

# Operational Description Document

## Intended application for the device

The FMU is a handheld device used to change the settings (via Infrared communication) and monitor the status of Site Monitoring Units (SMUs), Personal Identification Devices (PIDs) and other SGL produced equipments. FMU also has a panic button to be used if the officer encounters difficulties. Pressing the button will trigger an immediate transmission to any SMU in range. The SMU will flash the display backlight to acknowledge reception of the message to the officer and report the panic message to the control centre.

### ii. Modulation type, different transmit modes/packets and their corresponding ON-OFF times

The modulation scheme used in FMU2 is 2-FSK. FMU2 uses only one mode of transmission. FMU2 will transmit its status every 2 minutes + 15 seconds (random element) for an hour. Also if the panic button is enabled it will transmit a message for the next five seconds.

### Transmission Message structure:

The transmitted message structure is shown below:

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
AA	AA	AA	AA	AA	AA	AA	FF	FF	55	PRH	PRL	ID3	ID2	ID1	ID0	Seq No	Stat	CRC L	CRC H

### Message byte function

Bytes 7 – 8 are used to synchronize the receiving UART, i.e. to determine the start of the individual bytes in the actual message.

Byte 9 is always 0x55 for FMU message, i.e. this byte distinguishes regular FMU messages from any other message in the system.

Bytes 12 – 17 inclusive are encrypted. Bytes 10 – 11 hold pseudo random code used to access the accelerator table when decrypting the message.

Bytes 12 – 15 inclusive hold the FMU identification number.

Byte 16 holds the number of times the pseudo code table 'rolls over'.

Byte 17 holds the FMU status.

Bytes 18 – 19 hold the cyclic redundancy check for bytes 10 – 17 inclusive.

The received FMU message structure is assumed to be as shown below:

0	1	2	3	4	5	6	7	8	9	10
55	PRH	PRL	ID3	ID2	ID1	ID0	Seq No	Stat	CRC L	CRC H

### Panic Message:

The main purpose of the panic button is to inform the central server that the Field monitoring officer has encountered some problem. Once the Site monitoring unit receives this message it will immediately contact the central server via PSTN or GSM network.

### Status Byte of FMU:

D7	D6	D5	D4	D3	D2	D1	D0
P	X	X	X	X	X	X	X

P=1 Panic message    X = Not used  
P=0 FMU message

If a panic button is pressed the first bit of the status byte will set to high. On reception any such messages the SMU (Site monitoring Unit) will immediately dial out either through PSTN or GSM network. FMU will also transmit the same message for 5 seconds, when a panic button is pressed.

**FMU message:**

When the FMU is switched on initially, it will also transmit its status (same message but the first bit of the status byte will be low) every 120 + 15 sec (random element) for an hour to check the integrity of the transmission. On reception the SMU will log the details of FMU2 for later analysis.

**FCC Section 15.231:**

- a) As explained before FMU2 transmits its status (message) along with a control signal. (First bit of the status byte, which control signal -whether to send panic message or not)
  - 1. Panic message is a manually operated switch, which automatically deactivates the transmitter with in not more than 5 seconds of being released.
  - 2. The transmitter will automatically cease transmission within 5 seconds after the activation. FMU firmware will automatically deactivate the transmitter after 5 seconds for panic.
  - 3. FMU2 will send its own status to check the integrity of the transmission. (The total duration of transmission is not exceeding 2 seconds an hour). Also, this is not a periodic transmission.
  - 4. FMU2, is when activated to signal the panic, will operate during the pendency of alarm condition.
  - 5. Not applicable.

**iii. Antenna type and its connector.** Please note the antenna connector can not be a standard type connector for a hand-held unlicensed device.

Reception antenna is a whip connected via a BNC, whilst transmission is via copper strips on the PCB and hence no connector.