# Radio Test Report

## C9130AXE-A; C9130AXE-B; C9130AXE-T;

## C9130AXE-S; C9130AXE-K; C9130AXE-D; C9130AXE-Z;

## Wi-Fi 6 Access Point

**FCC ID: LDK948342197**
**IC ID: 2461N-948342197**

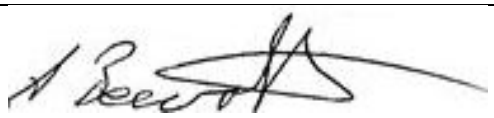
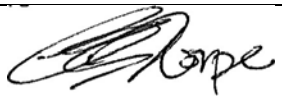
**5150 MHz – 5250 MHz**
**5250 MHz – 5350 MHz**
**5470 MHz – 5725 MHz**
**5725 MHz – 5850 MHz**

**Against the following Specifications:**

**Radiated TX Spurious Emissions**
**CFR47 Part 15.407; LP0002 (2018);**
**RSS-247 Issue 2, Feb 2017; RSS-GEN Issue 5, Feb 2019**

ACCREDITED

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

| | |
|---|---|
|  |  |
| **Author:** Allan Beecroft<br>**Tested By: Allan Beecroft** | **Approved By:** Gerard Thorpe<br>**Title:** Manager. MGMT-Engineering |
| **Revision: 4.0** | **Issue Date: 29-JAN-2020** |

This report replaces any previously entered test report under EDCS – 18486571 This test report has been electronically authorized and archived using the CISCO Engineering Document Control system. Test Report Template EDCS# 1526148



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**SECTION 1: OVERVIEW** ..... **3**

1.1 TEST SUMMARY ..... 3

**SECTION 2: ASSESSMENT INFORMATION** ..... **4**

2.1 GENERAL ..... 4
2.2 UNITS OF MEASUREMENT ..... 4
2.3 DATE OF TESTING (INITIAL SAMPLE RECEIPT DATE TO LAST DATE OF TESTING) ..... 6
2.4 REPORT ISSUE DATE ..... 6
2.5 TESTING FACILITIES ..... 6
2.6 EQUIPMENT ASSESSED (EUT) ..... 6
2.7 EUT DESCRIPTION ..... 7

**SECTION 3: RESULT SUMMARY** ..... **8**

3.1 RESULTS SUMMARY TABLE ..... 8

**SECTION 4: SAMPLE DETAILS** ..... **9**

**APPENDIX A: EMISSION TEST RESULTS** ..... **10**

A1 RADIATED SPURIOUS EMISSIONS 1GHZ – 40GHZ ..... 10
A.2 RADIATED EMISSIONS 30MHZ TO 1GHZ ..... 34

**APPENDIX B: LIST OF TEST EQUIPMENT USED TO PERFORM THE TEST** ..... **36**

**APPENDIX C: ABBREVIATION KEY AND DEFINITIONS** ..... **39**

**APPENDIX D: PHOTOGRAPHS OF TEST SETUPS** ..... **40**

**APPENDIX E: PHOTOGRAPHS OF EUT** ..... **42**

**APPENDIX F: SOFTWARE USED TO PERFORM TESTING** ..... **42**

**APPENDIX G: TEST PROCEDURES** ..... **42**

**APPENDIX H: SCOPE OF ACCREDITATION (A2LA CERTIFICATE NUMBER 1178-01)** ..... **43**

**APPENDIX I: TEST ASSESSMENT PLAN** ..... **43**



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Section 1: Overview

### 1.1 Test Summary

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

| **Specifications** |
| --- |
| Radiated TX Spurious Emissions only<br>**CFR47 Part 15.407;**<br>**LP0002 (2018);**<br>**RSS-247 Issue 2, Feb 2017;**<br>**RSS-GEN Issue 5, Feb 2019** |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Section 2: Assessment Information

### 2.1 General

This report contains an assessment of an apparatus against Radio 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%)

### 2.2 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



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

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.

**This report must not be reproduced except in full, without written approval of Cisco Systems.**



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**2.3 Date of testing (initial sample receipt date to last date of testing)**

28-OCT-2019 to 07-NOV-2019

**2.4 Report Issue Date**

See cover page.

**2.5 Testing facilities**

This assessment was performed by:

**Testing Laboratory**

Cisco Systems, Inc.
125 West Tasman Drive (Building P)
San Jose, CA 95134
USA

**Headquarters**

Cisco Systems, Inc.
170 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<br>United States | Company #: 2461M-1 |

**Test Engineers**
Allan Beecroft

**2.6 Equipment Assessed (EUT)**

C9130AXE



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

### 2.7 EUT Description

Product Name - Catalyst 9130AX 802.11ax Access Point
Program Summary – Mid-tier 8x8 802.11ax Access Point with Dual Band (2.4GHz - 4x4 MIMO with 4 SS/ 5GHz - 8X8 with 8 Spatial Streams) supports max 8 SS

The modes included in this report represent data for all modes.

The following antennas are supported by this product series.
The data included in this report represents data for all antennas.

***List of External Antennas Supported on C9130AXE***

| Part Number | Description | Gain |
|---|---|---|
| C-ANT9101= | Ceiling Mount Omni Self-Identifying Antenna with Bluetooth, 8-port, with DART connectors. | 2 dBi (2.4 GHz)<br>6 dBi (5 GHz)<br>3 dBi (BLE) |
| C-ANT9102= | Pole or Wall Mount Omni Self-Identifying Antenna with Bluetooth, 8-port, with DART connectors. | 4 dBi (2.4 GHz)<br>4 dBi (5 GHz)<br>4 dBi (BLE) |
| C-ANT9103= | Pole or Wall mount 75° Directional Self-Identifying Antenna with Bluetooth, 8-port, with DART connectors. | 6 dBi (2.4 GHz)<br>6 dBi (5 GHz)<br>6 dBi (BLE) |
| AIR-ANT2524V4C-R= | Ceiling Mount Omni Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 2 dBi (2.4 GHz)<br>4 dBi (5 GHz) |
| AIR-ANT2524V4C-RS= | Ceiling Mount Omni Self-Identifying Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 2 dBi (2.4 GHz)<br>4 dBi (5 GHz) |
| AIR-ANT2544V4M-R= | Wall Mount Omni Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 4 dBi (2.4 GHz)<br>4 dBi (5 GHz) |
| AIR-ANT2544V4M-RS= | Wall Mount Omni Self-Identifying Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 4 dBi (2.4 GHz)<br>4 dBi (5 GHz) |
| AIR-ANT2566D4M-R= | 60° Patch Antenna, 4-port, with RP-TNC connectors.[1]<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 6 dBi (2.4 GHz)<br>6 dBi (5 GHz) |
| AIR-ANT2566D4M-RS= | 60° Patch Self-Identifying Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 6 dBi (2.4 GHz)<br>6 dBi (5 GHz) |
| AIR-ANT2566P4W-R= | Directional Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 6 dBi (2.4 GHz)<br>6 dBi (5 GHz) |
| AIR-ANT2566P4W-RS= | Directional Self-Identifying Antenna, 4-port, with RP-TNC connectors.<br>**Note** Connect to AP using AIR-CAB002-D8-R=. | 6 dBi (2.4 GHz)<br>6 dBi (5 GHz) |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Section 3: Result Summary

### 3.1 Results Summary Table

**Radiated Emissions (General requirements)**

| Basic Standard | Technical Requirements / Details | Result |
|---|---|---|
| FCC 15.209; FCC 15.205; FCC 15.407(b); RSS-GEN Sec 8.9, 8.10; RSS-247 Sec 6.2; LP0002 (2018) Sec 3.10 & 4.7 | **TX Spurious Emissions:** Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the field strength limits table in this section. | Pass |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Section 4: Sample Details

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

### 4.1 Sample Details

| **Sample No.** | **Equipment Details** | **Manufacturer** | Hardware Rev. | Firmware Rev. | Software Rev. | **Serial Number** |
|---|---|---|---|---|---|---|
| S01 | Axel-E | KWC233200VP | 800-106171-01 | S01 | Axel-E | KWC233200VP |
| S02 | CISCO POE16U-1AF Power Injector | PHI 95204Y5 | 341-0556-01 REV A0 | S02 | CISCO POE16U-1AF Power Injector | PHI 95204Y5 |

### 4.2 System Details

| **System #** | **Description** | **Samples** |
|---|---|---|
| 1 | Equipment Under Test | S01 |
| 2 | POE Power Injector (support equipment) | S02 |

### 4.3 Mode of Operation Details

| **Mode#** | **Description** | **Comments** |
|---|---|---|
| 1 | Multiple Radio Mode | Both 5GHz radios (do1, do2) and the Chillwave radio were operating simultaneously. |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Appendix A: Emission Test Results**

**Testing Laboratory:** Cisco Systems, Inc., 125 West Tasman Drive, San Jose, CA 95134, USA

# A1 Radiated Spurious Emissions 1GHz – 40GHz

**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 – 40 GHz |
| Reference Level: | 80 dBuV |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 1MHz |
| Video Bandwidth: | 3 MHz |
| Detector: | Peak/Average |

Terminate the access Point RF ports with 50 ohm loads.

Define worst case azimuth x, y, z.
Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
2) Peak plot (Vertical and Horizontal), Limit = 74dBuV/m @3m

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

| System Number | Description | Samples | System under test | Support equipment |
|---|---|---|---|---|
| 1 | EUT | S01 | ☑ | ☐ |
| 2 | Support | S02 | ☐ | ☑ |

| | |
|---|---|
| **Tested By :**<br>Allan Beecroft | **Date of testing: 28-OCT-2019 – 07-NOV-2019** |
| **Test Result : Pass** | |

See Appendix C for list of test equipment



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## A.1.A Transmitter Radiated Spurious Emissions-Average (1GHz – 10GHz)

5GHz filters were used to prevent overloading the antenna pre-amp and/or spectrum analyzer.

