Popular Board Comparison Table

Board Comparison Table

The table below covers the most widely deployed boards for LoRa mesh networking as of 2025 - 2026, across both Meshtastic and MeshCore platforms. All TX power figures are nominal maximum; actual radiated power depends on antenna gain and any regulatory caps applied in firmware.

Board	MCU	Radio	TX Power	RX Current	Sleep	Battery	GPS	Screen	Platform	Notes
T-Beam v1.1	ESP32	SX1262	22 dBm	~40 mA	~10 mA	18650 holder	NEO-6M	Optional OLED	Meshtastic / MeshCore	Classic all-in-one. AXP192 PMIC.
T-Beam Supreme	ESP32-S3	SX1262	22 dBm	~45 mA	~8 mA	18650 holder	MAX-M10S	Optional OLED	Meshtastic	Newer variant; better GPS. (The SX1268 is only the 433/470 MHz China sibling; US/915 MHz units use the SX1262.)

Board	MCU	Radio	TX Power	RX Current	Sleep	Battery	GPS	Screen	Platform	Notes
Heltec LoRa 32 V3	ESP32-S3	SX1262	22 dBm	~40 mA	~800 µA	JST LiPo	No	0.96" OLED	Meshtastic / MeshCore	Cheap, OLED display useful for debug. USB-C.
RAK4631	nRF52840	SX1262	22 dBm	~8 mA	~2 µA	JST LiPo	Optional RAK1910/1920	No (separate module)	Meshtastic / MeshCore	Modular WisBlock system. Best power efficiency for ESP32-free builds.
LilyGO T-Echo	nRF52840	SX1262	22 dBm	~8 mA	~12 µA	JST LiPo	L76K GNSS	1.54" ePaper	Meshtastic	Excellent battery life. ePaper shows info with no power draw. Popular for hiking.

Board	MCU	Radio	TX Power	RX Current	Sleep	Battery	GPS	Screen	Platform	Notes
Heltec T114	nRF52840	SX1262	21 dBm	~8 mA	~12 µA	JST LiPo	Optional	1.14" TFT	MeshCore primary	Heltec Mesh Node T114 (a Heltec product, not LILYGO). Pairs an nRF52840 with a bare SX1262 (no external PA), so TX tops out near the SX1262's ~21 dBm ceiling. nRF52840 efficiency makes it a common MeshCore repeater choice.
Seeed XIAO S3 + LoRa	ESP32-S3	SX1262	22 dBm	~40 mA	~14 µA	JST LiPo	No	No	Meshtastic / MeshCore	Tiny form factor. Good for compact builds.

Board	MCU	Radio	TX Power	RX Current	Sleep	Battery	GPS	Screen	Platform	Notes
ZebraHat 1W	ESP32	SX1262 +PA	30 dBm	~45 mA active	~10 mA	External	No	No	Meshtastic	1W transmitter. For mountain-top infrastructure where extra power matters. Requires heat management.

Board	MCU	Radio	TX Power	RX Current	Sleep	Battery	GPS	Screen	Platform	Notes
Ikoka 2W Module	-	SX1262 +PA	33 dBm	~80 mA TX	-	External	No	No	Meshtastic / MeshCore	External power amplifier add-on. 2W output. 33 dBm conducted exceeds the FCC Part 15.247 1 W (30 dBm) conducted limit, so it is NOT legal for unlicensed US operation; using it lawfully requires an amateur (Part 97) license, which prohibits encryption and requires station identification.

Per-Platform Notes

ESP32 Boards (T-Beam, Heltec LoRa 32)

Easy to source, wide support, larger community. Higher power consumption limits battery life. Built-in USB serial is convenient for development. Not ideal for solar-only deployments where current draw matters.

nRF52840 Boards (RAK4631, T-Echo, T114)

Dramatically lower power consumption. RAK4631 is modular - add sensors, GPS, cellular as needed. T-Echo has excellent all-in-one form factor with ePaper. Preferred for long-term battery or solar deployment.

High-Power Options (ZebraHat, Ikoka)

In the US, 902-928 MHz operation is limited by FCC Part 15.247 to 1 W (30 dBm) *conducted* output referenced to a ≤6 dBi antenna (with dB-for-dB reduction above 6 dBi). A 30 dBm board like the ZebraHat is at that ceiling; a 33 dBm module like the Ikoka exceeds it and is not legal for unlicensed Part 15 use. Higher TX power is not always better - it increases interference with nearby nodes and draws more power. Use only for specific long-range requirements after confirming conducted-power and antenna-gain compliance (or operating under an appropriate amateur license).

Revision #3
Created 2026-05-03 04:18:57 UTC by Mesh America Admin
Updated 2026-06-09 15:58:34 UTC by Mesh America Admin