

## Sample Client

### Point to Point Site Survey



<b>Customer Name</b>	Sample Client
<b>Project Name</b>	Building-to-Building Connectivity
<b>Project Number</b>	EXA1P001
<b>Prepared By</b>	Andrew O'Brien
<b>Version</b>	1.0
<b>Date</b>	31/01/03

## **Introduction**

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### **Purpose**

This Report outlines the method and provides the results of the Point to Point Site Survey conducted by Simply Wireless on Wednesday, 22<sup>nd</sup> January 2003 at location 1 and location 2, NSW for the Sample Client.

### **Intended Audience**

The intended audience for this document is xxx.

### **Appreciation**

Simply Wireless would like to thank Sample Client for the opportunity to perform the Point to Point Site Survey.

### **Company Overview**

Simply Wireless is a pioneer in advanced wireless networking solutions. Simply Wireless has consistently innovated in wireless hardware and software solutions that combine multiple local wireless technologies in a single networking platform.

As the recognised leader in Wireless Fidelity and Bluetooth networking, Simply Wireless has built a strong customer base where mobility and access to information is critical to the performance of the customer's business.

Simply Wireless's unique wireless technology provides a secure and fully managed environment for the delivery of voice, video and data services across a multitude of wireless technologies – including Bluetooth, 802.11 and proprietary wireless LANs and WANs – to a broad range of mobile devices including desktops, laptops, PDAs, phones and handheld computers.

## Contents

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Introduction .....	2
Contents.....	3
Objectives .....	4
Methodology .....	5
Results .....	6
Appendix A – Additional Diagrams .....	8
Appendix B – Path Loss Analysis Details .....	10
Appendix C – Equipment Specification.....	13
Appendix D – Configuration Details .....	14
Appendix E – Installation Considerations .....	15
Appendix F – Warranty of Coverage.....	17

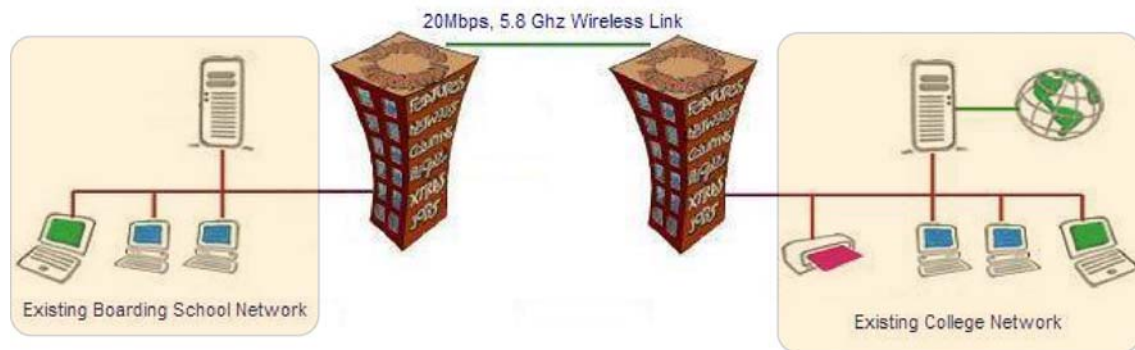
## Objectives

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Sample Client requires a permanent data link to be available between its Location xx and Location xx. Any proposed data link must be able to transfer any and all network data encapsulated in 802.3 data frames between the two sites.

After evaluating the options provided by Simply Wireless, a 20Mbps full duplex connection utilising Proxim Tsunami Quickbridge 20 Wireless Outdoor Bridges was selected. This report will detail the onsite observations, radio planning results and equipment configuration required to ensure that the proposed data link will meet the requirements outlined.

The diagram below provides a logical view of the proposed data link.



**Figure 1 – Logical Network View**

## Methodology

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The following steps are performed during a Site Survey for a point-to-point link. Additional detail about some of the steps is provided below:

- Meet with customer to identify any additional system or implementation requirements
- Visit the link end points to verify line-of-sight, to identify how the equipment will be mounted and to take any measurements required for radio frequency planning
- Perform the radio frequency planning and path loss analysis calculations
- Identify how the data link will be integrated into existing network infrastructure
- Determine the required configuration of all pieces of network equipment
- Report all findings in the form of a written report

### Site Observations

During the Site Survey, wireless engineers identify the optimum placement for the end points of the wireless data link. The placement of the end points is defined so the link availability is maximised while ensuring that the cost of installation is minimised.

