



Modular Transmitter Approvals

KDB 996369

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Module Topics

- Modular Policies and Guidance (KDB 996369)
 - General Overview
 - General
 - Eight Requirements of 15.212
 - Four Physical Configurations.
 - Licensed Module Considerations.
 - Note: Antenna EIRP / ERP OOB Discussion
 - RF Circuitry Must be Shielded
 - Types of Antennas
 - Note: Trace & Chip antenna
 - Note: Licensed versus Unlicensed
 - Module Labeling
 - OEM Instruction Requirements
 - Multiple Transmitters in a Host



General Overview

- Modules are applicable for Part 15 Transmitters under Section 15.212
- Licensed transmitters are permitted by interpretation see KDB 996369
- A modular grant only reduces the testing and equipment authorization procedures associated with the module. A host product is still required to comply with all other applicable FCC equipment authorizations procedures when the module is installed. It should be noted that many modules include Part 15B functions that the host manufacture must take into consideration for compliance to Part 15B requirements.
- Modules are tangible, clearly delineated, devices and cannot be the implementation by a design.
- A transmitter can be certified as a module and also marketed as an end product (computer peripheral) only if it is end-user accessible and plug-in replaceable.



Compliance to Eight Requirements of 15.212

- RF circuitry must be shielded. *
- Buffered modulation/data inputs. Module must inherently ensure compliance under host fault (watch-dog) conditions.
- Power supply regulation on the module. Module must inherently ensure compliance under stressed/abnormal host power conditions.
- Must have a permanently attached antenna, or unique antenna connector.*
- The module must demonstrate compliance in a stand-alone configuration.*
- The module must be labeled with its permanently affixed FCC ID label, or use an electronic display. *
- The grantee must provide comprehensive instructions to explain compliance requirements.*
- The module must comply with RF exposure requirements.

* Discussed further in following charts.



Four Physical Grant Configurations for Demonstrating Compliance:

- Single-modular transmitter - independent of any host
 - Compliance to all 8 requirements of 15.212 rules is demonstrated in a standalone open configuration.
- Limited single-modular transmitter.-constrained to specific operating host or grant conditions,
 - Module Needs to be constrained in a specific host or environment for demonstrating compliance to the 8 requirements of 15.212.
- Split-modular transmitter- separated into a radio front-end section and a control-element section for a range of similar type hosts, but not constrained to specific operating host.
 - Split module can demonstrated compliance to the 8 rules of 15.212 in an open platform that simulates an abundance of different host products.
- Limited split-modular transmitter: separated into a radio front-end section and a control-element section constrained to specific operating host or grant conditions to comply with the 15.212 rules.
 - Limited split modules is constrained to specific type hosts for fulfillment of the 8 requirements of 15.212 .



Licensed Modules

See Interpretation in KDB 99369

- Applications for Licensed modules are Permitted for the following conditions:
- Single or limited-single modules only- split single or I split limited- not permitted
- Section 15.212 can be used as a guide to determine compliance
- Clear instructions describing the other party's responsibility to obtain station license
- A licensed module must have a FCC ID label on the module itself.
- The maximum antenna gain to ensure compliance with licensed rules, such as EMC (e.g. EIRP, PPSD limits),
 - The grantee is responsible to ensures that all antennas as used in host are in compliance with Power/EIRP/ PPSD & OOB limits for the applicable rule parts.
 - **Provide comments on Draft KDB:**
 - Test configurations for different types of licensed modules
 - Test required (conducted, radiated)
 - Limitations on conditions of use for Host manufactures
 - Required Instructions to Host manufactures on antenna conditions.
 - (Provide input by submitting KDB inquiry on the topic)



RF Circuitry Must be Shielded

- RF circuitry must be shielded even if the module meets the limits in a stand alone configuration without any shielding.
- The shielding must fully enfold the RF circuitry
 - That includes shielding the top, all sides and the bottom.
 - Shielding must be expressly designed as an effective shield made of materials such as sheet metal, metal mesh, or a metallic ink coated material.
 - The bottom may be a shielding ground plane.

Note: A monolithic integrated circuit (known as IC, chip, etc) packaged in a material expressly designed as an effective shield for use over a shielding ground plane, that can meet the eight requirements of 15.212 and provide antenna connections via a trace to an antenna (see next chart) can be considered a module.



