



**Federal Communications Commission  
Office of Engineering and Technology  
Laboratory Division**

October 24, 2023

**MODULE FREQUENTLY ASKED QUESTIONS**

**Question 1:** What options are available for parties other than the original grantee to apply for changes to an existing modular grant?

**Answer 1:** When using a module in a host device the actual end-use configurations often require changes in the authorization of the device that has been granted as a module. The following options are available for certified modules:

**a) New Certification Application (i.e., approved under a new FCC ID):**

- 1) Obtain a new certification for the entire host including the module, or obtain a new certification for the module. The new party is responsible for full compliance with all applicable rules for the new grant. There are no vested or transferable conditions in the original grant (initial grant or permissive changes) that are conveyed to the new grant. The new party must follow all the engineering and operation guidelines as specified by the original grantee.
- 2) For the new filing, it is permissible to upload relevant test reports from the original module filing, if they accurately represent test results under the new conditions described in the new application(s). When original results are used, the new applicant must provide a statement and explanation that the original test reports accurately represent test results under the new conditions. For each original test report, this statement must list the associated FCC ID, specific test report identifiers, and a description explaining how the report accurately represents test results under the new conditions. All exhibits for uploaded original test reports must represent the new device in its entirety. The module must be identical for the original tests to apply. Thus, the original test report exhibit must, in its entirety, be the same as the test report contained in the original filing. A reference to only a section of an original test report, or uploading only a portion of an original test report, is not permitted. However, certain test data may be re-used if properly justified. For instance, conducted signal tests may be re-used if the power is verified to be the same. Any changes to hardware, hosts or co-location configuration require new radiated emission testing and SAR evaluation and/or testing.
- 3) A new test report may be needed to demonstrate full compliance under any new conditions of use. This includes testing to demonstrate compliance with new grant conditions that remove the previously limited conditions. For example: Limitations on simultaneous transmission conditions may be modified to include additional transmitters; or Restrictions that limit the use to a specific host may be changed to include additional hosts.

**b) Application for a Change of the FCC ID (Section 2.933).**

- 1) An applicant can only file for a change in FCC ID for a certified module if they have written permission from the original grantee. The written permission from the original grantee shall be filed as a cover letter exhibit with the change in FCC ID application and shall be signed or endorsed by an authorized representative of the original grantee.
- 2) The party filing for the change in FCC ID may subsequently file a Class II permissive change to amend the grant and expand the operating environments tested by the original party, which was

not covered in the original grant. In some cases, the original grantee may be willing to file the permissive change, making the change in FCC ID unnecessary.

---

**Question 2:** How are U-NII modules with Dynamic Frequency Selection (DFS)/radar detection capability handled?

**Answer 2:** U-NII modular devices with radar detection are typically filed as limited modules covering the specific receive antennas used with the device. The performance of radar detection is affected by the receive antennas and therefore the module approval is limited to the specific host / antenna used for the DFS compliance tests. However, standalone module approval can be obtained for devices with radar detection capability on a case-by-case basis. Further, the U-NII devices must also comply with the additional guidance in KDB Publication 443999.

---

**Question 3:** Can unlicensed Part 15 transmitter modules and antennas be marketed separately?

**Answer 3:** Yes, the radio component portion of a transmitter module and its associated antennas may be marketed separately, but only if the module and antenna incorporate an authentication protocol to ensure that only authorized modules and authorized antennas work together.

---

**Question 4:** Can Part 15 transmitter modules and associated antennas be sold separately when the certification authentication protocol is performed by the host?

**Answer 4:** It is permissible to rely on the host to provide compliance with the authentication requirement between the certified module and the associated antenna. The certified module shall not transmit until the host authentication ensures that the proper certified antenna is present. The grantee is responsible for providing the authentication protocol, and must also provide clear instructions to the host manufacturer on integration of the code within the host to ensure compliance.

---

**Question 5:** Can a grantee obtain a limited modular approval for a transmitter that operates under specific host conditions and is installed by end users?