### Radio Frequency Planning

Radio frequency planning is performed to ensure that radio link has unobstructed access to the desired sections of the 5.8 GHz spectrum and to ensure interference levels are minimised.

### Path Loss Analysis

The path loss analysis is performed by taking GPS co-ordinates at potential end point locations. The parameters required for path loss analysis are longitude, latitude and elevation. Other details are also recorded such as current activity on the ISM and UNII bands as well as height of any physical obstructions.

## Results

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The results of the point-to-point Site Survey are provided below.

### Site Observations

A total of eight (8) prospective end point locations were identified during the site survey, I  
The latitude and longitude of each prospective end point is provided in the table below.

End Point Label	Latitude	Longitude	Elevation	Notes
TRI01	33°53'.966 S	151°07'.872 E	75m	High levels of “noise” from another wireless LAN were detected at -80dBm at 2.442Ghz
TRI02	33°53'.968 S	151°07'.876 E	75m	Line-of-sight partially obstructed by trees
TRI03	33°53'.968 S	151°07'.873 E	75m	Line-of-sight partially obstructed by trees
TRI04	33°53'.965 S	151°07'.884 E	75m	Inside computer room
TRI06	33°53'.671 S	151°07'.914 E	45m	Line-of-sight unobstructed
TRI07	33°53'.879 S	151°07'.866 E	45m	Line-of-sight partially obstructed by trees
TRI08	33°53'.823 S	151°07'.880 E	45m	Line-of-sight partially obstructed by trees

**Table 1 – Point locations**

The diagrams in Appendix A show the approximate positions of each proposed end point on the rooftop at either end of the link.

### Radio Frequency Planning

No other wireless networks were detected within the 5.8 GHz UNII band during the Site Survey.

### Path Loss Analysis

The results of the path loss analysis for the link end points TRI01 and TRI06 is provided in Appendix B.

The path between point **TRI01** and **TRI06** have line of sight and is clear all obstacles, including trees, by the required clearance of 1.52 metres (see figure 8).

### End Point Selection

After the on-site observations, radio frequency planning and path loss analysis was performed, the end point locations **TRI01** and **TRI06** were chosen for the following reasons.

- Unobstructed line-of-sight between the two end points is available



- The required clearance of 1.52 metres could be obtained along the length of the link
- The availability of the link is maximised.

### **Recommended Equipment and Configuration**

The equipment specified in Appendix C is required to complete the installation of the required point-to-point wireless data link.

The configuration details of the equipment are provided in Appendix D.

### **Network Interconnection**

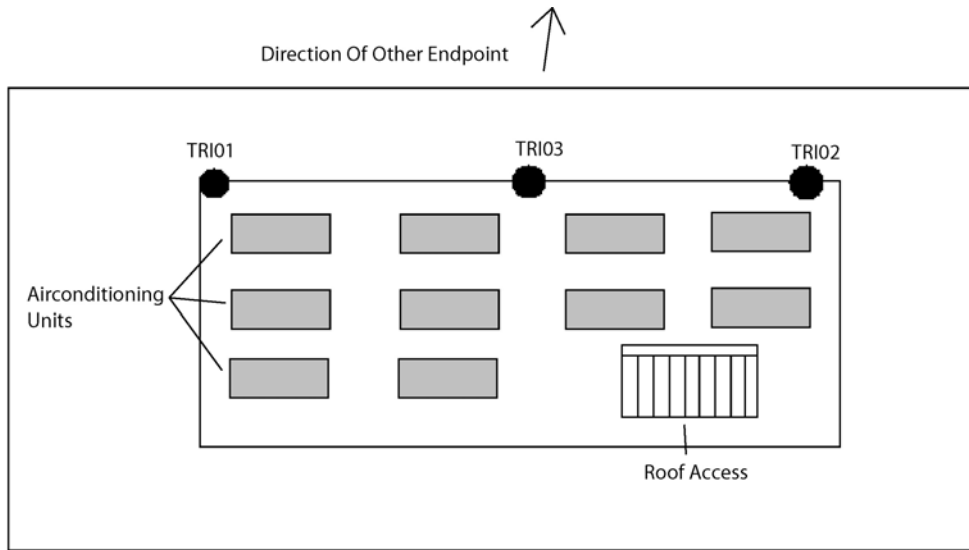
The wireless data link will interconnect the two specified locations as requested by the customer with an estimated availability of 100% and an estimated downtime of 0 minutes per year.

