



# Xpander Survey Kit User Guide

## MAN3134

WORLD LEADER OF INNOVATIVE SOLUTIONS  
IN FIRE DETECTION AND ALARM SYSTEMS



# Contents

<b>Introduction</b>	<b>3</b>
<b>About The Survey Kit</b>	<b>4</b>
Survey Kit Overview	4
Signal Surveyor Features	5
Using the Signal Surveyor	5
Signal Surveyor Battery Replacement	6
Device Survey Tool Features	6
Device Survey Tool Battery Replacement	6
Using the Device Survey Tool	7
Survey Results Explained	7
<b>Diversity Remote Loop Interface Unit Survey</b>	<b>8</b>
Diversity Survey Objectives	8
Diversity System Overview	8
Diversity Survey Guidelines	8-10
Step By Step Guide - Diversity System Survey	11
Diversity Survey Form	12
<b>Hub &amp; Cluster (RCC) Survey</b>	<b>13</b>
Hub/RCC Survey Objectives	13
Typical Hub/RCC System Overview	13
Hub/RCC System Survey Guidelines	13-14
Step By Step Guide - Hub/RCC to RCC Surveying	15
Hub/RCC to RCC Survey Form	16
Step By Step Guide - Device to RCC Surveying	18
Device to RCC Survey Form	19

## Introduction

This manual provides a guide to using the 915MHz wireless survey kit.

The wireless survey kit should be used to determine the equipment requirements for the site, to ensure that full wireless site coverage for the areas concerned is achieved, with the required signal strengths for reliable communication.

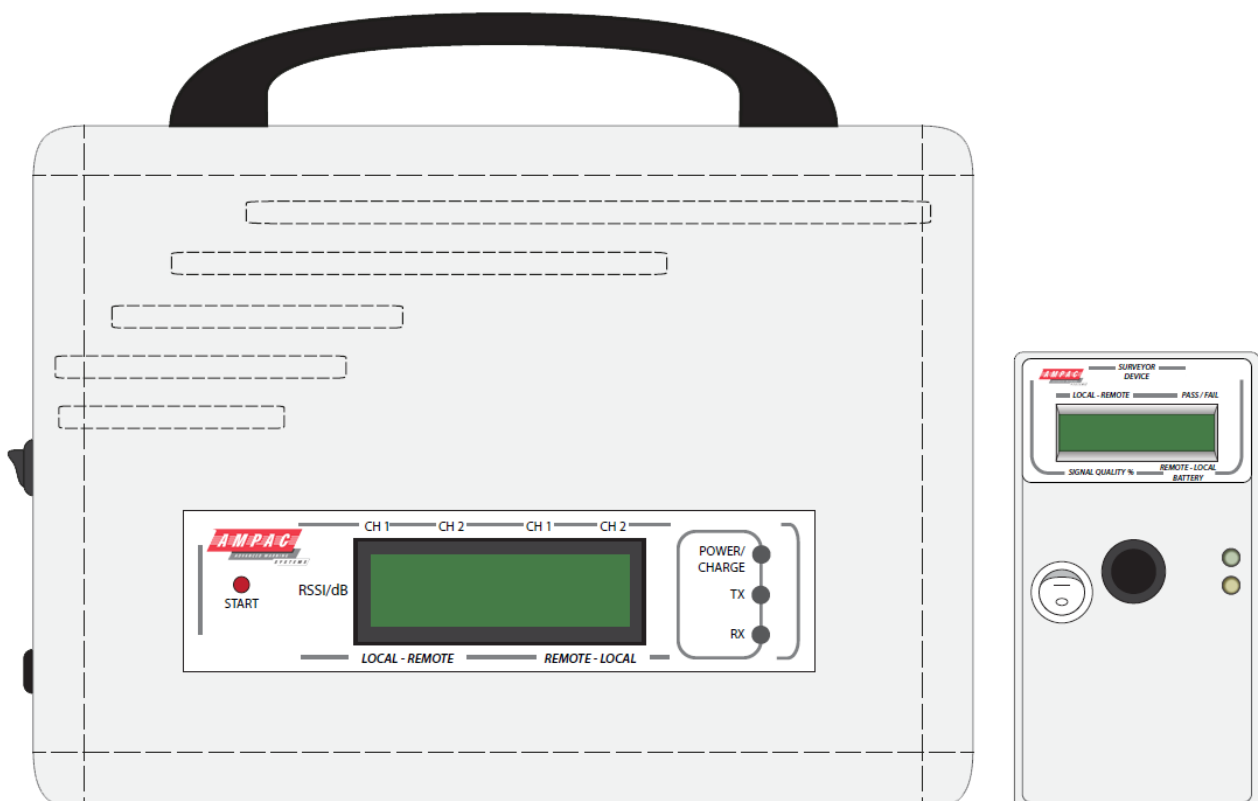
Each site will have a level of background noise, that may affect the signals on site. Under AS7240-25 (Fire detection and fire alarm systems components using radio links). The minimum signal headroom must be checked, to ensure reliable communication. This is essential to ensure immunity against site attenuation, caused by environmental changes and other electrical equipment.

The survey will create the foot print for the installed system, specifying the final positions for the devices and wireless infrastructure.

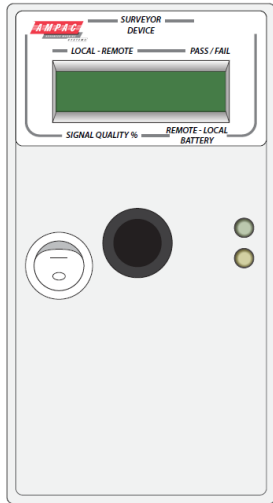
The wireless survey kit has been designed so that it can survey Xpander Diversity and Hub & Cluster (RCC) radio loop module systems.

All wireless communication is bi-directional and utilises the 915MHz frequency.

It is recommended that the survey results are recorded for future reference. The survey kit automatically calculates the required headroom (signal level above background interference), then displays the results. The results are displayed together with Pass or Fail confirmation.

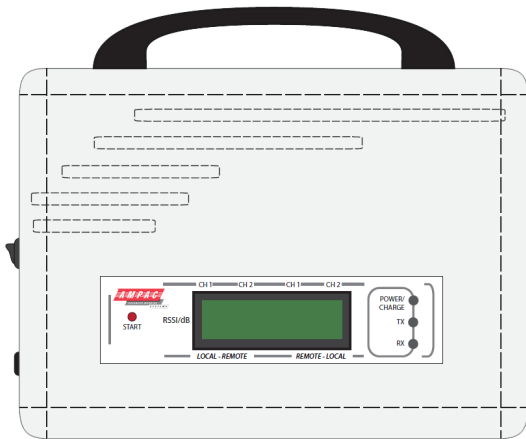


## Survey Kit Overview



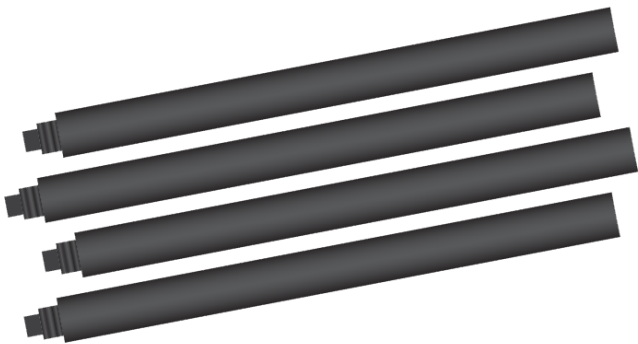
### Pole Mounted Survey Tool (1 per kit)

This part of the survey equipment when used in conjunction with the Signal Surveyor Unit, identifies accurate signal strength information between the two points. Since wireless devices and RCCs both communicate using the same 915MHz wireless protocol, the process for device to Diversity/RCC surveys is the same as RCC to Hub/RCC surveys..



