.9 | 7.9 | 7.5 | | 12.2 | 25.2 | 13.0 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | 10.2 | 11.1 | 10.8 | | 15.5 | 28.2 | 12.7 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | 11.2 | 12.3 | 12.0 | | 16.6 | 30.0 | 13.4 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -4.6 | -2.5 | -3.3 | -4.0 | 2.5 | 24.0 | 21.5 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | 6.9 | 7.9 | 7.5 | 6.9 | 13.3 | 27.0 | 13.7 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | 8.9 | 10.1 | 9.5 | 9.1 | 15.4 | 28.8 | 13.4 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | 12.2 | 13.1 | | | 15.7 | 30.0 | 14.3 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | 11.2 | 12.3 | 12.0 | | 16.6 | 30.0 | 13.4 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | 10.2 | 11.1 | 10.8 | 10.3 | 16.6 | 30.0 | 13.4 |
| | | | | | | | | | | |
| 5190 | Non HT-40, 6 to 54 Mbps | 1 | 6 | 9.2 | | | | 9.2 | 30.0 | 20.8 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | 8.2 | 9.5 | | | 11.9 | 30.0 | 18.1 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | 7.3 | 8.4 | 8.0 | | 12.7 | 30.0 | 17.3 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | 6.3 | 7.5 | 7.1 | 6.4 | 12.9 | 30.0 | 17.1 |
| | HT-40, M0 to M7 | 1 | 6 | 8.8 | | | | 8.8 | 30.0 | 21.2 |
| | HT-40, M0 to M7 | 2 | 6 | 7.6 | 8.9 | | | 11.3 | 30.0 | 18.7 |
| | HT-40, M8 to M15 | 2 | 6 | 7.6 | 8.9 | | | 11.3 | 30.0 | 18.7 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HT-40, M0 to M7 | 3 | 6 | 5.6 | 6.9 | 6.3 | | 11.1 | 30.0 | 18.9 |
| | HT-40, M8 to M15 | 3 | 6 | 5.6 | 6.9 | 6.3 | | 11.1 | 30.0 | 18.9 |
| | HT-40, M16 to M23 | 3 | 6 | 5.6 | 6.9 | 6.3 | | 11.1 | 30.0 | 18.9 |
| | HT-40, M0 to M7 | 4 | 6 | 4.4 | 5.9 | 5.2 | 4.4 | 11.0 | 30.0 | 19.0 |
| | HT-40, M8 to M15 | 4 | 6 | 4.4 | 5.9 | 5.2 | 4.4 | 11.0 | 30.0 | 19.0 |
| | HT-40, M16 to M23 | 4 | 6 | 4.4 | 5.9 | 5.2 | 4.4 | 11.0 | 30.0 | 19.0 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | 4.4 | 5.9 | | | 8.2 | 27.0 | 18.8 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | 7.6 | 8.9 | | | 11.3 | 30.0 | 18.7 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | 1.4 | 2.3 | 1.7 | | 6.6 | 25.2 | 18.6 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | 4.4 | 5.9 | 5.2 | | 10.0 | 28.2 | 18.2 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | 5.6 | 6.9 | 6.3 | | 11.1 | 30.0 | 18.9 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -4.0 | -2.0 | -3.2 | -3.8 | 2.8 | 24.0 | 21.2 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | 1.4 | 2.3 | 1.7 | 1.3 | 7.7 | 27.0 | 19.3 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | 3.4 | 4.8 | 4.3 | 3.4 | 10.0 | 28.8 | 18.8 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | 7.6 | 8.9 | | | 11.3 | 30.0 | 18.7 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | 5.6 | 6.9 | 6.3 | | 11.1 | 30.0 | 18.9 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | 4.4 | 5.9 | 5.2 | 4.4 | 11.0 | 30.0 | 19.0 |
| | | | | | | | | | | |
| 5230 | Non HT-40, 6 to 54 Mbps | 1 | 6 | 14.3 | | | | 14.3 | 30.0 | 15.7 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | 14.3 | 15.3 | | | 17.8 | 30.0 | 12.2 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | 14.3 | 15.3 | 15.3 | | 19.8 | 30.0 | 10.2 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | 14.3 | 15.3 | 15.3 | 15.0 | 21.0 | 30.0 | 9.0 |
| | HT-40, M0 to M7 | 1 | 6 | 14.8 | | | | 14.8 | 30.0 | 15.2 |
| | HT-40, M0 to M7 | 2 | 6 | 14.8 | 15.9 | | | 18.4 | 30.0 | 11.6 |
| | HT-40, M8 to M15 | 2 | 6 | 14.8 | 15.9 | | | 18.4 | 30.0 | 11.6 |
| | HT-40, M0 to M7 | 3 | 6 | 14.8 | 15.9 | 15.8 | | 20.3 | 30.0 | 9.7 |
| | HT-40, M8 to M15 | 3 | 6 | 14.8 | 15.9 | 15.8 | | 20.3 | 30.0 | 9.7 |
| | HT-40, M16 to M23 | 3 | 6 | 14.8 | 15.9 | 15.8 | | 20.3 | 30.0 | 9.7 |
| | HT-40, M0 to M7 | 4 | 6 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 30.0 | 8.5 |
| | HT-40, M8 to M15 | 4 | 6 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 30.0 | 8.5 |
| | HT-40, M16 to M23 | 4 | 6 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 30.0 | 8.5 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | 14.8 | 15.9 | | | 18.4 | 27.0 | 8.6 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | 14.8 | 15.9 | | | 18.4 | 30.0 | 11.6 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | 14.8 | 15.9 | 15.8 | | 20.3 | 25.2 | 4.9 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | 14.8 | 15.9 | 15.8 | | 20.3 | 28.2 | 7.9 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | 14.8 | 15.9 | 15.8 | | 20.3 | 30.0 | 9.7 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 24.0 | 2.5 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 27.0 | 5.5 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 28.8 | 7.3 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | 14.8 | 15.9 | | | 18.4 | 30.0 | 11.6 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | 14.8 | 15.9 | 15.8 | | 20.3 | 30.0 | 9.7 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | 14.8 | 15.9 | 15.8 | 15.5 | 21.5 | 30.0 | 8.5 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5240 | Non HT-20, 6 to 54 Mbps | 1 | 6 | 14.7 | | | | 14.7 | 30.0 | 15.3 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | 14.7 | 16.0 | | | 18.4 | 30.0 | 11.6 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | 14.7 | 16.0 | 16.0 | | 20.4 | 30.0 | 9.6 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | 14.7 | 16.0 | 16.0 | 15.9 | 21.7 | 30.0 | 8.3 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | 14.7 | 16.0 | | | 18.4 | 27.0 | 8.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | 14.7 | 16.0 | 16.0 | | 20.4 | 25.2 | 4.8 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | 14.7 | 16.0 | 16.0 | 15.9 | 21.7 | 24.0 | 2.3 |
| | HT-20, M0 to M7 | 1 | 6 | 15.0 | | | | 15.0 | 30.0 | 15.0 |
| | HT-20, M0 to M7 | 2 | 6 | 15.0 | 16.0 | | | 18.5 | 30.0 | 11.5 |
| | HT-20, M8 to M15 | 2 | 6 | 15.0 | 16.0 | | | 18.5 | 30.0 | 11.5 |
| | HT-20, M0 to M7 | 3 | 6 | 15.0 | 16.0 | 16.2 | | 20.5 | 30.0 | 9.5 |
| | HT-20, M8 to M15 | 3 | 6 | 15.0 | 16.0 | 16.2 | | 20.5 | 30.0 | 9.5 |
| | HT-20, M16 to M23 | 3 | 6 | 15.0 | 16.0 | 16.2 | | 20.5 | 30.0 | 9.5 |
| | HT-20, M0 to M7 | 4 | 6 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 30.0 | 8.2 |
| | HT-20, M8 to M15 | 4 | 6 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 30.0 | 8.2 |
| | HT-20, M16 to M23 | 4 | 6 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 30.0 | 8.2 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | 15.0 | 16.0 | | | 18.5 | 27.0 | 8.5 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | 15.0 | 16.0 | | | 18.5 | 30.0 | 11.5 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | 15.0 | 16.0 | 16.2 | | 20.5 | 25.2 | 4.7 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | 15.0 | 16.0 | 16.2 | | 20.5 | 28.2 | 7.7 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | 15.0 | 16.0 | 16.2 | | 20.5 | 30.0 | 9.5 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 24.0 | 2.2 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 27.0 | 5.2 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 28.8 | 7.0 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | 15.0 | 16.0 | | | 18.5 | 30.0 | 11.5 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | 15.0 | 16.0 | 16.2 | | 20.5 | 30.0 | 9.5 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | 15.0 | 16.0 | 16.2 | 15.9 | 21.8 | 30.0 | 8.2 |



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| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 PSD (dBm/MHz) | Tx 2 PSD (dBm/MHz) | Tx 3 PSD (dBm/MHz) | Tx 4 PSD (dBm/MHz) | Total PSD (dBm/MHz) | Limit (dBm/MHz) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 1 | 6 | 3.2 | | | | 3.2 | 17.0 | 13.8 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | 0.9 | 2.2 | | | 4.6 | 17.0 | 12.4 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | 0.9 | 2.2 | 1.8 | | 6.4 | 17.0 | 10.6 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | 0.1 | 1.0 | 0.7 | 0.3 | 6.6 | 17.0 | 10.4 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | 0.1 | 1.0 | | | 3.6 | 14.0 | 10.4 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | -3.2 | -2.0 | -2.6 | | 2.2 | 12.2 | 10.0 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -15.8 | -13.9 | -14.7 | -14.9 | -8.8 | 11.0 | 19.8 |
| | HT-20, M0 to M7 | 1 | 6 | 2.9 | | | | 2.9 | 17.0 | 14.1 |
| | HT-20, M0 to M7 | 2 | 6 | 1.4 | 2.0 | | | 4.7 | 17.0 | 12.3 |
| | HT-20, M8 to M15 | 2 | 6 | 1.4 | 2.0 | | | 4.7 | 17.0 | 12.3 |
| | HT-20, M0 to M7 | 3 | 6 | 0.2 | 1.1 | 0.8 | | 5.5 | 17.0 | 11.5 |
| | HT-20, M8 to M15 | 3 | 6 | 0.2 | 1.1 | 0.8 | | 5.5 | 17.0 | 11.5 |
| | HT-20, M16 to M23 | 3 | 6 | 0.2 | 1.1 | 0.8 | | 5.5 | 17.0 | 11.5 |
| | HT-20, M0 to M7 | 4 | 6 | -1.0 | 0.1 | -0.2 | -0.6 | 5.6 | 17.0 | 11.4 |
| | HT-20, M8 to M15 | 4 | 6 | -1.0 | 0.1 | -0.2 | -0.6 | 5.6 | 17.0 | 11.4 |
| | HT-20, M16 to M23 | 4 | 6 | -1.0 | 0.1 | -0.2 | -0.6 | 5.6 | 17.0 | 11.4 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | -1.0 | 0.1 | | | 2.6 | 14.0 | 11.4 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | 1.4 | 2.0 | | | 4.7 | 17.0 | 12.3 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | -4.3 | -3.3 | -3.7 | | 1.0 | 12.2 | 11.2 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | -1.0 | 0.1 | -0.2 | | 4.4 | 15.2 | 10.8 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | 0.2 | 1.1 | 0.8 | | 5.5 | 17.0 | 11.5 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -15.7 | -13.6 | -14.5 | -15.0 | -8.6 | 11.0 | 19.6 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | -4.3 | -3.3 | -3.7 | -4.4 | 2.1 | 14.0 | 11.9 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | -2.2 | -1.2 | -1.7 | -1.8 | 4.3 | 15.8 | 11.5 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | 1.4 | 2.0 | | | 4.7 | 17.0 | 12.3 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | 0.2 | 1.1 | 0.8 | | 5.5 | 17.0 | 11.5 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | -1.0 | 0.1 | -0.2 | -0.6 | 5.6 | 17.0 | 11.4 |
| | | | | | | | | | | |
| 5190 | Non HT-40, 6 to 54 Mbps | 1 | 6 | -4.5 | | | | -4.5 | 17.0 | 21.5 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | -5.2 | -4.3 | | | -1.7 | 17.0 | 18.7 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | -6.2 | -5.1 | -5.2 | | -0.7 | 17.0 | 17.7 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | -7.2 | -6.2 | -5.8 | -6.9 | -0.5 | 17.0 | 17.5 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HT-40, M0 to M7 | 1 | 6 | -4.8 | | | | -4.8 | 17.0 | 21.8 |
| | HT-40, M0 to M7 | 2 | 6 | -6.4 | -5.0 | | | -2.6 | 17.0 | 19.6 |
| | HT-40, M8 to M15 | 2 | 6 | -6.4 | -5.0 | | | -2.6 | 17.0 | 19.6 |
| | HT-40, M0 to M7 | 3 | 6 | -8.2 | -6.9 | -7.2 | | -2.6 | 17.0 | 19.6 |
| | HT-40, M8 to M15 | 3 | 6 | -8.2 | -6.9 | -7.2 | | -2.6 | 17.0 | 19.6 |
| | HT-40, M16 to M23 | 3 | 6 | -8.2 | -6.9 | -7.2 | | -2.6 | 17.0 | 19.6 |
| | HT-40, M0 to M7 | 4 | 6 | -9.3 | -8.1 | -8.2 | -9.4 | -2.7 | 17.0 | 19.7 |
| | HT-40, M8 to M15 | 4 | 6 | -9.3 | -8.1 | -8.2 | -9.4 | -2.7 | 17.0 | 19.7 |
| | HT-40, M16 to M23 | 4 | 6 | -9.3 | -8.1 | -8.2 | -9.4 | -2.7 | 17.0 | 19.7 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | -9.3 | -8.1 | | | -5.6 | 14.0 | 19.6 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | -6.4 | -5.0 | | | -2.6 | 17.0 | 19.6 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | -12.7 | -11.7 | -11.8 | | -7.3 | 12.2 | 19.5 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | -9.3 | -8.1 | -8.2 | | -3.7 | 15.2 | 18.9 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | -8.2 | -6.9 | -7.2 | | -2.6 | 17.0 | 19.6 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -17.7 | -16.1 | -16.6 | -17.4 | -10.9 | 11.0 | 21.9 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | -12.7 | -11.7 | -11.8 | -12.3 | -6.1 | 14.0 | 20.1 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | -10.5 | -8.9 | -9.2 | -10.3 | -3.7 | 15.8 | 19.5 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | -6.4 | -5.0 | | | -2.6 | 17.0 | 19.6 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | -8.2 | -6.9 | -7.2 | | -2.6 | 17.0 | 19.6 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | -9.3 | -8.1 | -8.2 | -9.4 | -2.7 | 17.0 | 19.7 |
| | | | | | | | | | | |
| 5230 | Non HT-40, 6 to 54 Mbps | 1 | 6 | 0.6 | | | | 0.6 | 17.0 | 16.4 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | 0.6 | 1.6 | | | 4.1 | 17.0 | 12.9 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | 0.6 | 1.6 | 1.2 | | 5.9 | 17.0 | 11.1 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | 0.6 | 1.6 | 1.2 | 1.3 | 7.2 | 17.0 | 9.8 |
| | HT-40, M0 to M7 | 1 | 6 | 0.6 | | | | 0.6 | 17.0 | 16.4 |
| | HT-40, M0 to M7 | 2 | 6 | 0.6 | 1.7 | | | 4.2 | 17.0 | 12.8 |
| | HT-40, M8 to M15 | 2 | 6 | 0.6 | 1.7 | | | 4.2 | 17.0 | 12.8 |
| | HT-40, M0 to M7 | 3 | 6 | 0.6 | 1.7 | 1.6 | | 6.1 | 17.0 | 10.9 |
| | HT-40, M8 to M15 | 3 | 6 | 0.6 | 1.7 | 1.6 | | 6.1 | 17.0 | 10.9 |
| | HT-40, M16 to M23 | 3 | 6 | 0.6 | 1.7 | 1.6 | | 6.1 | 17.0 | 10.9 |
| | HT-40, M0 to M7 | 4 | 6 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 17.0 | 9.6 |
| | HT-40, M8 to M15 | 4 | 6 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 17.0 | 9.6 |
| | HT-40, M16 to M23 | 4 | 6 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 17.0 | 9.6 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | 0.6 | 1.7 | | | 4.2 | 14.0 | 9.8 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | 0.6 | 1.7 | | | 4.2 | 17.0 | 12.8 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | 0.6 | 1.7 | 1.6 | | 6.1 | 12.2 | 6.1 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | 0.6 | 1.7 | 1.6 | | 6.1 | 15.2 | 9.1 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | 0.6 | 1.7 | 1.6 | | 6.1 | 17.0 | 10.9 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 11.0 | 3.6 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 14.0 | 6.6 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 15.8 | 8.4 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HT-40 STBC, M0 to M7 | 2 | 6 | 0.6 | 1.7 | | | 4.2 | 17.0 | 12.8 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | 0.6 | 1.7 | 1.6 | | 6.1 | 17.0 | 10.9 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | 0.6 | 1.7 | 1.6 | 1.4 | 7.4 | 17.0 | 9.6 |
| | | | | | | | | | | |
| 5240 | Non HT-20, 6 to 54 Mbps | 1 | 6 | 3.7 | | | | 3.7 | 17.0 | 13.3 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | 3.7 | 5.3 | | | 7.6 | 17.0 | 9.4 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | 3.7 | 5.3 | 5.0 | | 9.5 | 17.0 | 7.5 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | 3.7 | 5.3 | 5.0 | 5.0 | 10.8 | 17.0 | 6.2 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | 3.7 | 5.3 | | | 7.6 | 14.0 | 6.4 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | 3.7 | 5.3 | 5.0 | | 9.5 | 12.2 | 2.7 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | 3.7 | 5.3 | 5.0 | 5.0 | 10.8 | 11.0 | 0.2 |
| | HT-20, M0 to M7 | 1 | 6 | 3.8 | | | | 3.8 | 17.0 | 13.2 |
| | HT-20, M0 to M7 | 2 | 6 | 3.8 | 5.0 | | | 7.5 | 17.0 | 9.5 |
| | HT-20, M8 to M15 | 2 | 6 | 3.8 | 5.0 | | | 7.5 | 17.0 | 9.5 |
| | HT-20, M0 to M7 | 3 | 6 | 3.8 | 5.0 | 4.9 | | 9.4 | 17.0 | 7.6 |
| | HT-20, M8 to M15 | 3 | 6 | 3.8 | 5.0 | 4.9 | | 9.4 | 17.0 | 7.6 |
| | HT-20, M16 to M23 | 3 | 6 | 3.8 | 5.0 | 4.9 | | 9.4 | 17.0 | 7.6 |
| | HT-20, M0 to M7 | 4 | 6 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 17.0 | 6.3 |
| | HT-20, M8 to M15 | 4 | 6 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 17.0 | 6.3 |
| | HT-20, M16 to M23 | 4 | 6 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 17.0 | 6.3 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | 3.8 | 5.0 | | | 7.5 | 14.0 | 6.5 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | 3.8 | 5.0 | | | 7.5 | 17.0 | 9.5 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | 3.8 | 5.0 | 4.9 | | 9.4 | 12.2 | 2.8 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | 3.8 | 5.0 | 4.9 | | 9.4 | 15.2 | 5.8 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | 3.8 | 5.0 | 4.9 | | 9.4 | 17.0 | 7.6 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 11.0 | 0.3 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 14.0 | 3.3 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 15.8 | 5.1 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | 3.8 | 5.0 | | | 7.5 | 17.0 | 9.5 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | 3.8 | 5.0 | 4.9 | | 9.4 | 17.0 | 7.6 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | 3.8 | 5.0 | 4.9 | 4.9 | 10.7 | 17.0 | 6.3 |



