

Emergency Lighting System

The present invention relates to an emergency lighting system and, in particular, to a test system for an
5 emergency lighting system operated over a LoRa (Long Range) wireless communication network.

Background

Emergency lighting systems including multiple emergency
10 luminaires are installed into buildings and activated in the event of a power outage or other emergency incident. Such emergency lighting systems are typically installed in commercial premises and in other environments such as larger residential premises.

15 Emergency luminaires are powered separately from the main lighting systems of a building. Typically, emergency luminaires are backed up by batteries. The performance of emergency luminaires is tested periodically to check that
20 the lights are in a suitable working condition in the event that an emergency incident occurs.

Known testing systems for emergency lighting systems operate over radio networks. Figure 1 shows an
25 illustration of a prior art distributed emergency lighting system. In the example of Figure 1, Emergency luminaires 120, 121, 122 are connected to multiple emergency luminaires 120a-c, 121a 122a-f, etc. This is referred to as a branch network. Communications from area controller
30 110 are transmitted to emergency luminaires within the emergency lighting system via defined communication pathways.

Emergency luminaires 120, 121 and 122 are referred to as
35 primary luminaires in the example of figure 1. Primary luminaires communicate directly with area controller 110

by receiving radio signals from area controller 110 and transmitting radio signals to area controller 110. Each of primary emergency luminaires 120, 121 and 122 has a branch of further emergency luminaires extending from it.

5 For example, emergency luminaire 120 has emergency luminaires 120a, 120b and 120c on its branch. The further emergency luminaires on the branch are referred to as secondary luminaires. The secondary luminaires communicate with area controller via the relevant primary
10 luminaire. Secondary luminaires do not communicate directly with area controller 110. Any instruction signals from area controller are received by primary luminaires 120, 121 and 122 and forwarded to secondary luminaires on the branch. These communication paths are
15 referred to as communication pathways.

The communication pathways for the emergency luminaires in the network are now described. In the case of primary luminaire 120, communication signals from area controller
20 110 are received at primary luminaire 120, transmitted from primary luminaire 120 to secondary luminaire 120a, and further transmitted from secondary luminaire 120a to secondary luminaires 120b and 120c. For primary luminaire 121, communication signals from area controller 110 are
25 received at primary luminaire 121, transmitted from primary luminaire 121 to secondary luminaire 121a. In the case of primary luminaire 122, communication signals from area controller 110 are received at primary luminaire 122, transmitted from primary luminaire 122 to secondary
30 luminaires 122a, 122b and 122c, and further transmitted from secondary luminaire 122b to secondary luminaire 122d, and further transmitted from secondary luminaire 122d to secondary luminaires 122e and 122f.

35 Communications from secondary luminaires to area controller 110 are transmitted in the reverse direction

along the same communication pathway. For example, signals from secondary luminaire 120c are transmitted to secondary luminaire 120a, and further transmitted from secondary luminaire 120a to primary luminaire 120, and
5 then transmitted from primary luminaire 120 to area controller 110.

In the prior art example of Figure 1, the area controller is typically connected to the primary emergency luminaires
10 via a short range radio communication network, although other network connections, for example wired networks may be used. The connections between primary emergency luminaires and secondary luminaires and between secondary luminaires may be across a fixed line network or a short
15 range radio network.

When the emergency lighting system of Figure 1 executes a test procedure for all emergency luminaires, an emergency luminaire test initiation signal is transmitted from area
20 controller 110 to primary emergency luminaires 120, 121 and 122.

On receipt of the test initiation signal, each of the primary emergency luminaires 120, 121, and 122 transmits
25 the test initiation signal on to secondary emergency luminaires on its branch, along the communication pathways discussed above. Each of the primary and secondary emergency luminaires executes an emergency test procedure on receipt of the test initiation signal. Test results
30 are transmitted from each emergency luminaire along the communication pathway of the branches to emergency luminaires 120, 121 and 122. Primary emergency luminaires 120, 121 and 122 then transmit the test results back to area controller 110 across the radio communication
35 network. As discussed above, the distributed emergency luminaires are connected in a branch network.

Prior art systems encounter several operational challenges and problems. Branch networks are short range radio networks. Such networks have limited range and typically
5 require the area controller to be in close proximity to the emergency luminaires. In large buildings this may require multiple area controllers and multiple branch networks. The area controllers are generally connected together via physical cabling. The number of emergency
10 luminaires associated with each branch network is also limited. Such prior art systems may also encounter issues with implementation in particular with the radio link between emergency luminaires within the branch network. Fault diagnosis and identification of the location of
15 faults in the system can also be challenging since communication failure between the area controller and the emergency luminaires could occur at a number of points in the system. If a single emergency luminaire in a branch were to fail then all downstream emergency luminaires
20 would also lose communication. For example, in figure 1 if emergency luminaire 122b were to fail then emergency luminaires 122d to 122f would all lose communication to primary emergency luminaire 122 and, hence, area controller 110.

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There are other network technologies to address some of these limitations such as mesh networks. In a mesh network any adjacent emergency luminaire can talk to any other emergency luminaire. If a given emergency luminaire fails
30 an alternative communication path can be tried. Such networks still have relatively short range connections and require sophisticated software to manage.

Embodiments of the present invention seek to address these
35 challenges.

Summary of Invention

In a first aspect the invention provides an emergency lighting system for a building comprising a control node and plurality of emergency luminaires. Each of the
5 plurality of emergency luminaires receives control signals directly from the control node across a long range wireless communications network. The system is configured to allow commissioning of respective emergency luminaries onto the control node through a commissioning protocol,
10 using a mobile device positioned in proximity to the respective emergency luminaries and operated over a separate wireless communications network, and once commissioned, to enable the control node to transmit test initiation signals to each emergency luminaire over the
15 long range wireless communications network.

The long range wireless communications network can be a LoRa network.

20 The separate wireless communication network can be a short-range network.

Each of the plurality of emergency luminaires can be configured to transmit a signal over the separate wireless
25 network, in response to receiving an initial signal from the mobile device.

The plurality of emergency luminaires can be each configured to emit audio cues, visual cues, or both, to
30 indicate a status information.

The plurality of emergency luminaires can be a plurality of the emergency luminaires mentioned in the second aspect below.

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In the emergency lighting system, the control node can be

as mentioned below in the fifth aspect.

In a second aspect the invention provides an emergency luminaire for use in an emergency lighting system. The
5 emergency luminaire is configured to receive a test signal across a first wireless communications network directly from a control node and to activate a test procedure at the emergency luminaire on receipt of the test signal, wherein said receipt of said test signal is enabled after
10 said emergency luminaire is commissioned. The emergency luminaire is also configured to receive and transmit signals across a second wireless communications network with a user device positioned in range of the emergency luminaire, to be commissioned onto a control node through
15 a commissioning protocol using the user device.

