

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

The transceiver is classified as a mobile device, the calculation was done to check a minimum safe distance.

The LTE UE radio module approved by FCC under FCC ID: O2J-AC25 may be installed together with the AirUnity 588, 3.550-3.700 GHz (B48). They were evaluated for Maximum Permissible Exposure compliance for end-use multi-radio.

Limit for power density for general population/uncontrolled exposure is 1 mW/cm² for 1500 -100000 MHz frequency range.

The power density P (mW/cm²) = $P_T / 4\pi r^2$, where

AirUnity 588, 3.550-3.700 GHz (B48)

P_T is the transmitted power, which is equal to the peak transmitter output power plus maximum antenna gain. The maximum equivalent isotropically radiated power EIRP is

$$P_T = 22.49 \text{ dBm} + 10 \text{ dBi} = 32.49 \text{ dBm} = 1774.189 \text{ mW}, \text{ where}$$

22.49 dBm is the EUT maximum output power (per port),
10 dBi – antenna gain.

LTE UE radio module

P_T is the transmitted power, which is equal to the peak transmitter output power plus maximum antenna gain. The maximum equivalent isotropically radiated power EIRP is

$$P_T = 23 \text{ dBm} + 9.5 \text{ dBi} = 32.5 \text{ dBm} = 1778.279 \text{ mW}, \text{ where}$$

23 dBm is the EUT maximum output power (per port),
9.5 dBi – total antenna gain, which is equal to $G_{ANT} + 10 \log N_{\text{Cross-pol ANT}}$.

Table of estimated safe distance calculation

Tx	Frequency, MHz	Peak Tx power		Antenna gain, dBi	Duty cycle	Power density, mW/cm ²	Limit, mW/cm ²	% of Std
		dBm	mW					
Tx1	3550 – 3700	22.49	177.41	10.0	0.74	0.26	1.0	0.26
Tx2*	1850-1910 or 1710-1755 or 1850-1915	23.0	199.52	9.5	1.0	0.35	1.0	0.35

*- data from FCC ID: O2J-AC25 grant dated 05/15/2023. Maximum total power used for calculation.

A warning about a 20 cm safe distance is contained in the user manual.

Total % of standard: Tx1 + Tx2 = 0.26 + 0.35 = 0.56

Distance (estimated) = $20 \times \sqrt{0.56} = 20 \times 0.75 = 15$ cm.

Recommended MPE distance is 20 cm when all antennas are within 20 cm of each other.