FCC Wireless Product Approval Framework

CHOOSING THE BEST PATHWAY TO COMPLIANCE

DATE: JULY 2026

Foreward

Wireless certification is often viewed as a laboratory exercise undertaken near the end of product development. In reality, the compliance pathway selected can have a significant impact on development costs, certification timelines, and overall project risk. Understanding the four FCC compliance pathways early in the design process helps businesses choose the most appropriate route for their product and avoid unnecessary delays and expense.

Table of Contents

FOREWARD 2

EXECUTIVE SUMMARY 3

THE FOUR REGULATORY COMPLIANCE OPTIONS 4

FULL MODULAR INTEGRATION 4

CLASS II PERMISSIVE CHANGE 5

CHANGE IN ID + CLASS II PERMISSIVE CHANGE 6

FULL RADIO CERTIFICATION 7

COMPARISON MATRIX 8

ADMINISTRATIVE REQUIREMENTS 9

STRATEGIC RECOMMENDATIONS 10

APPENDIX A: FULL RADIO CERTIFICATION PROCESS 11

Executive Summary

When introducing an electronic product with Wi-Fi or Bluetooth functionality into the United States market, the Federal Communications Commission (FCC) requires the device to be formally authorised under 47 CFR Part 15. Because Wi-Fi and Bluetooth components actively transmit radio frequency (RF) energy, they are classified as Intentional Radiators.

A common misconception is that integrating a pre-certified Wi-Fi or Bluetooth module automatically eliminates all regulatory burdens for the finished product. In reality, the compliance pathway depends entirely on how the module is integrated and whether the antenna subsystem deviates from the module's original grant of authorisation. This document outlines the four primary compliance options available to businesses, their technical requirements, and necessary administrative structures.

The 4 Regulatory Compliance Options

Option 1: Full Modular Integration (As Intended)

Scenario: You integrate a pre-certified Wi-Fi or Bluetooth module and use an approved antenna of the exact same type and equal or lower peak gain as specified in the module's original FCC grant. You also adhere to all integration conditions (e.g., minimum separation distance to the human body).

Technical Requirement: The modular approval remains valid and is inherited by the host. The finished product does not require a new FCC ID.

Testing Scope: You only need to perform FCC Part 15 Subpart B (Unintentional Radiator) testing on the final host device to ensure the digital circuitry, housing, and power lines do not emit excessive noise.

Labelling: The product enclosure must be labelled with:
Contains FCC ID: [Module Manufacturer's ID]

The 4 Regulatory Compliance Options

Option 2: Class II Permissive Change

Scenario: You use a pre-certified module, but you deviate from the approved antenna list (e.g., you select a different antenna type, or a model with a higher peak gain). However, you have an active commercial relationship with the module vendor.

Technical Requirement: The module vendor acts as the applicant to update their existing FCC ID grant. They file a Class II Permissive Change (C2PC) under 47 CFR §2.1043 to add your specific antenna to their approved list.

Testing Scope: The finished host device must undergo physical laboratory testing. This is restricted to Radiated Spurious Emissions (RSE), band-edge compliance, and an updated RF Exposure (MPE or SAR) evaluation. Costly conducted (cable-direct-to-chip) testing is avoided.

Labelling: Once approved, the product uses the vendor's original ID:
Contains FCC ID: [Module Manufacturer's ID]

The 4 Regulatory Compliance Options

Option 3: Change in ID + Class II Permissive Change

Scenario: You deviate from the module's approved antenna parameters, but the module vendor is an off-the-shelf supplier who will not file paperwork on your behalf.

Technical Requirement: You execute a two-step filing to "adopt" the module under your own company's authority. First, you perform a Change in Identification (47 CFR §2.933) to establish a new FCC ID under your own Grantee Code, using a formal letter of permission from the original vendor. Second, your company immediately files a C2PC against this new ID to authorise the new antenna.

Testing Scope: Mirroring Option 2, testing is limited to radiated emissions (RSE), band-edge, and RF exposure on the final host device. No conducted RF testing is required.

