

Maximum Permissible Exposure Evaluation

FCC ID: 2AX6X-M1

1. Client Information

Applicant	:	Simpnic co., Ltd.
Address	:	16F-6, No. 79, Sec 1, Xintai 5th Rd, Xizhi Dist., New Taipei City, Taiwan
Manufacturer	:	Suzhou WINTECH Electronics Technology Co., Ltd
Address	:	Building 1, No. 2639, tianedang Road, Wuzhong District, Suzhou City, Jiangsu Province, China

2. General Description of EUT

EUT Name	:	Miu Keeper
Models No.	:	M1
Model Difference	:	N/A
Sample ID	:	20200928-20-1_02
Brand Name	:	SiMPNiC
Product Description	:	Operation Frequency: 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz
Power Rating	:	AC/DC Adapter(Model: A18A-050100U-US2): Input: AC 100-240V, 50/60Hz 0.2A Max Output: DC 5V, 1A
Software Version	:	B04
Hardware Version	:	M1-B04
Connecting I/O Port(S)	:	Please refer to the User's Manual

TB-RF-073-3.0

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	2.4G Antenna Gain(dBi)
ANT. A	N/A	N/A	FPC	3.68
ANT. B	N/A	N/A	FPC	3.68
Note: For MIMO mode: Directional Gain=ANT. Gain+10*LOG(N _{ANT}) =6.69dBi 2.4G working with 802.11g/n(HT20/HT40) has MIMO mode.				

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. Simultaneous transmission MPE Considerations

According to KDB447498 :All transmitters and antennas in the host must be either evaluated for MPE compliance, by measurement or computational modeling, or qualify for the standalone MPE test exclusion in section 7.1. Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneous transmitting antennas incorporated in a host device, based on the calculated/estimated, numerically modeled or measured field strengths or power density, is ≤ 1.0 .

This means that:

$$\sum \text{ of MPE ratios } \leq 1.0$$

5. Standalone MPE Evaluation:

[2.4GHz WLAN]

Mode	Channel	Frequency	Peak Conducted Output Power (dBm)		Tolerance ± (dB)	Turn-up Power Tolerance (dB)	
			Ant. A	Ant. B		Ant.A	Ant.B
IEEE 802.11b	1	2412	13.57	13.17	1.0	13±1	13±1
	6	2437	12.04	11.71	1.0	13±1	11±1
	11	2462	10.91	10.83	1.0	11±1	11±1
IEEE 802.11g	1	2412	21.02	19.73	1.0	21±1	19±1
	6	2437	20.78	17.93	1.0	21±1	18±1
	11	2462	19.74	19.05	1.0	20±1	20±1
IEEE 802.11n HT20	1	2412	21.80	20.00	1.0	21±1	20±1
	6	2437	21.55	18.59	1.0	21±1	18±1
	11	2462	21.22	19.26	1.0	21±1	19±1
IEEE 802.11n HT40	3	2422	21.08	19.23	1.0	21±1	19±1
	6	2437	21.55	18.40	1.0	21±1	18±1
	9	2452	20.59	17.52	1.0	21±1	17±1

2.4GHz WLAN ANT. A

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	14.00	25.12	3.68	2.3335	20	0.0117	1.0000
IEEE 802.11g	22.00	158.49	3.68	2.3335	20	0.0736	1.0000
IEEE 802.11n HT20	22.00	158.49	3.68	2.3335	20	0.0736	1.0000
IEEE 802.11n HT40	22.00	158.49	3.68	2.3335	20	0.0736	1.0000

2.4GHz WLAN ANT. B

Modulation Type	Output power (Turn-up Procedure)		Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
	dBm	mW					
IEEE 802.11b	14.00	25.12	3.68	2.3335	20	0.0117	1.0000
IEEE 802.11g	21.00	125.89	3.68	2.3335	20	0.0584	1.0000
IEEE 802.11n HT20	21.00	125.89	3.68	2.3335	20	0.0584	1.0000
IEEE 802.11n HT40	20.00	100.00	3.68	2.3335	20	0.0464	1.0000

Remark:

1. Output power (Average) including turn-up tolerance;
2. Output power was adjust to duty cycle at 100% if measured duty cycle less than 98%;
3. MPE evaluate distance is 20cm from user manual provide by manufacturer.

6. Summary simultaneous transmission information

Modulation Type	Work Frequency Band	Transmit Antenna		Antenna A Antenna B Synchronization transmit
		Antenna A	Antenna B	
IEEE 802.11b	2.4GHz	Yes	Yes	No
IEEE 802.11g	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT20	2.4GHz	Yes	Yes	Yes
IEEE 802.11n HT40	2.4GHz	Yes	Yes	Yes

7. Summary simultaneous transmission results

Antenna A and Antenna B for 2.4G WLAN

Modulation Type	MPE _{Antenna A} (mW/cm ²)	MPE _{Antenna B} (mW/cm ²)	ΣMPE ratios	Limit	Results
IEEE 802.11b	0.0117	0.0117	/	1.0	PASS
IEEE 802.11g	0.0736	0.0584	0.1320	1.0	PASS
IEEE 802.11n HT20	0.0736	0.0584	0.1320	1.0	PASS
IEEE 802.11n HT40	0.0736	0.0464	0.1200	1.0	PASS

Maximum Simultaneous transmission MPE Ratios is $0.1320 \leq 1.0$.

8. 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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