



Maximum Permissible Exposure Evaluation

FCC ID: 2A3TX-HOTSPOTG1

1. Client Information

Applicant	:	Ingenious Technology LLC
Address	:	111 Deerwood Road Suite 200 San Ramon California United States 94583
Manufacturer	:	Shenzhen Hoverstar Innovations Technology Co., Ltd.
Address	:	111 Deerwood Road Suite 200 San Ramon California United States 94583

2. General Description of EUT

EUT Name	:	Osprey Electronics
Models No.	:	Hotspot G1
Model Difference	:	----
Product Description	:	Operation Frequency: DSS: LoRa(125KHz): 902.3MHz-914.9MHz DTS: LoRa(500KHz): 903MHz-914.2MHz DTS: LoRa(500KHz): 923.3MHz-927.5MHz Bluetooth 5.0(BLE): 2402MHz~2480MHz 802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz-2452MHz
Power Rating	:	Adapter(XSD-0503000NUSD) Input: 100-240V~50/60Hz 0.5A Max Output: 5V3000mA
Software Version	:	G1
Hardware Version	:	G1
Connecting I/O Port(S)	:	Please refer to the User's Manual
Remark	:	the MPE report used the EUT-2(RW-C-202204-0089-2-2#).

TB-RF-073-3.0

MPE Calculations

1. Antenna Gain:

Antenna	Brand	Model Name	Type	LoRa Antenna Gain(dBi)
Lora	N/A	N/A	Dipole	0

Antenna	Brand	Model Name	Type	BLE&2.4G WIFI Antenna Gain(dBi)
/	N/A	N/A	PCB	2.5

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:

LoRa FHSS(902.3-914.9MHz)

Channel	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]	Limit of Power Density (mW/ cm ²) (S)
Channel 01	21.35	21±1	22	0	20	0.0315	0.6015
Channel 32	21.11	21±1	22	0	20	0.0315	0.6015
Channel 64	21.18	21±1	22	0	20	0.0315	0.6015

LoRa DTS(903-914.2MHz)

Channel	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]	Limit of Power Density (mW/ cm ²) (S)
Channel 01	27.12	27±1	28	0	20	0.125	0.602
Channel 04	26.83	26±1	27	0	20	0.099	0.602
Channel 08	26.66	26±1	27	0	20	0.099	0.602

LoRa DTS(923.3-927.5MHz)

Channel	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]	Limit of Power Density (mW/ cm ²) (S)
Channel 01	26.57	26±1	27	0	20	0.099	0.615
Channel 04	26.28	26±1	27	0	20	0.099	0.615
Channel 08	26.16	26±1	27	0	20	0.099	0.615

BLE

Mode	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm2)	MPE Limits (mW/cm2)
GFSK	2402	-5.19	-5±1	-4	2.5	1.7782	20	0.0001	1.0000
	2440	-4.33	-4±1	-3	2.5	1.7782	20	0.0001	1.0000
	2480	-4.28	-4±1	-3	2.5	1.7782	20	0.0001	1.0000

Mode	Freq. (MHz)	Conducted Power(max) (dBm)	Turn-up Power (dB)	Max tune up power (dBm) [P]	Antenna Gain (dBi)	Antenna Gain (Numeric)	Distance (cm) [R]	MPE (mW/cm ²)	MPE Limits (mW/cm ²)
802.11b	2412	16.71	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2437	17.67	17±1	18	2.5	1.7782	20	0.0223	1.0000
	2462	17.90	17±1	18	2.5	1.7782	20	0.0223	1.0000
802.11g	2412	16.15	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2437	16.61	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2462	16.92	16±1	17	2.5	1.7782	20	0.0177	1.0000
802.11n(HT20)	2412	17.61	17±1	18	2.5	1.7782	20	0.0223	1.0000
	2437	16.18	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2462	16.47	16±1	17	2.5	1.7782	20	0.0177	1.0000
802.11n(HT40)	2422	16.89	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2437	16.28	16±1	17	2.5	1.7782	20	0.0177	1.0000
	2452	15.86	15±1	16	2.5	1.7782	20	0.0141	1.0000

Remark:

1. Output power 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.
4. Only the worst power was evaluated for each wireless function

6. 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

7. Summary simultaneous transmission information

The sample supports two antennas for LoRa and BT/WLAN. The SRD and BT/WLAN can transmit simultaneous. The BT/WLAN are share the same antenna

According to KDB447498 for Transmitters used in mobile exposure conditions for simultaneous transmission operations;

$\sum$ of MPE ratios ≤ 1.0

8. Summary simultaneous transmission results

LoRa + BT/2.4G Wifi Maximum Simultaneous transmission MPE Ratios is
 $0.2076+0.0223=0.2299 \leq 1.0$.

9. 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-----