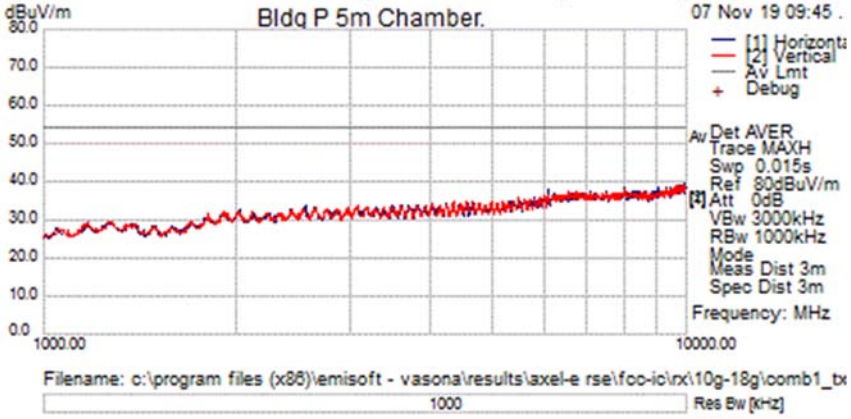
There are no harmonic emissions to measure below 10GHz.



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

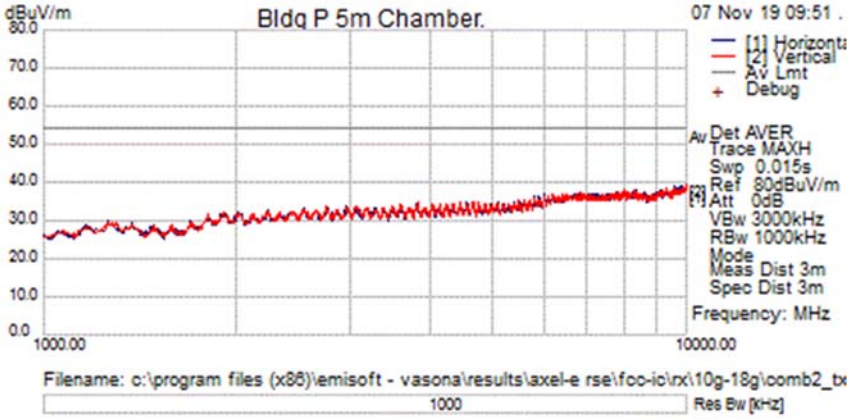
**Non-HE20, Do1 radio 5180MHz, Do2 radio 5745MHz, Chillwave 5180MHz**

**A.1.A.1 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (1-10GHz)**



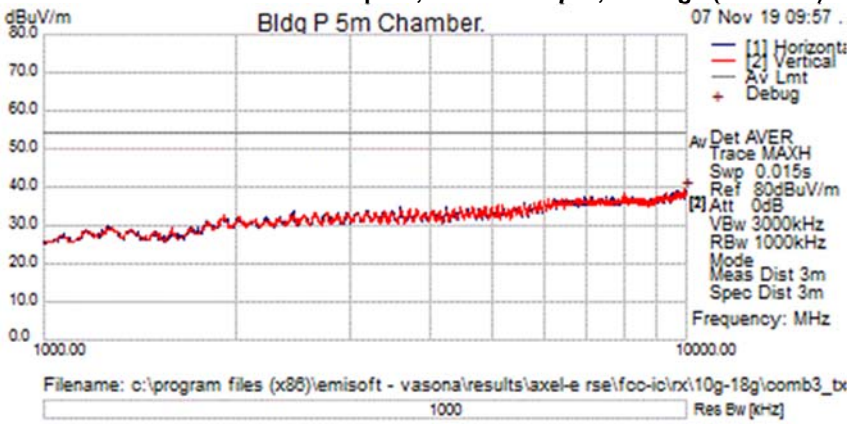

**Non-HE20, Do1 radio 5220MHz, Do2 radio 5785MHz, Chillwave 5220MHz**

**A.1.A.2 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (1-10GHz)**




**Non-HE20, Do1 radio 5240MHz, Do2 radio 5825MHz, Chillwave 5240MHz**

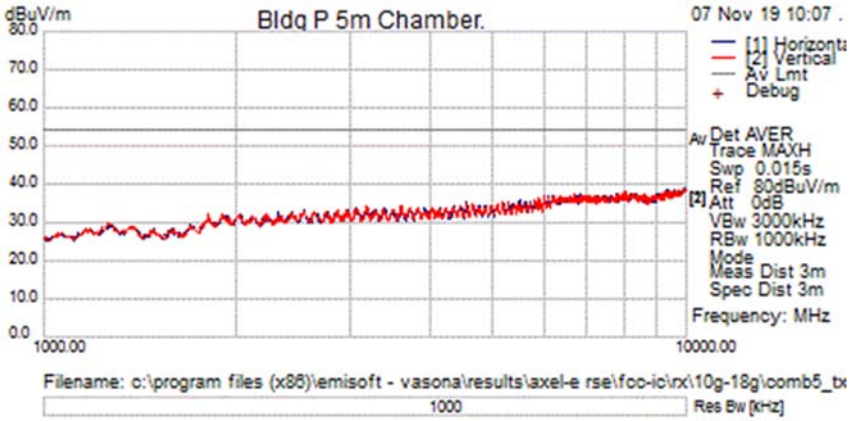
**A.1.A.3 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (1-10GHz)**






This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

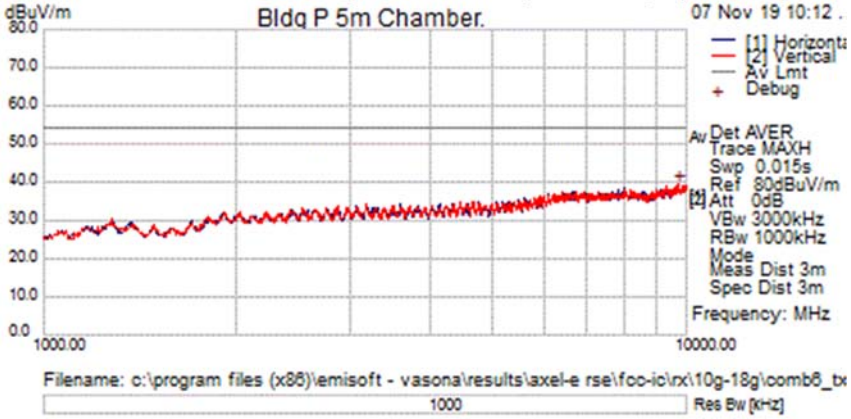
**Non-HE20, Do1 radio *5320 MHz, Do2 radio 5500MHz,* Chillwave 5320MHz**
**A.1.A.4 Radiated Transmitter Spurs *6 to 54 Mbps*, Average (1-10GHz)**



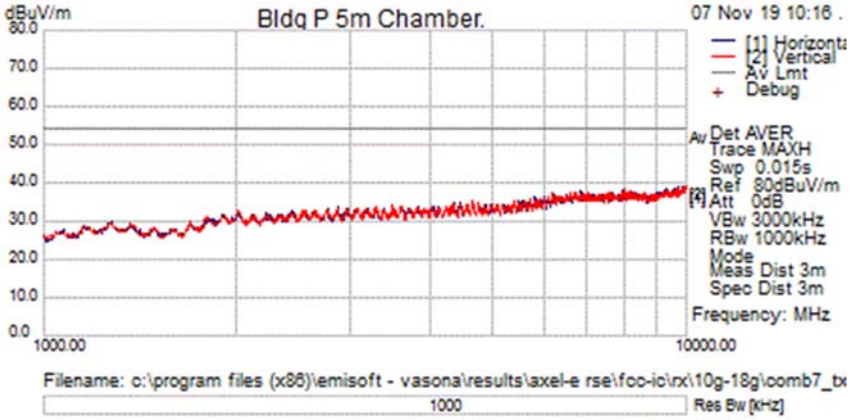



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio *5300 MHz, Do2 radio 5560MHz,* Chillwave 5300MHz**
**A.1.A.5 Radiated Transmitter Spurs *6 to 54 Mbps* , Average (1-10GHz)**



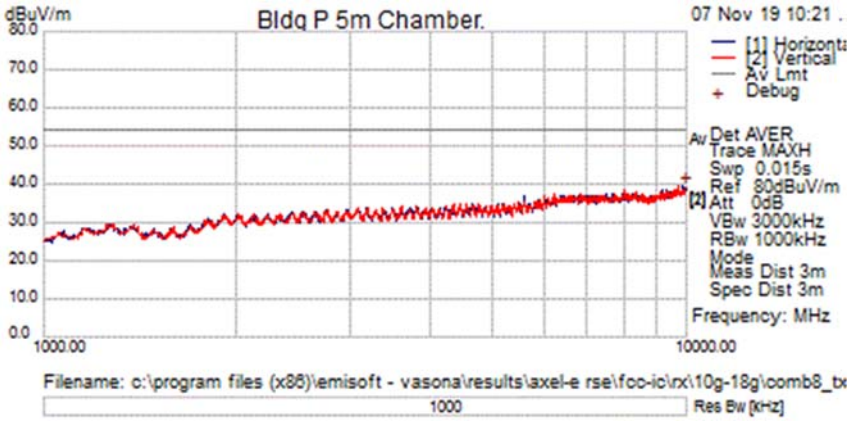

**Non-HE20, *Do2 radio 5700MHz,* Chillwave 5700MHz**
**A.1.A.6 Radiated Transmitter Spurs *6 to 54 Mbps* , Average (1-10GHz)**






This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5260 MHz, Do2 radio 5720MHz, Chillwave 5260MHz**
**A.1.A.7 Radiated Transmitter Spurs 6 to 54 Mbps , Average (1-10GHz)**



