

# 1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

## 1.1 General Information

### Client Information

Applicant: Tekview Limited  
Address of applicant: Unit 8 George Holmes Business Centre George Holmes Way Swadlincote  
  
Manufacturer: Xiamen SimPal Communication Technology Co., Ltd.  
Address of manufacturer: 3F, No 2208, Dianqian Group II, Gaodian Village, Huli District, Xiamen

### General Description of EUT:

Product Name: 4G Power Socket  
Trade Name: /  
Model No.: GSMSOCUS4G (EXA)  
Adding Model(s): SimPal-S460  
Rated Voltage: AC120V  
FCC ID: 2AJWI-GSMSOCUS4GEXA  
Equipment Type: Mobile device

### Technical Characteristics of EUT:

#### 4G

Support Networks:	FDD-LTE
Support Band:	FDD-LTE Band 2, 4, 5, 7,12, 13, 25, 26, 66, 71
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 5: Tx: 824-849MHz, FDD-LTE Band 7: Tx: 2500-2570MHz, FDD-LTE Band 12: Tx: 699-716MHz, FDD-LTE Band 13: Tx: 777-787MHz, FDD-LTE Band 25: Tx: 1850-1915MHz, FDD-LTE Band 26: Tx: 814-824MHz, FDD-LTE Band 26: Tx: 824-849MHz, FDD-LTE Band 66: Tx: 1710-1780MHz, FDD-LTE Band 71: Tx: 663-698MHz
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 5: Rx: 869-894MHz, FDD-LTE Band 7: Rx: 2620-2690MHz, FDD-LTE Band 12: Rx: 729-746MHz, FDD-LTE Band 13: Rx: 746-756MHz, FDD-LTE Band 25: Rx: 1930-1995MHz, FDD-LTE Band 26: Rx: 859-869MHz,

	FDD-LTE Band 26: Rx: 859-894MHz, FDD-LTE Band 66: Rx: 2110-2200MHz, FDD-LTE Band 71: Rx: 617-652MHz
RF Output Power:	FDD-LTE Band 2: 22.28dBm, FDD-LTE Band 4: 23.39dBm, FDD-LTE Band 5: 22.14dBm, FDD-LTE Band 7: 20.99dBm, FDD-LTE Band 12: 22.85dBm, FDD-LTE Band 13: 22.46dBm, FDD-LTE Band 25: 22.80dBm FDD-LTE Band 26: 22.39dBm FDD-LTE Band 66: 22.32dBm FDD-LTE Band 71: 23.30dBm
Type of Emission:	FDD-LTE Band 2: 17M9G7D, 17M9W7D FDD-LTE Band 4: 17M8G7D, 17M8W7D FDD-LTE Band 5: 9M00G7D, 9M01W7D FDD-LTE Band 7: 17M9G7D, 17M9W7D FDD-LTE Band 12: 8M97G7D, 8M97W7D FDD-LTE Band 13: 8M92G7D, 8M90W7D FDD-LTE Band 25: 17M9G7D, 17M9W7D FDD-LTE Band 26: 13M4G7D, 13M4W7D FDD-LTE Band 66: 17M8G7D, 17M8W7D FDD-LTE Band 71: 17M9G7D, 17M9W7D
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 2dBi, FDD-LTE Band 4: 2dBi, FDD-LTE Band 5: 2dBi, FDD-LTE Band 7: 2dBi, FDD-LTE Band 12: 2dBi, FDD-LTE Band 13: 2dBi, FDD-LTE Band 25: 2dBi, FDD-LTE Band 26: 2dBi, FDD-LTE Band 66: 2dBi, FDD-LTE Band 71: 2dBi
<b>3G</b>	
Support Networks:	WCDMA, HSDPA, HSUPA
Support Band:	WCDMA Band 2, WCDMA Band 4, WCDMA Band 5
Uplink Frequency:	WCDMA Band 2: 1850~1910MHz WCDMA Band 4: 1710~1755MHz WCDMA Band 5: 824~849MHz
Downlink Frequency:	WCDMA Band 2: 1930~1990MHz WCDMA Band 4: 2100~2155MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 22.12dBm, WCDMA Band 4: 22.93dBm, WCDMA Band 5: 22.71dBm
Type of Emission:	WCDMA Band 2: 4M16F9W WCDMA Band 4: 4M14F9W