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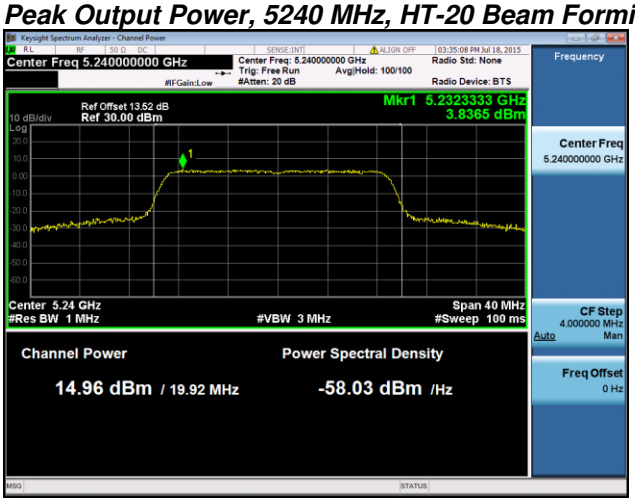
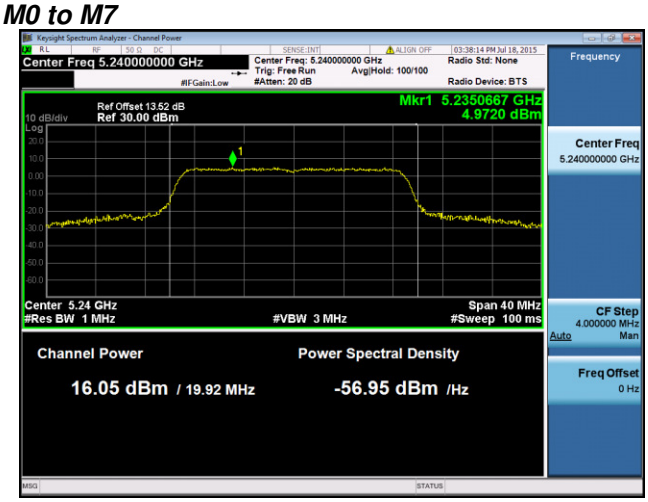
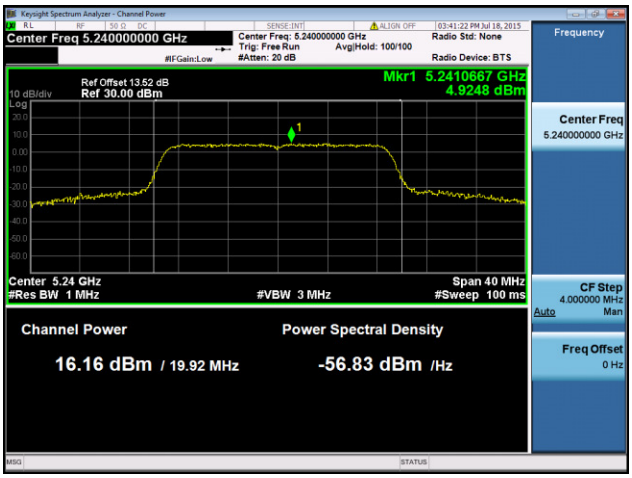
***Peak Output Power, 5240 MHz, HT-20 Beam Forming, M0 to M7***



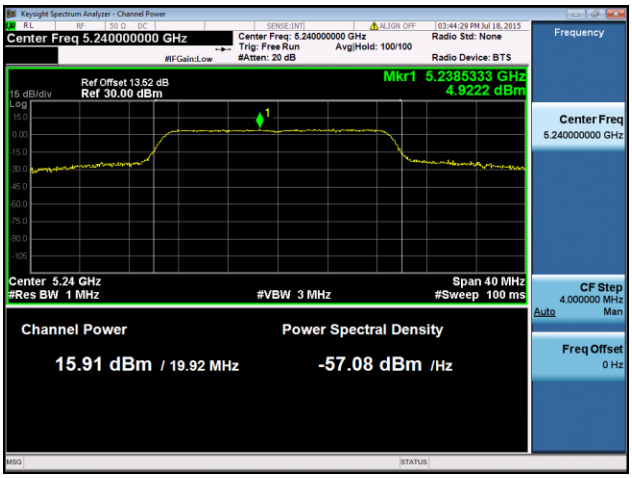

***Antenna A***




***Antenna B***




***Antenna C***




***Antenna D***



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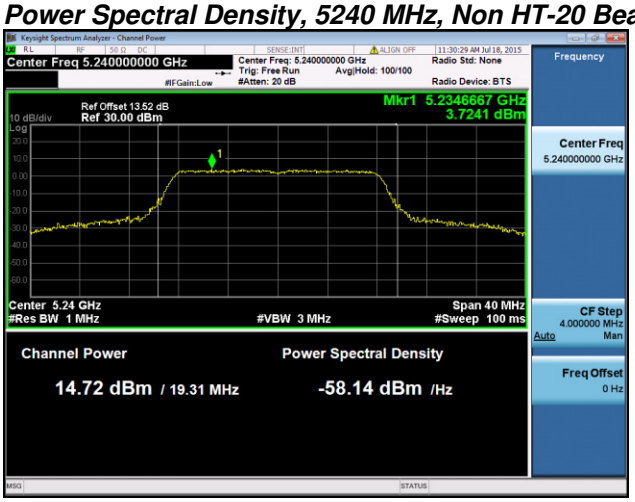
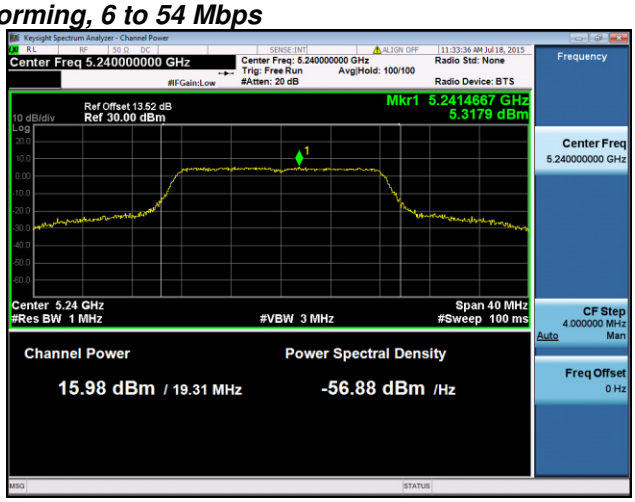
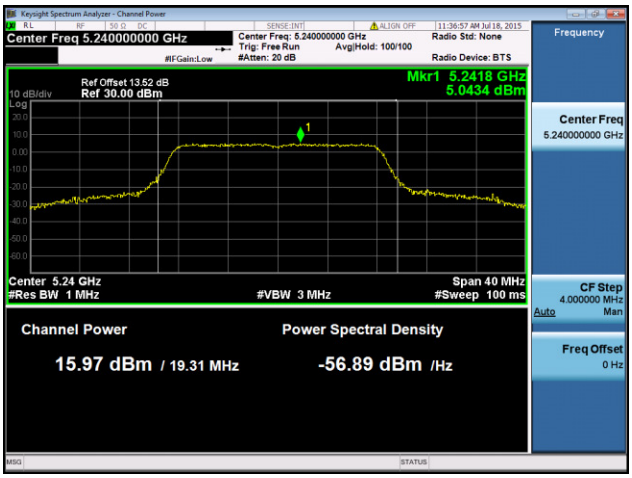
***Power Spectral Density, 5240 MHz, Non HT-20 Beam Forming, 6 to 54 Mbps***



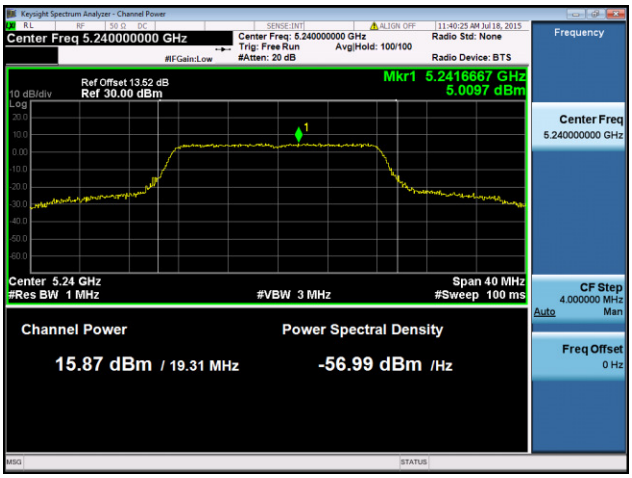

***Antenna A***




***Antenna B***




***Antenna C***




***Antenna D***



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# A.3 Conducted Spurious Emissions

**15.407** b) *Undesirable emission limits.* Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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)).

