

Theory of Operation SEMS II / Blue Tooth

Scott Emergency Management System (SEMS II) with Blue Tooth is a telemetry system for firefighter, comprises mainly of two devices a (1) Control Module which house the piezos for the Personnel Alarm Safety System (PASS) and (2) an Console unit which houses the telemetry radio being capable of bidirectional communications with a base station (gateway) comprised of a USB or PCMCIA card. The system operates on a radio frequency of 2.4 GHz, where by the console unit is capable of transmitting and receiving information to and from the base station. The transmission range is 450ft in a typical indoor environment and 2000ft line of sight (LOS). The Console also contains a blue tooth radio with ability to pair and transmit data every 60 seconds.

CONSOLE Unit:

The console unit is carried by a firefighter as part of the Self Contained Breathing Apparatus (SCBA) and is automatically activated “powered on” when air is applied to the system; the principle of the automatic activation is the same as the Heads Up Display (HUD) which is part of the SCBA. The console unit is only capable of being turned off when no air pressure is sensed or applied on the system. The user must double click the reset button on the console to turn the console and control module off. The method of turning the console and PASS control module off is the same as Scott PASS system currently utilized on the NFPA 1982 edition 2007.

The console unit has three buttons a (Reset) button “yellow”, a (Manual) PASS alarm button “Red” and a (Withdraw) button “Blue”.

By depressing the “RESET” pushbutton the Console unit (if in a PASS alarm) the PASS alarm will be reset and stop the alarm sounds. Furthermore, the Reset button is used to turn the PASS off if no air pressure is on the system. The Manual “PASS alarm” pushbutton if depressed will cause an audible alarm, the alarm can be reset by the “Reset” button.

The Withdraw button when depressed will transmit a signal to the base station, and alert the person at the base station that that individual is withdrawing from his/hers area.

The SEMS II system console unit utilizes the same control module (PASS unit) as the 2007 edition currently in production at Scott Health and Safety. The console unit contains 2 transceivers that operate in the 2.4GHz unlicensed spectrum (FCC part 15). The transceivers are:

1. An 802.15.1 Bluetooth transceiver operating the basic data rate (1MBPS)
2. An 802.15.4 Zigbee transceiver operating on a single channel (2405MHz).

Both transceivers are connected to an internal antenna and communicate with the gateway that is connected to a PC as the base station. The system provides an Ad-Hoc network between the console units and the base station which provides the users with a great range than competitive point to point systems currently on the market. The console is capable of transmitting a SCBA identification name, manual and auto PASS alarms, air pressure and a withdraw message. The console is capable of receiving an Evacuate

message from the base station and a RF Range messages both visual and audible indicators for all alarms and messages. The console also contain a 125kHz RFID scanner which allows a user to read a RFID tag which can be programmed with information about the firefighter and the information is transmitted to the base station. To read the information from the RFID tag the user depresses the Withdraw button o the console while there is no air pressure on the system the user is prompted with a visual indicator to swap the RFID tag and if read is successful the console will display a visual flashing indication.

The console blue tooth radio coupled to an antenna operates in the 2.4 GHz spectrum.