Complete Guide to FCC Part 15

Understanding the certification process

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Introduction

Brad Bonomo,
Chief Operations Officer for Compliance Testing writes:

The Federal Communications Commission (FCC) requires that all digital devices sold in the USA meet the Unintentional Radiator requirement of 47 CFR Part 15b – this is not a new requirement but often the most over-looked.

Unintentional Radiation is radio frequency noise generated by a device that is not used for telecommunications. This noise could potentially interfere and have an impact on the operation of other devices, and therefore requires testing of the unintentional emissions.

We are an FCC designated Telecommunications Certification Body, which means we are able to certify a products regulatory compliance on behalf of the FCC. We come armed with decades of experience, providing uncompromising integrity, objectivity and guidance throughout the project.

Compliance Testing provides full testing services needed to achieve certification. Industry leaders, we have been providing certification services for over 50 years and can walk our clients through the process ensuring smooth navigation of testing and certification.

Our state-of-the-art facility is the oldest continuously operating FCC/Canada recognised testing laboratory in Arizona.

To help you understand the certification process we have put together this eBook packed full of information around FCC Part 15b, what it is and who needs it.

Delve in and have a read – any questions, queries or indeed if you would like to book our services, please reach out to me on **Bbonomo@compliancetesting.com** or alternatively, for more information on our testing services, please visit our website **www.compliancetesting.com**.

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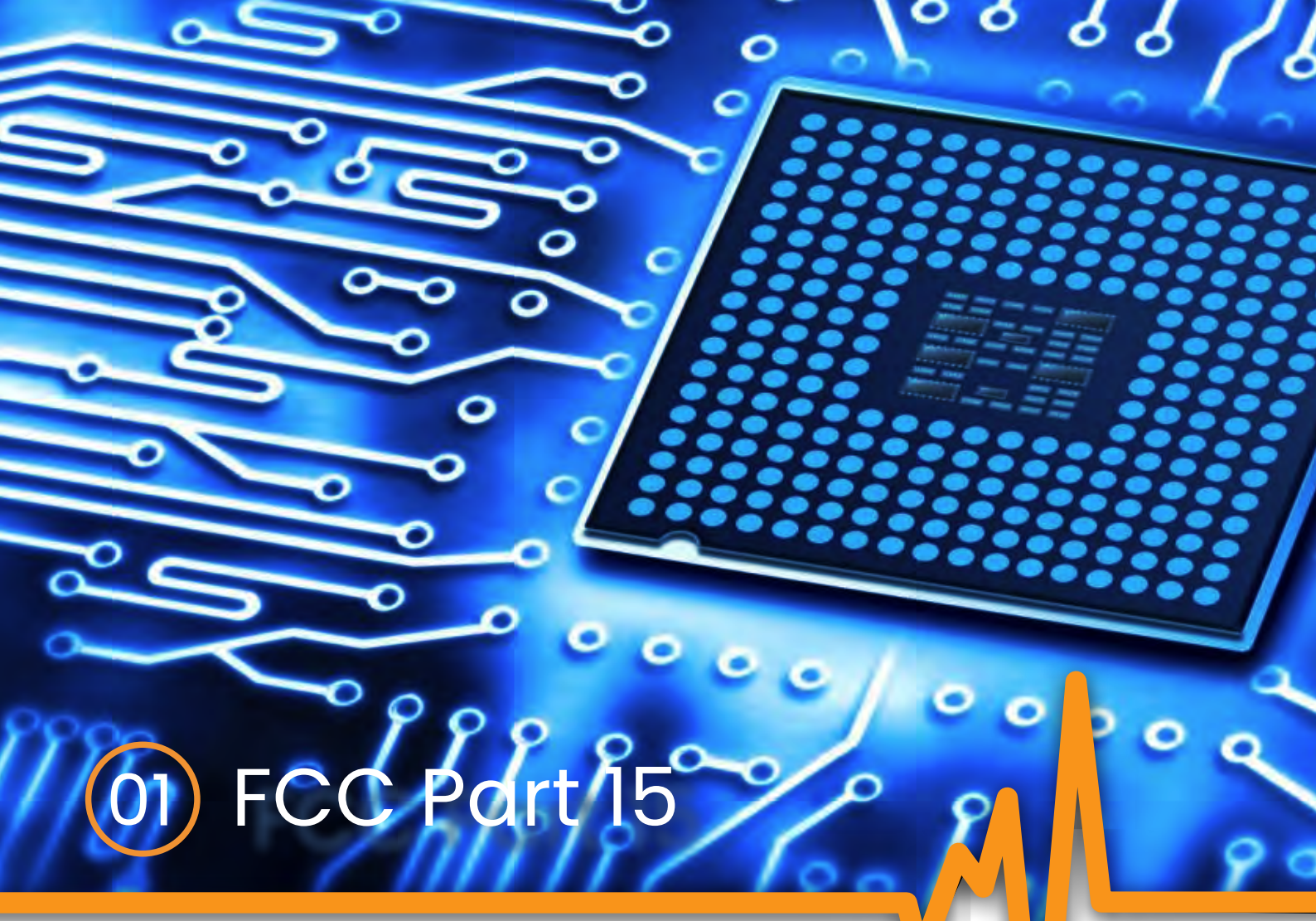


01 FCC Part 15

All electronics device manufacturers need to familiarize themselves with the FCC Part 15 and its requirements. Notably, if you are working with any device that operates at 9 kHz or higher, you are working with a Part 15 device regulated by the Federal Communications Commission (FCC) under the FCC Part 15 regulations.