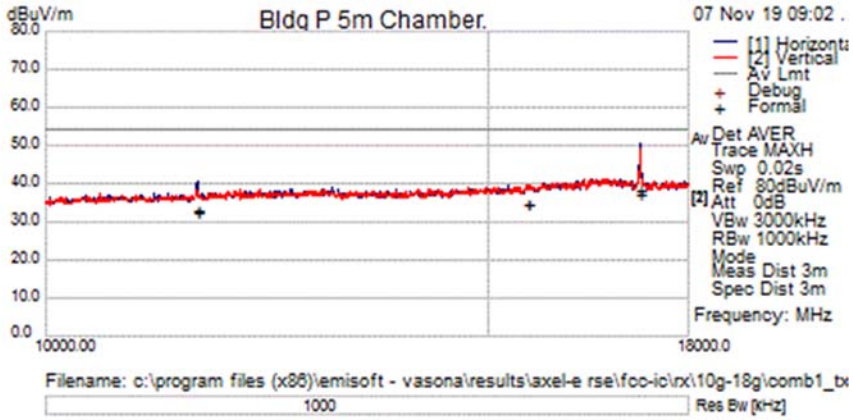



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Transmitter Radiated Spurious Emissions-Average (10GHz – 18GHz)

**Non-HE20, Do1 radio 5180MHz, Do2 radio 5745MHz, Chillwave 5180MHz**

**A.1.A.8 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**




**Formal Data**

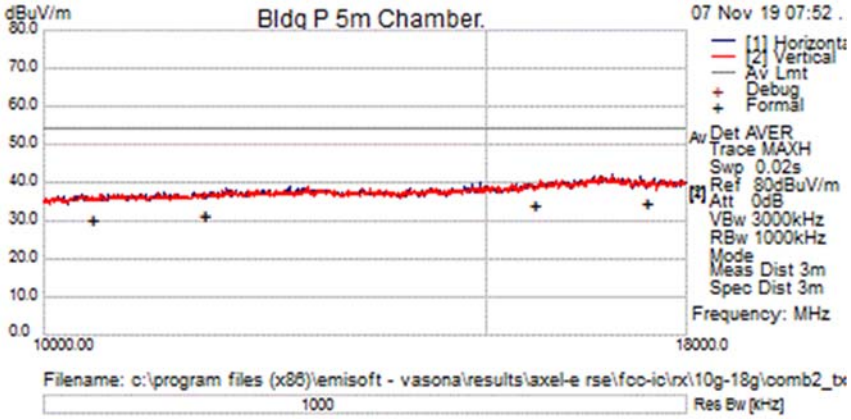
| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1036.000 | -15.5 | 3.1 | 27.4 | 15.0 | Average | H | 150 | 0 | 54.0 | -39.0 | Pass | |
| 2 | 1036.000 | -15.5 | 3.1 | 27.4 | 15.0 | Average | V | 150 | 0 | 54.0 | -39.0 | Pass | |
| 3 | 15540.000 | 30.1 | 15.2 | -10.7 | 34.5 | Average | V | 150 | 0 | 54.0 | -19.5 | Pass | |
| 4 | 15540.000 | 30.1 | 15.2 | -10.7 | 34.6 | Average | H | 150 | 0 | 54.0 | -19.4 | Pass | |
| 5 | 11490.000 | 32.7 | 12.7 | -12.4 | 33.0 | Average | H | 109 | 280 | 54.0 | -21.0 | Pass | |
| 6 | 11490.000 | 31.9 | 12.7 | -12.4 | 32.3 | Average | V | 99 | 243 | 54.0 | -21.7 | Pass | |
| 7 | 17235.000 | 31.6 | 16.2 | -9.7 | 38.1 | Average | H | 167 | 280 | 54.0 | -15.9 | Pass | |
| 8 | 17235.000 | 30.5 | 16.2 | -9.7 | 37.0 | Average | V | 99 | 315 | 54.0 | -17.0 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5220MHz, Do2 radio 5785MHz, Chillwave 5220MHz**

**A.1.A.9 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**



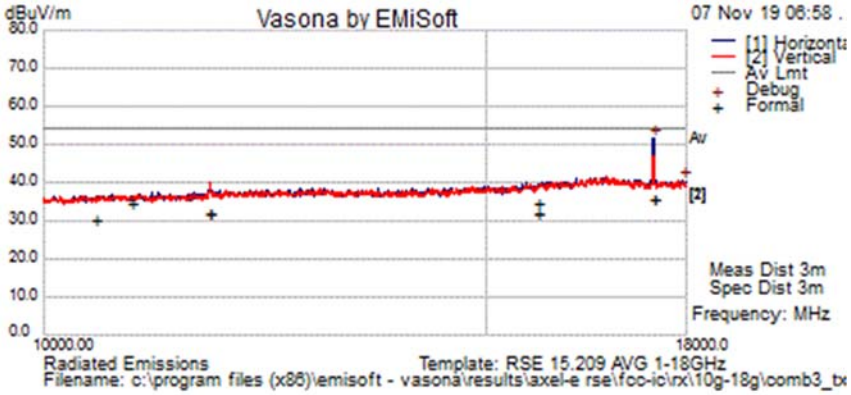

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10440.000 | 32.5 | 11.9 | -14.0 | 30.5 | Average | V | 150 | 0 | 54.0 | -23.5 | Pass | |
| 2 | 10440.000 | 32.5 | 11.9 | -14.0 | 30.4 | Average | H | 150 | 0 | 54.0 | -23.6 | Pass | |
| 3 | 15660.000 | 29.5 | 15.3 | -11.0 | 33.9 | Average | H | 150 | 0 | 54.0 | -20.1 | Pass | |
| 4 | 15660.000 | 29.5 | 15.3 | -11.0 | 33.8 | Average | V | 150 | 0 | 54.0 | -20.2 | Pass | |
| 5 | 11570.000 | 31.2 | 12.6 | -12.5 | 31.3 | Average | V | 150 | 0 | 54.0 | -22.7 | Pass | |
| 6 | 11570.000 | 31.2 | 12.6 | -12.5 | 31.3 | Average | H | 150 | 0 | 54.0 | -22.7 | Pass | |
| 7 | 17355.000 | 28.3 | 16.3 | -10.0 | 34.6 | Average | H | 156 | 35 | 54.0 | -19.4 | Pass | |
| 8 | 17355.000 | 28.5 | 16.3 | -10.0 | 34.8 | Average | V | 99 | 0 | 54.0 | -19.2 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5240MHz, Do2 radio 5825MHz, Chillwave 5240MHz**
**A.1.A.10 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**



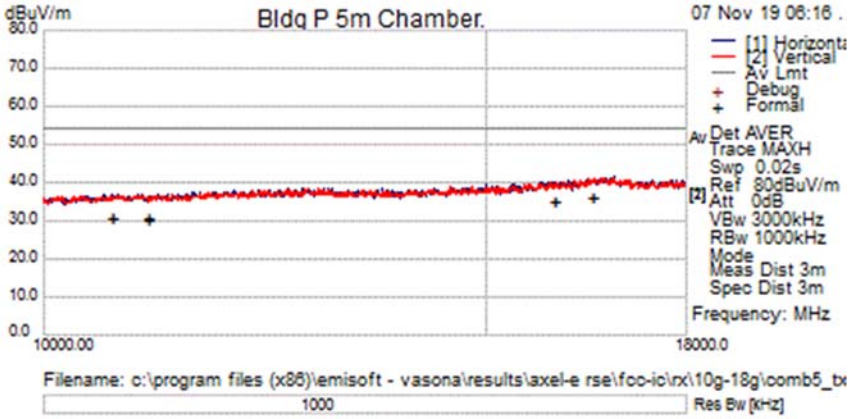

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10480.000 | 32.5 | 12.0 | -13.9 | 30.6 | Average | H | 164 | 279 | 54.0 | -23.4 | Pass | |
| 2 | 10480.000 | 32.5 | 12.0 | -13.9 | 30.6 | Average | V | 164 | 279 | 54.0 | -23.4 | Pass | |
| 3 | 15720.000 | 29.9 | 15.4 | -10.9 | 34.4 | Average | V | 164 | 279 | 54.0 | -19.6 | Pass | |
| 4 | 15720.000 | 29.9 | 15.4 | -10.9 | 34.5 | Average | H | 164 | 279 | 54.0 | -19.5 | Pass | |
| 5 | 11650.000 | 32.6 | 12.8 | -12.1 | 33.3 | Average | H | 164 | 279 | 54.0 | -20.7 | Pass | |
| 6 | 11650.000 | 32.4 | 12.8 | -12.1 | 33.1 | Average | V | 164 | 279 | 54.0 | -20.9 | Pass | |
| 7 | 17475.000 | 34.1 | 16.5 | -9.5 | 41.0 | Average | H | 161 | 20 | 54.0 | -13.0 | Pass | |
| 8 | 17475.000 | 35.4 | 16.5 | -9.5 | 42.4 | Average | V | 159 | 0 | 54.0 | -11.6 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5320MHz, Do2 radio 5500MHz, Chillwave 5320MHz**
**A.1.A.11 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**



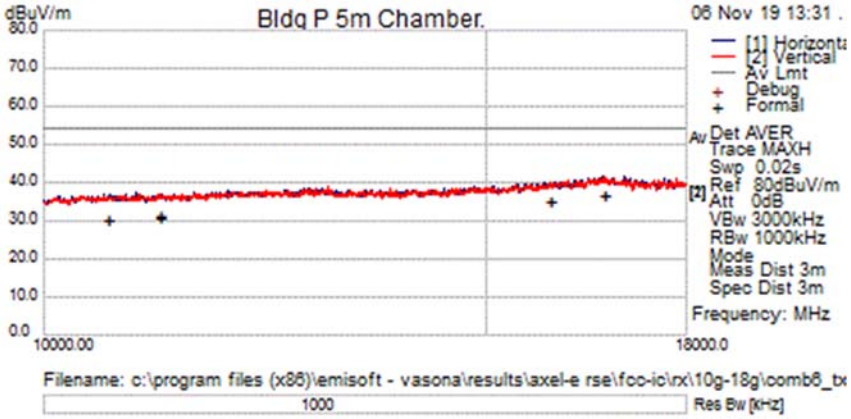

**Formal Data**

| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Ht cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10640.000 | 32.3 | 12.1 | -13.6 | 30.9 | Average | V | 151 | 0 | 54.0 | -23.1 | Pass | |
| 2 | 10640.000 | 32.4 | 12.1 | -13.6 | 31.0 | Average | H | 151 | 0 | 54.0 | -23.0 | Pass | |
| 3 | 15960.000 | 30.0 | 15.6 | -10.4 | 35.2 | Average | H | 151 | 0 | 54.0 | -18.8 | Pass | |
| 4 | 15960.000 | 29.9 | 15.6 | -10.4 | 35.1 | Average | V | 151 | 0 | 54.0 | -18.9 | Pass | |
| 5 | 11000.000 | 31.3 | 12.4 | -13.1 | 30.6 | Average | V | 151 | 0 | 54.0 | -23.4 | Pass | |
| 6 | 11000.000 | 31.4 | 12.4 | -13.1 | 30.7 | Average | H | 151 | 0 | 54.0 | -23.3 | Pass | |
| 7 | 16500.000 | 29.9 | 15.8 | -9.4 | 36.3 | Average | H | 151 | 0 | 54.0 | -17.7 | Pass | |
| 8 | 16500.000 | 29.9 | 15.8 | -9.4 | 36.2 | Average | V | 151 | 0 | 54.0 | -17.8 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5300MHz, Do2 radio 5560MHz, Chillwave 5300MHz**
**A.1.A.12 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**




