Federal Communications Commission
Office of Engineering and Technology
Laboratory Division

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Draft Laboratory Division Publications Report

Title: Module Equip Auth Guide

Short Title: Module Equip Auth Guide

Reason: 996369 D01 Module Certification Guide v03 to be updated to v03 to allow Split modules for licensed devices. General Clarifications were added, and a PAG approval procedure for limited modules. Appendix A lists equipment classes to identify when modules are permitted or not. Added references to draft publication 447498 D01 General RF Exposure Guidance for Equipment Authorization DR05-44791 447498 and its future attachment D01 General RF Exposure Guidance v07 when published.

Publication: 96369 D01 Module Certification Guide v03

Keyword/Subject: Modules, Module Certification, 15.212

Question: What is the FCC guidance for equipment authorization of transmitter module devices, and equipment that incorporates transmitter modules?

Answer:

See the guidance for transmitter module devices in the following attachments:

996369 D01 Module Certification Guide v03 provides a guide for equipment authorization applications under Section 15.212 modular transmitters;

996369 D02 Module Q and A v01 provides additional guidance in a question and answer format;

996369 D03 OEM Manual v01r01 provides guidance to grantees (applicants) seeking to certify a modular transmitter (module) and the key elements to be reviewed by a Telecommunication Certification Body (TCB) during the certification process;

996369 D04 Module Integration Guide v02 provides guidance to host product manufactures.

Attachment List:

[996369 D01 Module Certification Guide v03](#)*
996369 D02 Module Q&A v01
996369 D03 OEM Manual v01
996369 D04 Module Integration Guide V02

* This Attachment being posted for draft review.

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TRANSMITTER MODULE EQUIPMENT AUTHORIZATION GUIDE

Introduction

This guidance supplements the module rule CFR 47 CFR 15.212[1]. A transmitter with a modular or limited modular grant[2] can be installed in different end-use products (also referred to as the host, host product, or host device). The host product may[3] not be subject to further Certification. However, the host product still needs to obtain other applicable equipment authorizations not covered by the module certification. Host manufacturers can save time and costs for equipment authorization compared to certifying the same transmitter multiple times when used in different host products.

A module can be certified in one of the following four configurations:

- **A single-modular transmitter:** a complete RF transmission assembly[4] designed to be incorporated into the host. The Grantee of the Module must demonstrate compliance to all requirements of §15.212(a)(1) (i) through (viii) independently of any host in a standalone configuration.

- **A limited single-modular transmitter:** a single-modular transmitter that complies with some, but not all, of the § 15.212(a)(1) (i) through (vii) requirements.

- **A split-modular transmitter:** an RF transmission assembly separated into a radio front-end(s) and a control-element section that can demonstrate compliance for a range of "similar type" hosts, as defined in the 996369 D05 Split Module attachment.

- **A limited split-modular transmitter:** a split-modular transmitter that cannot comply with some but not all of the requirements § 15.212(a)(2) (i) through (vi), and must be certified in "similar type" host(s), as defined in 996369 D05 Split Module attachment.

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[1] https://www.ecfr.gov/current/title-47/chapter-I/subchapter-A/part-15#15.212

[2] FCC Public Notice DA 00-1407 established policies that allowed for Part 15 unlicensed transmitter equipment authorization certification for a modular device; DA 00-1407 is now replaced by rules in Part 15. The Second Report and Order FCC 07-56 (Docket No. 03-201) established rules under Part 15 (§ 15.212 Modular Transmitters), provided clarification for modular grants, and set a new class for modular devices called split modular transmitters. FCC Public Notice DA 08-314 is a guide to help small businesses, small organizations (non-profits), small governmental jurisdictions, etc., comply with the § 15.212 rules.
[3] The term "may be subject to Certification" refers to the situation when a module, when used differently in a host for the condition that it was granted, a C2PC may be required. The Module is not subject to further Certification when used under the conditions it was granted.
[4] A module consists of a completely self-contained transmitter that is missing only an input signal and power source to make it functional. (FCC DA 08-314).