Labelling: The final product bears your own brand's custom FCC ID:
FCC ID: [Your Grantee Code][Your Product Code]

The 4 Regulatory Compliance Options

Option 4: Full Radio Certification

Scenario: You are designing the Wi-Fi RF circuit directly onto your main PCB layout (chip-down design), or you are using a module without an existing FCC certification, or the module vendor refuses to provide a Change in ID permission letter.

Technical Requirement: The product must undergo full, ground-up certification as a brand-new intentional radiator. Unlike modular paths where you reference existing paperwork, a full certification requires your business to compile an entirely new, sovereign technical entry in the FCC Equipment Authorisation System (EAS) database. The process is outlined in Appendix A.

Testing Scope: Exhaustive and expensive laboratory testing. This includes full conducted RF parameters (output power, occupied bandwidth, power spectral density) across all operating channels, alongside extensive radiated emissions, band-edge, and RF exposure evaluations.

Labelling: The final product bears your own brand's custom FCC ID:
FCC ID: [Your Grantee Code][Your Product Code]

Comparison Matrix

Parameter	Option 1: As Intended	Option 2: C2PC	Option 3: Change in ID + C2PC	Option 4: Full Radio Cert
Testing Scope	Radiated (Part 15B) only	Radiated (15B + 15C/E RSE)	Radiated (15B + 15C/E RSE)	Full Radiated, Conducted & RF Exposure (MPE/SAR)
Testing Cost	Low	Moderate	Moderate	High
Timeline*	1–2 Weeks	3–5 Weeks	4–6 Weeks	6–10+ Weeks
Who Owns the RF ID?	Module Vendor	Module Vendor	Your Company	Your Company
Vendor Dependency	Low (Follow manual)	Critical (Must file for you)	Moderate (Need permission letter)	None

*Timelines indicatively only, dependent on lab and TCB

Administrative Requirements

Do you need a US entity?: A common point of confusion for international businesses is whether they must incorporate a legal entity within the United States to secure an FCC ID.

The Short Answer: No. A business does not need to be a registered US corporation or have a physical US office to apply for an FCC Grantee Code or own an FCC ID. International companies (e.g., based in New Zealand, Australia, or the UK) can legally hold these certifications.

The Crucial Caveat: U.S. Agent for Service of Process - While the applicant can be foreign, the FCC strictly mandates under 47 CFR §2.911(d)(7) that all applicants designate a U.S. Agent for Service of Process.

What is a U.S. Agent?: This is a physical person or business entity located inside the United States that formally agrees to accept legal documentation, regulatory inquiries, or notices of non-compliance from the FCC on behalf of the international grantee.

How to fulfill this requirement: If your company does not have a US subsidiary or a permanent US-based employee, you must contract a professional third-party corporate agent located in the United States. Many accredited test laboratories and compliance consulting firms offer this service for a standard annual fee. Crucially, the FCC requires you to maintain this active agent relationship for at least one year after all marketing and importation of the product has permanently ceased. This designated agent must sign a formal attestation letter that is submitted to the Telecommunication Certification Body (TCB) during the application process.

Additional Compliance Declarations: Regardless of the chosen path, any company filing for an FCC ID (Options 3 and 4) must also provide:

1. Covered List Attestation (§2.911(d)(5)): A formal declaration certifying that the equipment is not produced by any entities deemed a threat to US national security (e.g., Huawei, ZTE, Hikvision).
2. Anti-Drug Abuse Act Certification: An attestation that no party to the application is subject to a denial of federal benefits pursuant to Section 5301 of the Anti-Drug Abuse Act

Strategic Recommendations

Protect the Antenna Design Early

If time-to-market is your primary metric, strictly adhere to Option 1. Force industrial designers to accommodate the module manufacturer's pre-approved antenna options.