### Test Procedure

**Ref.** KDB 789033 D02 General UNII Test Procedures New Rules v01
ANSI C63.10: 2013

| **Conducted Spurious Emissions**<br>Test Procedure |
|---|
| 1. Connect the antenna port(s) to the spectrum analyzer input.<br>2. Place the radio in continuous transmit mode. Use the procedures in KDB 789033 D02 General UNII Test Procedures New Rules v01 to substitute conducted measurements in place of radiated measurements.<br>3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer).<br>4. Record the marker waveform peak to spur difference. Also measure any emissions in the restricted bands.<br>5. 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. The worst case output is recorded.<br>6. Capture graphs and record pertinent measurement data. |

**Ref.** KDB 789033 D02 General UNII Test Procedures New Rules v01
ANSI C63.10: 2013 section 12.7.7.3 (average) & 12.7.6 (peak)

| **Conducted Spurious Emissions**<br>Test parameters |
|---|
| Span = 30MHz to 18GHz / 18GHz to 40GHz<br>RBW = 1 MHz<br>VBW ≥ 3 x RBW for Peak, 1kHz for Average<br>Sweep = Auto couple<br>Detector = Peak<br>Trace = Max Hold. |

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| **Tested By :** | **Date of testing:** |
|---|---|
| Jose Aguirre | 08-Aug-15 - 10-Oct-15 |
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 Spur Power (dBm) | Tx 2 Spur Power (dBm) | Tx 3 Spur Power (dBm) | Tx 4 Spur Power (dBm) | Total Conducted Spur (dBm) | Limit (dBm) | Margin (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 1 | 6 | -62.5 | | | | -56.5 | -27.00 | 29.5 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | -63.6 | -61.9 | | | -53.7 | -27.00 | 26.7 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | -63.6 | -61.9 | -61.5 | | -51.5 | -27.00 | 24.5 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | -62.2 | -62.6 | -62.9 | -61.8 | -50.3 | -27.00 | 23.3 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | -62.2 | -62.6 | | | -50.4 | -27.00 | 23.4 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | -63.5 | -60.6 | -61.9 | | -46.3 | -27.00 | 19.3 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -61.4 | -63.4 | -63.2 | -62.4 | -44.5 | -27.00 | 17.5 |
| | HT-20, M0 to M7 | 1 | 6 | -61.9 | | | | -55.9 | -27.00 | 28.9 |
| | HT-20, M0 to M7 | 2 | 6 | -63.6 | -62.8 | | | -54.2 | -27.00 | 27.2 |
| | HT-20, M8 to M15 | 2 | 6 | -63.6 | -62.8 | | | -54.2 | -27.00 | 27.2 |
| | HT-20, M0 to M7 | 3 | 6 | -62.9 | -62.5 | -62.4 | | -51.8 | -27.00 | 24.8 |
| | HT-20, M8 to M15 | 3 | 6 | -62.9 | -62.5 | -62.4 | | -51.8 | -27.00 | 24.8 |
| | HT-20, M16 to M23 | 3 | 6 | -62.9 | -62.5 | -62.4 | | -51.8 | -27.00 | 24.8 |
| | HT-20, M0 to M7 | 4 | 6 | -63.1 | -63.5 | -62.7 | -62.9 | -51.0 | -27.00 | 24.0 |
| | HT-20, M8 to M15 | 4 | 6 | -63.1 | -63.5 | -62.7 | -62.9 | -51.0 | -27.00 | 24.0 |
| | HT-20, M16 to M23 | 4 | 6 | -63.1 | -63.5 | -62.7 | -62.9 | -51.0 | -27.00 | 24.0 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | -63.1 | -63.5 | | | -51.3 | -27.00 | 24.3 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | -63.6 | -62.8 | | | -54.2 | -27.00 | 27.2 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | -62.6 | -63.8 | -61.8 | | -47.1 | -27.00 | 20.1 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | -63.1 | -63.5 | -62.7 | | -50.5 | -27.00 | 23.5 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | -62.9 | -62.5 | -62.4 | | -51.8 | -27.00 | 24.8 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -62.0 | -63.7 | -62.7 | -64.8 | -45.2 | -27.00 | 18.2 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | -62.6 | -63.8 | -61.8 | -63.5 | -47.8 | -27.00 | 20.8 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | -62.8 | -60.7 | -62.6 | -62.2 | -48.8 | -27.00 | 21.8 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | -63.6 | -62.8 | | | -54.2 | -27.00 | 27.2 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | -62.9 | -62.5 | -62.4 | | -51.8 | -27.00 | 24.8 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | -63.1 | -63.5 | -62.7 | -62.9 | -51.0 | -27.00 | 24.0 |
| | | | | | | | | | | |
| 5190 | Non HT-40, 6 to 54 Mbps | 1 | 6 | -63.8 | | | | -57.8 | -27.00 | 30.8 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | -63.4 | -64.0 | | | -54.7 | -27.00 | 27.7 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | -61.4 | -63.0 | -62.3 | | -51.4 | -27.00 | 24.4 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | -62.6 | -63.5 | -62.6 | -63.8 | -51.1 | -27.00 | 24.1 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HT-40, M0 to M7 | 1 | 6 | -63.6 | | | | -57.6 | -27.00 | 30.6 |
| | HT-40, M0 to M7 | 2 | 6 | -63.0 | -63.4 | | | -54.2 | -27.00 | 27.2 |
| | HT-40, M8 to M15 | 2 | 6 | -63.0 | -63.4 | | | -54.2 | -27.00 | 27.2 |
| | HT-40, M0 to M7 | 3 | 6 | -63.1 | -62.4 | -63.2 | | -52.1 | -27.00 | 25.1 |
| | HT-40, M8 to M15 | 3 | 6 | -63.1 | -62.4 | -63.2 | | -52.1 | -27.00 | 25.1 |
| | HT-40, M16 to M23 | 3 | 6 | -63.1 | -62.4 | -63.2 | | -52.1 | -27.00 | 25.1 |
| | HT-40, M0 to M7 | 4 | 6 | -62.0 | -63.1 | -62.5 | -61.6 | -50.2 | -27.00 | 23.2 |
| | HT-40, M8 to M15 | 4 | 6 | -62.0 | -63.1 | -62.5 | -61.6 | -50.2 | -27.00 | 23.2 |
| | HT-40, M16 to M23 | 4 | 6 | -62.0 | -63.1 | -62.5 | -61.6 | -50.2 | -27.00 | 23.2 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | -62.0 | -63.1 | | | -50.5 | -27.00 | 23.5 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | -63.0 | -63.4 | | | -54.2 | -27.00 | 27.2 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | -63.8 | -63.1 | -61.8 | | -47.2 | -27.00 | 20.2 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | -62.0 | -63.1 | -62.5 | | -49.9 | -27.00 | 22.9 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | -63.1 | -62.4 | -63.2 | | -52.1 | -27.00 | 25.1 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -63.8 | -62.2 | -63.9 | -61.8 | -44.8 | -27.00 | 17.8 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | -63.8 | -63.1 | -61.8 | -61.8 | -47.5 | -27.00 | 20.5 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | -62.6 | -62.9 | -62.5 | -61.6 | -49.2 | -27.00 | 22.2 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | -63.0 | -63.4 | | | -54.2 | -27.00 | 27.2 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | -63.1 | -62.4 | -63.2 | | -52.1 | -27.00 | 25.1 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | -62.0 | -63.1 | -62.5 | -61.6 | -50.2 | -27.00 | 23.2 |
| | | | | | | | | | | |
| 5230 | Non HT-40, 6 to 54 Mbps | 1 | 6 | -62.9 | | | | -56.9 | -27.00 | 29.9 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | -62.9 | -63.0 | | | -53.9 | -27.00 | 26.9 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | -62.9 | -63.0 | -60.4 | | -51.2 | -27.00 | 24.2 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | -62.9 | -63.0 | -60.4 | -61.8 | -49.9 | -27.00 | 22.9 |
| | HT-40, M0 to M7 | 1 | 6 | -62.4 | | | | -56.4 | -27.00 | 29.4 |
| | HT-40, M0 to M7 | 2 | 6 | -62.4 | -61.7 | | | -53.0 | -27.00 | 26.0 |
| | HT-40, M8 to M15 | 2 | 6 | -62.4 | -61.7 | | | -53.0 | -27.00 | 26.0 |
| | HT-40, M0 to M7 | 3 | 6 | -62.4 | -61.7 | -62.2 | | -51.3 | -27.00 | 24.3 |
| | HT-40, M8 to M15 | 3 | 6 | -62.4 | -61.7 | -62.2 | | -51.3 | -27.00 | 24.3 |
| | HT-40, M16 to M23 | 3 | 6 | -62.4 | -61.7 | -62.2 | | -51.3 | -27.00 | 24.3 |
| | HT-40, M0 to M7 | 4 | 6 | -62.4 | -61.7 | -62.2 | -63.1 | -50.3 | -27.00 | 23.3 |
| | HT-40, M8 to M15 | 4 | 6 | -62.4 | -61.7 | -62.2 | -63.1 | -50.3 | -27.00 | 23.3 |
| | HT-40, M16 to M23 | 4 | 6 | -62.4 | -61.7 | -62.2 | -63.1 | -50.3 | -27.00 | 23.3 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | -62.4 | -61.7 | | | -50.0 | -27.00 | 23.0 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | -62.4 | -61.7 | | | -53.0 | -27.00 | 26.0 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | -62.4 | -61.7 | -62.2 | | -46.5 | -27.00 | 19.5 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | -62.4 | -61.7 | -62.2 | | -49.5 | -27.00 | 22.5 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | -62.4 | -61.7 | -62.2 | | -51.3 | -27.00 | 24.3 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -62.4 | -61.7 | -62.2 | -63.1 | -44.3 | -27.00 | 17.3 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | -62.4 | -61.7 | -62.2 | -63.1 | -47.3 | -27.00 | 20.3 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | -62.4 | -61.7 | -62.2 | -63.1 | -49.1 | -27.00 | 22.1 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HT-40 STBC, M0 to M7 | 2 | 6 | -62.4 | -61.7 | | | -53.0 | -27.00 | 26.0 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | -62.4 | -61.7 | -62.2 | | -51.3 | -27.00 | 24.3 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | -62.4 | -61.7 | -62.2 | -63.1 | -50.3 | -27.00 | 23.3 |
| | | | | | | | | | | |
| 5240 | Non HT-20, 6 to 54 Mbps | 1 | 6 | -61.6 | | | | -55.6 | -27.00 | 28.6 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | -61.6 | -61.6 | | | -52.6 | -27.00 | 25.6 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | -61.6 | -61.6 | -63.5 | | -51.4 | -27.00 | 24.4 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | -61.6 | -61.6 | -63.5 | -63.7 | -50.5 | -27.00 | 23.5 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | -61.6 | -61.6 | | | -49.6 | -27.00 | 22.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | -61.6 | -61.6 | -63.5 | | -46.6 | -27.00 | 19.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -61.6 | -61.6 | -63.5 | -63.7 | -44.5 | -27.00 | 17.5 |
| | HT-20, M0 to M7 | 1 | 6 | -60.8 | | | | -54.8 | -27.00 | 27.8 |
| | HT-20, M0 to M7 | 2 | 6 | -60.8 | -59.1 | | | -50.9 | -27.00 | 23.9 |
| | HT-20, M8 to M15 | 2 | 6 | -60.8 | -59.1 | | | -50.9 | -27.00 | 23.9 |
| | HT-20, M0 to M7 | 3 | 6 | -60.8 | -59.1 | -63.0 | | -49.9 | -27.00 | 22.9 |
| | HT-20, M8 to M15 | 3 | 6 | -60.8 | -59.1 | -63.0 | | -49.9 | -27.00 | 22.9 |
| | HT-20, M16 to M23 | 3 | 6 | -60.8 | -59.1 | -63.0 | | -49.9 | -27.00 | 22.9 |
| | HT-20, M0 to M7 | 4 | 6 | -60.8 | -59.1 | -63.0 | -63.4 | -49.2 | -27.00 | 22.2 |
| | HT-20, M8 to M15 | 4 | 6 | -60.8 | -59.1 | -63.0 | -63.4 | -49.2 | -27.00 | 22.2 |
| | HT-20, M16 to M23 | 4 | 6 | -60.8 | -59.1 | -63.0 | -63.4 | -49.2 | -27.00 | 22.2 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | -60.8 | -59.1 | | | -47.9 | -27.00 | 20.9 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | -60.8 | -59.1 | | | -50.9 | -27.00 | 23.9 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | -60.8 | -59.1 | -63.0 | | -45.1 | -27.00 | 18.1 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | -60.8 | -59.1 | -63.0 | | -48.1 | -27.00 | 21.1 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | -60.8 | -59.1 | -63.0 | | -49.9 | -27.00 | 22.9 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -60.8 | -59.1 | -63.0 | -63.4 | -43.2 | -27.00 | 16.2 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | -60.8 | -59.1 | -63.0 | -63.4 | -46.2 | -27.00 | 19.2 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | -60.8 | -59.1 | -63.0 | -63.4 | -48.0 | -27.00 | 21.0 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | -60.8 | -59.1 | | | -50.9 | -27.00 | 23.9 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | -60.8 | -59.1 | -63.0 | | -49.9 | -27.00 | 22.9 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | -60.8 | -59.1 | -63.0 | -63.4 | -49.2 | -27.00 | 22.2 |



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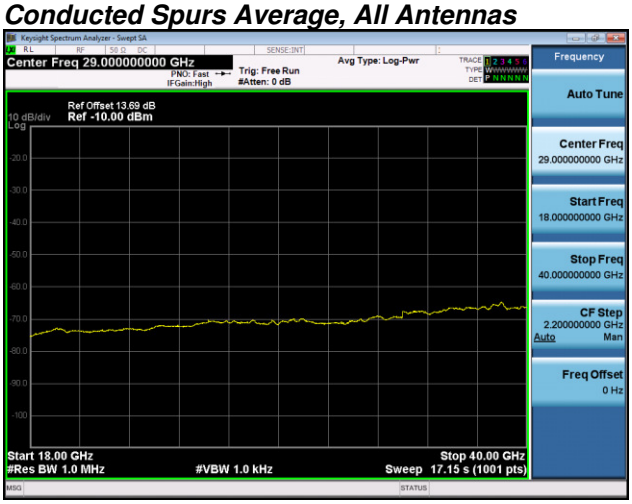
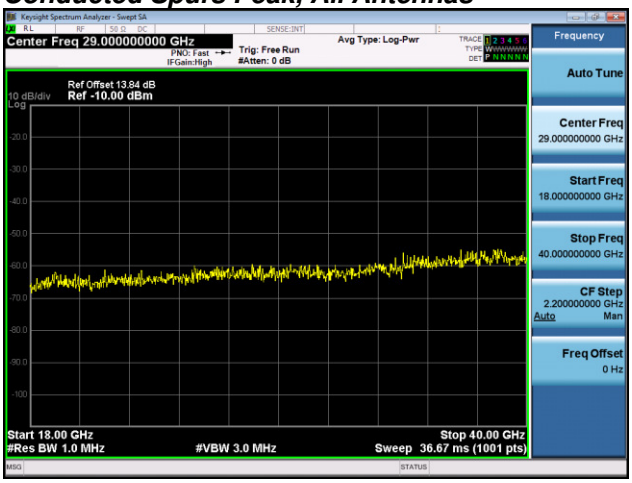
### *Conducted Spurs Average, All Antennas*




