



Architects & Consultants Technical Specification for an EMS FireCell Wireless/Hybrid Addressable Fire Detection System

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This document is provided for fire system documentation where EMS wireless or hybrid systems/devices have been identified as the preferred solution. Any text can be freely used and lifted directly from any part of this document to produce a specification.

Wireless Analogue Addressable Fire Detection & Alarm System

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SPECIFICATION FOR WIRELESS ANALOGUE ADDRESSABLE RADIO FIRE DETECTION & ALARM SYSTEM

The area(s) shall be protected using wireless detectors, call points and alarm indication devices capable of transmitting their status back via a wireless Radio Cluster Communicator (RCC), which transmits to a central Radio Hub for interpretation of the data and action as appropriate. The site should have a full radio survey ensuring the relevant signal headroom is adhered to as stated in EN54:25. The wireless radio fire detection and alarm system shall be selected and installed in accordance with the following:

1.0 System Components

- 1.1 The fire alarm system shall be analogue addressable, and devices are to be installed throughout the areas nominated as part of the system design and in conjunction with the site survey report.
- 1.2 The system shall consist of analogue addressable fire detection, radio wireless optical and heat detector variants, call-points, electronic alarm indication units which communicate via wireless Radio Cluster Communicators to a Radio Hub.
- 1.3 The System shall be capable of full system wide cause and effect functionality.
- 1.4 The system shall be designed in accordance with the requirements of BS5839-1:2017 and all relevant parts of EN54 for which third party certification should be provided.

2.0 Wireless Hub

- 2.1 The Wireless Fire Alarm System shall be analogue addressable. It shall consist of a Wireless Hub coupled to the Control Panel (C.I.E). Via the Loop using the XP or ZP protocols.
- 2.2 The Wireless Hub shall have an individual LCD display along with menu controls to allow manual system programming and interrogation of the system if required.
- 2.3 The Wireless Hub shall have LED indication of power status and fault indication.
- 2.4 The Wireless Hub shall be capable of self-testing and reporting any internal fault within 100 seconds.
- 2.5 The Wireless Hub shall have the ability to use UHF 868 MHz frequency transmitter/receivers. The unit must be capable of handling a maximum of 64 RCC's each can have up to 31 directly logged on devices selectable from detectors, call points, sounders and interface accessories.
- 2.6 The Wireless Hub shall have a power output of 14dBm.
- 2.7 The Wireless Hub shall use diversity aerial configuration for increased signal reliability.
- 2.8 The Wireless Hub shall have built in dual transceivers to allow redundancy and increased system reliability.
- 2.9 The Wireless Hub shall have as standard a TTL serial input/output facility. It shall be capable of programming and diagnostics using a laptop or portable computer.

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- 2.10 The Wireless Hub Programming software shall have an inbuilt setup comparison feature to warn/ advise of system changes prior to upload. The entire upload/download process shall complete within 30 seconds.
- 2.11 The Wireless Hub shall be capable of passing information to the C.I.E. as appropriate:
- Pre-alarm
 - Alarm
 - Fault conditions
 - Signal strength readings
- 2.12 The Wireless Hub will be powered from the loop of the C.I.E. and will be available in 1, 2 and 4 loop options.
- 2.13 The Wireless Hub shall have the ability to show via its menu structure individual device signal strengths and provide graphical representation of individual device battery levels. This functionality shall also be provided by the pc-based system configuration software.
- 2.14 The Wireless Hub shall monitor the entire wireless infrastructure and be capable of deviating from the pre-programmed communication paths in the event of an RCC communications failure.

3.0 Radio Cluster Communicator (RCC)

- 3.1 Radio wireless optical and heat detector variants, call-points and electronic alarm indication units shall communicate directly to nominate RCC's for onward communication to the Radio Hub.
- 3.2 The RCC'S shall have LED indication of power status and fault indication.
- 3.3 The RCC's shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 3.4 The RCC's shall have a power output of 14dBm.
- 3.5 The RCC's shall use diversity aerial configuration for increased signal reliability.
- 3.6 The RCC's shall be capable of self-testing and analysing its power sources on a constant basis, reporting any internal battery fault within 100 seconds.
- 3.7 The RCC shall have the capability to monitor up to 31 directly logged on devices selectable from detectors, call points, sounders and interface accessories.
- 3.8 The RCC shall have as standard TTL serial input/output facility. It shall be capable of diagnostics using a laptop or portable computer
- 3.9 The RCC shall communicate via radio either directly to the Radio Hub or via additional RCC's.
- 3.10 RCC's shall be connected via an integral PSU to the 230-volt supply. These shall be capable of providing 72 hours battery backup.

