

RF Exposure Report

Report No.: SA180108C15D

FCC ID: Q6G-AP225W

Test Model: W-118

Received Date: Jan. 08, 2018

Test Date: Oct. 25 ~ Nov. 04, 2019

Issued Date: Nov. 11, 2019

Applicant: WatchGuard Technologies, Inc.

Address: 505 Fifth Avenue South, Suite 500 Seattle WA United States 98104

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

Lab Address: No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

Test Location: No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City
33383, Taiwan

FCC Registration / 788550 / TW0003
Designation Number:



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification. The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any government agencies.

Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits for Maximum Permissible Exposure (MPE).....	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
3 Calculation Result of Maximum Conducted Power	6

Release Control Record

Issue No.	Description	Date Issued
SA180108C15D	Original release.	Nov. 11, 2019

1 Certificate of Conformity

Product: AP225W

Brand: WatchGuard

Test Model: W-118

Sample Status: Engineering sample

Applicant: WatchGuard Technologies, Inc.

Test Date: Oct. 25 ~ Nov. 04, 2019

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 RF characteristics under the conditions specified in this report.

Prepared by : Pettie Chen, **Date:** Nov. 11, 2019
Pettie Chen / Senior Specialist

Approved by : Bruce Chen, **Date:** Nov. 11, 2019
Bruce Chen / Senior Project Engineer

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

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

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 22cm away from the body of the user. So, this device is classified as Mobile Device.

3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
Radio 1					
WLAN 2412~2462 (CDD mode)	25.84	7.32	22	0.340	1
WLAN 2412~2462 (Beamforming mode)	21.46	7.32	22	0.124	1
Radio 2					
WLAN 5180~5240 (CDD mode)	24.23	9	22	0.346	1
WLAN 5745~5825 (CDD mode)	26.58	9	22	0.594	1
WLAN 5180~5240 (Beamforming mode)	21.13	9	22	0.169	1
WLAN 5745~5825 (Beamforming mode)	23.57	9	22	0.297	1
Radio 3					
WLAN 2412~2462 (CDD mode)	18.60	5.79	22	0.045	1
WLAN 5180~5240 (CDD mode)	17.20	7.84	22	0.052	1
WLAN 5745~5825 (CDD mode)	16.85	7.84	22	0.048	1
BT LE/Zigbee					
BT LE 2402~2480	2.15	2.76	22	0.001	1
Zigbee	2.12	2.76	22	0.001	1

Note:

2.4GHz:

Radio 1: Directional gain = 4.31dBi + 10log(2) = 7.32dBi

Radio 3: Directional gain = 2.78dBi + 10log(2) = 5.79dBi

5.0GHz:

Radio 2: Directional gain = 5.99dBi + 10log(2) = 9dBi

Radio 3: Directional gain = 4.83dBi + 10log(2) = 7.84dBi

Frequency Band	Max. Power (dBm)				Total Power (dBm)	Power Limit (dBm)
	Radio 1	Radio 3 (WLAN 2.4GHz)	BT LE	Zigbee		
2.4GHz	25.84	18.60	2.15	-	26.61	30
2.4GHz	25.84	18.60	-	2.12	26.61	30

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

The simultaneous operation mode was determined by client.

No	Mode
1	Radio 1 + Radio 2 + Radio 3(2.4GHz) + BT LE
2	Radio 1 + Radio 3(5GHz) + BT LE
3	Radio 1 + Radio 2 + Radio 3(2.4GHz)+ Zigbee
4	Radio 1 + Radio 3(5GHz) + Zigbee

*The Radio 2 and Radio 3(5GHz) cannot transmit simultaneously.

Radio 1 + Radio 2 + Radio 3(2.4GHz) + BT LE = $0.340 + 0.594 + 0.045 + 0.001 = 0.98$

Radio 1 + Radio 3(5GHz) + BT LE = $0.340 + 0.052 + 0.001 = 0.393$

Radio 1 + Radio 2 + Radio 3(2.4GHz) + Zigbee = $0.340 + 0.594 + 0.045 + 0.001 = 0.98$

Radio 1 + Radio 3(5GHz) + Zigbee = $0.340 + 0.052 + 0.001 = 0.393$

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

---END---