The emergency luminaire can comprise a radio receiver for receiving the test signal directly from the control node.

20 The second wireless communications network can be a short range communications network.

The emergency luminaire can be configured to receive and transmit ultra-high frequency radio waves.

25 Test signal can be received at the emergency luminaire, and the performance results are transmitted from the emergency luminaire, across a LoRa network.

30 The emergency luminaire can comprise an emergency lighting node, the emergency lighting node comprising the radio receiver and radio transmitter.

The emergency luminaire can comprise a processor for
35 executing a response procedure in response to receiving scan signals across the second wireless communications

network from the mobile device, the response procedure causes an initiation and transmission of a reply signal across the second wireless communication device.

- 5 The processor can be configured for executing a test procedure at the emergency luminaire in response to receiving the test signal.

10 The emergency luminaire can further comprise a radio transmitter for transmitting performance results associated with the executed test procedure directly to the control node.

15 The processor can be configured to control activation of a light source, an audio source, or both.

20 The emergency luminaire can be configured to receive a luminaire status signal and to activate the light source, the audio source, or both, in accordance with the luminaire status signal.

25 The processor can control activation of the light source, the audio source, or both, in accordance with a data linkage status with the user device.

30 The emergency luminaire can further comprise a performance measurement system, the processor initiating the test procedure by causing activation of the light source for a predefined activation period, the performance measurement system measuring the performance of the emergency luminaire during the activation period.

35 The performance of the emergency luminaire can be the current and voltage performance during the activation period.

In a third aspect, the present invention provides a method for testing the performance of an emergency lighting system for a building, the emergency lighting system comprising a plurality of emergency luminaires, comprising
5 the steps of:

from a user device, commission onto a control node one or more of the luminaires, which are in range of the mobile device over a wireless communication network, through a commissioning protocol;

10 at the control node, transmitting a test signal from a control node to each of the one or more emergency luminaries once they are commissioned, over a communication network which is different than the wireless communication network; and

15 at an emergency luminaire, receiving the test signal directly from the control node and activating a test procedure at the emergency luminaire on receipt of the test signal.

20 The step of receiving the test signal directly from the control node can be performed at a receiver at the emergency luminaire.

The method can comprise the step of, at the emergency
25 luminaire transmitting performance results from the executed test procedure directly to the control node.

The steps of receiving the test signals at the emergency light and transmitting the performance results from the
30 emergency luminaire can be performed across a LoRa network.

Each emergency luminaire can comprise an emergency lighting node, the emergency lighting node comprising the
35 radio receiver and radio transmitter.

The method can comprise the further step of storing identification for each of the plurality of emergency luminaires at the control node.

5 The method can comprise the step of comparing received performance results with stored identification to identify whether performance results have been received from each of the plurality of emergency luminaires.

10 In a fourth aspect, the present invention provides a method for enabling control of an emergency lighting system for a site or building from a control node over a communication network, the emergency lighting system comprising a plurality of emergency luminaires, the method
15 comprising the steps of:

from a user device, receiving data comprising location data of the site or building in relation to the site or building;

from the user device, commissioning one or more of
20 the luminaires in the system on to the control node through a commissioning protocol,

said one or more luminaires being in range of said user device over a second communication network.

25 The step of commissioning of a luminaire onto the control node can comprise registering a location information of the luminaire corresponding to identification data for the luminaire in the control node.

30 The step of commissioning one or more luminaires onto the control node comprises saving onto a memory location in the user device, said location information and identification data, and uploading the location information and identification data to the control node.

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The second communication can be a local short-range

network. The local short-range network can be an ultra-high frequency radio communication network.

5 The method comprises, from the user device, transmitting a scan signal across the second communication network, wherein the emergency luminaires are configured to, upon receipt of said scan signal, transmit a return signal across the second communication network to be received by the user device.

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A strength for the scan signal can be adjustable, or a frequency characteristic of the scan signal can be tuneable, or both.

15 The one or more luminaires commissioned from the user device can comprise those luminaires in the system which are positioned to receive the scan signal, and to transmit its respective return signal.

20 The one or more luminaires commissioned from the user device can be those luminaires which are positioned to transmit respective return signals of strengths above a threshold signal strength.

25 In a fifth aspect, the invention provides a control node for an emergency lighting system for a building comprising a control node and a plurality of emergency luminaires:

the control node comprising:

30 a transmitter configured to transmit a test initiation signal across a wireless communication network to each of a plurality of emergency luminaires to initiate a test procedure at each emergency luminaire;

a receiver configured to receive results signals across the wireless communication network directly from
35 each of the emergency luminaires, the results signals comprising the results from the test procedure from the

emergency luminaires; and

a data receiver configured to receive luminaire commissioning data from a user device, over another communication network.

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The control node can comprise a transmitter configured to transmit a results transmission signal across the wireless network directly to the plurality of emergency luminaires, the results transmission signal configured to initiate the emergency luminaires to transmit the results signals.

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The wireless communication network can be a LoRa network.

Each of the plurality of emergency luminaires can have a node ID, the node ID of the emergency luminaire being included in the results signal from the emergency lighting node.

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The radio control node can further comprise memory, the memory storing the node ID of each of the plurality of emergency luminaires.

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The radio control node can further comprise a processor, the processor configured to compare the node ID of each of the plurality of emergency lighting nodes stored in the memory with node IDs of the received results signals.

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The control node can further comprise an alert system.

In a sixth aspect, the present invention provides a test system for a control node of an emergency lighting system as mentioned above in the fifth aspect, the processor

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further comprising a clock, the processor being configured to activate the alert system if a results signal is not received from an emergency luminaire within a predefined time period.

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In a seventh aspect, the present invention provides a commissioning protocol for commissioning, from a user device, luminaires for an emergency lighting system onto a control node of the emergency lighting system, the control
10 node and the user device being configured to communicate over a first communication network, the luminaire and the user device being configured to communicate over a second communication network, the commissioning protocol comprising:

15 from the user device, transmitting an initial signal over the second communication network, and awaiting detection of reply signals from at least one of the luminaires, to detect corresponding luminaires from which the reply signals are transmitted;

20 on detection of a reply signal, assigning an identifier to the detected luminaire and assigning commissioning data corresponding to the detected luminaire;

confirming an access right in respect of the control
25 node, from the user device, prior to at least the identifier and commissioning data being written to the control node.

The assigning of the identifier and the commissioning data
30 can comprise uploading the identifier and the commissioning data to the control node over the first communication network.

The uploading can be performed after completion of
35 assignment of the identifier and the commissioning data.

The protocol can comprise synchronising a site data regarding a site where the emergency lighting system is installed, from the control node to the user device.

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The protocol can comprise updating a commissioning status for the luminaire after it is commissioned onto the control node.

10 The reply signal can be of at least a threshold strength.

The protocol can comprise establishing a data linkage between one of the detected luminaires with the user device.

