



RADIO EXPOSURE TEST REPORT

FCC ID : VW3FAST5295
Equipment : WiFi 6E Router
Brand Name : SAGEMCOM
Model Name : SAX2V1S
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 Jul. 01, 2022, and testing was started from Oct. 03, 2022 and completed on Jan. 10, 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 variant 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

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History of this test report

TEL : 886-3-656-9065
FAX : 886-3-656-9085
Report Template No.: CB-A1_1 Ver1.1

Page Number : 3 of 14
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Report Version : 01



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: Sandy Chuang



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 5250-5350 5470-5725 5725-5850 5725-5895	5180-5250 5250-5320 5500-5720 5745-5825 5815-5885	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	6115-7115	802.11ax: OFDMA (BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM)
IEEE 802.15.4	2400-2483.5	2405-2480	O-QPSK (250kbps)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK


1.1.1 Antenna Information

Ant.	Port					Brand	Model Name	Ant. Type	Connector	Modes of Operation
	2.4GHz	5GHz	6GHz	IEEE 802.15.4 / Bluetooth	GPS					
1	1	1	-	-	-	GALTRONICS	DB1	PIFA	I-PEX	2.4GHz and 5GHz UNII1~UNII4
2	2	3	-	-	-	GALTRONICS	DB2	PIFA	I-PEX	
3	3	2	-	-	-	GALTRONICS	DB3	PIFA	I-PEX	
4	4	4	-	-	-	GALTRONICS	DB4	PIFA	I-PEX	
5	-	5	1	-	-	GALTRONICS	ANT1	PIFA	I-PEX	5GHz UNII1~UNII4 and 6GHz UNII5~8
6	-	6	2	-	-	GALTRONICS	ANT2	PIFA	I-PEX	
7	-	7	3	-	-	GALTRONICS	ANT3	PIFA	I-PEX	
8	-	8	4	-	-	GALTRONICS	ANT4	PIFA	I-PEX	
9	-	-	5	-	-	GALTRONICS	6G1	PIFA	I-PEX	6GHz UNII5~8 (for ant. 9~12) 、IEEE 802.15.4 and BT (for ant. 11~12)
10	-	-	6	-	-	GALTRONICS	6G2	PIFA	I-PEX	
11	-	-	7	1	-	GALTRONICS	6G3	PIFA	I-PEX	
12	-	-	8	2	-	GALTRONICS	6G4	PIFA	I-PEX	
13	-	-	-	-	1	GALTRONICS	GNSS	PIFA	I-PEX	GPS

<Antenna Gain>

Ant.	Antenna Gain (dBi)											
	2.4GHz	5GHz UNII 1	5GHz UNII 2A	5GHz UNII 2C	5GHz UNII 3	5GHz UNII 4	6GHz UNII 5	6GHz UNII 6	6GHz UNII 7	6GHz UNII 8	IEEE 802.15.4 / Bluetooth	GPS
1	1.86	2.95	1.8	2.24	2.33	2.14	-	-	-	-	-	-
2	1.63	2.31	3.25	3.39	3.62	3.56	-	-	-	-	-	-
3	4.5	4.86	4.24	3.23	3.43	3.43	-	-	-	-	-	-
4	4.78	3.95	3.04	2.54	3.38	2.73	-	-	-	-	-	-
5	-	4.89	4.29	3.5	3.99	4.43	4.46	4.1	4.5	3.33	-	-
6	-	2.94	2.93	3.09	4.31	3.75	2.63	2.79	2.83	2.96	-	-
7	-	3.55	3.53	4.34	3.5	4.11	3.71	2.18	3.63	2.99	-	-
8	-	5.48	5.08	5.06	5.28	6.24	4.66	4.23	5.31	4.77	-	-
9	-	-	-	-	-	-	1.06	1.02	1.1	1.1	-	-
10	-	-	-	-	-	-	1.45	1.02	1.12	1.65	-	-
11	-	-	-	-	-	-	3.34	1.84	2.05	2	4.078	-
12	-	-	-	-	-	-	3.37	2.58	4	3.68	5.064	-
13	-	-	-	-	-	-	-	-	-	-	-	3.82

**<Directional Gain>**

DG	Directional Gain (dBi)
	2.4GHz
DG [1SS]	4.98

DG	Directional Gain (dBi)				
	5GHz UNII 1	5GHz UNII 2A	5GHz UNII 2C	5GHzUNII 3	5GHzUNII 4
DG [1SS] (dBi) option1	5.25	5.26	4.44	5.26	5.59
DG [1SS] (dBi) option2	4.55	3.75	3.74	4.17	4.69
DG [1SS] (dBi) option3	4.91	4.31	3.85	4.32	5.08
DG [1SS] (dBi) option4	4.24	3.9	3.94	4.18	3.74
DG [1SS] (dBi) option5	5.68	5.35	5.23	5.66	5.09
DG [1SS] (dBi) option6	4.33	3.54	4.19	4.43	4.65
DG [1SS] (dBi) option7	4.69	4.96	5.17	4.77	5.18
DG [1SS] (dBi) option8	5.57	4.88	3.91	4.79	3.91
DG [1SS] (dBi) option9	5.29	5.67	5.86	7.08	7.24
DG [1SS] (dBi) option10	5.4	5.15	4.82	5.9	6.13
DG [1SS] (dBi) option11	3.19	2.89	3.34	4.23	4.55
DG [1SS] (dBi) option12	3.92	3.82	4.46	4.85	3.91
DG [1SS] (dBi) option13	5.09	5.35	6.02	6.53	6.68
DG [1SS] (dBi) option14	5.38	5.06	4.88	5.52	5.48
DG [1SS] (dBi) option15	4.98	3.51	3.36	3.45	3.78
DG [1SS] (dBi) option16	5.18	4.17	3.71	4.56	4.08