Module overview

Under 47 CFR 15.212 rules, a certified module is only allowed for part 15 transmitters. For equipment authorization, by policy, the provisions in this Knowledge Data Base Publication are also applicable to licensed transmitters, and therefore this publication covers both licensed and part 15 transmitters.

Module certifications do not apply to Part 15B unintentional radiators or Part 18 devices, and transmitter modules are not permitted for specific equipment classes, as listed in Appendix A.

Any host product using a module must also obtain the applicable part 15B equipment authorization for any unintentional radiators part with the module installed, even if the module stand alone is compliant and already authorized under part 15B[5].

A host product may not use a module while operating simultaneously with other transmitters, such as Bluetooth and Wi-Fi, either modules or not, without further regulatory compliance testing. This may either require the host manufacturer to evaluate compliance for simultaneous transmissions, or the module Grantee performing additional testing at an accredited lab followed by a Class II Permissive Change (C2PC) related to the operation in a specific host. More details on compliance testing are discussed in the EMC Considerations, and RF Exposure sections below.

Limited Module

If one or more, but not all, of the requirements of §15.212(a)(1) (i) to (viii) (e.g., shielding, buffered modulation/data inputs, power supply regulation) cannot be met, then the Module may be granted as a limited module.

The Grantee of a limited module must file with the application for certification a description[6] of the proposed method used to ensure host with the limited module installed is compliant . There is no specific format or template required for this filing. The Grantee can devise a strategy to be approved through a Pre-Approval Guidance (KDB Publication 388624 PAG item MODLIM) inquiry. Once approved, the same approval can be reused for additional modules by the same Grantee using the same method.

Integration Instructions.

Section 15.212(a)(1)(vii)) requires the module Grantee provides adequate integration instructions for host manufacturers. This ensures that host manufacturers are made aware of any restrictions and operational conditions required for using the module properly. Attachment 996369 D03 OEM Manual v01 provides guidance about what must be included in the application for equipment authorization.

The instructions shall describe all the applicable rule restrictions (e.g., indoor use, not used on aircraft, etc.) and RF exposure requirements for portable, mobile, and fixed-mount equipment configurations. In addition, the integration instruction shall inform the host manufacturer about what restrictions cannot be

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[5] For individual modules claiming compliance to 15B as an unintentional radiator, this authorization is not inherited by the host. The host must still test for 15B complainants with the module installed. Either under SDoC or certification as an initial authorization or a Class I or class II change.

[6] 47 CFR 15.212(b)

modified (such as indoor use, not used on aircraft), and about those that can (e.g., mobile to portable) along with the required process.

Filing Requirements

A modular grant is obtained by requesting Certification for equipment as a modular device. An applicant for a modular authorization must provide all the requirements as defined in § 2.1033 and in any KDB guidance applicable for the transmitter under consideration. In addition, the following is required:

- Selecting on the form 731 the appropriate modular approval type
- Additional Module exhibits containing:
  - A cover letter requesting modular approval that includes an itemized list documenting compliance with the modular approval requirements in the Section 15.212 rules for unlicensed modules, or the licensed module approval conditions in Section III of this document
  - An integration manual with detailed instructions describing host manufacturers' conditions, limitations, and procedures for integrating the Module (see 96369 D03 OEM Manual for guidance).
  - For split modular transmitters, details are provided in D05 Split Module guidance.
  - Non-Software Defined Radio transmitter modules must provide a technical description of how such control is implemented to prevent third-party modification (see KDB 594280).
  - Software Defined Radio (SDR) transmitter modules must provide a software security description (see KDB 442812).

RF exposure

KDB Publication 447498 D01 DR05-44791 provides guidance to determine RF exposure requirements related to module certifications. This guidance includes module certification for mobile and portable RF exposure configurations on standalone[7] vs. simultaneous transmission[8] modes. References to specific topics in KDB 447498 are summarized in Table .