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The protocol can comprise requiring a confirmation of a visual inspection of a detected luminaire prior to its being commissioned.

20 In a eighth aspect, the present invention provides an application executable on a processing device, the application being configured to, on execution on a user device, implement the protocol mentioned above.

25 In an ninth aspect, the present invention provides a non-transitory and non-volatile machine readable medium, providing a computer program including machine readable instructions to implement the application or the method mentioned above.

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Description of the Drawings

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

35 Figure 1 illustrates a prior art emergency lighting system;

Figure 2 illustrates an emergency lighting system in accordance with an embodiment of the invention;

Figure 3A illustrates the components of a control node;

Figure 3B illustrates the components of a control node;

5 Figure 4 illustrates the components of emergency lighting node and emergency light;

Figure 5 is a flow diagram showing steps taken in an embodiment of the invention;

10 Figure 6 is a flow diagram showing steps taken in an embodiment of the invention;

Figure 7 is a flow diagram showing steps taken in an embodiment of the invention;

Figure 8 illustrates an emergency lighting system in accordance with another embodiment of the invention;

15 Figure 9 is a flow diagram showing steps taken to commission an emergency light, in an embodiment of the invention;

Figure 10A to 10H depict user interfaces in a mobile application for commissioning an emergency lighting system, provided in accordance with an embodiment of the invention.

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Detailed Description

25 An embodiment of the present invention is shown in Figure 2 with some components illustrated in greater detail in Figures 3 and 4. Emergency lighting system 200 includes control node 210. Control node 210 activates an emergency test procedure for an emergency lighting system.

30 The emergency lighting system includes emergency luminaires 1200, 2200, 3200, 4200 and 5200. Each luminaire includes a light source 1222a, 2222b, 3222c, 4222d and 5222e and each emergency light source has an associated emergency lighting node 1220a, 2220b, 3220c, 4220d and 5220e. The emergency lighting node is typically
35 the part of the emergency luminaire responsible for

communication with the control node and can also control operation of the emergency light. Typically, the emergency lighting node is physically wired to the associated emergency light source. In some embodiments, 5 emergency lighting node may be contained in the same physical unit as the emergency light source. In other embodiments emergency lighting node and emergency light source may be separate units. The emergency lighting node and emergency light may be connected via electrical 10 wiring.

Control node 210 communicates directly with emergency lighting nodes 1220a, 2220b, 3220c, 4220d and 5220e over radio network 230. Preferred embodiments of the invention 15 communicate using LoRa technology. LoRa is a low power wide area radio network. Control node 210 includes a LoRa transmitter and LoRa receiver. Emergency lighting nodes are LoRa nodes and each node also include LoRa transmitter and receiver. A benefit of using LoRa technology in 20 emergency lighting systems is the long range of the LoRa communications network. LoRa networks have range of several Kilometres (Kms). Therefore, a single LoRa control node is able to communicate with multiple emergency lighting nodes at large enough distances to 25 cover large buildings or areas. Additionally, the LoRa communication protocol is reliable over such long distances and can communicate with many nodes.

In the network architecture of Figure 2, every emergency 30 luminaire in the emergency lighting system communicates directly with the control node across a radio network. Control node 210 communicates with each emergency lighting node directly. All emergency lighting nodes receive radio signals from control node 210. In the architecture of 35 Figure 2, the radio signals are transmitted in a star configuration. The control node 210 is a hub which

communicates with each emergency luminaire. Radio signals to and from the control node are not transmitted between emergency lighting nodes, instead signals are transmitted directly between control node and each emergency lighting node. This communication architecture is sometimes referred to as point to point communication where there is direct communication between the control node and the emergency luminaires. The communication from the control node to the emergency luminaires may be by a single broadcast communication or may be individual messages to each emergency luminaire.

Possible arrangements of the components of control node 210A are illustrated in Figures 3A and 3B. The components of control node 210A may be contained in a single physical unit or in multiple physical units which may be remote from one another.

Figure 3A illustrates a first example of control node 210A in which the components are distributed between two physical units. Control node 210A includes gateway 302A and server 304A. Gateway 302A includes the radio components for the control node including LoRa antenna 310A and RF driver 360A. Server 304A includes the processing and control components. Server 304A typically makes the decisions and instructions, and includes memory 320A, processor 330A, clock 340A and input 350A.

Gateway 302A and server 304A are connected by communication channel 370A. In the example of Figure 3A the communication channel is an ethernet connection. In further embodiments other wired connections may be used, for example electrical connection across an electrical wire, or wireless connections may be used.

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In the example of Figure 3B the components are contained

within one physical unit. Control node 210B includes LoRa antenna 310B configured to transmit and receive radio signals over LoRa network. Signals from antenna 310B are driven by RF engine 360B. Control node 210B also includes
5 memory 320B, processor 330B, clock 340B and input 350B.

Each control node is associated with one or more emergency lighting systems. Details of the emergency lighting systems are stored in memory 320A/B. Each emergency
10 lighting system has a lighting system ID. Further details of each lighting system are stored in the memory including at least some of the following information: number of emergency lights within the emergency lighting system, location of the emergency lighting system, location of
15 emergency lights within the emergency lighting system, identification data for each emergency light. Memory 320A/B also includes performance history and performance requirements for each emergency lighting system. At least some of the following information may be stored for each
20 emergency lighting system: required frequency for testing emergency lighting system, date and time of previous emergency tests, test requirements for emergency lighting system for example duration of activation of emergency lights during test, and any other specific performance
25 requirements associated with that emergency lighting system. Memory may also include the time and date of the next scheduled test for the emergency lighting system.

Control nodes 210A/B include processors 330A/B. The
30 processors 330A/B manage incoming and outgoing radio signals and accesses information to and from memory 320A/B relating to emergency lighting tests.

Processors 330A/B access clock 340A/B. Control nodes 210
35 A/B may include input 350A/B. 350A/B may be a manual input device, for example a keyboard, activation switch or

other input device. Input relating to emergency lighting test activation and management may be received at input device 350A/B.

5 An example of an emergency luminaire 4000 including an emergency lighting node and associated emergency light source is shown in Figure 4. In the example of Figure 4 the emergency lighting node 400 includes a transmitter and receiver antenna 420. As discussed previously, preferably
10 the emergency lighting node operates within the LoRa communication framework and is configured to receive LoRa radio signals. Emergency lighting node 400 includes memory 425. Memory 425 is configured to store performance data related to the emergency light during operation.
15 Memory also stores node ID allocated to the emergency lighting node and/or the emergency light. Memory may also store previous performance data relating to the associated emergency light. Memory may store test procedure characteristics for example duration of test, measurements
20 required to be measured during test etc. The processor 430 receives and interprets signals received by antenna 420 and controls activation of emergency light 410. Clock 435 monitors activation periods for emergency light unit 410.
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Emergency light unit 410 includes power supply 455. Typically, power supply 455 is a battery unit dedicated to the emergency light. Emergency light 410 includes light source 445 and switch 440 to control the ON/OFF state of
30 light source 445. Switch 440 is controlled by processor 430. Switch 440 may include additional inputs not shown to trigger activation of the emergency light source, for example light sensors or other sensors or a manual input. Performance management system 450 monitors performance of
35 light source 445 during activation. Typically, the voltage across the light source and current through the

light source are measured during the activation period. Performance measuring system 450 may monitor other performance criteria for the emergency light during the test procedure. Results obtain by the performance
5 measurement system during the test are provided to memory 425 for storage.

