

Football Stadium Wi-Fi Design

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#WiFiDesignDay

by Ekahau and Open Reality

CAE

Football Stadium Wi-Fi Design

- Design Considerations
- AP Placement
- Capacity Calculations

Introduction

Weekdays

- > Senior Consultant with CAE
- > Started working in Wi-Fi in 2010
- > CCNP EN, CWAP, CWSP, CWDP, CWISA



Weekends

- > Manager with ZM Racing
- > Strategist, Chef, Chief mechanic and Transport and logistics manager









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Wi-Fi Design Considerations for a Football Stadium?

ⓘ Start presenting to display the poll results on this slide.

Design Considerations

Information Gathering



Coverage

Everywhere?
Really?



Roaming Pathways

Pinch points,
Congregation areas



Client Uses

Applications?



Capacity

User density



AP placement

Options, Restrictions

AP placement



Gantry Internal



Calculating Beamwidth

$A = ?$

$$\cos A = (b^2 + c^2 - a^2) / 2bc$$

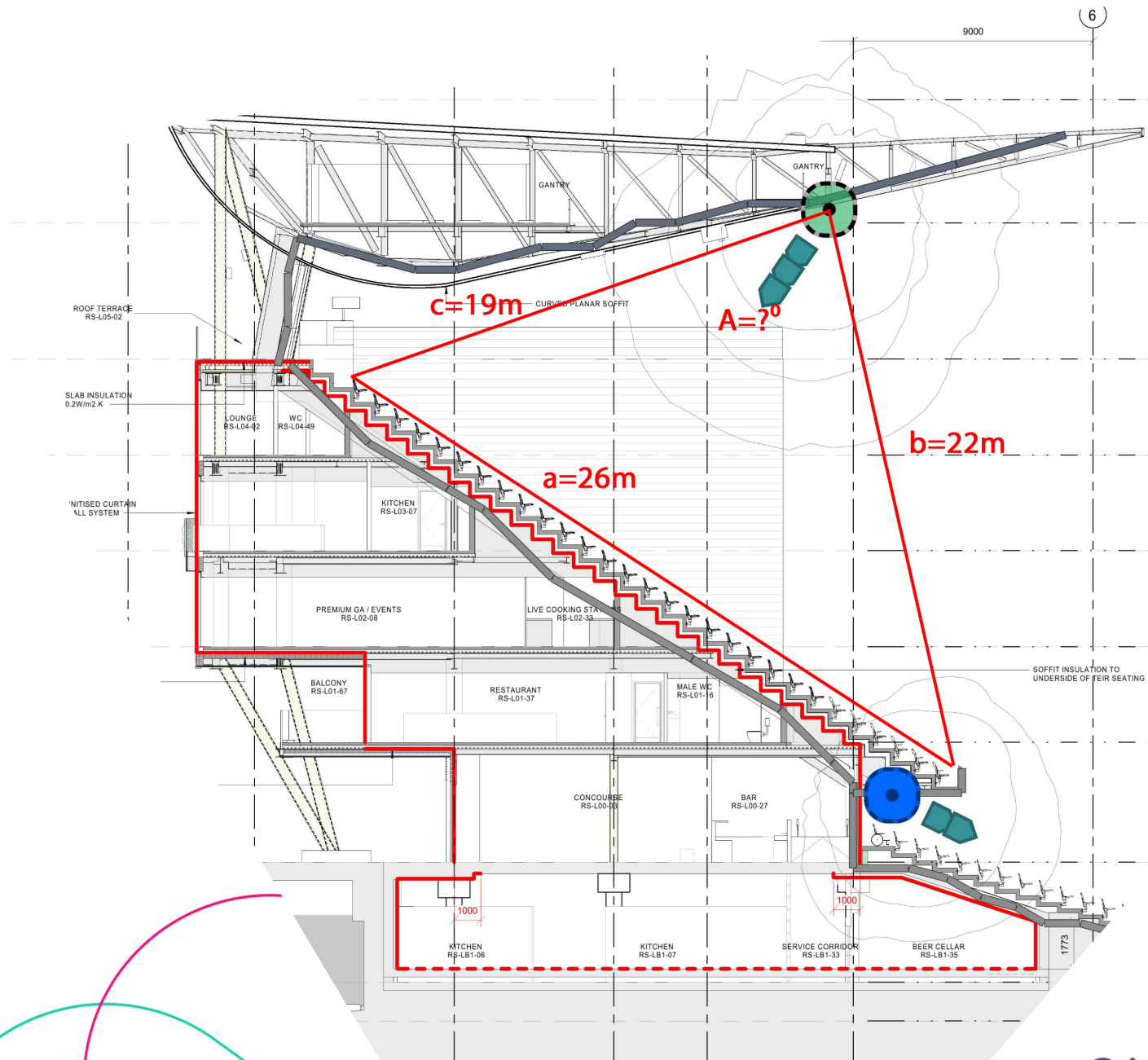
$$\cos A = (22^2 + 19^2 - 26^2) / 2 \times 22 \times 19$$

