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EMC and the USA

A Quick Guide

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Authorities

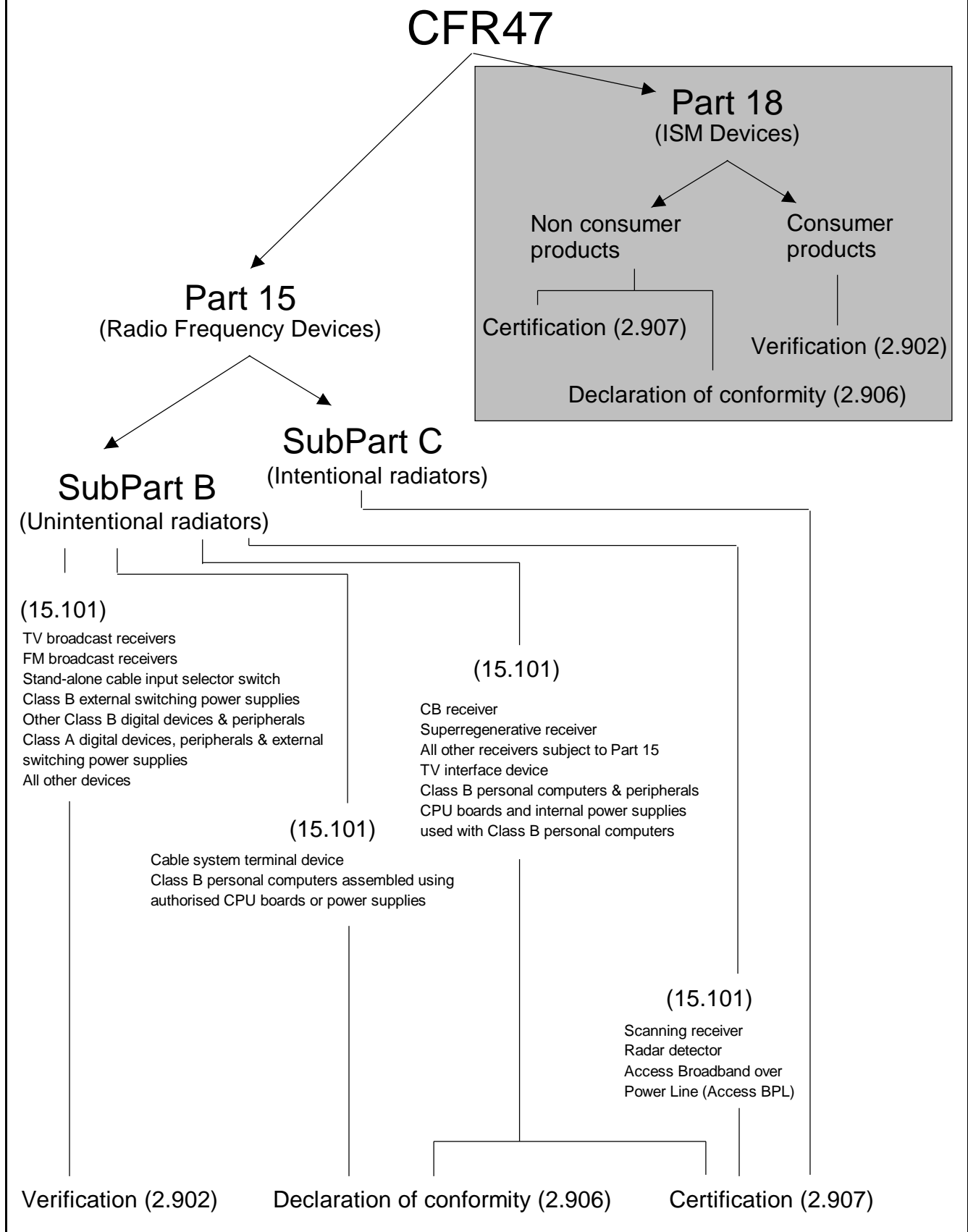
The Federal Communication Commission¹ (FCC) is the authority responsible for overseeing the authorisation of equipment using the radio frequency (RF) spectrum in the USA (this covers both intentional and unintentional transmitters). The Office of Engineering & Technology² is responsible for advising the commission on such matters.


Rules & regulations

The FCC rules and regulations are laid out in Title 47 of the Code of Federal Regulations (CFR47)³. This title consists of many parts, only a few of which are applicable to electronic equipment. The parts listed below are those to which we commonly test. Devices may not be imported and/or marketed until they have shown compliance with the technical standards which have been specified by the Commission.