The arrangement of components within Figure 4 is for the purposes of illustration only and is not restrictive. In
10 further embodiments the components are distributed differently between physical units. For example, light source 445 may be in a physically separate head unit and all other components may be contained within a head unit. In further embodiments all components are positioned on a
15 single physical unit.

The mode of operation of an embodiment of the invention is now described with reference to the flow diagrams of Figures 5, 6 and 7.

20 At 510 a particular lighting system is identified for testing at control node 210A/B. Typically, the lighting system is associated with a particular building or premises. Control node 210A/B retrieves information
25 relating to the identified lighting system from memory 320A/B. Typically information may include lighting system ID, location of the lighting system, number of lights within the identified lighting system, etc. The test may be triggered by a manual input from input device 350A/B or
30 triggered by a timing module using the timer from clock 340A/B.

Processor 330A/B creates a test initiation signal. Typically, the test initiation signal includes the
35 identification of the emergency lighting system. In a situation where different configurations of test events

might occur within a single system, the signal also includes identification of the relevant test procedure requirements. For example, the system may include a first test procedure in which emergency lights are tested for a
5 120 minutes period and a second test procedure when the lights are tested for a 90 minutes period. At 520 the test initiation signal is transmitted from radio transmitter 310A/B of control node 210A/B across LoRa network 230. In some embodiments the time at which the
10 test initiation signal is transmitted from control node 210A/B is stored in memory 320A/B as Tstart. As discussed above control node 210A/B transmits test initiation signals directly to each emergency luminaire. This is performed in a star configuration with control node 210A/B
15 being the hub.

At 530 the test initiation signal is received at emergency lighting node 400 by antenna 420. Test initiation signal is decoded by processor 430. The parameters for the test
20 are determined at 540. The test parameters may be included in the test initiation signal or, alternatively, the particular test may be identified within the test initiation signal by a particular code and the test parameters associated with the code are retrieved from
25 memory 425. After the parameters are determined the test procedure is initiated at 550. In an embodiment the test procedure involves activating emergency light source for a particular time period associated with the test. At 550 the processor 430 activate switch 440 of the emergency
30 light to activate light source 445. The time at which the light source is activated is provided by clock 435 and stored as test data against this test. During the emergency light test performance measurement systems 450 monitors the performance of the emergency light. As
35 discussed above, the voltage and current of the lighting circuit may be measured and stored in memory 425 at 560.

Clock 435 monitors the duration of the test procedure and upon completion of the test duration processor 430 terminates the test by switching off light source 445 by switch 440. Emergency light test is terminated at 570.

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In some embodiments of the invention the test results are automatically transmitted back from transmitter 420 of each emergency lighting node to control node 210A/B. In further embodiments control node 210A/B monitors the time
10 period from Tstart. Upon completion of a predefined time period, for example the time period associated with the test or at a later predefined period, control node 210A/B transmits a result request signal to all emergency lighting nodes within emergency lighting system at 610.
15 At 620 emergency lighting node 400 receives the results request signal at radio receiver 420. At 630 processor 430 retrieves results from the emergency test from memory 425. Typically, the test identification is included in the results request signal in order that results are
20 retrieved from the appropriate test. The results signal is transmitted from each emergency lighting node 400 at 640 and received at control node 210A/B at 650.

Referring now to Figure 7, at 710 the results signals
25 received from emergency lighting nodes within the emergency lighting system are analysed at control node 210A/B. The performance of each emergency light is analysed against predetermined criteria. If an emergency luminaire fails to meet the required performance standard
30 an alert is raised at 730 by control node 210A/B.

At 720 control node 210A/B determines whether results have been received from all emergency lighting nodes within the emergency lighting system. The emergency lighting node
35 IDs contained within the received signals are compared against the list of emergency lighting nodes within the

emergency lighting system to identify whether any results have not been received. In the event that a results signal is not received from an emergency lighting node, an alert is raised at 730.

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The alert may be raised in many different forms, for example control node 210A/B may send an electronic communication, for example a SMS or email, to predefined personnel responsible for the emergency lighting system to raise attention to the missing data. Alternatively, a visible alert may be raised to alert personnel. In some embodiments control node 210A/B creates an additional interrogation signal and transmits this to those emergency lighting nodes which have not responded with results data.

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A further embodiment of the present invention is shown in Figure 8. This embodiment is similar to the embodiment shown in Figure 2. Components described in respect of those embodiments, with reference to Figures 3A, 3B, and 4, are understood to be applicable to the embodiment of Figure 8.

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Referring again to Figure 8, each emergency luminaire 840, 842, 844, 846, 848 directly communicates with the control node 810. Similar to the earlier embodiment, it is preferred that the communication between the control node 810 and the emergency luminaires 840, 842, 844, 846, 848 is enabled using over a long range network 230, such as a LoRa network.

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The luminaires 840, 842, 844, 846, 848 each includes a light source 8404, 8424, 8444, 8464, 8484, and a luminaire node 8402, 8422, 8442, 8462, 8482. The luminaire node is configured to communicate with the control node 810 and the device 820 of a user (such as an administrator). The device 820 may be a mobile device. The luminaire node may

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also be configured to control operation of the light source. Optionally, one or more of the luminaires may also include an audio source 8406, 8426, 8446, 8466, 8486.

5 In this embodiment, each luminaire 840, 842, 844, 846, 848, in addition to being configured to communicate with the control node 810 over a communication network 230, will further be configured to communicate with the fixed or mobile devices 820 over a second communication network
10 830 which is wireless.

Preferably, to implement the above, the luminaires are each enabled with short-range communication capability, so as to communicate with the fixed or mobile devices 820
15 which are enabled with the same capability, which are in range of each other. This enables the luminaire nodes to be commissioned or initialised using the devices 820. An example of the short-range communication is enabled using short-wavelength radio waves which have a low power
20 requirement, such as short-wavelength, ultra-high frequency radio waves, e.g., Bluetooth®. In this example, the luminaire nodes will each be equipped with a radio antenna which can receive and transmit signals in the ultra-high frequency band.

