

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant: Qingsong youmi (Beijing) Technology Co., Ltd.
Address of applicant: 121, 1st Floor, Building 16, Beijie jiayuan , Changping District, Beijing, China.

Manufacturer: Dongguan Best New Energy Technology co. LTD
Address of manufacturer: 101, no.2, north industrial road 2, songshan lake high-tech development zone, dongguan city, China.

General Description of EUT:

Product Name: Power Bank Cabinet
Trade Name: /
Model No.: BST-0204-MG
Adding Model(s): /
FCC ID: 2AVK5-BST-0204-MG
Rated Voltage: AC120V/60Hz

Technical Characteristics of EUT:	
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: 23.56dBm, WCDMA Band 4: 21.93dBm WCDMA Band 5: 23.68dBm
Type of Emission:	WCDMA Band 2: 4M14F9W WCDMA Band 4: 4M16F9W WCDMA Band 5: 4M18F9W
Type of Modulation:	BPSK
Antenna Type:	Integral Antenna
Antenna Gain:	WCDMA Band 2: 2.0dBi, WCDMA Band 4: 2.0dBi, WCDMA Band 5: 2.0dBi
4G	
Support Networks:	FDD-LTE

Support Band:	FDD-LTE Band 2, 4, 12
Uplink Frequency:	FDD-LTE Band 2: Tx: 1850-1910MHz, FDD-LTE Band 4: Tx: 1710-1755MHz, FDD-LTE Band 12: Tx: 699-716MHz,
Downlink Frequency:	FDD-LTE Band 2: Rx: 1930-1990MHz, FDD-LTE Band 4: Rx: 2110-2155MHz, FDD-LTE Band 12: Rx: 729-746MHz,
RF Output Power:	FDD-LTE Band 2: 22.38dBm, FDD-LTE Band 4: 23.14dBm, FDD-LTE Band 12: 23.52dBm,
Type of Emission:	FDD-LTE Band 2: 17M9G7D, 17M9W7D FDD-LTE Band 4: 17M9G7D, 17M9W7D FDD-LTE Band 12: 8M95G7D, 8M95W7D
Type of Modulation:	QPSK, 16QAM
Antenna Type:	Integral Antenna
Antenna Gain:	FDD-LTE Band 2: 2.0dBi, FDD-LTE Band 4: 2.0dBi, FDD-LTE Band 12: 0.5dB

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

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

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 2:

Maximum Tune-Up output power: 24(dBm)

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

Prediction distance: >20(cm)

Prediction frequency: 1852.4 (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/cm²)

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

The exclusion thresholds is $0.0792 \text{mw/cm}^2 < 1 \text{mw/cm}^2$

For WCDMA Band 4:

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: 1733.4 (MHz)

Antenna gain: 2.0(dBi)

Directional gain (numeric gain): 1.58

The worst case is power density at prediction frequency at 20cm: 0.0561(mw/cm²)

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

The exclusion thresholds is $0.0561\text{mw/cm}^2 < 1\text{ mw/cm}^2$

For WCDMA Band 5:

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: 846.6 (MHz)

Antenna gain: 2.0(dBi)

Directional gain (numeric gain): 1.58

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

MPE limit for general population exposure at prediction frequency: 0.5644 (mw/cm²)

The exclusion thresholds is $0.0889\text{mw/cm}^2 < 0.5644\text{ mw/cm}^2$

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(MHz)

Antenna gain: 2.0(dBi)

Directional gain (numeric gain): 1.58

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)

The exclusion thresholds is $0.0629\text{mw/cm}^2 < 1\text{ mw/cm}^2$

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: 1720(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/cm²)

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

The exclusion thresholds is $0.0792\text{mw/cm}^2 < 1\text{ mw/cm}^2$

For FDD-LTE Band 12:

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: 704(MHz)

Antenna gain: 0.5(dBi)

Directional gain (numeric gain): 1.12

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

MPE limit for general population exposure at prediction frequency: 0.4693 (mw/cm²)

The exclusion thresholds is $0.0629\text{mw/cm}^2 < 0.4693\text{ mw/cm}^2$

Result: Pass