



## FCC PART 2.1901

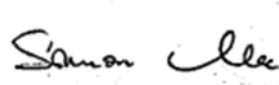

# RF EXPOSURE EVALUATION REPORT

For

**Cisco System Inc.**

170 West Tasman San Jose, CA 95134, USA

**FCC ID: LDKIW3702**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Cisco Aironet 802.11ac Dual Band Access Points
<b>Prepared By:</b> Simon Ma RF Lead	
<b>Report Number:</b> S1511091-MPE	
<b>Report Date:</b> 2016-02-23	
<b>Reviewed By:</b> Bo Li RF Supervisor	
Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732-9164	

**Note:** This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. This report **must not** be used by the customer to claim product certification, approval, or endorsement by A2LA\*, NIST, or any agency of the Federal Government.

\* This report may contain data that are not covered by the A2LA accreditation and are marked with an asterisk "\*" (Rev. 0)

TABLE OF CONTENTS

1 General Description..... 4

1.1 Product Description for Equipment Under Test (EUT) ..... 4

1.2 Objective..... 4

1.3 Related Submittal(s)/Grant(s) ..... 4

1.4 Test Methodology ..... 4

1.5 Test Facility ..... 4

2 FCC §2.1091 - RF Exposure Evaluation..... 6

2.1 Applicable Standard..... 6

2.2 MPE Prediction..... 6

2.3 MPE Results ..... 6

2.4 Conclusion ..... 7

**DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	S1511091-MPE	Original	2016-02-23

## 1 General Description

### 1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report has been compiled on behalf of *Cisco System Inc.*, and their product, *FCC ID: LDKIW3702*, model number: *AIR-CAP3702P-B-K9*, which henceforth is referred to as the EUT (Equipment Under Test.) The EUT is an 802.11ac Dual Band Access Point.

### 1.2 Objective

This report is prepared on behalf of *Cisco System, Inc.*, in accordance with FCC Part 2.1091 of the Federal Communication Commission's rules.

The objective is to determine Maximum Permissible Exposure in compliance with 47 Code of Federal Regulations 2.1091. The evaluation was in accordance with methodology as referenced in FCC Bulletin OET 65C (rev 01-01).

### 1.3 Related Submittal(s)/Grant(s)

2.4 GHz DTS Report: EDCS-1276410, 1276405, 1276387, 1276418, 1248110  
5 GHz UNII-1 Report: EDCS-1276440, 1276444, 1497903  
5 GHz UNII-2 Report EDCS-1278285, 1395033, 1278289, 1394652, 1497904  
5 GHz UNII-2ext Report EDCS-1518128, 1518131, 1518134, 1518137, 1278297, 1278295, 1395059  
5 GHz UNII-3 Report: EDCS-1518129, 1518132, 1518135, 1518138

### 1.4 Test Methodology

All calculations contained in this report were conducted in accordance with ANSI C95.1, Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz and FCC Bulletin OET 65C, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields.

### 1.5 Test Facility

Bay area compliance Laboratories Corp. (BACL) is:

1- An independent Commercial Test Laboratory accredited to **ISO 17025: 2005** by **A2LA**, in the fields of: Electromagnetic Compatibility & Telecommunications covering Emissions, Immunity, Radio, RF Exposure, Safety and Telecom. This includes NEBS (Network Equipment Building System), Wireless RF, Telecommunications Terminal Equipment (TTE); Network Equipment; Information Technology Equipment (ITE); Medical Electrical Equipment; Industrial, Commercial, and Medical Test Equipment; Professional Audio and Video Equipment; Electronic (Digital) Products; Industrial and Scientific Instruments; Cabled Distribution Systems and Energy Efficiency Lighting.

2- An ENERGY STAR Recognized Laboratory, for the LM80 Testing, a wide variety of Luminaires and Computers.

3- A NIST Designated Phase-I and Phase-II CAB including: ACMA (Australian Communication and Media Authority), BSMI (Bureau of Standards, Metrology and Inspection of Taiwan), IDA (Infocomm Development Authority of Singapore), IC(Industry Canada), Korea (Ministry of Communications Radio Research Laboratory), NCC (Formerly DGT; Directorate General of Telecommunication of Chinese Taipei) OFTA (Office of the Telecommunications Authority of Hong Kong), Vietnam, VCCI - Voluntary Control Council for

Interference of Japan and a designated EU CAB (Conformity Assessment Body) (Notified Body) for the EMC and R&TTE Directives.

