

1 Safety Human Exposure

1.1 Radio Frequency Exposure Compliance

1.1.1 Electromagnetic Fields

RESULT:

Pass

Report Number : CN24397K 003
Test Specification
Test item : Lawn Mowing Robot
Identification / Type No. : MPB14
Trademark : ECOVACS
FCC ID : 2A64B-MPB14
IC: 28593-MPB14
Test standard : CFR47 FCC Part 2: Section 2.1091
CFR47 FCC Part 1: Section 1.1310
FCC KDB Publication 447498 D01 v06
FCC KDB Publication 865664 D02 v01r02
RSS-102 Issue 5 February 2021

1.1.1.1 RF Exposure Compliance Requirement for FCC

FCC requirement: Systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess limit for maximum permissible exposure. In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as a mobile device whereby a distance of 20cm normally can be maintained between the user and the device.

Max 4.10 dBi for Bluetooth & 2.4GHz Wi-Fi

➤ Radio Frequency Exposure Limit

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)
300-1,500	--	--	f/1500
1,500-100,000	--	--	1.0

➤ Radio Frequency Exposure Calculation Formula

$$S = \frac{PG}{4\pi R^2}$$

where: 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

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

or:

$$S = \frac{EIRP}{4\pi R^2}$$

where: EIRP = equivalent (or effective) isotropically radiated power

a) RF Exposure Evaluation standalone operations (worse case)

Mode	*Measured RF Output Power (dBm)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm ²)	FCC Limit (mW/cm ²)
Bluetooth	7.32	11.42	20	0.003	1.0
2.4G Wi-Fi	19.00	23.10	20	0.041	1.0

Note:

1. 2.4GHz Band RF Output Power: Refer to CN24397K 001 & CN24397K 002.
2. The Bluetooth and 2.4GHz Wi-Fi of EUT cannot transmitting sync.

➤ **Conclusion**

Therefore, the maximum calculations result of above are meet the requirement of Radio Frequency Exposure (MPE) limit.

1.1.1.2 RF Exposure Compliance Requirement for IC

The EUT shall comply with the requirement of RSS-102 section 2.5.2.

Exemption from Routine Evaluation Limits – RF Exposure Evaluation

RF exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm, except when the device operates as follows:

at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than $1.31 \times 10^{-2} f^{0.6834}$ W (adjusted for tune-up tolerance), where f is in MHz;

- RF exposure evaluation exempted power for 2.4GHz: 2.68 W

Max 4.10 dBi for Bluetooth & 2.4GHz Wi-Fi

a) RF Exposure Calculations for ISSED, Stand-alone mode

Operating Mode	Max. EIRP incl. tune-up (dBm)	Distance (cm)	Maximum EIRP (W)	Threshold power (W)	Verdict
Bluetooth	11.42	20	0.014	2.68	Pass
2.4G Wi-Fi	23.10	20	0.204	2.68	Pass

Note: The maximum EIRP lower than the threshold power in section 2.5.2, thus compliant.

Both e.i.r.p. for Bluetooth & 2.4GHz Wi-Fi are less than the RF exposure evaluation exempted power. So RF exposure evaluation is not required.

➤ **Conclusion**

“RF Radiation Exposure Statement Caution: This Transmitter must be installed to provide a separation distance of at least 20 cm from all persons.”