- Part 2 - Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
- Part 15 - Radio Frequency Devices
- Part 18 - Industrial, Scientific and Medical Devices

Example Routes of compliance



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Routes of compliance explained^{3/4}

3 Verification (2.902)

The manufacturer is able to make measurements or take the necessary steps to ensure the product complies with the appropriate technical standards. There is no requirement to submit a sample unit or data to the Commission to demonstrate compliance. The manufacturer can therefore test the product themselves or test at a facility of their choice. Details of such testing should be kept on file and only need be produced if requested. A full description of the test facilities must also be kept unless tests are performed at a site whose details are filed with the FCC (e.g. dB Technology).

3 Certification (2.907)

This is an authorisation procedure whereby the Commission or, more commonly, a Telecommunications Certification Body (TCB) issues an authorisation following the submission of test data by the applicant. For certification, measurements must be made at one of the following:

- Y a site whose facilities are filed with the FCC (e.g. dB Technology)
- Y a site accredited under NVLAP (see below)

3 Declaration of conformity (2.906)

This is a process whereby a responsible party makes measurements or takes the necessary steps to ensure the product complies with the appropriate technical standards. There is no requirement to submit a sample unit or data to the Commission to demonstrate compliance unless specifically requested. A responsible party is a test house that has been accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) or one that has been designated by the Commission under a Mutual Recognition Agreement (MRA).

Can dB Technology complete my testing?

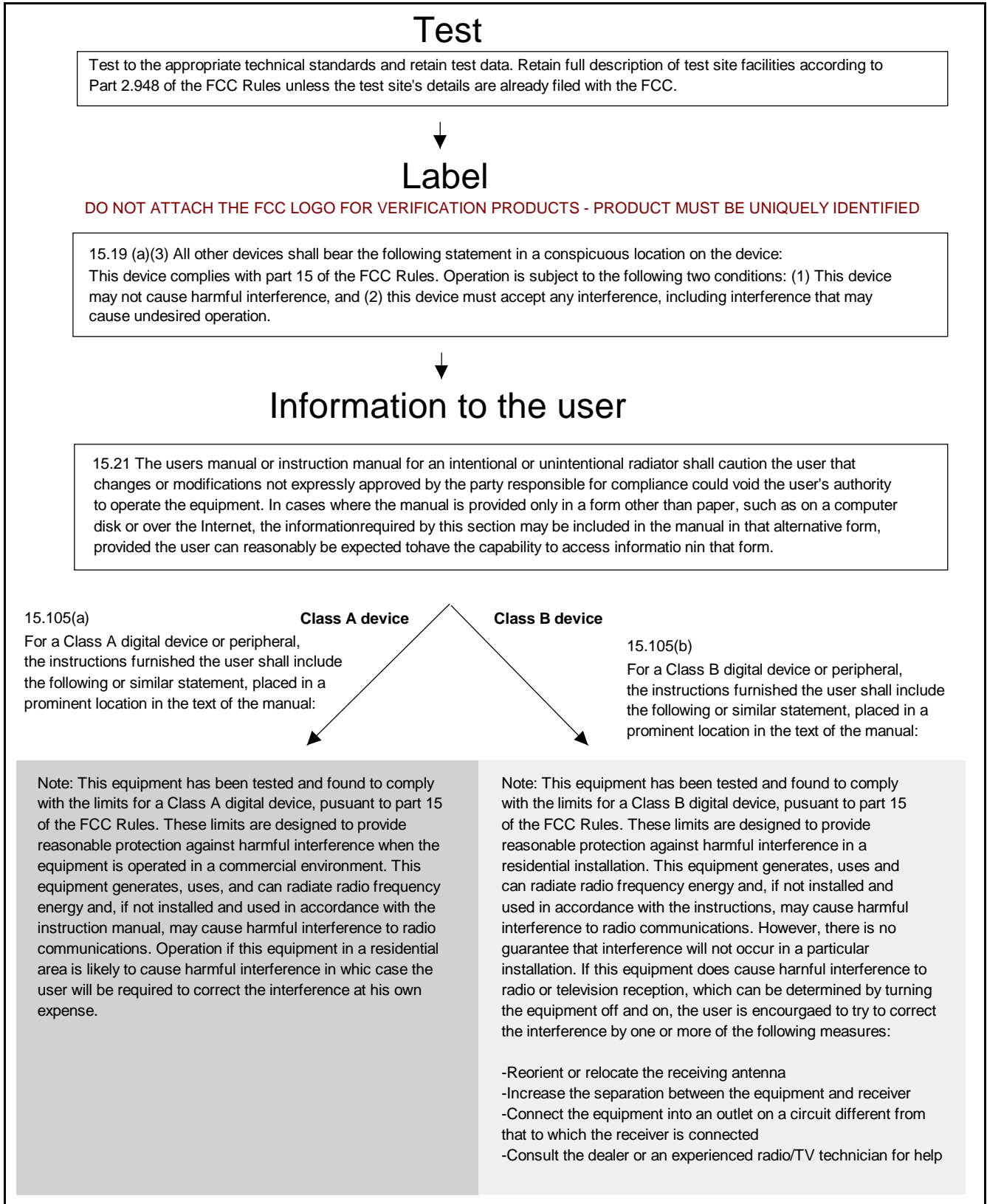
dB Technology has its test site description filed with the FCC (Reg: 90528) but is not accredited by NVLAP. This means that we have submitted the information required by Part 2.948 of the FCC Rules for measuring devices subject to Certification under Parts 15 & 18. We are therefore only able to operate the Verification and Certification requirements. For Certification the manufacturer will also need to involve a TCB. dB Technology will provide the test data required for vetting by the TCB, but all other parts of the application will need to be handled by the manufacturer.