4.0 Optical Analogue Addressable Smoke Detectors

- 4.1 All detector assemblies used shall be of a three-part construction:
 1. Optical detector head
 2. Radio address module and battery board
 3. Ceiling mount
- 4.2 The detector shall be self-testing and be analogue addressable.
- 4.3 The radio address module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 4.4 The radio address module shall have variable power output of 0-14dBm.
- 4.5 The radio address module shall house a battery compartment, which has six 'AA' Alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions.
- 4.6 The detector head shall operate at 3 volts.
- 4.7 The radio address module shall contain a factory programmed unique ident code.
- 4.8 The device will have a locking mechanism to disable device removal without the use of a special tool.
- 4.9 The unit shall be fitted with an integral tamper switch, which contacts the ceiling mount and be capable of monitoring detector head removal.
- 4.10 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure.
- 4.11 The unit will transmit its battery condition indicating when the batteries require replacement.
- 4.12 The device shall have non-volatile memory.
- 4.13 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub.
- 4.14 The device shall have a fast test mode controlled by the Radio Hub to ease maintenance and limit excess test smoke being used.
- 4.15 The device shall be third party certified as tested to EN54 parts 7 and 25.

5.0 Analogue Addressable Heat Detector

- 5.1 All detector assemblies used shall be of a three-part construction:
 1. Detector head (fixed temp or rate of rise)
 2. Radio address module
 3. Ceiling mount
- 5.2 The detector shall be analogue addressable.
- 5.3 The radio address module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 5.4 The radio address module shall have variable power output of 0-14dBm.
- 5.5 The radio address module shall house a battery compartment, which has six 'AA' Alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions
- 5.6 The detector head should operate at 3 volts.
- 5.7 The radio address module shall contain a factory programmed unique ident code.
- 5.8 The device will have a locking mechanism to disable device removal without the use of a special tool.
- 5.9 The unit shall be fitted with an integral tamper switch, which contacts the ceiling mount and be capable of monitoring detector head removal.
- 5.10 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure.
- 5.11 The unit will transmit its battery condition indicating when the batteries require replacement
- 5.12 The device shall have non-volatile memory.
- 5.13 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub.
- 5.14 The device shall be third party certified as tested to EN54 parts 5 and 25.

6.0 Call points

- 6.1 Call points or break glasses are to be of such manufacture as generally used within the fire industry.
- 6.2 The radio module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 6.3 The radio call point shall have variable power output of 0-14dBm.
- 6.4 The unit shall be fitted with an integral tamper switch that shall contact the back box.
- 6.5 The call point shall house a battery compartment, which has six 'AA' Alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions
- 6.6 The call point shall have its own unique ident code installed during manufacture.
- 6.7 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure.
- 6.8 The unit will transmit its battery pack condition indicating when a replacement is due.
- 6.9 The device shall have non-volatile memory.
- 6.10 The Call point will have an IP rating of IP23.
- 6.11 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub
- 6.12 The device shall be third party certified as tested to EN54 parts 11 and 25.

7.0 Addressable Radio Input / Output Transmitter

- 7.1 The unit shall be fitted with an integral tamper switch.
- 7.2 The radio module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 7.3 The radio Input/Output unit shall have variable power output of 0-14dBm.
- 7.4 The radio input/output transmitter shall have six 'AA' Alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions
- 7.5 The unit shall provide the facility of transmitting alarm signals from third party equipment, such as beam detection, aspirating detection systems and other ancillary equipment or fire related systems that require monitoring by the fire control panel. The Input shall be fully monitored.
- 7.6 The unit shall provide the facility of receiving command signals from the control panel to devices that require remote activation, including magnetic door release units, staircase ventilation systems or other ancillary equipment.
- 7.7 The unit shall provide the facility of a fail-safe mode for the output operation.
- 7.8 The unit shall provide a variant with dual input and dual output facility.
- 7.9 Its relay output shall be capable of switching 24V @ 1A DC.
- 7.10 The unit shall have an interface for a 230V Ac switching output module.
- 7.11 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure.
- 7.12 The unit will transmit its battery pack condition indicating when the batteries require replacement.
- 7.13 The device shall have non-volatile memory.
- 7.14 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub.
- 7.15 The device shall be third party certified as tested to EN54 parts 18 and 25.

8.0 Electronic Sounder/VAD

- 8.1 Sounders are to be of such manufacture as generally used within the fire industry.
- 8.2 The unit shall be capable of generating 32 different sounder tones set via dip- switches on the sounder and have the ability to adjust the volume via a potentiometer.
- 8.3 The radio sounder shall have three 'C' and three 'AA' alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions
- 8.4 The unit shall have an in-built microphone allowing for a rapid and unobstructed test of every sounder, generated and reporting to the control panel.
- 8.5 The radio module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 8.6 The unit shall have variable power output of 0-14dBm.
- 8.7 The unit shall be fitted with an integral tamper switch, which contacts the wall mount and be capable of monitoring sounder head removal.
- 8.8 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure and provision to energise the sounder at its full operating level for a further thirty-minute period.
- 8.9 The individual units shall have fully synchronised sounder patterns to their relevant RCC.
- 8.10 The sounder shall be capable of having two different tones to allow for cause and effect i.e. phased evacuation which must be activated within 10 seconds of a generated fire alarm or test signal.
- 8.11 The unit has an IP rating of IP23 as standard IP65 options shall also be available.
- 8.12 The unit will transmit its battery pack condition indicating when a replacement is due.
- 8.13 The device shall have non-volatile memory.
- 8.14 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub.
- 8.15 The device shall be certified as tested to EN54 parts 3, 23 and 25.

