

Maximum Permissible Exposure Evaluation

FCC ID: 2A7ZM-ALLEGROX8

1. Client Information

Applicant	:	JBU GLOBAL LLC
Address	:	19416 NE 26th Ave, 114B, Miami, Florida 33180
Manufacturer	:	GUANGZHOU MIAOSHENG ELECTRONIC TECHNOLOGY Co., LTD
Address	:	1-2, second floor West Street Watermelon Ridge Dongguan village Xinya Street Huadu District, Guangzhou, China

2. General Description of EUT

EUT Name	:	Allegro X8	
Model(s) No.	:	Allegro X8	
Product Description	:	Operation Frequency:	Bluetooth V5.0: 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
	:	Number of Channel:	Bluetooth 5.0(BDR+EDR): 79 channels Bluetooth 5.0(BLE): 40 channels 802.11b/g/n(HT20):11 channels 802.11n(HT40): 7 channels
	:	RF Output Power:	BLE:1.827dBm (Max) BT:1.351dBm (Max) 802.11b: 17.434dBm (Max) 802.11g: 15.942dBm (Max) 802.11n (HT20): 15.985dBm (Max) 802.11n (HT40): 14.691dBm (Max)
	:	Antenna Gain:	2.3dBi FPC Antenna
	:	Modulation Type:	GFSK, $\pi/4$ -DQPSK, 8-DPSK 802.11b: DSSS(CCK, DQPSK, DBPSK) 802.11g/n:OFDM(BPSK,QPSK,16QAM,64QAM)
Power Supply	:	For Adapter (Model: QD-POWER-GF-01) Input: AC 110-240V 50/60Hz Output: DC 15V 3500mA	
Software Version	:	5.3.0.0	
Hardware Version	:	T367-V1.8.1 P40-V2.1	
Remark: The antenna gain provided by the applicant, the adapter and verified for the RF conduction test and adapter provided by TOBY test lab.			

Note: More test information about the EUT please refer the RF Test Report.

MPE Calculations for WIFI

1. Antenna Gain:

FPC Antenna: 2.3dBi

2. EUT Operation Condition:

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

3. Exposure Evaluation:

Equation from page 18 of OET Bulletin 65, Edition 97-01

$$S=(PG)/4\pi R^2$$

Where

S: power density

P: power input to the antenna

G: power gain of the antenna in the direction of interest relative to an isotropic radiator.

R: distance to the center of radiation of the antenna

4. Test Result:

Worst Maximum MPE Result								
Mode	N _{TX}	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	ANT Gain (dBi) [G]	Distance (cm) [R]	Power Density (mW/ cm ²) [S]
GFSK	1	2402	1.657	2±1	3	2.3	20	0.0007
		2441	1.569	2±1	3	2.3	20	0.0007
		2480	0.634	1±1	2	2.3	20	0.0005
π/4-DQPSK	1	2402	1.727	2±1	3	2.3	20	0.0007
		2441	1.619	2±1	3	2.3	20	0.0007
		2480	0.684	1±1	2	2.3	20	0.0005
8-DPSK	1	2402	1.827	2±1	3	2.3	20	0.0007
		2441	1.679	2±1	3	2.3	20	0.0007
		2480	0.761	1±1	2	2.3	20	0.0005
BLE(1Mbps)	1	2402	1.351	1±1	2	2.3	20	0.0005
		2440	1.022	1±1	2	2.3	20	0.0005
		2480	0.172	0±1	1	2.3	20	0.0004

802.11b	1	2412	16.965	17±1	18	2.3	20	0.0213
		2437	16.953	17±1	18	2.3	20	0.0213
		2462	17.434	17±1	18	2.3	20	0.0213
802.11g	1	2412	15.067	15±1	16	2.3	20	0.0135
		2437	15.506	16±1	17	2.3	20	0.0169
		2462	15.942	16±1	17	2.3	20	0.0169
802.11n(HT20)	1	2412	15.18	15±1	16	2.3	20	0.0135
		2437	15.648	16±1	17	2.3	20	0.0169
		2462	15.985	16±1	17	2.3	20	0.0169
802.11n(HT40)	1	2422	14.18	14±1	15	2.3	20	0.0107
		2437	14.453	14±1	15	2.3	20	0.0107
		2452	14.691	15±1	16	2.3	20	0.0135

Note:

(1) N_{TX}= Number of Transmit Antennas

(2) RF Output power specifies that Maximum Conducted Peak Output Power.

5. Conclusion:

As specified in Table 1B of 47 CFR 1.1310- Limits for Maximum Permissible Exposure (MPE),

Limits for General Population/ Uncontrolled Exposure

Frequency Range (MHz)	Power density (mW/ cm ²)
300-1,500	F/1500
1,500-100,000	1.0

For:2402~2480MHz&2412~2462MHz

MPE limit S: 1mW/ cm²

6. Summary simultaneous transmission results

WiFi and Bluetooth support simultaneous transmit the

WIFI ANT1 MPE (Ratio)	Bluetooth MPE (Ratio)	simultaneous MPE (Ratio)	MPE Limits (Ratio)
0.0007	0.0213	0.022	1.0000

So, RF exposure limit warning or SAR test are not required.

The EUT will only be used with a separation of 20cm or greater between the antenna and nearby persons and can therefore be considered a mobile transmitter per 47 CFR2.1091 (b). The RF Exposure Information page from the manual is included here for reference.

7. Conclusion:

The measurement results comply with the FCC Limit per 47 CFR 2.1091 for the uncontrolled RF Exposure of mobile device.

-----END OF REPORT-----