KDB Publication 616217 guidance for a module on SAR evaluations for laptop and tablet computers. This guide discusses in more detail the case of modules that can be granted for use with externally-controlled power management (see Publication 616217 section 6.5) for a portable host with sensors located on the host, such as proximity sensors, orientation sensors, etc.

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[7] Standalone mode refers to a host that only uses a certified module, not with any other transmitter, transmitting simultaneously with the Module.
[8] Simultaneous transmission refers to a host using other transmitters simultaneously. The other transmitters may be another module or a transmitter part of the host.

Table 1. Reference Guide to 447498[9]	
General Module RF exposure Requirements for Host environments	Sections 1.6
Module Certification	Section 4.1
Module Integration Stand-alone	Section 4.2
Module Integration Simultaneous	Section 4.3
2.1091-Mobile	Section 6
Fixed installations	Section 6.1.3
Change RF exposure conditions	Sections 4.1.3

EMC Considerations

For standalone mode, the guidance in D04 Module Integration Guide recommends[10] that host manufactures use best RF engineering practices to confirm continued compliance with EMC requirements, by evaluating the module transmitter operating in the host.

An EMC evaluation test is required for simultaneous transmissions[11], see D02 Module Q&A Question 12, that is considered sufficient to confirm compliance.

The evaluation test shall be performed with all devices operating, including unintentional (15B) radiators, for both the standalone and simultaneous cases. If the evaluation testing confirms that no emissions exceed the limit of any individual transmitter or unintentional radiator (i.e., § 2.947), no additional C2PC is required. If any emission exceeds an applicable limit, the host manufacturer must provide corrective actions to bring the device intp compliance.

PERMISSIVE CHANGES

Only Grantees are permitted to make permissive changes. See KDB 178919 Permissive changes. Changes from a non-modular to a modular and from a full modular to a limited modular are permitted (see also KDB Publication 178919).

A host manufacturer that wants to make permissive changes must have the Grantee make the changes or request permission from the original Grantee to file a Change-in-ID (see KDB 249634). After the change in ID is approved by a TCB, the host manufacturer is authorized to make permissive changes.

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[9] Reference to 447498 D01 General RF Exposure Guidance for Equipment Authorization DR05-44791.pdf or published or 447498 D01 General RF Exposure Guidance v07 or later.

[10] For standalone mode, although not required by the rule, a host manufacture can use D04 Module Integration Guide recommending "best practice" RF design engineering testing and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement to host components or properties.

[11] Since the module was not certified with any other transmitters for simultaneous transmission, a C2PC or new FCC ID would typically be required by the Grantee. However, KDB policy permits, by D02 Q&A Q12, that a host manufacture only needs to do an evaluation (i.e., no C2PC required when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite (i.e., § 2.947). The host manufacturer must fix any failure.

Changes from a non-modular to modular certification, and from a full-modular to a limited-modular certification are permitted if the changes meet the requirements in § 2.1043 (also see KDB Publication 178919), as well as the modular approval requirements discussed above.

SELECTED RELATED KDB PUBLICATIONS

- KDB Publication 178919 Permissive Change Policy
- KDB Publication 388624 Pre-Approval Guidance procedures and list
- KDB Publication 442812 SDR Apps (Application) Guide
- KDB Publication 447498 RF exposure in equipment authorizations
- KDB Publication 594280 Software Configuration control
- KDB Publication 616217 RF exposure for laptop and tablet computers
- KDB Publication 784748 Labeling requirements

Change notices:

02/03/2011: 996369 D01 Module Equip Auth Guide v01 has been changed to 996369 D01 Module Equip Auth Guide v01r01.
1. Minor editorial changes have been made to correct spelling and grammar.
2. Answer to Question 1 B has been changed - Change in ID Certification (Section 2.933) - to clarify that an applicant can only file for a change in ID for a certified module if they have written permission from the original Grantee.
3. Question 10 has been added - must the shield enclose the entire module.
4. Question 11 has been added – a device that uses a micro-strip trace in the antenna design.

