

RF Exposure Report

Report No.: SA190415E04

FCC ID: VW3FAST3686V2H

Test Model: F@ST 3686 V2.2 HP

Received Date: Apr. 15, 2019

Test Date: Sep. 07 to 12, 2019

Issued Date: Sep. 23, 2019

Applicant: SAGEMCOM Broadband SAS

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Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch
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**FCC Registration /
Designation Number:** 723255 / TW2022

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Release Control Record

Issue No.	Description	Date Issued
SA190415E04	Original release.	Sep. 23, 2019

1 Certificate of Conformity

Product: Euro-DOCSIS3.0

Brand: Sagemcom

Test Model: F@ST 3686 V2.2 HP

Sample Status: ENGINEERING SAMPLE

Applicant: SAGEMCOM Broadband SAS

Test Date: Sep. 07 to 12, 2019

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 : Phoenix Huang , **Date:** Sep. 23, 2019
Phoenix Huang / Specialist

Approved by : May Chen , **Date:** Sep. 23, 2019
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

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

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

2.4 Antenna Gain

Ant. No.	Chain No.	Brand	Antenna Gain (dBi)	Frequency Range (MHz)	Antenna Type	Connector Type	Cable Length (mm)
1	Chain (0)	TSKY	3.13	2400~2500	PCB	i-pex(MHF)	56.5
			5.72	5150~5850			
2	Chain (1)	TSKY	3.57	5150~5850	PCB	i-pex(MHF)	250
3	Chain (2)	TSKY	3.54	2400~2500	PCB	i-pex(MHF)	40
			5.87	5150~5850			

2.5 Calculation Result of Maximum Conducted Power

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN (2.4GHz)	2437	468.343	6.35	23	0.30402	1
WLAN (U-NII-1)	5200	404.38	9.89	23	0.59309	1
WLAN (U-NII-3)	5755	405.907	9.89	23	0.59533	1

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: The directional gain = $10 \log[(10^{G0/20} + 10^{G2/20})^2 / 2] = 6.35 \text{ dBi}$
- 5GHz: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 9.89 \text{ dBi}$.

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

$WLAN \ 2.4GHz + WLAN \ 5GHz = 0.30402 / 1 + 0.59533 / 1 = 0.89935$

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

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