Compliance Testing will guide you through the entire FCC Part 15 testing process to ensure you quickly and efficiently meet the current FCC regulations and access the market faster. We will show you how FCC conducts their testing and duplicate their test techniques in our state-of-the-art labs. Additionally, our staff keeps up to speed with current regulations and will be at hand to help with all the new paperwork and labeling requirements.

What Are the Types of Part 15 Devices?

There are two types of Part 15 devices: Class A and Class B.

- **Class A devices:** Class A devices are designed for industrial and commercial usages. These devices are usually sensitive as they produce a higher EMI activity. Equipment under this category is better insulated against radiofrequency radiation and electromagnetic interferences than Class B devices. Class A devices, therefore, have less strenuous requirements than Class B.
- **Class B devices:** Class B devices are designed for consumer or residential use. Consumer electronics are typically low-powered and are not as vigorously used as Class B devices. They, therefore, attract more stringent requirements relating to internal protection and EMI tolerance. FCC requires all Class B devices designed for residential use must have lower radiation levels to prevent them from causing harmful disruptions or annoyance to the owner of devices.

The FCC defines intentional radiators as any electronic device that deliberately uses radio waves / RF to communicate or connect to other devices. Common examples of intentional radiators include wireless microphones, cell phones, remote controls, cell phones, garage door openers, and a range of IoT sensors designed for home use.

At Compliance Testing, we provide comprehension high-quality FCC testing for all classes of intentional radiators. If you are working with a device that requires FCC certifications, contact us today.

What Is Required for FCC Part 15 Testing?

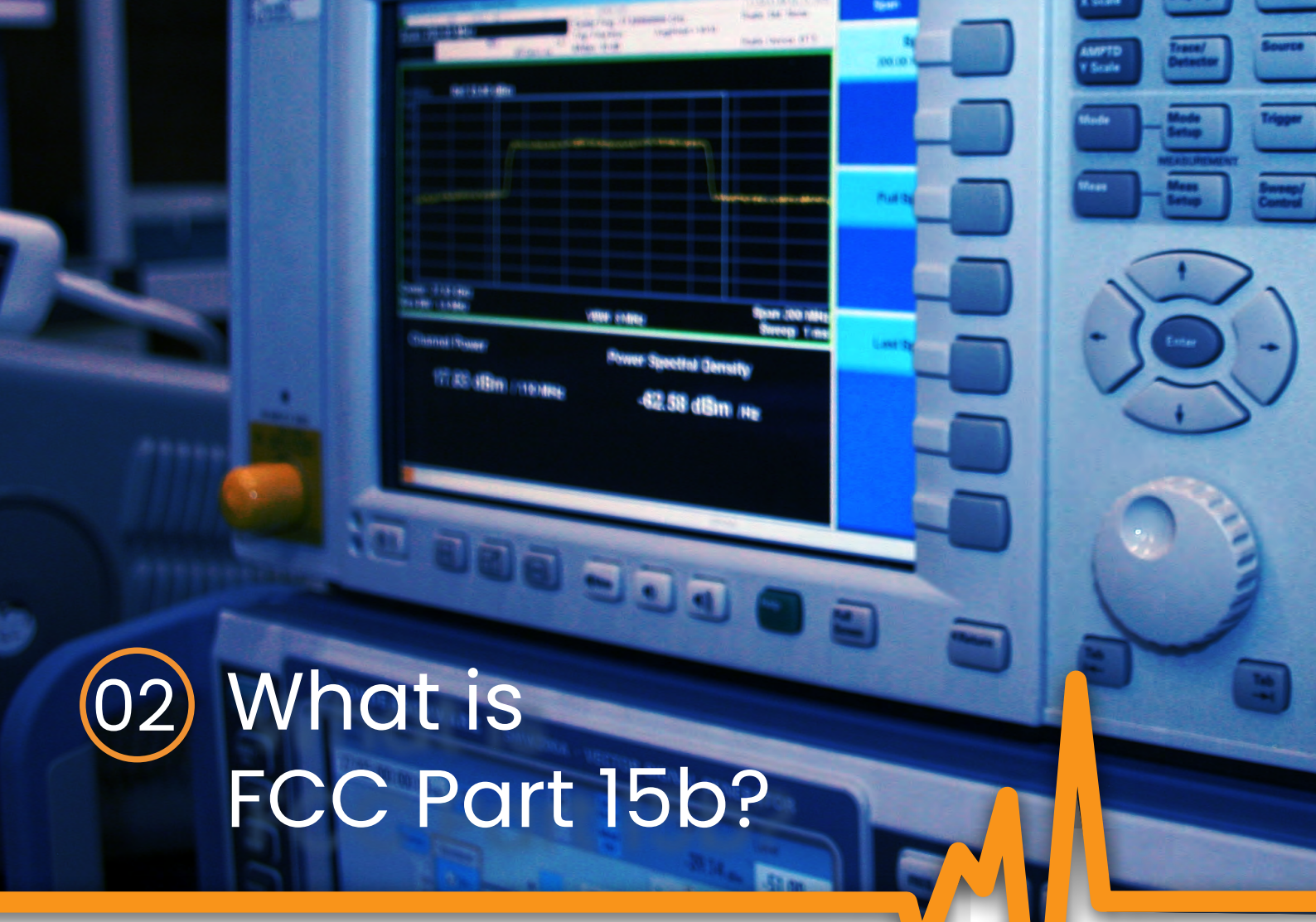
FCC Part 15C Testing requires the following:

- All FCC certification testing should be conducted by an accredited laboratory such as Compliance Testing. Failure to comply will these requirements results in automatic rejections of the results by the FCC.
- If you are a new applicant, you must apply for a Grantee Code. This Code is part of your final FCC ID, a unique identifier required on each end device.
- A chamber testing must be performed for radiated and conducted emissions. Additionally, you have to run the product's radio in a particular pattern to show wireless compliance.
- You also need to provide some specific disclosures and warnings in your product manual. This information helps assure users that the device meets the FCC's certification requirements and it is safe to use.
- Devices designed to be worn on the body may have to undergo **Specific Absorption Rate (SAR) testing**. This testing typically measures the intentional emissions of the device to guarantee its RF exposure characteristics don't cause any harm to the body.