**Answer 5:** Yes, for user-installed limited module transmitters in a host (e.g., tablet and laptop computers.), a two-way certification authentication protocol or two-way BIOS lock implementation is required to ensure compliance. This ensures the module verifies that the proper host is used, and the host verifies that the proper module is used.

The Grant condition must state: “This device must use a BIOS lock mechanism which ensures that it only operates with hosts as specified in the certification filing.” This ensures that the module verifies that the proper host is used, and the host verifies that the proper module is used. For guidance on RF Exposure considerations, see KDB Publication 996369 D01.

Other options to a BIOS lock mechanism may be considered, but the method must be agreed to by the FCC prior to TCB approval.

---

**Question 6:** Can end users install transmitter modules into a laptop computer that has an integrated antenna built into the laptop screen, or on the motherboard?

**Answer 6:** Yes. However, since the antenna is built into the laptop screen or on the motherboard and the module cannot be tested as a stand-alone module, it can only be approved as a limited module. Further,

the approval requires a two-way certification authentication protocol between the host and the module. See answer 5 above.

---

**Question 7:** Can a module be a reference design layout intended as a portion of a host and integrated onto the host board during assembly?

**Answer 7:** No, this is considered to be a reference design, not a physical discrete component, and is not permitted.

---

**Question 8:** Can a module be approved as a Software Defined Radio (SDR)?

**Answer 8:** A physically delineated, tangible module may be approved as SDR if it meets all the security requirements imposed by Section 2.944, in addition to the requirements for a modular transmitter. The host manufacturer or the OEM integrator must not be able to modify the RF parameters or configuration options of the module through software. See KDB Publication 442812 and the attachment for additional information.

---

**Question 9:** What are the requirements for using a certified device inside another enclosure or inside another device, without having to re-certify the device in the new enclosure or device under a new FCC ID?

**Answer 9:** If the transmitter is certified as a module, it may be integrated or used inside another device. No further approval is required when the module is used in accordance with the FCC grant conditions, and any limitations or usage conditions required by the manufacturer's instructions, as discussed in this publication and labeled as discussed in KDB Publication 784748.

See KDB Publication 178919 for further guidance on changing the enclosure or permitting the use of a certified device that has not been approved as a module.

In both cases above, compliance with all grant conditions must be observed. For example: adherence to the grant condition that states that this transmitter cannot be co-located with other transmitters; or the transmitter cannot be used within a certain distance from the body of a user or nearby persons. In addition, other electronic functions not associated with the certified module or certified transmitter may require additional equipment authorization.

---

**Question 10:** To qualify as a module, must the shielding enclose the entire module or just the RF circuitry? If the module can meet the technical standards in a standalone configuration without shielding, is this acceptable to qualify the module as a module?

**Answer 10:** In order to qualify as a module, the RF circuitry must be shielded even if the module meets the limits in a standalone configuration without any shielding. The shielding design must fully encompass the RF circuitry – that includes shielding the top, all sides, and the bottom of the RF section. The bottom may be a shielding ground plane, and must be expressly designed as an effective shield made of materials such as sheet metal, metal mesh, or a metallic ink coated material. Any holes in the shield must be significantly smaller than the wavelength of the radiation that is being blocked, to effectively approximate an unbroken conducting surface.

The shielding of the RF section is to help prevent RF coupling when installed in a host. Other circuitry such as flash memory, a temperature-sensor, input voltage regulators, input data buffering circuits, etc., may not be RF, and therefore need not be shielded. However, the grantee must use good engineering judgment to reduce any possible RF coupling that might affect a host.

---

**Question 11:** Can a module be certified where the host device uses a microstrip trace on the host's printed circuit board to an antenna connector or a trace antenna on the host circuit board?

**Answer 11:** The following provisions apply for both unlicensed device and licensed device modular approvals.

A modular transmitter may be certified when the connection to the antenna is made through a host's printed board microstrip trace layout to an external connector, trace antenna, or component (chip) antenna on a printed circuit board (herein referenced as "trace design"). This can be extended to include passive parts for antenna attenuation padding, impedance matching, or providing test ports. Other components, such as amplifiers and active drivers, are not considered a trace layout and must be contained in the module.

