

# Legal Considerations

Meshtastic and MeshCore both operate in license-free ISM radio bands, but license-free does not mean unregulated. You must comply with applicable FCC rules for US deployments.

## US regulatory framework (FCC Part 15)

In the United States, 915 MHz operation is governed by FCC Part 15 rules for ISM band devices. The key limits for intentional radiators in the 902 - 928 MHz band:

Parameter	Limit
Conducted transmit power	1 W (30 dBm) maximum, referenced to an antenna of 6 dBi or less
EIRP (with antenna gain)	36 dBm (4 W) is a <i>derived</i> ceiling - it is the result of 30 dBm conducted + 6 dBi gain, not a flat standalone cap. For antenna gain above 6 dBi, conducted power must be reduced dB-for-dB (see below).
Duty cycle	US Part 15 imposes <b>no duty-cycle limit</b> on digital-modulation systems such as LoRa in 902 - 928 MHz. The dwell-time limits in 15.247(a)(1) apply only to frequency-hopping (FHSS) systems, not to LoRa's digital modulation. Other regions (e.g. the EU 868 MHz band) DO impose duty-cycle limits - check your region.

## Antenna gain and EIRP

EIRP combines transmit power and antenna gain:  $EIRP = \text{conducted power} + \text{antenna gain (in dBi)} - \text{cable loss}$ .

The actual FCC rule (47 CFR 15.247(b)(4)) is: conducted transmit power of **1 W (30 dBm) is the absolute maximum**, and antenna gain up to 6 dBi is permitted at that full power. **For every dB of antenna gain above 6 dBi, conducted power must be reduced by the same number of dB.** The often-cited 36 dBm EIRP figure is simply the result of this rule at exactly 6 dBi of gain (30 dBm + 6 dBi = 36 dBm) - it is not an independent allowance to radiate 36 dBm EIRP with any antenna.

Worked examples:

- 3 dBi antenna: the 30 dBm conducted limit is absolute - you may **not** raise conducted power above 30 dBm to reach 36 dBm EIRP.
- 9 dBi antenna (3 dB over 6 dBi): reduce conducted power by 3 dB to 27 dBm (500 mW). Result: 36 dBm EIRP - at the legal limit, and compliant because conducted power was reduced per the 6 dBi rule (not merely because EIRP lands at 36 dBm).
- 9 dBi antenna + 30 dBm (1 W) conducted = 39 dBm EIRP and also violates the dB-for-dB conducted-reduction rule - **over the limit**.

Meshtastic ships with a region-based power cap; setting `tx_power` to 0 lets the firmware use the maximum the selected region allows. This is compliant only when paired with an antenna of 6 dBi or less. With any higher-gain antenna you must reduce conducted power per the 6 dBi rule above. The region setting is the master legal power-cap control - set it correctly first.

# No amateur radio license required

Standard Meshtastic and MeshCore operation in [the 915 MHz ISM band](#) does not require an amateur radio license. The band is available to any compliant Part 15 device without licensing. This holds only while the device remains within its Part 15 certification: adding a non-certified antenna or amplifier, or exceeding the power/EIRP limits, can void the certification - at which point the operation is no longer authorized under Part 15. The operator is responsible for keeping the device compliant, and Part 15 devices must accept interference and must not cause harmful interference.

# Always verify current regulations

Radio regulations can change. The information above is provided as a general guide. For definitive requirements, consult the [FCC Part 15 rules](#) directly.

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