### Signal Surveyor (1 per kit)

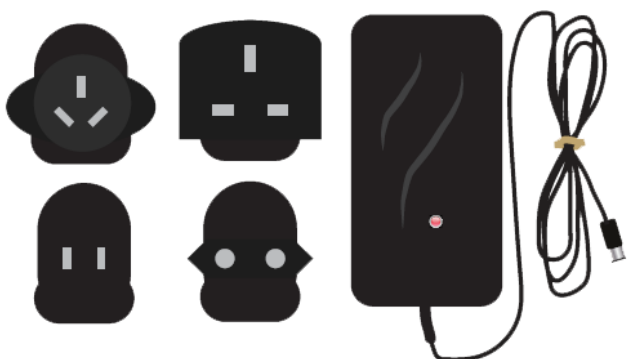
This part of the survey equipment is used to communicate with the Device Survey Tool. This unit will be located in the position of the proposed Diversity, Hub or RCC.



### Device Survey Poles (4 per Kit)

The survey poles are used for connection into the Device Survey Tool. This allows results to be taken from device locations which are out of reach.

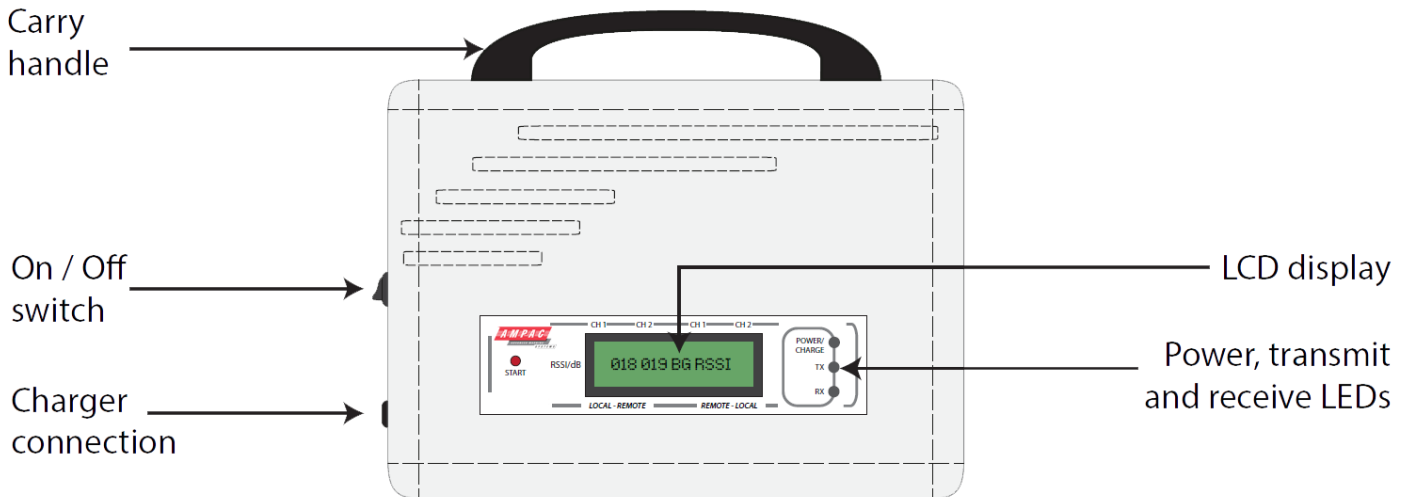
*Note: to ensure optimum surveying accuracy, it is recommended that minimum two polls are used with the Survey Tool.*



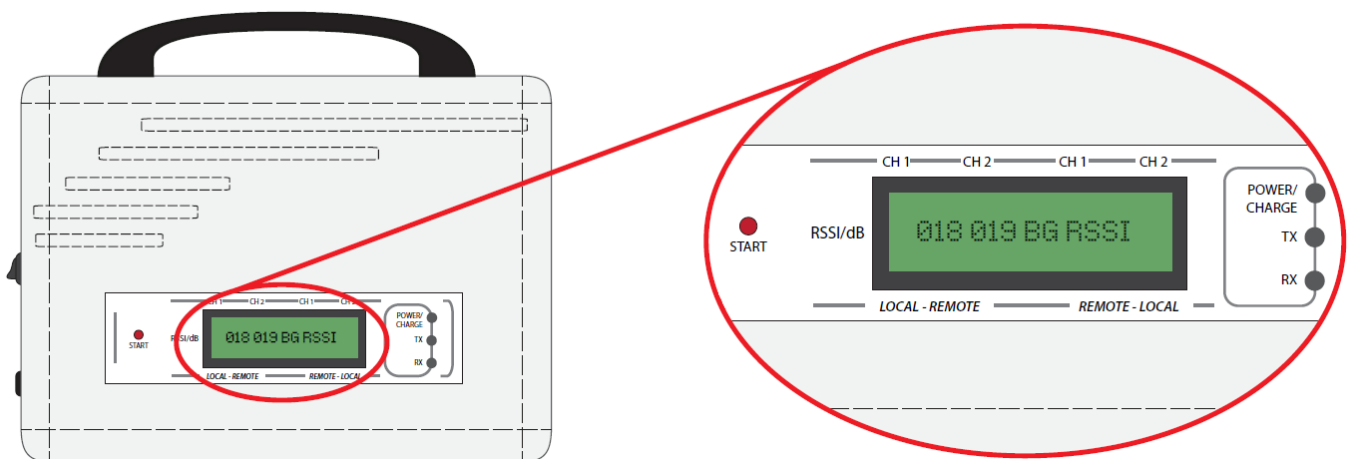
### Signal Surveyor mains charger (provided separately)

The mains charger is used for connection into the Signal Surveyor units for re-charging the devices on board battery.

## Signal Surveyor Features



## Using the Signal Surveyor



Once switched on, the Signal Surveyor's display will show the current background interference level. To achieve the maximum signal distance the background level should be as low as possible. This level is shown between 000 and 100. If the background levels are high, try repositioning the unit. Then turn off and back on again. This will re-show the background level for the new position.