25 In order for the user device(s) 820 to be able to commission the luminaires 840, 842, 844, 846, 848 onto the control node 810, the user device(s) 820 and the control node 810 are configured to communicate over a further
30 wireless communication network 850.

The above arrangement enables a user to, from a user device 820, commission onto a control node 810 one or more of the luminaires, which are in proximity to the user
35 device 820 over the wireless communication network 830, through a commissioning protocol.

Figure 9 depicts a commissioning protocol for commissioning one or more of the luminaire in the emergency lighting system onto the corresponding control node, in accordance with an embodiment of the present invention.

Initialisation or commissioning of a luminaire node will cause location, functional, and identification information pertaining to that node, to be registered with the control node 810. Thus, at step 902, the control node 810 involved in the registration will be identified. This can be done by the user or administrator entering or selecting a unique identifier for the control node 810, such as an internet protocol (IP) address for the control node 810. In cases where one control node 810 is provide for an entire building, building portion (e.g., a particular floor or level, or particular wing of a large building) or structure, the identification of the control node 810 may be achieved by the identification of the building, building portions, or structure.

Depending on the specific implementation, the user or administrator may be required to log into the control node 810 or a server at the control node, for instance by entering their credentials in order to interact with the control node 810 (step 904), before they can add the luminaire node or nodes to be commissioned.

The order of steps 902 and 904 may be reversed. That is, the user may log into the program or system first, and then identify the site or the control node or site where the emergency lighting system is to be commissioned. The system may only allow a certain user to commission lighting systems at particular sites or onto particular control nodes.

Preferably, the control node 810 and the device 820 will be synchronised, by the control node 810 providing data relating to the site where the emergency lighting system
5 is located, to the device 820 (step 906). The data relating to the site may be comprise the building structure data, floor plan, building area or size information.

10 In step 908, from the location of the user's device 820, the surrounding area will be scanned, to identify or detect the presence of luminaires, or more generally, the physical units, that are close by. The scanning and detection are enabled over the wireless communication
15 network 830. Given the proximity between the user device 820 and the luminaires, the wireless communication network 830 can be a short range communication network. For instance, a short-range radio wave (e.g., Bluetooth®) transmission will be initiated from the user device.
20 Luminaire nodes which are in range of this transmission will respond by providing return signals. The user device is adapted to receive the return signals. If the user device does not receive any return signals, this indicates that the user will need to move to a location closer to
25 the luminaires (step 909), and scan again (step 908). This is represented by the dashed arrows 922 in Figure 9.

The program or application for commissioning the system will then cause the user device to display the detected
30 nodes, i.e., nodes whose return signals are detected (step 910). Optionally, only nodes whose return signals are of a sufficient level of signal strength, i.e., above a signal strength threshold, will be included in the scan result. Furthermore, the program or application for
35 commissioning the system may allow the user to adjust a signal strength of the scan signal to be transmitted to

scan for nearby luminaires. A lower scan signal strength results in a smaller scan range, and thus a luminaire will need to be nearer to the user device, in order for its return signal to be received. The program or application
5 may additionally or alternatively, allow the user to tune the scan signal.

The strengths of the return signals from different luminaire nodes can provide an indication for the
10 proximity of these nodes to the user device 820. The commissioning program or application installed on the user device 820, will display a list of the detected luminaire nodes. The list may be sorted by the respective return signal strengths of the detected nodes. This enables the
15 administrator to choose the most adjacent or most easily accessible luminaire node to start the commissioning process.

At step 912, the user selects, from amongst the luminaire
20 nodes whose return signals are detected, a luminaire to commission onto the control node 810. This selection may cause the user device 820 to establish a data linkage, i.e., a communication linkage, with the luminaire, over the wireless communication network 830. This data linkage
25 enables the user to write commissioning information (if required) to memory location(s) provided on the luminaire node. The commissioning information may be, e.g., an assignment of a location data for the luminaire node.

30 This data linkage can also allow the user to provide signals to the linked luminaire node to activate either or both of any light source and audio source controlled from the luminaire node.

35 Further, the display may provide an indication as to whether any of the in-range luminaires are already

commissioned, by displaying corresponding visual indicators next to each detected luminaire. In the display, the result list of luminaires may be sorted so that not-yet commissioned luminaires show up earlier in the list.

Preferably, the user will be required to make a visual confirmation (as shown in step 913) of a detected luminaire, before they can commission that luminaire. For example, the user can check that the nodes the user has selected on the display are the one the user is standing underneath. Thus, not only does a luminaire need to be within data communication range, it will also be located in close enough proximity to the user so that the user can visually inspect it, before the user can commission that luminaire. The user can vary the selection by selecting additional luminaries or by deselecting the pre-selected luminaries from step 912. This is represented by the dashed arrow 924 in Figure 9.

The requirement for physical proximity allows the user to receive or perceive audio cues, visual cues, or both, from the luminaires. For instance, as shown in Figure 8 the processor (430) (as shown in in Figure 4) of each luminaire (840, 842, 844, 846, 848) will be configured to receive luminaire status signals, and accordingly control the activation of its respective the light source (8404, 8424, 8444, 8464, 8484), audio source (8406, 8426, 8446, 8466, 8486), or both. The luminaire status signals may be provided over the same long range wireless communication network 230 from the control node 210, 810. The processor 430 may also activate either the light source, the audio source, or both, in dependence of its status of data linkage with the user device 820.

The cue(s) help the user(s) to ascertain the status of the

luminaires. For example, for each luminaire, either the light source or an indicator light may emit lights of different colours, or emit lights at different intervals (e.g., blinking lights), to indicate the status of the luminaire. Different visual or audio signals may indicate one or more of statuses including but not limited to the following: the luminaire has not been commissioned, is or is not in short range communication with the user device, is in the process of being commissioned, the commissioning process is successful, has been commissioned and is operational, is under a testing protocol, or is faulty.

At step 914, the administrator will enter or select relevant parameters for the selected luminaire, to commission it onto the control node 810. These parameters can include, e.g., location information (site, building, floor, area, type of luminaire associated with the node), and a unique identifier for the node. One or more of these parameters may be automatically determined or suggested, on the basis of geolocation data corresponding to the location of the user device 820.

In step 914, data representing the parameters are provided to the control node 810 over the further wireless network 850 to commission the node. The user may also be required to positive confirm that the luminaire is to be commissioned. This further wireless network 850 may be a local area network or over a Wi-Fi network. The device may be connected to a wireless hotspot enabled from the control node 810. At this point, the commissioned luminaire becomes a known unit to the user device 810. It is also assigned to a particular luminaire location according to the data for the site where the emergency luminaire system is provided. The commissioning program is able to recognise which luminaires have been commissioned, by checking which luminaires are known units, or by

checking which luminaires are known units which are assigned to known luminaire locations at the site.

