



**Test Report**  
**IW3702 - 4E - UXK9**

**Cisco Industrial Wireless 802.11ac Dual Band Access Point**

FCC ID: LDKIW3702  
IC: 2461B-IW3702

**2400-2483.5 MHz**

**Antenna Gain 4 dBi**

**Against the following Specifications:**

**CFR47 Part 15.247**

**Radiated Spurious Emissions**

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



**Author:** Chris Blair

**Approved By:** See EDCS

**Title:** See EDCS

This report replaces any previously entered test report under EDCS – 1500424



This test report has been electronically authorized and archived using the CISCO Engineering Document Control system.

<b>SECTION 1: OVERVIEW .....</b>	<b>3</b>
1.1 TEST SUMMARY .....	3
<b>SECTION 2: ASSESSMENT INFORMATION.....</b>	<b>4</b>
2.1 GENERAL.....	4
2.2 DATE OF TESTING .....	5
2.3 REPORT ISSUE DATE.....	5
2.4 TESTING FACILITIES.....	5
2.5 EQUIPMENT ASSESSED (EUT) .....	5
2.6 EUT DESCRIPTION .....	6
<b>SECTION 3: RESULT SUMMARY.....</b>	<b>7</b>
<b>SECTION 4: SAMPLE DETAILS.....</b>	<b>8</b>
<b>APPENDIX A: EMISSION TEST RESULTS .....</b>	<b>9</b>
RADIATED RECEIVER SPURIOUS MEASUREMENTS .....	40
<b>APPENDIX B: PHOTOGRAPHS OF TEST SETUPS.....</b>	<b>44</b>
<b>APPENDIX C: TEST EQUIPMENT/SOFTWARE USED TO PERFORM THE RSE TESTS.....</b>	<b>47</b>
<b>APPENDIX D: EUT PHOTOS. ....</b>	<b>49</b>

## Section 1: Overview

### 1.1 Test Summary

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

Emission	Immunity
CFR47 Part 15.247 Radiated Spurious Emissions	N/A

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

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

#### Notes:

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



## **Section 2: Assessment Information**

### **2.1 General**

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

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

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

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

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

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

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## **2.2 Date of testing**

20-May-2015 to 26-May-2015: Radiated Spurious Emissions

## **2.3 Report Issue Date**

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

## **2.4 Testing facilities**

This assessment was performed by:

### **Testing Laboratory**

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

### **Test Engineers**

Chris Blair, Johanna Knudsen

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

IW3702 - 4E - UXK9 Cisco Industrial Wireless 802.11ac Dual Band Access Point



## **2.6 EUT Description**

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

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

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

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

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

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



The following antennas are supported by this product series.

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

AIR-ANT2547V-N	<b>Dual-band 4 dBi (2.4 GHz) 7 dBi (5 GHz) omnidirectional antenna with 1x type N (m) connector (white)</b>
AIR-ANT2547VG-N	<b>Dual-band 4 dBi (2.4 GHz) 7 dBi (5 GHz) omnidirectional antenna with 1x type N (m) connector (gray)</b>
AIR-ANT2513P4M-N	Dual-band 13 dBi (2.4 GHz) 13 dBi (5 GHz) patch antenna with 4x type N (f) connector
AIR-ANT2524V4C-R	Dual-band 2 dBi (2.4 GHz) 4 dBi (5 GHz) omni-directional antenna with 4x RP-TNC (m) connector (indoor only)
AIR-ANT2544V4M-R	Dual-band 4 dBi (2.4 GHz) 4 dBi (5 GHz) omni-directional antenna with 4x RP-TNC (m) connector
AIR-ANT2566P4W-R	Dual-band 6 dBi (2.4 GHz) 6 dBi (5 GHz) patch antenna with 4x RP-TNC (m) connector

### Section 3: Result Summary

#### Radiated emissions

Basic Standard	Result
Radiated Spurious and Harmonic Emissions	Pass
Radiated Receiver Spurious Emissions	Pass

This test report covers radiated spurious emissions from the enclosure only. All other testing has been leverage from the AIR-CAP3702P-A-K9 series test reports EDCS-1276418, 1276387, 1276405 and 1276410.



## Section 4: Sample Details

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

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

Sample No.	Equipment Details	Part Number	Manufacturer	Hardware Rev.	Serial Number
S03	IW3702-4E-UXX9	68-5584-04	Cisco Systems	68-5584-04	FOC19167ZLE
S04	PWR-IE3000-AC=V01	341-0304-01	Cisco Systems	N/A	DTM160801WH

### 4.2 System Details

System #	Description	Samples
2	EUT, RSE	S03, S04

### 4.3 Mode of Operation Details

Mode#	Description	Comments
1	Continuous Transmitting	Continuous Transmitting
2	Radios Shut down	Used only to establish baseline for RSE for 30M-1G.
3	Receive Mode	EUT powered in receive mode