- 4- A Product Certification Body accredited to **ISO Guide 65: 1996** by **A2LA** to certify:
2. Radio Standards Specifications (RSS) in the Category I Equipment Standards List and All Broadcasting Technical Standards (BETS) in Category I Equipment Standards List for Industry Canada.
3. Radio Communication Equipment for Singapore.
4. Radio Equipment Specifications, GMDSS Marine Radio Equipment Specifications, and Fixed Network Equipment Specifications for Hong Kong.
5. Japan MIC Telecommunication Business Law (A1, A2) and Radio Law (B1, B2 and B3).
6. Audio/Video, Battery Charging Systems, Computers, Displays, Enterprise Servers, Imaging Equipment, Set-Top Boxes, Telephony, Televisions, Ceiling Fans, CFLs (Including GU24s), Decorative Light Strings, Integral LED Lamps, Luminaires, Residential Ventilating Fans.

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997, and Article 8 of the VCCI regulations on December 25, 1997. The test site also complies with the test methods and procedures set forth in CISPR 22:2008 §10.4 for measurements below 1 GHz and §10.6 for measurements above 1 GHz as well as ANSI C63.4-2014, ANSI C63.4-2009, TIA/EIA-603 & CISPR 24:2010.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: A-0027. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL Corp. is an American Association for Laboratory Accreditation (A2LA) accredited laboratory (Lab Code 3297-02). The current scope of accreditations can be found at

<http://www.a2la.org/scopepdf/3297-02.pdf?CFID=1132286&CFTOKEN=e42a3240dac3f6ba-6DE17DCB-1851-9E57-477422F667031258&jsessionid=8430d44f1f47cf2996124343c704b367816b>

## 2 FCC §2.1091 - RF Exposure Evaluation

### 2.1 Applicable Standard

According to FCC §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

#### Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm <sup>2</sup> )	Averaging Time (minutes)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	* (100)	30
1.34-30	824/f	2.19/f	* (180/f <sup>2</sup> )	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz

\* = Plane-wave equivalent power density

### 2.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

### 2.3 MPE Results

Two RF exposure evaluations are performed in the following sections. 20 cm distance applied for 7 dBi antenna gain; 30 cm distance applied for 13 dBi antenna gain.

### 2.3.1 RF Exposure Evaluation for 7 dBi antenna gain

Band	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Margin (mW/cm <sup>2</sup> )
2.4 GHz DTS	20	21.2	6	0.10	1	0.90
5 GHz UNII-1	20	16.8	7	0.05	1	0.95
5 GHz UNII-2	20	23.3	7	0.21	1	0.79
5 GHz UNII-2e	20	22.7	7	0.19	1	0.81
5 GHz UNII-3	20	22.2	7	0.17	1	0.83

The EUT supports multiple transmitter transmission simultaneously, i.e. 2.4 GHz WLAN and 5 GHz WLAN.

$MPE_1 + MPE_2 = 0.1 + 0.21 = 0.31$ , which is less than 1 mW/cm<sup>2</sup>.

Where  $MPE_1$  is the power density of 2.4 GHz WLAN at 20 cm;  $MPE_2$  is the highest power density in 5 GHz WLAN at 20 cm.

### 2.3.2 RF Exposure Evaluation for 13 dBi antenna gain

Band	MPE Distance (cm)	Peak Transmit Power (dBm)	Antenna Gain (dBi)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Margin (mW/cm <sup>2</sup> )
2.4 GHz DTS	30	21.2	13	0.23	1	0.77
5 GHz UNII-1	30	16.8	13	0.08	1	0.92
5 GHz UNII-2	30	23.3	13	0.38	1	0.62
5 GHz UNII-2e	30	22.7	13	0.33	1	0.67
5 GHz UNII-3	30	22.2	13	0.29	1	0.71

The EUT supports multiple transmitter transmission simultaneously, i.e. 2.4 GHz WLAN and 5 GHz WLAN.

$MPE_1 + MPE_2 = 0.23 + 0.38 = 0.61$ , which is less than 1 mW/cm<sup>2</sup>.

Where  $MPE_1$  is the power density of 2.4 GHz WLAN at 30 cm;  $MPE_2$  is the highest power density in 5 GHz WLAN at 30 cm.

## 2.4 Conclusion

In order to comply with General Population/Uncontrolled Exposure limits, this device must be installed to provide a separation distance of at least **30** cm from all persons. Installer must be provided with antenna installation and transmitter operating conditions for satisfying RF exposure compliance.

--- END OF REPORT ---