BG RSSI	Recommendation
21-100	High Level Must Re-Position Unit
11-20	Medium Try Re-positioning Unit
0-10	Low Continue with survey

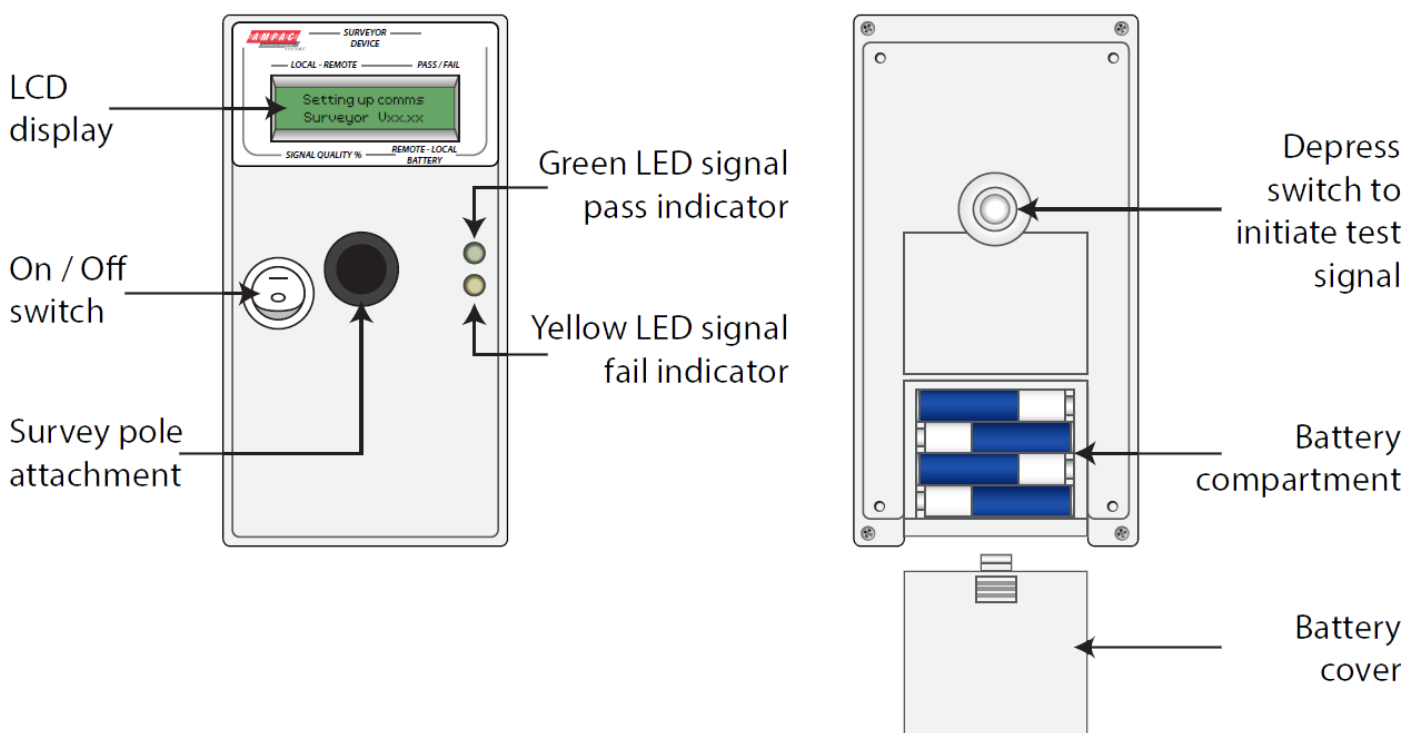
## Signal Surveyor Battery Replacement

The Signal Surveyor's mains charger can be left connected if necessary, during the survey process. The rated mains supply voltage is between 90-264Vac 47-63Hz 0.35A max.

Authorised chargers limit output current to 1.0A

Should the internal battery require replacement, correct polarity must be observed as marked on the battery (NP4-6 6V, 4.0Ah) red wire = positive, black wire = negative.

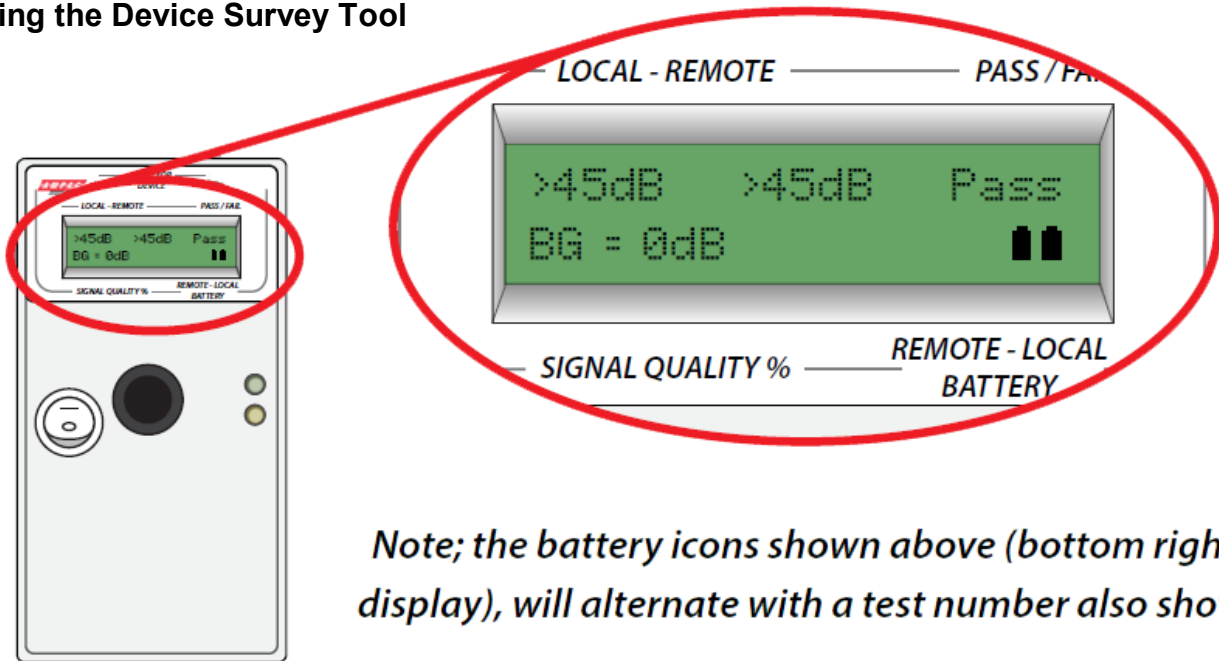
## Device Survey Tool Features



## Device Survey Tool Battery Replacement

The device Survey Tool requires 4 x AA (LR6 Alkaline 1.5V) batteries. Please ensure batteries are installed in the correct polarity as shown above.

## Using the Device Survey Tool

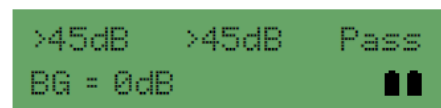
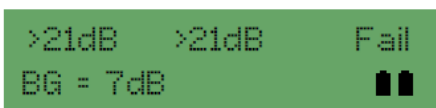


*Note; the battery icons shown above (bottom right of display), will alternate with a test number also shown.*

With the Device Survey Tool switched on, depress the rear switch to initiate a signal. After a few seconds results will be displayed and a high pass or a at fail tone will be heard.

LED signal indication is also shown on the device, a Green LED indicates a Pass and the Yellow LED indicates a Fail.