How Compliance Testing Assist with Your FCC Part 15 Testing

At Compliance Testing, we have well-equipped and accredited laboratories for conducting testing that meets international requirements. Our experts are ready to walk through every step with you, from the product design and development stage to the filing and certification stage. We are experts in SDoC EMC testing and boast experienced in the updated testing requirements the FCC requirements.

Our experts also have an in-depth understanding of all the requirements of leading regulatory bodies and governments across the planet to ensure exceptional product testing, compliance, and certifications. Whether you are bringing intentional or unintentional devices to the market, we are ready to guide your Part 15 testing needed to market your product. **Get in touch** with us today to learn more about our testing solutions.



02 What is FCC Part 15b?

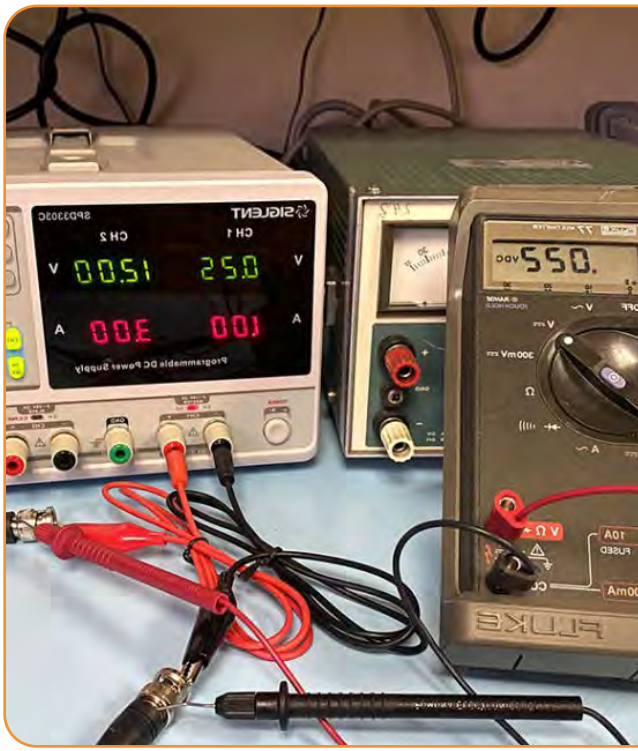
Whenever you work with electronics, it's important to be sure to comply with FCC regulations. Any RF devices that produce radio frequency radiation can possibly interfere with other devices; the purpose of the regulations is to ensure that electronic devices are able to work. Radios, phones, and other types of communications devices obviously produce RF radiation. However, virtually all electronics produce some amount of RF radiation. If you want your product to succeed, you'll need to be sure that it complies with FCC Part 15b regulations.

What is FCC Part 15b?

FCC Part 15b is more specifically Part 15b of FCC **Rules and Regulations Title 47**. While Title 47 is a fairly expansive set of laws and documents, Part 15b is the one that draws the most attention from people. This is because of the fact that it governs acceptable levels of radio frequency radiation output. Radio frequency waves need to stay within certain safe, approved levels to avoid creating hazardous EMI, and this is the purpose of Part 15b.

Why is it Important to Follow FCC Part 15b?

If you've worked in an electronic or mechanical field, you should understand the importance of controlling EMI. However, even if you haven't worked in such an area, you still have exposure EMI control procedures. For instance, you turn off devices before a plane takes off to minimize the latent interference that it can create. That's right, a handheld device can pose a danger to a large aircraft with hundreds of passengers. Virtually any sensitive electronic equipment, such as that which hospitals or emergency first responders use could be disrupted by unchecked interference.



What is a Part 15 Device?

Any device that produces a type of radiation that Part 15b defines is subject to the regulations within the part. However, this applies to virtually any industrial equipment, household appliances, new products, and personal inventions that use electricity. Even if something isn't an intentional radiator, Part 15b is sure to apply due to unintentional or incidental radiation.

Understanding Part 15b Radiation Types

Intentional Radiation

Intentional radiation is the most straightforward type of RF output that Part 15b governs. It refers to radiation that the device deliberately produces to communicate with other devices. When you connect to wifi or call a friend, your phone is acting as an intentional radiator. However, that same phone is also an unintentional radiator any time that it's on.

Unintentional Radiation

Unintentional radiation is a bit more complex. When a device uses RF as a means to function internally, it will still produce some amount of radiation that can impact other devices. What defines unintentional radiation and separates it from incidental radiation is that the output is key to the device functioning, but is not supposed to affect other devices.

Incidental Radiation

Incidental radiation is a type of latent EMI that isn't relevant to the operation of the device that produces it. In this case, the RF output of the device is purely accidental. Devices that produce incidental radiation include light bulbs, DC motors, and simple mechanical products.

