



Addressable Wireless
Detection System

A wired fire alarm system is one that makes use of wires to send signals between the various devices across the system and the control panel, while a wireless fire alarm system makes use of radio frequencies to transmit the signals.

Wireless fire alarm systems offer a variety of benefits and advantages such as;

- Reliability equal to a wired system
- Quick to install and can be fitted with minimum disruption
- Can be easily installed in buildings where there is limited access
- Layout is easily modified if something in your building changes e.g. you extend
- Will save you money on labor
- Can be used as a temporary system in locations where a wired one can't be installed e.g. building sites
- Can be used to extend existing wired system



The **4611AU** Wireless Photoelectric Smoke Detector with inbuilt Sounder is ideal for those applications where it is difficult to run or hide cables normally associated with standard point type detectors. The **4611AU** has a low profile housing utilising the latest IC technology to secure the highest reliability possible.



Features

- Insect filter, sensitivity compensation for contamination
- Detector removal tamper switch
- External antenna (adjustable)
- LED for fire alarm indication
- Signal check push button
- Built in sounder (3 x selectable tones inc temporal), 85dB
- Batteries, 2 x (3 volt, 1600mA Lithium). Typical 6 year battery life
- Low battery warning in control unit
- Up to 16 Wireless detectors can communicate with one Base station
- Transmission distance is up to 170m in open air
- Approved to AS7240.7-2004, AS7240.25-2010 & AS/NZS4268:2017



The **4620AU** Addressable Base Station interfaces wireless devices to the nearest COM loop.

Features

- Built-in short circuit isolator
- 2 x built-in antennas
- Frequency 916MHz
- 4 Base stations per COM loop
- 16 wireless devices per base station
- Up to 256 wireless devices per control unit (FT1020G3)
- Approved to AS7240.17-2015, AS7240.18-2015 & AS/NZS4268:2017



The **4611AU** in conjunction with a simple PC program can check the environment for background noise as well as confirm the quality of the signal strength between the 4611AU & 4620AU wireless devices.



The wireless detector system consists of an Addressable Base station for wireless units, type 4620AU and Wireless photoelectric smoke detectors, type 4611AU.

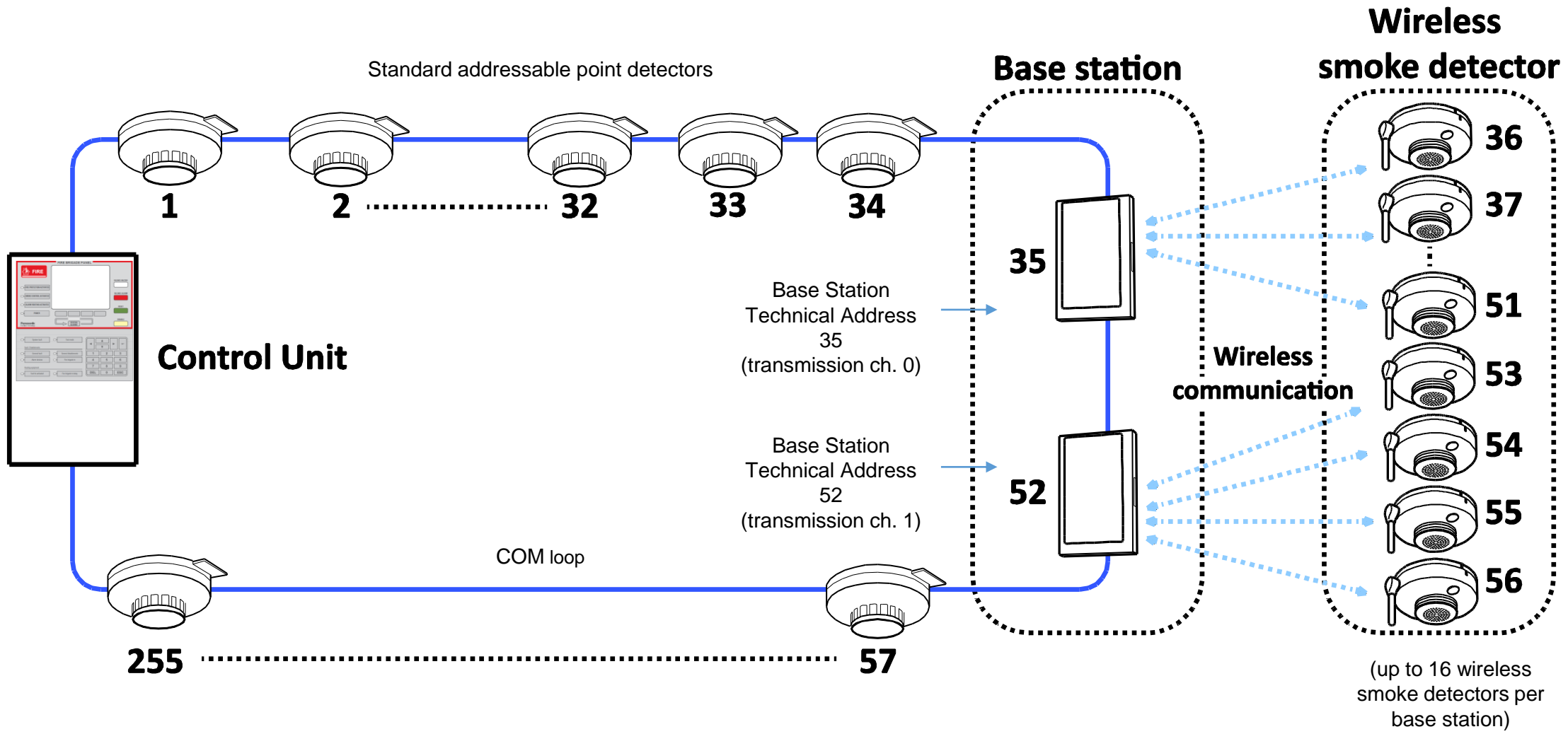
Each Base station can communicate with up to 16 Wireless detectors.