Proxim Tsunami Quickbridge 20 Wireless Bridges are compliant with both the IEEE 802.11d and IEEE 802.1q (VLAN trunking) standards. Proxim Tsunami Quickbridge 20 Wireless Bridges will pass all IEEE 802.3 compliant frames (up to 1584 bytes in length).

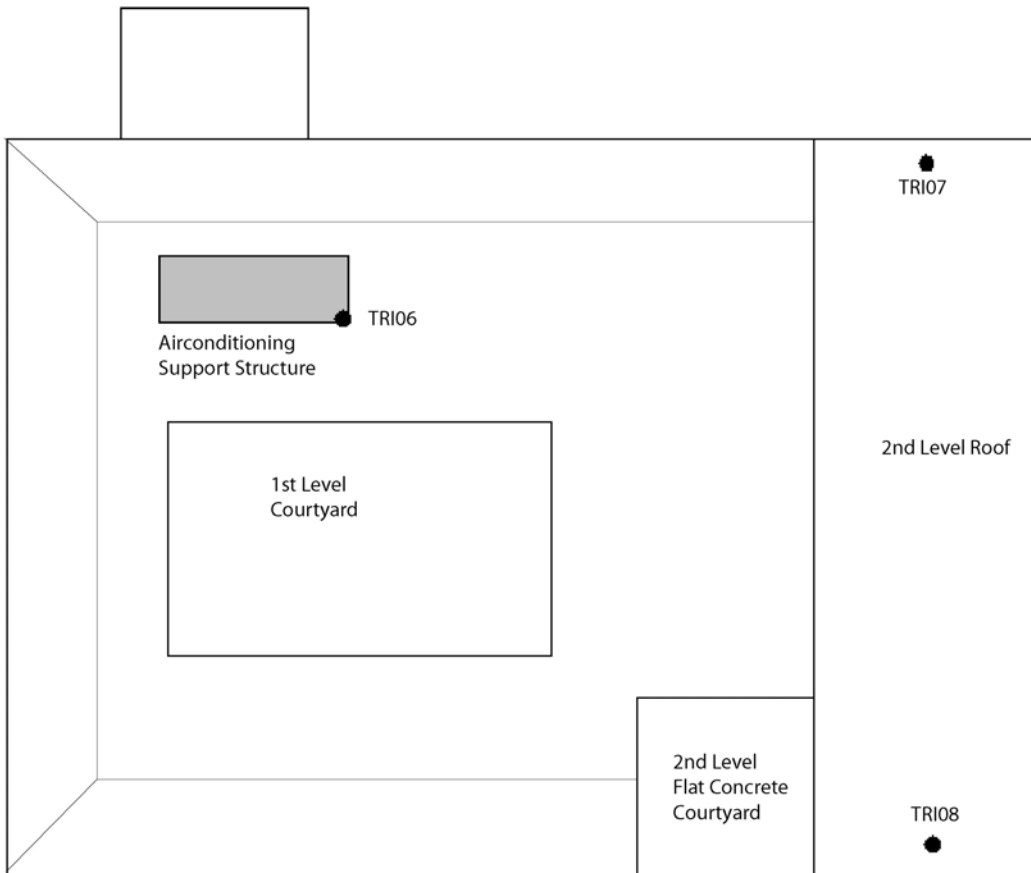
### **Assumptions**

- The integration of the wireless point-to-point link in to the existing Sample Client network is the responsibility of Sample Client. Simply Wireless is not required to perform any of these tasks
- A failover or backup connection between the two sites is not required

