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PART 15 UNLICENSED MODULAR TRANSMITTER APPROVAL

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To: Federal Communications Commission
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Subject: Justification for Part 15 Radio Module Approval

To Whom It May Concern

The following is justification for Trilliant Networks 2.4GHz High Sensitivity 1 Watt RF Module application for "Radio Module Approval", set forth in the requirements and policies of the authorization of unlicensed, low power "transmitter modules" for operation under Part 15 of the Commission's Rules. "Radio Module Approval" is sought with the understanding that the Trilliant Networks 2.4GHz Wireless High Sensitivity 1 Watt RF Module is designed for use with Trilliant Networks products.

Over the years, the Office of Engineering and Technology (OET) has, on a limited number of occasions, granted approval of modular transmitter circuitry that could be used in a variety of Part 15 devices without requiring those devices to obtain subsequent and separate FCC approvals. Such approvals have been granted in an effort to afford relief to equipment manufacturers by eliminating the requirement that a new equipment authorization be obtained for the same transmitter when it is installed in a new device. More recently, a number of manufacturers have requested information about the conditions under which such modular approvals might be granted. This Public Notice sets forth the requirements for approval of modular transmitter equipment designs. These requirements are in addition to what is normally required for an application for an intentional radiator.

Factors considered when seeking an equipment authorization for modular transmitters:

(a) In order to be considered a transmitter module, the device must be a complete RF transmitter, i.e., it must have its own reference oscillator (e.g., VCO), antenna, etc. The only connectors to the module, if any, may be power supply and modulation/data inputs.

The Trilliant Networks 2.4GHZ High Sensitivity 1 Watt Radio Module is a single printed wiring board that implements a self contained, complete wireless interface module. The radio section utilizes a Freescale MC13213 radio transceiver, utilizing the 802.15.4 standard driven by a 16.000MHz crystal circuit on the board. The MC13213 chip drives a balun which couples the signal through transmit/receive switches to an RF amplifier delivering 30dbm to a printed and U.FL connector (dependent upon configuration selected). Typically an omni-directional ½ wave dipole antenna is supplied with the U.FL connector, with alternative antennas only approved for special, specifically tested applications. The only connections to the module provide antenna connection (in U.FL configuration), serial data connectivity and power.

(b) Compliance with FCC RF Exposure requirements may, in some instances, limit the output power of a module and/or the final applications in which the approved module may be employed.

The RF power out for the transmit amplifier in the Trilliant Networks 2.4GHZ 1 Watt Radio Module is limited to 30dbm, with a typical power output between 5-30dbm.

(c) While the applicant for a device into which an authorized module is installed is not required to obtain a new authorization for the module, this does not preclude the possibility that some other form of authorization or testing may be required for the device (e.g., a WLAN into which an authorized module is installed must still be authorized as a PC peripheral, subject to the appropriate equipment authorization).

The Trilliant Networks 2.4GHZ 1 Watt Radio Module is designed to be mounting in various plastic enclosures depending upon the requirements of the product. No variation of the radio circuitry occurs.

(d) In the case of a modular transceiver, the modular approval policy only applies to the transmitter portion of such devices. Pursuant to Section 15.101(b), the receiver portion will either be subject to Verification, or it will not be subject to any authorization requirements (unless it is a Scanning Receiver, in which case it is also subject to Certification, pursuant to Section 15.101(a)).

(e) The holder of the grant of equipment authorization (Grantee) of the module is responsible for the compliance of the module in its final configuration, provided that the OEM, integrator, and/or end user has complied with all of the instructions provided by the Grantee which indicate installation and/or operating conditions necessary for compliance.

The Trilliant Networks 2.4GHZ 1 Watt Radio Module is designed to be used internally only in products utilizing the Trilliant Networks communication infrastructure, such as electric meters, gas meters, thermostats, etc.

In order to obtain a modular transmitter approval, this cover letter requesting modular approval is being submitted and the numbered requirements identified below are addressed in the application for equipment authorization.

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 Trilliant Networks 2.4GHZ 1 Watt Radio Module is a completely self contained radio module which has its own RF shielding. No other RF shielding is required or implemented.

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 Trilliant Networks 2.4GHZ 1 Watt Radio Module is a completely self contained radio module which modulates its own RF transmitter. It controls the data flow to the transmitter section compliant with Part 15 requirements.

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.

There is not a hardware voltage regulator on board. Instead, the micro-controller monitors the power supply voltage on a continuous basis. Should the supply voltage be founds outside of the normal specified operating parameters, the unit will refuse to transmit. The unit operates within the stated Part 15 requirements when operated within the specified voltage range.

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.

The Trilliant Networks 2.4GHZ 1 Watt Radio Module employs either a complete printed trace antenna or a U.FL connector used with only approved antennas.

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)).

The Trilliant Networks 2.4GHZ 1 watt Radio Module is tested standalone with a one meter cable interfacing the module with its host Receiver/Translator motherboard and found to be compliant with Part 15 regulations.

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.

An FCC label ID is affixed to each unit at the time of manufacture. Since this printed circuit board is mounted inside various enclosures, the product data nameplate on the enclosure indicated the FCC ID.


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.

The Trilliant Networks 2.4GHZ 1 Watt Radio Module is compliant with Part 15.247. Installation and other requirements are presented in the user guide to allow the unit to be installed correctly.

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.

The Trilliant Networks 2.4GHZ 1 Watt Radio Module complies with the RF exposure requirements of Parts 15.247, 2.1091 and 2.1093.

Sincerely,



By: Robert Fischette
Title: Director, Wireless Products
Trilliant Networks