

Meru Wireless Site Survey

For Example Primary School

Prepared by
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1. Management Summary.

Siracom were commissioned by Reseller to perform a wireless site survey of Example Primary School for Berkshire County Council.

We were briefed ahead of the visit by our Contact at Reseller. The briefing stated that good coverage is required across the school for low densities of users, and that "whole of class" wireless applications are not required. These requirements were verified by Alison, our main contact on site.

Our key recommendations based on the briefing given are as follows:

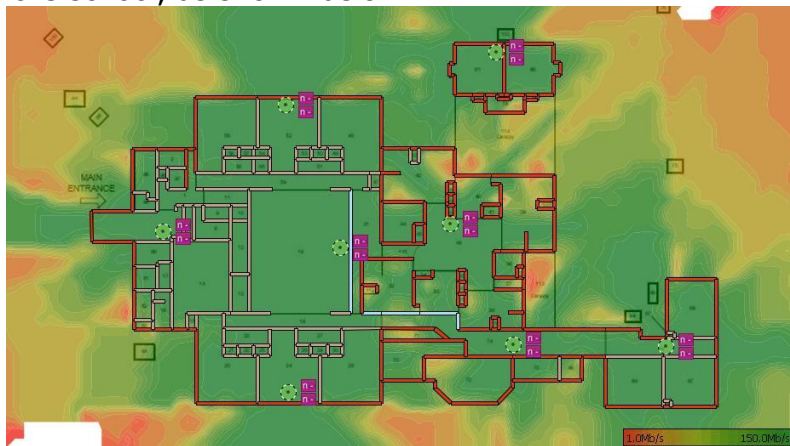
Number of Controllers	1
Controller type	MN-MC1500
Number of Access Points recommended.	8
Recommended AP type	MN-AP320
Operational Channel(s)	2.4GHz #1 & 5GHz #36

The APs should be located as follows:

AP	Location
1	Corridor outside Staff Room 60
2	Centre rear wall pillar of Classroom 52 (Yr6)
3	Main Hall 18 centre of right wall
4	Centre rear wall pillar of Classroom 24 (Yr4)
5	Corridor 74 on divide of Music Room 72 and small Classroom 73
6	Corridor 88 on corner of Classroom 69 (Yr3)
7	On end wall 104 in open Workspace 46 (Yr1/Reception)
8	By window in joining wall of Classroom 81 (Yr2)

** Room references taken from supplied floor plan*

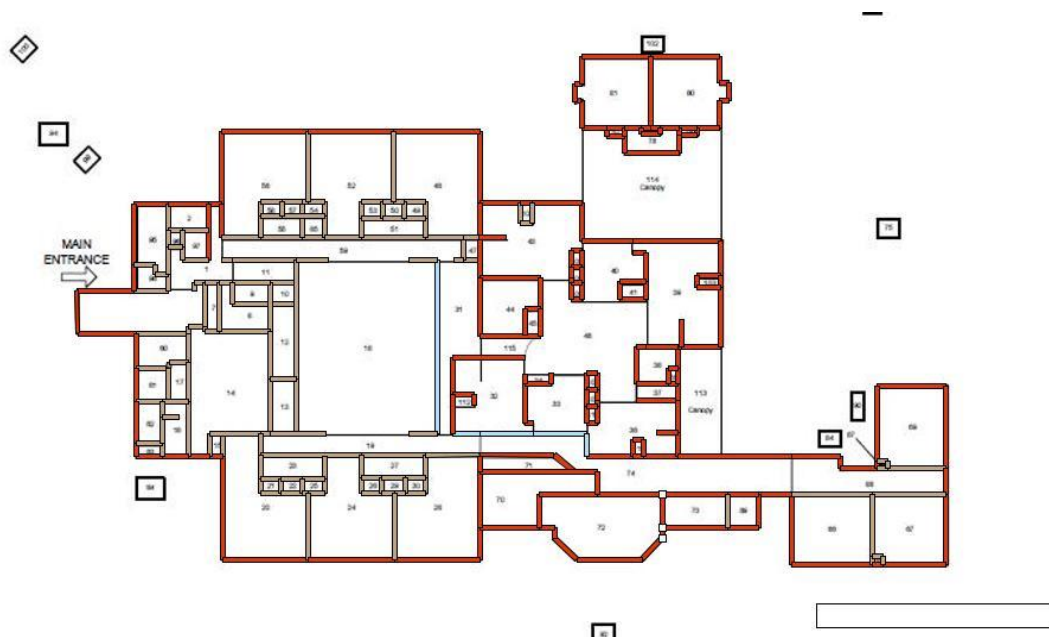
It is anticipated that this will provide a minimum connection speed of 24Mb/s, throughout the area requested, with connection speeds of 150Mb/s across the majority of the school, as shown below.