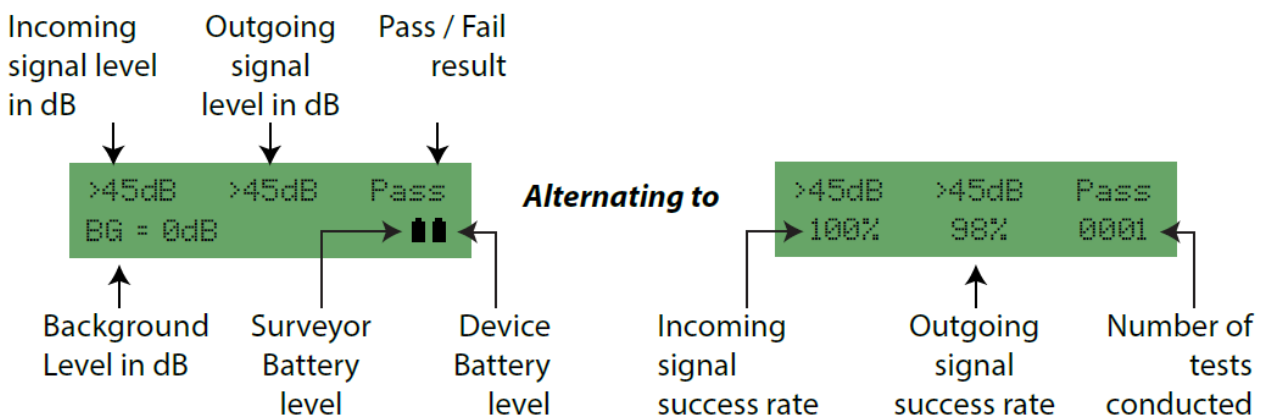
**Whether undertaking a Diversity or Hub & Cluster survey, a level of 24dB or above is required as a pass result.**



The background levels are taken into account prior to displaying the events on the units. If the required device position fails to pass the test then a further Diversity/RCC positions will need to be found closer to the device and the survey repeated. Every device position should be recorded along with the received signal levels.

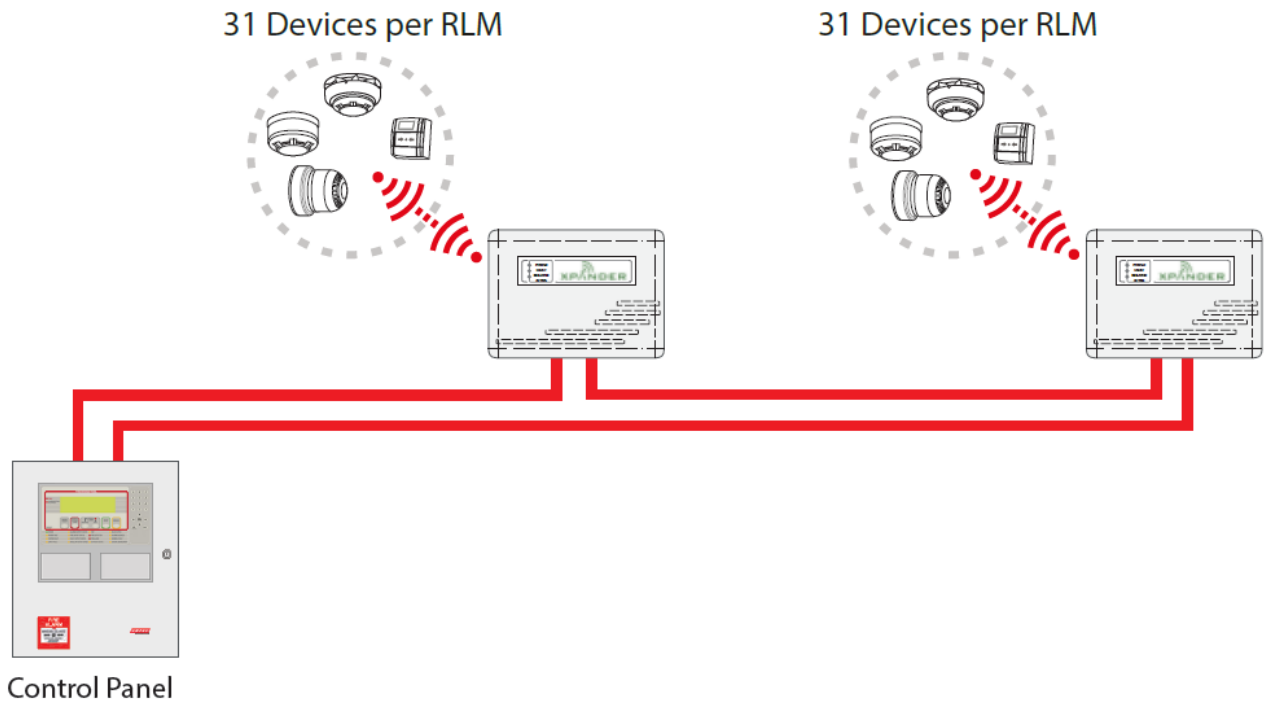
## Survey Results Explained

The figures shown are explained as follows:-



## Diversity Survey Objectives

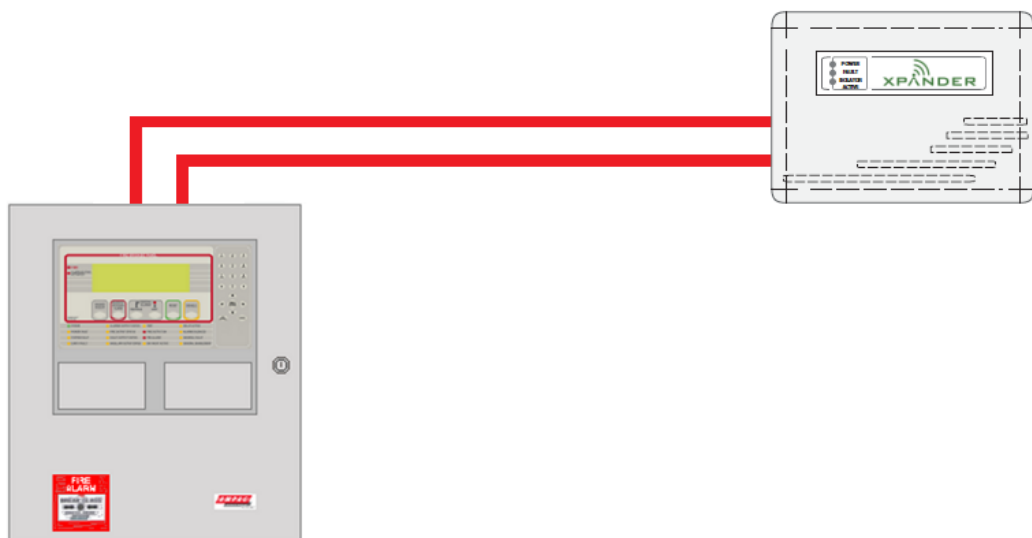
- Identify all Ampac Diversity positions.
- Prove all wireless device communications are above 24dB and indicate a pass.



## Diversity Survey Guidelines

Before you start surveying the premises there are a number of points to take into consideration that will aid the survey. These are as follows:-

1. Identify where the RLM is to be installed on the loop cabling. This is the starting point of the wireless infrastructure and where you should position your Signal Surveyor.