Verify Part 15b Compliance

Ensuring Part 15b compliance is vital to help keep the public safe and to avoid fees and penalties from the FCC. If you need to ensure that your new product falls in line with FCC regulations, then hire the certified lab technicians with Compliance Testing.

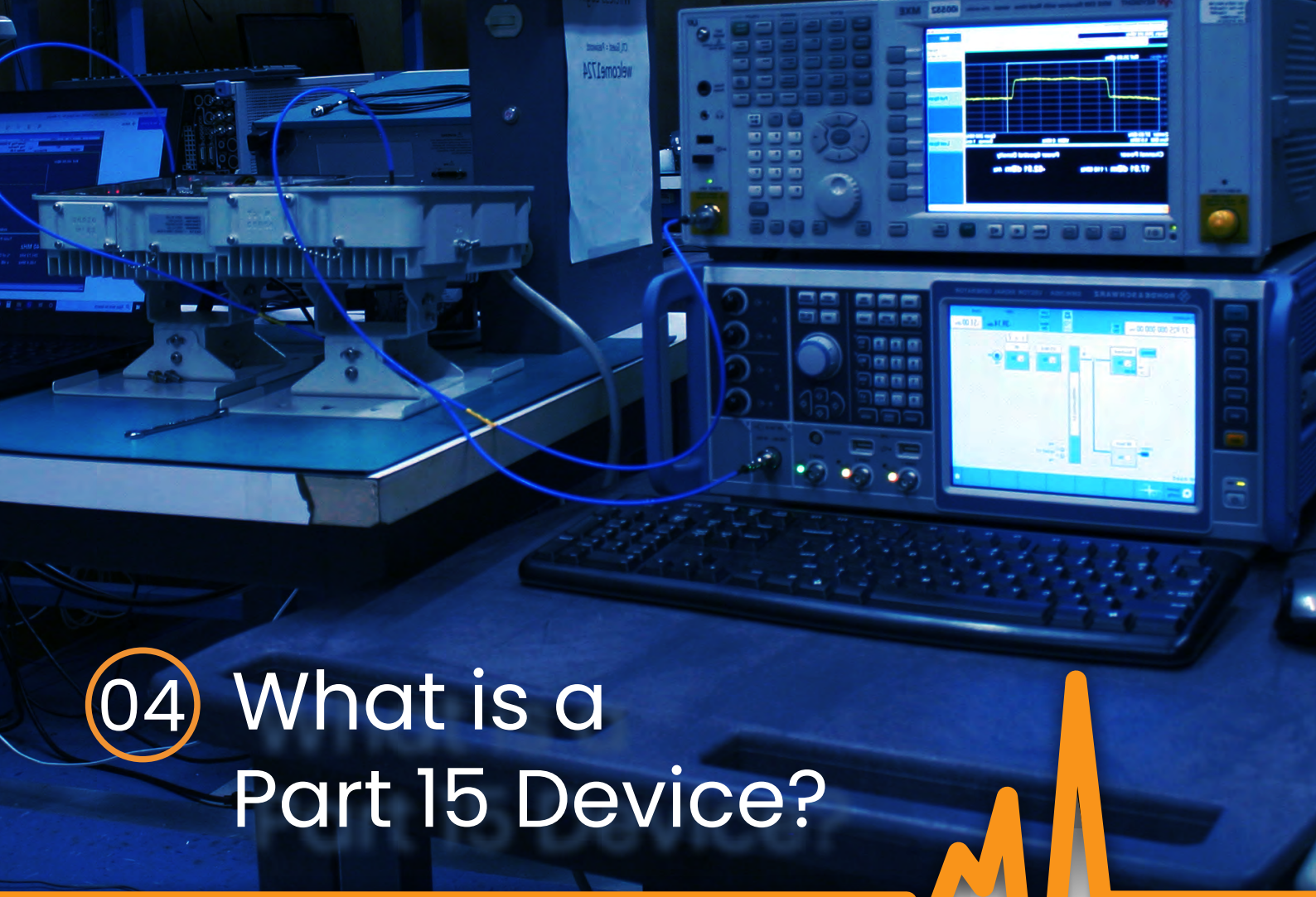
03 Who Needs Part 15 Compliance Testing?

If you produce any sort of electronic device, it's likely that you need Part 15 compliance testing. Even simple electronic tools today often operate on digital logic and produce sufficient levels of EMI that they need to be Part 15 compliant.

Which Devices Need Part 15 Compliance Testing?

If you're involved in any of the following fields or industries and have questions or would like support, contact our team of subject matter expert test engineers here today.

- Electronic Device Manufacturers
- IoT / IIoT
- Smart Devices
- Smart Appliances
- Smart Pet Devices
- Smart Home (i.e. Smart Lighting, Smart Locks)
- Smart City
- Smart Wearable Tech
- Athletic Gear
- Heart Rate Sensors
- Industries
- Agriculture
- Automotive / Automotive & EV Components
- Forestry
- Logistics
- Manufacturing
- MedTech / Medical Devices
- Mining
- Oil & Gas
- Robotics
- SatCom & Telecom



04 What is a Part 15 Device?

If you're a small inventor or part of a company that produces electronics, you've probably heard of Part 15 regulations. While you presumably know that it's important to adhere to these regulations, that doesn't make it clear what a Part 15 device is. If you work with citizen radio, design electronics, then it's important to know that you're working with a Part 15 device and adhere to relevant regulations.

What is a Part 15 Device?

