FCC Part 15 Compliance for LoRa Mesh

Meshtastic and MeshCore operate in the 902-928 MHz ISM band under FCC Part 15 in the United States. This section explains what the rules require, what they allow, and what you need to know for compliant operation.

FCC Part 15 Basics

Part 15 covers unlicensed intentional radiators - devices that deliberately emit radio frequency energy. The key rules for 902-928 MHz spread spectrum:

- **Maximum conducted power: 1 watt (30 dBm)** - Measured at the radio's antenna connector, before any external antenna
- **Antenna gain above 6 dBi: reduce conducted power dB-for-dB** - For antenna gain above 6 dBi, the rule (15.247(b)(4)) requires reducing conducted power by the number of dB the gain exceeds 6 dBi. This reduction is keyed to antenna gain alone; feedline (cable) loss does not offset the required reduction. With a 6 dBi antenna at full 1 W conducted, this works out to a 36 dBm (4 W) EIRP - but the 4 W figure is a derived result of the gain-reduction rule, not a separate flat EIRP allowance you can "spend" cable loss against.
- **No license required** for operation within these limits
- **Non-interference** - Part 15 devices must accept interference and cannot cause harmful interference to licensed services
- **No protection from interference** - You have no recourse if a licensed service interferes with your mesh

The 1W + Antenna Gain Calculation

Most LoRa hardware ships configured at or below 1W (30 dBm) conducted power. Note that the 1 W limit under 15.247 applies to digitally-modulated systems whose minimum 6 dB bandwidth is at least 500 kHz; many Meshtastic/MeshCore presets use 125-250 kHz bandwidth, which may be certified under different provisions - so treat 1 W as an upper ceiling, not a guaranteed allowance

for every preset. If you add a high-gain external antenna, you must reduce conducted power for any antenna gain above 6 dBi.

Example calculation:

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First example:
Antenna gain: +6 dBi (at the 6 dBi threshold - no reduction required)
Conducted power: 30 dBm (1W) - COMPLIANT
(Resulting EIRP works out to about 36 dBm / 4 W, the derived ceiling.)

Second example:
Antenna gain: +9 dBi (3 dB above 6 dBi)
Rule: reduce conducted power by (9 - 6) = 3 dB
Maximum conducted power: 30 - 3 = 27 dBm (500 mW)
Running 30 dBm conducted into a 9 dBi antenna is NON-COMPLIANT.
Note: feedline (cable) loss does NOT offset this 3 dB reduction - the
reduction is based on antenna gain alone.
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For typical community deployments with 5-6 dBi antennas and short coax runs, full 1W conducted power is generally compliant (gain is at or below the 6 dBi threshold). With 8-9 dBi antennas, you must reduce conducted power by the dB of gain above 6 dBi - e.g. to 27-28 dBm for a 8-9 dBi antenna.

Point-to-Point Operations (Fixed Infrastructure)

Important: at 902-928 MHz there is **no** special power allowance for fixed point-to-point links. The relaxed point-to-point rule that some guides cite applies only to other bands:

- Under **47 CFR 15.247(b)(4)**, if you use a directional antenna with more than 6 dBi of gain at 915 MHz, you must reduce conducted output power by 1 dB for every 1 dB of gain above 6 dBi (dB-for-dB). This holds EIRP at the 36 dBm (4 W) ceiling whether the link is point-to-point or area coverage.
- The relaxed "reduce power 1 dB for every 3 dB of gain above 6 dBi" point-to-point allowance in **15.247(c)(1)(i)** applies *only* to the 2400-2483.5 MHz (2.4 GHz) band, and the 5725-5850 MHz band (15.247(c)(1)(ii)) allows extra gain with no power reduction at all. **Neither applies to the 902-928 MHz band that Meshtastic and MeshCore use.**
- Bottom line for 915 MHz: plan around the 36 dBm (4 W) EIRP ceiling regardless of antenna type or link geometry - there is no higher point-to-point limit to unlock.

Pre-Certified Hardware

Reputable mesh hardware sold in the US should carry an FCC ID - check the device label or the FCC ID database. Verify this before deploying: some imported hobbyist dev boards are not properly certified, or carry only module-level certification rather than full device authorization. This certification confirms Part 15 compliance when used with the included antenna and at the specified power levels. Using third-party antennas or modifying conducted power beyond the certified levels may affect compliance status. For community mesh operations, using hardware within its certified parameters is the simplest path to compliance.

What Part 15 Does NOT Require

- No license - operators need no FCC authorization
- No station identification - Part 15 devices do not require ID (unlike Part 97 ham radio)
- No frequency coordination - you may operate anywhere in the 902-928 MHz band without coordination
- No notification of your installation

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