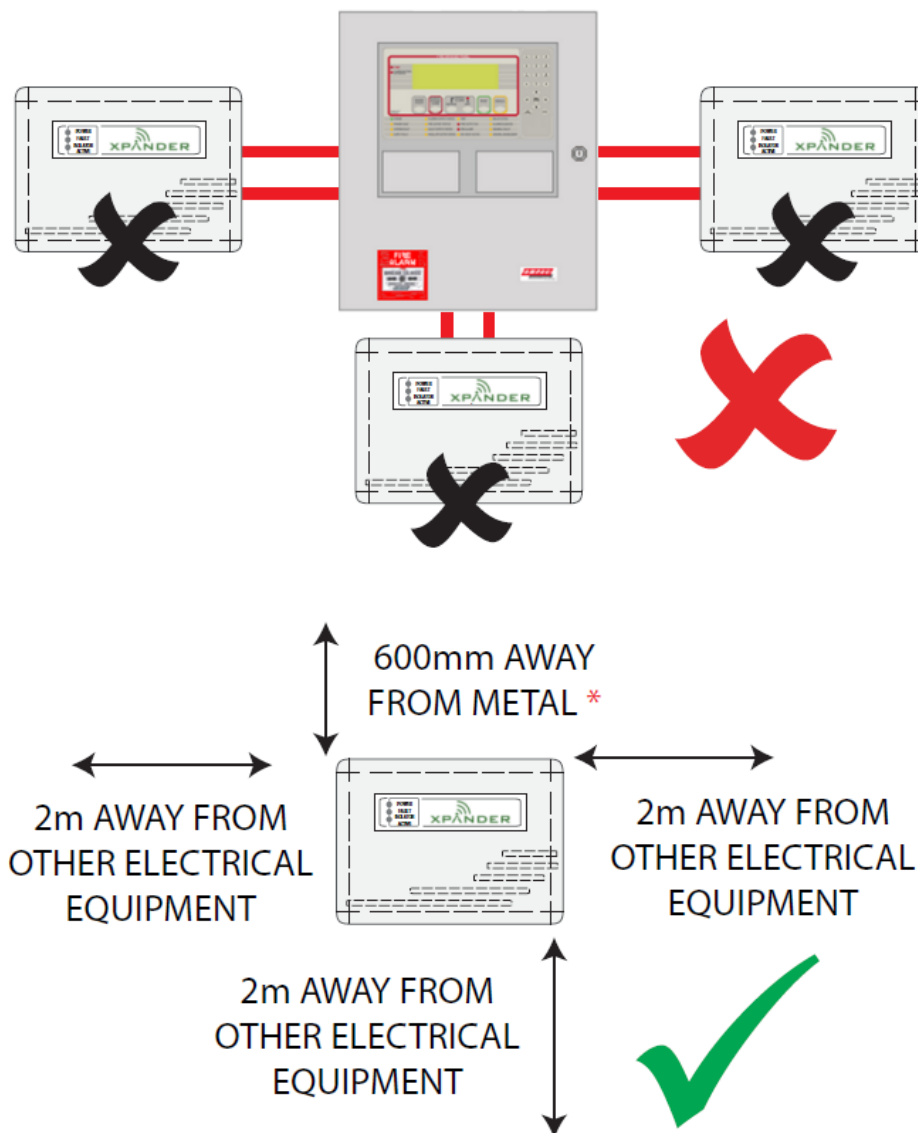




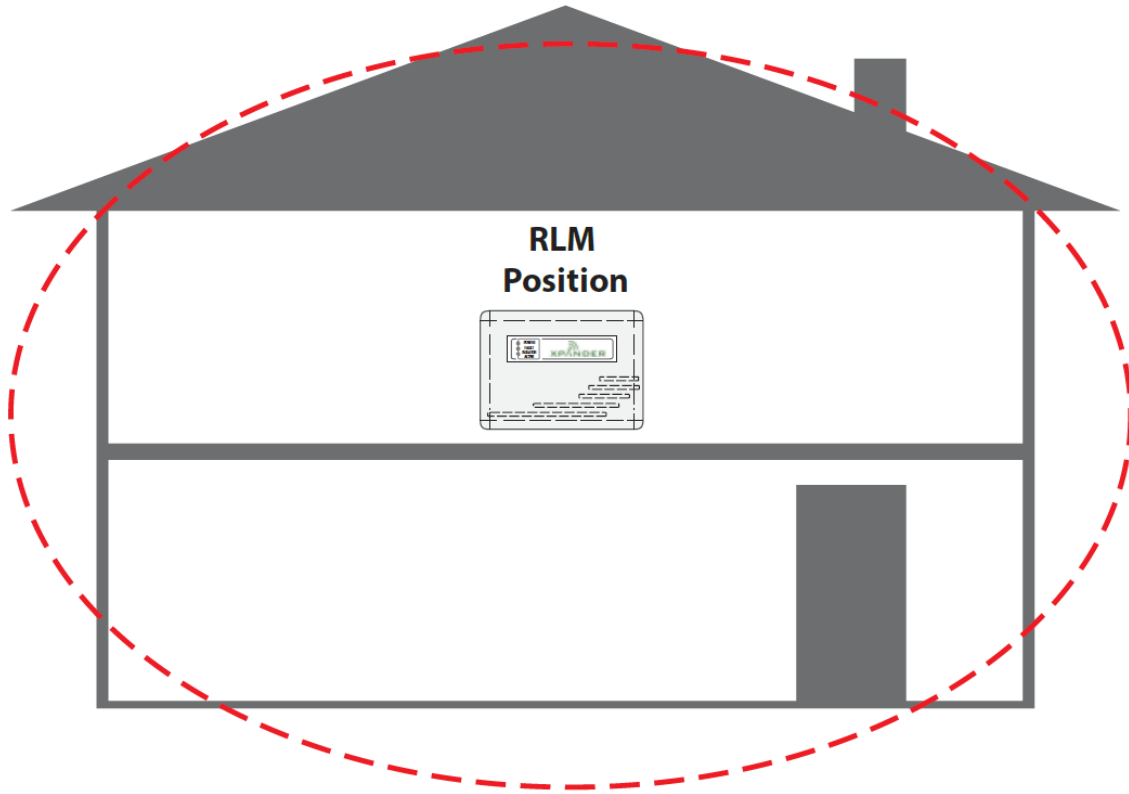
2. Remember when choosing a location, the Diversity modules require a loop in and out cable connection and a maximum of five RLMs per loop are allowed.