A Part 15 device is anything that falls under the regulations within **47 CFR § 15.5**. These are unlicensed electronics, which need to adhere to regulations to avoid the risk of interfering with other devices. There are different types of devices that fall under the auspices of Part 15, and these types have their own relevant guidelines to adhere to. In general, the regulations are fairly lax so long as you, the operator understand that you will turn off the device should it interfere with other Part 15 devices. Likewise, you're entitled to ask the same of any other Part 15 device operator who's interfering with your operation.
The two types of Part 15 devices are Class A, which is meant for industrial or commercial usage, and Class B, which are destined for residential use.

Class A Devices

While industrial and commercial settings are full of sensitive equipment, they're also centers for EMI activity. As a result, industrial equipment is generally better-insulated against radio frequency radiation and electromagnetic interference. Class A devices have less strenuous requirements than Class B devices, which must put out lower levels of radiation.

However, this makes successful Class B testing more prestigious and a popular means of testing. Even devices that the designer has made for use in industrial and commercial settings will often undergo Class B tests, simply to prove how well they've managed to minimize EMI output.

Class B Devices

Consumer electronics are generally low-powered and subject to less rigorous, extensive usage. As such, they generally have less stringent requirements with regard to internal protection and EMI tolerance. Conversely, residential devices that Class B governs are expected to have lower levels of radiation. This way, they won't cause annoying or dangerous disruptions to the owner or their neighbors. When designing a product that's not meant for residential usage, it's common to still seek out Class B trials simply to be able to say that a product is even safer than it needs to be.

Part 15 Radiation Types

There are three types of radiation that will make your device subject to Part 15 regulations. While many devices don't produce intentional radiation, virtually any electronic device will create unintentional or incidental RF and EMI radiation.

Intentional Radiation

The FCC defines Intentional Radiation for the purposes of Part 15 devices as any intentional radio frequency output that's meant to connect to other devices. Phones, ham radios, computers, wireless routers, and similar devices fall under the umbrella of those with intentional radiation output.

Unintentional Radiation

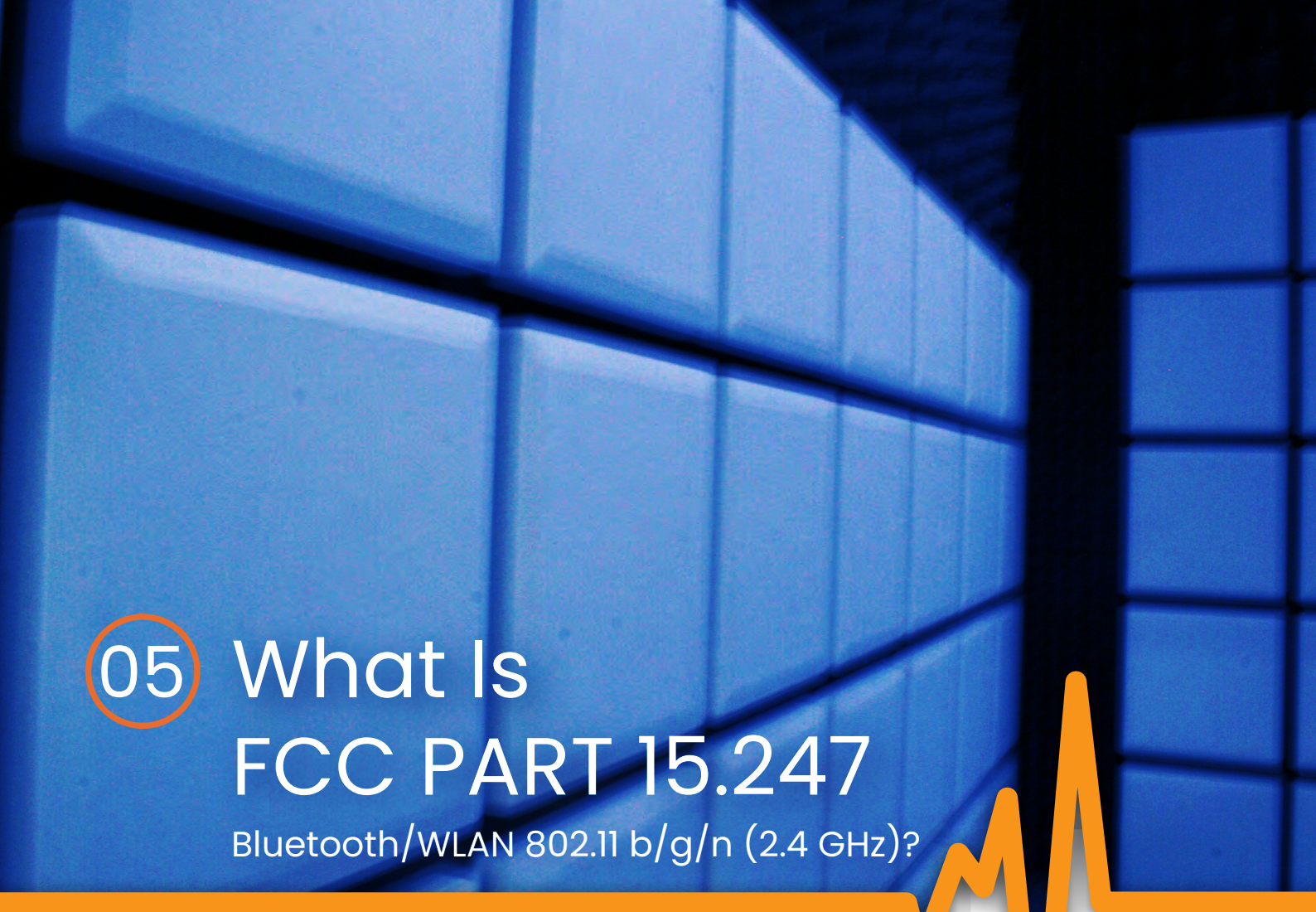
An unintentional radiator is a bit more complex than an unintentional radiator. Unintentional radiation is any type of RF output that's a result of internal processes and not meant for communication purposes.