### *Conducted Spurs Peak, All Antennas*



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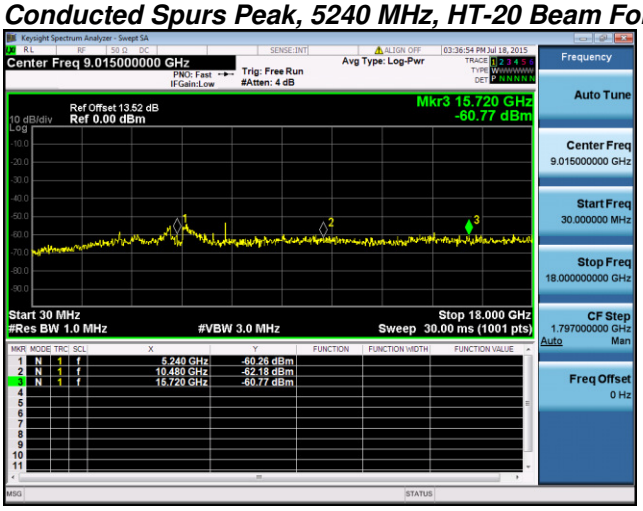
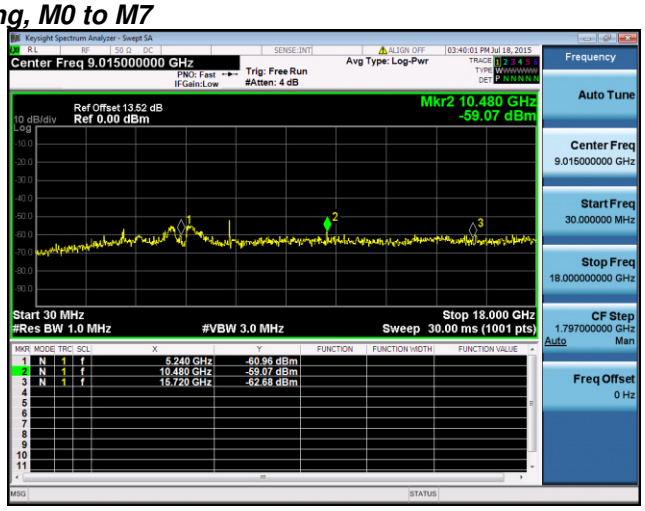
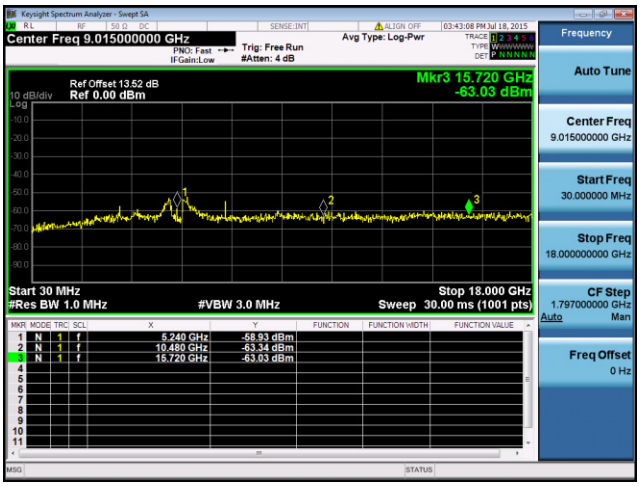
***Conducted Spurs Peak, 5240 MHz, HT-20 Beam Forming, M0 to M7***



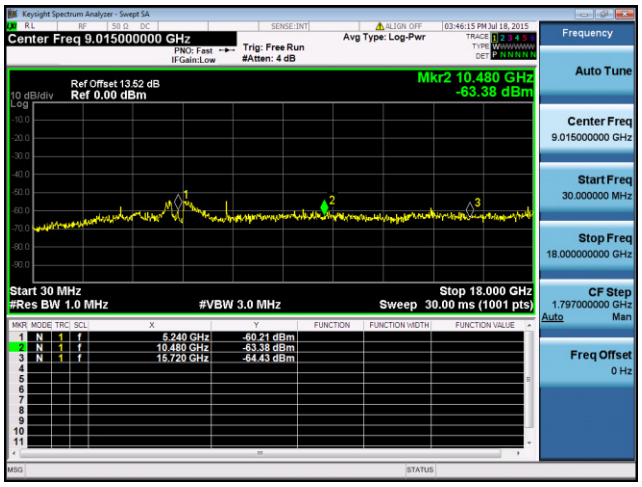

***Antenna A***




***Antenna B***




***Antenna C***




***Antenna D***



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# A.4 Conducted Band edge

**15.407** b) *Undesirable emission limits.* Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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)).

### Test Procedure

**Ref.** ANSI C63.10: 2013

| **Conducted Band edge**<br>Test Procedure |
|---|
| 1. Connect the antenna port(s) to the spectrum analyzer input.<br>2. Place the radio in continuous transmit mode. Use the procedures in ANSI C63.10: 2013 to substitute conducted measurements in place of radiated measurements.<br>3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer).<br>4. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance.<br>Also measure any emissions in the restricted bands.<br>5. 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. The worst case output is recorded.<br>6. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance.<br>Also measure any emissions in the restricted bands<br>7. Capture graphs and record pertinent measurement data. |

**Ref.** ANSI C63.10: 2013 section 12.7.6 (peak) & 12.7.7.3 (average, Method VB-A (Alternative))

| **Conducted Band edge**<br>Test parameters restricted Band |
|---|
| RBW = 1 MHz<br>VBW ≥ 3 x RBW for Peak, 100Hz for Average<br>Sweep = Auto couple<br>Detector = Peak<br>Trace = Max Hold. |

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| **Tested By :** | **Date of testing:** |
|---|---|
| Jose Aguirre | 08-Aug-15 - 10-Oct-15 |
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 1 | 6 | -47.6 | | | | -41.6 | -41.25 | 0.4 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | -52.1 | -51.8 | | | -42.9 | -41.25 | 1.7 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | -52.1 | -51.8 | -52.7 | | -41.4 | -41.25 | 0.2 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | -53.3 | -53.5 | -54.5 | -54.3 | -41.8 | -41.25 | 0.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | -53.3 | -53.5 | | | -41.4 | -41.25 | 0.1 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | -56.9 | -56.8 | -57.3 | | -41.4 | -41.25 | 0.2 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -57.6 | -60.0 | -67.3 | -57.6 | -41.3 | -41.25 | 0.1 |
| | HT-20, M0 to M7 | 1 | 6 | -47.3 | | | | -41.3 | -41.25 | 0.0 |
| | HT-20, M0 to M7 | 2 | 6 | -50.8 | -50.5 | | | -41.6 | -41.25 | 0.4 |
| | HT-20, M8 to M15 | 2 | 6 | -50.8 | -50.5 | | | -41.6 | -41.25 | 0.4 |
| | HT-20, M0 to M7 | 3 | 6 | -52.2 | -52.5 | -53.5 | | -41.9 | -41.25 | 0.7 |
| | HT-20, M8 to M15 | 3 | 6 | -52.2 | -52.5 | -53.5 | | -41.9 | -41.25 | 0.7 |
| | HT-20, M16 to M23 | 3 | 6 | -52.2 | -52.5 | -53.5 | | -41.9 | -41.25 | 0.7 |
| | HT-20, M0 to M7 | 4 | 6 | -53.4 | -54.0 | -55.1 | -54.3 | -42.1 | -41.25 | 0.9 |
| | HT-20, M8 to M15 | 4 | 6 | -53.4 | -54.0 | -55.1 | -54.3 | -42.1 | -41.25 | 0.9 |
| | HT-20, M16 to M23 | 4 | 6 | -53.4 | -54.0 | -55.1 | -54.3 | -42.1 | -41.25 | 0.9 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | -53.4 | -54.0 | | | -41.7 | -41.25 | 0.4 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | -50.8 | -50.5 | | | -41.6 | -41.25 | 0.4 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | -57.0 | -56.9 | -57.8 | | -41.6 | -41.25 | 0.4 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | -53.4 | -54.0 | -55.1 | | -41.5 | -41.25 | 0.3 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | -52.2 | -52.5 | -53.5 | | -41.9 | -41.25 | 0.7 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -57.5 | -59.9 | -67.2 | -58.6 | -41.6 | -41.25 | 0.3 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | -57.0 | -56.9 | -57.8 | -54.4 | -41.3 | -41.25 | 0.1 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | -54.6 | -55.0 | -55.9 | -54.3 | -41.7 | -41.25 | 0.4 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | -50.8 | -50.5 | | | -41.6 | -41.25 | 0.4 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | -52.2 | -52.5 | -53.5 | | -41.9 | -41.25 | 0.7 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | -53.4 | -54.0 | -55.1 | -54.3 | -42.1 | -41.25 | 0.9 |
| | | | | | | | | | | |
| 5190 | Non HT-40, 6 to 54 Mbps | 1 | 6 | -48.6 | | | | -42.6 | -41.25 | 1.4 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | -50.9 | -50.6 | | | -41.7 | -41.25 | 0.5 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | -52.4 | -52.1 | -53.4 | | -41.8 | -41.25 | 0.6 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | -53.7 | -53.1 | -54.4 | -54.4 | -41.8 | -41.25 | 0.6 |
| | HT-40, M0 to M7 | 1 | 6 | -48.5 | | | | -42.5 | -41.25 | 1.3 |
| | HT-40, M0 to M7 | 2 | 6 | -50.7 | -50.4 | | | -41.5 | -41.25 | 0.3 |
| | HT-40, M8 to M15 | 2 | 6 | -50.7 | -50.4 | | | -41.5 | -41.25 | 0.3 |
| | HT-40, M0 to M7 | 3 | 6 | -52.4 | -51.9 | -53.3 | | -41.7 | -41.25 | 0.5 |
| | HT-40, M8 to M15 | 3 | 6 | -52.4 | -51.9 | -53.3 | | -41.7 | -41.25 | 0.5 |
| | HT-40, M16 to M23 | 3 | 6 | -52.4 | -51.9 | -53.3 | | -41.7 | -41.25 | 0.5 |
| | HT-40, M0 to M7 | 4 | 6 | -53.3 | -54.0 | -55.3 | -54.5 | -42.2 | -41.25 | 0.9 |
| | HT-40, M8 to M15 | 4 | 6 | -53.3 | -54.0 | -55.3 | -54.5 | -42.2 | -41.25 | 0.9 |
| | HT-40, M16 to M23 | 4 | 6 | -53.3 | -54.0 | -55.3 | -54.5 | -42.2 | -41.25 | 0.9 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | -53.3 | -54.0 | | | -41.6 | -41.25 | 0.4 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | -50.7 | -50.4 | | | -41.5 | -41.25 | 0.3 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | -58.0 | -57.6 | -59.2 | | -42.6 | -41.25 | 1.4 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | -53.3 | -54.0 | -55.3 | | -41.6 | -41.25 | 0.3 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | -52.4 | -51.9 | -53.3 | | -41.7 | -41.25 | 0.5 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -57.7 | -60.0 | -67.3 | -59.7 | -42.0 | -41.25 | 0.8 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | -58.0 | -57.6 | -59.2 | -54.7 | -42.0 | -41.25 | 0.8 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | -54.6 | -54.8 | -56.2 | -54.6 | -41.8 | -41.25 | 0.5 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | -50.7 | -50.4 | | | -41.5 | -41.25 | 0.3 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | -52.4 | -51.9 | -53.3 | | -41.7 | -41.25 | 0.5 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | -53.3 | -54.0 | -55.3 | -54.5 | -42.2 | -41.25 | 0.9 |



