



RADIO EXPOSURE TEST REPORT

FCC ID : VW3FAST399V2
Equipment : Wireless Home Router
Brand Name : SAGEMCOM
Model Name : FAST 399
Applicant : SAGEMCOM BROADBAND SAS
250 Route de l'Empereur - 92848 RUEIL
MALMAISON CEDEX- FRANCE
Manufacturer : SAGEMCOM BROADBAND SAS
250 Route de l'Empereur - 92848 RUEIL
MALMAISON CEDEX- FRANCE
Standard : 47 CFR Part 2.1091

The product was received on Nov. 07, 2022, and testing was started from Nov. 08, 2022 and completed on Jan. 05, 2023. We, Sporton International Inc. Hsinchu Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International Inc. Hsinchu Laboratory, the test report shall not be reproduced except in full.

Approved by: Sam Chen

Sporton International Inc. Hsinchu Laboratory

No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)



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History of this test report

Report No.	Version	Description	Issued Date
FA170737-06	01	Initial issue of report	Jan. 11, 2023



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

1. The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers. It's means measurement values may risk exceeding the limit of regulation standards, if measurement uncertainty is include in test results.
2. The measurement uncertainty please refer to report "Measurement Uncertainty".

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: **Sam Chen**

Report Producer: **Penny Kao**



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) VHT: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
5GHz WLAN	5150-5250 5725-5850	5180-5240 5745-5825	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM) 802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
6GHz WLAN	5925-7125	5955-7095	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)



1.2 Antenna Information

Ant.	Port			Brand	Model Name	Type	Connector	Gain (dBi)	Remark
	WLAN 2.4GHz	WLAN 5GHz	WLAN 6GHz						
1	3	3	-	Galtronics	02102140-07501-1 DB1	PCB	I-Pex	Note1	WLAN 2.4GHz, WLAN 5GHz UNII 1, 3
2	2	2	-	Galtronics	02102140-07501-2 DB2	PCB	I-Pex		WLAN 2.4GHz, WLAN 5GHz UNII 1, 3
3	1	1	-	Galtronics	02102140-07501-3 DB3	PCB	I-Pex		WLAN 2.4GHz, WLAN 5GHz UNII 1, 3
4	-	4	-	Galtronics	02102142-07501 5G	PCB	I-Pex		WLAN 5GHz UNII 1, 3
5	-	-	1	Galtronics	02102475-07501B1 6G1 (HPOLOMNI)	PCB	I-Pex		WLAN 6GHz UNII 5~8
6	-	-	2	Galtronics	02102475-07501B2 6G2 (HPOLOMNI)	PCB	I-Pex		WLAN 6GHz UNII 5~8
7	-	-	3	Galtronics	02102475-07501A1 6G3	PCB	I-Pex		WLAN 6GHz UNII 5~8
8	-	-	4	Galtronics	02102475-07501A2 6G4	PCB	I-Pex		WLAN 6GHz UNII 5~8

Note1:

Ant.	Gain (dBi)					
	WLAN 2.4GHz	WLAN 5GHz UNII 1	WLAN 5GHz UNII 2A	WLAN 5GHz UNII 2C	WLAN 5GHz UNII 3	WLAN 6GHz UNII 5~8
1	3.12	3.32	3.31	2.65	3.66	-
2	1.24	2.27	1.97	2.31	2.46	-
3	3.18	3.33	2.68	2.36	2.01	-
4	-	4.9	3.67	3.24	3.22	-
5	-	-	-	-	-	5.519
6	-	-	-	-	-	3.588
7	-	-	-	-	-	4.972
8	-	-	-	-	-	6.680
Directional Gain (dBi) (3T1S)	3.41	-	-	-	-	-
Directional Gain (dBi) (4T1S)	-	5.13	4.03	4.01	4.42	-

Note2: The above information (except Ant.1~4 gain) was declared by manufacturer.

Note3: The directional gain of WLAN 2.4GHz,5GHz is measured which follows the procedure of KDB 662911 D03.

Note4: The DFS band doesn't enable at this time.

Note5: <WLAN 2.4GHz function>

802.11 b/g/n/VHT/ax mode (3TX/3RX):

Port 1, Port 2 and Port 3 can be used as transmitting/receiving antenna.

Port 1, Port 2 and Port 3 could transmit/receive simultaneously.

<WLAN 5GHz function>

802.11a/n/ac/ax mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.

Port 1, Port 2, Port 3 and Port 4 could transmit/receive simultaneously.

<WLAN 6GHz function>

802.11ax mode (4TX/4RX):

Port 1, Port 2, Port 3 and Port 4 can be used as transmitting/receiving antenna.



