

RF Exposure Report

Report No.: SA111005C22D

FCC ID: TVE-0120201

Test Model: EMP7618

Series Model: EMP7618-FT

Received Date: Mar. 07, 2013

Test Date: Mar. 22 ~ Apr. 19, 2016

Issued Date: Apr. 19, 2016

Applicant: Fortinet, Inc.

Address: 899 Kifer Road Sunnyvale, CA 94086 USA

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

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Release Control Record

| Issue No. | Description | Date Issued |
|--------------|-------------------|---------------|
| SA111005C22D | Original release. | Apr. 19, 2016 |

1 Certificate of Conformity

Product: 802.11 abgn RF Module Card

Brand: Fortinet Inc.

Test Model: EMP7618

Series Model: EMP7618-FT

Sample Status: Engineering sample

Applicant: Fortinet, Inc.

Test Date: Mar. 22 ~ Apr. 19, 2016

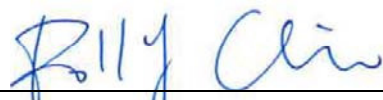
Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 (October 23, 2015)

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 :


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Date:

Apr. 19, 2016

Approved by :


Ken Liu / Senior Manager

Date:

Apr. 19, 2016

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 | | | | |
| 300-1500 | ... | ... | F/1500 | 30 |
| 1500-100,000 | ... | ... | 1.0 | 30 |

F = Frequency in MHz

2.2 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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

3 Calculation Result Of Maximum Conducted Power

2.4G + 5G combo Module

2.4G PIFA antenna + 5G PIFA antenna:

| Frequency Band (MHz) | Modulation Mode | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|-----------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2412-2462 | 802.11b | 14.02 | 6.01 | 20 | 0.020 | 1 |
| | 802.11g | 21.77 | 6.01 | 20 | 0.119 | 1 |
| | 802.11n (20MHz) | 21.38 | 6.01 | 20 | 0.109 | 1 |
| | 802.11n (40MHz) | 20.18 | 6.01 | 20 | 0.083 | 1 |
| 5180-5240 | 802.11a | 13.39 | 7.01 | 20 | 0.022 | 1 |
| | 802.11n (20MHz) | 14.96 | 7.01 | 20 | 0.031 | 1 |
| | 802.11n (40MHz) | 16.64 | 7.01 | 20 | 0.046 | 1 |
| 5745-5825 | 802.11a | 13.29 | 7.01 | 20 | 0.021 | 1 |
| | 802.11n (20MHz) | 12.10 | 7.01 | 20 | 0.016 | 1 |
| | 802.11n (40MHz) | 11.94 | 7.01 | 20 | 0.016 | 1 |

2.4G Dipole antenna + 5G Dipole antenna:

| Frequency Band (MHz) | Modulation Mode | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm ²) | Limit (mW/cm ²) |
|----------------------|-----------------|-----------------|--------------------|---------------|-------------------------------------|-----------------------------|
| 2412-2462 | 802.11b | 14.02 | 6.01 | 20 | 0.020 | 1 |
| | 802.11g | 21.77 | 6.01 | 20 | 0.119 | 1 |
| | 802.11n (20MHz) | 21.38 | 6.01 | 20 | 0.109 | 1 |
| | 802.11n (40MHz) | 20.18 | 6.01 | 20 | 0.083 | 1 |
| 5180-5240 | 802.11a | 13.39 | 9.01 | 20 | 0.035 | 1 |
| | 802.11n (20MHz) | 14.96 | 9.01 | 20 | 0.050 | 1 |
| | 802.11n (40MHz) | 16.64 | 9.01 | 20 | 0.073 | 1 |
| 5745-5825 | 802.11a | 13.29 | 9.01 | 20 | 0.034 | 1 |
| | 802.11n (20MHz) | 12.10 | 9.01 | 20 | 0.026 | 1 |
| | 802.11n (40MHz) | 11.94 | 9.01 | 20 | 0.025 | 1 |

NOTE:

1. 2.4G:
For PIFA antenna: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi}$
For Dipole antenna: Directional gain = $3\text{dBi} + 10\log(2) = 6.01\text{dBi}$
2. 5G:
For PIFA antenna: Directional gain = $4\text{dBi} + 10\log(2) = 7.01\text{dBi}$
For Dipole antenna: Directional gain = $6\text{dBi} + 10\log(2) = 9.01\text{dBi}$
3. For max. power, please refer to the original report.

CONCLUSION:

Both of the WLAN 2.4G & WLAN 5G can transmit simultaneously, the formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

2.4G PIFA antenna + 5G PIFA antenna:

$\text{WLAN 2.4G} + \text{WLAN 5.0G} = 0.119 + 0.046 = 0.165$

2.4G Dipole antenna + 5G Dipole antenna

$\text{WLAN 2.4G} + \text{WLAN 5.0G} = 0.119 + 0.073 = 0.192$

Therefore, the maximum calculation of this situation is 0.192, which is less than the "1" limit.

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