**Formal Data**

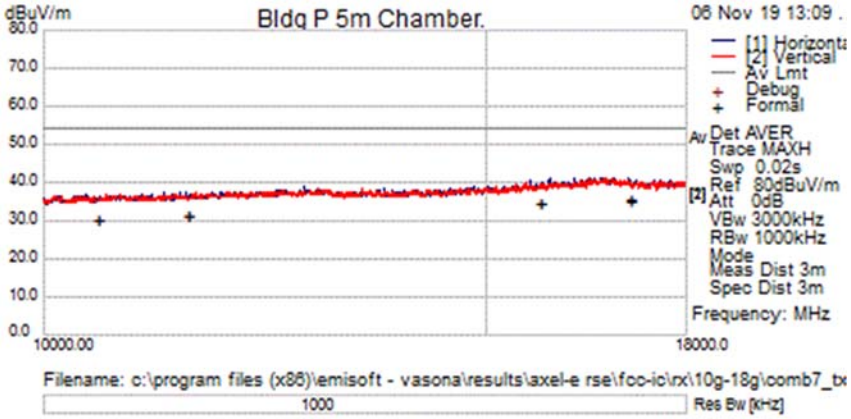
| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10600.000 | 32.1 | 12.1 | -13.6 | 30.5 | Average | V | 151 | 360 | 54.0 | -23.5 | Pass | |
| 2 | 10600.000 | 32.1 | 12.1 | -13.6 | 30.6 | Average | H | 151 | 360 | 54.0 | -23.4 | Pass | |
| 3 | 15900.000 | 30.2 | 15.5 | -10.6 | 35.1 | Average | H | 151 | 360 | 54.0 | -18.9 | Pass | |
| 4 | 15900.000 | 30.1 | 15.5 | -10.6 | 34.9 | Average | V | 151 | 360 | 54.0 | -19.1 | Pass | |
| 5 | 11120.000 | 31.6 | 12.5 | -13.1 | 31.1 | Average | V | 151 | 360 | 54.0 | -22.9 | Pass | |
| 6 | 11120.000 | 31.8 | 12.5 | -13.1 | 31.3 | Average | H | 151 | 360 | 54.0 | -22.7 | Pass | |
| 7 | 16680.000 | 29.9 | 16.2 | -9.4 | 36.7 | Average | V | 151 | 360 | 54.0 | -17.3 | Pass | |
| 8 | 16680.000 | 29.8 | 16.2 | -9.4 | 36.6 | Average | H | 151 | 360 | 54.0 | -17.4 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do2 radio 5700MHz, Chillwave 5700MHz**

**A.1.A.13 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**



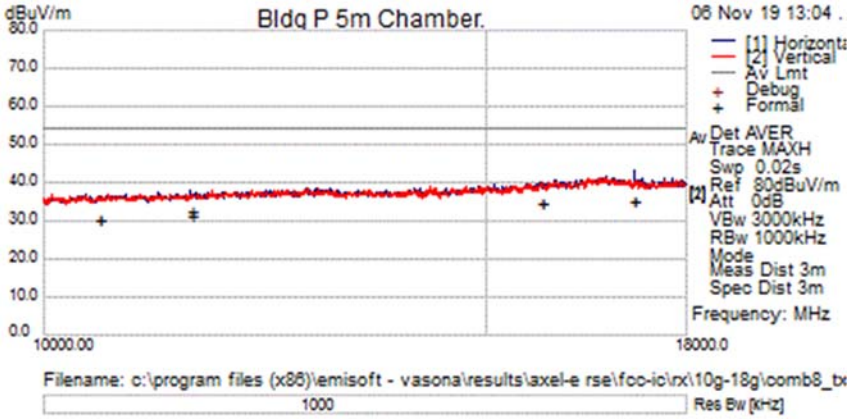

**Formal Data**

| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Ht cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10500.000 | 32.3 | 12.0 | -13.8 | 30.4 | Average | V | 149 | 360 | 54.0 | -23.6 | Pass | |
| 2 | 10500.000 | 32.3 | 12.0 | -13.8 | 30.4 | Average | H | 151 | 360 | 54.0 | -23.6 | Pass | |
| 3 | 15750.000 | 29.9 | 15.4 | -10.7 | 34.7 | Average | H | 151 | 360 | 54.0 | -19.3 | Pass | |
| 4 | 15750.000 | 29.7 | 15.4 | -10.7 | 34.5 | Average | V | 151 | 360 | 54.0 | -19.5 | Pass | |
| 5 | 11400.000 | 31.6 | 12.5 | -12.8 | 31.3 | Average | V | 151 | 360 | 54.0 | -22.7 | Pass | |
| 6 | 11400.000 | 32.0 | 12.5 | -12.8 | 31.7 | Average | H | 151 | 360 | 54.0 | -22.3 | Pass | |
| 7 | 17100.000 | 29.1 | 16.1 | -9.6 | 35.6 | Average | H | 151 | 360 | 54.0 | -18.4 | Pass | |
| 8 | 17100.000 | 28.8 | 16.1 | -9.6 | 35.4 | Average | V | 151 | 360 | 54.0 | -18.6 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5260MHz, Do2 radio 5720MHz, Chillwave 5260MHz**
**A.1.A.14 Radiated Transmitter Spurs, *6 to 54 Mbps* , Average (10-18GHz)**




**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 15780.000 | 29.8 | 15.4 | -10.5 | 34.6 | Average | V | 149 | 360 | 54.0 | -19.4 | Pass | |
| 2 | 10520.000 | 32.2 | 11.9 | -13.7 | 30.5 | Average | H | 149 | 360 | 54.0 | -23.5 | Pass | |
| 3 | 10520.000 | 32.2 | 11.9 | -13.7 | 30.4 | Average | V | 149 | 360 | 54.0 | -23.6 | Pass | |
| 4 | 15780.000 | 29.9 | 15.4 | -10.5 | 34.8 | Average | H | 149 | 360 | 54.0 | -19.2 | Pass | |
| 5 | 11440.000 | 32.5 | 12.5 | -12.6 | 32.4 | Average | H | 149 | 360 | 54.0 | -21.6 | Pass | |
| 6 | 11440.000 | 31.8 | 12.5 | -12.6 | 31.7 | Average | V | 149 | 360 | 54.0 | -22.3 | Pass | |
| 7 | 17160.000 | 28.6 | 16.3 | -9.6 | 35.3 | Average | V | 149 | 360 | 54.0 | -18.7 | Pass | |
| 8 | 17160.000 | 28.5 | 16.3 | -9.6 | 35.2 | Average | H | 149 | 360 | 54.0 | -18.8 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

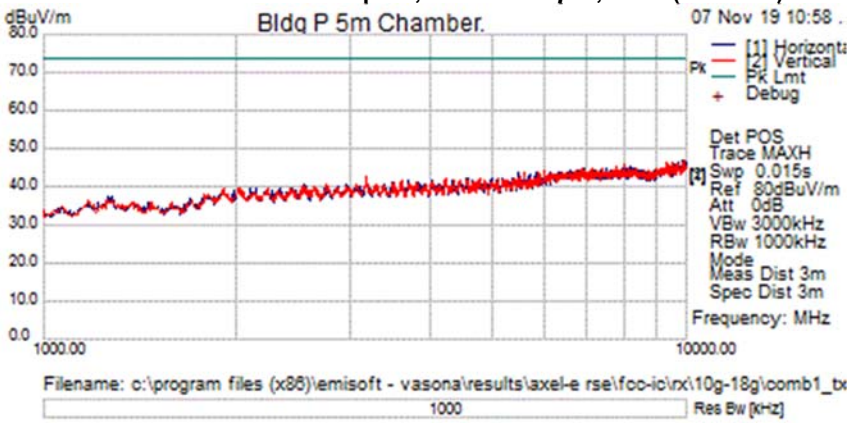
## A.1.P Transmitter Radiated Spurious Emissions-Peak (1GHz – 10GHz)

5GHz filters were used to prevent overloading the antenna pre-amp and/or spectrum analyzer.

There are no harmonic emissions to measure below 10GHz.