Secure the Relationship Before Deviating

If the product enclosure demands a custom or embedded antenna, negotiate the availability of a Change in ID Permission Letter with the module vendor before locking down the Bill of Materials (BOM). This ensures Option 3 (Path B) remains viable, saving thousands in testing fees.

Budget for Lifecycle Management

Remember that owning the FCC ID (Options 3 and 4) shifts the long-term compliance liability to your company. Any future firmware updates that alter the RF output power or switching characteristics will require your team to re-engage with a TCB for a Permissive Change evaluation.

APPENDIX A:

Full Radio Certification Process

Step 1: Establish Your FCC Registration & Grantee Code
If your company has never filed an FCC application before, you must register for a 10-digit FCC Registration Number (FRN) through the FCC Commission Registration System (CORES) portal. Once the FRN is active, you apply for and pay the fee for a unique Grantee Code (the first 3 or 5 characters of your future FCC ID).

Step 2: Prepare the "Radio Test Mode" Firmware
Because the lab must test the raw performance of the Wi-Fi chip itself, your firmware team must prepare a special, non-commercial software build for the test engineers.

This firmware must allow the lab technician to:
1. Force the Wi-Fi radio to transmit continuously (100% duty cycle).
2. Lock the radio onto specific channels (e.g., low, middle, and high channels across the 2.4 GHz or 5 GHz bands).
3. Manually switch between different Wi-Fi modulations (e.g., 802.11b/g/n/ac) and data rates.

Step 3: Formal Accredited Testing
You ship the product running the test firmware to an FCC-recognized, accredited testing laboratory. The lab will perform the full suite of conducted and radiated testing and issue a comprehensive, multi-page formal Test Report under 47 CFR Part 15C (and Part 15E if utilizing 5 GHz).

Step 4: Compile the Technical Exhibit File
While testing is underway, your engineering team must compile the proprietary technical data required for an intentional radiator filing. The FCC mandates the submission of the following discrete documents:

- Schematics & Block Diagrams: Full circuit schematics of the RF stage and a block diagram showing the clock frequencies and signal paths.
- Operational Description: A technical narrative explaining how the radio operates, its modulation techniques, and how the antenna functions.
- Internal and External Photos: High-resolution photographs showing the internal PCB layout (with RF shielding removed if applicable) and the external enclosure.
- User Manual: Must include mandatory FCC interference warnings (§15.21) and RF exposure compliance statements.

Step 5: Retain a Telecommunication Certification Body (TCB)
The FCC does not review applications directly. You must contract an independent, accredited third-party TCB to audit your filing. You submit the Test Report, the Technical Exhibits, your U.S. Agent for Service of Process Attestation, and a completed Form 731 Application to the TCB.

Step 6: Review, Upload, and Grant Issuance
The TCB performs a strict legal and technical review of the data package. If it passes, the TCB uploads the package directly into the official FCC EAS database. The TCB then issues the formal Grant of Equipment Authorisation, making your custom FCC ID active, legally searchable, and cleared for US commercial distribution.

Global Product Confidence

Global Product Confidence helps manufacturers and exporters reduce product risk throughout the product lifecycle. We work with businesses developing and exporting products internationally by helping them manage product risk and global product compliance. Our practical approach helps businesses avoid costly delays, failed certifications, product recalls and market access issues.

Fiona van Petegem is the founder of Global Product Confidence and author of *The Smart Risk Playbook*. She has more than 25 years' international experience helping manufacturers reduce product risk and successfully access global markets.

Regulatory Disclaimer

The information provided in this document is intended for general informational and educational purposes only and does not constitute legal, engineering or regulatory advice. While every effort has been made to ensure the accuracy of this guidance at the date of publication, the Federal Communications Commission (FCC) regularly updates its rules, interpretations and Knowledge Database (KDB) procedures.

Equipment authorisation outcomes depend on the specific hardware configuration, antenna design, firmware implementation and operating environment of each product. Businesses should consult an FCC-recognised accredited testing laboratory and an authorised Telecommunication Certification Body (TCB) before finalising product designs or commencing formal certification testing.

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