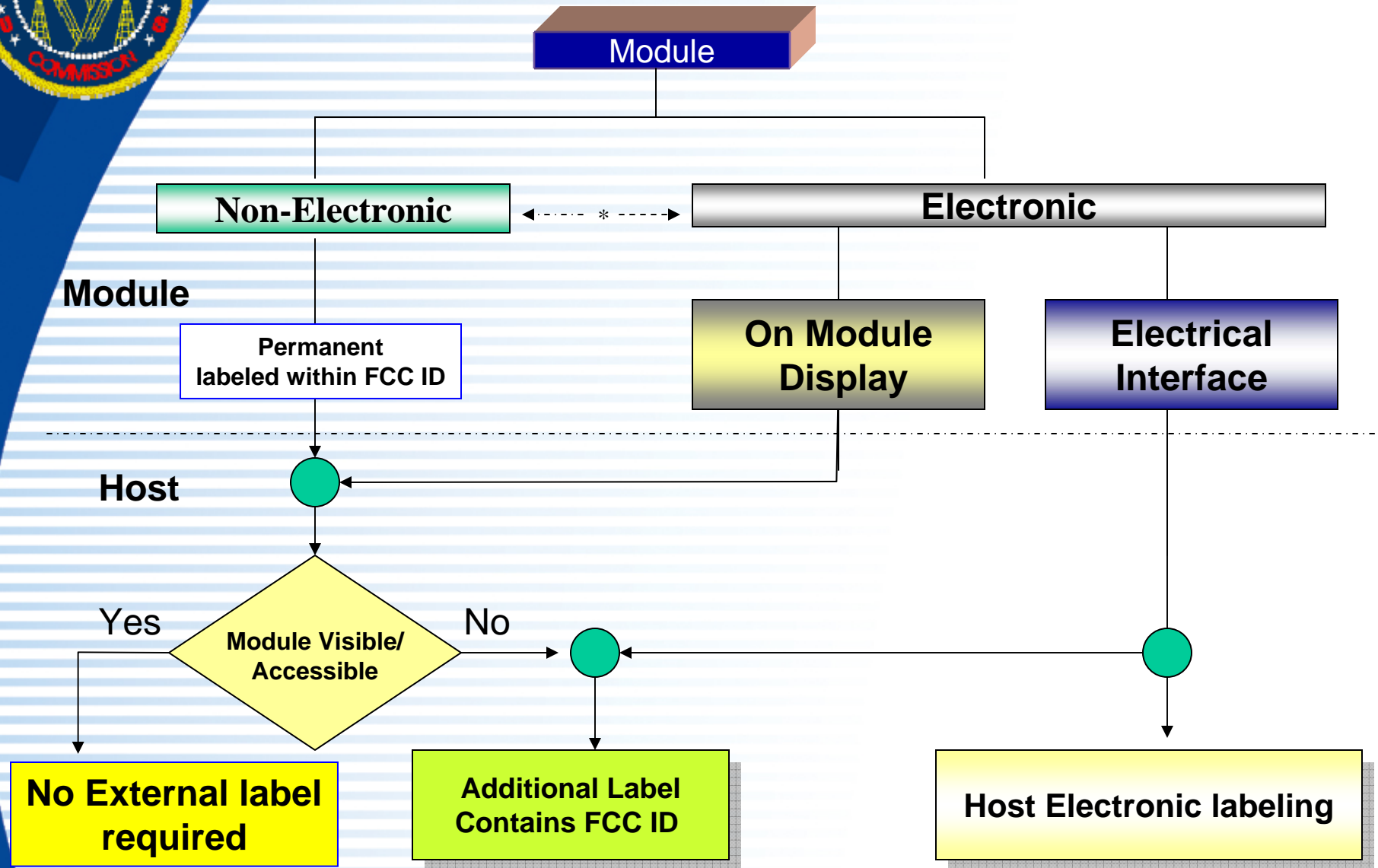
Permanently Attached Antenna/Connector

Types	Part 15 Devices	Licensed Devices
Antenna on Module	Sections 15.203, 15.204, 15.204(c), 15.212(a),	Demonstrate Power/EIRP/PPSD limits as applicable to the rules. Seeking inputs to help provide more detail guidance see slide on Licensed Modules.
Connector on module <ul style="list-style-type: none"> • Cabled to Antenna • Cabled to Antenna Host Connector 		
Trace connection off Module ** <ul style="list-style-type: none"> • to Antenna (chip) • Trace to Antenna Connector • to Antenna Trace 		

** Trace layout details required in filling –**see question 11 of KDB 996369**



Module Labeling





OEM Guidance

- Comprehensive instructions for the Host manufacture must be included in the Form 731 exhibits
- Example:
 - RF exposure -all necessary details for ensuring compliance for RF exposure requirements
 - Hearing-aid compatibility,
 - Limitations of with specific antennas,
 - specific host/enclosure configurations.
 - Limitations on Mobile/portable Distances
 - Co-location with other transmitters.
 - Any other conditions and limitations for authorized uses.
 - **Software drivers and consideration for unauthorized protocol stacks that can violate compliance.**
 - **Grantee is responsible for documenting-as a condition of use- any required software/operating conditions that must not be violated.**



Multiple Transmitters in a Host

- A Host provider can only use collocated transmitters operating simultaneously if all the module's or transmitters have been granted without restriction of co-location of multiple transmitters.
- Restricted modules for collated transmission use must be clearly documented in the OEM instructions for the Host manufacture.
- The Grantee can apply for a Class II permissive change, to remove this restriction by submitting the applicable simultaneous transmission test (RF exposure and EMC may be necessary) procedures.
- Other parties that need to remove restrictions can (see question 1 of KDB 996369):
 - Request Grantee to make the Class II Change.
 - File for new FCC ID
 - File for a change in ID



Questions and Answers

Thanks!