Up to four Base stations can be connected to each COM loop in an EBL system.





Wireless System Overview



Radio Signals are affected by attenuation and reflection.

Radio signal transmission distances can be affected for a number of reasons. Metal or materials including metal, electrical products, high frequency equipment, mobile phones and other wireless systems are all elements which can influence signal strength.



Attenuation

Attenuation is a reduction of signal strength during transmission and is represented in decibels (dB). As the range increases, attenuation also increases. Attenuation in outdoor free space applications is reasonably simple to calculate but in contrast, indoor applications can be very complex.

The following tables show the approximate attenuation for different materials and the attenuation of the wireless signal in open air:

Glass Window (13mm)	2 dB
Plasterboard Wall	3 dB
Brick Wall (90mm)	3.5 dB
Concrete Wall (100mm)	12dB

10m	24dB
20m	40dB
40m	56dB
85m	72dB
170m	88dB



When trying to determine just how far any particular radio signal will transmit indoors, the main difficulty lies in figuring out just what path the radio signal will take and how many walls and obstacles the signal must transmit through.

While taking into account the different building materials and their thicknesses can be helpful for estimation purposes, testing in the actual environment is the only sure way to determine whether or not communication will be successful.

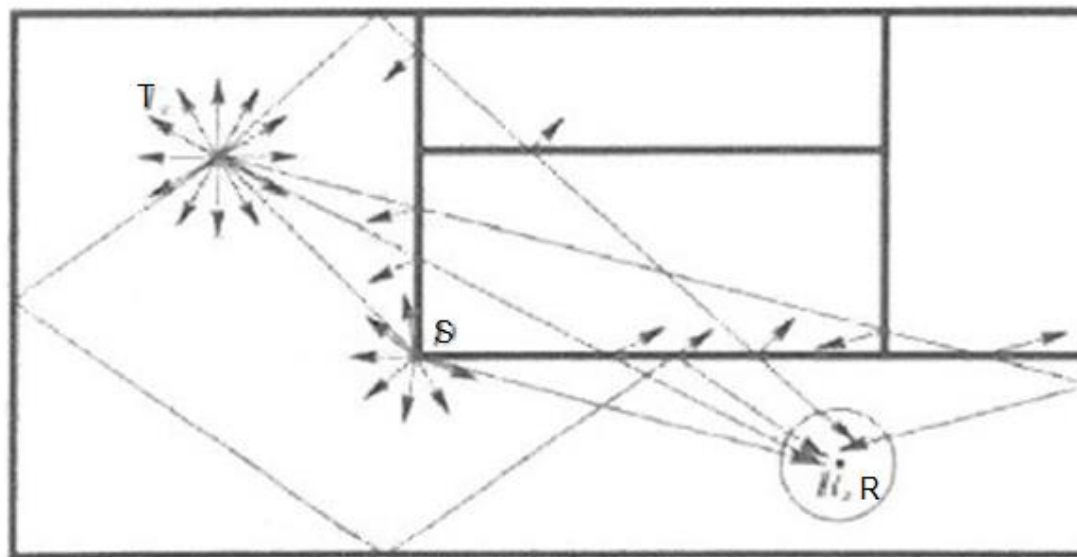
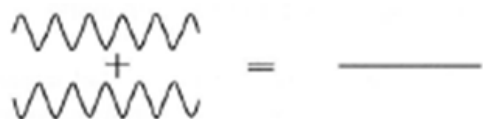
NOTE! The use of a Wireless sniffer is highly recommended, to check the background noise as well as the signals between a Base station and its Wireless detectors.



