LoRa Radio Chips Explained: SX1262 vs SX1276 vs LR1110

When buying LoRa hardware, listings frequently mention specific radio chip models. Understanding what these chips are and how they differ prevents costly purchasing mistakes.

Why the chip matters

The LoRa transceiver chip is the core radio hardware. It determines the radio's maximum transmit power, receiver sensitivity, supported frequency bands, and power consumption. The board that surrounds it (the MCU, display, GPS, etc.) matters too - and two boards using the same LoRa chip will have a similar baseline radio performance, unless one board adds a power amplifier, LNA, or different RF front-end (antenna matching, filtering), which can change output power and sensitivity significantly.

The three chip families you'll encounter

SX1262 (current standard)

The most common LoRa chip in new hardware as of 2024 - 2026, and the dominant chip across current Meshtastic and MeshCore supported-hardware lists. An evolution of the SX1276 with significant improvements.

Spec	Value
Max TX power	+22 dBm (158 mW) max; some boards add an external PA to reach higher power

Spec	Value
Frequency range	150 MHz - 960 MHz (covers both 868 MHz EU and 915 MHz US)
Receiver sensitivity	~−137 dBm at SF12 / 125 kHz BW (the headline −148 dBm figure is at the narrowest bandwidth, not BW125)
RX current	~4.6 mA
Sleep current	0.6 µA
Interface	SPI

Used in: Heltec V3, V4, T096 (with PA), RAK4630/4631, T-Echo, T-Deck, T-Deck Plus, Station G2, most recent LilyGo boards, Nano G2 Ultra.

Buy this if: You're buying any new hardware. The SX1262 is the current generation chip and has no meaningful disadvantages compared to older alternatives. Its real advantages over the SX1276 are lower RX current, TCXO stability, and a slightly better link budget.

SX1276 (older generation, still common)

The predecessor to the SX1262. Widely used in older boards (T-Beam v0.7 - v1.1, early Heltec boards) and still found in some current products. Fully compatible with SX1262-based nodes - they use the same LoRa protocol.

Spec	Value
Max TX power	up to +20 dBm (100 mW) via PA_BOOST on 868/915 MHz boards (+17 dBm is the RFO-path limit)
Frequency range	137 MHz - 1020 MHz
Receiver sensitivity	~−137 dBm at SF12 / 125 kHz BW (headline −148 dBm is at the narrowest bandwidth) - within ~1-3 dB of the SX1262 at the same SF/BW
RX current	~9.9 mA - significantly higher than SX1262
Sleep current	0.2 µA
Interface	SPI

Used in: Original T-Beam (before Supreme), some budget LoRa modules, SX1278/SX1279 are frequency variants of the same family.

Key limitation: Lower max TX power (+20 dBm via PA_BOOST vs +22 dBm on the SX1262) and higher RX current. At the same SF/BW the two chips' sensitivity is within ~1-3 dB - so the SX1262's edge is mainly its lower RX current and TCXO stability, not a dramatic range difference. For battery-powered use, the SX1262 is preferable.

Buy this if: You have existing SX1276 hardware that still works. Don't specifically seek it out for new purchases.

LR1110 / LR1120 (multi-band, advanced)

Semtech's newest transceiver family, adding GNSS/Wi-Fi geolocation scanning and (on the LR1120) multi-band capability beyond standard sub-GHz LoRa. Note the two chips differ: the **LR1110** does LoRa on sub-GHz only (150-960 MHz), while the **LR1120** adds 2.4 GHz LoRa and an S-band.

Spec	Value
Max TX power	+22 dBm sub-GHz LoRa (LR1110 & LR1120); +15 dBm 2.4 GHz LoRa (LR1120 only)
Frequency range	LR1110: 150-960 MHz LoRa (sub-GHz only). LR1120: adds 2.4 GHz LoRa and S-band. The LR1110's extended receive coverage applies to its passive Wi-Fi/GNSS geolocation scanner, not to LoRa.
Additional features	Wi-Fi passive scanning, GNSS scanning (geolocation without a GPS chip)
RX current	~5.3 mA (LoRa RX; verify against the Semtech LR1110 datasheet)

Used in: Seeed Wio Tracker 1110, some newer development boards.

Key advantage: GNSS scanning for geolocation without a dedicated GPS module. (2.4 GHz LoRa for short-range high-throughput applications is an LR1120-only feature, not available on the LR1110.)

For mesh use: Meshtastic supports LR1110 on the Wio Tracker 1110 for standard 915 MHz operation. MeshCore LR1110 support status is unclear - check the MeshCore supported-hardware docs. The 2.4 GHz LoRa band is not used by standard mesh protocols.

What about SX1278 and SX1268?

You may see these variants in search results:

- **SX1278:** Lower-frequency variant of the SX1276 family, covering roughly 137-525 MHz (e.g. 433/470 MHz). Not used for 915 MHz mesh.
- **SX1268:** The 433/470 MHz (China) sibling of the SX1262 family, supporting up to +22 dBm in a similar package. Functionally equivalent to the SX1262 for LoRa mesh purposes, but on the lower bands.
- **LLCC68:** Budget SX1262-compatible chip used in some low-cost boards. Supports SF5 - SF11 only (not SF12). Fine for community mesh presets but lacks the maximum sensitivity

of SF12.

Power amplifiers: getting to 1W and beyond

The stock SX1262 outputs +22 dBm (158 mW). Some boards add an external RF power amplifier (PA) to reach higher power levels:

TX power	In mW	How achieved	Example hardware
22 dBm	158 mW	SX1262 native	Most standard boards
28 dBm	630 mW	SX1262 + PA (contested - verify against heltec.org)	Heltec T096 (28 dBm-PA claim is contested/NEEDS-EXPERT)
30 dBm	1000 mW	SX1262 + 1W PA (e.g. E22-900M30S module)	Ikoka Stick 1W variant
33 dBm	2000 mW	SX1262 + 2W PA	Ikoka Stick 2W variant (existence of a turnkey 2W variant is unverified)

Important - FCC limits: Under 47 CFR 15.247 the US 902-928 MHz limit is **1 W (30 dBm) conducted** referenced to an antenna of ≤6 dBi; antennas above 6 dBi require a dB-for-dB conducted-power reduction. The 36 dBm (4 W) EIRP figure is the *derived* ceiling (30 dBm + 6 dBi), not a flat standalone limit. The 33 dBm conducted figure above **exceeds the 30 dBm conducted limit** and is not legal for unlicensed US (Part 15) use - it would only be operable under an amateur (Part 97) license (no encryption, station identification required). See the FCC Regulations page in the Antennas & RF section.

Summary: what to buy

Use case	Chip recommendation	Example board
Portable companion node (low power priority)	SX1262, nRF52840 board	T-Echo, T1000-E
Fixed repeater (solar/mains)	SX1262 on nRF52 or ESP32	RAK4631, Heltec V4
High-power infrastructure repeater	SX1262 + PA (Ikoka 1W)	Ikoka Stick 1W
GPS-tracking node (ultra-long battery)	SX1262, nRF52840, T096	Heltec T096
Budget/experimental	LLCC68 or SX1276	Various eBay modules

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