$$\cos A = (484 + 361 - 676) / 836$$

$$\cos A = 169 / 836$$

$$A = \cos^{-1} 0.202$$

$$A = 78.3^\circ$$



Calculating Beamwidth

$A = ?$

$$\cos A = (b^2 + c^2 - a^2) / 2bc$$

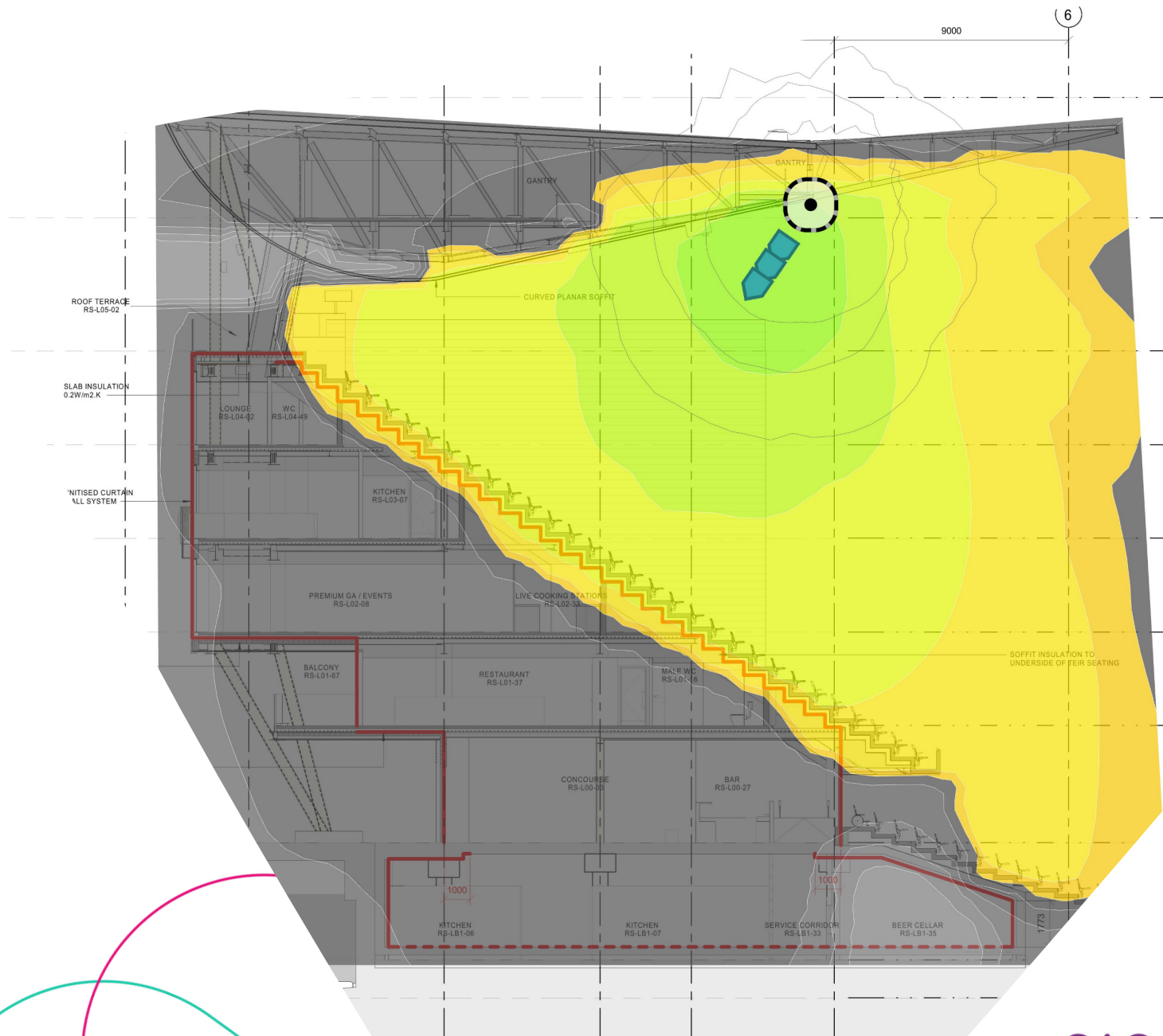