Reflection

Generally, walls and objects between or close to the wireless detectors and the Base station, as well as the type of material, will affect the radio signal. Reflection of radio waves caused by walls or objects in the building can result in an increase or a reduction of the signal.

The resulting signal is impossible to calculate.
The worst case result:



T = Transmitter

S = Spherical
reflections

R = Receiver

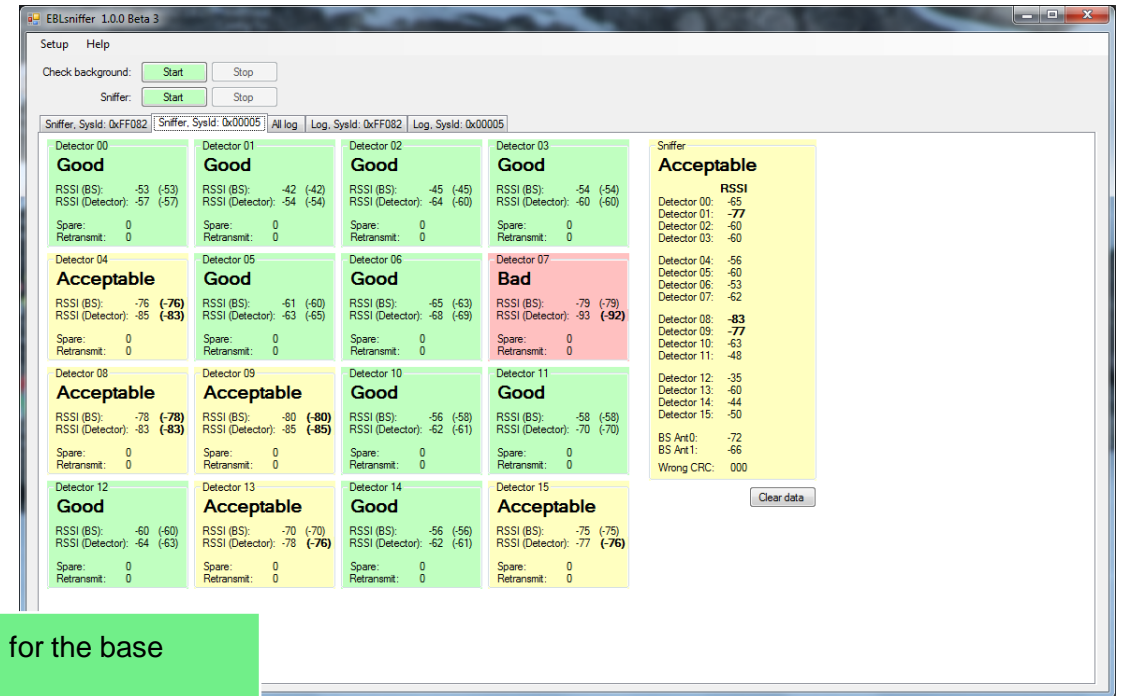




Radio Signals – Wireless Sniffer



Check of the background noise.



Check of the transmission signals between a Base station and its wireless detectors as well as the sniffer antenna position relative to the wireless units.

Good (green): Both the average value for the base station and the detector are over -75.

Acceptable (yellow): At least one average value for the base station and the detector are between -90 and -75.

Bad (red): At least one average value for the base station and the detector are beneath -90. Detector and / or Base station positions have to be changed.

The exact attenuation for different materials is not possible to calculate in advance, because it is dependent on not only the material itself but also the thickness of it.

As radio signal attenuation is difficult to predict the 4613AU wireless sniffer can help during the planning, installation and commissioning process of a wireless system. In conjunction with a simple PC program the 4613AU can check the environment for background noise as well as confirm the signal strength between the 4611AU & 4620AU wireless devices



For safety reasons the following is recommended:

- If more than four Base stations shall be used, the distance between the Base stations using the same transmission channel should be ≥ 30 metres. The same is valid for the wireless detectors using the same transmission channel.
- The distance between the Base stations and wireless detectors using a different transmission channel(s) should be ≥ 2 metres.