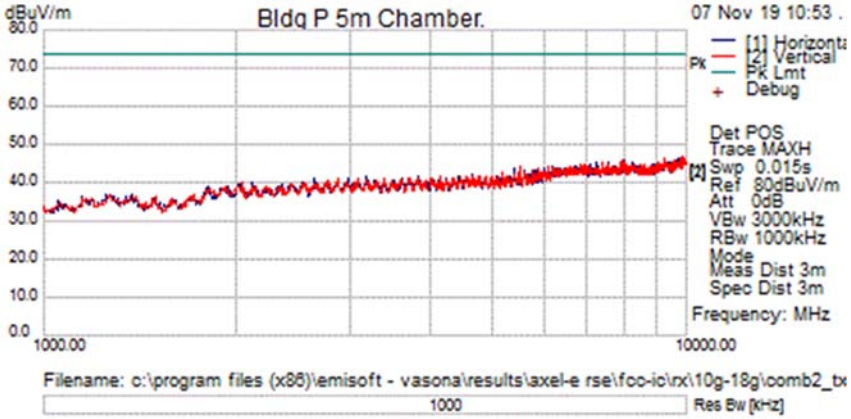
**Non-HE20, Do1 radio 5180MHz, Do2 radio 5745MHz, Chillwave 5180MHz**

**A.1.P.1 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**




**Non-HE20, Do1 radio 5220MHz, Do2 radio 5785MHz, Chillwave 5220MHz**

**A.1..P.2 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**

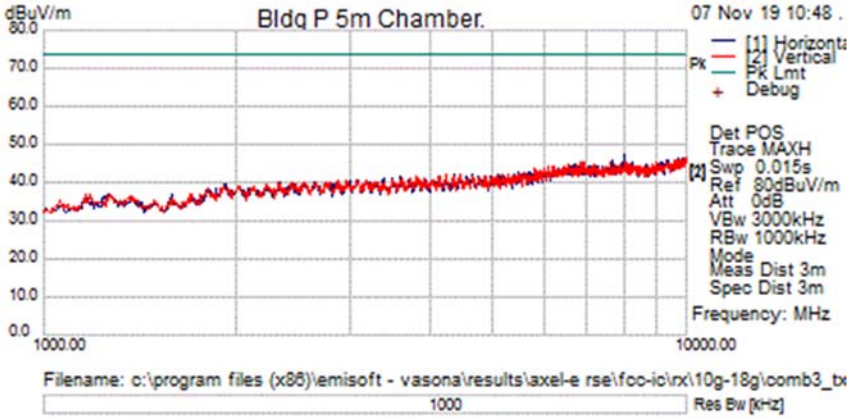





This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

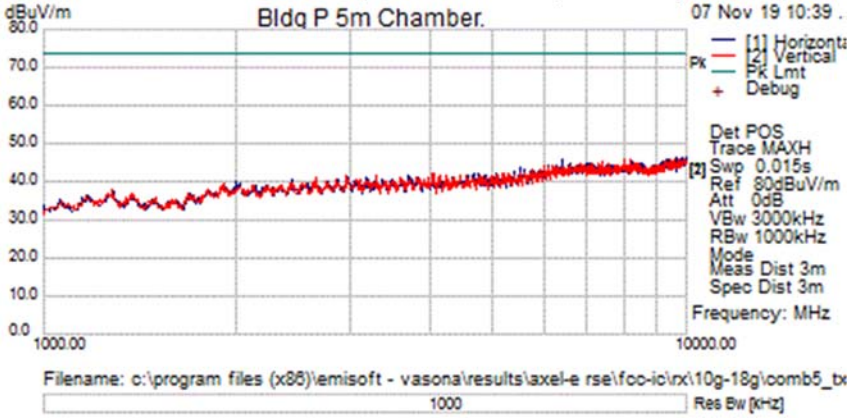
**Non-HE20, Do1 radio 5240MHz, Do2 radio 5825MHz, Chillwave 5240MHz**

**A.1.P.3 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**




**Non-HE20, Do1 radio 5320MHz, Do2 radio 5500MH , Chillwave 5320MHz**

**A.1.P.4 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**

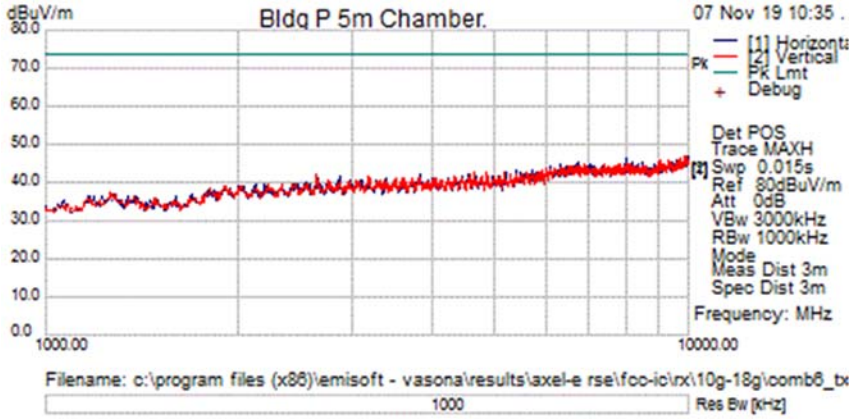





This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

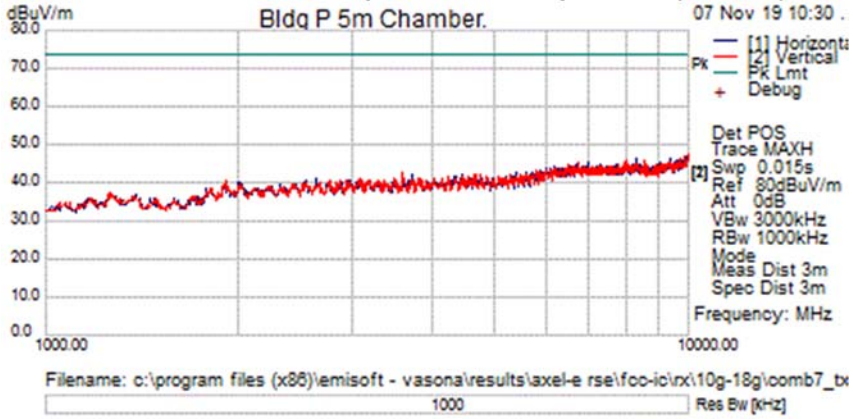
**Non-HE20, Do1 radio 5240MHz, Do2 radio 5825MHz, Chillwave 5240MHz**

**A.1.P.5 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**



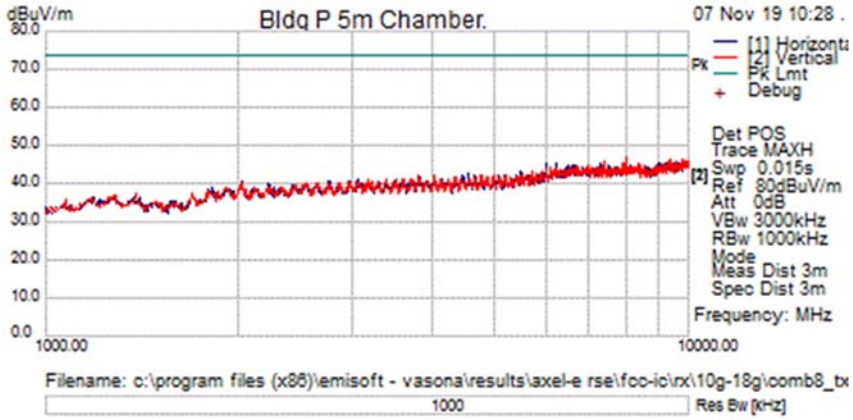

**Non-HE20, Do2 radio 5700MHz, Chillwave 5700MHz**

**A.1.P.6 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**




**Non-HE20, Do1 radio 5260MHz, Do2 radio 5720MHz, Chillwave 5260MHz**

**A.1.P.7 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (1-10GHz)**



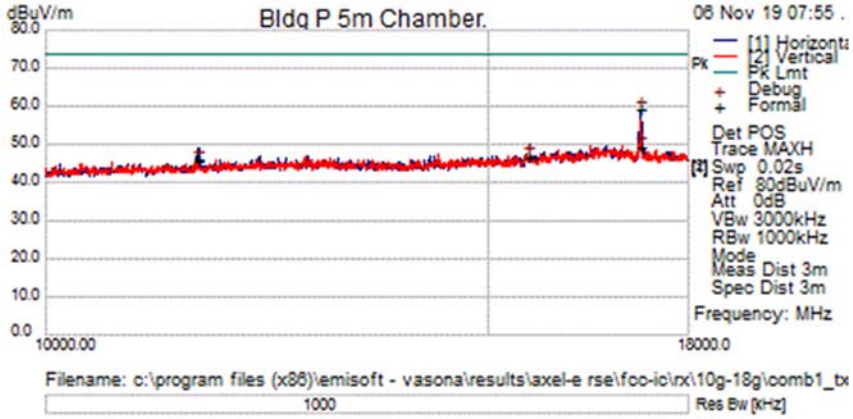



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Transmitter Radiated Spurious Emissions-Peak (10GHz – 18GHz)

**Non-HE20, Do1 radio 5180MHz, Do2 radio 5745MHz, Chillwave 5180MHz**

**A.1.P.8 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**



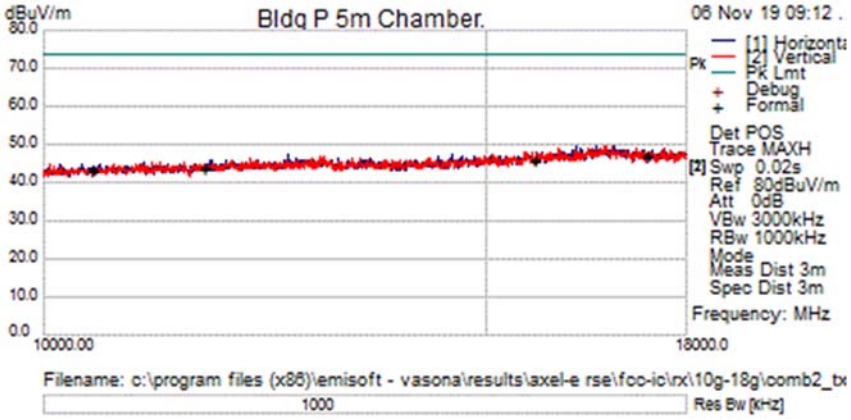

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1036.000 | -4.0 | 3.1 | 27.4 | 26.6 | Peak | H | 189 | 360 | 74.0 | -47.5 | Pass | |
| 2 | 1036.000 | -3.2 | 3.1 | 27.4 | 27.3 | Peak | V | 99 | 0 | 74.0 | -46.7 | Pass | |
| 3 | 11490.000 | 45.5 | 12.8 | -12.4 | 45.8 | Peak | V | 151 | 284 | 74.0 | -28.2 | Pass | |
| 4 | 11490.000 | 45.6 | 12.8 | -12.4 | 46.0 | Peak | H | 151 | 284 | 74.0 | -28.0 | Pass | |
| 5 | 15540.000 | 42.3 | 15.2 | -10.7 | 46.8 | Peak | V | 151 | 284 | 74.0 | -27.2 | Pass | |
| 6 | 15540.000 | 42.5 | 15.2 | -10.7 | 47.0 | Peak | H | 151 | 284 | 74.0 | -27.0 | Pass | |
| 7 | 17233.594 | 52.7 | 16.2 | -9.7 | 59.2 | Peak | H | 183 | 360 | 74.0 | -14.8 | Pass | |
| 8 | 17233.594 | 43.0 | 16.2 | -9.7 | 49.5 | Peak | V | 145 | 360 | 74.0 | -24.5 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5220MHz, Do2 radio 5785MHz, Chillwave 5220MHz**
**A.1.P.9 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**