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| 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) |
|---|---|---|---|---|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 1 | 6 | -30.1 | | | | -24.1 | -21.25 | 2.9 |
| | Non HT-20, 6 to 54 Mbps | 2 | 6 | -39.9 | -39.0 | | | -30.4 | -21.25 | 9.2 |
| | Non HT-20, 6 to 54 Mbps | 3 | 6 | -39.9 | -39.0 | -38.9 | | -28.5 | -21.25 | 7.2 |
| | Non HT-20, 6 to 54 Mbps | 4 | 6 | -42.9 | -42.8 | -42.0 | -44.5 | -30.9 | -21.25 | 9.7 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 2 | 9 | -42.9 | -42.8 | | | -30.8 | -21.25 | 9.6 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 3 | 11 | -47.5 | -46.3 | -46.9 | | -31.3 | -21.25 | 10.1 |
| | Non HT-20 Beam Forming, 6 to 54 Mbps | 4 | 12 | -53.9 | -55.1 | -56.2 | -52.1 | -36.0 | -21.25 | 14.8 |
| | HT-20, M0 to M7 | 1 | 6 | -32.7 | | | | -26.7 | -21.25 | 5.5 |
| | HT-20, M0 to M7 | 2 | 6 | -32.2 | -35.9 | | | -24.7 | -21.25 | 3.4 |
| | HT-20, M8 to M15 | 2 | 6 | -32.2 | -35.9 | | | -24.7 | -21.25 | 3.4 |
| | HT-20, M0 to M7 | 3 | 6 | -41.6 | -39.5 | -43.6 | | -30.5 | -21.25 | 9.2 |
| | HT-20, M8 to M15 | 3 | 6 | -41.6 | -39.5 | -43.6 | | -30.5 | -21.25 | 9.2 |
| | HT-20, M16 to M23 | 3 | 6 | -41.6 | -39.5 | -43.6 | | -30.5 | -21.25 | 9.2 |
| | HT-20, M0 to M7 | 4 | 6 | -46.2 | -40.0 | -45.3 | -44.5 | -31.2 | -21.25 | 10.0 |
| | HT-20, M8 to M15 | 4 | 6 | -46.2 | -40.0 | -45.3 | -44.5 | -31.2 | -21.25 | 10.0 |
| | HT-20, M16 to M23 | 4 | 6 | -46.2 | -40.0 | -45.3 | -44.5 | -31.2 | -21.25 | 10.0 |
| | HT-20 Beam Forming, M0 to M7 | 2 | 9 | -46.2 | -40.0 | | | -30.1 | -21.25 | 8.8 |
| | HT-20 Beam Forming, M8 to M15 | 2 | 6 | -32.2 | -35.9 | | | -24.7 | -21.25 | 3.4 |
| | HT-20 Beam Forming, M0 to M7 | 3 | 11 | -46.8 | -46.1 | -46.9 | | -31.0 | -21.25 | 9.8 |
| | HT-20 Beam Forming, M8 to M15 | 3 | 8 | -46.2 | -40.0 | -45.3 | | -30.3 | -21.25 | 9.1 |
| | HT-20 Beam Forming, M16 to M23 | 3 | 6 | -41.6 | -39.5 | -43.6 | | -30.5 | -21.25 | 9.2 |
| | HT-20 Beam Forming, M0 to M7 | 4 | 12 | -54.4 | -55.0 | -55.7 | -51.1 | -35.6 | -21.25 | 14.4 |
| | HT-20 Beam Forming, M8 to M15 | 4 | 9 | -46.8 | -46.1 | -46.9 | -46.3 | -31.5 | -21.25 | 10.2 |
| | HT-20 Beam Forming, M16 to M23 | 4 | 7 | -44.7 | -41.2 | -42.6 | -46.2 | -30.0 | -21.25 | 8.8 |
| | HT-20 STBC, M0 to M7 | 2 | 6 | -32.2 | -35.9 | | | -24.7 | -21.25 | 3.4 |
| | HT-20 STBC, M0 to M7 | 3 | 6 | -41.6 | -39.5 | -43.6 | | -30.5 | -21.25 | 9.2 |
| | HT-20 STBC, M0 to M7 | 4 | 6 | -46.2 | -40.0 | -45.3 | -44.5 | -31.2 | -21.25 | 10.0 |



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| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 5190 | Non HT-40, 6 to 54 Mbps | 1 | 6 | -33.7 | | | | -27.7 | -21.25 | 6.5 |
| | Non HT-40, 6 to 54 Mbps | 2 | 6 | -37.1 | -37.0 | | | -28.0 | -21.25 | 6.8 |
| | Non HT-40, 6 to 54 Mbps | 3 | 6 | -45.9 | -37.2 | -39.5 | | -28.8 | -21.25 | 7.6 |
| | Non HT-40, 6 to 54 Mbps | 4 | 6 | -45.7 | -40.5 | -41.7 | -47.9 | -31.0 | -21.25 | 9.7 |
| | HT-40, M0 to M7 | 1 | 6 | -40.5 | | | | -34.5 | -21.25 | 13.3 |
| | HT-40, M0 to M7 | 2 | 6 | -42.8 | -39.7 | | | -32.0 | -21.25 | 10.7 |
| | HT-40, M8 to M15 | 2 | 6 | -42.8 | -39.7 | | | -32.0 | -21.25 | 10.7 |
| | HT-40, M0 to M7 | 3 | 6 | -42.8 | -42.7 | -42.6 | | -31.9 | -21.25 | 10.7 |
| | HT-40, M8 to M15 | 3 | 6 | -42.8 | -42.7 | -42.6 | | -31.9 | -21.25 | 10.7 |
| | HT-40, M16 to M23 | 3 | 6 | -42.8 | -42.7 | -42.6 | | -31.9 | -21.25 | 10.7 |
| | HT-40, M0 to M7 | 4 | 6 | -45.7 | -43.8 | -44.8 | -49.6 | -33.5 | -21.25 | 12.2 |
| | HT-40, M8 to M15 | 4 | 6 | -45.7 | -43.8 | -44.8 | -49.6 | -33.5 | -21.25 | 12.2 |
| | HT-40, M16 to M23 | 4 | 6 | -45.7 | -43.8 | -44.8 | -49.6 | -33.5 | -21.25 | 12.2 |
| | HT-40 Beam Forming, M0 to M7 | 2 | 9 | -45.7 | -43.8 | | | -32.6 | -21.25 | 11.4 |
| | HT-40 Beam Forming, M8 to M15 | 2 | 6 | -42.8 | -39.7 | | | -32.0 | -21.25 | 10.7 |
| | HT-40 Beam Forming, M0 to M7 | 3 | 11 | -45.6 | -46.2 | -50.2 | | -31.3 | -21.25 | 10.1 |
| | HT-40 Beam Forming, M8 to M15 | 3 | 8 | -45.7 | -43.8 | -44.8 | | -32.1 | -21.25 | 10.9 |
| | HT-40 Beam Forming, M16 to M23 | 3 | 6 | -42.8 | -42.7 | -42.6 | | -31.9 | -21.25 | 10.7 |
| | HT-40 Beam Forming, M0 to M7 | 4 | 12 | -54.7 | -54.5 | -57.4 | -51.1 | -35.8 | -21.25 | 14.6 |
| | HT-40 Beam Forming, M8 to M15 | 4 | 9 | -45.6 | -46.2 | -50.2 | -49.6 | -32.4 | -21.25 | 11.2 |
| | HT-40 Beam Forming, M16 to M23 | 4 | 7 | -44.3 | -44.1 | -46.4 | -50.5 | -32.5 | -21.25 | 11.2 |
| | HT-40 STBC, M0 to M7 | 2 | 6 | -42.8 | -39.7 | | | -32.0 | -21.25 | 10.7 |
| | HT-40 STBC, M0 to M7 | 3 | 6 | -42.8 | -42.7 | -42.6 | | -31.9 | -21.25 | 10.7 |
| | HT-40 STBC, M0 to M7 | 4 | 6 | -45.7 | -43.8 | -44.8 | -49.6 | -33.5 | -21.25 | 12.2 |



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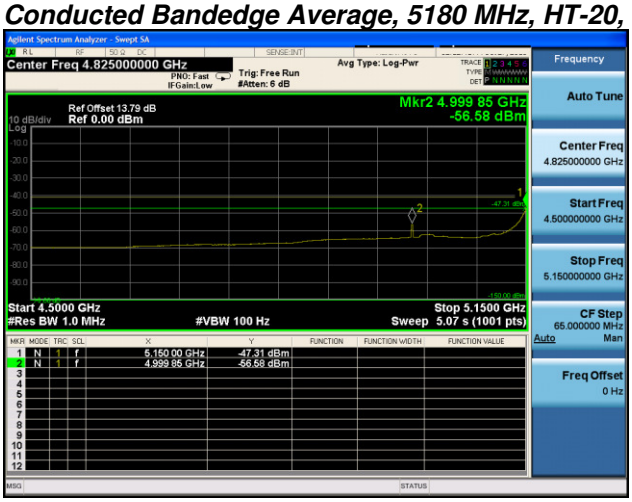
***Conducted Bandedge Average, 5180 MHz, HT-20, M0 to M7***




***Antenna A***



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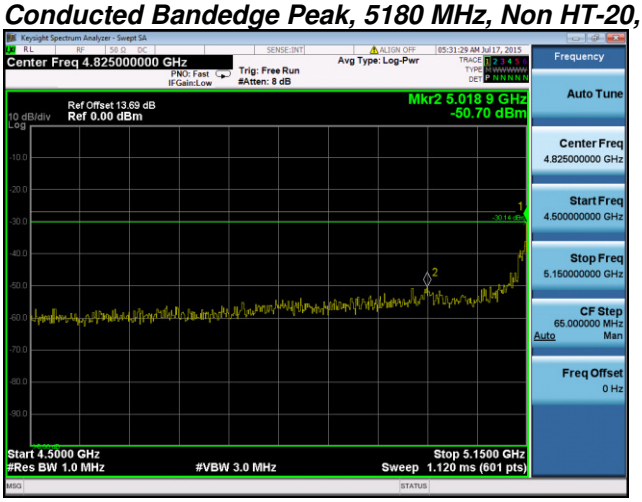
***Conducted Bandedge Peak, 5180 MHz, Non HT-20, 6 to 54 Mbps***




***Antenna A***



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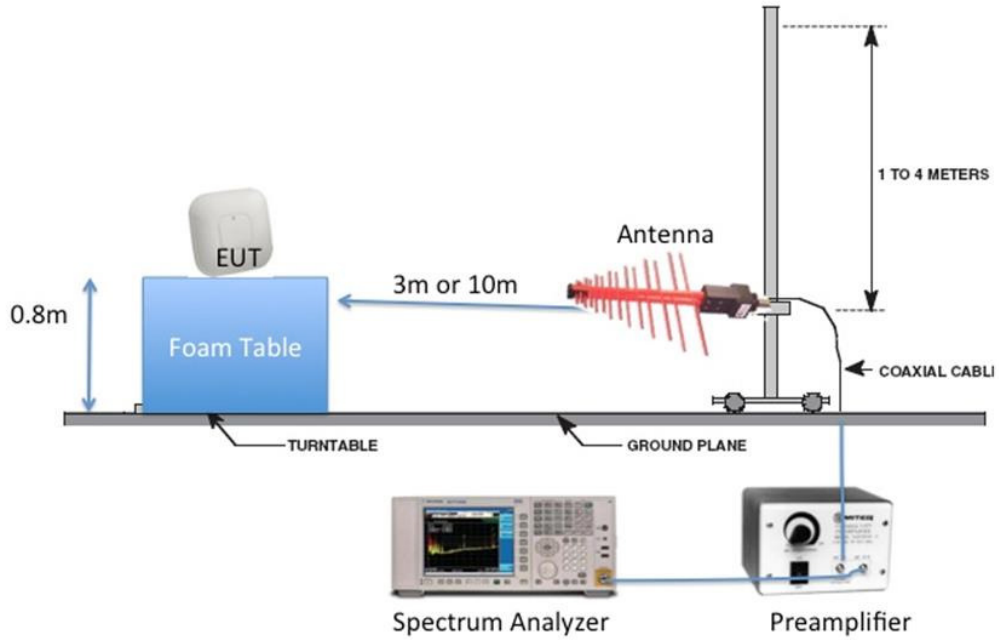
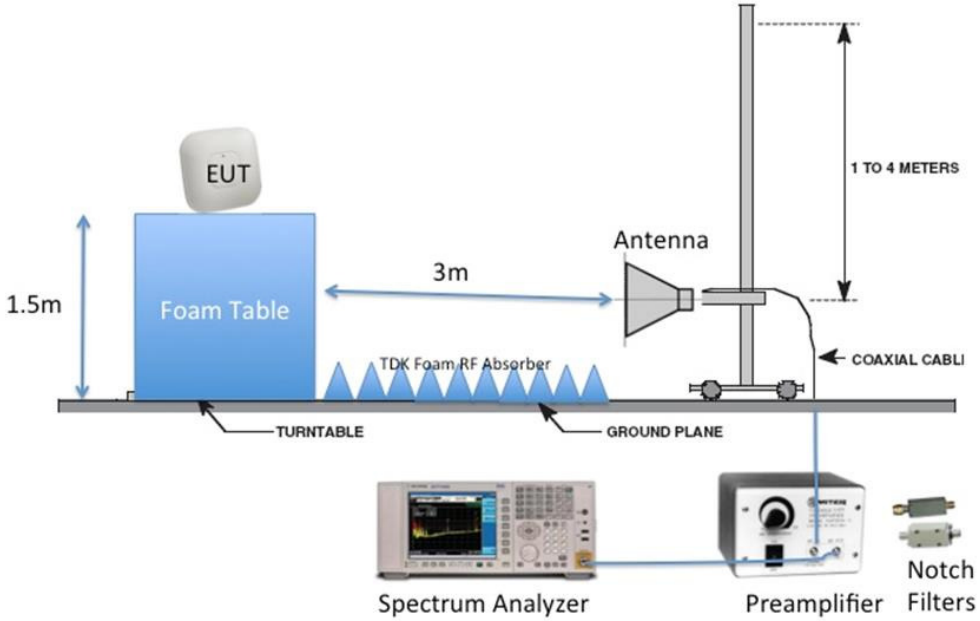
**Appendix B: Emission Test Results**

**Testing Laboratory:** Cisco Systems, Inc., 170 West Tasman Drive, San Jose, CA 95134, USA

## Radiated Emission Setup Diagram-Below 1G




## Radiated Emission Setup Diagram-Above 1G



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# B.1 Radiated Spurious Emissions

**FCC 15.205** / **15.407** 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)).

**Ref.** ANSI C63.10: 2013 section 12.7.6 (peak) & 12.7.7.3 (average)

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| | |
|---|---|
| Span: | 1GHz – 18 GHz/18GHz-26G/26GHz-40GHz |
| Reference Level: | 80 dBuV |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 1MHz |
| Video Bandwidth: | 3 MHz for peak, 1 KHz for average |
| Detector: | Peak |

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

Save 2 plots: 1) Average plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
2) Peak plot (Vertical and Horizontal), Limit = 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.

This report represents the worst case data for all supported operating modes and antennas. There are no measurable emissions above 18 GHz.

