

## **IDEU-810-4** **Operational Description**

The IDEU-810-4 is a Data Extending unit.

The unit is a 12VDC operated unit. The unit comprises one Printed Circuit Board (PCB), which includes a RF transmitter module with an integral antenna, and a microcontroller, which controls its operation.

The IDEU-810-4 has one RF channel. It is 433.92 MHz carrier with FSK modulated.

Inserting the Power Supply turns on the Unit.

While turned on the Unit transmits a 7mSec identification & status signal and then it stops transmission. As a life safety equipment the Unit transmits the next signal about 18-22 seconds after the last signal transmission (randomly) – any interruption in the reception of the transmitted signal (which might indicate a lost Offender / Patient) may put the Officer / Patient life at risk – the central monitoring system sends an immediate alert to the Officer / Nurse in-charge, which should take immediate actions to find the lost Offender / Patient.

### **Compliance with FCC 15.231(a)**

**Section 15.231(a) (1)** is not relevant for the regular working mode of the IDEU-810 since it deals with manually operated transmitters. The IDEU-810 works only under automatic mode.

**As per section 15.231(a) (2)** *“A transmitter activated automatically shall cease transmission within 5 seconds after activation”* - IDEU-810 ceases transmission about 7 milliseconds after activation, therefore it meets the requirements of this paragraph.

**As per section 15.231(a)(3)** *“Periodic transmissions at regular predetermined intervals are not permitted”* – IDEU-810 does not transmit at regular predetermined intervals.

**As per section 15.231(a)(4)** *“Intentional radiators which are employed for radio control purposes during emergencies involving fire, security, and safety of life, when activated to signal an alarm, may operate during the pendency of the alarm condition”* – IDEU-810 is a safety of life intentional radiator, officer / patient’s life may be in danger when he leave the area / nursing home. Therefore the IDEU-810 receive and transmit normally a signal transmission about 18-22 seconds after the last signal transmission (and stops after 7 milliseconds) to the center.

iDEU should have three modes:

Non-install.

Install.

Monitor.

Following power up, the iDEU starts functioning at the non-install mode. In this mode the iDEU has no layer and it waits for only two commands from the AMTR: “TEST” and “LEARN” (or Reset from MRD-RF).

The “TEST” command is used, during the iDEU manufacturing process (when an internal jumper is installed), for programming a system type number (0 – 7) and company, when the internal jumper is not installed (in the field) the test command is used for iDEU status query.

The LEARN” command is used for calculating the iDEU “distance” from the AMTR. This “distance” is called a “Layer”, and is used in the message routing algorithm in order to minimize the network\’s messages traffic. When the iDEU receives a “LEARN” command, with signal strength higher than a given threshold, either from the AMTR or from a neighbor iDEU, it calculates its layer as the neighbor’s layer+1. It then re-transmits a “LEARN” command, changes its operational mode to “Install” and after a 1sec timeout it sends a “SUPERVISE” message.

The iDEU shall “listen” to the re-transmission of any of its sent messages, from one of the neighboring iDEUs. If the message has not been re-transmitted within few milliseconds (128mSec), the iDEU shall re-transmit the message. The iDEU shall listen and continue to perform retries upon failure.

In Install mode the iDEU receives, executes and repeats all the commands received from the AMTR to iDEU direction, and repeat “SUPERVISE” messages from iDEUs, with number layer higher than its own layer number, to the AMTR direction. If the iDEU receives a “START” message, it relays it to the next iDEUs, after 1sec returns a number of supervise messages to the AMTR, and changes its operational mode to “Monitor” mode. Turning the iDEU off and on, while in Install mode changes the iDEU’s operational mode back to Non-install mode.

In Monitor mode the iDEU executes all install mode functions, exclude “LEARN” command, and additionally repeats transmitters messages to AMTR direction.

Leaving the Monitor mode is only done by a “STOP” command from the AMTR. In this case, the iDEU changes its mode of operation to install mode.

Turning the iDEU off and on, while in Monitor mode, should not change the iDEU operational mode, and it should remain in Monitor mode.

Transmit iDEU messages to AMTR

iDEU should produce "SUPERVISE" message consisted internal status of iDEU, for example monitor (status of re-transmission of transmitters) or install mode, layer (distance from AMTR), acknowledge, battery status, external power supply and etc. If iDEU has layer, it must send this message every predefinition time to AMTR as sanity transmission. The second case of sending this message is after receive message from AMTR, for example messages "LEARN", "START", "STOP", "SET" and "TEST".

Receive and re-transmit messages from neighbor iDEUs to AMTR

iDEU should receive messages from neighbor iDEUs to AMTR direction. iDEU should re-transmit received messages, if they arrived from iDEUs with number of layer more than itself. If iDEU just received this message early, it doesn't re-transmit this message again. Delay for re-transmission should be from 5 up 128ms. iDEU should kept every message for 300 ms for checking if a received transmission has already handled by the iDEU and should be ignored. Since the maximum delay time, before re-transmission is 128 ms, this 300 ms cater for a chain of up to 3 iDEUs.

Monitor power supply and battery charging.

The iDEU shall be powered by 1 internal battery (7.2 VDC).

The battery may be disposable or rechargeable, according to customer requirements.

The iDEU shall be powered an external 110 VAC or 220-240 VAC to 12 VDC power adapter.

The iDEU power consumption shall not exceed 500mA.