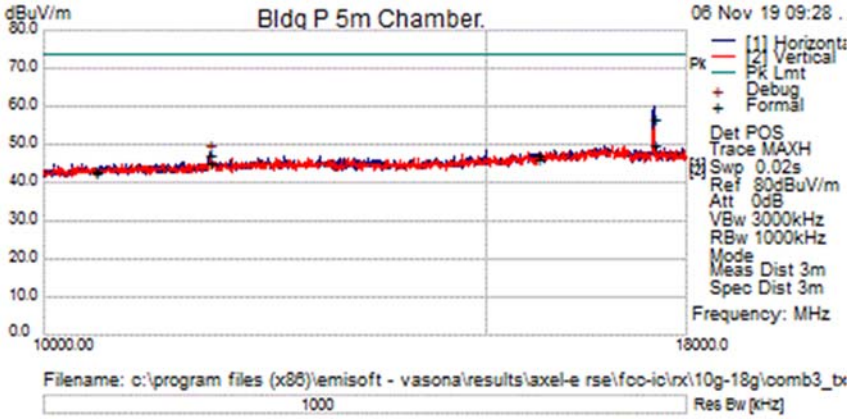

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10440.000 | 45.6 | 11.9 | -14.0 | 43.6 | Peak | H | 151 | 360 | 74.0 | -30.4 | Pass | |
| 2 | 10440.000 | 44.9 | 11.9 | -14.0 | 42.8 | Peak | V | 151 | 360 | 74.0 | -31.2 | Pass | |
| 3 | 15660.000 | 41.1 | 15.3 | -11.0 | 45.5 | Peak | V | 151 | 360 | 74.0 | -28.5 | Pass | |
| 4 | 15660.000 | 41.6 | 15.3 | -11.0 | 46.0 | Peak | H | 151 | 360 | 74.0 | -28.0 | Pass | |
| 5 | 11570.000 | 43.3 | 12.6 | -12.5 | 43.4 | Peak | H | 151 | 360 | 74.0 | -30.6 | Pass | |
| 6 | 11570.000 | 44.1 | 12.6 | -12.5 | 44.2 | Peak | V | 151 | 360 | 74.0 | -29.8 | Pass | |
| 7 | 17355.000 | 40.5 | 16.3 | -10.0 | 46.8 | Peak | V | 151 | 360 | 74.0 | -27.2 | Pass | |
| 8 | 17355.000 | 41.0 | 16.3 | -10.0 | 47.3 | Peak | H | 151 | 360 | 74.0 | -26.7 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5240MHz, Do2 radio 5825MHz, Chillwave 5240MHz**
**A.1.P.10 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**



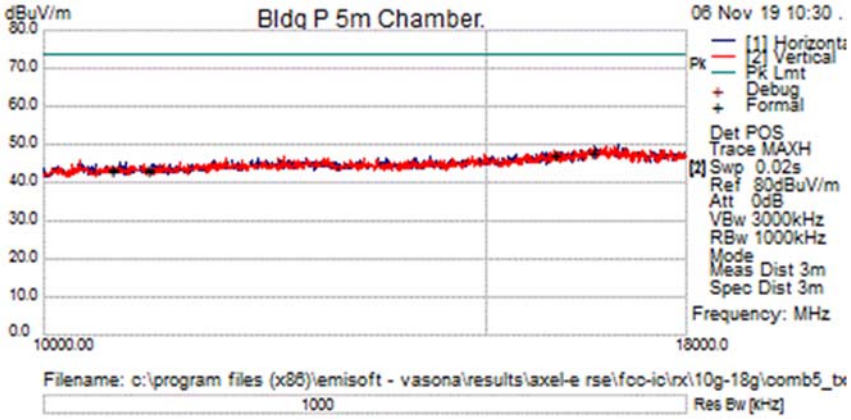

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10480.000 | 44.8 | 12.0 | -13.9 | 42.9 | Peak | H | 151 | 360 | 74.0 | -31.1 | Pass | |
| 2 | 10480.000 | 44.3 | 12.0 | -13.9 | 42.4 | Peak | V | 151 | 360 | 74.0 | -31.6 | Pass | |
| 3 | 15720.000 | 41.5 | 15.4 | -10.9 | 46.0 | Peak | V | 151 | 360 | 74.0 | -28.0 | Pass | |
| 4 | 15720.000 | 42.5 | 15.4 | -10.9 | 47.1 | Peak | H | 151 | 360 | 74.0 | -26.9 | Pass | |
| 5 | 11650.000 | 44.5 | 12.8 | -12.1 | 45.2 | Peak | H | 151 | 360 | 74.0 | -28.8 | Pass | |
| 6 | 11650.000 | 46.8 | 12.8 | -12.1 | 47.5 | Peak | V | 151 | 360 | 74.0 | -26.5 | Pass | |
| 7 | 17475.000 | 43.1 | 16.5 | -9.5 | 50.0 | Peak | V | 99 | 270 | 74.0 | -24.0 | Pass | |
| 8 | 17475.000 | 49.7 | 16.5 | -9.5 | 56.7 | Peak | H | 232 | 270 | 74.0 | -17.3 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5320MHz, Do2 radio 5500MHz, Chillwave 5320MHz**
**A.1.P.11 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**




**Formal Data**

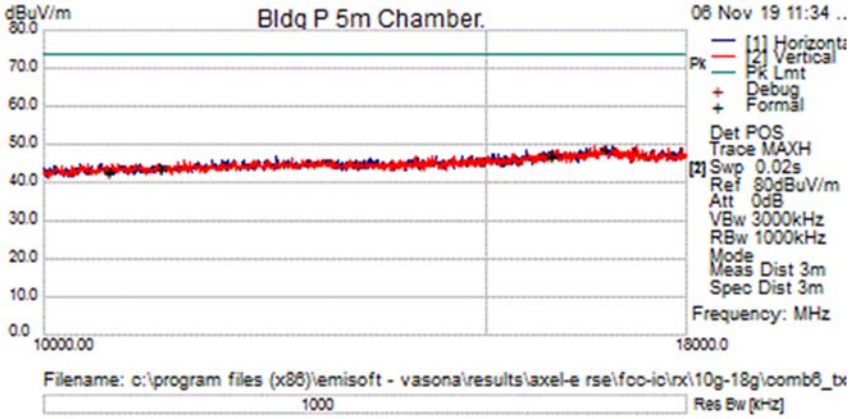
| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10640.000 | 45.1 | 12.1 | -13.6 | 43.6 | Peak | H | 197 | 70 | 74.0 | -30.4 | Pass | |
| 2 | 10640.000 | 44.5 | 12.1 | -13.6 | 43.0 | Peak | V | 99 | 0 | 74.0 | -31.0 | Pass | |
| 3 | 15960.000 | 42.1 | 15.6 | -10.4 | 47.3 | Peak | V | 99 | 259 | 74.0 | -26.7 | Pass | |
| 4 | 15960.000 | 42.1 | 15.6 | -10.4 | 47.3 | Peak | H | 151 | 259 | 74.0 | -26.7 | Pass | |
| 5 | 11000.000 | 44.3 | 12.4 | -13.1 | 43.5 | Peak | H | 99 | 0 | 74.0 | -30.5 | Pass | |
| 6 | 11000.000 | 43.8 | 12.4 | -13.1 | 43.1 | Peak | V | 99 | 0 | 74.0 | -30.9 | Pass | |
| 7 | 16500.000 | 41.7 | 15.8 | -9.4 | 48.1 | Peak | V | 99 | 0 | 74.0 | -25.9 | Pass | |
| 8 | 16500.000 | 41.7 | 15.8 | -9.4 | 48.1 | Peak | H | 156 | 0 | 74.0 | -25.9 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5300MHz, Do2 radio 5560MHz, Chillwave 5300MHz**

**A.1.P.12 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**




**Formal Data**

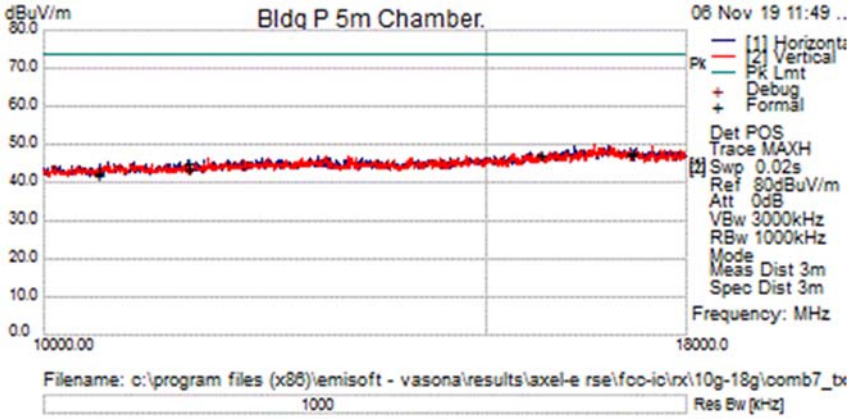
| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass/Fail | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10600.000 | 44.7 | 12.1 | -13.6 | 43.2 | Peak | H | 149 | 0 | 74.0 | -30.8 | Pass | |
| 2 | 10600.000 | 44.2 | 12.1 | -13.6 | 42.7 | Peak | V | 99 | 0 | 74.0 | -31.3 | Pass | |
| 3 | 15900.000 | 42.6 | 15.5 | -10.6 | 47.5 | Peak | V | 99 | 0 | 74.0 | -26.5 | Pass | |
| 4 | 15900.000 | 42.0 | 15.5 | -10.6 | 46.9 | Peak | H | 99 | 0 | 74.0 | -27.1 | Pass | |
| 5 | 11120.000 | 44.0 | 12.5 | -13.1 | 43.4 | Peak | H | 99 | 0 | 74.0 | -30.6 | Pass | |
| 6 | 11120.000 | 44.3 | 12.5 | -13.1 | 43.7 | Peak | V | 99 | 0 | 74.0 | -30.3 | Pass | |
| 7 | 16680.000 | 41.9 | 16.2 | -9.4 | 48.7 | Peak | V | 99 | 0 | 74.0 | -25.3 | Pass | |
| 8 | 16680.000 | 41.9 | 16.2 | -9.4 | 48.8 | Peak | H | 99 | 0 | 74.0 | -25.2 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do2 radio 5700MHz, Chillwave 5700MHz**

