

The logo for Antenova, featuring the word "antenova" in a lowercase, sans-serif font. The letter "o" is replaced by a solid blue circle. The background of the entire page is a blue-tinted photograph of a precision manufacturing process, likely a pick-and-place machine, with several mechanical arms and nozzles positioned over a printed circuit board (PCB) populated with various electronic components. Large, semi-transparent blue circles are overlaid on the image, framing the content.

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2026 GUIDE

# The Antenova guide to wireless testing and certification

# Introduction

As wireless technologies evolve and new standards emerge, the certification process has expanded into a complex, multi-layered discipline that touches every stage of wireless product design. What once focused purely on regulatory compliance now includes verification of real-world performance, interoperability across diverse networks and protection against security vulnerabilities.

In 2026, device manufacturers face growing technical expectations from both regulators and customers. Products need to deliver reliable performance across crowded frequency bands, adapt to new communication protocols and maintain consistent connectivity under demanding conditions. These requirements have shifted certification from a final checkpoint into a continuous design consideration.

This guide explores the current landscape of wireless testing and certification, highlighting the latest updates, the critical role of OTA testing and the antenna design practices that enable faster approval and stronger performance.

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## Wireless for the next generation

Antenova designs high-performance antennas and RF modules that power the connected world. From IoT to wearables, our technology delivers seamless, reliable wireless performance.

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## The evolving landscape of wireless certification

Testing and certification were once focused solely on proving that devices met regional radio regulations such as the [FCC \(United States\)](#) or [CE \(Europe\)](#). In 2026, these processes extend far beyond simple emission limits. Devices must now demonstrate stable performance under real-world conditions, across multiple protocols and with integrated security safeguards.

Industrial IoT systems, connected vehicles and smart infrastructure all require wireless reliability at scale. Low-power wide-area networks like NB-IoT and LoRa demand certification frameworks that verify long-term, energy-efficient connectivity. The rise of vehicle-to-grid (V2G) communication, formalised under standards such as [ISO 15118-20](#), introduces new interoperability and cybersecurity requirements for both vehicles and charging systems.

Certification bodies are increasingly evaluating how devices manage interference, handle concurrent data streams and recover from connection loss. Each of these performance dimensions depends directly on the quality of antenna integration.

## OTA testing and the role of measured performance

Designing wireless devices with small ground planes is as much art as engineering challenge. As product sizes shrink, physical constraints of the PCB directly impact RF performance. Every millimetre becomes invaluable and the once straightforward task of antenna integration now involves carefully balancing efficiency and bandwidth with mechanical design.

- **Total Radiated Power (TRP)** measures transmitted energy across all directions
- **Total Isotropic Sensitivity (TIS)** evaluates how well the receiver detects weak signals
- **Radiated Spurious Emissions (RSE)** ensures that the device radiates cleanly within its allocated spectrum

These results provide insight into how effectively an antenna has been integrated into its environment. Strong TRP and TIS figures confirm efficient radiation and reception. Controlled RSE values indicate that the design achieves compliance without excessive emissions. Together, these metrics form the technical foundation for certification success.

Devices that undergo early OTA validation often progress through certification faster. Each measurement highlights how integration choices (like antenna placement or material selection) influence wireless performance. For product designers, OTA testing serves as a feedback mechanism that strengthens both compliance and usability outcomes.

## Certification pathways in 2026

Certification follows several distinct pathways, each designed to verify a specific aspect of wireless performance and regulatory compliance. Regional frameworks establish the foundational requirements for radio operation and safety, whereas industry-led schemes such as PTCRB and GCF focus on interoperability, reliability and network readiness.

### Regional and global compliance

Most products begin with regional certification requirements. The FCC, CE, [ISED \(Canada\)](#), MIC (Japan) and other national authorities define the baseline for radio emissions, safety and electromagnetic compatibility. Achieving multi-region approval requires planning for various factors like frequency variations and harmonised test procedures.

Beyond these regional frameworks, global carriers and technology alliances maintain their own certification programs to ensure interoperability and network integrity. These include the [PTCRB](#), [GCF](#) and specific mobile operator test plans.

### PTCRB certification - updated standards and expectations

A key example of a shift in certification is the PTCRB, which defines performance and interoperability requirements for cellular devices on North American networks. It aligns with CTIA and 3GPP standards to confirm consistent RF, OTA and coexistence performance.

In 2026, [PTCRB updates](#) focus on:

- **Expanded OTA validation:** Devices must meet defined TRP and TIS benchmarks across all supported radio access technologies.

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- **MIMO performance testing:** Multi-antenna products undergo 2x2 MIMO and transmit-diversity evaluations to verify radiated efficiency.

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- **Cross-technology coexistence:** Testing now includes radiated checks for cellular, Wi-Fi, GNSS and Bluetooth® operation within shared enclosures.

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- **5G and LPWAN compliance:** Certification aligns with current 3GPP releases covering 5G NR, LTE-M and NB-IoT technologies.

These refinements strengthen the role of OTA testing within certification, placing greater emphasis on antenna integration and system-level performance.

## Designing for certification success

Certification outcomes are determined long before a device reaches the test lab. Antenna integration, PCB design and component placement influence every major test parameter. Poor layout or inadequate ground design can result in detuning and power inefficiency which are leading causes of certification failure.

An effective design process links mechanical and RF engineering from the start. Antenna placement must account for proximity to batteries, displays, sensors and metallic surfaces. Housing materials should be evaluated for dielectric properties that affect resonance and radiation patterns. Simulation tools and early-stage prototypes help designers visualise these interactions before committing to tooling.

By treating certification as a design objective, rather than an afterthought, engineers create products that align with compliance standards from the beginning. This approach reduces costly redesign cycles and accelerates time to market.

## Engineering confidence through antenna performance

Every certification pathway leads back to antenna performance. OTA metrics validate how well the antenna integrates into the system, and PTCRB verification ensures that the design performs consistently across networks. A product that performs strongly in these areas moves through certification more predictably and delivers better user experience after launch.

Antenova's antenna solutions are developed to support this process from the earliest design stage. Each antenna combines high efficiency, mechanical versatility and clear integration guidance to simplify testing and shorten development cycles. Antenova's designs maintain consistent TRP, TIS and RSE performance across enclosures, materials and use cases, helping product teams achieve compliance the first time.

ANTENNAS

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without compromise.