tyco
Safety Products

FCC ID: F5323NB937

Environmental evaluation and exposure limit according to FCC CFR 47part 1, §1.1307, §1.1310

The Home unit is classified as a mobile device. The Home unit includes transmitter operating according to FCC part 15 subpart C section 15.247 (DTS) and Cellular module approval under FCC ID: RI7ME310G1W1.

BLE and the Cellular work together only at the installation stage.

Limit for power density for general population/uncontrolled exposure is 1mW/cm^2 for 1500 -100000 MHz frequency range.

The power density **P (mW/cm^2) = P_T / 4π r^2**, where

PT is the transmitted power, which is equal to the peak transmitter output power 5.25 dBm plus maximum antenna gain (-13)dBi, the maximum equivalent isotropically radiated power EIRP is

PT = 5.25dBm + (-13)dBi = -7.75dBm = 0.168mW

5.25 dBm is the EUT maximum output power with the tune up tolerance,
-13 dBi – antenna gain.

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

0.168mW / 4π (20 cm)^2 **=** 0.00033mW/cm^2 << 1mW/cm^2

Maximum conducted power given in FCC ID: RI7ME310G1W1 module grant is 158mW (21.99dBm) in band 2, 153mW (21.85dBm) in band 4, 138mW (21.4dBm) in band 5, 157mw (21.96dBm) in band 12, 138mW (21.4dBm) in band 13, 147mW (21.67dBm) in band 25, 145mW (21.61dBm) in band 26, 158mW (21.99dBm) in band 66, 142mW (21.52dBm) in band 71 and 129mW (21.11dBm) in band.

Limit for power density is f/1500= 0.56mW/cm2 for band 5 (824-849 MHz), 0.47mW/cm2 for band 12 (699-716 MHz), 0.52mW/cm2 for band 13 (777-787 MHz), 0.56mW/cm2 for band 26 (814-849 MHz), 0.46mW/cm2 for band 71 (663-698 MHz), 0.47mW/cm2 for band 85 (698-716 MHz) and 1mW/cm2 for 1500 -100000 MHz for general population/uncontrolled exposure for bands 25, 4, 66 and 2.

The gain of antennas used with the module are 11dBi for band 2 and band 25, 8dBi for band 4 and band 66, 12.4dBi for band 5, 11.6dBi for band 12, 12.1dBi for band 13, 12.3dBi for band 26, 11.6dBi for band 85 and 11.4dBi for band 71.

The maximum equivalent isotropic radiated power EIRP is for band 26:

PT = 21.61dBm + 12.3dBi = 33.91 dBm = 2460.36mW

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

$$2460.36\text{mW} / 4\pi\ (20\ \text{cm})^2 = 0.489\text{mW/cm}^2 << 0.56\text{mW/cm}^2$$

Assessment of RF hazard from BLE and LTE wireless module

$$S1/\text{limit} + S2/\text{limit} \leq 1, \text{ i.e}$$
$$0.00033/1 + 0.489/0.56 = 0.00033 + 0.8732 = 0.8735 \leq 1$$

The aggregate ratio of transmit power to the relevant power limits does not exceed 100% and meets the safety requirements.