**A.1.P.13 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**



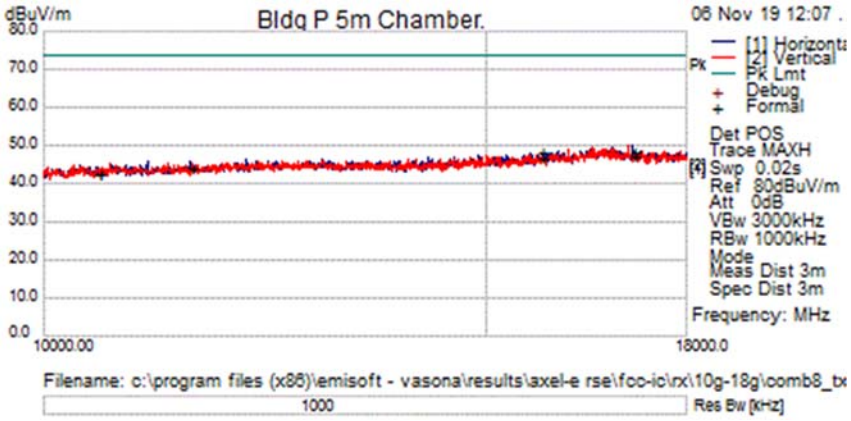

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10500.000 | 44.7 | 12.0 | -13.8 | 42.8 | Peak | H | 149 | 0 | 74.0 | -31.2 | Pass | |
| 2 | 10500.000 | 44.1 | 12.0 | -13.8 | 42.2 | Peak | V | 149 | 0 | 74.0 | -31.8 | Pass | |
| 3 | 15750.000 | 42.3 | 15.4 | -10.7 | 47.1 | Peak | V | 149 | 0 | 74.0 | -26.9 | Pass | |
| 4 | 15750.000 | 42.3 | 15.4 | -10.7 | 47.1 | Peak | H | 149 | 0 | 74.0 | -26.9 | Pass | |
| 5 | 11400.000 | 45.7 | 12.5 | -12.8 | 45.4 | Peak | H | 149 | 0 | 74.0 | -28.6 | Pass | |
| 6 | 11400.000 | 43.8 | 12.5 | -12.8 | 43.4 | Peak | V | 149 | 0 | 74.0 | -30.6 | Pass | |
| 7 | 17100.000 | 41.5 | 16.1 | -9.6 | 48.0 | Peak | V | 149 | 0 | 74.0 | -26.0 | Pass | |
| 8 | 17100.000 | 40.9 | 16.1 | -9.6 | 47.4 | Peak | H | 149 | 0 | 74.0 | -26.6 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Non-HE20, Do1 radio 5260MHz, Do2 radio 5720MHz, Chillwave 5260MHz**
**A.1.P.14 Radiated Transmitter Spurs, *6 to 54 Mbps* , Peak (10-18GHz)**



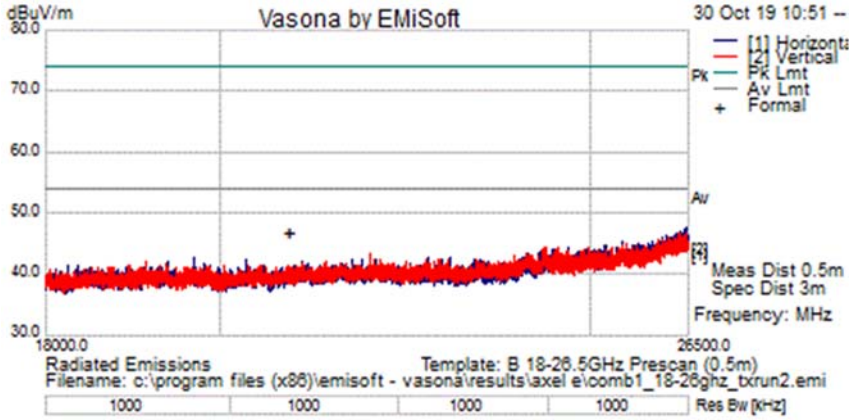

**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 10520.000 | 44.1 | 11.9 | -13.7 | 42.3 | Peak | H | 149 | 0 | 74.0 | -31.7 | Pass | |
| 2 | 10520.000 | 44.2 | 11.9 | -13.7 | 42.4 | Peak | V | 149 | 0 | 74.0 | -31.6 | Pass | |
| 3 | 15780.000 | 43.4 | 15.4 | -10.5 | 48.3 | Peak | V | 149 | 0 | 74.0 | -25.7 | Pass | |
| 4 | 15780.000 | 41.6 | 15.4 | -10.5 | 46.5 | Peak | H | 149 | 0 | 74.0 | -27.5 | Pass | |
| 5 | 11440.000 | 44.2 | 12.5 | -12.6 | 44.0 | Peak | H | 149 | 0 | 74.0 | -30.0 | Pass | |
| 6 | 11440.000 | 44.4 | 12.5 | -12.6 | 44.2 | Peak | V | 149 | 0 | 74.0 | -29.8 | Pass | |
| 7 | 17160.000 | 41.8 | 16.3 | -9.6 | 48.5 | Peak | H | 149 | 243 | 74.0 | -25.5 | Pass | |
| 8 | 17160.000 | 40.5 | 16.3 | -9.6 | 47.2 | Peak | V | 99 | 360 | 74.0 | -26.8 | Pass | |

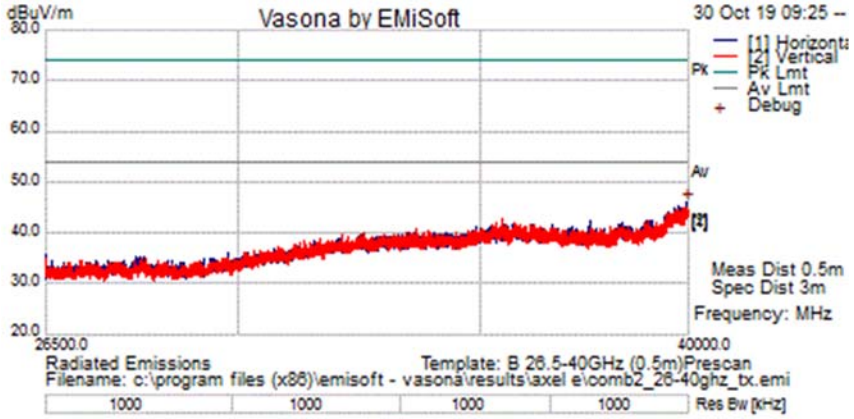


This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Radiated Transmitter Spurs, All radios, All rate, All modes, Peak & Average (18GHz-26.5GHz) Horizontal & Vertical




## Radiated Transmitter Spurs, All radios, All rate, All modes, Peak & Average (26.5-40GHz) Horizontal & Vertical






This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

# A.2 Radiated Emissions 30MHz to 1GHz

**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 |
| . | 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 data for all supported operating modes and antennas.

| System # | Description | Samples |
|---|---|---|
| 1 | EUT | S01 |
| 2 | Support Power Supply | S02 |

| | |
|---|---|
| **Tested By :**<br>Allan Beecroft | **Date of testing: 28-OCT-2019** |
| **Test Result : PASS** | |

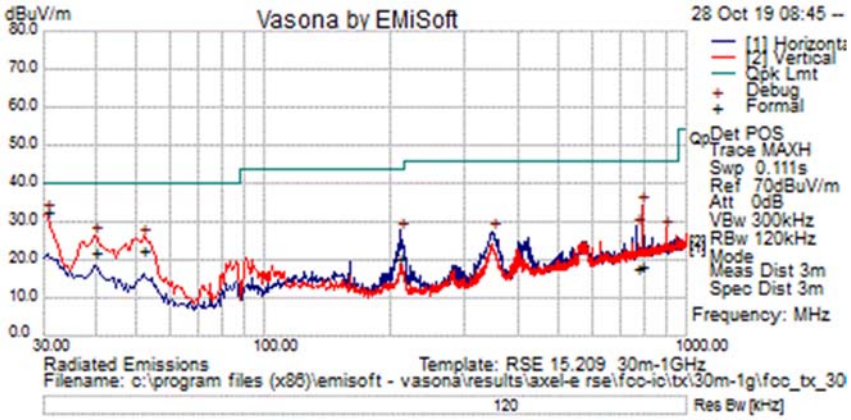
See Appendix C for list of test equipment



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Transmitter Radiated Emissions (30MHz – 1GHz) Horizontal & Vertical

**All rates, all modes.**




**Formal Data**

| No | 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 30.584 | 38.9 | .6 | -6.7 | 32.7 | Quasi Max | V | 122 | 11 | 40.0 | -7.3 | Pass | |
| 2 | 51.884 | 41.8 | .7 | -20.1 | 22.4 | Quasi Max | V | 117 | 12 | 40.0 | -17.6 | Pass | |
| 3 | 39.622 | 34.8 | .6 | -13.7 | 21.8 | Quasi Max | V | 124 | 88 | 40.0 | -18.2 | Pass | |
| 4 | 210.606 | 35.9 | 1.4 | -16.7 | 20.6 | Quasi Max | H | 322 | 85 | 43.5 | -22.9 | Pass | |
| 5 | 786.051 | 22.2 | 2.7 | -6.9 | 18.0 | Quasi Max | V | 219 | 50 | 46.0 | -28.0 | Pass | |
| 6 | 766.956 | 22.3 | 2.7 | -7.4 | 17.6 | Quasi Max | H | 164 | 200 | 46.0 | -28.4 | Pass | |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

