Maximum Permissible Exposure Evaluation
FCC ID:2A8O2-G10

1. Client Information

Applicant	:	Shenzhen Senma Utrend Technology Co., Ltd.
Address	:	Floor 2, Building 9, Rundongsheng Industrial Zone, No. 467, Section Xixiang, 107 National Road, Longteng Community, Xixiang Street, Bao'an District, Shenzhen, China
Manufacturer	:	Shenzhen Senma Utrend Technology Co., Ltd.
Address	:	Floor 2, Building 9, Rundongsheng Industrial Zone, No. 467, Section Xixiang, 107 National Road, Longteng Community, Xixiang Street, Bao'an District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Laser Engraver	
Models No.	:	G10, G20, S10	
Model Difference	:	All PCB boards and circuit diagrams are the same, the only difference is that size and color.	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz
		Number of Channel:	802.11b/g/n(HT20):11 channels
		RF Output Power:	802.11b: 14.739dBm 802.11g: 15.966dBm 802.11n (HT20): 16.495dBm
		Antenna Gain:	3dBi FPC Antenna
Power Rating	:	Input: AC 100-240V~ 50/60Hz 1.5A Output: DC 12V, 5A	
Software Version	:	V1.2	
Hardware Version	:	V1.1	
Connecting I/O Port(S)	:	Please refer to the User's Manual	

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MPE Calculations for WIFI

1. **Antenna Gain:**
   FPC Antenna: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]
802.11b	1	2412	13.869	14±1	15	3	20	0.0126
		2437	13.812	14±1	15	3	20	0.0126
		2462	14.739	15±1	16	3	20	0.0158
802.11g	1	2412	15.326	15±1	16	3	20	0.0158
		2437	14.743	15±1	16	3	20	0.0158
		2462	15.966	16±1	17	3	20	0.0199
802.11n(HT20)	1	2412	15.613	16±1	17	3	20	0.0199
		2437	16.243	16±1	17	3	20	0.0199
		2462	16.495	16±1	17	3	20	0.0199

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 2.4WIFI:2412~2462 MHz

MPE limit S: $1mW/cm^2$

The MPE is calculated as **0.0199** ***mW / cm² < limit 1mW / cm²***. 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.

Note

For a more detailed features description, please refer to the RF Test Report.

6. Conclusion:

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

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