2. Background.

Example Primary School in Berkshire, is a single level building comprising classrooms, an open plan teaching area, main Hall and offices. The offices are located by the main entrance, classrooms for Year4,5 and 6 are either side of the main hall, with an open plan Reception and Year1 teaching area behind. Year3 classrooms and an ICT suite extend to the rear of the building, with the Year2 classrooms in an adjacent building linked by a canopy.

The building is a brick construction around a steel framework, with much glass in the outer facing walls. The internal walls are a mix of brick and dry wall divides as shown below.



Key:

- Brick Walls = red line
- Dry Walls = beige line
- Thick Window = blue line

The current wireless provision is a 3-Com wireless network delivered over 9 APs that exhibits poor performance and connectivity issues.

3. Overview of Requirement.

Our briefing provided by Reseller and Client described the requirement as follows:

- To provide wireless coverage throughout the school except in the kitchen and bathroom areas.
- High density / whole class teaching is not a requirement at present.
- Coverage in the open plan area for Year1 and Reception will be for staff use only.

Coverage :

Areas to be covered by 2.4GHz	All school buildings
Areas to be covered by 5GHz	All school buildings
Areas where coverage is not required	Kitchen, Bathrooms
Other areas	None specified
Operational Frequencies	2.4GHz and 5GHz
Standards to be supported	802.11a,b,g,n
Resilience requirements	None specified for APs or Controller
Aesthetic requirements	None specified. AP320s will be wall mounted close to ceiling height.

User Density:

Areas of very high user density (40+)	None
Areas of high user density (15+)	None

Performance:

Whole of Class teaching	Not required
Applications to be supported	General education applications, no voice, some unicast video.

Design Criteria.

From the specification above we have designed to the following technical specification.

Minimum Connection Speed achievable (from test laptop)	50Mb/s
Minimum number of access points visible from any position (from test laptop).	1
Access Point locations	As whole class teaching is not required access points will be positioned to minimise cost – they may therefore be placed in the corridors. A network designed for general coverage promotes location of the APs in the corridors. A design for whole class teaching would position the APs within the classrooms.

4. Site Survey.

a. Access Point Numbers and Positions

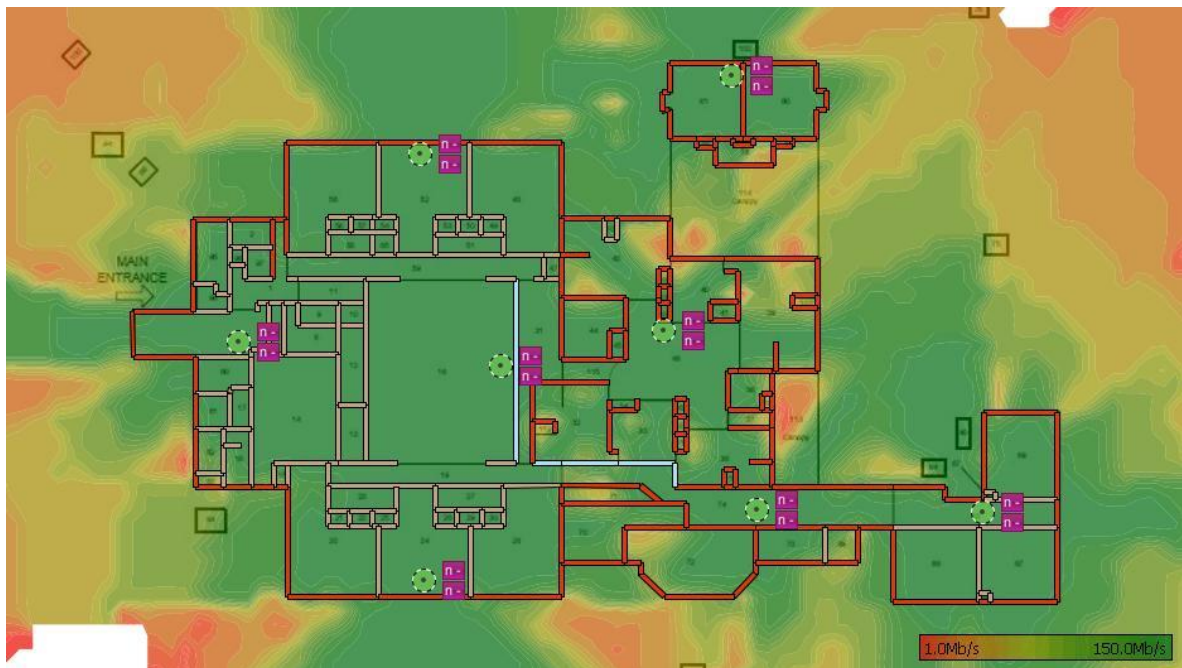
A site survey was performed using Ekahau Site Survey using the following process.