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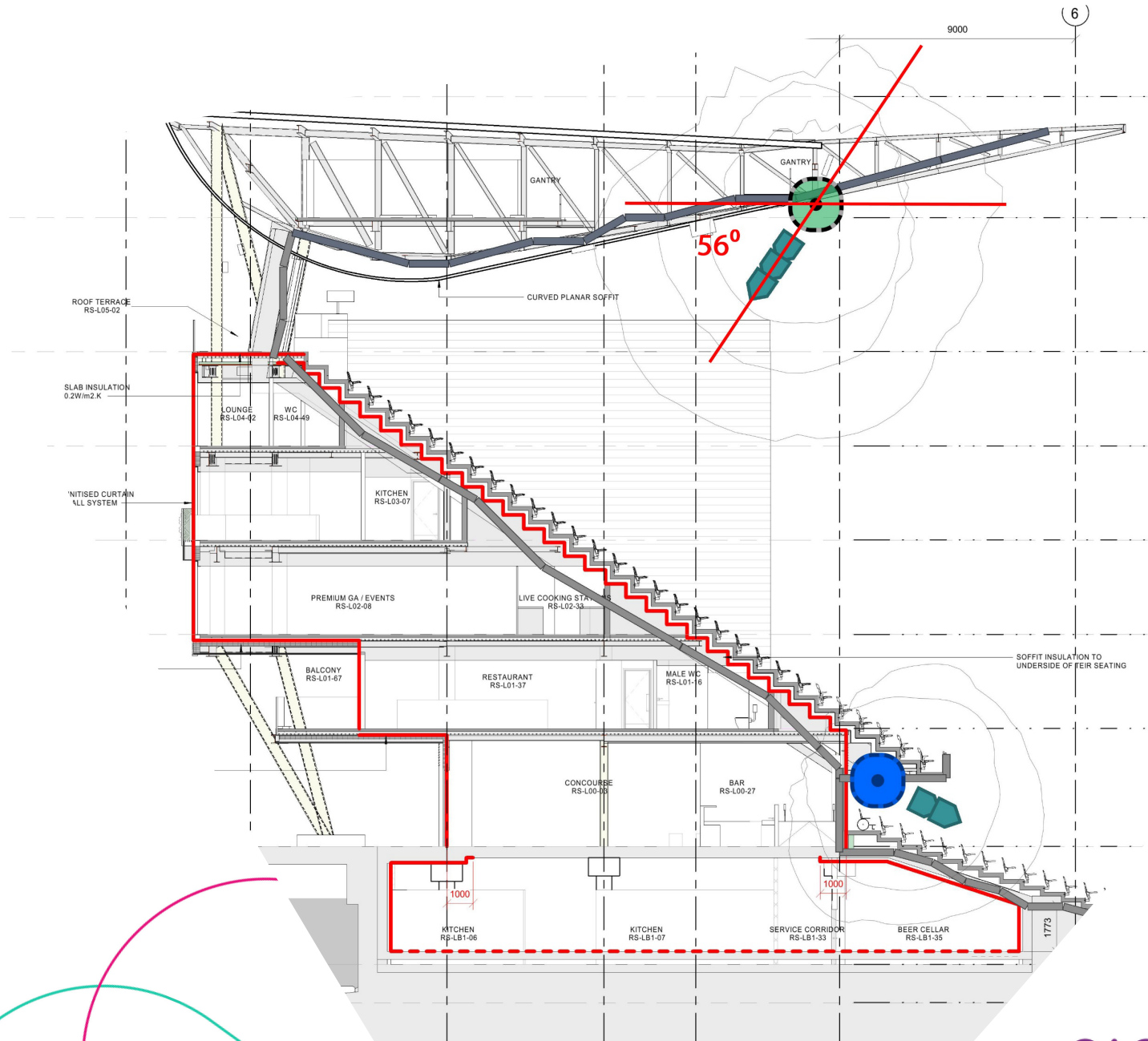
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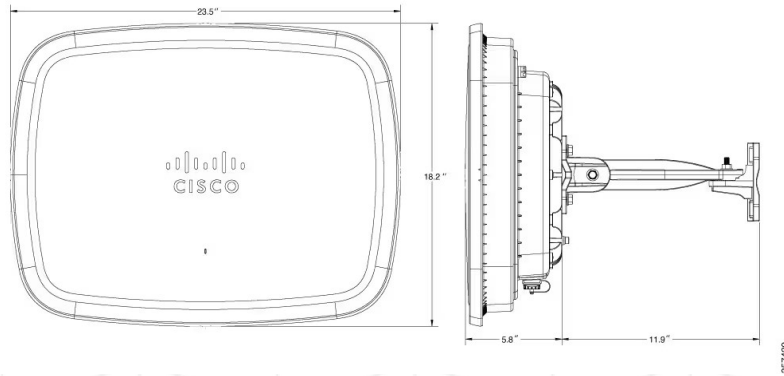
$$A = \cos^{-1} 0.202$$