Incidental Radiation

Almost any mechanical device will produce some amount of incidental radiation. For instance, operating a DC motor produces trace amounts of incidental radiation that are irrelevant to operation. Nonetheless, even this radiation must be measured and kept within safe levels.

Part 15 Compliance Testing

Don't take chances with compliance testing. Contact us to learn more about what we can do to help your products stay within the bounds of FCC regulations.



05 What Is FCC PART 15.247

Bluetooth/WLAN 802.11 b/g/n (2.4 GHz)?

Every electronic device that is sold or manufactured in the US must be officially approved by the Federal Communications Commission (FCC). If you're planning on selling your own product, you'll need to make sure that you follow the right guidelines released by the FCC. The main goal of these guidelines is to reduce the radio frequency interference between devices. In addition, they help verify that approved electronic goods are safe for the general public to use.

By adhering to official FCC guidelines, you can ensure that the process goes as smoothly as possible and reduce the risk of errors. It's also crucial to follow the right section of the FCC's guidelines. If your product falls under FCC Part 15.247 for Bluetooth/WLAN 802.11 b/g/n (2.4 GHz), here's everything you need to know about getting approved.

What Is FCC Part 15.247 for Bluetooth/WLAN 802.11 b/g/n (2.4 GHz)?

Part 15.247 of the FCC's official guidelines includes electronic devices that are used for wireless internet, wireless access points and Bluetooth transceivers. According to the FCC, equipment that is approved under **Section 15.247** can operate as a Digital Transmission System (DTS), Frequency Hopping Spread Spectrum (FHSS) system or hybrid system. These systems include Bluetooth/WLAN 802.11 b/g/n (2.4 GHz).

The FCC permits the use of three different ISM bands intended for unlicensed communication equipment purposes. These three ISM bands are 902 to 928 MHz, 2.400 to 2.4835 GHz and 5.725 to 5.875 GHz. Bluetooth/WLAN 802.11 b/g/n devices are included in this list of ISM bands, as their frequency is estimated to be 2.4 GHz.

Why Do You Need Testing for FCC Part 15.247 for Bluetooth/WLAN 802.11 b/g/n (2.4 GHz)?

This section of the FCC's guidelines requires rigorous testing for your Bluetooth/WLAN device. Once the FCC has identified the specific type of radio frequency for your product, they will begin the testing process. This process is essential for a number of reasons.

First, FCC testing ensures that your electronic device adheres to the commission's standards. If you pass testing, this means that your product does not exceed the radio frequency limits imposed by the FCC. As a result, your electronic product is considered safe for consumers to use.

Submitting your device for testing also helps you avoid hefty fines. If you sell or manufacture electronic goods that do not conform to FCC guidelines, you may be faced with fines of up to hundreds of thousands of dollars. The FCC takes its verification and enforcement procedures seriously, and it will penalize you if you fail to adhere them. The best way to avoid surprises is to have your product rigorously tested by an accredited testing service.

Find the Support You Need for FCC Part 15.247 Approval

Whether it's your first time navigating the FCC approval process or you're already familiar with it, you can always benefit from professional insight and support. At Compliance Testing, we know the FCC's guidelines inside and out, and we understand what it takes to have your electronic device approved. We're even well-versed in FCC PART 15.247 for Bluetooth/WLAN 802.11 b/g/n (2.4 GHz), helping ensure that you receive high-quality service for your specific needs.

To benefit from our unparalleled expertise and top-tier testing equipment, reach out to us today. We can help you navigate the FCC approval process like a seasoned professional.

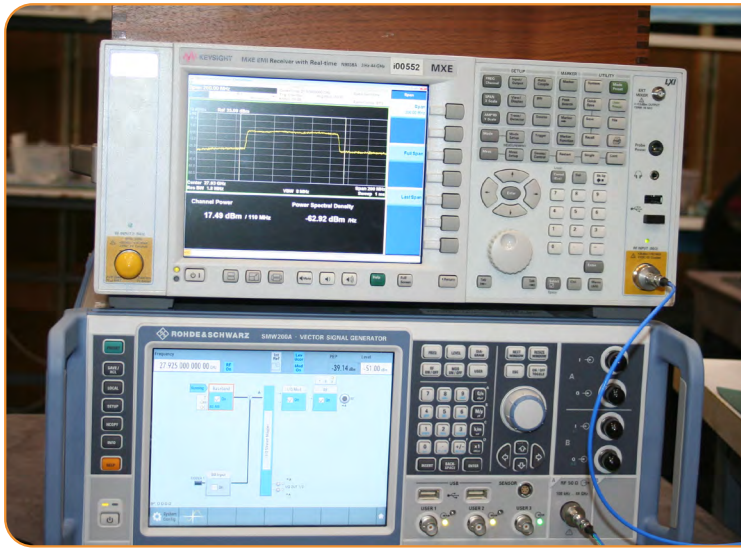
06 What Is FCC PART 15.407

WLAN 802.11 a/n/ac (5 GHz)?

