

1. MAXIMUM PERMISSIBLE EXPOSURE (MPE)

1.1 General Information

Client Information

Applicant: TCL OVERSEAS MARKETING LIMITED
Address of applicant: 7/F BUILDING 22E 22 SCIENCE PARK EAST AVENUE,
HONG KONG SCIENCE PARK, SHATIN NT, Hong Kong

Manufacturer: TCL OVERSEAS MARKETING LIMITED
Address of manufacturer: 7/F BUILDING 22E 22 SCIENCE PARK EAST AVENUE,
HONG KONG SCIENCE PARK, SHATIN NT, Hong Kong

General Description of EUT:

Product Name: Robot Vacuum Cleaner

Trade Name:



Model No.: RV3024BM

Adding Model(s): RV3020B

Rated Voltage: Charging Port:DC24V

Battery:DC14.4V

MODEL:BLJ24W240100P-U

Power Adapter Model: INPUT:AC100-240V, 50/60Hz, 0.6A

OUTPUT:DC24.0V, 1.0A

Software Version: V1.0.0.7

Hardware Version: V1.0

FCC ID: 2AZVS-RV3020B

Equipment Type: Mobile Device

Note: The test data is gathered from a production sample provided by the manufacturer. The appearance of others models listed in the report is different from main-test model RV3024BM, but the circuit and the electronic construction do not change, declared by the manufacturer.

Technical Characteristics of EUT:

Wi-Fi

Support Standards: 802.11b, 802.11g, 802.11n

Frequency Range: 2412-2462MHz for 802.11b/g/n(HT20)

RF Output Power: 15.49dBm (Conducted)

Type of Modulation: DBPSK,BPSK,DQPSK,QPSK,16QAM,64QAM

Quantity of Channels: 11 for 802.11b/g/n(HT20)

Channel Separation: 5MHz

Type of Antenna: PCB Antenna

Antenna Gain: 3dBi

Bluetooth

Bluetooth Version:	V4.2 (BLE mode)
Frequency Range:	2402-2480MHz
RF Output Power:	4.71dBm (Conducted)
Data Rate:	1Mbps
Modulation:	GFSK
Quantity of Channels:	40
Channel Separation:	2MHz
Type of Antenna:	PCB Antenna
Antenna Gain:	3dBi

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 Wi-Fi

Maximum Tune-Up output power: 16.0 (dBm)

Maximum peak output power at antenna input terminal: 39.81 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2462 (MHz)

Antenna gain: 3 (dBi)

Directional gain (numeric gain): 2.00

The worst case is power density at prediction frequency at 20cm: 0.0158 (mw/cm²)

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

For Bluetooth

Maximum Tune-Up output power: 5.0 (dBm)

Maximum peak output power at antenna input terminal: 3.16 (mW)

Prediction distance: >20(cm)

Prediction frequency: 2480 (MHz)

Antenna gain: 3 (dBi)

Directional gain (numeric gain): 2.00

The worst case is power density at prediction frequency at 20cm: 0.0013(mw/cm²)

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

Mode for Simultaneous Multi-band Transmission

Wi-Fi+ Bluetooth

The worst case is power density at prediction frequency at 20cm: $0.0158/1+0.0013/1=0.0171<1$

Result: Pass