Exposure limit according to §15.247(i) and RSS-102

The PM-360 control panel PG2 transmitter operates according to FCC part 15 subpart C section 15.247(FHSS) and RSS-247. The panel contains the Z-wave module operating according to FCC part 15 subpart C section 15.249, the Wi-Fi module – according to section 15.247(DTS) The panel includes a single modular approved transmitter FCC ID:RI7UE910NA, IC:5131A-UE910NA.
The control panel is classified as mobile device.

Limit for power density for general population/uncontrolled exposure is $f/1500$ mW/cm^2 for 300 – 1500 MHz frequency range and 1 mW/cm^2 for 2.4 GHz:

$$P = 912.75/1500 = 0.61 \text{ mW/cm}^2$$

The power density $\mathbf{P \text{ (mW/cm}^2) = P_T / 4\pi r^2}$

1) PG2 module (912.75 MHz): P_T is the transmitted power, which is equal to the peak transmitter output power 21.45 dBm plus maximum antenna gain -2 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_T = 21.45 \text{ dBm} - 2 \text{ dBi} = 19.45 \text{ dBm} = 88 \text{ mW}.$$

The power density at 20 cm (minimum safe distance, required for mobile devices), calculated as follows:

$$88 \text{ mW} / 4\pi (20 \text{ cm})^2 = 0.018 \text{ mW/cm}^2 << 0.61 \text{ mW/cm}^2$$

2) Wi-Fi module (2412-2462 MHz): P_T is the transmitted power, which is equal to the peak transmitter output power 23.81 dBm plus maximum antenna gain 0 dBi, the maximum equivalent isotropically radiated power EIRP is

$$P_T = 23.81 \text{ dBm} = 240 \text{ mW}.$$

The power density at 20 cm (minimum safe distance, required for mobile devices), calculated as follows:

$$240 \text{ mW} / 4\pi (20 \text{ cm})^2 = 0.05 \text{ mW/cm}^2 << 1 \text{ mW/cm}^2$$

3) Maximum conducted output power given in FCC ID:RI7UE910NA module grant is 1910 mW (32.8 dBm) in 824.2-848.8 MHz band and 850 mW (29.2 dBm) in 1850.2-1909.8 MHz band.
Limit for power density is $f/1500 = 0.56$ mW/ cm^2 for 824-849 MHz for general population/uncontrolled exposure.

The max test result of measured ERP provided in the test report VISRAD_FCC.26893_22_24 is 34.04 dBm in 824.2-848.8 MHz band.
The maximum equivalent isotropically radiated power EIRP is

$$P_T = 34.04 \text{ dBm} = 2.15 \text{ dB} = 36.19 \text{ dBm} = 4159 \text{ mW}.$$

According to Document:ANNEX1 to RF Exposure Analisys_UE910NA_r0 (Application FCC ID:RI7UE910NA at the FCC database) the Tx duty cycle is 25%. So, the equivalent average power is 4159 mW x Duty cycle = 1039.8 mW. The power density at 20 cm is calculated as follows:

$$1039.8 / 4\pi (20 \text{ cm})^2 = 0.21 \text{ mW/cm}^2 < 0.56 \text{ mW/cm}^2$$

Summation
When all the antennas are at least 20 cm away from the user but individual antennas cannot be separated by 20 cm from each other, the following equation shall be fulfilled

$$S1/\text{Limit} + S2/\text{Limit} + S3/\text{Limit} < 1, \text{ i.e.}$$
$$0.018 \text{ mW/cm}^2 /0.61 \text{ mW/cm}^2 + 0.05 \text{ mW/cm}^2 /1 \text{ mW/cm}^2 + 0.21 \text{ mW/cm}^2 /0.56 \text{ mW/cm}^2 = 0.03 + 0.03 + 0.375 =$$
$$= 0.455 < 1$$

Therefore, the control panel including approved module complies with FCC RF exposure limit for mobile device for general population.
General public cannot be exposed to dangerous RF level.