## Appendix A: Emission Test Results

15.205 & RSS-210 sec2.7:

Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

### Graphical Test Results for 30 – 1000MHz:

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

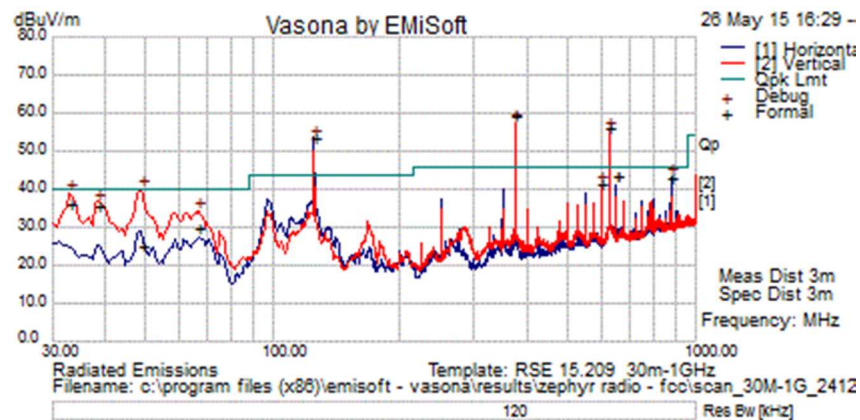
Note that the high emissions at 375MHz, 125MHz, and 625MHz are digital emissions. These will be covered in the EMC test report. A comparison measurement was made with the radio transmitter turned off (page 66). The emissions were still observed when the radio was off, so it can be concluded that the emissions are not caused by the radio.

**EUT mode: f=2412, quad, 17dBm per port, 11Mbps, 20Mhz-wide channel**

#### EMiSoft - Vasona Results

Test	Radiated Emissions [Electric Field]
Class/Spec	B / B RE FCC 30M-1GHz (3M)
Range	30 - 1000MHz
For	cblair
Lab Used	P-5m
Template	RSE 15.209 30m-1GHz
Date/Time	26 May 15/16:39, Status: Filed on
Manufacturer	
EUT	
Config	

#### Graphical Data

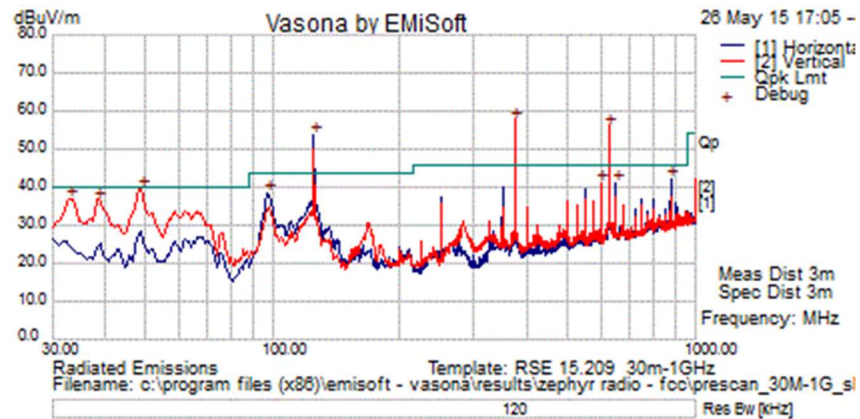


**Formal Data**

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	375.007	42.4	1.8	15.1	59.4	Quasi Max	V	139	195	46.0	13.4	Fail	
2	125.009	38.8	1.1	14.0	53.8	Quasi Max	H	184	190	43.5	10.3	Fail	
3	625.007	34.6	2.4	19.4	56.4	Quasi Max	V	102	316	46.0	10.4	Fail	
4	48.794	16.2	.6	8.4	25.1	Quasi Max	H	378	25	40.0	-14.9	Pass	wideband
5	33.171	17.1	.5	18.8	36.4	Quasi Max	V	115	69	40.0	-3.6	Pass	
6	875.016	18.2	2.8	22.1	43.1	Quasi Max	H	110	312	46.0	-2.9	Pass	
7	38.748	20.5	.5	14.6	35.6	Quasi Max	V	104	355	40.0	-4.4	Pass	wideband
8	650.014	21.3	2.4	19.9	43.6	Quasi Max	H	277	150	46.0	-2.4	Pass	
9	600.014	20.7	2.3	18.4	41.4	Quasi Max	V	104	325	46.0	-4.6	Pass	
10	66.375	21.3	.8	8.0	30.1	Quasi Max	V	118	275	40.0	-9.9	Pass	wideband

**EUT mode: radios off.****EMiSoft - Vasona Results**

Test	Radiated Emissions [Electric Field]
Class/Spec	B / B RE FCC 30M-1GHz (3M)
Range	30 - 1000MHz
For	cblair
Lab Used	P-5m
Template	RSE 15.209 30m-1GHz
Date/Time	26 May 15/17:05, Status: Filed on
Manufacturer	
EUT	
Config	