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Antenna Choice

Cisco 9104 7dBi Stadium Antenna



Beamwidth Azimuth	80°
Beamwidth Elevation	25°

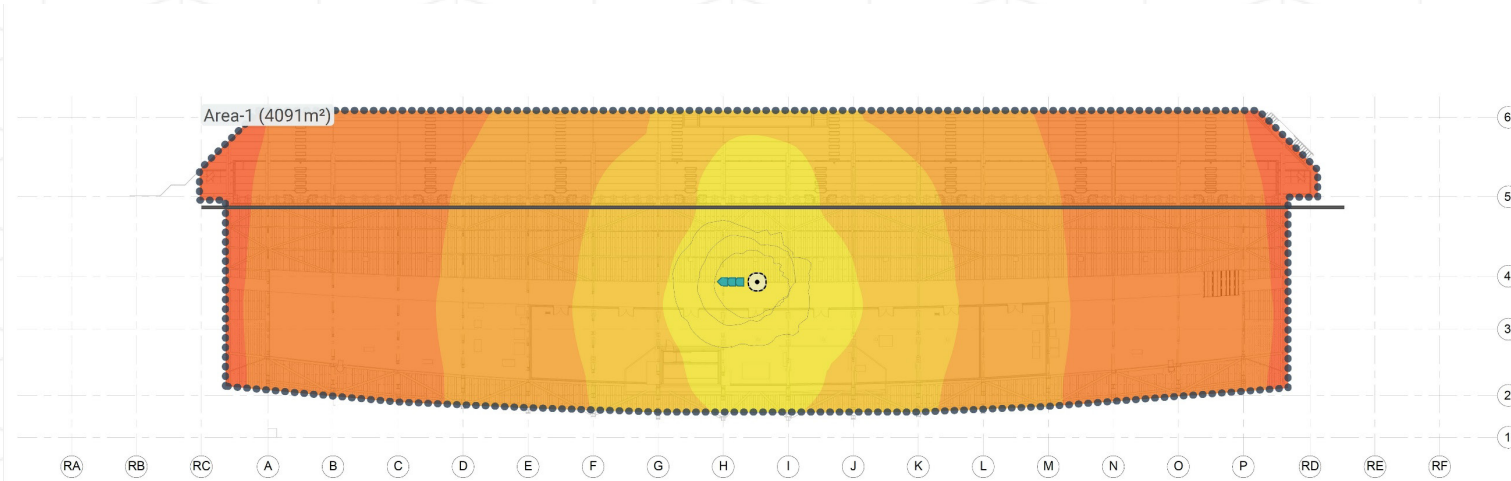
AccelTex 13dBi Warehouse Antenna



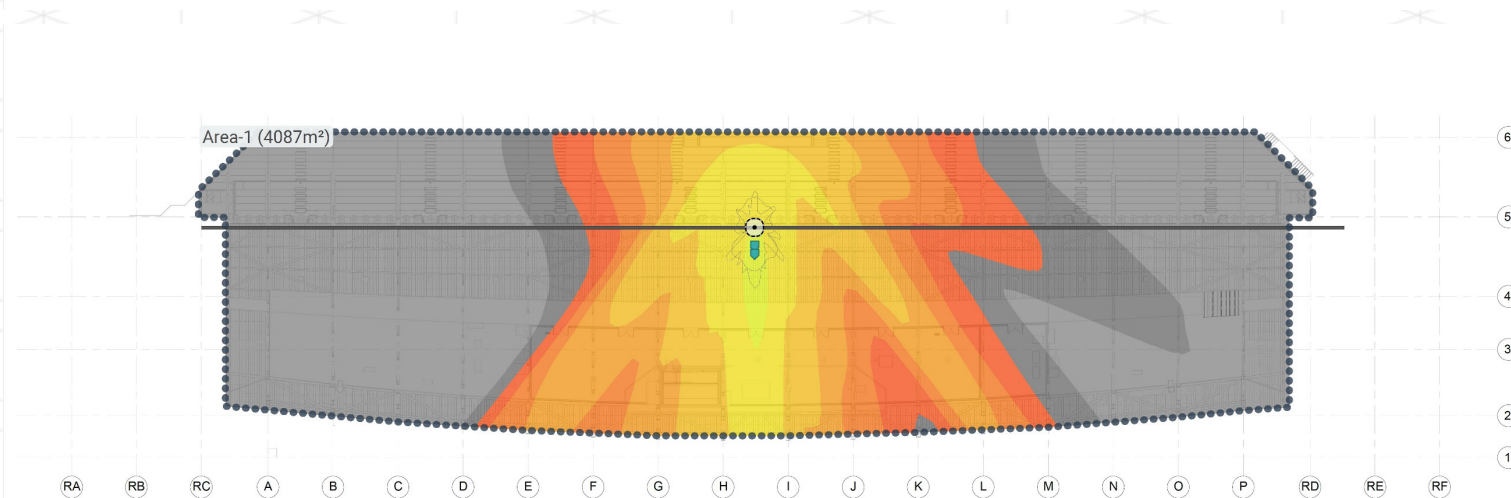
Beamwidth Azimuth	15°
Beamwidth Elevation	110°

-85dBm Cell Size

Cisco 9104
20m 12.5mW



AccelTex 13dBi Patch
20m 12.5mW



Capacity Calculations 5GHz

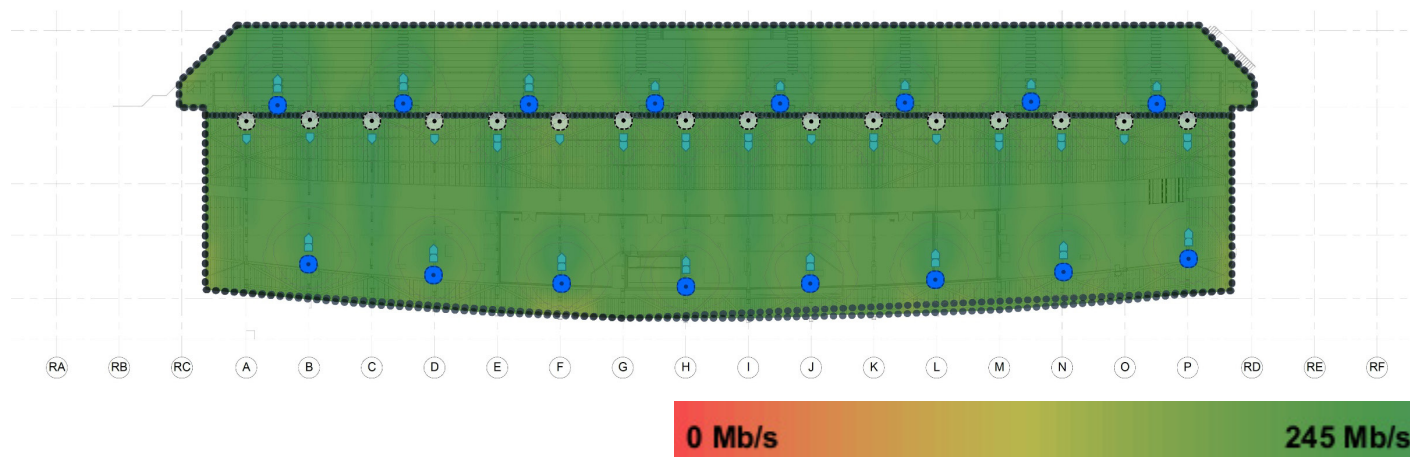
11,800
Seating capacity

32
APs

48
Radios

220Mbps
Max Data Throughput

Data Throughput



Seats	11,800
Active Clients	5900
Clients per Radio	123
Data per Client	1.8Mbps

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Metrics Used For Calculating Wi-Fi Capacity?

ⓘ Start presenting to display the poll results on this slide.

The logo features the letters 'CAE' in a large, white, sans-serif font. The 'A' is stylized with a dot above it. Below 'CAE' is the tagline 'TECHNOLOGY ON POINT' in a smaller, white, all-caps sans-serif font. The background is a vibrant purple with a complex geometric pattern of overlapping triangles and polygons in various shades of purple and magenta.

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TECHNOLOGY ON POINT

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