# RF Exposure Report

**Report No.:** SA171005C05

**FCC ID:** REP-8020-1

**Test Model:** HotPort 8020

**Received Date:** Oct. 05, 2017

**Test Date:** Oct. 23 ~ Dec. 26, 2017

**Issued Date:** Dec. 26, 2017

**Applicant:** Firetide Inc.

**Address:** Firetide Inc. A Division of UNICOM GLOBAL 2105, South Bascom Avenue, Suite 220, Campbell, California, United States, 950008

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan (R.O.C.)

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)

**FCC Registration / Designation Number:** 788550 / TW0003

## Table of Contents

**Release Control Record**

| Issue No. | Description | Date Issued |
|-----------|-------------|-------------|
| SA171005C05 | Original release. | Dec. 26, 2017 |

## 1 Certificate of Conformity

**Product:** Firetide Wireless Mesh Node

**Brand:** Firetide

**Test Model:** HotPort 8020

**Sample Status:** Engineering sample

**Applicant:** Firetide Inc.

**Test Date:** Oct. 23 ~ Dec. 26, 2017

**Standards:** FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

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 :** _____ , **Date:** _____ Dec. 26, 2017 _____

Suntee Liu / Specialist

**Approved by :** _____ , **Date:** _____ Dec. 26, 2017 _____

Ken Liu / Senior 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 | | | | |
| 300-1500 | … | … | F/1500 | 30 |
| 1500-100,000 | … | … | 1.0 | 30 |

F = Frequency in MHz

### 2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$
where
Pd = power density in mW/cm$^2$
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 51cm away from the body of the user. So, this device is classified as Mobile Device.

## 3  Calculation Result of Maximum Conducted Power

| Function | Frequency Band (MHz) | Mode | Max Power (dBm) | Antenna Gain (dBi) | Distance (cm) | Power Density (mW/cm$^2$) | Limit (mW/cm$^2$) |
|---|---|---|---|---|---|---|---|
| WLAN 5GHz | | | Radio 1, Antenna 1 | | | | |
| | 5180~5240 | CDD | 10.92 | 13.02 | 51 | 0.008 | 1 |
| | | Beamforming | 4.90 | 13.02 | 51 | 0.002 | 1 |
| | 5745~5825 | CDD | 25.98 | 13.02 | 51 | **0.243** | 1 |
| | | Beamforming | 19.96 | 13.02 | 51 | 0.061 | 1 |
| | | | Radio 1, Antenna 2 | | | | |
| | 5180~5240 | CDD | 13.95 | 23.27 | 51 | 0.161 | 1 |
| | | Beamforming | 7.93 | 23.27 | 51 | 0.040 | 1 |
| | 5745~5825 | CDD | 14.32 | 23.27 | 51 | **0.176** | 1 |
| | | Beamforming | 8.16 | 23.27 | 51 | 0.043 | 1 |
| | | | Radio 2, Antenna 1 | | | | |
| | 5180~5240 | CDD | 10.94 | 13.02 | 51 | 0.008 | 1 |
| | | Beamforming | 4.72 | 13.02 | 51 | 0.002 | 1 |
| | 5745~5825 | CDD | 26.05 | 13.02 | 51 | **0.247** | 1 |
| | | Beamforming | 20.03 | 13.02 | 51 | 0.062 | 1 |
| | | | Radio 2, Antenna 2 | | | | |
| | 5180~5240 | CDD | 13.78 | 23.27 | 51 | 0.155 | 1 |
| | | Beamforming | 7.76 | 23.27 | 51 | 0.039 | 1 |
| | 5745~5825 | CDD | 14.27 | 23.27 | 51 | **0.174** | 1 |
| | | Beamforming | 8.25 | 23.27 | 51 | 0.043 | 1 |
| WLAN 4.9GHz | | | Radio 1, Antenna 1 | | | | |
| | 4942.5~4987.5 | - | 17.62 | 12.52 | 51 | **0.032** | 1 |
| | | | Radio 1, Antenna 2 | | | | |
| | 4942.5~4987.5 | - | 17.62 | 22.27 | 51 | **0.298** | 1 |
| | | | Radio 2, Antenna 1 | | | | |
| | 4942.5~4987.5 | - | 19.15 | 12.52 | 51 | **0.045** | 1 |
| | | | Radio 2, Antenna 2 | | | | |
| | 4942.5~4987.5 | - | 19.15 | 22.27 | 51 | **0.424** | 1 |

Note:
5GHz:
Antenna 1 max. directional gain = 7dBi + 10log(4) = 13.02dBi
Antenna 2 max. directional gain = 18.5dBi + 10log(3) = 23.27dBi
4.9GHz:
Antenna 1 max. directional gain = 6.5dBi + 10log(4) = 12.52dBi
Antenna 2 max. directional gain = 17.5dBi + 10log(3) = 22.27dBi

| Frequency Band | Max Power (dBm) | | Total Power (dBm) | Power Limit (dBm) |
|---|---|---|---|---|
| | Radio 1 | Radio 2 | | |
| WLAN 5GHz | 25.98 | 26.05 | 29.03 | 30 |
| WLAN 4.9GHz | 17.62 | 19.15 | 21.46 | 27 |

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

Max.: Radio 1, Antenna 1, 5GHz   +  Radio 2, Antenna 1, 5GHz   = 0.243 + 0.247 = 0.490  < 1
Max.: Radio 1, Antenna 2, 5GHz   +  Radio 2, Antenna 2, 5GHz   = 0.176 + 0.174 = 0.350  < 1
Max.: Radio 1, Antenna 1, 4.9GHz  +  Radio 2, Antenna 1, 4.9GHz = 0.032 + 0.045 = 0.077  < 1
Max.: Radio 1, Antenna 2, 4.9GHz  +  Radio 2, Antenna 2, 4.9GHz = 0.298 + 0.424 = 0.722  < 1
Max.: Radio 1, Antenna 1, 5GHz   +  Radio 2, Antenna 1, 4.9GHz = 0.243 + 0.045 = 0.288  < 1
Max.: Radio 1, Antenna 2, 5GHz   +  Radio 2, Antenna 2, 4.9GHz = 0.176 + 0.424 = 0.600  < 1
Max.: Radio 1, Antenna 1, 4.9GHz  +  Radio 2, Antenna 1, 5GHz   = 0.032 + 0.247 = 0.279  < 1
Max.: Radio 1, Antenna 2, 4.9GHz  +  Radio 2, Antenna 2, 5GHz   = 0.298 + 0.174 = 0.472  < 1


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