From the supplied building floor plans, a desktop survey was performed to ascertain theoretical coverage using computer modelling.

Using Meru AP320s and the access point locations suggested by the desktop survey actual signal strength and propagation was measured throughout the building. The signal strength readings obtained from walking the site showing actual coverage are contained in the appendices to this document.

AP positions and numbers were amended to meet the design criteria with the minimum number of access points.

The site survey suggests 8 access points deployed as follows:



Heatmap

Key:

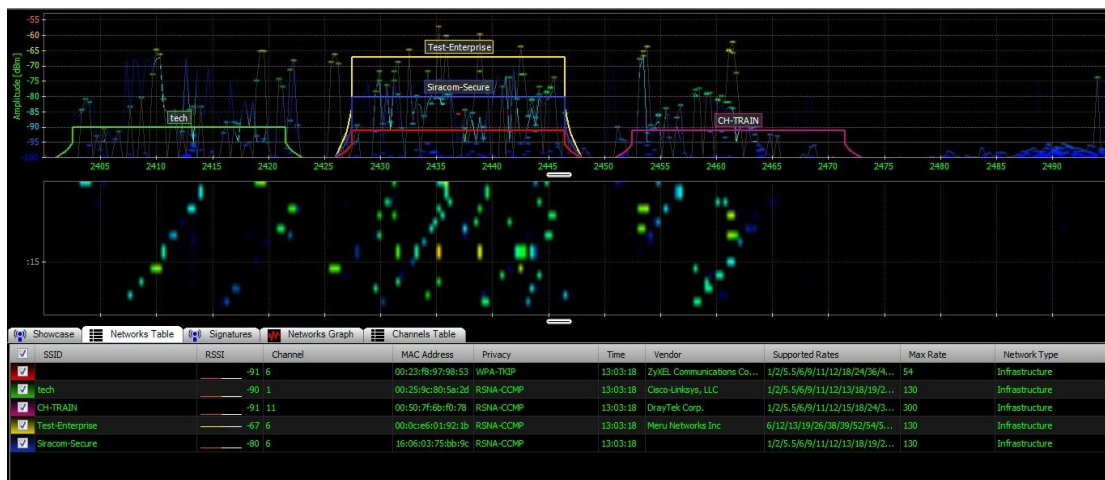
- Brick Walls = red line
- Dry Walls = beige line
- Thick Window = blue line
- AP = green circle

b. Interference Analysis

Analysis of the Radio Frequency spectrum was performed using Wi-Spy and served to identify possible sources of interference and promote the most suitable channels for wireless deployment.

Non WiFi Interferers

Analysis of the RF spectrum identified a major source of potential interference as the schools PIR security system. This is a site wide interferer operating around Channels 8 and 9 of the 2.4 GHz frequency. This could have an adverse effect on Channels 6 through 11.



Known Wi-Fi Interferers

The existing "Example" network could be seen. There were no other school wireless networks

Un-Known WiFi Interferers

No significant interference was detected from surrounding wireless networks.

c. Channel Recommendations

The levels of RF spectrum activity and potential interference detected indicate that the Meru wireless would be best allocated to Channel 1 in the 2.4 GHz operating frequency. All channels were found to be free from interference in the 5 GHz range suggesting an allocation to Channel 36.

5. Recommendations.

The site survey indicates a requirement for 8 APs to deliver the wireless network service to satisfy the schools requirement.