Making Devices FCC Part 15.407 Legal When Upgrading to 802.11a/n/ac (Wi-Fi 5) at 5 GHz. Why is FCC part 15.407 compliance an important part of your Wi-Fi enabled device's commercial success? If your device is a dual-band unit offering 2.4 GHz and 5 GHz frequency band transmission, **these requirements** likely apply to you. Compliance Testing, LLC can help.

FCC Compliance Testing Keeps the Airwaves Cleaner with Less Interference

FCC compliance testing for Part 15.407 and related standards helps to manage the radio frequency (RF) emissions of Wi-Fi devices and keep interference to a minimum.



It's essential for 5 GHz Wi-Fi device sales in the United States, and major retailer Amazon.com has introduced requirements in the second quarter of 2021 that will restrict electronics they sell to those that have the proper FCC documentation. FCC penalties for selling devices without proper certification are significant. In some cases, certain "unintentional radiator" devices can be sold based on a "supplier declaration of conformity," but if tested in the future and found to be non-compliant, trouble can follow.

Inheriting Certification of Past Designs or Certified Modules

If you're launching a dual band Wi-Fi device, there are important considerations regarding FCC testing if you previously underwent testing for single-band 2.4 GHz units, or are using certified Wi-Fi modules. If your equipment transmits Wi-Fi signals in the 5 GHz band, such as 802.11ac or Wi-Fi 5, your existing certification and testing need to be updated for the new frequency band. Your device should also be tested as an "unintentional radiator" to ensure that any RF spectrum emitted by your unit in addition to the transmitted signals are within limits. Additional device testing will be needed for future devices employing Wi-Fi 6E and Wi-Fi 7, which add further frequency bands and signaling techniques to the Wi-Fi family.

Frequency and Power Output Standards Apply

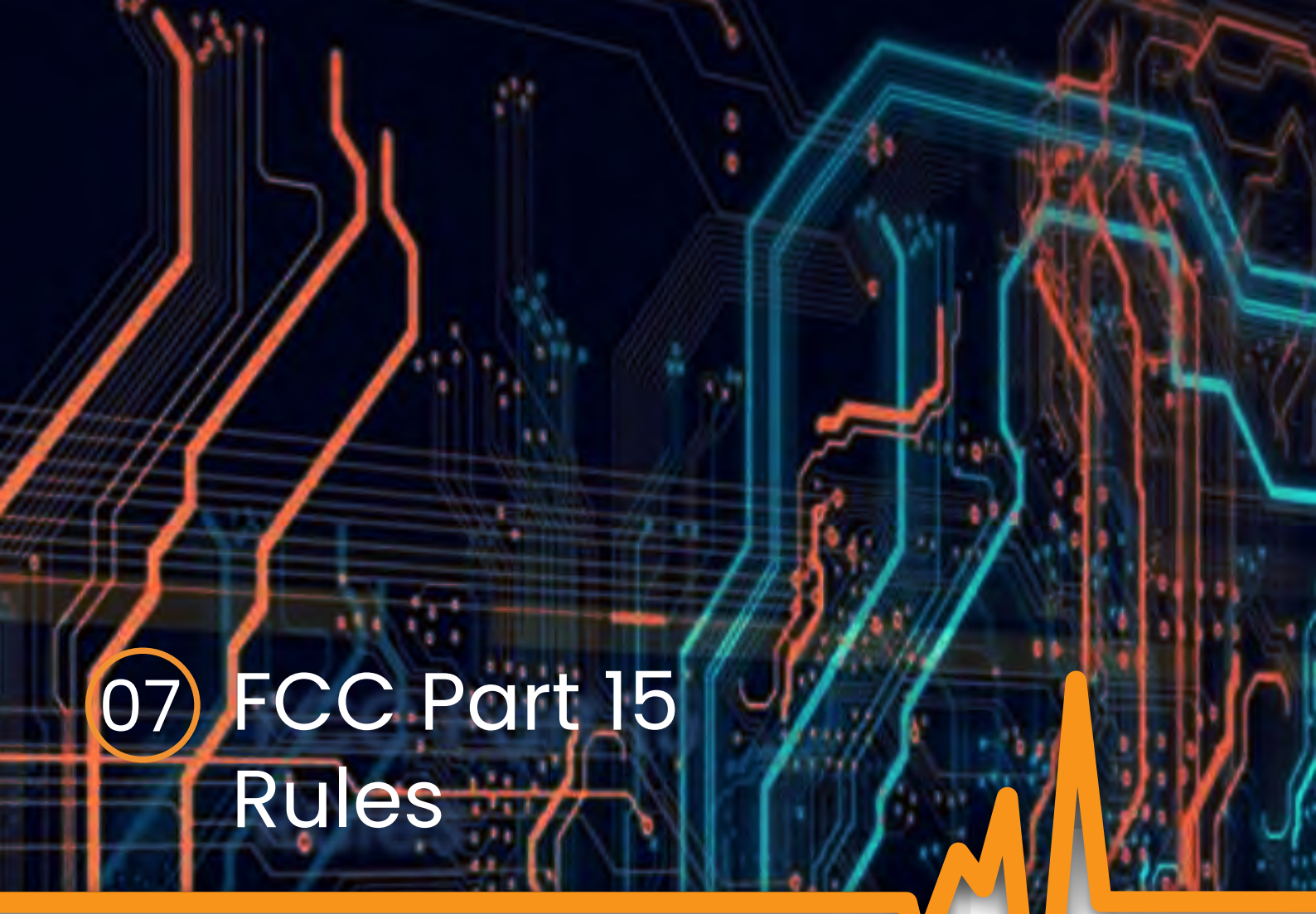
Both transmitted RF energy and any radiated by electronics in the unit must meet the relevant RF emissions standards. Power output requirements go beyond the transmitter RF wattage, and **include the gain** of directional and omnidirectional antennas. This can make ensuring that the device is actually compliant an engineering challenge, especially with newer antenna technology such as MIMO. Use of pre-certified Wi-Fi modules can help add dual band functionality quickly, but still requires testing of the device as a whole to ensure that it meets FCC emissions requirements.