The base station has to be programmed in EBLWin requiring COM loop technical address and short circuit isolator sequence number.

Addressable base station for wireless units 4620

General Information

Technical address Name

Short circuit isolator

Sequence number



Each wireless detector (0-15) has to be programmed in EBLWin requiring COM loop technical address, Zone-Address, description and sounder activation requirements.

Wireless detector "0": Base station's COM loop (Technical) address + 1

Wireless detector "1": Base station's COM loop (Technical) address + 2

Wireless detector "2": Base station's COM loop (Technical) address + 3



Wireless detector "15": Base station's COM loop (Technical) address + 16

The screenshot shows a window titled "Wireless photoelectric smoke detector 4611". It contains the following fields and options:

- General Information:**
 - Technical address: 4
 - Name: Wireless photoelectric smoke detector 4611
- Alampoint:** High priority | Medium priority | Low priority
- Alam point table:**

Zone	Address	Alert annunciation time channel
1	1	Always off
- Disable time channel:** Always off
- 2-unit Dependent Time channel:** Always off
- Text:** (Empty text box)
- Buttons:** OK, Cancel, Apply, Add



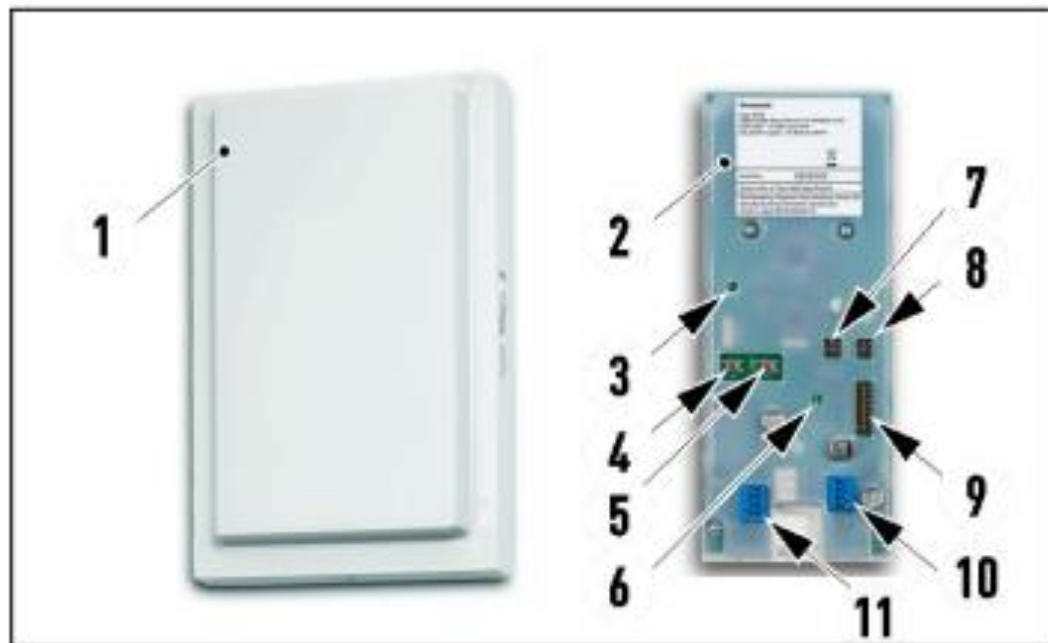
Pre-installation checks

- If possible perform a Background noise check prior to the installation.
- Check the building with respect to walls, floors etc.
- If possible put up a test installation.

Installation

- Vertically mount the base station as close to the wireless devices as practibly possible.
- Set the base station COM loop technical address and transmission channel.
- Connect the COM loop and 24 V DC.





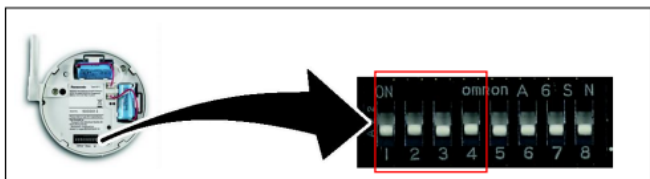
- 1) Cover
- 2) Base station – open
- 3) Blue LED
- 4) Setting button (Register)
- 5) Clear button (Unregister)
- 6) Red LED
- 7) Mode DIL
- 8) Channel DIL
- 9) Address DIL
- 10) Main power terminal
- 11) COM loop terminal

NOTE! The wireless base station technical address, transmission channel and registration activation is set via the DIL switches.