The user then repeats step 908 to scan for in-range
5 luminaires, and then the subsequent steps 910, 912,
through step 914 to commission another luminaire.
Therefore, preferably, when the in-range luminaires are
shown in the scan result, the display will provide
indications as to which luminaires have been commissioned.

10

In a different embodiment, while there are still in-range
luminaires remaining in the scan result (from step 908)
that have not yet been commissioned, the commissioning
protocol 900 will allow the use to select another
15 luminaire to commission, without rescanning for in-range
luminaires. This is represented by the dashed arrow 920 in
Figure 9.

At the end of commissioning any particular luminaire, the
20 user may confirm that it has been properly commissioned
(step 916). For example, this may be done by the user re-
scanning for luminaires which are close by - i.e., re-
initiate a transmission of the short-range radio wave
signal, and scan for return signals. Depending on the
25 implementation, the scan result will show whether the node
or nodes have been commissioned. This allows the user to
see that a node has not been properly commissioned, if it
still shows up in the scan result as an un-commissioned
node, even though he or she had completed the data
30 transmission and confirmed to commission that node.

Prior to rescanning, the user may also move to a different
area or location (step 918), in order to scan for
luminaire nodes in that area or surrounding that location
35 (step 908). This relocation step is typically done after
the user has completed commissioning all of the luminaire

nodes in a previous area or location. The user may also move to a different area (step 918) at another time, e.g., when he or she cannot visually see a luminaire which is found during the scan process. However, after relocation,
5 the protocol preferably will require the user to re-scan for in-range luminaires.

The commissioning process for the system for a site is completed, once all of the nodes for that system have been
10 commissioned.

So that the above-mentioned protocol 900 can be performed, an application or program will be provided. The application or program are configured to be installed on
15 the user device 820, and when executed allow the user to interact with the program to carry out the various steps mentioned. The user will launch the application or program from their device 820, choose the site where the emergency lighting system to be commissioned is located, and then
20 commission the luminaires in the system one by one onto the control node 810 corresponding to the site.

In some embodiments, two or more users can be administrators, that is, having the ability to commission
25 the emergency luminaire system. In these cases, all of the users with the administrative privilege will preferably synchronise the site data with the control node 810 to ensure they are reviewing consistent site structure.

30 Portions of the commissioning process described above may be performed offline. That is, the user will still scan for luminaires in proximity to the user device over the wireless communication network 830. The user will then assign or enter the commissioning data offline. The
35 commissioning data comprise identifiers for the luminaires, location or site data for the luminaires, or

both. The commissioning data may include other data in relation to the luminaires. This commissioning data is retained in the user device 820, i.e., saved in a memory location in the user device 820. When the user makes a
5 data connection with the control node 810 and gains access to the control node 810 as an administrator, the data are then uploaded or synchronised to the control node 810.

Figures 10A to 10H are examples of application or program
10 interfaces or displays that are displayed on the user device 820, during the commissioning process.

Figure 10A shows, as an example, a mobile application interface 1002 which appears at the beginning of the
15 commissioning process, before the user has identified the site where the emergency lighting system to be commissioned is located. This initial interface 1002 includes an activatable field, button, or switch 1004, which when activated will allow the user to add a site
20 where an emergency lighting system is to be commissioned.

Figure 10B shows a "site data" interface 1006 which is displayed when the user interacts with the button 1004 to enter site data. The site data interface 1006 includes a
25 field 1008 for entering the identifier (e.g. IP address) of the control node 810 onto which the emergency lighting system is to be commissioned. The site data interface 1006 also includes an activatable button, switch, or area 1010, which on activation will initiate a connection between the
30 user device 820 and the identified control node 810.

For this connection can be made, the user device 820 and the control node 810 will need to be connected to the same network. This network will be the "further wireless
35 network" 850 mentioned with reference to Figure 8, or may be a local wired network on which the control node 810 is

provided. In the depicted embodiment, the site data interface 1006 also includes a message 1012 comprising directions for connection to the required network. The message 1012 may also comprise directions for connecting
5 to a control node for a site.

Figure 10C depicts an "site confirmation" interface 1014 which will be displayed once the device 820 is connected to the control node 810. The site confirmation interface
10 1014 allows the user to confirm that the site identified on the "site data" interface 1006 is to be added to the list of site or sites, for which the user will manage one or more of the testing, operating, and commissioning procedures.

15 The site confirmation interface 1014 provides an indication or message 1016 to confirm the device is connected to the control node 810. The indication or message 1016 may also comprise the site information, such
20 as any identifier for the site, for the user to review prior to confirming that the site should be added.

The site confirmation interface 1014 also provides an interactive field 1018 which the user will select (e.g.,
25 by clicking or touching the field), to confirm the site should be added. The message 1016 and the interactive field 1018 may be provided in a closable window 1019.

Figure 10D shows an interface 1020 which is launched when
30 the user selects the function to add a site (e.g., by interacting with the field 1018). The interface 1020 includes a portion 1022 which will display a list of one or more sites which have been added. The list is empty if no site has been added. In the listing, a visual
35 indication 1024 is preferably adjacent the name of an added site, to indicate whether there is data connection

between the user device 820 and the control node or server for that site. The interface 1020 also includes an activatable field, area, or button 1026, which on activation will prompt or allow the user to enter their log-in credentials in order to log into the control node or server.

An example of a log-in interface 1028 is shown in Figure 10E. The field 1025 for log-in credential entry and the field 1027 to submit the log-in information can be provided in a closable window 1029.

Figure 10F depicts the interface 1030 which is shown when the user successfully logs into a server and is considered an administrator. The interface 1030 displays a message 1032 which confirms that the user has successfully logged in as an administrator. The interface 1030 further includes an interactive field 1034 is included on the interface 1030, for the user to save their login credentials to facilitate future management of the same site. The message 1032 and interactive field 1034 may be provided in a closable window portion 1036. The closable window portion 1036 may be refreshed from the closable window portion 1029 which comprises the log-in credential and log-in submission fields 1025, 1027.

Figure 10G depicts a site interface 1038 which is shown when the closable window portion 1036 is closed. The site interface 1038 includes an interactive field 1040 which the user can activate to initiate a scan for nearby luminaires in the system. The user device 820 will scan for luminaires that are in-range, or both in range and being detected as in range and having at least a certain level of signal strength. Here this interactive field 1040 is shown as a Bluetooth® icon, because the emergency luminaires and the user device 820 are both enabled with

Bluetooth® capabilities.

The site interface 1038 includes a second interactive field 1042. Activation of or interaction with the second
 5 button 1042 will cause or initiate a data synchronisation process whereby any data relating to the site currently available on the user device 820 is synchronised with the control node data relating to the site. If no existing data pertaining to the site have been saved on the user
 10 device 820, the data from the control node 810 will be downloaded onto the user device 820 over the further wireless communication network 850. The icon for the second interactive field 1042 may change to visually indicate to the user that data is being synchronised from
 15 the control node 810.