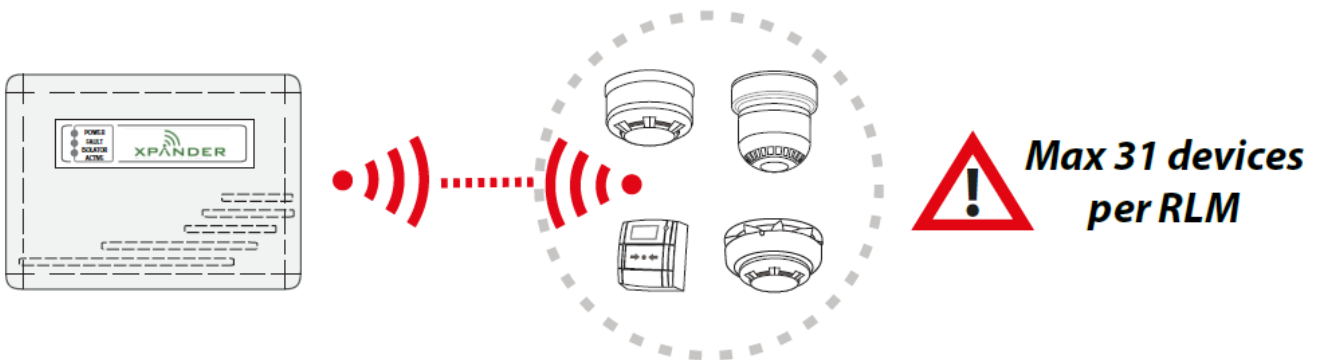
3. Remember to achieve maximum signal range, the Diversity module should be installed 600mm away from metal objects and other equipment and 2 metres from electrical equipment. This allows free space around the Diversity Modules internal aerials.



4. Consider positioning your Diversity modules centrally, giving as much 360 degree coverage as possible.

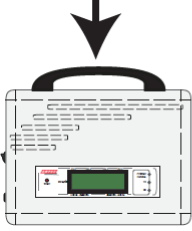
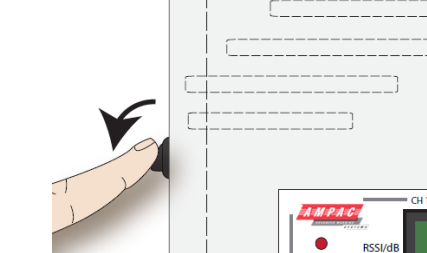
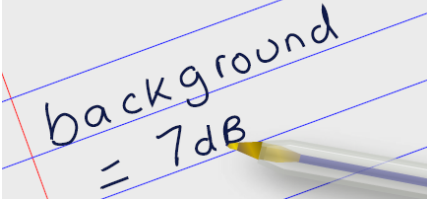
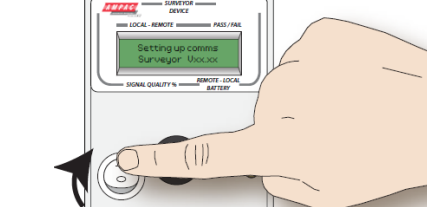

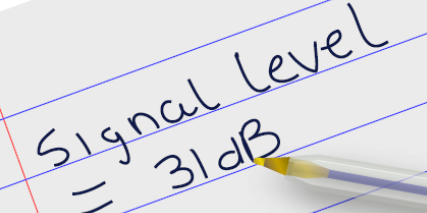



5. Remember, each Diversity RLM module can each accommodate a maximum of 31 wireless devices.



## Step By Step Guide - Diversity System Survey

*Note: a Ampac Diversity Survey Form is supplied on page 12.*

<p><b>Step 1.</b> Position the Signal Surveyor in the proposed Diversity location.</p>	 <p><b>Surveyor in Diversity position</b></p>
<p><b>Step 2.</b> Turn on the Signal Surveyor.</p>	
<p><b>Step 3.</b> Record the background level displayed, for future reference. Refer to the Using the Signal Surveyor section for more information.</p>	
<p><b>Step 4.</b> Turn on the Device Survey Tool.</p>	
<p><b>Step 5.</b> Position the Device Survey Tool against the wall or ceiling in the positions of the proposed Wireless device.</p>	
<p><b>Step 6.</b> Record the signal level.</p>	
<p><b>Step 7.</b> Repeat Steps 5-6 for all device positions associated with the Diversity module position.</p>	 <p><b>Steps 5 to 6</b></p>

# Ampac Diversity Survey Form

Site \_\_\_\_\_

Customer name \_\_\_\_\_

Survey date \_\_\_\_\_

Company \_\_\_\_\_

Surveyor name \_\_\_\_\_

Diversity number \_\_\_\_\_

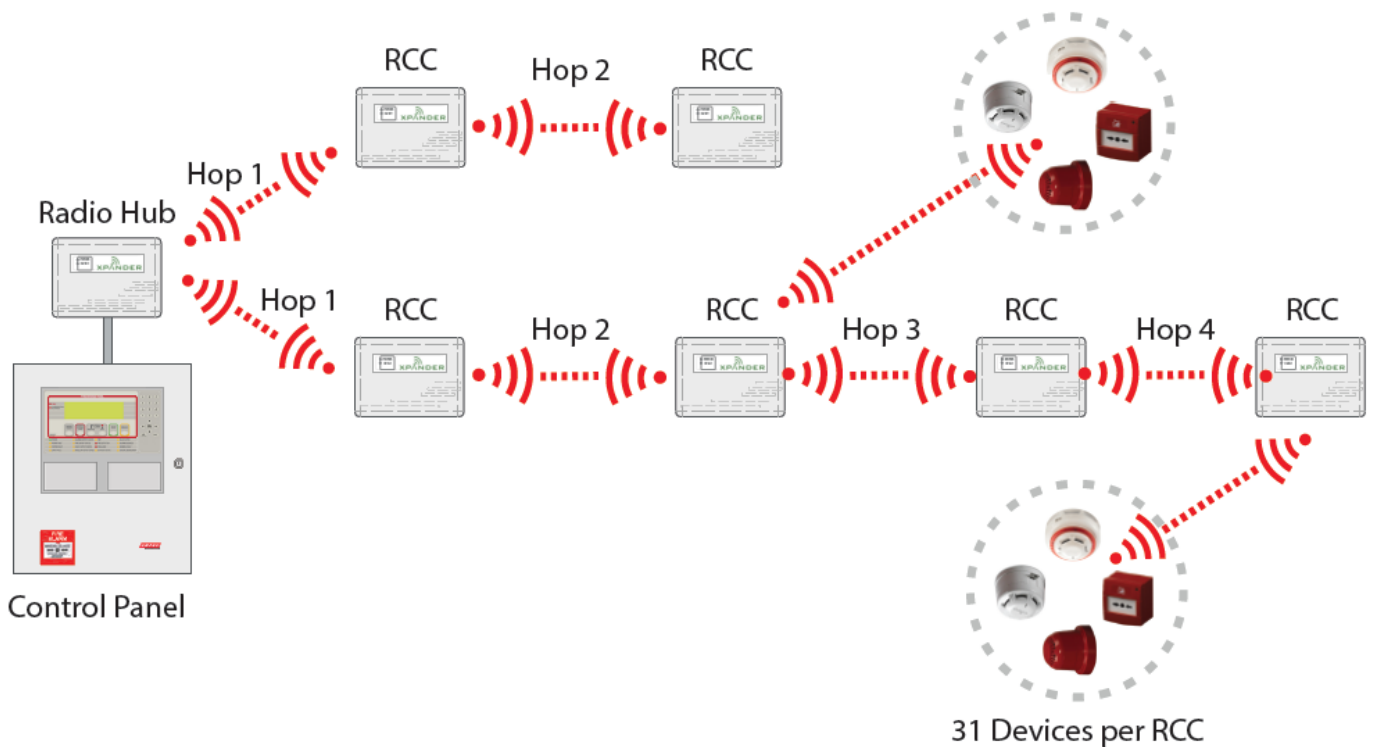
Background Level \_\_\_\_\_

Device No.	Signal Level				Pass	Fail	Comments
	dB		%				
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							
27							
28							
29							
30							
31							

## Hub and Cluster Survey Objectives

- Identify Hub and all RCC positions.
- Prove all Hub/RCC wireless communications are above 24dB and indicate a pass.
- Prove all wireless device communications are above 24dB and indicate a pass.