**Appendix A – Additional Diagrams**



**Figure 2 – Rooftop at Southern End of link**



**Figure 3 – Rooftop at Northern End of Link**



Figure 4 – Locality and elevation

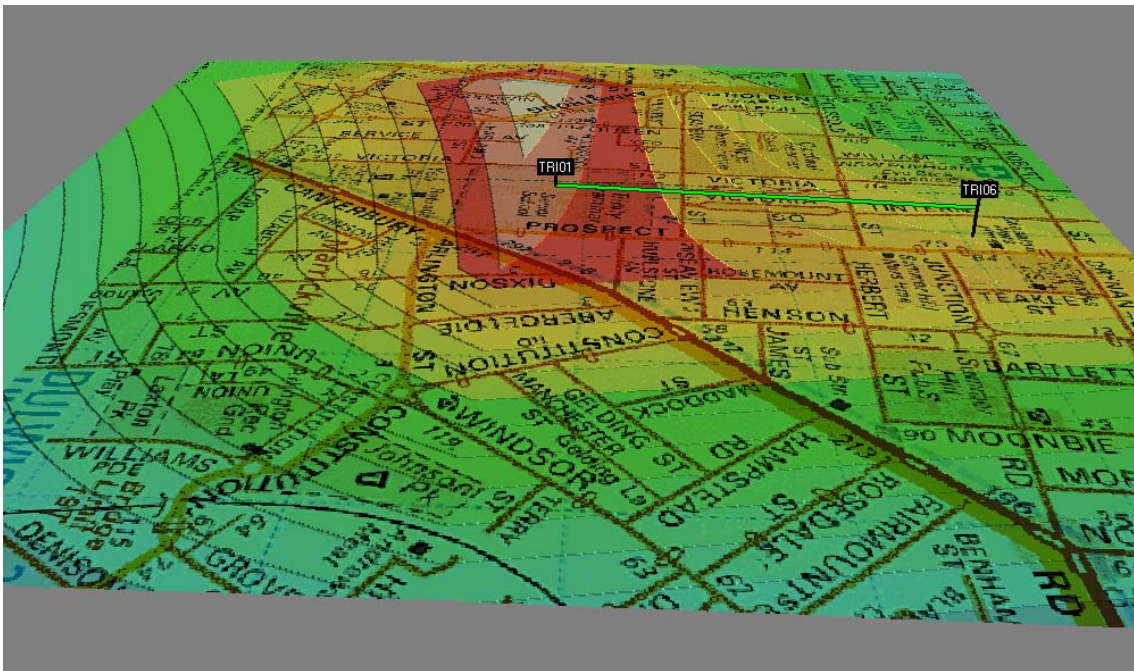


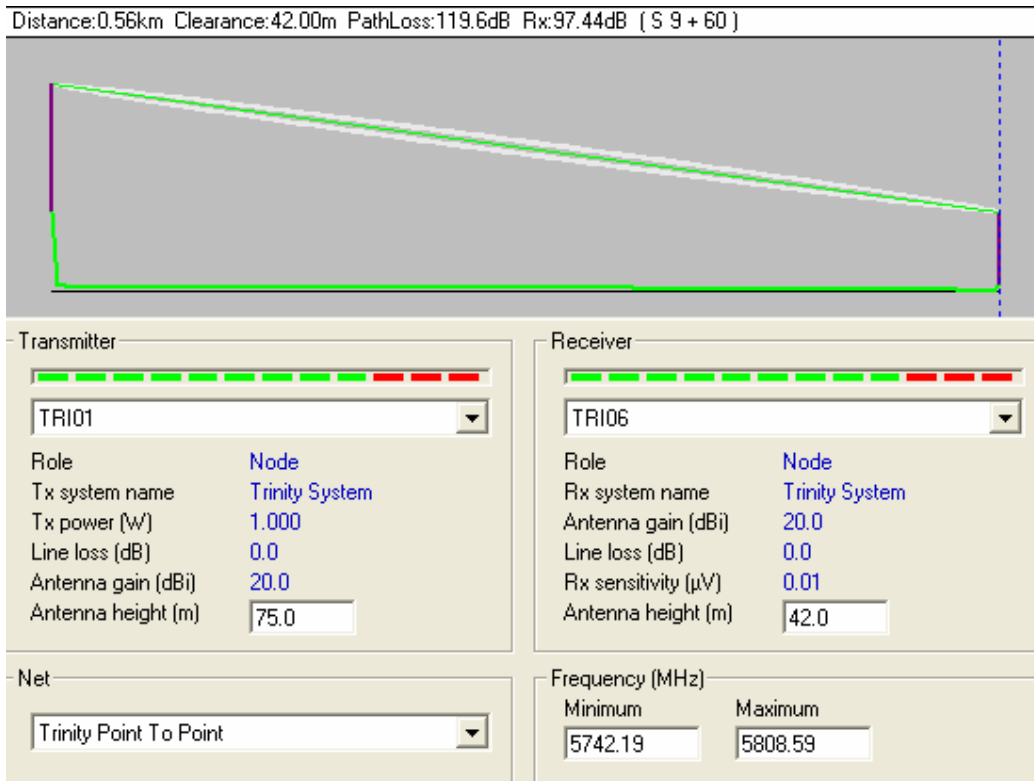
Figure 5 – Locality and elevation

## Appendix B – Path Loss Analysis Details

The detailed results of the path loss analysis are provided below.