Our key recommendations based on the briefing given are as follows:

Number of Controllers	1
Controller type	MN-MC1500
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Note. Each access point requires a network connection providing power over Ethernet.

Health and Safety.

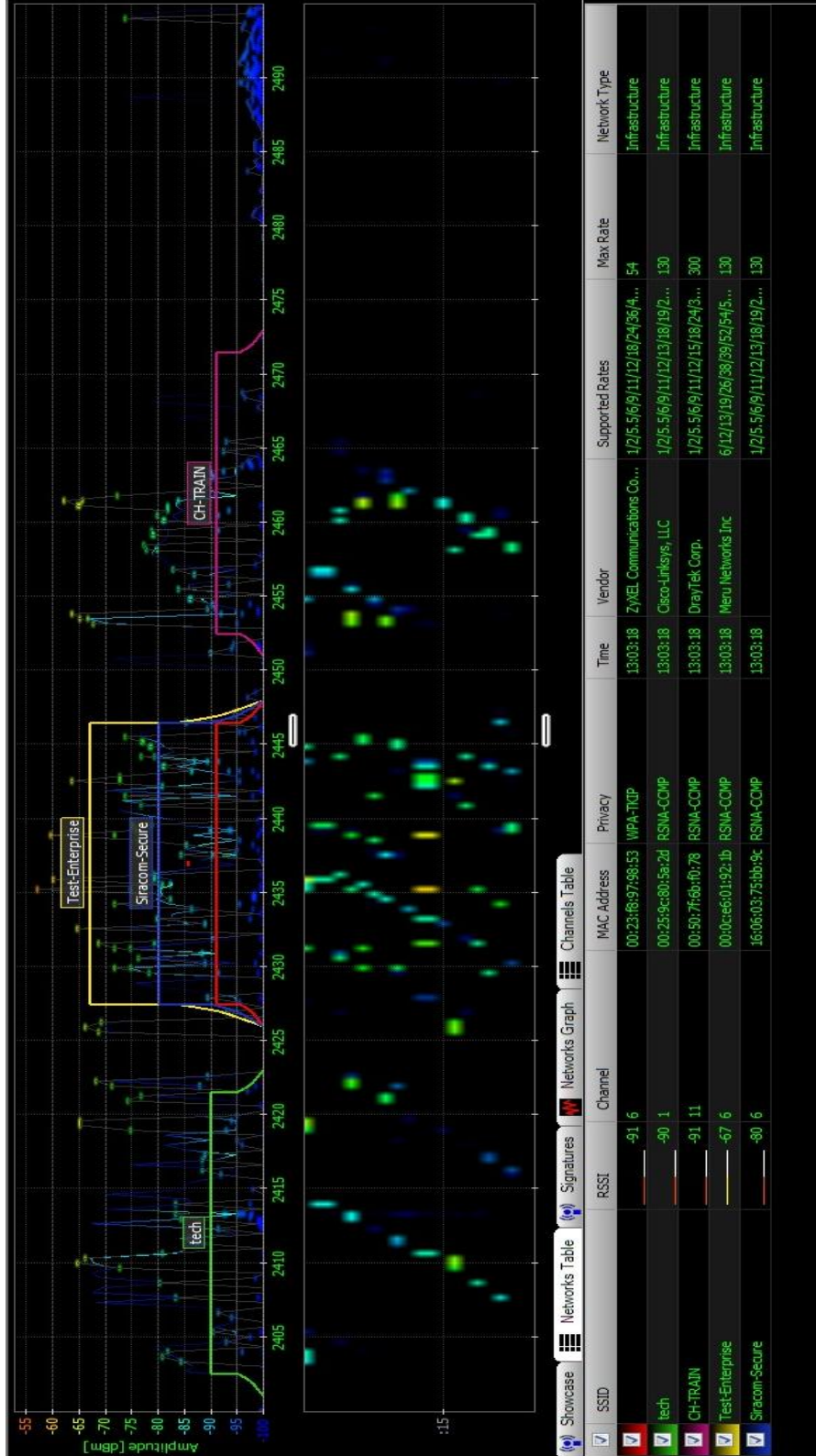
Normal health and safety procedures should be followed during installation. None of the access point locations suggested require access via "cherry picker", no obvious, unusual risks were detected.