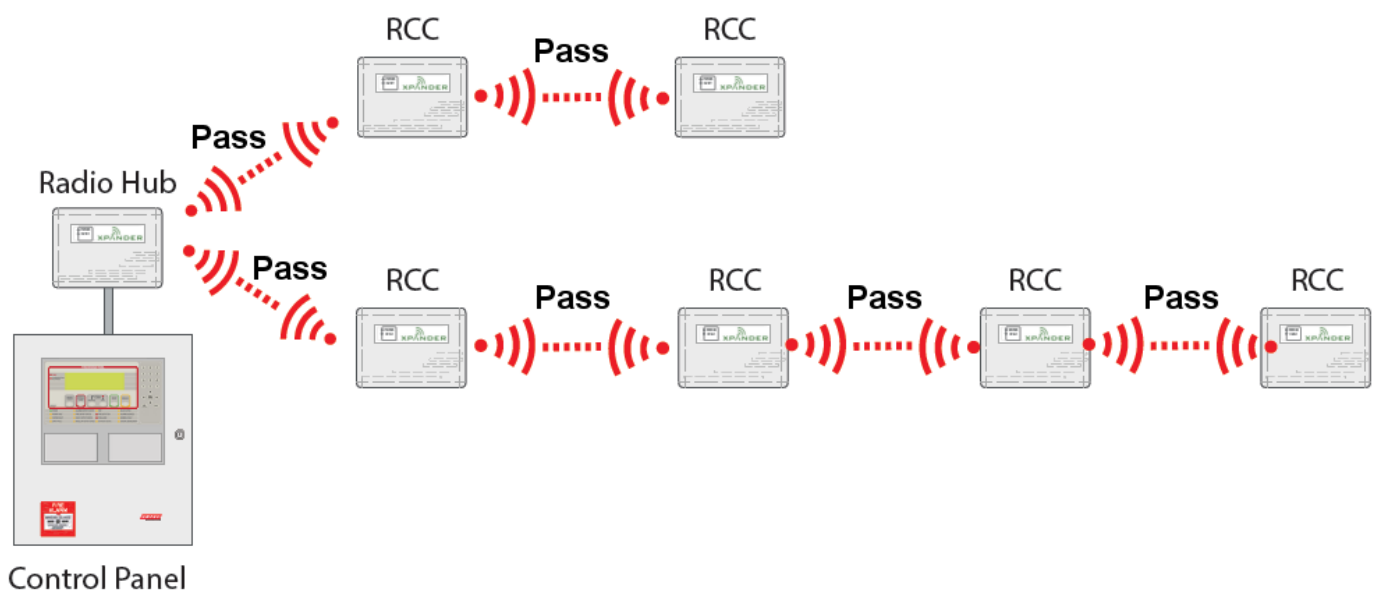
## Typical Hub & Cluster System Overview



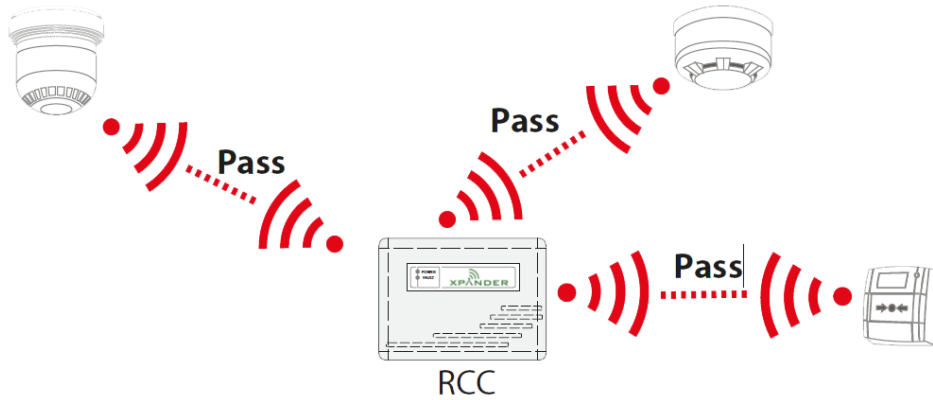
## Hub & Cluster System Survey Guidelines

Before you start surveying the premises there are a number of points to take into consideration that will aid the survey. These are as follows:-

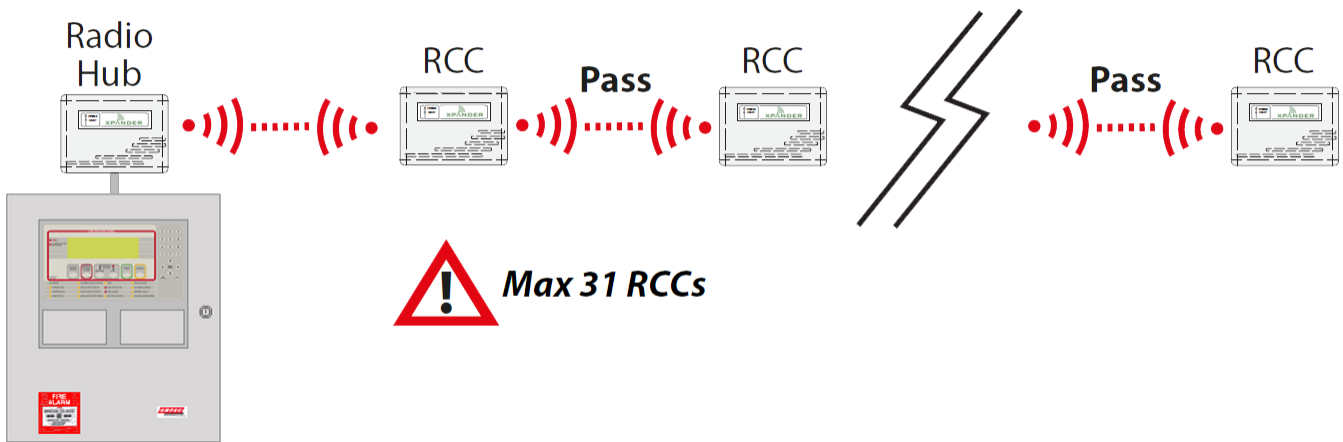
1. The Radio Hub and all Clusters (RCCs) must have a valid communication path (pass result).