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| Tested By : | Date of testing: |
|---|---|
| Jose Aguirre | 08-Aug-15 - 10-Oct-15 |
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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## B.1.A Transmitter Radiated Spurious Emissions-Average Worst Case

| Frequency (MHz) | Mode | Data Rate (Mbps) | Spurious Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (MHz) |
|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 6 | 49.7 | 54 | 4.3 |
| 5190 | HT-40, M0 to M23 | m0 | 49.6 | 54 | 4.4 |
| 5230 | HT-40, M0 to M23 | m0 | 49.8 | 54 | 4.2 |
| 5240 | Non HT-20, 6 to 54 Mbps | 6 | 49.8 | 54 | 4.2 |



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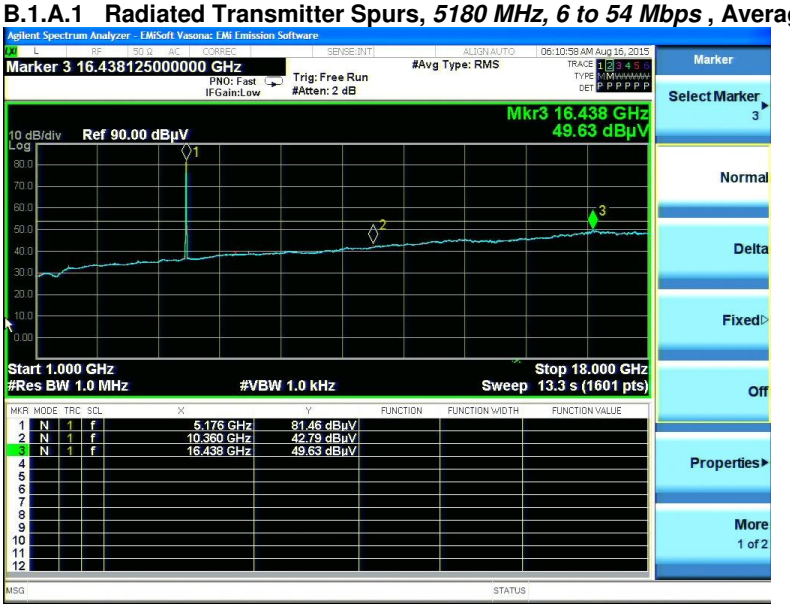
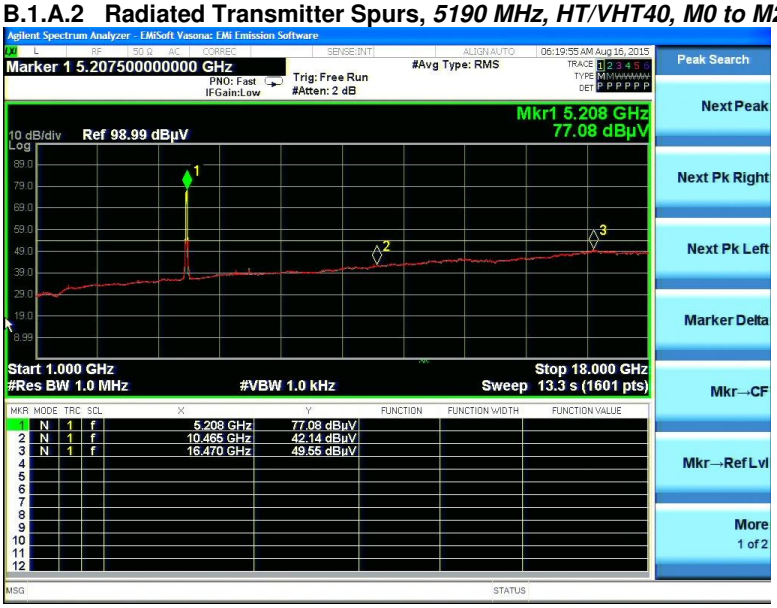
### B.1.A.1 Radiated Transmitter Spurs, *5180 MHz, 6 to 54 Mbps* , Average (1-18GHz)




### B.1.A.2 Radiated Transmitter Spurs, *5190 MHz, HT/VHT40, M0 to M23,* Average (1-18GHz)



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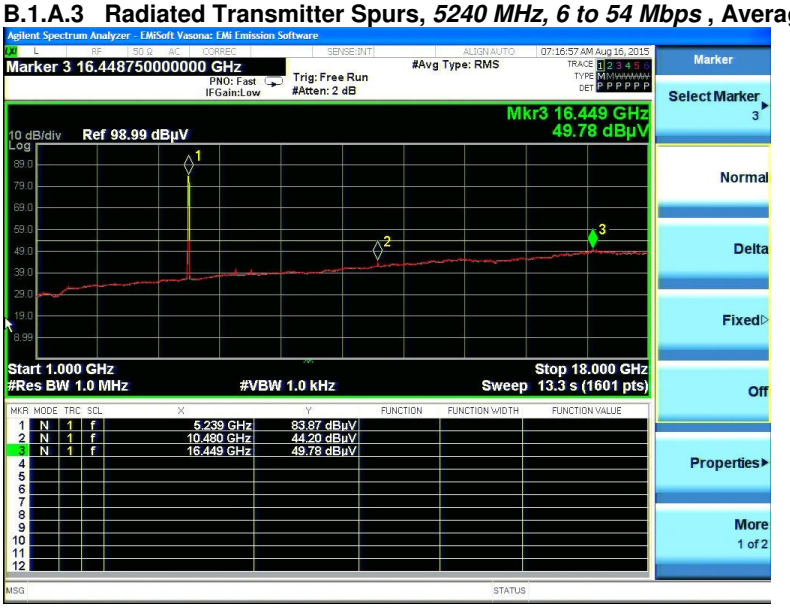
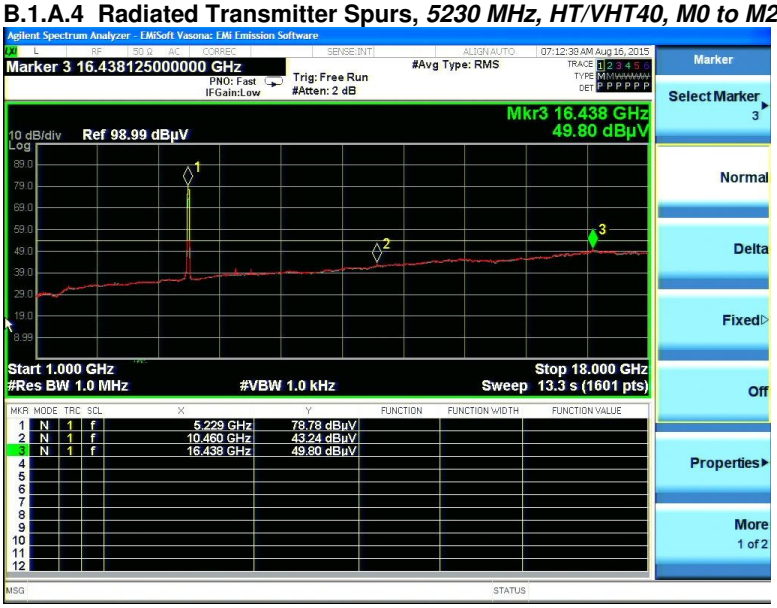
### B.1.A.3 Radiated Transmitter Spurs, *5240 MHz, 6 to 54 Mbps* , Average (1-18GHz)




### B.1.A.4 Radiated Transmitter Spurs, *5230 MHz, HT/VHT40, M0 to M23,* Average (1-18GHz)



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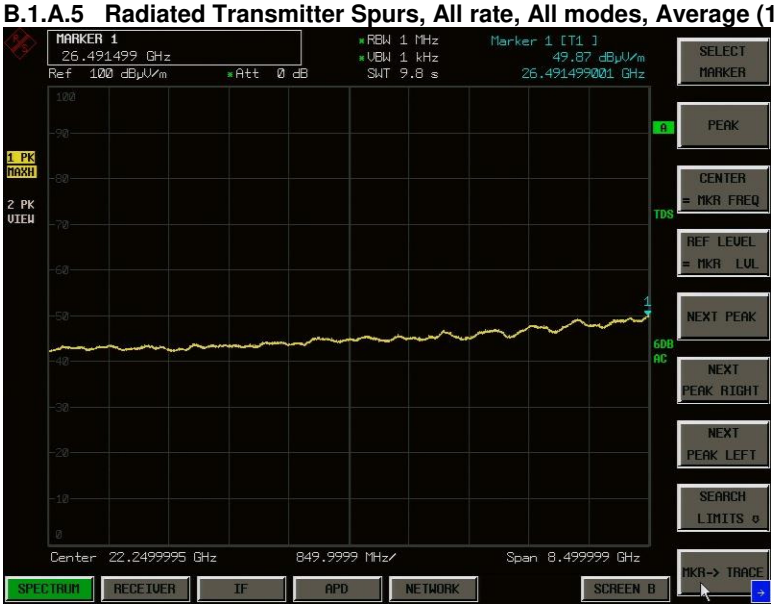
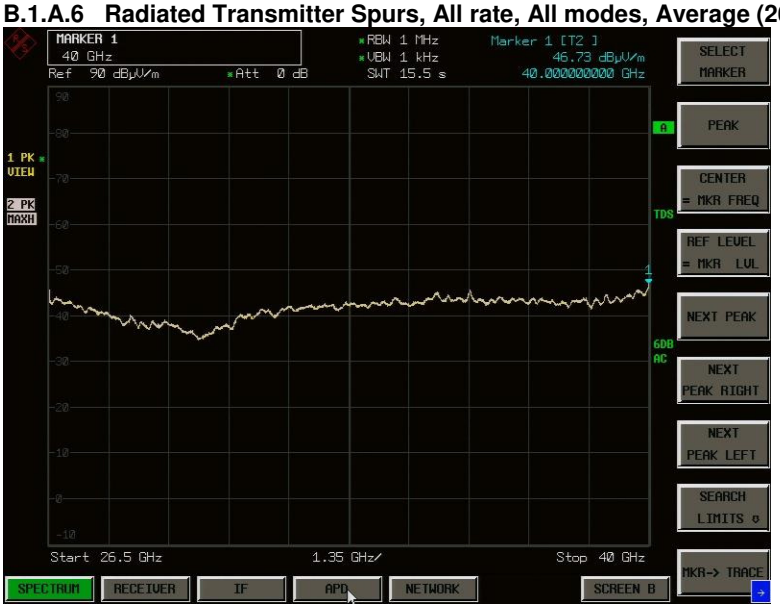
### B.1.A.5 Radiated Transmitter Spurs, All rate, All modes, Average (18-26.5GHz)




### B.1.A.6 Radiated Transmitter Spurs, All rate, All modes, Average (26.5- 40GHz)



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## B.1.P Transmitter Radiated Spurious Emissions-Peak Worst Case

| Frequency (MHz) | Mode | Data Rate (Mbps) | Spurious Emission Level (dBuV/m) | Limit (dBuV/m) | Margin (MHz) |
|---|---|---|---|---|---|
| 5180 | Non HT-20, 6 to 54 Mbps | 6 | 58.2 | 74 | 15.8 |
| 5190 | HT-40, M0 to M23 | m0 | 60.2 | 74 | 13.8 |
| 5230 | HT-40, M0 to M23 | m0 | 59.0 | 74 | 15.0 |
| 5240 | Non HT-20, 6 to 54 Mbps | 6 | 60.4 | 74 | 13.6 |



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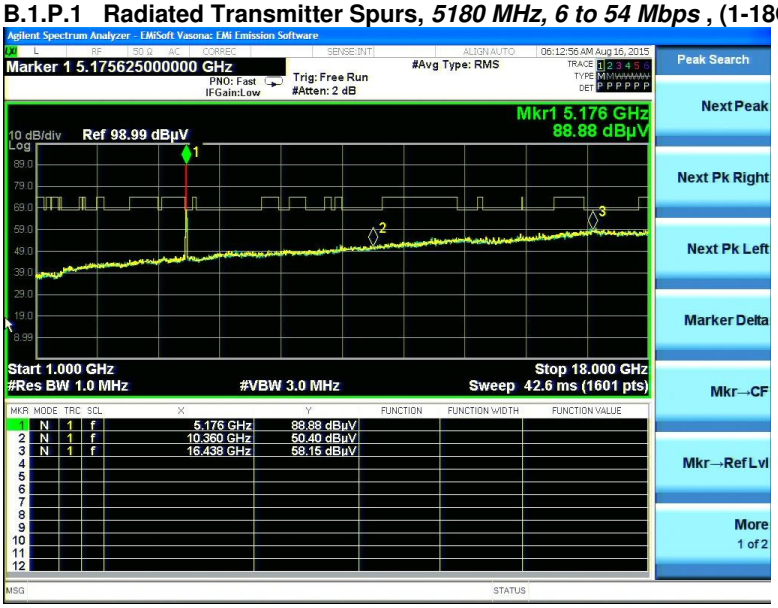
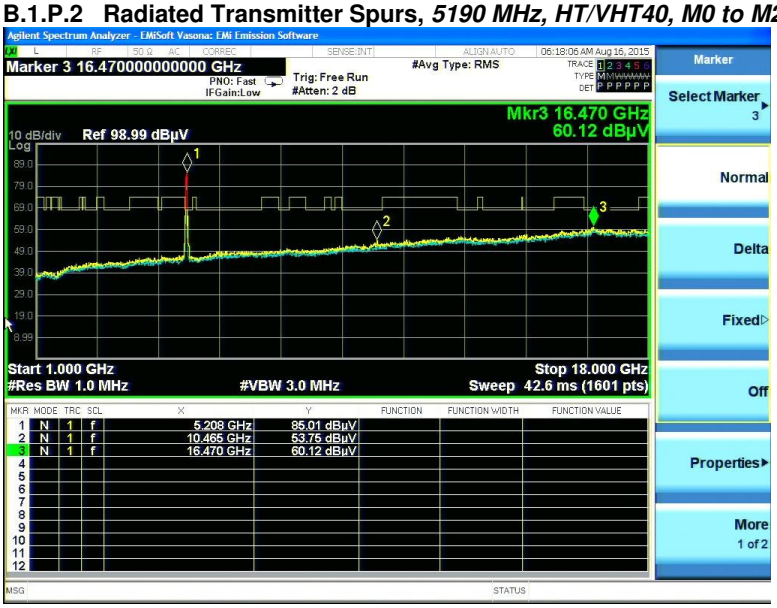
### B.1.P.1 Radiated Transmitter Spurs, *5180 MHz, 6 to 54 Mbps* , (1-18GHz)