Frequency	<b>5.8</b>	GHz			
Distance	<b>0.55</b>	Kilometres			
Path loss	<b>102.5</b>	dB			
Climate Factor	<b>0.25</b>	(see table)	Average	<b>0.25</b>	<b>1.00</b> Average
Terrain Factor	<b>1</b>	(see table)	Dry	<b>0.1</b>	<b>0.25</b> Mountainous
			Humid	<b>0.5</b>	<b>4.00</b> Smooth
Tx Power	<b>9</b>	dBm			
Feeder Length	<b>0</b>	ft			
Feeder Loss Spec	<b>0</b>	dB loss/100ft			
Additional Losses	<b>0</b>	dB			
Tx Antenna Gain	<b>20</b>	dB			
EIRP This Side	<b>29</b>	dBm			
Rx Antenna Gain	<b>20</b>	dB			
Feeder Length	<b>0</b>	ft			
Feeder Loss Spec	<b>0</b>	dB loss/100ft			
Additional Losses	<b>0</b>	dB			
Receiver Threshold	<b>-89</b>	dBm			
Received Signal Level	<b>-55.5</b>	dBm			
Fade Margin	<b>33.5</b>	dB			
Availability (one way)	<b>100.000000%</b>				
Outage Time (one way)	<b>0.00</b>	minutes/year			
<b>Opposite Direction:</b>					
Tx Power	<b>9</b>	dBm			
EIRP This Side	<b>29</b>	dBm			
Received Signal Level	<b>-55.5</b>	dBm			
Fade Margin	<b>33.5</b>	dB			
Availability (one way)	<b>100.000000%</b>				
Outage Time (one way)	<b>0.00</b>	minutes/year			

**Figure 6 – Path Loss Analysis Results**



**Figure 7 – Path Loss Analysis Results**

Frequency **5.8** GHz

Distance **0.341** Miles

**Earth Curvature**

		Distance from Link end (miles)	K factor		
<b>0.6 x First Fresnel Zone (feet)</b>	0	0	<b>1.00</b>	0 ft	
	3	0.0341	0	0 ft	
	4	0.0682	0	0 ft	
	5	0.1023	0	0 ft	
	5	0.1364	0	0 ft	
	<b>Mid Point</b>	<b>5</b>	<b>0.1705</b>	<b>0</b>	0 ft
		5	0.2046	0	0 ft
		5	0.2387	0	0 ft
		4	0.2728	0	0 ft
		3	0.3069	0	0 ft
	0	0.341	0	0 ft	

Total Clearance Required = 0.6 x First Fresnel Zone when k=1.0

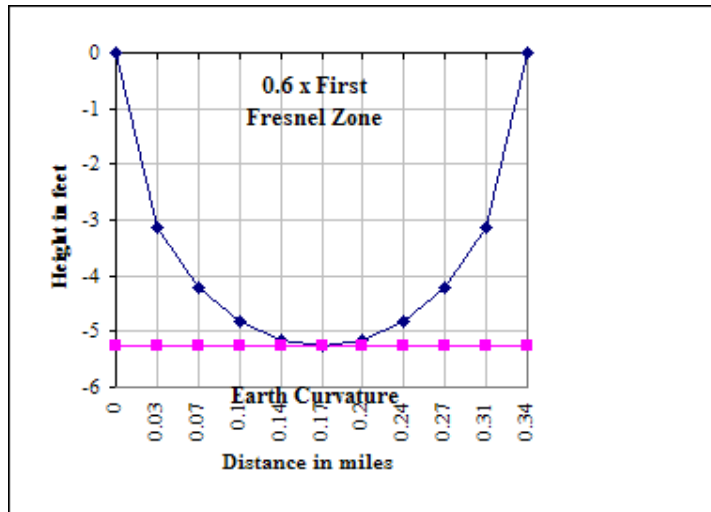


Figure 8 – Path Clearance Analysis Results

## Appendix C – Equipment Specification

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### Hardware Required

Description	Part Number	Quantity
Long range hardware xxxxx		1
Antenna Clamp	UB1	2
Duralium Mast	DRL3	1
Stand Off Mount – 90mm	WF36	1