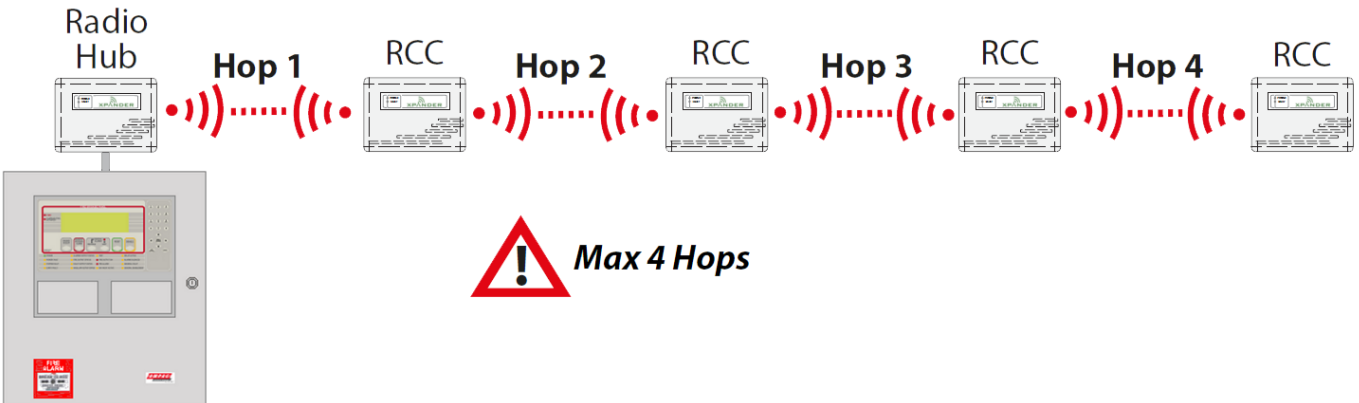
2. All Devices must have valid communication to a Cluster (RCC) (Pass Result).



3. Maximum 31 RCCs.



4. A maximum of 4 Hops can be achieved between RCCs to the Hub location.

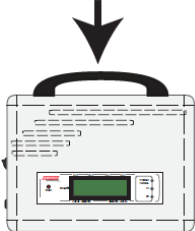
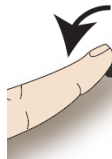
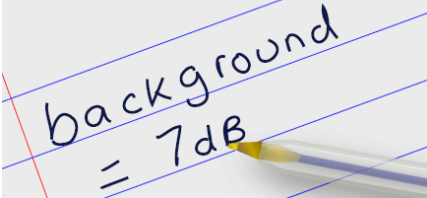
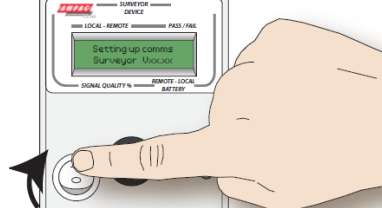

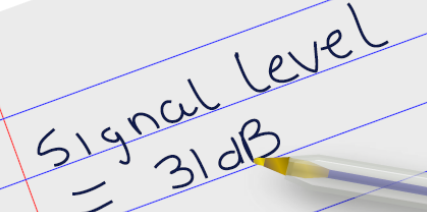




5. Remember, the RCCs can each accommodate a maximum of 31 wireless devices.



## Step By Step Guide - Ampac Hub/RCC to RCC Surveying

*Note: a Hub/RCC to RCC Survey Form is supplied on page 16.*

<p><b>Step 1.</b> Position the Signal Surveyor in the proposed Radio Hub location.</p>	 <p><b>Surveyor In Hub position</b></p>
<p><b>Step 2.</b> Turn on the Signal Surveyor.</p>	
<p><b>Step 3.</b> Record the background level displayed, for future reference. Refer to the Using the Signal Surveyor section for more information.</p>	
<p><b>Step 4.</b> Turn on the Device Survey Tool.</p>	
<p><b>Step 5.</b> Position the Device Survey Tool against the wall or ceiling in the positions of the proposed RCC position.</p>	
<p><b>Step 6.</b> Record the signal level.</p>	
<p><b>Step 7.</b> Repeat Steps 5-6 for all RCC positions as required.</p> <p> Note: the Surveyor Unit can be moved to an identified RCC location to further expand the coverage. Up to four hops from an RCC to the Hub can be achieved.</p>	 <p><b>Steps 5 to 6</b></p>

# Hub/RCC to RCC Survey Form

Site \_\_\_\_\_

Customer name \_\_\_\_\_

Survey date \_\_\_\_\_

Company \_\_\_\_\_

Surveyor name \_\_\_\_\_

RLM number \_\_\_\_\_

Background Level \_\_\_\_\_

Fire Panel and Radio Hub Location \_\_\_\_\_

**EXAMPLE**

RCC 1  
 Location Main Corridor

Comms Path	Talks to: <i>Hub</i>	dB		%		Pass	Fail
Signal Level		<i>31</i>	<i>31</i>	<i>100</i>	<i>98</i>	<i>✓</i>	
Background Level		<i>7</i>	<i>7</i>				

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	dB		%		Pass	Fail
Signal Level							
Background Level							

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	dB		%		Pass	Fail
Signal Level							
Background Level							

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	dB		%		Pass	Fail
Signal Level							
Background Level							



RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					


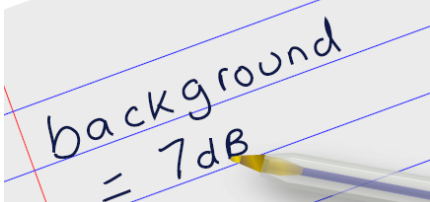

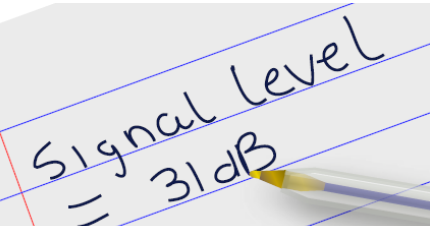

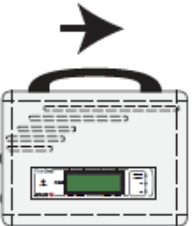
RCC \_\_\_\_\_

Location \_\_\_\_\_

Comms Path	Talks to:	┌ dB ┐	┌ % ┐	Pass	Fail
Signal Level					
Background Level					

## Step By Step Guide - Device to RCC Surveying

*Note: a Device to RCC Survey Form is supplied on page 20.*

<p><b>Step 8.</b></p> <p>Device to RCC coverage must now be proven. Position the Signal Surveyor in the proposed RCC location.</p>	 <p><b>Surveyor In RCC position</b></p>
<p><b>Step 9.</b></p> <p>Record the background level displayed, for future reference. Refer to the Using the Signal Surveyor section for more information.</p>	
<p><b>Step 10.</b></p> <p>Position the Device Survey Tool against the wall or ceiling in the positions of the proposed wireless device.</p>	
<p><b>Step 11.</b></p> <p>Record the signal level.</p>	
<p><b>Step 12.</b></p> <p>Repeat Steps 10-11 for all device positions associated with the RCC position.</p>	 <p><b>Steps 8 to 11</b></p>
<p><b>Step 13.</b></p> <p>If there are multiple RCC positions on site, repeat steps 8 to 12 for each RCC.</p>	 <p><b>Next RCC position</b></p>

# Device to RCC Survey Form

RCC Number \_\_\_\_\_

Additional Notes

Device No.	Signal Level		Pass	Fail	Comments
	dB	%			
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					