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Certificate No.: CB10307079

# Maximum Permissible Exposure

Applicant's company	Linksys LLC
Applicant Address	131 Theory Drive Irvine California 92617 United States
FCC ID	Q87-E8350
Manufacturer's company	Linksys LLC
Manufacturer Address	131 Theory Drive Irvine California 92617 United States

Product Name	Linksys Dual-Band Wireless-AC Router
Brand Name	Linksys
Model Name	E8350
Ref. Standard(s)	47 CFR FCC Part 2 Subpart J, section 2.1091
EUT Freq. Range	2400 ~ 2483.5MHz / 5150 ~ 5250MHz / 5725 ~ 5850MHz
Received Date	May 05, 2014
Final Test Date	Jun. 17, 2014
Submission Type	Original Equipment

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SPORTON INTERNATIONAL INC.

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## History of This Assessment Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA452068	Rev. 01	Initial issue of report	Jul. 16, 2014

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#### 1. MAXIMUM PERMISSIBLE EXPOSURE

#### 1.1. Applicable Standard

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 levels in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 0.2 m normally can be maintained between the user and the device.

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm²)	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)		
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz; \*Plane-wave equivalent power density

#### 1.2. MPE Calculation Method

E (V/m) = 
$$\frac{\sqrt{30 \times P \times G}}{d}$$
 Power Density:  $Pd$  (W/m²) =  $\frac{E^2}{377}$ 

E = Electric field (V/m)

P = Peak RF output power (W)

G = EUT Antenna numeric gain (numeric)

**d** = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$

From the peak EUT RF output power, the minimum mobile separation distance, d=0.2m, as well as the gain of the used antenna, the RF power density can be obtained.

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#### 1.3. Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

For 5GHz UNII Band:

Antenna Type: Dipole Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT20: 29.06 dBm

Directional Gain (dBi)	Sain (dRi) Gain Output Power		Average	Distance (m)	Power Density (S) (mW/cm²)	Limit of Power Density (S)	Test Result
	(numeric)	(dBm)	(mW)		(ITIVV/CITE)	(mW/cm²)	
6.77	4.7587	29.0649	806.2933	0.2	0.763717	1	Complies

Note: Directional gain= 
$$10 \cdot \log \left[ \frac{\sum_{j=1}^{N_{\text{NN}}} \left\{ \sum_{k=1}^{N_{\text{ANT}}} g_{j,k} \right\}^2}{N_{\text{ANT}}} \right]$$

For 5GHz ISM Band:

Antenna Type: Dipole Antenna

Conducted Power for IEEE 802.11ac MCS0/Nss1 VHT40: 28.19 dBm

Directional Gain (dBi)	Antenna Gain (numeric)	The Maximum Combined Average Output Power		Distance (m)	Power Density (S) (mW/cm²)	Limit of Power Density (S)	Test Result
	(Hullielle)	(dBm)	(mW)		(ITIW/CITE)	(mW/cm²)	
7.09	5.1200	28.1947	659.8915	0.2	0.672500	1	Complies

Note: Directional gain= 
$$10 \cdot \log \left[ \frac{\sum\limits_{j=1}^{N_{SS}} \left\{ \sum\limits_{k=1}^{N_{ANT}} g_{j,k} \right\}^2}{N_{ANT}} \right]$$

For 2.4GHz Band:

Antenna Type: Dipole Antenna

Conducted Power for IEEE 802.11b: 29.46 dBm

Antenna Gain (dBi)	Antenna Gain (numeric)	The Maximum Combined Average Output Power		Distance (m)	Power Density (S) (mW/cm²)	Limit of Power Density (S)	Test Result
	(Hullielic)	(dBm)	(mW)		(ITIVV/CITI)	(mW/cm²)	
1.21	1.3213	29.4582	882.7050	0.2	0.232149	1	Complies

#### **CONCULSION:**

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

CPD1 / LPD1 + CPD2 / LPD2 + .....etc. < 1

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is 0.232149 / 1 + 0.763717 / 1 = 0.995866, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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