06//17/2011 996369 D01 Module Equip Auth Guide v01r01 has been changed to 996369 D01 Module Equip Auth Guide v01r02.
1. Clarification added in the filling requirements for software configuration controls for non-Software defined radios and software defined radios.
2. Changes made IV. RF Exposure Considerations to for RF exposure requirements for modules.
3. Changes made to question 11 to reiterate and clarify question 11 for RF exposure and OEM instructions.

07//12/2011 996369 D01 Module Equip Auth Guide v01r02 has been changed to 996369 D01 Module Equip Auth Guide v01r03
996369 D01 Module Equip Auth Guide v01r02 was mislabeled in the footer as 996369 D01 Module Equip Auth Guide v01r01. This version 996369 D01 Module Equip Auth Guide v01r03 updates the footer to agree with the current posted version and revision. No other changes have been made.

10//31/2013: 996369 D01 Module Equip Auth Guide v01r03 has been changed to 996369 D01 Module Equip Auth Guide v01r04 . Split Module applications were removed from the exclusion list (KDB 628591) and added to the Permit but Ask (PBA) list (KDB 388624). Section VII Permit but Ask Guidance for Split Modular Transmitters above was added for providing PBA guidance.

10/23/2015: 996369 D01 Module Equip Auth Guide v01r04 has been changed to 996369 D01 Module Equip Auth Guide v02.
1. The module Q&A section of 996369 D01 Module Equip Auth Guide v01r04 has been moved to a separate attachment 996369 D02 Module Q&A.

2. Questions 12 and 13 are added to 996369 D02 Module Q&A about misc. multi-transmitter operations.
3. Question 14 added about USB dongles as example integrated within end products.
4. Clause I modified by moving the first bulleted list to end of the clause.
5. Footnote 1 amended to remind that DA-00-1407 obsolete because it is superseded by 15.212.
6. Change notation from PBA to PAG.
7. Misc. basic editorial cleanups.
8. Clause numbering adjusted after adding number for integration instructions clause.
9. Clause IX added about host product considerations.

10/25/2022: 996369 D01 Module Equip Auth Guide v02 has been changed to 996369 D01 Module Equip Auth Guide v03. v03.chamnges allow Split modules allowed for licensed devices, added PAG approval procedure for limited modules, List of Equipment Classes as Appendix A for modules not permitted, additional clarification on RF exposure referencing for publication 447498 D01 General RF Exposure Guidance for Equipment Authorization DR05-44791 or when draft is published as 447498 D01 General RF Exposure Guidance v07.

Appendix A Modules Permitted (Y) or Not Permitted (N) by Equipment Class

code	Description	Module Permitted
5GM	Part 30 Mobile Transmitter	N
5GT	Part 30 Transportable Transmitter	N
6PP	15E 6 GHz Subordinate Indoor Device	N
B2I	Part 20 Industrial Booster (CMRS)	N
B2P	Part 20 Provider-Specific Consumer Booster (CMRS)	N
B2W	Part 20 Wideband Consumer Booster (CMRS)	N
B9A	Part 90 Class A Industrial Booster (non-SMR)	N
B9B	Part 90 Class B Industrial Booster (non-SMR)	N
BOS	All other signal boosters other than 20.21/90.219	N
DWM	Part 15 Wireless Microphone	N
5GB	Part 30 Fixed Transmitter	Y
6CD	15E 6 GHz Low Power Dual Client	Y
6ID	15E 6 GHz Low Power Indoor Access Point	Y
6XD	15E 6 GHz Low Power Indoor Client	Y
8CC	Part 18 Consumer Device	Y
AIS	Automatic Identification Systems	Y
AMP	Amplifier	Y
BPL	Access Broadband Over Powerline System	Y
CBD	Citizens Band Category A and B Devices	Y
CBE	Citizens Band End User Devices	Y
CRD	Part 15 Radar Detector	Y
CRR	Superregenerative Receiver	Y
CSR	Scanning Receiver	Y
CXX	Communications Rcvr for use w/ licensed Tx and CBs	Y
CYY	Communications Receiver used w/Pt 15 Transmitter	Y
DCD	Part 15 Low Power Transmitter Below 1705 kHz	Y
DSC	Part 15 Security/Remote Control Transmitter	Y
DSR	Part 15 Remote Control/Security Device Transceiver	Y
DSS	Part 15 Spread Spectrum Transmitter	Y
DTS	Digital Transmission System	Y
DXX	Part 15 Low Power Communication Device Transmitter	Y
EAD	Part 11 Emergency Alert Devices	Y
EAV	Part 15 Automatic Vehicle Identification System	Y
ETB	Part 15 Cordless Telephone Base Transceiver	Y
ETR	Part 15 Cordless Telephone Remote Transceiver	Y
ETS	Part 15 Cordless Telephone System	Y