1.3 Accessories

Accessories			
Equipment Name	Brand Name	Model Name	Rating
Adapter	MOSO	MSG-V2500NR120-030E0-US	INPUT: 100-127V~ 50/60Hz, 1.0A Max. OUTPUT: 12.0V, 2.5A

1.4 Applicable Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR Part 2.1091
- ♦ KDB 447498 D04 Interim General RF Exposure Guidance v01

The following reference test guidance is not within the scope of accreditation of TAF.

- ♦ 47 CFR Part 1.1307
- ♦ 47 CFR Part 1.1310

1.5 Testing Location

Testing Location Information	
Test Lab. : Sporton International Inc. Hsinchu Laboratory	
Hsinchu	ADD: No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County 302010, Taiwan (R.O.C.)
(TAF: 3787)	TEL: 886-3-656-9065 FAX: 886-3-656-9085
Test site Designation No. TW3787 with FCC.	
Conformity Assessment Body Identifier (CABID) TW3787 with ISED.	



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	*(100)	<6
3.0-30	1842/f	4.89/f	*(900/f ²)	<6
30-300	61.4	0.163	1.0	<6
300-1500	-	-	f/300	<6
1500-100,000	-	-	5	<6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
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

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 44 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \qquad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 MPE Exemption

Option (A): 1.1307(b)(3)(i)(A): Available maximum time-averaged power is < 1 mW

Option (B): 1.1307(b)(3)(i)(B): Device operates between 300 MHz and 6 GHz and the maximum time-averaged power or effective radiated power (ERP), whichever is greater, <= Pth.

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

Option (C): 1.1307(b)(3)(i)(C): ERP is below a threshold calculated based on the distance R between the person and the antenna / radiating structure, where $R > \lambda / 2 \pi$.

Single RF Sources Subject to Routine Environmental Evaluation	
RF Source frequency (MHz)	Threshold ERP (watts)
0.3-1.34	$1,920 R^2$.
1.34-30	$3,450 R^2/f^2$.
30-300	$3.83 R^2$.
300-1,500	$0.0128 R^2f$.
1,500-100,000	$19.2R^2$.
Note: R is in meters, f is in MHz.	



2.4 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Option *1	TL EIRP (dBm) *2	TL Ratio *3
2.4G;G1D	3.18	29.84	33.02	0.50	33.52	44	0.09245	1.00000	C	37.851	0.3689
5.2G;D1D	5.13	29.55	34.68	0.50	35.18	44	0.13548	1.00000	C	37.851	0.5407
5.8G;D1D	4.42	29.98	34.40	0.50	34.90	44	0.12702	1.00000	C	37.851	0.5069
6.2G;D1D	6.68	-	24.53	0.50	25.03	44	0.01309	1.00000	C	37.851	0.0522
6.4G;D1D	6.68	-	23.89	0.50	24.39	44	0.01129	1.00000	C	37.851	0.0451
6.7G;D1D	6.68	-	24.16	0.50	24.66	44	0.01202	1.00000	C	37.851	0.0480
7.0G;D1D	6.68	-	23.68	0.50	24.18	44	0.01076	1.00000	C	37.851	0.0429

Note 1: Option A, B and C refer as clause 2.3

Note 2: For option B, Pth(mW) convert to TL EIRP(dBm); For option C, ERP(W) convert to TL EIRP(dBm)

Note 3: TL Ratio=Tune-up EIRP(mW)/TL EIRP(mW)

Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz UNII 1, 3 +WLAN 6GHz UNII 5~8

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Distance (cm)	S (mW/cm ²)	Limit (mW/cm ²)	Option *1	TL EIRP (dBm)*2	TL Ratio *3
2.4G;G1D	3.18	29.84	33.02	0.50	33.52	44	0.09245	1.00000	C	37.851	0.3689
5.2G;D1D	5.13	29.55	34.68	0.50	35.18	44	0.13548	1.00000	C	37.851	0.5407
6.2G;D1D	6.68	-	24.53	0.50	25.03	44	0.01309	1.00000	C	37.851	0.0522
Sum TL Ratio_C	0.9618										
Ratio Limit	1										

Note 1: Option A, B and C refer as clause 2.3

Note 2: For option B, Pth(mW) convert to TL EIRP(dBm); For option C, ERP(W) convert to TL EIRP(dBm)

Note 3: TL Ratio=Tune-up EIRP(mW)/TL EIRP(mW)

Note 4: The above antenna gain (except WLAN 2.4GHz and WLAN 5GHz) was declared by manufacturer.

————THE END————