




MPE Report

Test Report Number	STA-22021143-LC-FCC-MPE
FCC ID	2A8IP-efuseA9X
Applicant	F&S Elektronik Systeme GmbH
Applicant Address	Untere Waldplaetze 23 Stuttgart Baden-Wuerttemberg Germany, 70569
Product Name	Computer On Module
Model (s)	efusA9X
Date of Receipt	06/07/2022
Date of Test	06/28/2022 - 07/15/2022
Report Issue Date	07/20/2022
Test Standards	47 CFR §1.1307(b), 47 CFR §1.1310
Test Result	PASS
	<p>Issued by:</p> <p>Vista Compliance Laboratories 1261 Puerta Del Sol, San Clemente, CA 92673 USA www.vista-compliance.com</p>
 <hr/> <p>Devin Tai (Test Engineer)</p>	 <hr/> <p>David Zhang (Technical Manager)</p>
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REVISION HISTORY

Report Number	Version	Description	Issued Date
STA-22021143-LC-FCC-MPE	01	Initial report	07/20/2022

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1 General Information

1.1 Applicant

Applicant	F&S Elektronik Systeme GmbH
Applicant Address	Untere Waldplaetze 23 Stuttgart Baden-Wuerttemberg Germany, 70569
Manufacturer	F&S Elektronik Systeme GmbH
Manufacturer Address	Untere Waldplaetze 23 Stuttgart Baden-Wuerttemberg Germany, 70569

1.2 Product information

Product Name	Computer On Module
Model Number	efusA9X
Family Model Number	efusA9Xr2
Serial Number	N/A
Operational Frequency	WLAN 2.4G: 2412 - 2462MHz WLAN 5G: U-NII-1: 5150-5250MHz U-NII-2A: 5250-5350MHz U-NII-2C: 5470-5725MHz U-NII-3: 5725-5850MHz
Channel Bandwidth	20MHz, 40MHz, 80MHz
Type of Modulation	WLAN_2.4G: DSSS(CCK/QPSK/BPSK); OFDM(BPSK/QPSK/16QAM/64QAM) WLAN_5G: 256QAM,64QAM, 16QAM, QPSK, BPSK
Equipment Class	DTS, U-NII
Antenna Information	Chip antenna with 2.1 dBi gain for 2.4G band, and 2.4 dBi for 5G band
Clock Frequencies	N/A
Port/Connectors	N/A
Input Power	F&S Efus baseboard input power 5Vdc, efusA9X modules power 3.3Vdc
Power Adapter Manu/Model	N/A
Power Adapter SN	N/A
Hardware version	N/A
Software version	N/A
Simultaneous Transmission	N/A
Additional Info	N/A

1.3 Test standard and method

Test standard	47 CFR §1.1307(b), 47 CFR §1.1310 47 CFR §2.1093
Test method	47 CFR §1.1307(b), 47 CFR §1.1310 47 CFR §2.1093

2 Test Site Information

Lab performing tests	Vista Laboratories, Inc.
Lab Address	1261 Puerta Del Sol, San Clemente, CA 92673 USA
Phone Number	+1 (949) 393-1123
Website	www.vista-compliance.com

Test Condition	Temperature	Humidity	Atmospheric Pressure
RF Testing	23.2°C	57.5%	996 mbar
Radiated Emission Testing	23.2°C	57.5%	996 mbar

3 RF Exposure

3.1 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

3.2 MPE Calculation Formula

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

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

3.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as Mobile Device.

3.4 Antenna Gain

The antenna type is Chip antenna with 2.1 dBi gain for 2.4G band, and 2.4 dBi for 5G band.

4 Test Results

Mode	Max Power (dBm)	Max Power (mW)	Turn-Up Tolerance	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN_2.4G	16.751	47.33	±1dB	2.1	20	0.0192	1
WLAN_5G	14.13	25.88	±1dB	2.4	20	0.0113	1

Note: 2.4G and 5G wlan cannot transmit simultaneously.

Conclusion:

The worst-case ratio = 0.0192 < 1

The above results show that the device complies with the MPE requirement.

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