



Maximum Permissible Exposure Evaluation

FCC ID: 2A727-WS-R642

1. Client Information

Applicant	:	Shenzhen Lingkong Technology Co.,Ltd.
Address	:	Room 607, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China
Manufacturer	:	Shenzhen Lingkong Technology Co.,Ltd.
Address	:	Room 607, Block B, TAOJINDI Electronic Business Incubation Base, Tenglong Road, Longhua District, Shenzhen, China

2. General Description of EUT

EUT Name	:	4G Router
Models No.	:	WS-R642, WS-G, WS-GR401, WS-GR402, WS-GR403, WS-GR405, WS-GR406, WS-GR410, WS-GR420, CF-E, CF-ER10, CF-E5, CF-E3 V3, CF-E4, CF-E7
Model Different	:	All PCB boards and circuit diagrams are the same, the only difference is the color appearance.
Product Description	:	802.11b/g/n: 2412MHz~2462MHz LTE Band 2: TX: 1850MHz-1910MHz, RX: 1930MHz-1990MHz LTE Band 4: TX: 1710MHz-1755MHz, RX: 2110MHz-2155MHz LTE Band 5: TX: 824MHz-849MHz, RX: 869MHz-894MHz LTE Band 12: TX: 699MHz -716MHz, RX: 729MHz-746MHz LTE Band 17: 704MHz -716MHz, RX: 734MHz-746MHz
	:	Antenna Gain: 2.4G WIFI: 5 dBi External Antenna LTE Band 2/4/5/12/17: 5dBi External Antenna
Power Rating	:	Adapter: RA042-1201000US Input: 100-240V~ 50/60Hz,0.35A Max Output:12V---1A
Software Version	:	N/A
Hardware Version	:	N/A

MPE Calculations

1. Antenna Gain:

2.4G WIFI

Mode	Antenna Type	Antenna Gain
802.11b/g/n20/n40	External	Antenna1 5dBi
		Antenna2 5dBi

LTE

Band	Antenna Type	Antenna Gain
LTE Band 2	External	5dBi
LTE Band 4	External	5dBi
LTE Band 5	External	5dBi
LTE Band 12	External	5dBi
LTE Band 17	External	5dBi

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}	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	Ant1	15.05	15±1	16	5	20	0.0251
	Ant2	14.89	14±1	15	5	20	0.0199
802.11g	Ant1	15.53	15±1	16	5	20	0.0251
	Ant2	14.71	14±1	15	5	20	0.0199
802.11n(HT20)	Ant1	15.22	15±1	16	5	20	0.0251
	Ant2	15.04	15±1	16	5	20	0.0251
802.11n(HT40)	Ant1	14.42	14±1	15	5	20	0.0199
	Ant2	15.32	15±1	16	5	20	0.0251
LTE Band 2	Ant1	23.17	23±1	24	5	20	0.1580
LTE Band 4	Ant1	23.73	23±1	24	5	20	0.1580
LTE Band 5	Ant1	24.70	24±1	25	5	20	0.1580
LTE Band 12	Ant1	24.66	24±1	25	5	20	0.1580
LTE Band 17	Ant1	24.70	24±1	25	5	20	0.1580

Note:

NTX= Number of Transmit Antennas

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

300-1500MHz:

The worst MPE is calculated as $0.1580 \text{ mW} / \text{cm}^2 < \text{limit } 699/1500 = 0.466 \text{ mW/cm}^2$. So, RF exposure limit warning or SAR test are not required.

1500-100000MHz:

The worst MPE is calculated as $0.1580 \text{ mW} / \text{cm}^2 < \text{limit } 1 \text{ mW/cm}^2$. So, RF exposure limit warning or SAR test are not required.

WiFiAnt1+2 and LTEAnt1 support Synchronization transmit the

$$\sum \text{MPE}_{\text{ratios}} = 0.0251 + 0.0251 + 0.1580 = 0.2082 < 1$$

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 CFR 2.1091 (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.

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