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
Test Date:	January 10 ~ 29, 2022

Reviewed By: Sunny Sun

Approved By: Robin Wu

Revision History

Report No.	Version	Description	Issue Date	Note
2201RSU021-U5	Rev. 01	Initial Report	03-05-2022	Valid

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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

☒	**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		CNAS: L10551		
	FCC: CN1166		ISED: CN0001		
	VCCI:	☐R-20025	☐G-20034	☐C-20020	☐T-20020
		☐R-20141	☐G-20134	☐C-20103	☐T-20104
☐	**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		CNAS: L10551		
	FCC: CN1284		ISED: CN0105		
☐	**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 ~ 5.85	4.89	4.53	3.51	3.88	4.89	6.90
ZigBee Antenna							
Dipole	2.4 ~ 2.5	2.85					
Z-Wave Antenna							
Dipole	0.9 ~ 1	-0.46					

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	6
1500-100,000	--	--	1	30

f= Frequency in MHz

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

Where

Pd = power density in mW/cm^2

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, $1mW/cm^2$. 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. Test Result

Product	Giga Hub
Test Item	RF Exposure Evaluation

Test Mode	Frequency Band (MHz)	Conducted Power (dBm)	Max. Antenna Gain (dBi)	Max. EIRP (dBm)	Compliance Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
802.11b/g/n	2412 ~ 2462	29.87	2.95	32.82	30	0.1693	1
802.11a/n/ac	5180 ~ 5240	29.41	4.89	34.30	30	0.2380	1
802.11a/n/ac	5725 ~ 5825	29.75	4.89	34.64	30	0.2574	1
ZigBee	2405 ~ 2480	18.61	2.85	21.46	30	0.0124	1

CONCLUSION:

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

The Max. Power Density at R (30 cm) = 0.1693 mW/cm^2 + 0.2574mW/cm^2 + 0.0124mW/cm^2 = 0.4391mW/cm^2 < 1mW/cm^2.

So the compliance distance is 30cm for device installed without any other radio equipment.

Appendix - EUT Photograph

Refer to “2201RSU021-UE” file.

The End