Figure 10H depicts a scan result interface 1044. A list
 1046 of one or more detected luminaire nodes, preferably sorted by their return signal strengths, is shown. Further
 20 preferably, regardless of the return signal strengths detected, the detected luminaires which have not been commissioned will be presented earlier in the list.

As further shown in Figure 10H, in this example, three
 25 fields are displayed provided for each listed luminaire. These include a first field 1048 which will indicate the luminaire's type (e.g., a luminaire for an emergency exit, or a luminaire which provides a flood light). The first field 1048 may include different icons depending on what
 30 the luminaire is for.

A second field 1050 is provided for each identified node, for the administrator to confirm they have made a visual confirmation or inspection of that luminaire. A third
 35 field 1052 is provided to enable the administrator to see the luminaire's name (if the luminaire is commissioned) or

the words "Not Commissioned" if the luminaire is yet to be commissioned.

One or more of the three fields 1048, 1050, 1052 may
5 further be displayed in a manner which indicates the
status of the nodes. For instance, they may be shown in
different colours or with different lights, to indicate
that the luminaire is not-yet commissioned (e.g., grey
10 colour), out of maintenance or off-line (e.g., red
colour), online or operational (e.g. green colour), in the
process of joining a server network (e.g., blue flashing
light). These may be coordinated with the outputs of
lights or indicators provided on the physical unit at the
node.

15

The interface 1044 further provides an interactive field,
being a scan button 1054, which upon activation will cause
the program to scan for in-range luminaires again.

20 Embodiments of the present invention provide a system for
testing, commissioning, or both, an emergency lighting
system which operates to initiate tests at emergency
luminaires within emergency lighting system over a radio
communication network. Embodiments are configured to
25 operate over a LoRa network. In embodiments a control
node communicates directly with all emergency lighting
nodes within an emergency lighting system. Each emergency
lighting node is associated with an emergency luminaire.
Each emergency lighting node includes a receiver for
30 receiving radio signals from the control node. The
configuration allows all emergency luminaires to be
controlled directly from the control node without signals
needing to be transmitted between emergency lighting
nodes.

35

Such embodiments provide a flexible system in which

additional emergency luminaires can be added into an emergency lighting system without requiring any rewiring of existing infrastructure. Additionally, an entire emergency lighting system even within large buildings or
5 infrastructures can be tested by control node sending a single test initiation signal. Such systems provide control over the test environment and reduce the number of potential points of error in the case that a test result is not received from an emergency light.

10

It will be clear to those skilled in the art that the advantages of using a one-to-many communication system between a control node and emergency light extend beyond the test environment and could be used to interrogate any
15 particular light at any time or could be used to control activation of the lights in any situation.

20

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

25

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but
30 not to preclude the presence or addition of further features in various embodiments of the invention.

Claims

1. An emergency lighting system for a building comprising a control node and plurality of emergency
5 luminaires, wherein each of the plurality of emergency luminaires receives control signals directly from the control node across a long range wireless communications network, the system being configured to allow
10 commissioning of respective emergency luminaries onto the control node through a commissioning protocol using a mobile device positioned in proximity to the respective emergency luminaries and operated over a separate wireless communications network, and once commissioned, to enable the control node to transmit test initiation signals to
15 each emergency luminaire over the long range wireless communications network.
2. An emergency lighting system according to claim 1 wherein the long range wireless communications network is a LoRa network.
- 20 3. An emergency lighting system according to claim 1 or claim 2, wherein the separate wireless communication network is a short range network.
4. An emergency lighting system according to any preceding claim, wherein each of the plurality of
25 emergency luminaires is configured to transmit a signal over the separate wireless network, in response to receiving an initial signal from the mobile device.
5. An emergency lighting system according to any preceding claim, wherein the plurality of emergency
30 luminaires are each configured to emit audio cues, visual cues, or both, to indicate a status information.
6. An emergency lighting system according to any preceding claim, wherein the plurality of emergency luminaires is a plurality of the emergency luminaires of
35 any of claims 8 to 21.

7. An emergency lighting system according to any preceding claim, wherein control node is the control node of any of claims 38 to 44.

8. An emergency luminaire for use in an emergency
5 lighting system:

the emergency luminaire being configured to receive a test signal across a first wireless communications network directly from a control node and to activate a test procedure at the emergency luminaire on receipt of the
10 test signal, wherein said receipt of said test signal is enabled after said emergency luminaire is commissioned;

the emergency luminaire being configured to receive and transmit signals across a second wireless communications network with a user device positioned in
15 range of the emergency luminaire, to be commissioned onto a control node through a commissioning protocol using the user device.

9. An emergency luminaire according to claim 8 comprising a radio receiver for receiving the test signal
20 directly from the control node.

10. An emergency luminaire according to claim 8 or claim 9, wherein said second wireless communications network is a short range communications network.

11. An emergency luminaire according to claim 10,
25 configured to receive and transmit ultra-high frequency radio waves.

12. An emergency luminaire according to any one of claims 8 to 11 wherein the test signal is received at the emergency luminaire, and the performance results are
30 transmitted from the emergency luminaire, across a LoRa network.

13. An emergency luminaire according to any one of claims 8 to 12 wherein the emergency luminaire comprises an emergency lighting node, the emergency lighting node

comprising the radio receiver and radio transmitter.

14. An emergency luminaire according to any one of claims 8 to 13, further comprising:

5 a processor for executing a response procedure in response to receiving scan signals across the second wireless communications network from the mobile device, the response procedure causes an initiation and transmission of a reply signal across the second wireless communication device.

10 15. An emergency luminaire according to claim 14, wherein the processor is configured for executing a test procedure at the emergency luminaire in response to receiving the test signal.

15 16. An emergency luminaire according to claim 15, wherein the emergency luminaire further comprises a radio transmitter for transmitting performance results associated with the executed test procedure directly to the control node.

20 17. An emergency luminaire according to any one of claims 14 to 16, wherein the processor is configured to control activation of a light source, an audio source, or both.

25 18. An emergency luminaire according to claim 17, configured to receive a luminaire status signal and to activate the light source, the audio source, or both, in accordance with the luminaire status signal.

19. An emergency luminaire according to claim 17 or 18, wherein the processor controls activation of the light source, the audio source, or both, in accordance with a data linkage status with the user device.

30 20. An emergency luminaire according to any one of claims 17 to 19, further comprising a performance measurement system, the processor initiating the test procedure by causing activation of the light source for a predefined activation period, the performance measurement system
35 measuring the performance of the emergency luminaire

during the activation period.

21. An emergency luminaire according to claim 20 wherein the performance of the emergency luminaire is the current and voltage performance during the activation period.