The certification application shall include detailed engineering reference dimensions for the trace design, in addition to the required OEM instructions (see KDB Publication 996369 D01) for all trace designs approved with the module. In particular, the integration instructions shall include the following:

- a) Trace layout and dimensions including specific designs for each design:
  - 1) Layout of trace design, parts, antenna, connectors, and isolation requirements.
  - 2) Boundary limits of size, thickness, length, width, shape(s), dielectric constant, and impedance must be clearly described for each type of antenna.
  - 3) Different antenna length and shapes affect radiated emissions, and each design shall be considered a different type; e.g., antenna length in multiple(s) of frequency wavelength and antenna shape (traces in phase) can affect antenna gain and must be considered.
  - 4) The above data is to be provided by a Gerber file (or equivalent) for PC layout.
- b) Test procedures for design verification.
- c) Production test procedures for ensuring compliance.

Only trace designs approved with an original grant or through permissive change can be used by an OEM. PCB circuit designs have an increased potential for design mishandling, and are susceptible to cross-talk and increased unintentional radiation. The applicant must provide compliance test data for all antenna circuit trace designs being marketed or used. Different antenna length and trace layouts can affect radiated emissions, and each design shall be considered a different type.

For demonstrating compliance, when not limited to a specific host, a standalone reference PCB test board design that is representative of the worst-case boundary limits (as constrained by the design rules documented in the integration instructions) for each trace design (type) shall be used.

For SAR consideration, the most recent test procedures and guidance must be followed, as discussed in KDB Publication 996369 D01 and all the relevant KDB publications, and in particular the conditions defined in KDB Publication 447498.

It is recommended that the grantee have an agreement with the host manufacturer to build the device in accordance with any necessary instructions to ensure compliance.

Grant comment: "This module can only be used when installed in a host device that follows the required instructions for use of a trace reference design."

The integration instructions must contain language stating that this module's FCC certification is only valid when the manufacturer/integrator adheres to the trace reference design guidance as provided in this integration instruction.

If the trace reference design information is held confidential as part of the operational description, the grantee must provide a procedure for integrators to access sufficient information, even if properly redacted to protect intellectual property and sensitive content.

---

**Question 12:** Aside from RF exposure evaluation considerations (which are covered in, e.g., Question 13), is there guidance for multiple certified *transmitters with modular grant of certification* (hereafter referred to as *Modules*) when integrated in a host and transmitting simultaneously in the same or different bands?

**Answer 12:** The host manufacturer or integrator (hereafter referring to the *host responsible party* for the compliance to the Equipment Authorization rules applicable to the host device in accordance with Clause IX in KDB Publication 996369 D01) is responsible for compliance with the applicable FCC rules and Equipment Authorization published procedures for all the transmitters in the host, both operating individually and simultaneously. This includes compliance for the summation of all emissions from all outputs occupying the same or overlapping frequency ranges, as defined by the applicable rules.

For EMC/radio-parameter compliance purposes, an evaluation may be done by the grantee *host responsible party*.

The *host responsible party* integrator must perform EMC testing of the Module in simultaneous-transmission operations while integrated in the host. It is not necessary to file the result of these simultaneous transmission test data if no emissions with increased amplitude and/or on different frequencies as compared due to what is reported in the modular grant (that refer to, single-transmitter operations testing) are detected. This comparison is considered acceptable if:

- any detected variations are within the overall tolerance of the test equipment used by the *host responsible party*,

and

- compliance would be still demonstrated for the overall tolerance of the test equipment used by the *host responsible party* (this to prevent purposely the use of an excessively high tolerance test equipment).

For instance, if the *Module* EMC emissions, as reported in the grant of certification, are 0.5% below the compliance limit (or equivalent value in dB) for a particular frequency, and the *host responsible party* instrumentation tolerance is shown to be 1%, then the host responsible party cannot claim that the operation of the module in the host are compliant.

