

Phaser RF Module - 24-42507-01
FCC ID:H9PPHASERMODULE

These are the responses to the specific questions posed by the FCC for module approval:

Note that we are applying for a limited modular approval since we do not comply with all module requirements. A limited modular approval is acceptable since Symbol Technologies will have complete control over all design and integration efforts.

- 1) The modular transmitter must have its own RF shielding. This is intended to ensure that the module does not have to rely upon the shielding provided by the device into which it is installed in order for all modular transmitter emissions to comply with Part 15 limits. It is also intended to prevent coupling between the RF circuitry of the module and any wires or circuits in the device into which the module is installed. Such coupling may result in non-compliant operation.

The module contains its own RF shielding. A snap-on shield is attached to one side of the PCB shielding the VCO and other RF components. The module will pass all radiated emissions tests with this shield in place.

- 2) The modular transmitter must have buffered modulation/data inputs (if such inputs are provided) to ensure that the module will comply with Part 15 requirements under conditions of excessive data rates or over-modulation.

The TXD data input to the module is buffered and thresholded with a comparator. This removes the voltage effects on the RF modulation. Data rate control is limited not by buffering on the TXD input, but the response time of the phase lock loop that produces the RF output. Other inputs to the module, such as the data signals to the synthesizer are CMOS inputs buffered internal to the synthesizer chip. Note that the module also requires a reference clock for the phase lock loop. The value of this clock must be 6.2Mhz \pm 22ppm.

- 3) The modular transmitter must have its own power supply regulation. This is intended to ensure that the module will comply with Part 15 requirements regardless of the design of the power supplying circuitry in the device into which the module is installed.

The module does not have its own power supply regulation. Although a voltage regulator is present to provide power to the VCO and synthesizer circuitry, other parts of the design rely on a stable Vcc into the module.

- 4) The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c). The antenna must either be permanently attached or employ a “unique” antenna coupler (at all connections between the module and the antenna, including the cable). Any antenna used with the module must be approved with the module, either at the time of initial authorization or through a Class II permissive change. The “professional installation” provision of Section 15.203 may not be applied to modules.

One variant of the module contains an integral, permanently attached antenna. The other variant, which uses an external antenna, contains a coaxial connection using a unique antenna coupler.

- 5) The modular transmitter must be tested in a stand-alone configuration, i.e., the module must not be inside another device during testing. This is intended to demonstrate that the module is capable of complying with Part 15 emission limits regardless of the device into which it is eventually installed. Unless the transmitter module will be battery powered, it must comply with the AC line conducted requirements found in Section 15.207. AC or DC power lines and data input/output lines connected to the module must not contain ferrites, unless they will be marketed with the module (see Section 15.27(a)). The length of these lines shall be length typical of actual use or, if that length is unknown, at least 10 centimeters to insure that there is no coupling between the case of the module and supporting equipment. Any accessories, peripherals, or support equipment connected to the module during testing shall be unmodified or commercially available (see Section 15.31(i)).an authorized module is installed must still be authorized as a PC peripheral, subject to the appropriate equipment authorization).

The module submitted for test is a stand-alone module, with all signal and power lines attached to a connector. In order to exercise the module, it is connected to a host test box which contains a microprocessor that programs the transmit frequency and provides transmit data. No ferrites or other suppression components are present – the what you see is what you get. The goal of the modular approval is to copy the module PCB artwork (exact copy) and integrate it onto other PCB designs. During the integration, the module will clearly be separated by the absence of copper on all layers of the PCB and all signals will be routed to the module through a single “bridge” on the PCB.

- 6) The modular transmitter must be labeled with its own FCC ID number, and, if the FCC ID is not visible when the module is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module. This exterior label can use wording such as the following: “Contains Transmitter Module FCC ID: XYZMODEL1” or “Contains FCC ID: XYZMODEL1.” Any similar wording that expresses the same meaning may be used. The Grantee may either provide such a label, an example of which must be included in the application for equipment authorization, or, must provide adequate instructions along with the module which explain this requirement. In the latter case, a copy of these instructions must be included in the application for equipment authorization.

Symbol will comply. Sample label file shows correct wording.

- 7) The modular transmitter must comply with any specific rule or operating requirements applicable to the transmitter and the manufacturer must provide adequate instructions along with the module to explain any such requirements. A copy of these instructions must be included in the application for equipment authorization. For example, there are very strict operational and timing requirements that must be met before a transmitter is authorized for operation under Section 15.231. For instance, data transmission is prohibited, except for operation under

Section 15.231(e), in which case there are separate field strength level and timing requirements. Compliance with these requirements must be assured.

A specification sheet is included inside the Theory of Operation document, also submitted with the application. These specifications clearly state the requirement needed to operate the module properly and maintain compliance with all applicable standards. Since all designs that incorporate the module will be managed by Symbol Technologies, compliance to these specifications is assured.

- 8) The modular transmitter must comply with any applicable RF exposure requirements. For example, FCC Rules in Sections 2.1091, 2.1093 and specific Sections of Part 15, including 15.319(i), 15.407(f), 15.253(f) and 15.255(g), require that Unlicensed PCS, UNII and millimeter wave devices perform routine environmental evaluation for RF Exposure to demonstrate compliance. In addition, spread spectrum transmitters operating under Section 15.247 are required to address RF Exposure compliance in accordance with Section 15.247(b)(4). Modular transmitters approved under other Sections of Part 15, when necessary, may also need to address certain RF Exposure concerns, typically by providing specific installation and operating instructions for users, installers and other interested parties to ensure compliance. If compliance with one or more of the numbered requirements, listed above, cannot be demonstrated, it may be possible to obtain a “Limited Modular Approval” (LMA). This will be issued in those instances where the Grantee can demonstrate that it will retain control over the final installation of the device, such that compliance of the end product is assured. In such a case, an operating condition on the grant of equipment authorization for the module would state that the module is only approved for use when installed in devices produced by a specific manufacturer, typically the Grantee. If LMA is sought, the application for equipment authorization must make this fact clear. It must also specifically state how control of the end product, into which the module will be installed, will be maintained, such that full compliance of the end product is always ensured. If approved, the grant of equipment authorization for a transmitter module will have either the word “module” or “modular” added to the Remarks section on the grant. Absent this specific reference, the authorized device will not be considered an approved transmitter module and its use in any new device would require a separate FCC approval of that device.

A limited modular approval is being sought. This module is intended for Symbol Technology Inc. products only. The first application is in a mobile application in a forklift truck. Antenna will be further then 20 cms. from the operator. This is the only known application at this time. This radio was previously filed as FCC ID: H9PP470 and H9PPL470. This filing is being done as a limited modular application. Three antennas were included in this filing. First antenna was the board attached antenna similar to H9PP470. Other two antennas are antennas connected to ForkLift base VRC (Vehicle Radio Computer) enclosure in first application. Enclosure is mounted on a ForkLift.

Since Symbol Technologies will have complete control all design and integration efforts, it is guaranteed that the module will be properly integrated into products. Symbol can provide this guarantee because the development and manufacture of all products is controlled by ISO9000 certified processes and is internally monitored and regulated.