

## RF Exposure Report

**Report No.:** SA141027E05

**FCC ID:** Q87-EA4500V3

**Test Model:** EA4500 V3

**Received Date:** Oct. 27, 2014

**Test Date:** Jan. 12, 2015

**Issued Date:** Jan. 29, 2015

**Applicant:** Linksys LLC

**Address:** 121 Theory Drive Irvine California 92617 United States

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Hsin Chu Laboratory

**Lab Address:** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

**Test Location (1):** No. 81-1, Lu Liao Keng, 9th Ling, Wu Lung Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

**Test Location (2):** No. 49, Ln. 206, Wende Rd., Shangshan Tsuen, Chiung Lin Hsiang, Hsin  
Chu Hsien 307, Taiwan R.O.C.

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### Release Control Record

Issue No.	Description	Date Issued
SA141027E05	Original release.	Jan. 29, 2015

## 1 Certificate of Conformity

**Product:** 802.11 a/b/g/nAP

**Brand:** Linksys

**Test Model:** EA4500 V3

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** Linksys LLC

**Test Date:** Jan. 12, 2015

**Standards:** FCC Part 2 (Section 2.1091)  
KDB 447498 D03  
IEEE C95.1

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

**Prepared by**

:



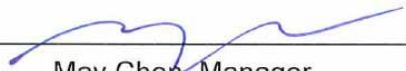
Elsie Hsu, Specialist

, **Date:**

Jan. 29, 2015

**Approved by**

:



May Chen, Manager

, **Date:**

Jan. 29, 2015

## 2 RF Exposure Limit

### Limits For Maximum Permissible Exposure (MPE)

FREQUENCY RANGE (MHz)	ELECTRIC FIELD STRENGTH (V/m)	MAGNETIC FIELD STRENGTH (A/m)	POWER DENSITY (mW/cm <sup>2</sup> )	AVERAGE TIME (minutes)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3 MPE calculation Formula

$$P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = output power to antenna in mW

$G$  = gain of antenna in linear scale

$\pi$  = 3.1416

$r$  = distance between observation point and center of the radiator in cm

### 4 Classification

The antenna of this product, under normal use condition, is at least 27cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 5 Antenna Gain

1. The antennas provided to the EUT, please refer to the following table:

2.4GHz antenna							
No.	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Frequency range (GHz to GHz)	Antenna Type	Connector Type
1	0	WNC	57EAAH15.0CH	2.98	2.4~2.4835	PIFA	NA
3	1	WNC	57EAAH15.0CJ	3.26	2.4~2.4835	PIFA	NA
6	2	WNC	57EAAH15.0CK	3.57	2.4~2.4835	PIFA	NA
5GHz antenna							
No.	Transmitter Circuit	Brand	Model	Gain (dBi) (Include cable loss)	Frequency range (GHz to GHz)	Antenna Type	Connector Type
2	0	WNC	57EAAH15.0CL	3.18	5.15~5.25	PIFA	i-pex(MHF)
				2.46	5.725~5.850	PIFA	i-pex(MHF)
4	1	WNC	57EAAH15.0CM	2.67	5.15~5.25	PIFA	i-pex(MHF)
				3.88	5.725~5.850	PIFA	i-pex(MHF)
5	2	WNC	57EAAH15.0CN	3.19	5.15~5.25	PIFA	i-pex(MHF)
				3.90	5.725~5.850	PIFA	i-pex(MHF)

## 6 Calculation Result Of Maximum Conducted Power

For 15.247(2.4GHz):

### 802.11b

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	748.275	8.04	27	0.52014	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.04\text{dBi}$

### 802.11g

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	700.586	8.04	27	0.48699	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.04\text{dBi}$

### 802.11n (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	641.433	8.04	27	0.44587	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.04\text{dBi}$

### 802.11n (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422 - 2452	205.172	8.04	27	0.14262	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 8.04\text{dBi}$

# For 15.407 (5GHz\_U-NII-1):

## 802.11a

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5240	595.601	7.79	27	0.39086	1

**NOTE: For U-NII-1 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 7.79\text{dBi}$

## 802.11ac (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 ~ 5240	458.001	7.79	27	0.30056	1

**NOTE: For U-NII-1 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 7.79\text{dBi}$

## 802.11ac (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5190 ~ 5230	632.872	7.79	27	0.41531	1

**NOTE: For U-NII-1 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 7.79\text{dBi}$

# For 15.407 (5GHz\_U-NII-3):

## 802.11a

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	483.205	8.21	27	0.34930	1

**NOTE: For U-NII-3 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 8.21\text{dBi}$

## 802.11ac (HT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5745 ~ 5825	343.756	8.21	27	0.24849	1

**NOTE: For U-NII-3 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 8.21\text{dBi}$

## 802.11ac (HT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5755 ~ 5795	336.979	8.21	27	0.24359	1

**NOTE: For U-NII-3 Band:** Directional gain =  $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 8.21\text{dBi}$

**CONCLUSION:**

Both of the 2.4GHz and 5GHz WLAN can transmit simultaneously, the formula of calculated the MPE is:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

**CPD = Calculation power density**

**LPD = Limit of power density**

Therefore, the worst-case situation is  $0.52014 / 1 + 0.41531 / 1 = 0.935$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

**--- END ---**