If additional emissions originating from the simultaneous transmission operations are present (within the provision just discussed above), the *host responsible party* is required to account for those emissions in the equipment authorization documentation. In the case of a host authorized via SDoC, the pertinent document of record shall be included the additional compliance data and retained according to 47 CFR §2.906.

For hosts that utilize the certification Equipment Authorization procedure, the proper test report exhibit(s) shall be updated following a Class II permissive change related to the host certification filing. An exception to this requirement is for hosts that are certified as Unintentional Radiators, under Part 15 B. For these cases, per KDB 447498, the certification of the unintentional radiator does not require the filing of an RF exposure report. Therefore, since no change in the RF exposure exhibits is made, the Class 2 Permissive Change is not required.

**Question 13:** As described in the following three questions, what are the RF exposure procedures to be followed when integrating transmitters with modular grant of Equipment Authorization via the certification procedure (hereafter referred to as *Modules*) in hosts that lead to conditions of operation different from those for which the *Module* was certified?

More specifically, there are three cases being considered:

**QUESTION 13A).** A transmitter *Module* certified as *2.1091-mobile* configuration is integrated into a host, and by the virtue of its design the host will always operate the *Module* in stand-alone conditions, i.e., without any other transmitter in the host (if any) operating while the *Module* is transmitting. What are the *Module* integration requirements if the host design and operations require that the host is classified as *2.1093-portable* device?

**ANSWER 13A):** The *2.1091-mobile* configuration of the *Module* implies less restrictive conditions than those for the *2.1093-portable* case. Therefore, in this case, additional testing, modifications, and/or evaluation are needed to allow the *Module* to operate in a host device that is considered under the more restrictive *2.1093-portable* configuration conditions.

This may be accomplished through a *Module* Class II permissive change filing, demonstrating that the *Module* meets the *2.1093-portable* requirements as integrated into the host. In some cases, the *Module* as it was designed may meet the *2.1093-portable* requirements, even if it was certified as *2.1091-mobile*. For instance, this could be the case when the RF power is sufficiently low. In other cases, the *Module* may need modifications (hardware and/or firmware), typically to reduce the RF power, and/or inserted within the host layout so that the *2.1093-portable* requirements are met, for example, due to a sufficient distance from the host outer enclosure.

Permissive changes for the *Module* can be filed only by the *Module* grantee. In alternative, the *host responsible party* may have to first request to obtain a change of FCC ID for the *Module*, and subsequently, for the *Module* with the newly obtained FCC ID, file for the appropriate Class II permissive change that pertains to the specific host installation.

Finally, an additional option for the host responsible party is to consider certification for the entire host device, while the modular transmitters are just considered as “components”, thus without referring to their individual modular certification previously obtained. Accordingly, as for any other component present in the host, equipment authorization compliance is to be determined in reference to the testing of the entire host device, per all applicable rule parts.

-----

**QUESTION 13B):** For a single host that is certified as a *2.1091-mobile* device, what are the procedures for integrating *Modules* that may transmit simultaneously with other RF devices (regardless of whether they are modular transmitters or not) that are present in the host?

**ANSWER 13B):**

The *host responsible party* needs to perform a new RF Exposure MPE evaluation (that may also include the determination of test exemption conditions, as applicable) for all the combinations of simultaneous transmissions that are allowed by design, or for a demonstrated worst-case scenario.

Consistently with this evaluation, a minimum compliance boundary (i.e., a minimum distance required between a person’s body and the radiating structures in the host) will be established. In general, the compliance boundary may not be isotropic, i.e., may be larger than 20 cm in some directions. For this reason, the MPE evaluation is required along the three principal axes of each radiating structure integrated into the host. Symmetry considerations may be used to reduce the amount of testing.

If the compliance boundary resulting from the evaluation just described is less or equal to each of the ones that were established for the *Module* certifications, and for all directions, the evaluation shall be

reported in the RF exposure exhibit of the host certification filings.