code	Description	Module Permitted
FAP	Part 15 Anti-Pilferage Device	Y
FDS	Part 15 Field Disturbance Sensor	Y
FRB	Part 95 Family Radio Base Transmitter	Y
FRE	Part 95 Family Radio Ear Held Transmitter	Y
FRF	Part 95 Family Radio Face Held Transmitter	Y
FRT	Part 95 Family Radio Body Worn Transmitter	Y
GAT	Part 15 Auditory Assistance Device (Transmitter)	Y
GEP	406 MHz EPIRB	Y
GHF	Part 80 HF Transmitter (GMDSS)	Y
GHH	Part 80 VHF Hand Held Transmitter (GMDSS)	Y
GMF	Part 80 MF Transmitter (GMDSS)	Y
GVH	Part 80 VHF Transmitter (GMDSS)	Y
HID	Part 15 TV Interface Device	Y
JAB	Part 15 Class B Digital Device	Y
JAD	Part 15 Class A Digital Device	Y
JAV	Other Non-Digital SDoC Devices	Y
JBC	Part 15 Class B Computing Device/Personal Computer	Y
JBP	Part 15 Class B Computing Device Peripheral	Y
LMS	Part 90 Location & Monitoring Transmitter	Y
LPR	Level Probing Radar	Y
MRD	Marine Radar	Y
MWR	Part 80 Marine Watch Receiver	Y
NII	Unlicensed National Information Infrastructure TX	Y
PCB	PCS Licensed Transmitter	Y
PCE	PCS Licensed Transmitter held to ear	Y
PCF	PCS Licensed Transmitter held to face	Y
PCT	PCS Licensed Transmitter worn on body	Y
PLB	Personal Locator Beacons	Y
PUB	Part 15 Unlicensed PCS Base Station	Y
PUE	Part 15 Unlicensed PCS portable Tx held to ear	Y
PUF	Part 15 Unlicensed PCS portable Tx held to face	Y
PUT	Part 15 Unlicensed PCS portable Tx worn on body	Y
RNV	Part 80 NAVTEX Receiver	Y
SRT	Radar Transponder	Y
SSA	Ship Security Alert Systems (SSAS)	Y
TBC	Licensed Broadcast Station Transmitter	Y
TBF	Licensed Broadcast Transmitter Held to Face	Y
TBT	Licensed Broadcast Transmitter Worn on Body	Y

code	Description	Module Permitted
TDC	Part 80 DSC Controller	Y
TLD	Licensed LPAS Device	Y
TNB	Licensed Non-Broadcast Station Transmitter	Y
TNE	Licensed Non-Broadcast Transmitter Held to Ear	Y
TNF	Licensed Non-Broadcast Transmitter Held to Face	Y
TNT	Licensed Non-Broadcast Transmitter Worn on Body	Y
UWB	Ultra-Wideband Transmitter	Y
VRD	Part 95 Vehicular Radar Systems	Y
WBT	Wideband Transmitter	Y
WG1	White Space Device with Geo-location- Mode 1	Y
WG2	White Space Device with Geo-location- Mode 2	Y
WGF	White Space Device with Geo-location- Fixed	Y
WIT	White Space Device Narrowband	Y
WMO	White Space Device Mobile	Y
WS1	White Space Device with Sensing-Mode 1	Y