**Graphical Data****Debug 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	Com men
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													ts
1	374.956	40.8	1.8	15.1	57.7	Peak [Scan]	V	100	0	46.0	11.7	Fail	
2	125.181	38.6	1.1	14.0	53.6	Peak [Scan]	H	200	0	43.5	10.1	Fail	
3	624.731	34.4	2.4	19.4	56.1	Peak [Scan]	V	100	0	46.0	10.1	Fail	
4	48.794	30.9	.6	8.4	39.8	Peak [Scan]	V	100	0	40.0	-.2	Pass	
5	33.031	17.4	.5	18.9	36.8	Peak [Scan]	V	100	0	40.0	-3.2	Pass	
6	38.488	21.2	.5	14.8	36.5	Peak [Scan]	V	100	0	40.0	-3.5	Pass	
7	875.113	17.1	2.8	22.1	42.0	Peak [Scan]	H	200	0	46.0	-4.0	Pass	
8	650.194	18.9	2.4	19.9	41.2	Peak [Scan]	H	300	0	46.0	-4.8	Pass	
9	599.875	20.4	2.3	18.4	41.2	Peak [Scan]	V	100	0	46.0	-4.8	Pass	
10	97.294	28.0	.9	9.6	38.5	Peak [Scan]	H	200	0	43.5	-5.0	Pass	



**Test Results for 1-18GHz:**

15.205:

Radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a).

**Note: measurements with correction factors included.**

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.

Run Vasona prescan in order to determine worst case orientation (x,y,z).

Span:	1GHz – 18 GHz
Reference Level:	87 dBuV
Attenuation:	0 dB
Sweep Time:	Coupled
Resolution Bandwidth:	1MHz
Video Bandwidth:	1 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

Measure any emissions in the restricted bands.



**Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):**  
2412, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

Marker 1 2.413125000000 GHz #Avg Type: RMS

PNO: Fast IFGain:High Trig: Free Run #Atten: 0 dB

11:22:47 PM May 20, 2015

Trace/Det

Select Trace 1

Clear Write

Trace Average

Max Hold

Min Hold

View/Blank Trace On

More 1 of 3

10 dB/div Ref 86.99 dBμV

Mkr1 2.413 GHz 76.04 dBμV

74.00 dBμV

Start 1.000 GHz Stop 18.000 GHz

#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.413 GHz	76.04 dBμV			
2	N	1	f	4.825 GHz	41.51 dBμV			
3	N	1	f	18.000 GHz	61.02 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Title: RSE 1-18GHz Peak Results for 802.11b (2412MHz) pol=V



Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2412, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path







Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2412, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

RF 50 Ω AC CORREC SENSE:INT ALIGN: AUTO 11:25:00 PM May 20, 2015

**RBW 1.0 MHz** #Avg Type: RMS

PNO: Fast IFGain:High Trig: Free Run #Atten: 0 dB

TRACE 1 2 3 4 5 6  
TYPE M  
DET P P P P P P

10 dB/div Ref 86.99 dBμV

Mkr2 4.825 GHz 47.00 dBμV

74.00 dBμV

Start 1.000 GHz Stop 18.000 GHz  
#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.413 GHz	65.73 dBμV			
2	N	1	f	4.825 GHz	47.00 dBμV			
3	N	1	f	18.000 GHz	61.66 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Res BW 1.0 MHz  
Video BW 1.0 MHz  
VBW:3dB RBW 1.0  
Span:3dB BW 106  
RBW Control [Gaussian,-3 dB]



Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):  
2412, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path





Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2412, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

RF 50 Ω AC CORREC SENSE:INT ALIGN: AUTO 11:07:17 PM May 20, 2015

**RBW 1.0 MHz** #Avg Type: RMS

PN0: Fast IF Gain: High Trig: Free Run #Atten: 0 dB

TRACE 1 2 3 4 5 6  
TYPE  
DET P P P P P P

10 dB/div Ref 86.99 dBμV

Mkr2 4.825 GHz  
32.97 dBμV

Log

77.0  
67.0  
57.0  
47.0  
37.0  
27.0  
17.0  
6.99  
-3.01

Start 1.000 GHz Stop 18.000 GHz  
#Res BW 1.0 MHz #VBW 1.0 kHz Sweep 13.3 s (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.413 GHz	68.49 dBμV			
2	N	1	f	4.825 GHz	32.97 dBμV			
3	N	1	f	18.000 GHz	52.98 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

BW

Res BW 1.0 MHz

Auto

Video BW 1.0 kHz

Auto

VBW:3dB BW 1.0

Auto

Span:3dB BW 106

Auto

RBW Control [Gaussian,-3 dB]

Title: RSE 1-18GHz Average Results for 802.11b (2412MHz) pol=V



2442, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

Marker 2 4.8875000000 GHz #Avg Type: RMS

PN0: Fast Trig: Free Run  
IFGain: High #Atten: 0 dB

11:28:24 PM May 20, 2015

Trace/Det  
Select Trace  
Clear Write  
Trace Average  
Max Hold  
Min Hold  
View/Blank  
Trace On  
More  
1 of 3