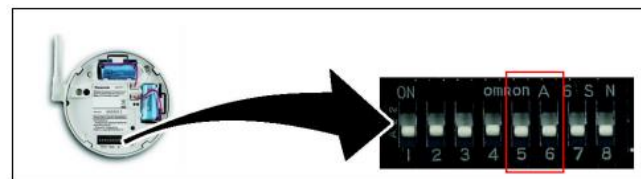


Set the transmission channel and wireless detector number (0-15) for each wireless detector respectively.

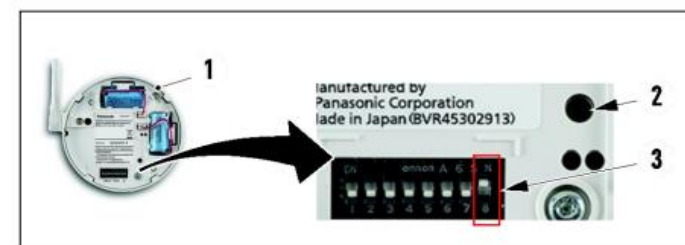
NOTE! The wireless detector address, transmission channel and registration activation is set via the DIL switches. Address 0 is always used for the first detector connected to a base station.



Address	Switch 1	Switch 2	Switch 3	Switch 4
0	0	0	0	0
1	0	0	0	1
2	0	0	1	0
3	0	0	1	1
4	0	1	0	0
5	0	1	0	1
6	0	1	1	0
7	0	1	1	1
8	1	0	0	0
9	1	0	0	1
10	1	0	1	0
11	1	0	1	1
12	1	1	0	0
13	1	1	0	1
14	1	1	1	0
15	1	1	1	1

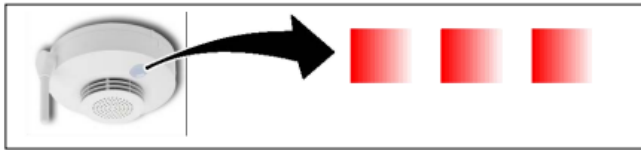


Transmission channel	Switch 5	Switch 6
0	0	0
1	0	1
2	1	0
3	1	1

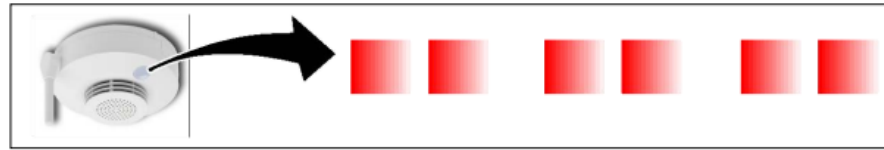


- 1) Wireless detector – open
- 2) Registration button
- 3) DIL switch 8. ON = Register

- Connect the batteries.
- Perform the registration procedure for each wireless detector described in Technical Description.
- Perform the manual signal check by pressing the signal check button. Check the detector LED flash pattern for transmission signal strength.



If the LED is flashing 3 times (1s ON/0.5s OFF) it is indicating both the average value for the Base station and the detector are over -75.



If the LED is flashing 2 times x 3 is indicating that at least one average value for the Base station and the detector are between -90 and -75.



If the LED is flashing 3 times (0.25s ON/1.25s OFF) it is indicating that the transmission signal is too low. The Wireless detector and/or the Base station have to be moved to another position.

- Test all detectors for fire alarm.

NOTE! Check the installation again when the building is ready, people have moved in and all normal activities are running. Furniture, people, etc. might affect the signal strength and system functionality.



What have you learnt?

1. The part number for the wireless photoelectric smoke detector with inbuilt sounder is?
 - a) 4611
 - b) 4620AU
 - c) 4611AU
 - d) 4613

2. How many base stations can be connected per COM loop?
 - a) 16
 - b) Depends on what else is connected to the loop
 - c) 14
 - d) 4

3. Maximum number of wireless detectors per base station?
 - a) 8 x Wireless Detectors & 8 x Wireless Sounders
 - b) 14
 - c) 16
 - d) None of the above



What have you learnt?

4. Radio signals are affected by?
 - a) Attenuation only
 - b) Reflection only
 - c) Attenuation & Reflection
 - d) Wind

5. The distance between the base station and wireless detectors using a different transmission channel(s) should be?
 - a) < 2 metres
 - b) > 20 metres
 - c) \geq 2 metres
 - d) > 22 metres

6. During the manual signal check process, if the LED on the detector is flashing 3 times (0.25s ON/1.25s OFF) it is indicating that the transmission signal is?
 - a) Ready for programming
 - b) Acceptable
 - c) Good
 - d) Bad





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