A search of sites that either have details of test facilities filed with the FCC under the requirements of Part 2.948 or are accredited for FCC testing by NVLAP can be found at:

<https://gulfoss2.fcc.gov/oetcf/eas/reports/TestFirmSearch.cfm>

Flowchart for Part 15 SubPart B Verification

The majority of our customers will follow the verification route to FCC compliance. The following flowchart acts as a quick guide to ensure the correct process had been followed. Part numbers referenced from CFR47³.



How does testing to the FCC regulations differ to Europe for unintentional radiators?

When considering unintentional radiators there is really very little additional testing required if a manufacturer is already submitting a unit for testing to the European requirements. The USA has no requirements for immunity tests only emission tests. Although these tests will be carried out in order to meet European requirements it is necessary to repeat these tests with the unit powered from US mains voltage. The radiated emissions may also need to be tested above 1GHz depending on the maximum operating clock frequency of the unit under test.

Tests required	Emission tests	Immunity tests
Europe	<p>p</p> Radiated emissions 30MHz-1GHz Conducted emissions (UK mains voltage) Various other emission tests	<p>p</p> Radiated immunity Conducted immunity Various other immunity tests
USA	<p>p</p> Radiated emissions 30MHz - 1GHz (or more) Conducted emissions (US mains voltage) No other emission tests	<p>y</p> No requirements

How do I determine whether I need to test my unintentional radiator to Class A or Class B limits?

The USA have a very straight forward approach to limits. If the unit is to be marketed for use in a residential environment then Class B limits must be applied to the device (these limits are the most stringent limits to meet). If the device is to be marketed for use only in commercial/industrial/business environments then the Class A limits are sufficient. The following sections have been taken from CFR47³.

Class A Digital Device (15.3(h))	Class B Digital Device (15.3(i))
A digital device that is marketed for use in commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.	A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

Labelling and User Information

As with the European standards it is important to refer to the labelling and documentation requirements of the FCC.

Route of compliance	FCC logo	Other product label	Information to the user
Verification	y Do not attach to the product	p Must be attached to the product Refer to Part 15.19(a) for specific requirements or http://www.fcc.gov/oet/ea/labels.html#sec1 Unit must also be uniquely identified Refer to Part 2.954 (ID must not be confused with that required by Part 2.925 for Certification)	p Refer to Part 15.21 and 15.105 for specific requirements and add appropriate information to the user manual
Certification	y Do not attach to the product	p Must be attached to the product Refer to Part 15.19(a) and 2.925 for specific requirements or http://www.fcc.gov/oet/ea/labels.html#sec1	p Refer to Part 15.21 and 15.105 for specific requirements and add appropriate information to the user manual
Declaration of Conformity	p Must be attached to the product Refer to Part 15.19(b) for specific requirements or http://www.fcc.gov/oet/ea/labels.html#sec2	p Unit must be uniquely identified Refer to Part 2.954 (ID must not be confused with that required by Part 2.925 for Certification)	p Refer to Part 15.21 and 15.105 for specific requirements and add appropriate information to the user manual

Import documentation

You are required to fill out FCC Form 740⁵ when importing radio frequency devices to the USA (this includes both intentional and unintentional radiators). You must be careful when completing Part II of the form to put a cross in the correct box. Mark Box 1 if you have completed the Certification route. Mark Box 2 if you have gone through either the Verification or Declaration of Conformity routes.

Useful addresses

- | | | |
|----|-------------------------------------------------------------------------------------------------|----------------------------------------------------|
| 1) | http://www.fcc.gov/ | - home page of Federal Communication Commission |
| 2) | http://www.fcc.gov/oet/ | - home page of Office of Engineering & Technology |
| 3) | http://wireless.fcc.gov/rules.html | - link to electronic copy of CFR47 |
| 4) | http://www.fcc.gov/oet/ea/ | - link to equipment authorization help page of OET |
| 5) | http://www.fcc.gov/Forms/Form740/740.pdf | - link to electronic copy of FCC Form 740 |

This summary has been produced as a quick guide only, and reflects dB Technology's understanding of the EMC requirements of the USA at the date of issue.