10 dB/div Ref 86.99 dBμV

Mkr2 4.889 GHz  
45.22 dBμV

Start 1.000 GHz Stop 18.000 GHz  
#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.445 GHz	71.74 dBμV			
2	N	1	f	4.889 GHz	45.22 dBμV			
3	N	1	f	18.000 GHz	61.27 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Title: RSE 1-18GHz Peak Results for 802.11b (2412MHz) pol=V



## Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):

2442, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path







Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2442, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path





Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):  
2442, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

Marker 2 4.878125000000 GHz #Avg Type: RMS

PN0: Fast IF Gain: High Trig: Free Run #Atten: 0 dB

10 dB/div Ref 86.99 dBμV Mkr2 4.878 GHz 43.35 dBμV

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.445 GHz	70.77 dBμV			
2	N	1	f	4.878 GHz	43.35 dBμV			
3	N	1	f	18.000 GHz	61.49 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

Start 1.000 GHz Stop 18.000 GHz  
#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MSG STATUS



## Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):

2442, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path





Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2442, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path







Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):  
2462, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path



Agilent Spectrum Analyzer - EMIsoft Vasona: EMI Emission Software

Marker 2 4.920625000000 GHz

#Avg Type: RMS

Trace 1 2 3 4 5 6

TYPE M P P P P P

DET P P P P P P

PNO: Fast IFGain:High Trig: Free Run #Atten: 0 dB

10 dB/div Ref 86.99 dBμV

Mkr2 4.921 GHz 43.66 dBμV

74.00 dBμV

Start 1.000 GHz Stop 18.000 GHz

#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.466 GHz	71.46 dBμV			
2	N	1	f	4.921 GHz	43.66 dBμV			
3	N	1	f	18.000 GHz	62.38 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Title: RSE 1-18GHz Peak Results for 802.11b (2412MHz) pol=V



## Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):

2462, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path







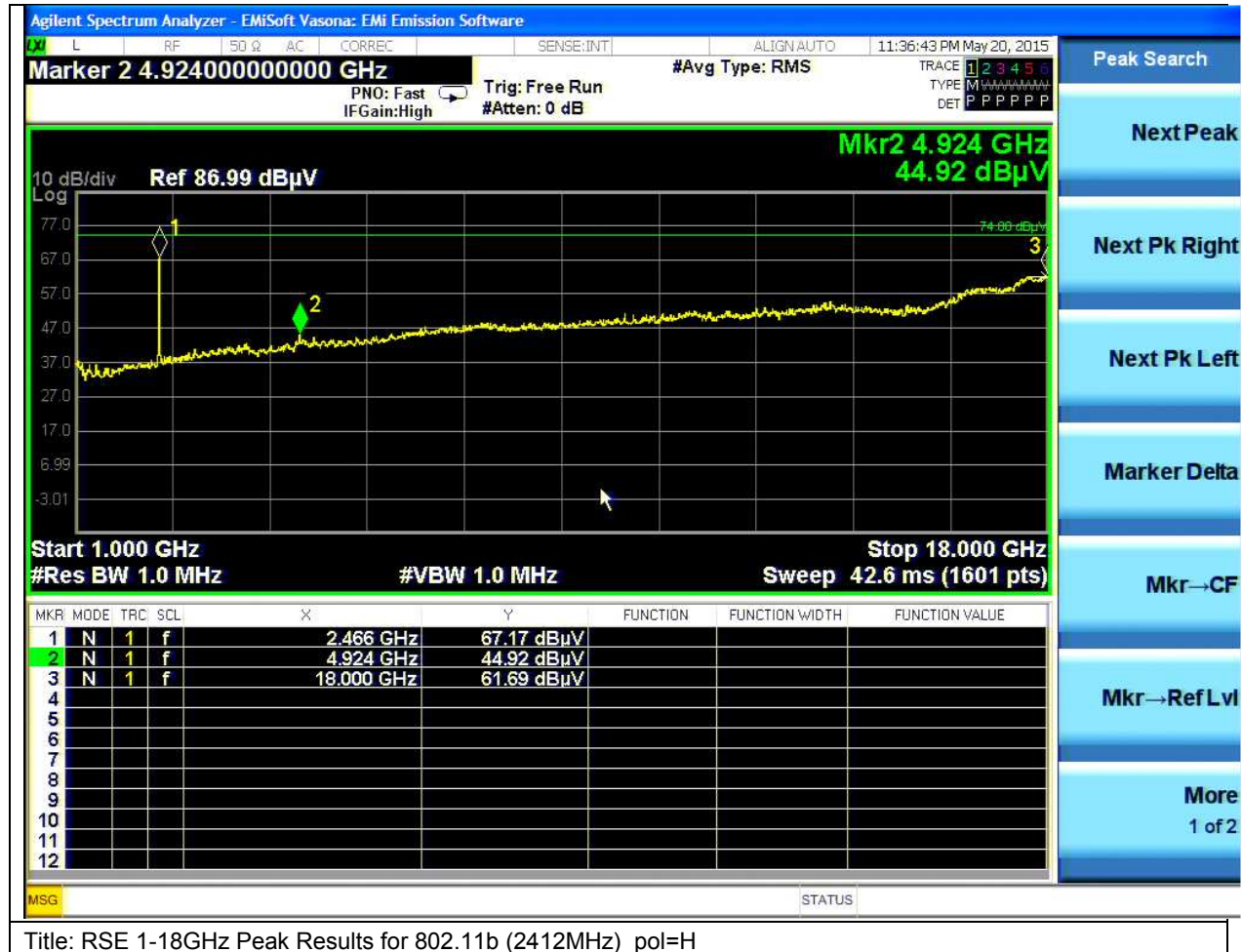
Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2462, 11 Mbps, 20 MHz, 4Tx paths, 17dBm/path





## Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):

2462, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path





**Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Peak):**  
2462, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path





## Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):

2462, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path





Graphical Test Results: Radiated Transmit Spurious Emissions for 802.11b: 1 – 18GHz (Average):  
2462, 6 Mbps, 20 MHz, 4Tx paths, 17dBm/path

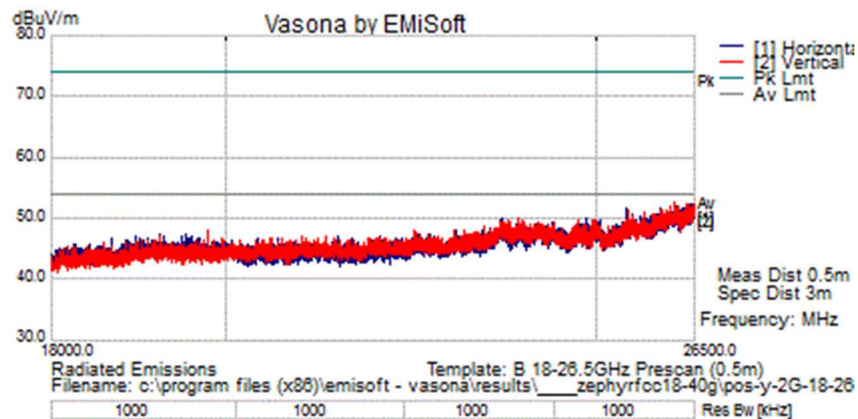


**Graphical Test Results for 18 – 26.5 GHz:**

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'.  
This data depicts the “+Y” face of the EUT, but other faces (+X, -X, -Y, +Z, -Z) were similar.  
No significant emissions were observed.

**EMiSoft - Vasona Results**

Test	Radiated Emissions [Electric Field]
Class/Spec	B / b re fcc 10-40ghz peak
Range	18000 - 26499.999MHz
For	cblair
Lab Used	Cisco
Template	B 18-26.5GHz Prescan (0.5m)
Date/Time	21 May 15/16:58, Status: Filed on
Manufacturer	
EUT	
Config	

**Graphical Data****Debug Data**

No	Frequency MHz	Raw dBuV	Cable Loss	AF dB	Level dBuV/m	Measuremen t Type	P ol	Hgt cm	Azt Deg	Limit dBuV/	Margin dB	Pass /Fail	Com ment
----	------------------	-------------	---------------	----------	-----------------	----------------------	---------	-----------	------------	----------------	--------------	---------------	-------------





											m			s
1	26205.155	47.9	.0	4.9		52.7	Peak [Scan]	V	100	0	54.0	-1.3	Pass	

**EUT mode: f=2412, quad, 17dBm per port, 11Mbps, 20Mhz-wide channel**



## Radiated Receiver Spurious Measurements

## Graphical Test Results: Radiated Receiver Spurious Emissions for 802.11b: 1 – 18GHz (Peak):



Title: RSE 1-18GHz Peak Results for 802.11b (2412MHz) pol=H

Note that the data displayed on the plots detailed in this section were measured using a 'Peak Detector'.



Agilent Spectrum Analyzer - EMI Software Vasona: EMI Emission Software

Marker 1 2.413125000000 GHz #Avg Type: RMS

PN0: Fast Trig: Free Run  
IFGain: High #Atten: 0 dB

11:23:33 PM May 20, 2015

Trace/Det  
Select Trace  
Clear Write  
Trace Average  
Max Hold  
Min Hold  
View/Blank  
Trace On  
More  
1 of 3

10 dB/div Ref 86.99 dBμV

Mkr1 2.413 GHz  
36.52 dBμV

Start 1.000 GHz Stop 18.000 GHz  
#Res BW 1.0 MHz #VBW 1.0 MHz Sweep 42.6 ms (1601 pts)

MKR	MODE	TRC	SCL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE
1	N	1	f	2.413 GHz	36.52 dBμV			
2	N	1	f	4.825 GHz	40.68 dBμV			
3	N	1	f	18.000 GHz	61.49 dBμV			
4								
5								
6								
7								
8								
9								
10								
11								
12								

MSG STATUS

Note that the data displayed on the plots detailed in this section were measured using a 'Peak Detector'.



