



Federal Communications Commission  
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This letter requests limited modular approval of Elster Integrated Solutions, LLC's *EnergyAxis Gas Module*. This low-power radio device operates as a frequency-hopping spread-spectrum transceiver in the 902-928 MHz ISM band under the provisions of 47 CFR Part 15.247.

The *EnergyAxis Gas Module* is designed to be affixed to gas meters, using various plastic housings and fittings, to allow automatic meter reading, in conjunction with Elster's EnergyAxis wireless meter reading system. The *EnergyAxis Gas Module* has three digital inputs to count switch closures and/or accept a digital meter reading, so that gas usage information can be relayed to other devices in Elster's EnergyAxis System. The *EnergyAxis Gas Module* can also accept configuration data and information queries from other devices in Elster's EnergyAxis System via its integral ISM band transceiver.

We address the specific items of Public Notice DA 00-1407 below:

- a) Shields. The *EnergyAxis Gas Module* incorporates shielding over the wireless transceiver. The shields are soldered to the printed circuit board. The bottom of the shield is enclosed by a copper plane that is part of the circuit board.
- b) I/O connections. The only connections to the module are switch/data inputs for counting rotations of the gas meter shaft. There are no external power connections, because the unit is powered only from an internal battery.
- c) Effect of inputs on modulation. The *EnergyAxis Gas Module* incorporates digital data buffers on the switch/data inputs, which are an integral part of the transceiver (microcontroller) IC. The peak modulation is set by a computer program (firmware) stored in the transceiver IC. The rate of switch closures and/or digital inputs on the switch/data inputs cannot change the transmission rate, produce over-modulation or change RF output power.
- d) Completeness and availability. The *EnergyAxis Gas Module* is a complete transmitter with its own quartz-crystal-controlled reference oscillator. It is designed to be incorporated into various meter housings manufactured by Elster for installation on and near residential and commercial gas meters. The *EnergyAxis Gas Module* is not available for sale for other applications, or without a meter enclosure.
- e) Power regulation. The *EnergyAxis Gas Module* has its own internal battery power supply and internal voltage regulation. The *EnergyAxis Gas Module* is not designed to be operated using external voltage, nor is there any connector for it to be applied. The lithium thionyl-chloride battery has a maximum voltage of 3.67 volts, which is applied directly to the transmitter's power amplifier. This same voltage is applied to the unit in the factory to calibrate the RF output power. Battery voltage drops as when the battery is nearly depleted, but by design RF output power always drops as battery voltage drops. The transceiver IC has its own internal 1.8V regulator to power the frequency-determining circuitry. Frequency cannot drift if battery voltage drops, as when the battery is



nearly depleted.

- f) Antennas. The *EnergyAxis Gas Module* has a built-in, internal antenna that is a permanent part of the printed circuit board. It is not removable. An external antenna cannot be used.
- g) Host Devices. The *EnergyAxis Gas Module* is designed to be installed only in meter housings supplied by Elster Integrated Solutions, LLC, which in turn are designed to be installed on or near gas meters. The module has been tested in standalone and representative configurations. It is not co-located with any other radio devices.
- h) RF Exposure. The *EnergyAxis Gas Module* is a low-power (250 mW) device and operates with a very low transmit duty cycle. Analysis shows the device complies with MPE RF exposure requirements for mobile devices. Installation and operation instructions specify the required minimum distance from humans for installation on and around gas meters.
- i) Labelling. The *EnergyAxis Gas Module* is identified with the FCC ID on a label that is permanently affixed to the *EnergyAxis Gas Module* with adhesive that has been shown in our field tests to last the life of the unit. Additionally, the Module's FCC ID and the Part 15 warnings appears on a label that is permanently affixed to the outside of the meter housing.
- j) The *EnergyAxis Gas Module* complies with with all applicable provisions of FCC Part 15.247 for frequency-hopping spread-spectrum devices.

Thank you for your consideration.

A handwritten signature in blue ink that reads "Steven D. Bragg". The signature is written in a cursive, flowing style.

Steven D. Bragg  
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