Maximum Permissible Exposure Evaluation
FCC ID: 2A7RW-TYZG1

1. Client Information

Applicant	:	Shenzhen CDTONG Technology Co., Ltd
Address	:	Dongjiang Haoyuan, No. 1 longjing Second Road, Longjing Community, Xin 'an Street, Bao 'an District, Shenzhen, China
Manufacturer	:	Shenzhen CDTONG Technology Co., Ltd
Address	:	Dongjiang Haoyuan, No. 1 longjing Second Road, Longjing Community, Xin 'an Street, Bao 'an District, Shenzhen, China

2. General Description of EUT

EUT Name	:	Smart gateway	
Models No.	:	TYZG1, TYZB1, TYBL1	
Model Different		All these models are identical in the same PCB, layout and electrical circuit, The only difference is model name.	
Product Description	:	Operation Frequency:	802.11b/g/n(HT20): 2412MHz~2462MHz 802.11n(HT40): 2422MHz~2452MHz Zigbee: 2405MHz~2480MHz
		Number of Channel:	802.11b/g/n(HT20):11 channels 802.11n(HT40): 7 channels Zigbee:16 channels
		Antenna Gain:	0dBi PCB Antenna for 2.4G 0dBi PCB Antenna for Zigbee
Power Rating	:	Output: DC 5V/1A	
Software Version	:	V2.0.0	
Hardware Version	:	V2.0.0	
Connecting I/O Port(S)	:	Please refer to the User's Manual	
Remark	:	the evaluation report used the EUT(202206-0350-1-2#).	

MPE Calculations for WIFI

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

2. **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

3. **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:
   ∑ of MPE ratios ≤ 1.0

4. **Test Result:**

2.4G WiFi & Zigbee

2.4GWiFi Mode	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)
802.11B	2412	18.755	19±1	20	0	20	0.0199	1
	2437	18.76	19±1	20	0	20	0.0199	1
	2462	17.934	18±1	19	0	20	0.0158	1
802.11G	2412	17.915	18±1	19	0	20	0.0158	1
	2437	18.474	18±1	19	0	20	0.0158	1
	2462	17.393	17±1	18	0	20	0.0126	1
802.11N(HT20)	2412	18.115	18±1	19	0	20	0.0158	1
	2437	18.572	19±1	20	0	20	0.0199	1
	2462	17.546	18±1	19	0	20	0.0158	1
802.11N(HT40)	2422	18.059	18±1	19	0	20	0.0158	1
	2437	17.832	18±1	19	0	20	0.0158	1
	2452	17.544	18±1	19	0	20	0.0158	1

Zigbee Mode	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)
Zigbee Mode	2405	-1.444	-1±1	0	0	20	0.00020	1
	2445	-1.825	-1±1	0	0	20	0.00020	1
	2480	-2.295	-2±1	-1	0	20	0.00016	1

Maximum Simultaneous transmission MPE Ratios for 2.4GHz WiFi and Zigbee.

Maximum MPE ratio 2.4GWiFi	Maximum MPE ratio Zigbee	∑MPE	Limit	Results
0.0199	0.00016	0.02006	1.0	PASS

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 0.02006***/ cm^2 < limit 1mW / cm^2***. 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.

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