## Graphical Test Results: Radiated Receiver Spurious Emissions for 802.11b: 1 – 18GHz (Average):



Title: RSE 1-18GHz Average Results for 802.11b (2412MHz) pol=H

Note that the data displayed on the plots detailed in this section were measured using a 'Peak Detector'.



## Graphical Test Results: Radiated Receiver Spurious Emissions for 802.11b: 1 – 18GHz (Average):



Title: RSE 1-18GHz Average Results for 802.11b (2412MHz) pol=V

Note that the data displayed on the plots detailed in this section were measured using a 'Peak Detector'.

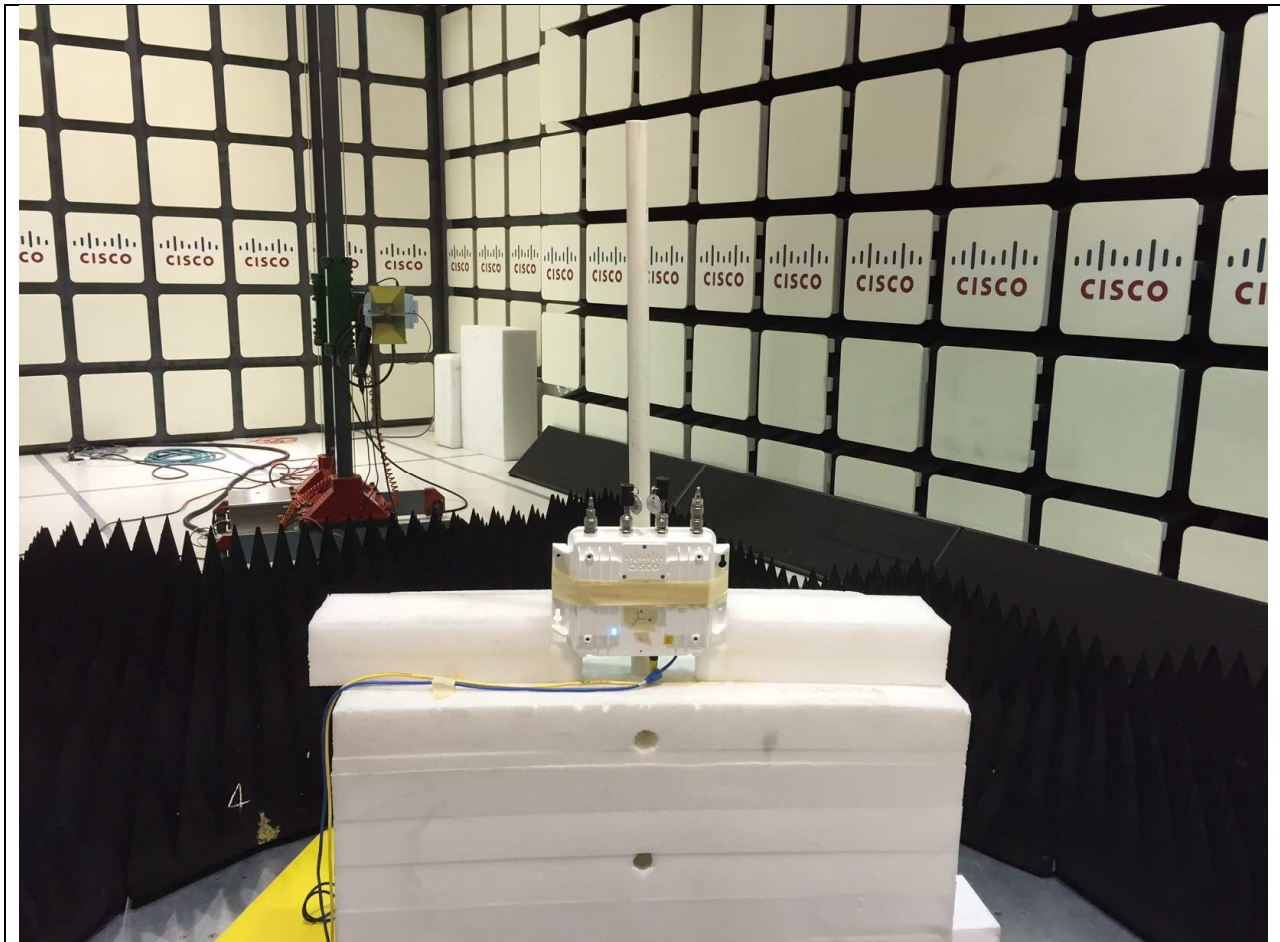
## Appendix B: Photographs of Test Setups

