

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 Derbyshire DE11 9DF United Kingdom

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
Adding Model(s): SimPal-T420
Rated Voltage: AC110-250V
FCC ID: 2AJWI-GSMSOCUS4G
Equipment Type: Mobile

Technical Characteristics of EUT: Main board	
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: 869-894MHz FDD-LTE Band 66: Rx: 2110-2200MHz FDD-LTE Band 71: Rx: 617-652MHz
RF Output Power:	FDD-LTE Band 2:23.67dBm, FDD-LTE Band 4: 24.08dBm, FDD-LTE Band 5: 23.45dBm, FDD-LTE Band 7: 23.45dBm, FDD-LTE Band 12: 24.39dBm, FDD-LTE Band 13: 24.28dBm, FDD-LTE Band 25: 24.58dBm FDD-LTE Band 26(814-824MHz): 24.21dBm, FDD-LTE Band 26 (824-849MHz): 23.76dBm FDD-LTE Band 66: 23.27dBm FDD-LTE Band 71: 23.17dBm
Type of Emission:	FDD-LTE Band 2: 17M8G7D, 17M8W7D FDD-LTE Band 4: 17M8G7D, 17M8W7D FDD-LTE Band 5: 8M94G7D, 8M93W7D FDD-LTE Band 7: 17M8G7D, 17M8W7D FDD-LTE Band 12: 8M93G7D, 8M92W7D FDD-LTE Band13: 8M91G7D, 8M90W7D FDD-LTE Band 25: 17M8G7D, 17M8W7D FDD-LTE Band 26(814-824MHz): 8M90G7D, 8M89W7D FDD-LTE Band 26 (824-849MHz): 13M3G7D, 13M4W7D FDD-LTE Band 66: 17M9G7D, 17M9W7D FDD-LTE Band 71: 17M8G7D, 17M8W7D
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 1dBi, FDD-LTE Band 4:1dBi, FDD-LTE Band 5: 1dBi, FDD-LTE Band 7: 1dBi, FDD-LTE Band 12: 1dBi, FDD-LTE Band 13: 1dBi, FDD-LTE Band 25: 1dBi FDD-LTE Band 26(814-824MHz): 1dBi, FDD-LTE Band 26 (824-849MHz): 1dBi FDD-LTE Band 66: 1dBi FDD-LTE Band 71: 1dBi
3G	
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: 2110~2155MHz WCDMA Band 5: 869~894MHz
RF Output Power:	WCDMA Band 2: 23.49dBm, WCDMA Band 4: 23.39dBm WCDMA Band 5: 23.53dBm
Type of Emission:	WCDMA Band 2: 4M17F9W WCDMA Band 4: 4M15F9W WCDMA Band 5: 4M16F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 1dBi, WCDMA Band 4: 1dBi, WCDMA Band 5: 1dBi

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 ²)	Averaging Times E ² , H ² 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 ²)	Averaging Times E ² , H ² 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

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

S = power density (in appropriate units, e.g., mw/cm²)

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 V

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: 826.4 (MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.5509 (mw/cm²)

For WCDMA Band IV

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: 1752.6 (MHz)

Antenna gain: 1(dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For WCDMA Band II

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: 1907.6 (MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For FDD-LTE Band 2

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: 1860.0 (MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For FDD-LTE Band 4

Maximum Tune-Up output power: 24.5(dBm)

Maximum peak output power at antenna input terminal: 281.84 (mW)

Prediction distance: >20(cm)

Prediction frequency: 1732.5(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0706 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For FDD-LTE Band 5

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: 829.0(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.5527 (mw/cm²)

For FDD-LTE Band 7

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: 2535.0 (MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

For FDD-LTE Band 12

Maximum Tune-Up output power: 25.0(dBm)

Maximum peak output power at antenna input terminal: 316.23(mW)

Prediction distance: >20(cm)

Prediction frequency: 707.5(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.4717 (mw/cm²)

For FDD-LTE Band 13

Maximum Tune-Up output power: 25.0(dBm)

Maximum peak output power at antenna input terminal: 316.23 (mW)

Prediction distance: >20(cm)

Prediction frequency: 782.0(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0792 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.5213 (mw/cm²)

For FDD-LTE Band 25

Maximum Tune-Up output power: 25.5(dBm)

Maximum peak output power at antenna input terminal: 354.81 (mW)

Prediction distance: >20(cm)

Prediction frequency: 1905.0 (MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0889 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

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

Maximum Tune-Up output power: 24.5(dBm)

Maximum peak output power at antenna input terminal: 281.84 (mW)

Prediction distance: >20(cm)

Prediction frequency: 819.0(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0706 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.5460 (mw/cm²)

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

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: 831.5(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.5543 (mw/cm²)

For FDD-LTE Band 66

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: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 1 (mw/cm²)

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: 688(MHz)

Antenna gain: 1 (dBi)

Directional gain (numeric gain): 1.26

The worst case is power density at prediction frequency at 20cm: 0.0629 (mw/cm²)

MPE limit for general population exposure at prediction frequency: 0.4587 (mw/cm²)

Result: Pass