When *Modules* are operated in simultaneous transmission within a host and host is certified via SDoC, the documents of record retained by the manufacturer, and subject to FCC inspection upon request per 47 CRF 2.906, shall be contain the details of the evaluations performed to ensure compliance with *Modules* operating in simultaneous transmission.

If the compliance boundary exceeds any of the ones established in the *Module* certifications, a Class II permissive change for the pertinent *Module* (s) will be required. The applicable permissive change options, consistent with the rules, are the same as described in ANSWER 13A, above, i.e., the host manufacturer has always the option to apply for their own FCC ID either for a *Module*, or for the entire host.

-----

**QUESTION 13C).** What are the procedures for integrating *Modules* that may transmit simultaneously into a single host that is certified as a 2.1093-portable device?

**ANSWER 13C).** As discussed in ANSWER 13B, when *Modules* are operated in simultaneous transmission within a host and host is certified via SDoC, the documents of record retained by the manufacturer, and subject to FCC inspection upon request per 47 CRF 2.906, shall be contain the details of the evaluations performed to ensure compliance with *Modules* operating in simultaneous transmissions.

The *host responsible party* needs to perform a new RF Exposure evaluation to establish compliance for all the combinations of simultaneous transmissions that are allowed by design, or for a demonstrated worst-case scenario. This may also include the determination of test exemption conditions, as applicable.

In some cases, this compliance evaluation may be accomplished through a simplified procedure (as opposed to a full RF exposure testing of the host device) that requires only the knowledge of the maximum Total Exposure Ratio (TER, based on SAR, or power density, as applicable) for each *Module*, and the relative distances between the radiating structures of each *Module* and every other transmitter (*Module* or not) installed in the host. This procedure is illustrated in KDB Publication 447498 and is based on the “SAR to Peak Location Separation Ratio” (SPLSR) test exemption formula.

In summary, the SPLSR condition is evaluated for each *Module* integrated into the host. So long as the *Module* and its distance from any other transmitter meet the SPLSR formula requirements, no further testing is required (however, the details of this evaluation shall be reported as an exhibit in the RF exposure section of the host certification filings).

In case for any particular *Module* the SPLSR condition is not met, the installation position in the host may need to be changed, so that a larger distance is imposed from other transmitters. If that is not possible or sufficient, the *Module* may require modifications, typically to reduce the RF power (and therefore the maximum SAR or TER). These modifications shall be reported via a Class II permissive change, and the related discussion in ANSWER 13A) also applies here. When more than one *Module* is integrated into a host, each *Module*, and any related permissive change is considered and filed separately.

Finally, if the SPLSR procedure (including any *Module* modification) is not sufficient to demonstrate compliance, the *host responsible party* is required to certify the host by providing a full RF exposure evaluation, without relying on the information obtained from the individual certification of the *Modules* that are being integrated into the host.

**Question 14:** Can a host manufacturer integrate a non-modular transmitter (e.g., USB dongle) into a non-accessible enclosure, then label the device with the FCC identifier such as “This product contains transmitter FCC ID XXXYYYYZZZ.”

**Answer 14:** This is acceptable under the following conditions:

- a) The host manufacturer must adhere to all guidance provided in KDB Publication 996369, including RF exposure requirements,
- b) The transmitter is also approved as a computer peripheral under DoC or certification, and must use a standard computer peripheral connector (e.g., USB),
- c) No modifications are made to the transmitter (i.e., the device integrated is identical to what is approved),
- d) Only antennas already approved with the device are used, and in accordance with all grant conditions and installation requirements,
- e) The host manufacturer performs verification testing to ensure that the device still complies (See Clause IX in KDB Publication 996369 D01),
- f) The host manufacturer provides appropriate Part 15 user information including any appropriate RF exposure warnings.

Note if any of the preceding conditions cannot be met, a new certification and filing is required by the host manufacturer.

---

**Change Notice:**

**10/23/2023:** 996369 D02 Module Q and A v01 has been changed to 996369 D02 Module Q and A v02. Editorial changes have been made to the overall document; and Q&A 11 has been modified to provide clarification on the procedures, Q12 and Q13 have been rewritten.