9.0 Combined Detector Sounder/Visual indicator

- 9.1 Sounder/Visual indicator base should be compatible with all FireCell detector heads.
- 9.2 The unit shall be capable of generating 4 different sounder tones set via dip- switches on the sounder and have the ability to adjust the volume via a dip- switch.
- 9.3 The radio sounder/Visual indicator base shall have three 'C' and three 'AA' alkaline batteries providing primary and secondary supply support and a microprocessor control unit. The battery pack should be capable of powering the device for five years under normal conditions
- 9.4 The unit shall have an in-built microphone allowing for a rapid and unobstructed test of every sounder, generated and reporting to the control panel.
- 9.5 The radio module shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 9.6 The unit shall have variable power output of 0-14dBm.
- 9.7 The unit shall be fitted with an integral tamper switch, which contacts the ceiling mount and be capable of monitoring sounder/head removal.
- 9.8 The unit shall be capable of indicating low battery warning with a minimum of thirty days notice of impending failure and provision to energise the sounder at its full operating level for a further thirty-minute period.
- 9.9 The individual units shall have fully synchronised sounder patterns to their relevant RCC.
- 9.10 The sounder shall be capable of having two different tones to allow for cause and effect i.e. phased evacuation which must be activated within 10 seconds of a generated fire alarm or test signal.
- 9.11 The unit will transmit its battery pack condition indicating when a replacement is due.
- 9.12 The device when coupled to an optical detector shall have a fast test mode controlled by the Radio Hub to ease maintenance and limit excess test smoke being used.
- 9.13 The device shall have non-volatile memory.
- 9.14 The device shall be capable of being logged on to the RCC and addressed via the Radio Hub.
- 9.15 The device shall be certified as tested to EN54 parts 3, 5, 7 and 25.

10.0 Radio Loop Module (RLM)

- 10.1 Radio wireless optical and heat detector variants, call-points and electronic alarm indication units shall communicate directly to nominate RLM for onward communication to the CIE via a hardwired Loop.
- 10.2 The RLM shall be compatible with Kentec control panels using the XP95 protocol.
- 10.3 The RLM shall have the ability to use UHF 868 MHz frequency transmitter/receivers.
- 10.4 The RLM shall have a power output of 14dBm.
- 10.5 A maximum of 5 RLM's can be associated per control panel loop.
- 10.6 The RLM shall use diversity aerial configuration for increased signal reliability.
- 10.7 The RLM shall be capable of self-testing and analysing its power sources on a constant basis, reporting any internal battery fault within 100 seconds.
- 10.8 The RLM shall have the capability to monitor up to 31 directly logged on devices selectable from detectors, call points, sounders and interface accessories.
- 10.9 The RLM shall be programmed using a simple user interface.

11.0 Radio Network Communicator (RNC)

- 11.1 The RNC shall use bi-directional communication using the 458MHz waveband.
- 11.2 The Units shall be capable of communication between themselves to allow for system network range extension.
- 11.3 The RNC shall have a simple user interface for programming and diagnostics.
- 11.4 It should be possible to fit remote high gain antenna for range extension purposes.
- 11.5 The RNC shall be capable of allowing networking of up to 16 FireCell control panels.
- 11.6 Each RNC shall have a power output of 500mW.
- 11.7 The device shall have non-volatile memory.
- 11.8 The device shall be certified as compliant to ETSI 300 220

12.0 Wireless Fire Alarm System Design

- 12.1 Those companies' tendering shall submit with the tender, all relevant information and detail as required for the appropriate design of the fire protection system as governed by the requirements below.
- 12.2 The detection system shall be arranged to comply with the requirements of BS5839-1:2017 and ensure optimum efficiency of smoke detection coverage commensurate with aesthetics and practical constraints.
- 12.3 Prior to installation the nominated contractor shall submit working drawings with engineering design details endorsed by the manufacturer.
- 12.4 The system shall be commissioned by the manufacturers approved installer who is suitably trained to survey, install, commission and maintain the system during its lifetime.
- 12.5 The system and all its sensors/devices shall be manufactured by a company working and accredited to the disciplined requirements of the ISO9001 Quality System. All system components shall have relevant third-party certification.

For More Information

This document has been produced to assist in the collation of an EMS FireCell fire alarm detection system specification with wireless or hybrid components for tender and quotation purposes.

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EMS is also able to provide FREE certified CPD seminars on a number of subjects associated with wireless and hybrid fire detection systems as well a fire system related subject.

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