### Physical Test arrangement Photograph:

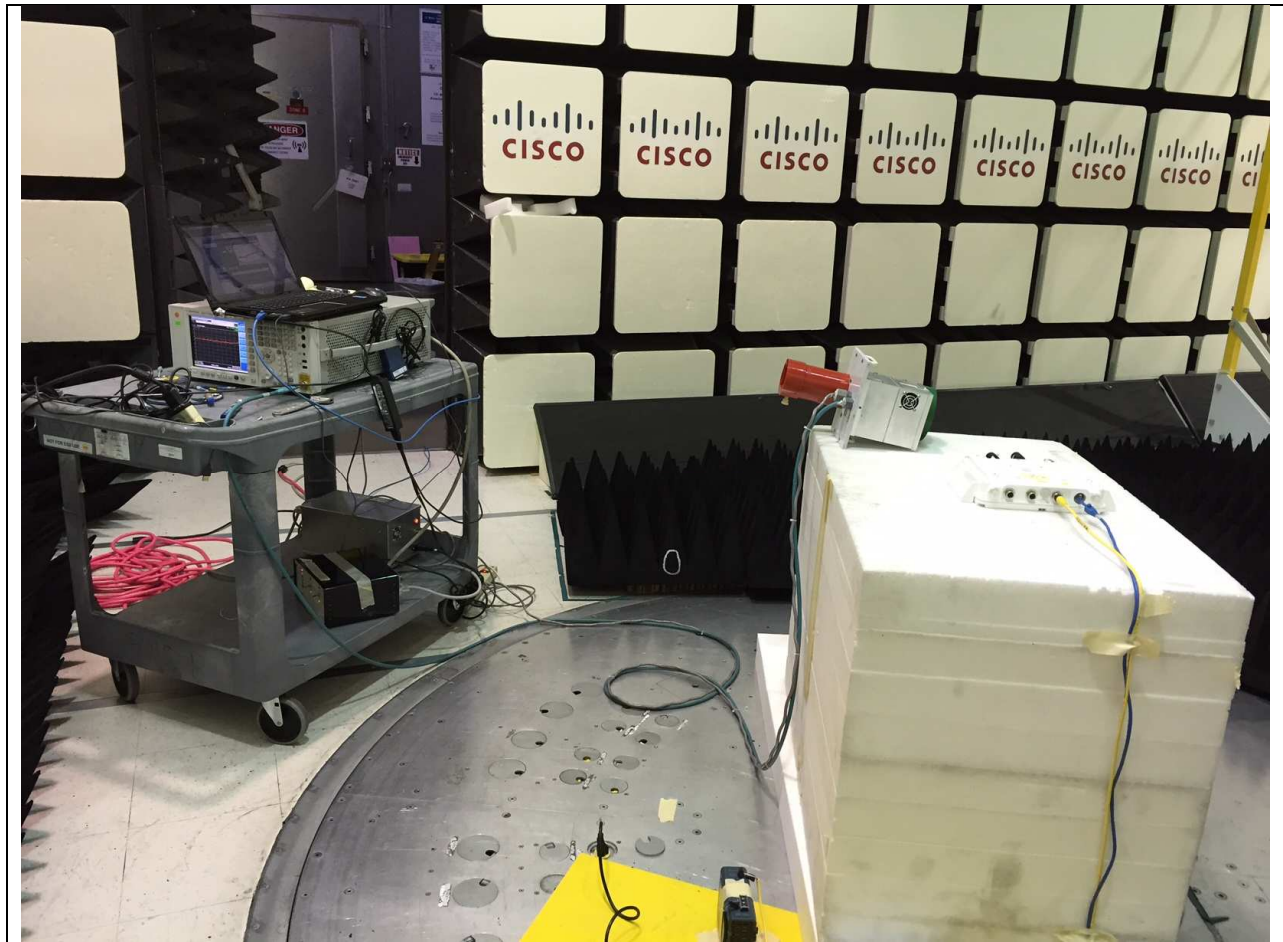


**Title:** Radiated Spurious Emissions Test Configuration 30M - 1000MHz. EUT is in "Y" orientation. Pol shown = H.





**Title:** Radiated Spurious Emissions Test Configuration 1G - 18GHz. EUT is in "X" orientation. Pol shown = H.



**Title:** Radiated Spurious Emissions Test Configuration 18 – 40GHz. EUT is in “Z” orientation.

**Appendix C: Test Equipment/Software Used to perform the RSE tests.**

Equip #	Manufacturer	Model	Description	Last Cal	Next Due
<b>30M-1GHz</b>					
47300	Keysight (Agilent)	N9038A	EMI Receiver	Jan 13, 2015	Jan 13, 2016
25658	Micro-coax	UFB311A-1-0840-504504	Coaxial Cable, 84.0 in. to 18GHz	13 Feb 2015	13 Feb 2016
21117	Micro-coax	UFB311A-0-2484-520520	Coaxial Cable-18Ghz	Aug 25, 2014	Aug 25, 2015
49563	Huber-Suhner	Sucoflex 106A	Coaxial Cable, 8m	25 Aug 2014	25 Aug 2015
30654	Sunol Sciences	JB1	Combination Antenna, 30MHz-2GHz	12 Dec 2014	12 Dec 2015
46708	Stanley	33-428	26' tape measure	NA	NA
54230	Newport	iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	01 Feb 2015	01 Feb 2016
8448	Cisco	NSA 5m Chamber	NSA 5m Chamber	07 Oct 2014	07 Oct 2015
27233	York	CNE V	COMPARISON NOISE EMITTER	NA	NA
<b>1-18GHz</b>					
25658	MICRO-COAX/ UFB311A-1-0840-504504	Coaxial Cable, 84.0 in. to 18GHz	13-Feb-15	13-Feb-16	25658
21117	MICRO-COAX/ UFB311A-0-2484-520520	Coaxial Cable-18Ghz	25-Aug-14	25-Aug-15	21117
49563	HUBER + SUHNER/ Sucoflex 106A	Coaxial Cable, 8m	25-Aug-14	25-Aug-15	49563
5691	MITEQ/ NSP1800-25-S1	PREAMPLIFIER	29-Jan-15	29-Jan-16	5691
4882	EMCO/ 3115	HORN ANTENNA	30-Jul-14	24-Jul-15	4882
40597	CISCO/ Above 1GHz Site Cal	1GHz Cisp Site Verification	28-May-14	28-May-15	40597
47300	Keysight (Agilent/HP) / N9038A	EMI Receiver	13-Jan-15	13-Jan-16	47300
47285	HUBER + SUHNER / Sucoflex 102E	40GHz Cable K Connector	06 Jun 2014	06 Jun 2015	47285
4883	EMCO/ 3115	HORN ANTENNA	Cal Not Required	Cal Not Required	4883
34075	SCHAFFNER / RSG 2000	Reference Spectrum Generator, 1-18GHz	Cal Not Required	Cal Not Required	34075