### Software Required

- No software is required

### Notes

- Roof access is required to both locations during install

## Appendix D – Configuration Details

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### Bridge PRTRI1BR01

#### Hardware Mounting

<i>Hardware Identifier:</i>	PRTRI1BR01
<i>Location Identifier:</i>	EXA01
<i>Mounting Surface:</i>	Steel Piping
<i>Mounted To:</i>	Support Structure
<i>Access Point Housing:</i>	Environmental Casing
<i>Mounting Height:</i>	2 metres from roof top
<i>Power:</i>	Power over Ethernet
<i>RF Power Output:</i>	9 dBm
<i>ERIP Power Output</i>	30 dBm

#### Software Configuration

<i>Bridge Manufacturer:</i>	Proxim
<i>AP Model:</i>	Quick Bridge 20
<i>Other Security:</i>	Inbuilt Security
<i>Transmit Frequency</i>	5743.85 MHz
<i>Receive Frequency</i>	5743.85 MHz

#### Notes

- No lightning protection is installed at the rooftop. A lightning protection rod and appropriate grounding is recommended to reduce the risk of a lightning strike

### Bridge PRTRI1BR02

#### Hardware Mounting

<i>Hardware Identifier:</i>	PRTRI1BR02
<i>Location Identifier:</i>	EXA06
<i>Mounting Surface:</i>	Steel Piping
<i>Mounted To:</i>	Support Structure
<i>Access Point Housing:</i>	Environmental Casing
<i>Mounting Height:</i>	9 meters from air-conditioning support structure
<i>Power:</i>	Power over Ethernet
<i>RF Power Output:</i>	9 dBm
<i>ERIP Power Output</i>	30 dBm

#### Software Configuration

<i>Bridge Manufacturer:</i>	Proxim
<i>AP Model:</i>	Quick Bridge 20
<i>Other Security:</i>	Inbuilt Security
<i>Transmit Frequency</i>	5743.85 MHz
<i>Receive Frequency</i>	5743.85 MHz

#### Notes

- No lightning protection is installed at this location. There is a low likelihood of a lightning strike at this location; however the installation of a lightning protection rod is advisable

## Appendix E – Installation Considerations

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### Electrical Considerations

All equipment sold by Simply Wireless is designed to work on 240 Volt AC power. However, performance degradation can occur due to random electrical disturbances.

Simply Wireless recommends the following options to be taken into account to ensure longevity of the equipment. The list is ordered from most desirable to least desirable;

- Dedicated circuit with UPS (and built-in line conditioning)
- Non-dedicated circuit with UPS (and built-in line conditioning)
- Dedicated circuit with line conditioning
- Non-dedicated circuit with line conditioning

The first option is highly recommended if the installed equipment is used in a mission critical environment. Circuits without line conditioning are not recommended.

Wireless data equipment generally has a low current draw; however other devices connected to the same circuit may affect the operation of the equipment. Simply Wireless recommends not connecting wireless data equipment with other devices on the same circuit.

The following list of equipment should not to be used in the same area or on the same circuit as the wireless networking equipment.

- Any devices prone to causing power surges or sudden voltage changes. Devices include refrigerators, air conditioners, etc.
- Any single devices drawing more than 25% of the rated value of the circuit
- Any combination of devices drawing more than 60% of the rated circuit value
- Any device that may cause excessive heat such as, photo copiers, laser printers, heaters, etc.

Any wireless network equipment that requires continuous power should not be connected to an energy management system.

### Environmental Considerations

The following general environmental considerations should be taken into account when mounting wireless network equipment:

- Harsh weather conditions
- Dust and dirt
- Lighting susceptibility
- Ambient air temperature

**NOTE:** Outdoor wireless bridges are built to withstand harsh environmental conditions.

## **General Recommendations**

There are several considerations to be taken into account in the general installation of the hardware.

- All new data cabling should have a minimum clearance of 1 meter from any existing alternating current circuitry
- All data cabling should not be installed into a new conduit as required. Existing power conduit should not be used
- A minimum clearance of 1.5 metres from any antenna should be observed at all times



## **Appendix F – Warranty of Coverage**

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Simply Wireless assures the above wireless coverage for a period of no longer than thirty (30) days from date of issue. To comply with this warranty all equipment must be configured and installed as described. Any changes to the environmental or electrical conditions of this site will void the Warranty.