5 22. A method for testing the performance of an emergency lighting system for a building, the emergency lighting system comprising a plurality of emergency luminaires, comprising the steps of:

from a user device, commission onto a control node
10 one or more of the luminaires, which are in range of the mobile device over a wireless communication network, through a commissioning protocol;

at the control node, transmitting a test signal from a control node to each of the one or more emergency
15 luminaries once they are commissioned, over a communication network which is different than the wireless communication network; and

at an emergency luminaire, receiving the test signal directly from the control node and activating a test
20 procedure at the emergency luminaire on receipt of the test signal.

23. A method according to claim 22, wherein the step of receiving the test signal directly from the control node is performed at a receiver at the emergency luminaire.

25 24. A method according to claim 23 comprising the step of:

at the emergency luminaire transmitting performance results from the executed test procedure directly to the control node.

30 25. A method according to any one of claims 22 to 24, wherein the steps of receiving the test signals at the emergency light and transmitting the performance results from the emergency luminaire are performed across a LoRa network.

35 26. A method according to any one of claims 22 to 25,

wherein each emergency luminaire comprises an emergency lighting node, the emergency lighting node comprising the radio receiver and radio transmitter.

27. A method according to any one of claims 22 to 26,
5 comprising the further step of storing identification for each of the plurality of emergency luminaires at the control node.

28. A method according to claim 27, comprising the step of comparing received performance results with stored
10 identification to identify whether performance results have been received from each of the plurality of emergency luminaires.

29. A method for enabling control of an emergency lighting system for a site or building from a control node
15 over a communication network, the emergency lighting system comprising a plurality of emergency luminaires, the method comprising the steps of:

from a user device, receiving data comprising location data of the site or building in relation to the
20 site or building;

from the user device, commissioning one or more of the luminaires in the system on to the control node through a commissioning protocol,

said one or more luminaires being in range of said
25 user device over a second communication network.

30. A method of claimed in claim 29, wherein commissioning of a luminaire onto the control node comprises registering a location information of the luminaire corresponding to identification data for the
30 luminaire in the control node.

31. A method of claim 30, wherein the step of commissioning one or more luminaires onto the control node comprises saving onto a memory location in the user device, said location information and identification data,
35 and uploading the location information and identification data to the control node.

32. A method as claimed in any one of claims 29 to 31, wherein the second communication is a local short-range network.

33. A method according to claim 32, wherein the local
5 short-range network is an ultra-high frequency radio communication network.

34. A method as claimed in any one of claims 29 to 33, comprising, from the user device, transmitting a scan
10 signal across the second communication network, wherein the emergency luminaires are configured to, upon receipt of said scan signal, transmit a return signal across the second communication network to be received by the user device.

35. A method as claimed in claim 34, wherein a strength
15 for the scan signal is adjustable, or a frequency characteristic of the scan signal is tuneable, or both.

36. A method as claimed in claim 34 or 35, wherein the one or more luminaires commissioned from the user device
20 comprise those luminaires in the system which are positioned to receive the scan signal, and to transmit its respective return signal.

37. A method as claimed in claim 36, wherein the one or more luminaires commissioned from the user device are those luminaires which are positioned to transmit
25 respective return signals of strengths above a threshold signal strength.

38. A control node for an emergency lighting system for a building comprising a control node and a plurality of emergency luminaires:

30 the control node comprising:

a transmitter configured to transmit a test
initiation signal across a wireless communication network to each of a plurality of emergency luminaires to initiate a test procedure at each emergency luminaire;

35 a receiver configured to receive results signals

across the wireless communication network directly from each of the emergency luminaires, the results signals comprising the results from the test procedure from the emergency luminaires; and

5 a data receiver configured to receive luminaire commissioning data from a user device, over another communication network.

39. A control node for an emergency lighting system according to claim 38 comprising a transmitter configured
10 to transmit a results transmission signal across the wireless network directly to the plurality of emergency luminaires, the results transmission signal configured to initiate the emergency luminaires to transmit the results signals.

15 40. Control node for an emergency lighting system according to claim 38 or 39 wherein the wireless communication network is a LoRa network.

41. Control node for an emergency lighting system according to any one of claims 38 to 40, wherein each of
20 the plurality of emergency luminaires has a node ID, the node ID of the emergency luminaire being included in the results signal from the emergency lighting node.

42. Control node for an emergency lighting system according to any one of claims 38 to 41, the radio control
25 node further comprising memory, the memory storing the node ID of each of the plurality of emergency luminaires.

43. Control node for an emergency lighting system according to claims 38 to 42 the radio control node further comprising a processor, the processor configured
30 to compare the node ID of each of the plurality of emergency lighting nodes stored in the memory with node IDs of the received results signals.

44. Control node for an emergency lighting system according to any of claims 38 to 43, the control node
35 further comprising an alert system.

45. A test system for the control node of an emergency lighting system according to claim 44, when dependent on claim 43, the processor further comprising a clock, the processor being configured to activate the alert system if
5 a results signal is not received from an emergency luminaire within a predefined time period.

46. A commissioning protocol for commissioning, from a user device, luminaires for an emergency lighting system onto a control node of the emergency lighting system, the
10 control node and the user device being configured to communicate over a first communication network, the luminaire and the user device being configured to communicate over a second communication network, the commissioning protocol comprising:

15 from the user device, transmitting an initial signal over the second communication network, and awaiting detection of reply signals from at least one of the luminaires, to detect corresponding luminaires from which the reply signals are transmitted;

20 on detection of a reply signal, assigning an identifier to the detected luminaire and assigning commissioning data corresponding to the detected luminaire;

confirming an access right in respect of the control
25 node, from the user device, prior to at least the identifier and commissioning data being written to the control node.

47. A protocol in accordance with claim 46, wherein the assigning of the identifier and the commissioning data
30 comprises uploading the identifier and the commissioning data to the control node over the first communication network.

48. A protocol in accordance with claim 47, wherein the uploading is performed after completion of assignment of
35 the identifier and the commissioning data.

49. A protocol in accordance with any one of claims 46 to 48, comprising synchronising a site data regarding a site where the emergency lighting system is installed, from the control node to the user device.

5 50. A protocol in accordance with any one of claims 46 to 49, comprising updating a commissioning status for the luminaire after it is commissioned onto the control node.

51. A protocol in accordance with any one of claims 45 to 50, wherein the reply signal is of at least a threshold
10 strength.

52. A protocol in accordance with any one of claims 45 to 51, comprising establishing a data linkage between one of the detected luminaires with the user device.

53. A protocol in accordance with any one of claims 45 to
15 52, comprising requiring a confirmation of a visual inspection of a detected luminaire prior to its being commissioned.

54. An application executable on a processing device, the application being configured to, on execution on a user
20 device, implement the protocol in accordance of any one of claims 46 to 53.

55. A non-transitory and non-volatile machine readable medium, providing a computer program which comprises machine readable instructions to implement the application
25 in accordance with claim 54 or the method in accordance with any one of claims 22 to 37.