

RF Exposure Report

Report No.: SA171208E04

FCC ID: Q87-08011

Test Model: WHW03 V2

Series Model: A03 V2

Received Date: Dec. 08, 2017

Test Date: Feb. 05, 2018

Issued Date: Feb. 13, 2018

Applicant: Linksys LLC

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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Release Control Record

| Issue No. | Description | Date Issued |
|-------------|-------------------|---------------|
| SA171208E04 | Original release. | Feb. 13, 2018 |

1 Certificate of Conformity

Product: WHOLE HOME WI-FI

Brand: Linksys

Test Model: WHW03 V2

Series Model: A03 V2

Sample Status: ENGINEERING SAMPLE

Applicant: Linksys LLC

Test Date: Feb. 05, 2018

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

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 :



Date:

Feb. 13, 2018

Wendy Wu / Specialist

Approved by :



Date:

Feb. 13, 2018

May Chen / Manager

2 RF Exposure

2.1 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 | | | | |
| 0.3-1.34 | 614 | 1.63 | (100)* | 30 |
| 1.34-30 | 824/f | 2.19/f | (180/f ²)* | 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 Calculation Formula

$$Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$$

where

Pd = power density in mW/cm²

Pout = 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 32cm away from the body of the user.

So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

| Bluetooth | | | | | | |
|-----------|-----------|------------------|--------------------|----------------------|--------------|----------------|
| Ant No. | Brand | Model | Antenna Gain (dBi) | Frequency rang (GHz) | Antenna type | Connector type |
| 1 | Aristotle | RFA-BT-9267 | 1.69 | 2.4~2.4835 | Dipole | i-pex(MHF) |
| Zigbee | | | | | | |
| Ant No. | Brand | Model | Antenna Gain (dBi) | Frequency rang (GHz) | Antenna type | Connector type |
| 1 | Aristotle | RFA-ZB-9267 | 0.85 | 2.4~2.4835 | Dipole | i-pex(MHF) |
| WLAN | | | | | | |
| Ant No. | Brand | Model | Antenna Gain (dBi) | Frequency rang (GHz) | Antenna type | Connector type |
| 1 | Aristotle | RFA-05-9267-L | 3.55 | 5.5~5.825 | Dipole | i-pex(MHF) |
| 2 | Aristotle | RFA-05-9267-R | 3.87 | 5.5~5.825 | Dipole | i-pex(MHF) |
| 3 | Aristotle | RFA-25-9267-B-V2 | 3.12 | 2.4~2.4835 | Dipole | i-pex(MHF) |
| | | | 3.77 | 5.18~5.320 | | |
| 4 | Aristotle | RFA-25-9267-F-V2 | 3.26 | 2.4~2.4835 | Dipole | i-pex(MHF) |
| | | | 3.68 | 5.18~5.320 | | |

2.5 Calculation Result of Maximum Conducted Power

WLAN:

| Frequency Band (MHz) | Max Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2412-2462 | 813.837 | 6.20 | 32 | 0.26365 | 1 |
| 5180-5240 | 729.665 | 6.74 | 32 | 0.26768 | 1 |
| 5745-5825 | 993.777 | 6.72 | 32 | 0.36289 | 1 |

NOTE:

2.4GHz: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.20\text{dBi}$

5GHz:

UNII-1: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.74\text{dBi}$

UNII-3: Directional gain = $10 \log[(10^{G0/20} + 10^{G1/20})^2 / 2] = 6.72\text{dBi}$

BT-EDR

| Frequency Band (MHz) | Max. Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2402-2480 | 5.200 | 1.69 | 32 | 0.00060 | 1 |

BT-LE

| Frequency Band (MHz) | Max. Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2402-2480 | 8.241 | 1.69 | 32 | 0.00095 | 1 |

Zigbee

| Frequency Band (MHz) | Max. Power (mW) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2405-2475 | 66.069 | 0.85 | 32 | 0.00624 | 1 |

Conclusion:

The formula of calculated the MPE is:

$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + WLAN 5GHz (UNII-1) + WLAN 5GHz (UNII-3) + Bluetooth + Zigbee = $0.26365 / 1 + 0.26768 / 1 + 0.36289 / 1 + 0.00095 / 1 + 0.00624 / 1 = 0.90141$

Therefore the maximum calculations of above situations are less than the "1" limit.

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