	WCDMA Band 5: 4M15F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 2dBi, WCDMA Band 4: 2dBi, WCDMA Band 5: 2dBi

## 1.2 Standard Applicable

According to § 1.1307(b)(1) and KDB 447498 D01 General RF Exposure Guidance v06, system operating under the provisions of this section shall be operating in a manner that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure.

### (a) Limits for Occupational / Controlled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f)*	6
30-300	61.4	0.163	1.0	6
300-1500	/	/	F/300	6
1500-100000	/	/	5	6

### (b) Limits for General Population / Uncontrolled Exposure

Frequency range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Times   E   <sup>2</sup> ,   H   <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	F/1500	30
1500-100000	/	/	1	30

Note: f = frequency in MHz: \* = Plane-wave equivalents power density

## 1.3 MPE Calculation Method

$$S = (30 * P * G) / (377 * R^2)$$

S = power density (in appropriate units, e.g., mw/cm<sup>2</sup>)

P = power input to the antenna (in appropriate units, e.g., mw)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator,  
the power gain factor is normally numeric gain.

R = distance to the center of radiation of the antenna (in appropriate units, e.g., cm)

## 1.4 MPE Calculation Result

For WCDMA Band 2:

Maximum Tune-Up output power: 22.5(dBm)

Maximum peak output power at antenna input terminal: 177.83(mW)

Prediction distance: >20(cm)

Prediction frequency: 1852.4 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0561 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For WCDMA Band 4:

Maximum Tune-Up output power: 23.5 (dBm)

Maximum peak output power at antenna input terminal: 223.87(mW)

Prediction distance: >20(cm)

Prediction frequency: 1733.4 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0706 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For WCDMA Band 5:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 836.6 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.5577 (mw/cm<sup>2</sup>)

For FDD-LTE Band 2:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 1860.0 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For FDD-LTE Band 4:

Maximum Tune-Up output power: 24.0 (dBm)

Maximum peak output power at antenna input terminal: 251.19(mW)

Prediction distance: >20(cm)

Prediction frequency: 1745 (MHz)

Antenna gain: 2.0 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For FDD-LTE Band 5:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 836.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.5577 (mw/cm<sup>2</sup>)

For FDD-LTE Band 7:

Maximum Tune-Up output power: 22.0 (dBm)

Maximum peak output power at antenna input terminal: 158.49(mW)

Prediction distance: >20(cm)

Prediction frequency: 2510.0 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0500 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For FDD-LTE Band 12:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 701.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.4677 (mw/cm<sup>2</sup>)

For FDD-LTE Band 13:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 799.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.533 (mw/cm<sup>2</sup>)

For FDD-LTE Band 25:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 1882.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For FDD-LTE Band 26(814-824MHz):

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 819.0 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.546 (mw/cm<sup>2</sup>)

For FDD-LTE Band 26(824-849MHz):

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: >20(cm)

Prediction frequency: 836.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.5577 (mw/cm<sup>2</sup>)

For FDD-LTE Band 66:

Maximum Tune-Up output power: 23.0 (dBm)

Maximum peak output power at antenna input terminal: 199.53(mW)

Prediction distance: ≥20(cm)

Prediction frequency: 1770.0 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm<sup>2</sup>)

For FDD-LTE Band 71:

Maximum Tune-Up output power: 24.0 (dBm)

Maximum peak output power at antenna input terminal: 251.19(mW)

Prediction distance: ≥20(cm)

Prediction frequency: 695.5 (MHz)

Antenna gain: 2 (dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm<sup>2</sup>)

MPE limit for general population exposure at prediction frequency: 0.4637 (mw/cm<sup>2</sup>)

Result: Pass