8166	Keysight (Agilent/HP) / 8491B Opt 010	ATTENUATOR	02 Feb 2015	02 Feb 2016	8166
54230	Newport / iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	1-Feb-15	1-Feb-16	54230
<b>18-40GHz</b>					
41979	Cisco	1840	18-40GHz EMI Test Head/Verification Fixture	09 Jul 2014	09 Jul 2015
38392	Keysight (Agilent)	8257D	PSG ANALOG SIGNAL GENERATOR	19 Aug 2014	19 Aug 2015
49516	Keysight (Agilent)	N9030A	PXA Signal Analyzer	12 Nov 2014	12 Nov 2015
46708	Stanley	33-428	26' tape measure	NA	NA
37236	JFW	GPIB control box	50CB-015	NA	NA
54230	Newport	iBTHP-5-DB9	5 inch Temp/RH/Press Sensor w/20ft cable	01 Feb 2015	01 Feb 2016



40597	Cisco	Above 1GHz Site Cal	1GHz Cspr Site Verification	28 May 2014	28 May 2015
<b>Attenuators on the EuT</b>					
47294	Fairview Microwave	ST6S-10	SMA Termination 6GHz	12 Aug 2014	12 Aug 2015
47293	Fairview Microwave	ST6S-10	SMA Termination 6GHz	12 Aug 2014	12 Aug 2015
49503	JFW	50T-039 SMA-F	SMA Female 50 Ohm Termination	27 Mar 2015	27 Mar 2016
49504	JFW	50T-039 SMA-F	SMA Female 50 Ohm Termination	27 Mar 2015	27 Mar 2016
54237	Pasternack / PE5011-1	PRESET TORQUE WRENCH, 8 IN/LBS	04 Feb 2015	04 Feb 2016	54237
20490	Keysight (Agilent/HP) / 8710-1765	PRESET TORQUE WRENCH 3.5 mm 12 in/lbs	4-Feb-15	4-Feb-16	20490

**Software Used to Perform Testing:**

EMIsoft Vasona, version 6.024



## Appendix D: EUT photos.

### EUT Photographs:



Title: EUT



Title: EUT PSU



## **Appendix E: Test Procedures**

Measurements were made in accordance with

- KDB Publication No. 558074 - D01 DTS Meas Guidance v03r02
- KDB Publication No. 662911 - MIMO
- Measurement method of spurious emission tolerance to the International Telecommunication Union (ITU) Recommendation SM329.
- ANSI C63.4 2009
- ANSI C63.10 2009

Test procedures are summarized below

FCC Test Procedures 2.4GHz	EDCS # - 1445042
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## **APPENDIX F: 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 G: TEST AND ASSESSMENT PLAN**

Compliance Test Plan (Excel) EDCS# 1237091  
Target Power Tables EDCS# 1501962