



RF Exposure Evaluation Declaration

FCC ID: VW3FAST5689E
Applicant: SAGEMCOM BROADBAND SAS
Product: Giga Hub
Model No.: FAST 5689E
Brand Name: SAGEMCOM
FCC Rule Part(s) FCC Part 2.1091
Result: Complies

Reviewed By:

Sunny Sun

Approved By:

Robin Wu



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.

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Revision History

Report No.	Version	Description	Issue Date	Note
2201RSU021-U8	Rev. 01	Initial Report	04-05-2022	Invalid

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1. General Information

1.1. Applicant

SAGEMCOM BROADBAND SAS

250 Route de l'Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

1.2. Manufacturer

SAGEMCOM BROADBAND SAS

250 Route de l'Empereur - 92848 RUEIL MALMAISON CEDEX- FRANCE

1.3. Testing Facility

<input checked="checked" type="checkbox"/>	Test Site – MRT Suzhou Laboratory
	Laboratory Location (Suzhou - Wuzhong) D8 Building, No.2 Tian'edang Rd., Wuzhong Economic Development Zone, Suzhou, China
	Laboratory Location (Suzhou - SIP) 4b Building, Liando U Valley, No.200 Xingpu Rd., Shengpu Town, Suzhou Industrial Park, China
	Laboratory Accreditations
	A2LA: 3628.01 FCC: CN1166 VCCI: <input type="checkbox"/> R-20025 <input type="checkbox"/> G-20034 <input type="checkbox"/> C-20020 <input type="checkbox"/> T-20020 <input type="checkbox"/> R-20141 <input type="checkbox"/> G-20134 <input type="checkbox"/> C-20103 <input type="checkbox"/> T-20104 CNAS: L10551 ISED: CN0001
<input type="checkbox"/>	Test Site – MRT Shenzhen Laboratory
	Laboratory Location (Shenzhen) 1G, Building A, Junxiangda Building, Zhongshanyuan Road West, Nanshan District, Shenzhen, China
	Laboratory Accreditations
	A2LA: 3628.02 FCC: CN1284 CNAS: L10551 ISED: CN0105
<input type="checkbox"/>	Test Site – MRT Taiwan Laboratory
	Laboratory Location (Taiwan) No. 38, Fuxing 2nd Rd., Guishan Dist., Taoyuan City 333, Taiwan (R.O.C.)
	Laboratory Accreditations
	TAF: L3261-190725 FCC: 291082, TW3261 ISED: TW3261

1.4. Product Information

Product Name	Giga Hub
Model No.	FAST 5689E
EUT Identification No.	20220107Sample#17(Radiated) 20220107Sample#16(Conducted)
Wi-Fi Specification	802.11b/g/n/ac/ax
Zigbee Specification	802.15.4
Z-Wave Specification	800 ~ 900MHz radio frequency range
Antenna Information	Refer to Section 1.7
Power Type	AC Adapter
Operating Environment	Indoor Use
Accessories	
Adapter 1#	Model No.: NBS60E120500M2 Input: 100-127V, 50/60Hz, 1.5A Output: 12.0V=5.0A
Adapter 2#	Model No.: MS-Z5000R120-060C0-P Input: 100-127V, 50/60Hz, 1.5A Output: 12.0V=5.0A
Adapter 3#	Model No.: ADS-65HI-12A-2 12060E-L Input: 100-127V, 50/60Hz, 1.5A Output: 12.0V=5.0A
Remark: The information of EUT was provided by the manufacturer, and the accuracy of the information shall be the responsibility of the manufacturer.	

1.5. Antenna Details

Antenna Type	Frequency Band (GHz)	Antenna Gain (dBi)				Directional Gain (dBi)	
		Ant 0	Ant 1	Ant 2	Ant 3	For Power	For PSD
Wi-Fi Antenna (4*4 MIMO)							
PIFA & Dipole	2.4 ~ 2.5	2.79	2.38	2.95	1.91	2.95	6.40
	5.15 ~ 5.25	3.37	4.41	3.51	3.53	4.41	6.46
	5.25 ~ 5.35	4.87	3.61	3.02	3.25	4.87	6.45
	5.47 ~ 5.725	4.73	4.07	3.46	3.88	4.73	6.76
	5.725 ~ 5.85	4.89	4.53	3.46	3.25	4.89	6.90
	5.925 ~ 7.125	4.13	3.18	4.51	4.83	4.83	7.03
ZigBee Antenna							
Dipole	2.4 ~ 2.5					2.98	
Z-Wave Antenna							
Dipole	0.9 ~ 1					-0.34	
Note: Software automatically backs power down based on a $10\log(N)$ factor for beamforming operation.							

2. RF Exposure Evaluation

2.1. Test Limits

According to FCC 1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in 1.1307(b)

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)
(A) Limits for Occupational/ Control Exposures				
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(B) Limits for General Population/ Uncontrolled Exposures				
300-1500	--	--	f/1500	30
1500-100,000	--	--	1	30

f= Frequency in MHz

Calculation Formula: $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot r^2)$

Where

Pd = power density in mW/cm²

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

Pd is the limit of MPE, 1mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

2.2. Device Classification

According to the user manual, the antenna of this device is at least 35cm away from the body of the user, this device is classified as a **Mobile Device**. So, the RF exposure evaluation requirements of § 2.1091 for mobile device exposure conditions subject to MPE limits.

2.3. Calculation Result

Product	Giga Hub
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Max. EIRP (dBm)	Power Density at 35cm (mW/cm ²)	Limit (mW/cm ²)
802.11b/g/n	2412 ~ 2462	32.80	0.1238	1
802.11a/n/ac/ax	5180 ~ 5240	34.30	0.1748	1
	5260 ~ 5320	28.72	0.0484	1
	5500 ~ 5720	28.58	0.0468	1
	5745 ~ 5825	34.64	0.1891	1
802.11a/ax	5955 ~ 7095	22.28	0.0110	1
ZigBee	2405 ~ 2480	21.46	0.0091	1

CONCLUSION:

WLAN 2.4GHz, 5GHz, 6GHz and ZigBee can transmit simultaneously.

The Ratio of Power Density at R (35 cm) = $0.1238 + 0.1891 + 0.0110 + 0.0091 = 0.3330 < 1$.

Appendix - EUT Photograph

Refer to "2206RSU052-UE" file.

The End