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

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Cal |
|---|---|---|---|---|
| **30MHz to 1GHz** | | | | |
| CIS008448 | NSA 5m Chamber<br>Cisco | NSA 5m Chamber | 26-SEP-19 | 26-SEP-20 |
| CIS047300 | Keysight N9038A | MXE EMI Receiver | 29-MAY-2019 | 29-MAY-2020 |
| CIS030654 | JB1<br>Sunol Sciences | Combination Antenna, 30MHz-2GHz | 05 Jun 2019 | 05 Jun 2020 |
| CIS021117 | MICRO-COAX<br>UFB311A-0-2484-520520 | Coaxial Cable-18Ghz | 12 Aug 2019 | 12 Aug 2020 |
| CIS 56157 | HUBER + SUHNER Sucoflex 104PEA | Sucoflex N Type blue 7ft cable | 15 Jan 2019 | 15 Jan 2020 |
| CIS49563 | HUBER + SUHNER Sucoflex 106A | Coaxial Cable, 8m | 12 Aug 2019 | 12 Aug 2020 |
| CIS45166 | STANLEY 33-428 | 26' Tape Measure | Cal Not Required | Cal Not Required |
| CIS54230 | NEWPORT iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 06 Feb 2019 | 06 Feb 2020 |
| CIS27233 | YORK VNE V | Comparison Noise Emitter | Cal Not Required | Cal Not Required |
| CIS54235 | PASTERNACK PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 28 Feb 2019 | 28 Feb 2020 |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

| 1GHz to 18GHz | | | | |
|---|---|---|---|---|
| CIS040597 | CISCO Above 1GHz Site Cal | 1GHz Cispr Site Verification | 27 Sep 2019 | 27 Sep 2020 |
| CIS047300 | Keysight N9038A | MXE EMI Receiver | 29-MAY-2019 | 29-MAY-2020 |
| CIS035285 | ETS Lindgren 3117 | Double Ridged Horn Antenna | 25 Jan 2019 | 25 Jan 2020 |
| CIS45096 | CISCO TH0118 | Mast Mount Preamplifier Array, 1-18GHz | 01 Nov 2018 | 01 Nov 2019 |
| CIS49563 | HUBER + SUHNER Sucoflex 106A | Coaxial Cable, 8m | 12 Aug 2019 | 12 Aug 2020 |
| CIS35040 | Micro-Tronics HPM50112-02 | Notch Filter | 27 Jun 2019 | 27 Jun 2020 |
| CIS34304 | Micro-Tronics BRM50702-02 | Band Reject Filter | 27 Jun 2019 | 27 Jun 2020 |
| CIS021117 | MICRO-COAX UFB311A-0-2484-520520 | Coaxial Cable-18Ghz | 12 Aug 2019 | 12 Aug 2020 |
| CIS 56157 | HUBER + SUHNER Sucoflex 104PEA | Sucoflex N Type blue 7ft cable | 15 Jan 2019 | 15 Jan 2020 |
| CIS45166 | STANLEY 33-428 | 26' Tape Measure | Cal Not Required | Cal Not Required |
| CIS54230 | NEWPORT iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 06 Feb 2019 | 06 Feb 2020 |
| CIS54235 | PASTERNACK PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 28 Feb 2019 | 28 Feb 2020 |
| CIS4883 | EMCO 3115 | Horn Antenna | Cal Not Required | Cal Not Required |
| CIS8171 | Keysight (Agilent/HP) 8491B Opt 010 | ATTENUATOR | 23 Apr 2019 | 23 Apr 2020 |
| CIS34075 | SCHAFFNER RSG 2000 | Reference Spectrum Generator, 1-18GHz | Cal Not Required | Cal Not Required |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

| 18GHz to 40GHz | | | | |
|---|---|---|---|---|
| CIS040597 | CISCO Above 1GHz Site Cal | 1GHz Cispr Site Verification | 27 Sep 2019 | 27 Sep 2020 |
| CIS45166 | STANLEY 33-428 | 26' Tape Measure | Cal Not Required | Cal Not Required |
| CIS54230 | NEWPORT iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 06 Feb 2019 | 06 Feb 2020 |
| CIS54235 | PASTERNACK PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 28 Feb 2019 | 28 Feb 2020 |
| CIS41979 | CISCO 1840 | 18-40GHz EMI Test Head/Verification Fixture | 09 Apr 2019 | 09 Apr 2020 |
| CIS5972 | Keysight (Agilent/HP) 83712B | SYNTHESIZED CW GENERATOR | Cal Not Required | Cal Not Required |
| CIS44940 | ROHDE & SCHWARZ ESU40 | EMI RECEIVER, 40GHZ | 13 Dec 2018 | 13 Dec 2019 |
| CIS37236 | JFW 50CB-015 | Control Box, GPIB | Cal Not Required | Cal Not Required |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Appendix C: 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 |

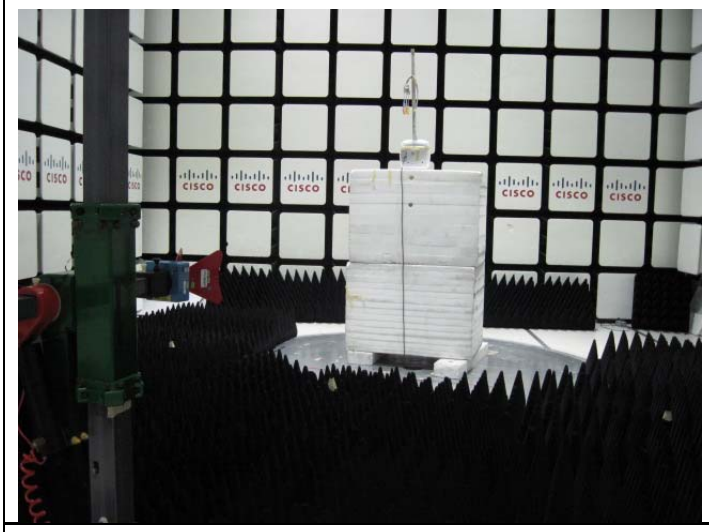


This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

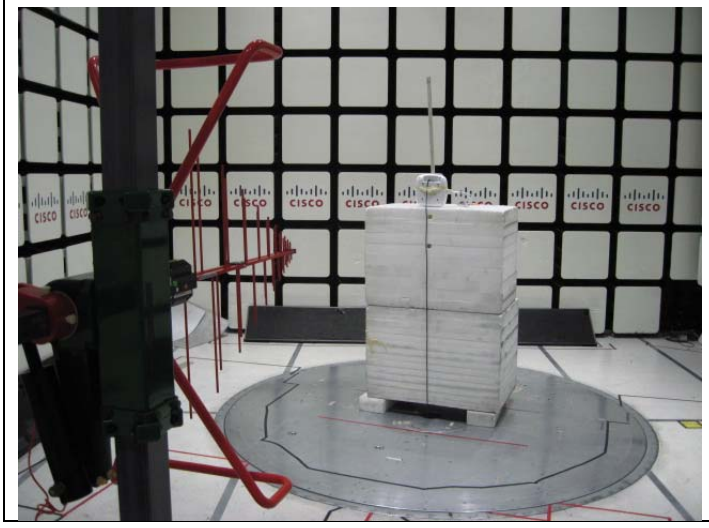
## Appendix D: Photographs of Test Setups

### Test Setup for Radiated Measurements

**Title: Radiated Emissions Configuration Photograph 1-18GHz**



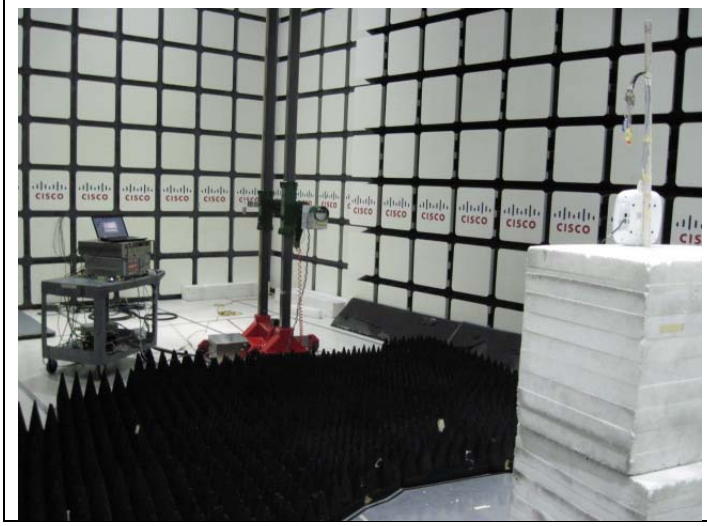
**Title:** Radiated Emissions Configuration Photograph 30MHz-1GHz





This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

**Title:** Radiated Emissions Configuration Photograph 18GHz to 40GHz





This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Appendix E: Photographs of EUT

## Appendix F: Software Used to Perform Testing

EMIsoft Vasona, version 6.024

## Appendix G: Test Procedures

Measurements were made in accordance with

- KDB 789033 - D02 General UNII Test Procedures New Rules v02r01
- KDB 662911 - MIMO
- ANSI C63.10 2013 Intentional Radiators

Test procedures are summarized below:

| | |
|---|---|
| FCC 5GHz RSE Test Procedures | EDCS # 1511600 |



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential

## Appendix H: Scope of Accreditation (A2LA certificate number 1178-01)

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

http://www.a2la.org/scopepdf/1178-01.pdf

## Appendix I: Test Assessment Plan

Compliance Test Plan (Excel) EDCS# 18486508



This document is uncontrolled. Please refer to the electronic copy within EDCS for the most up to date version.
Cisco Systems, Inc. Company Confidential