### B.1.P.2 Radiated Transmitter Spurs, *5190 MHz, HT/VHT40, M0 to M23,* Peak (1-18GHz)



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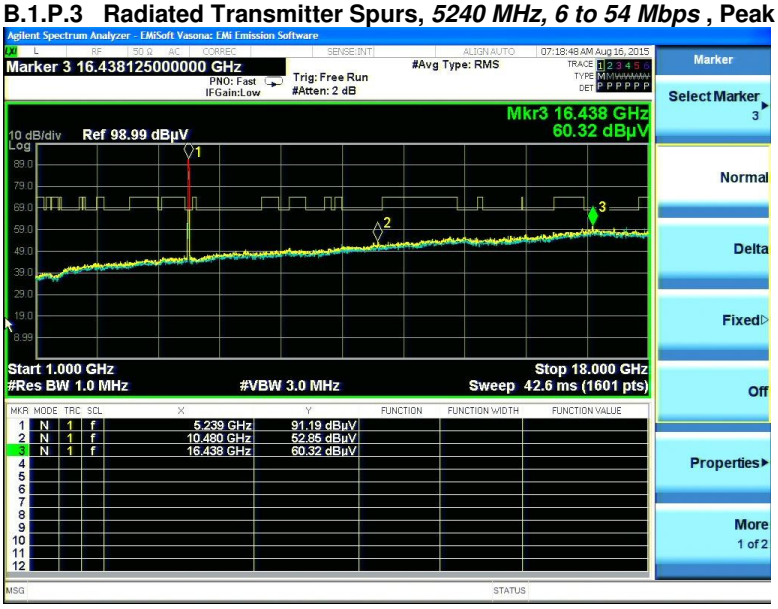
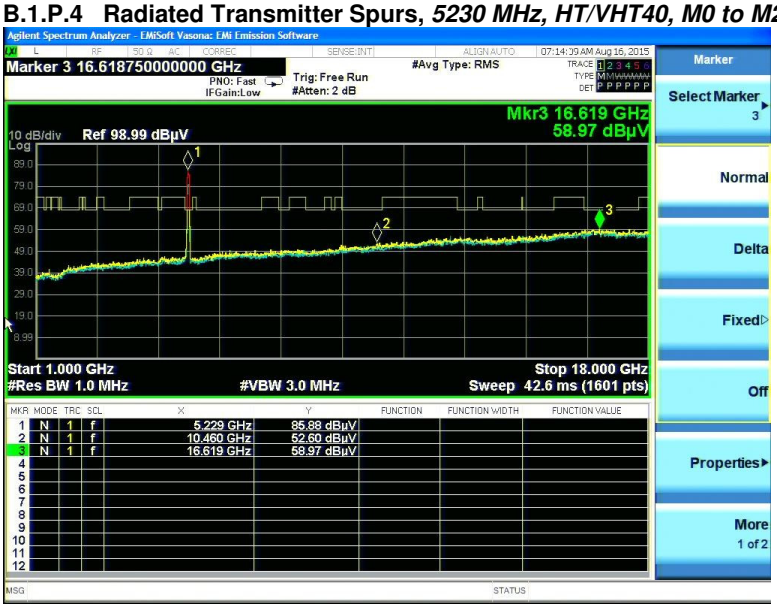
### B.1.P.3 Radiated Transmitter Spurs, *5240 MHz, 6 to 54 Mbps* , Peak (1-18GHz)




### B.1.P.4 Radiated Transmitter Spurs, *5230 MHz, HT/VHT40, M0 to M23,* Peak (1-18GHz)



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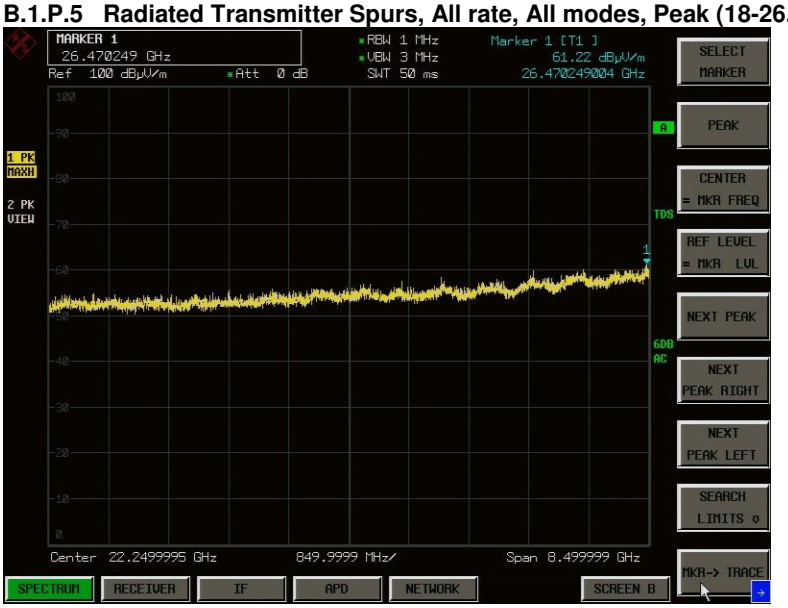
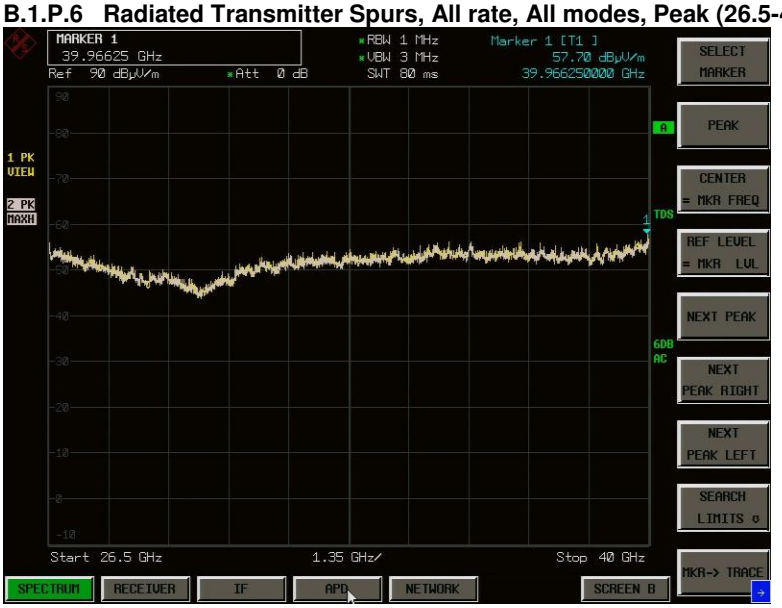
### B.1.P.5 Radiated Transmitter Spurs, All rate, All modes, Peak (18-26.5GHz) Horizontal & Vertical




### B.1.P.6 Radiated Transmitter Spurs, All rate, All modes, Peak (26.5-40GHz) Horizontal & Vertical



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# B.2 Radiated Emissions 30MHz to 1GHz

**FCC 15.209** / **15.205** / **15.407** 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)).

**Ref.** ANSI C63.10: 2013 section 6.5

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| | |
|---|---|
| Span: | 30MHz – 1GHz |
| Reference Level: | 80 dBuV |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 100kHz |
| Video Bandwidth: | 300kHz |
| Detector: | Peak for Pre-scan, Quasi-Peak<br>Compliance shall be determined using CISPR quasi-peak detection; however, peak detection is permitted as an alternative to quasi-peak detection. |

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

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

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| Tested By : | Date of testing: |
|---|---|
| Jose Aguirre | 08-Aug-15 - 10-Oct-15 |
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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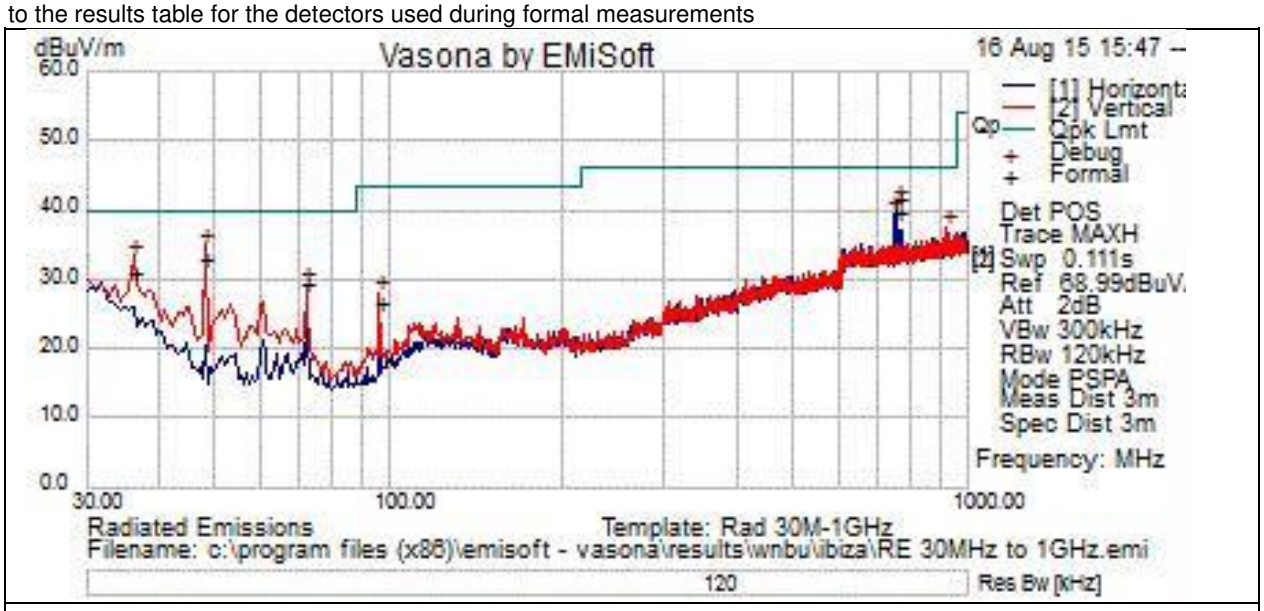
**Graphical Test Results**

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements




IBIZA

**Test Results Table**

| Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72.025 | 20.7 | 0.7 | 7.9 | 29.3 | Qp | V | 113 | 2 | 40 | -10.7 | Pass | |
| 96.038 | 17 | 0.8 | 9.1 | 26.9 | Qp | V | 115 | 52 | 43.5 | -16.6 | Pass | |
| 36.028 | 14.4 | 0.5 | 16.4 | 31.3 | Qp | V | 111 | 71 | 40 | -8.7 | Pass | |
| 758.406 | 18.6 | 2.3 | 20.8 | 41.8 | Qp | H | 108 | 148 | 46 | -4.2 | Pass | |
| 758.663 | 16.7 | 2.3 | 20.8 | 39.8 | Qp | H | 111 | 148 | 46 | -6.2 | Pass | |
| 48.028 | 24.1 | 0.6 | 8.4 | 33.2 | Qp | V | 101 | 310 | 40 | -6.8 | Pass | |



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# B.3 AC Conducted Emissions

**FCC 15.207** Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries.

Measurement Procedure
Accordance with ANSI C63.10:2013 section 6.2

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| | |
|---|---|
| Span: | 150 KHz – 30 MHz |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 9 KHz |
| Video Bandwidth: | 30 KHz |
| Detector: | Quasi-Peak / Average |

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| | Support | S02 | ☐ | ☑ |

| Tested By : | Date of testing: |
|---|---|
| Jose Aguirre | 08-Aug-15 - 10-Oct-15 |
| **Test Result : PASS** | |

See Appendix C for list of test equipment



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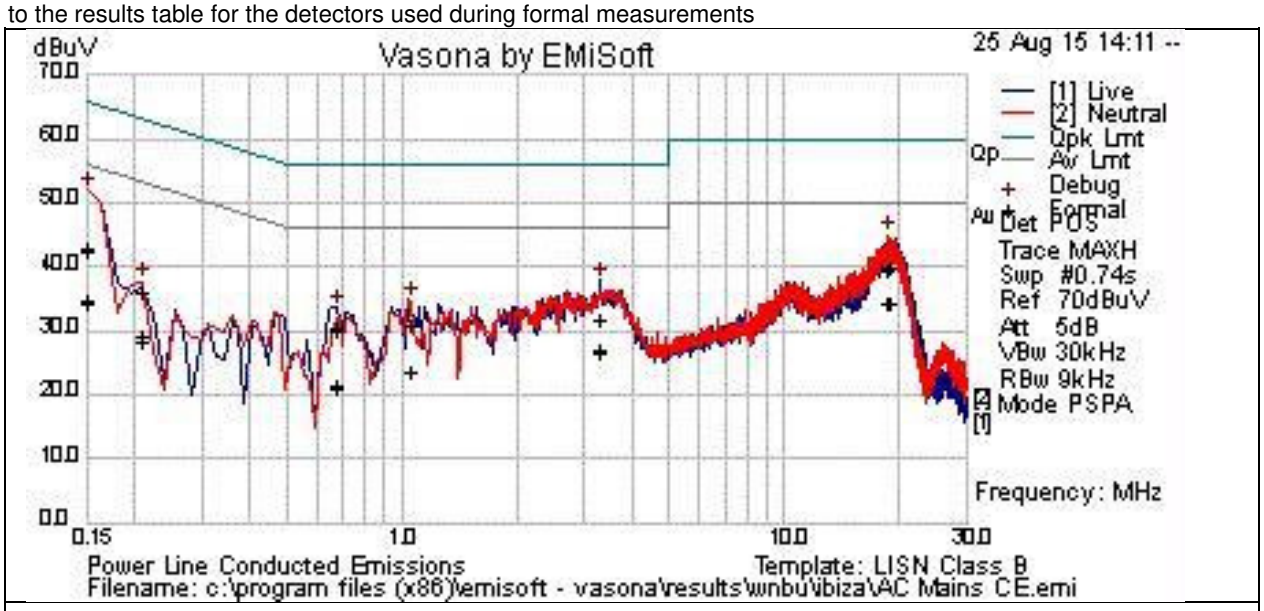
**Graphical Test Results**