DG	Directional Gain (dBi)			
	6GHz UNII 5	6GHz UNII 6	6GHz UNII 7	6GHz UNII 8
DG [1SS] (dBi) option1	3.24	4.73	5.38	4.81
DG [1SS] (dBi) option2	3.18	2.58	2.24	2.9
DG [1SS] (dBi) option3	4.66	4.96	5.5	4.76
DG [1SS] (dBi) option4	3.85	2.63	1.94	2.67
DG [1SS] (dBi) option5	3.51	4.15	5.24	4.73
DG [1SS] (dBi) option6	2.15	1.96	3.14	3.58
DG [1SS] (dBi) option7	4.02	4.2	5.36	4.74
DG [1SS] (dBi) option8	3.54	2.12	3.2	3.37
DG [1SS] (dBi) option9	3.44	4.17	4.41	4.33
DG [1SS] (dBi) option10	3.2	2.38	2.87	2.45
DG [1SS] (dBi) option11	5.12	4.52	4.55	5.1
DG [1SS] (dBi) option12	4.71	2.62	3.8	4.36
DG [1SS] (dBi) option13	3.46	3.87	4.44	4.12
DG [1SS] (dBi) option14	2.19	1.77	3.2	3.21
DG [1SS] (dBi) option15	5.9	4.24	4.58	5.05
DG [1SS] (dBi) option16	5.52	2.37	3.47	4.3



Note1: Maximum Directional Gain following KDB662911 D03.

Note2: The Ant. 13 for GPS used.

Note3: **<WLAN 2.4GHz function>**

For IEEE 802.11 b/g/n/VHT/ax (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 5GHz function>

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

Port 1~8 can be used as transmitting/receiving antenna.

There are only four ports to be used at the same time.

UNII1

Port 1, Port 3, Port 6 and Port 7 generated the worst case, so it was selected to perform the test and its test result was written in the report.

UNII2C

Port 1, Port 3, Port 6 and Port 8 generated the worst case, so it was selected to perform the test and its test result was written in the report.

UNII2A and UNII3~4

Port 1, Port 3, Port 5 and Port 8 generated the worst case, so it was selected to perform the test and its test result was written in the report.

<WLAN 6GHz function>

For IEEE 802.11ax (4TX/4RX):

Port 1~8 can be used as transmitting/receiving antenna.

There are only four ports to be used at the same time.

UNII5

Port 1, Port 4, Port 6 and Port 8 generated the worst case, so it was selected to perform the test and its test result was written in the report.

UNII6~7

Port 1, Port 4, Port 5 and Port 7 generated the worst case, so it was selected to perform the test and its test result was written in the report.

UNII8

Port 1, Port 4, Port 5 and Port 8 generated the worst case, so it was selected to perform the test and its test result was written in the report.

<IEEE 802.15.4 and Bluetooth>

The EUT supports the antenna with TX and RX diversity functions.

Both Port 1 and Port 2 support transmit and receive functions, but only one of them will be used at one time.

The Port 2 generated the worst case, so it was selected to test and record in the report.



1.1.2 Table of Antenna Configuration

The configuration of antenna option 1~16 are follows:

<For Ant.1~Ant.8>

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
Ant.1	Ant.2	Ant.1	Ant.3	Ant.1	Ant.2	Ant.1	Ant.3
Ant.2	Ant.3	Ant.4	Ant.4	Ant.2	Ant.2	Ant.4	Ant.4
Ant.5	Ant.5	Ant.5	Ant.5	Ant.6	Ant.6	Ant.6	Ant.6
Ant.7	Ant.7	Ant.7	Ant.7	Ant.7	Ant.7	Ant.7	Ant.7
Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15	Option 16
Ant.1	Ant.2	Ant.1	Ant.3	Ant.1	Ant.2	Ant.1	Ant.3
Ant.2	Ant.3	Ant.4	Ant.4	Ant.2	Ant.3	Ant.4	Ant.4
Ant.5	Ant.5	Ant.5	Ant.5	Ant.6	Ant.6	Ant.6	Ant.6
Ant.8	Ant.8	Ant.8	Ant.8	Ant.8	Ant.8	Ant.8	Ant.8

