



RF EXPOSURE REPORT

REPORT NO.: SA130725E01A

MODEL NO.: EA6900 V1.1

FCC ID: Q87-EA6900V11

RECEIVED: July 26, 2013

TESTED: Jan. 17, 2014

ISSUED: Feb. 17, 2014

APPLICANT: Linksys LLC

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ISSUED BY: Bureau Veritas Consumer Products Services
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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA130725E01A	Original release	Feb. 17, 2014

1. CERTIFICATION

PRODUCT: Linksys Smart Wi-Fi Router AC1900
BRAND NAME: Linksys
MODEL NO.: EA6900 V1.1
TEST SAMPLE: ENGINEERING SAMPLE
APPLICANT: Linksys LLC
TESTED DATE: Jan. 17, 2014
STANDARDS: FCC Part 2 (Section 2.1091)
FCC OET Bulletin 65, Supplement C (01-01)
IEEE C95.1

The above equipment (Model: EA6900 V1.1) 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.

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(Phoenix Huang, Specialist)

APPROVED BY : May Chen , **DATE:** Feb. 17, 2014
(May Chen, Manager)

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 ²)	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

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

where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 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 26cm away from the body of the user. So, this device is classified as **Mobile Device**.

5. ANTENNA GAIN

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

Transmitter Circuit	Brand	Antenna Type	Peak Gain(dBi) (Include cable loss)		Connector Type	Cable Loss (dB)	Cable Length (mm)
			For 2.4GHz (2.4GHz to 2.4835GHz)	For 5GHz (Band 1: 5.15 to 5.25GHz Band 4: 5.725 to 5.85GHz)			
Right Side Chain (0)	Galtronics	Dipole	1.3	5G Band1: 0.87 5G Band4: 1.95	R-SMA	NA	168
In center Chain (1)	Galtronics	Dipole	1.1	5G Band1: 0.47 5G Band4: 1.55	R-SMA	NA	262
Left Side Chain (2)	Galtronics	Dipole	1.1	5G Band1: 0.47 5G Band4: 1.55	R-SMA	NA	260

Note: From the above antennas, Chain (0) was selected as representative antenna for the 802.11a/b/g test and its data was recorded in this report.

6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 2.4GHz:

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11b					
2412 - 2462	497.737	1.3	26	0.07904	1.00
802.11g					
2412 - 2462	454.988	1.3	26	0.07225	1.00
CDD_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11n (HT20)					
2412 - 2462	986.826	5.94	26	0.45612	1.00
802.11n (HT40)					
2422 - 2452	336.396	5.94	26	0.15549	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 5.94\text{dBi}$					
STBC_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11n (HT20)					
2412 - 2462	986.826	1.3	26	0.15671	1.00
802.11n (HT40)					
2422 - 2452	417.997	1.3	26	0.06638	1.00
Beam forming_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11n (HT20)					
2412 - 2462	986.826	5.94	26	0.45612	1.00
802.11n (HT40)					
2422 - 2452	336.396	5.94	26	0.15549	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 5.94\text{dBi}$					

For 15.247(5GHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11a					
5745 - 5825	409.261	1.95	26	0.07548	1.00
CDD_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5745 - 5825	957.686	6.46	26	0.49896	1.00
802.11ac (VHT40)					
5755 - 5795	934.916	6.46	26	0.48710	1.00
802.11ac (VHT80)					
5775	457.400	6.46	26	0.23831	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 6.46\text{dBi}$					
STBC_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5745 - 5825	957.686	1.95	26	0.17663	1.00
802.11ac (VHT40)					
5755 - 5795	934.916	1.95	26	0.17243	1.00
802.11ac (VHT80)					
5775	457.400	1.95	26	0.08436	1.00
Beam forming_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5745 - 5825	747.871	6.46	26	0.38965	1.00
802.11ac (VHT40)					
5755 - 5795	739.090	6.46	26	0.38507	1.00
802.11ac (VHT80)					
5775	457.400	6.46	26	0.23831	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 6.46\text{dBi}$					

For 15.407(5GHz):

FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11a					
5180 - 5240	44.361	0.87	26	0.00638	1.00
CDD_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5180 - 5240	44.417	5.38	26	0.01805	1.00
802.11ac (VHT40)					
5190 - 5230	45.834	5.38	26	0.01862	1.00
802.11ac (VHT80)					
5210	40.331	5.38	26	0.01639	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 5.38\text{dBi}$					
STBC_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5180 - 5240	44.417	0.87	26	0.00639	1.00
802.11ac (VHT40)					
5190 - 5230	45.834	0.87	26	0.00659	1.00
802.11ac (VHT80)					
5210	47.399	0.87	26	0.00682	1.00
Beam forming_MODE					
FREQUENCY BAND (MHz)	MAX POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm ²)	LIMIT (mW/cm ²)
802.11ac (VHT20)					
5180 - 5240	44.417	5.38	26	0.01805	1.00
802.11ac (VHT40)					
5190 - 5230	45.834	5.38	26	0.01862	1.00
802.11ac (VHT80)					
5210	40.331	5.38	26	0.01639	1.00
NOTE: Directional gain = $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 5.38\text{dBi}$					

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 $0.45612 / 1 + 0.49896 / 1 = 0.955$, which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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