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements




IBIZA

**Test Results Table**

| Frequency MHz | Raw dBuV | Cable Loss | Factors dB | Level dBuV | Measurement Type | Line | Limit dBuV | Margin dB | Pass /Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| 0.15 | 21.5 | 21.1 | 0.1 | 42.6 | Qp | L | 66 | -23.4 | Pass | |
| 0.672375 | 10.2 | 20 | 0 | 30.2 | Qp | L | 56 | -25.8 | Pass | |
| 1.046 | 11.1 | 20 | 0 | 31.1 | Qp | L | 56 | -24.9 | Pass | |
| 3.299 | 11.8 | 20 | 0 | 31.8 | Qp | L | 56 | -24.2 | Pass | |
| 18.672 | 19.3 | 20.3 | 0.1 | 39.7 | Qp | L | 60 | -20.3 | Pass | |
| 0.2097 | 15.1 | 20.8 | 0 | 36 | Qp | L | 63.2 | -27.3 | Pass | |
| 18.956 | 19.3 | 20.3 | 0.1 | 39.8 | Qp | N | 60 | -20.2 | Pass | |
| 0.672375 | 10.3 | 20 | 0 | 30.4 | Qp | N | 56 | -25.6 | Pass | |
| 0.15 | 21.6 | 21.1 | 0.1 | 42.8 | Qp | N | 66 | -23.2 | Pass | |
| 1.046 | 10.9 | 20 | 0 | 31 | Qp | N | 56 | -25 | Pass | |
| 0.208 | 15.2 | 20.8 | 0 | 36 | Qp | N | 63.3 | -27.3 | Pass | |
| 3.276 | 11.8 | 20 | 0 | 31.8 | Qp | N | 56 | -24.2 | Pass | |
| 0.15 | 13.5 | 21.1 | 0.1 | 34.6 | Av | L | 56 | -21.4 | Pass | |
| 0.672375 | 1.2 | 20 | 0 | 21.3 | Av | L | 46 | -24.7 | Pass | |
| 1.046 | 3.6 | 20 | 0 | 23.6 | Av | L | 46 | -22.4 | Pass | |
| 3.299 | 6.6 | 20 | 0 | 26.7 | Av | L | 46 | -19.3 | Pass | |
| 18.672 | 13.9 | 20.3 | 0.1 | 34.3 | Av | L | 50 | -15.7 | Pass | |
| 0.2097 | 8.2 | 20.8 | 0 | 29.1 | Av | L | 53.2 | -24.2 | Pass | |
| 18.956 | 14 | 20.3 | 0.1 | 34.4 | Av | N | 50 | -15.6 | Pass | |
| 0.672375 | 1.2 | 20 | 0 | 21.2 | Av | N | 46 | -24.8 | Pass | |
| 0.15 | 13.2 | 21.1 | 0.1 | 34.4 | Av | N | 56 | -21.6 | Pass | |
| 1.046 | 3.4 | 20 | 0 | 23.5 | Av | N | 46 | -22.5 | Pass | |
| 0.208 | 7.5 | 20.8 | 0 | 28.3 | Av | N | 53.3 | -25 | Pass | |
| 3.276 | 6.8 | 20 | 0 | 26.8 | Av | N | 46 | -19.2 | Pass | |



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**Test Setup Photos**

**Title: AIR-CAP2602E-B-K9** Physical Test Arrangement Photograph

This is a dual band 2.4GHz / 5GHz device. All ports in this test set up photo are connected as all testing is automated. Section 2.6 of this test report given an overview of the different Tx antenna combinations used by this device.



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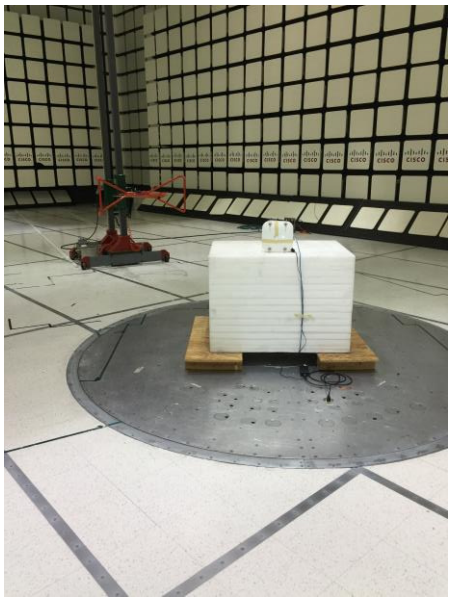
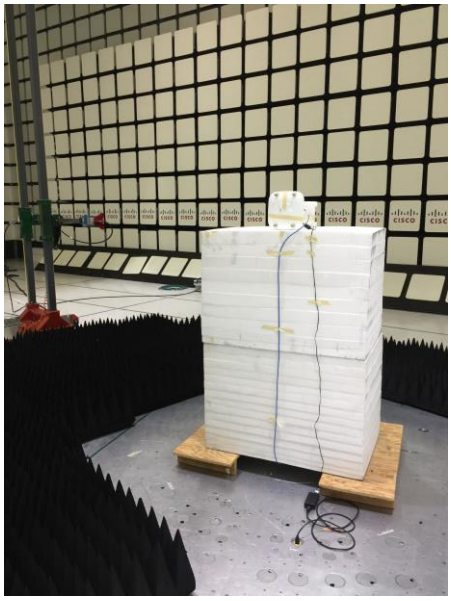
**AIR-CAP2602E-B-K9 Radiated Test setup photo 30MHz to 1GHz**



**AIR-CAP2602E-B-K9 Radiated Test setup photo above 1GHz**





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**AIR-CAP2602E-B-K9 AC Conducted Emissions setup photo**

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# Appendix C: List of Test Equipment Used to perform the test

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Due | Test Item |
|---|---|---|---|---|---|
| **Test Equipment used for Radiated Emissions above 1GHz** | | | | | |
| CIS044940 | ROHDE & SCHWARZ / ESU40 | EMI RECEIVER, 40GHZ | 27-May-15 | 27-May-16 | B.1 |
| CIS033988 | Agilent /E4446A | PSA Spectrum Analyzer | 9-Dec-14 | 9-Dec-15 | B.1 |
| CIS035284 | ETS Lindgren / 3117 | Double Ridged Horn Antenna | 16-Sep-14 | 16-Sep-15 | B.1 |
| CIS043124 | Cisco /Above 1GHz Site Cal | Above 1GHz Cispr Site Verification | 15-Jan-15 | 15-Jan-16 | B.1 |
| CIS008166 | HP / 8491B Opt 010 | 10dB Attenuator | 2-Feb-15 | 2-Feb-16 | B.1 |
| CIS003003 | HP / 83731B | Synthesized Signal Generator | 13-Mar-15 | 13-Mar-16 | B.1 |
| CIS005691 | Miteq / NSP1800-25-S1 | Broadband Preamplifier (1-18GHz) | 29-Jan-15 | 29-Jan-16 | B.1. |
| CIS005691 | Miteq / NSP1800-25-S1 | Broadband Preamplifier (1-18GHz) | 25-Jun-15 | 25-Jun-16 | B.1. |
| CIS041979 | Cisco / 1840 | 18-40GHz EMI Test Head/Verification Fixture | 13-Jul-15 | 13-Jul-16 | B.1 |
| CIS041929 | Newport /iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 20-Dec-14 | 20-Dec-15 | B.1 |
| CIS024998 | MICRO-COAX / UFB197C-1-0240-504504 | Coaxial RF Cable, 26.5 GHz | 11-Mar-15 | 11-Mar-16 | B.1 |
| CIS049516 | Keysight / N9030A | PXA Spectrum Analyzer | 12-Nov-14 | 12-Nov-15 | B.1 |
| CIS020975 | Micro-Coax / UFB311A-0-1344-520520 | RF Coaxial Cable, to 18GHz, 134.4 in | 18-Feb-15 | 18-Feb-16 | B.1 |
| CIS030559 | Micro-Coax / UFB311A-1-0950-504504 | RF Coaxial Cable, to 18GHz, 95 in | 20-Feb-15 | 20-Feb-16 | B.1 |
| CIS047410 | Agilent / N9038A | EMI Receiver | 17-Feb-15 | 17-Feb-16 | B.1 |
| CIS051642 | Huber+Suhner / Sucoflex 106PA | RF N Type Cable 8.5m | 10-Feb-15 | 10-Feb-16 | B.1 |
| | | | | | |
| **Test Equipment used for Radiated Emissions Below 1GHz** | | | | | |
| CIS008342 | Times Microwave Systems RG-214 | 4 ft RG-214 Cable | 20-MAY-15 | 20-MAY-16 | B.2 |
| CIS008447 | Cisco NSA 10m Chamber | NSA 10m Chamber | 14-OCT-14 | 14-OCT-15 | B.2 |
| CIS020975 | Micro-Coax UFB311A-0-1344-520520 | RF Coaxial Cable, to 18GHz, 134.4 in | 18-FEB-15 | 18-FEB-16 | B.2 |
| CIS027233 | York CNE V | Comparison Noise Emitter | Cal Not Required | N/A | B.2 |
| CIS030652 | Sunol Sciences JB1 | Combination Antenna, 30MHz-2GHz | 05-NOV-14 | 05-NOV-15 | B.2 |
| CIS030559 | Micro-Coax UFB311A-1-0950-504504 | RF Coaxial Cable, to 18GHz, 95 in | 20-FEB-15 | 20-FEB-16 | B.2 |
| CIS041929 | Newport iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 20-DEC-14 | 20-DEC-15 | B.2 |
| CIS046708 | Stanley 33-428 | 8 Meter Tape Measure | Cal Not Required | N/A | B.2 |
| CIS047410 | Agilent N9038A | EMI Receiver | 17-FEB-15 | 17-FEB-16 | B.2 |
| CIS051642 | Huber+Suhner Sucoflex 106PA | RF N Type Cable 8.5m | 10-FEB-15 | 10-FEB-16 | B.2 |
| **Test Equipment used for AC Mains Conducted Emissions** | | | | | |



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| | | | | | |
|---|---|---|---|---|---|
| CIS008192 | Fischer Custom Communications FCC-450B-2.4-N | Instrumentation Limiter | 28-JUL-15 | 28-JUL-16 | B.3 |
| CIS008197 | TTE H613-150K-50-21378 | Hi Pass Filter - 150KHz cutoff | 16-APR-15 | 16-APR-16 | B.3 |
| CIS008471 | Bird 5-T-MB | 50 Ohm, 5W Terminator,Type BNC | 18-SEP-14 | 18-SEP-15 | B.3 |
| CIS019337 | Fischer Custom Communications FCC-LISN-50/250-50-2-01 | LISN | 08-SEP-14 | 08-SEP-15 | B.3 |
| CIS019136 | Fischer Custom Communications FCC-801-M3-32A | Power Line Coupling/Decoupling Network | 12-NOV-14 | 12-NOV-15 | B.3 |
| CIS023874 | Fischer Custom Communications FCC-LISN-PA-NEMA-5-15 | Power Adaptor, Polarized 120VAC | 08-SEP-14 | 08-SEP-15 | B.3 |
| CIS035235 | Lufkin HY1035CME | 5 Meter Tape Measure | Cal Not Required | N/A | B.3 |
| CIS036031 | York CNE V | Comparison Noise Emitter | Cal Not Required | N/A | B.3 |
| CIS039110 | Coleman RG-223 | 25 ft BNC cable | 24-NOV-14 | 24-NOV-15 | B.3 |
| CIS047410 | Agilent / N9038A | EMI Receiver | 17-Feb-15 | 17-Feb-16 | B.3 |
| | | | | | |
| **RF Conducted at output antenna port** | | | | | |
| CIS050721 | N9030A/ Keysight | PXA Signal Analyzer | 13-Apr-15 | 13-Apr-16 | A1 thru A4 |
| CIS054609 | ZFSC-2-10G /Mini-Circuits | Splitter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054608 | D3C2060 / Ditom | Splitter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054607 | PS4-09-452/4S/ Pulsar | Splitter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054606 | BRC50705-02/ Micro-Tronics | Notch Filter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054605 | BRC50703-02 / Micro-Tronics | Notch Filter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054604 | BRC50704-02/ Micro-Tronics | Notch Filter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054603 | BRM50702-02/ Micro-Tronics | Notch Filter | 01-June-15 | 01-June-16 | A1 thru A4 |
| CIS054637 | BWS30-W2/ Aeroflex | SMA 30dB Attenuator | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054636 | BWS20-W2/ Aeroflex | 20dB SMA Attenuator | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054625 | RA08-S1S1-24/Megaphase | SMA cable 24" | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054624 | RA08-S1S1-18/Megaphase | SMA cable 18" | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054623 | RA08-S1S1-18/Megaphase | SMA cable 18" | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054622 | RA08-S1S1-18/Megaphase | SMA cable 18" | 02-June-15 | 02-June-16 | A1 thru A4 |
| CIS054621 | RA08-S1S1-18/Megaphase | SMA cable 18" | 02-June-15 | 02-June-16 | A1 thru A4 |



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## Appendix E: Abbreviation Key and Definitions

**The following table defines abbreviations used within this test report.**

| Abbreviation | Description | Abbreviation | Description |
|---|---|---|---|
| EMC | Electro Magnetic Compatibility | °F | Degrees Fahrenheit |
| EMI | Electro Magnetic Interference | °C | Degrees Celsius |
| EUT | Equipment Under Test | Temp | Temperature |
| ITE | Information Technology Equipment | S/N | Serial Number |
| TAP | Test Assessment Schedule | Qty | Quantity |
| ESD | Electro Static Discharge | emf | Electromotive force |
| EFT | Electric Fast Transient | RMS | Root mean square |
| EDCS | Engineering Document Control System | Qp | Quasi Peak |
| Config | Configuration | Av | Average |
| CIS# | Cisco Number (unique identification number for Cisco test equipment) | Pk | Peak |
| Cal | Calibration | kHz | Kilohertz ($1x10^3$) |
| EN | European Norm | MHz | MegaHertz ($1x10^6$) |
| IEC | International Electro technical Commission | GHz | Gigahertz ($1x10^9$) |
| CISPR | International Special Committee on Radio Interference | H | Horizontal |
| CDN | Coupling/Decoupling Network | V | Vertical |
| LISN | Line Impedance Stabilization Network | dB | decibel |
| PE | Protective Earth | V | Volt |
| GND | Ground | kV | Kilovolt ($1x10^3$) |
| L1 | Line 1 | µV | Microvolt ($1x10^{-6}$) |
| L2 | Line2 | A | Amp |
| L3 | Line 3 | µA | Micro Amp ($1x10^{-6}$) |
| DC | Direct Current | mS | Milli Second ($1x10^{-3}$) |
| RAW | Uncorrected measurement value, as indicated by the measuring device | µS | Micro Second ($1x10^{-6}$) |
| RF | Radio Frequency | µS | Micro Second ($1x10^{-6}$) |
| SLCE | Signal Line Conducted Emissions | m | Meter |
| Meas dist | Measurement distance | Spec dist | Specification distance |
| N/A or NA | Not Applicable | SL | Signal Line (or Telecom Line) |
| P | Power Line | L | Live Line |
| N | Neutral Line | R | Return |
| S | Supply | AC | Alternating Current |



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