<For Ant.5~Ant.12>

Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7	Option 8
Ant.5	Ant.6	Ant.5	Ant.6	Ant.5	Ant.6	Ant.5	Ant.6
Ant.7	Ant.7	Ant.8	Ant.8	Ant.7	Ant.7	Ant.8	Ant.8
Ant.9	Ant.9	Ant.9	Ant.9	Ant.10	Ant.10	Ant.10	Ant.10
Ant.11	Ant.11	Ant.11	Ant.11	Ant.11	Ant.11	Ant.11	Ant.11
Option 9	Option 10	Option 11	Option 12	Option 13	Option 14	Option 15	Option 16
Ant.5	Ant.6	Ant.5	Ant.6	Ant.5	Ant.6	Ant.5	Ant.6
Ant.7	Ant.7	Ant.8	Ant.8	Ant.7	Ant.7	Ant.8	Ant.8
Ant.9	Ant.9	Ant.9	Ant.9	Ant.10	Ant.10	Ant.10	Ant.10
Ant.12	Ant.12	Ant.12	Ant.12	Ant.12	Ant.12	Ant.12	Ant.12

Note 1: The above information was declared by the manufacturer.

Note 2:

The directional gain of the maximum was selected to test.

<For Ant.1~Ant.8> Option 5 for 5GHz UNII1, option 13 for 5GHz UNII 2C and option 9 for 5GHz UNII 2A, 3~4 have been tested and recorded in the test report.

<For Ant.5~Ant.12> Option 15 for 6GHz UNII5, Option 3 for 6GHz UNII6~7 and Option 11 for 6GHz UNII8 have been tested and recorded in the test report.



1.2 Table for Permissive Change

This product is an extension of original one reported under Sporton project number: FA263031.

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1. Adding UNII 2A, UNII 2C (5250~5350 MHz, 5470~5725 MHz) and IEEE 802.15.4 & Bluetooth function for this device. 2. Enabling the 160MHz for 5GHz UNII 1~2C. 3. Revising the Distance to "52cm" from "51cm".	Maximum Permissible Exposure.

1.3 Accessories

Accessories				
Equipment Name	Brand Name	Model Name	Rating	Remark
Adapter 1	Challenger Cable Sales	PS-2.5-12-3WT3	INPUT: 100-120V~50/60Hz, 1.0A OUTPUT: 12V, 3.0A	-
Adapter 2	NetBit	NBS36J120300VU	INPUT: 100-120V~, 50/60Hz, 1.0A OUTPUT: 12.0V, 3.0A	NB06
Adapter 3	NetBit	NBS36J120300VU	INPUT: 100-120V~, 50/60Hz, 1.0A OUTPUT: 12.0V, 3.0A	NB01



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 52 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

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

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	$0.0128 R^2 f$.
1,500-100,000	$19.2 R^2$.
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)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;D1D	4.98	29.95	34.93	0.50	35.43	3.49140	52	0.10275	1.00000
5.2G;D1D	5.68	28.24	33.92	0.50	34.42	2.76694	52	0.08143	1.00000
5.3G;D1D	5.67	23.94	29.61	0.38	29.99	0.99770	52	0.02936	1.00000
5.6G;D1D	6.02	23.94	29.96	0.03	29.99	0.99770	52	0.02936	1.00000
5.8G;D1D	7.08	28.83	35.91	0.08	35.99	3.97192	52	0.11689	1.00000
5.81G;D1D	7.24	28.59	35.83	0.16	35.99	3.97192	52	0.11689	1.00000
6.2G;D1D	5.90	-	26.90	0.50	27.40	0.54954	52	0.1617	1.00000
6.4G;D1D	4.96	-	24.60	0.50	25.10	0.32359	52	0.0952	1.00000
6.7G;D1D	5.50	-	24.49	0.50	24.99	0.31550	52	0.0929	1.00000
7.0G;D1D	5.10	-	24.75	0.50	25.25	0.33496	52	0.0986	1.00000
2.4G;BT-LE	5.064	16.18	21.24	0.50	21.74	0.14928	52	0.00439	1.00000
2.4G;IEEE 802.15.4	5.064	16.69	21.75	0.50	22.25	0.16788	52	0.00494	1.00000

MPE Exemption Option C							
Frequency (MHz)	$\lambda/2\pi$ (m)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	MPE Exemption
2437	0.0196	0.52	35.43	33.28	2.128	5.192	Complies
5755	0.0083		35.99	33.84	2.421	5.192	Complies
6345	0.0075		27.40	25.25	0.335	5.192	Complies
2402	0.0199		21.74	19.59	0.091	5.192	Complies
2405	0.0198		22.25	20.10	0.102	5.192	Complies

Simultaneous Transmission Analysis Mode:

Simultaneous Transmissions Option C							
Frequency (MHz)	R (m)	Tune-up EIRP (dBm)	Tune-up ERP (dBm)	Tune-up ERP (W)	ERP Threshold (W)	Simultaneous Transmissions	Simultaneous Transmissions Limit
2437	0.52	35.43	33.28	2.128	5.192	0.98	<= 1
5755		35.99	33.84	2.421	5.192		
6345		27.40	25.25	0.335	5.192		
2402		21.74	19.59	0.091	5.192		
2405		22.25	20.10	0.102	5.192		

Note: The above antenna gain was declared by manufacturer.

————THE END————