Global Certification for Global Market Compliance

FCC certification is necessary for Wi-Fi devices sold in the USA, with other similar requirements present in other countries including Canada, Japan, and European countries. Testing organizations such as Compliance Testing, LLC that offer certification to international standards can help simplify the process of bringing a product to the global market.

Combining Testing Skill with Engineering Expertise at Compliance Testing LLC

Compliance Testing LLC, a firm providing testing services and related consulting since 1963, consists of expert engineers who understand both advanced RF concepts and legal requirements. Our team can help you avoid penalties for transmitter problems and unintentional radiation issues that arise when your product hits the market. We can help you understand how to best engineer your product to meet FCC Part 15.407 standards, and provide worldwide testing resources for products intended for a global market. Contact us to get your device tested and certified to FCC standards.



07 FCC Part 15 Rules

FCC Part 15 provides the guidelines under which unintentional, intentional, or incidental radiators may be operated without an individual license. The regulations set limitations on the number of electromagnetic interferences that digital and electronic devices can produce. It also sets out the technical specifications for various types of devices under the FCC part 15 categories.

FCC Part 15 Rules

The following are some of the FCC Part 15 rules provided in the general Code Of Federal Regulations (CFR) for FCC Part 15 devices:

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- 47 CFR 15.1 - states that any radiator that emits radio energy, whether it is intentional or not, must be licensed except if it meets 47 CFR 15 or is otherwise exempted by the FCC. Notably, all digital devices operating at 9 kHz or higher must be regulated by the Federal Communications Commission (FCC) under its Part 15 regulations.
- 47 CFR 15.5 - directs that devices should not cause interferences and must accept any interference they receive. It also cautions manufacturers that any unapproved modification or changes to the device can void your authority to operate the devices.
- 47 CFR 15.5 - outlaws the intentional damped waver transmissions that unnecessarily occupy massive frequencies.
- 47 CFR 15.9 - disallows the operations of any part 15 device for purposes of eavesdropping unless all parties in a conversation consent or if it is intended for law enforcement
- **Rules on Class A & B devices emissions:** The FCC classifies unintentional devices as either Class A devices or Class B Devices. A Class A device is designed to be used in business or commercial environments. Class B devices are intended for use in residential environments. The FCC limits emissions for Class B devices to about 10 dB. The FCC requirements for the Class B devices are more restrictive than those of Class A devices because these devices are considered to have closer proximity to radio and television receivers. Class B devices include fluorescent lights, personal computers, and other popular home devices.
- **Unlicensed broadcasting:** The FCC prohibits unlicensed broadcasts on the TV broadcast bands unless intended for some medical telemetry devices. Additionally, the agency limits unlicensed broadcast on FM broadcasts to a field strength of 0.01 microwatts.
- **Design requirements:** An intentional or unintentional radiator must be designed and constructed per good engineering design and manufacturing practice. Manufacturers are required to suppress emanations from the device as much as possible. However, in no case should the emanations surpass the levels defined in the FCC rules.

- **Design adjustments requirements:** An intentional or unintentional radiator should be made so that adjustments of control by the user shall not cause the device to operate in violation of the regulations
- **Requirements for new applicants:** New applicants should apply for a Grantee Code. This Code is a unique identifier required on each end device and must be submitted as part of the final FCC ID. To obtain the Grantee Code, new applicants must send a letter stating the applicant's name, address, and a specific request for a grantee code. The letter must be accompanied by an FCC Form 159 ("Fee Advice Form") and a $45 processing fee.
- **Wearable devices requirements:** Any device intended to be worn on the part of a body should undergo the Specific Absorption Rate (SAR) testing.
- **Labeling requirements:** The FCC ID must be permanently labeled directly on the transmitter or on a permanently affixed tag. The device manufacturers must ensure the FCC ID label is readily visible to the purchaser at the time of purchase.
- **Testing and accreditation requirements:** An accredited laboratory like Compliance Testing must perform all FCC certification testing. Failure to comply with these requirements may result in an automatic rejection of the testing results by the FCC.

Get Professional Help

FCC sets out several rules that electronic device manufacturers must meet before their products are allowed into the market. Without the proper guidance from experts, ensuring that your products meet all the regulations can be challenging. At Compliance Testing, we are committed to fast-tracking the entire testing process to ensure your product meets all the FCC Part 15 regulations and reaches the market soonest.

Our top-notch laboratories are also fully equipped and accredited to conduct testing to various international requirements. Whether you are bringing intentional or unintentional devices to the market, we are ready to guide your Part 15 testing needed to market your product. **CONTACT US** today for more information about our testing processes.

About Compliance Testing

As an accredited testing service, Compliance Testing provides clients with the full testing services they need to achieve certification success. We have been providing worldwide compliance testing for FCC, IC and CE marks for over 50 years. We are able to offer services for the U.S., Canada, European Union, Australia/New Zealand, Korea, Japan and many others.

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