Siracom Liability

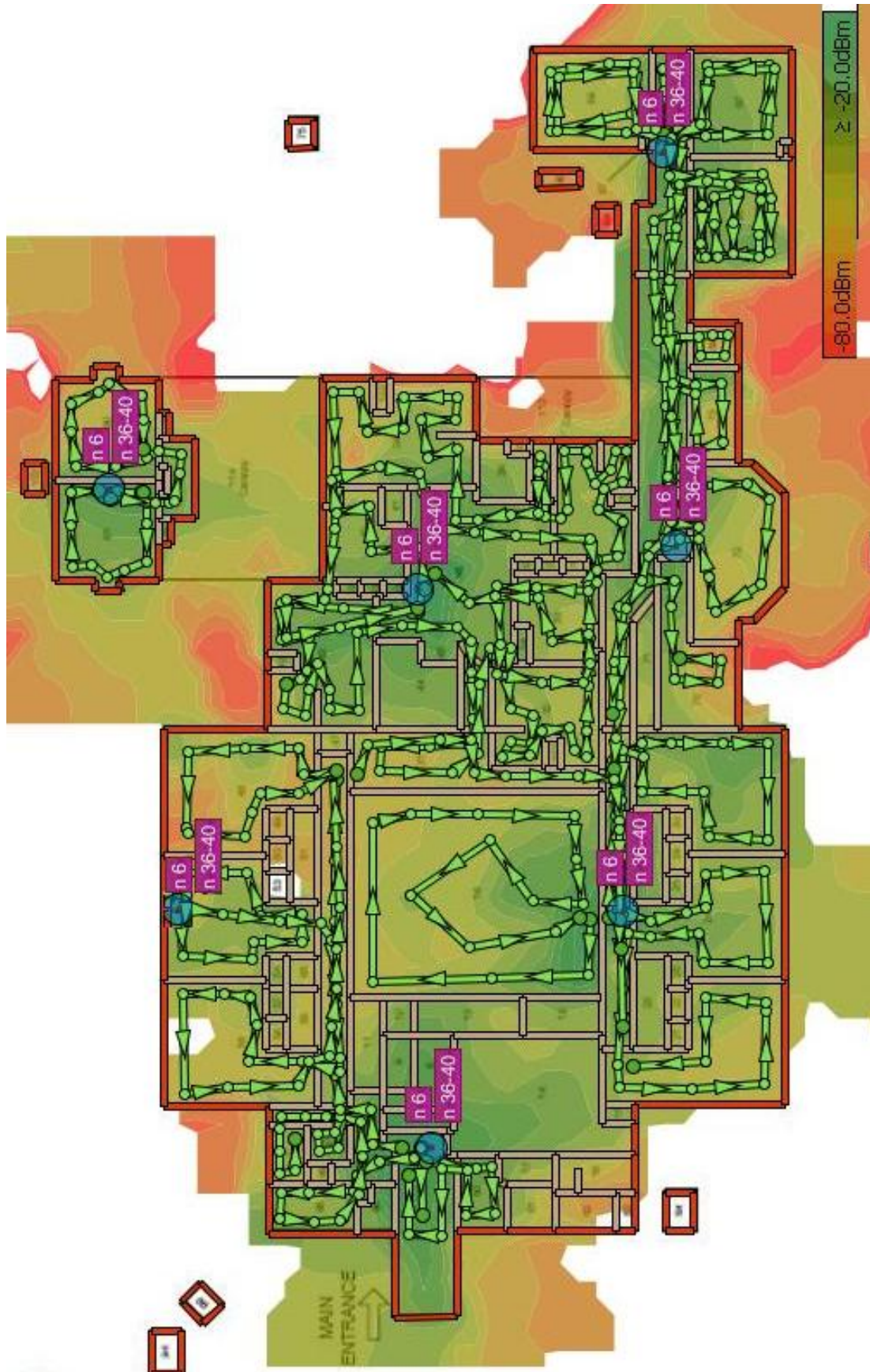
Siracom uses industry leading tools, relevant hardware and best practice to ensure that our surveys are as accurate as possible. The environment in which wireless is deployed is inherently dynamic so our readings and extrapolations can only be estimations and we can offer no guarantees as to the ongoing accuracy of our surveys.

Appendices:

RF Spectrum Analysis.



Site Survey Observed Coverage



Proposed Access Point Locations and Coverage

