

RF exposure evaluation

The Pool surface cleaner includes a BLE transmitter.

The minimum separation distance is assured by the typical device usage is 0.1 m (10cm). When the minimum separation distance will be more than the calculated value prescribed for the frequency (2480 MHz) then the exemption in Table 1 §1.1307(b)(3)(i)(C) of MPE based exemption criteria will be apply.

The minimum separation distance for 2480 MHz frequency will be calculate as following:

$$R = \lambda / 2\pi = 0.0192\text{m}$$

Where λ is the free-space operating wavelength in meters and R is a minimum separation distance (in meters).

MPE based exemption criteria according to Table 1 to §1.1307(b)(3)(i)(C)

Transmitter Frequency (MHz)	Threshold ERP (W)
0.3 – 1.34	1,920 R ²
1.34 – 30	3,450 R ² /f ²
30 – 300	3.83 R ²
300 – 1,500	0.0128 R ² f
1,500 – 100,000	19.2 R ²

The MPE based exemption threshold at frequency 2480 MHz and test separation distance 0.1m (10cm) will be:

$$19.2 \times 0.1^2 = 0.192\text{W} = 192\text{mW}$$

Maximum BLE measured transmitter power obtained from test report MAYRAD_FCC.56775_Rev1:

Pout ERP		Maximum antenna gain, dBd	Pout conducted	
dBm	mW		dBm	mW
3.59	2.28	1.95	1.64	1.46

The MPE exemption condition in terms of ERP at 2480 MHz frequency and 0.1m separation distance relates is 192mW threshold, so BLE is exempt and no evaluation is required.

The BLE transmitter exempt from MPE evaluation as per section 2.1.4 of KDB Publication 447498 D01 v07.

Based on the above the product can be considered complying with the RF exposure limitations.