



Digi International Inc.
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March 2, 2016

Subject: MODULAR APPROVAL LETTER

Applicant: Digi International Inc.
FCC ID: MCQ-50M1857
FRN: 0010283307

Dear Application Examiner:

Digi International, Inc. is seeking Modular Approval under Part 15.212 for the FCC ID: MCQ-50M1857. The radio meets the requirements for modular approval as detailed in FCC 15.212. Compliance to each of the requirements is described below:

“The modular transmitter must have its own RF shielding.” The radio portion of the module is contained in its own RF shielding. The shielding is installed at the factory. Please see the Internal Photos exhibit.

Digi's **Sigma Pumps Gen IV 802.11abgn Module** is designed such that all RF components and circuitry are placed on the bottom surface of the PCB. No RF related circuitry is present on the top surface of the PCB. A formed metal shield is soldered onto the bottom of the PCB and covers all RF components and circuitry.

“The modular transmitter must have buffered modulation/data inputs.” The EUT has buffered data inputs to insure compliance with Part 15 requirements under conditions of excessive data rates or over-modulation. Please see the Schematics exhibit.

The user data enters the **Sigma Pumps Gen IV 802.11abgn Module** through 2-pin serial data port. User data that is to be transmitted over the modular transmitter is buffered by the Module's baseband controller (integrated as part of the Transceiver's Chip set). The user's data is packetized and transmitted at data rates that are completely controlled by the baseband controller and its software. The user has no access to either the baseband controller or its software.

“The modular transmitter must have its own power supply regulation.” The EUT has its own power supply regulation to insure compliance with Part 15 requirements regardless of the quality or level of external DC supplying the module from the host unit. Please see Schematics exhibit. Also, the technical report exhibit contains AC power line conducted emissions data taken with the EUT powered from a linear power supply that contains no EMC suppression components.

All critical RF circuitry on **Sigma Pumps Gen IV 802.11abgn Module** runs on a locally regulated power supply which allows the module to function within specification with worst case input voltages ranging from 2.93V (module will enter a non-operative state if the Vin drops to <2.93V) to 4V (Vin >4V will cause a catastrophic failure of the processor and the unit will cease to function) .The optimal Vin voltage range is 3.3V +/-5%.



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“The modular transmitter must comply with the antenna requirements of Section 15.203 and 15.204(c).”
The EUT meets the FCC antenna requirements. Please see Antenna information exhibit and internal photos exhibit.

The **Sigma Pumps Gen IV 802.11abgn Module** has dual-band fixed embedded PCB antenna which is integrated on the PCB. There is only one configuration for the antennas and the configuration can't be changed by end user.

“The modular transmitter must be tested in a stand-alone configuration.” The EUT was tested in a stand-alone configuration. The module was greater than 10 cm from the host device. Please see test setup photos exhibit and technical report exhibit.

The **Sigma Pumps Gen IV 802.11abgn Module** is designed to be compliant with all relevant FCC requirements without any additional shielding or filtering of any sort. As tested, the **Sigma Pumps Gen IV 802.11abgn Module** was mounted on top of a dev board which provided power to the module and an RS232 line transceiver to allow serial data traffic. The dev board is powered by an external +12VDC power supply which is mains powered and provides 7V DC power to the module which is further converted to +3.3V by an on-card DC to DC converter to power the RF circuitry, Main Processor, Memory and etc. There are no additional filters associated with the module/dev board. Nor is there any additional shielding associated with this setup – beyond the shield that is placed on the module over RF circuitry.



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“The modular transmitter must be labeled with its own FCC ID number.” The EUT is labeled with its own FCC ID number. Please see FCC ID label & location exhibit. Since the FCC ID number will not be visible when the module is installed inside a host printer, another label with the FCC ID will be applied to the exterior of the printer.

The **Sigma Pumps Gen IV 802.11abgn Module** has FCC ID: MCQ-50M1857 and IC Canada ID: 1846A-50M1857 listed on the label which is placed on top of the RF Shield of the module. Also the FCC and IC Canada IDs will be listed on the enclosure of the end customer’s device as it is requested in our documentation.





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“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.” The EUT is compliant with all applicable FCC rules. Detail instructions for maintaining compliance are given in the User Manual.

The **Sigma Pumps Gen IV 802.11abgn Module** has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential environment. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

“The modular transmitter must comply with any applicable RF exposure requirements.” The EUT is compliant with all applicable RF exposure requirements. Please see RF Exposure Exhibit.

The **Sigma Pumps Gen IV 802.11abgn Module** complies with the RF exposure limits for humans as called out in RSS-102. It is exempt from RF evaluation based on its operating frequency of 2.4GHz and 5GHz, and effective radiated power less than the 3W requirement for a mobile device (>20 cm separation) operating at 2.4GHz and 1W for operating at 5GHz.

Please contact me if you have additional questions. Your attention to this matter is greatly appreciated.

Sincerely,

A handwritten signature in blue ink, appearing to read "Slava", followed by a long, horizontal, wavy line.

Slava Gekht
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