AI-Driven Wi-Fi 7 引領企業永續發展

蘇俊銘 - Kevin Su

RUCKUS 技術顧問

Wi-Fi 7/6E： Tri-Radio

Unlicensed Spectrum and Channel Allocations

2.4 GHz Channels — 60 MHz

Qty	ISM Band			
	Channel	1	6	11
3	Center Freq	2.412	2.437	2.462

5 GHz Channels — 500 MHz

Qty	Frequency																							
						DFS Channels				DFS Channels														
															TDWR									
	Radio Band	U-NII-1				U-NII-2a				U-NII-2c (Extended)												U-NII-3		
	Center Freq	5.180	5.200	5.220	5.240	5.260	5.280	5.300	5.320	5.500	5.520	5.540	5.560	5.580	5.600	5.620	5.640	5.660	5.680	5.700	5.720	5.745	5.765	5.785	5.805	5.825
25	20 MHz	36	40	44	48	52	56	60	64	100	104	108	112	116	120	124	128	132	136	140	144	149	153	157	161	165
11	40 MHz	38		46		54		62		102		110		118		126		134		142		151		159		
5	80 MHz	42				58				106				122				138				155				
2	160 MHz	50				114																				

165 was ISM, now U-NII-3

6 GHz Channels — 480 MHz

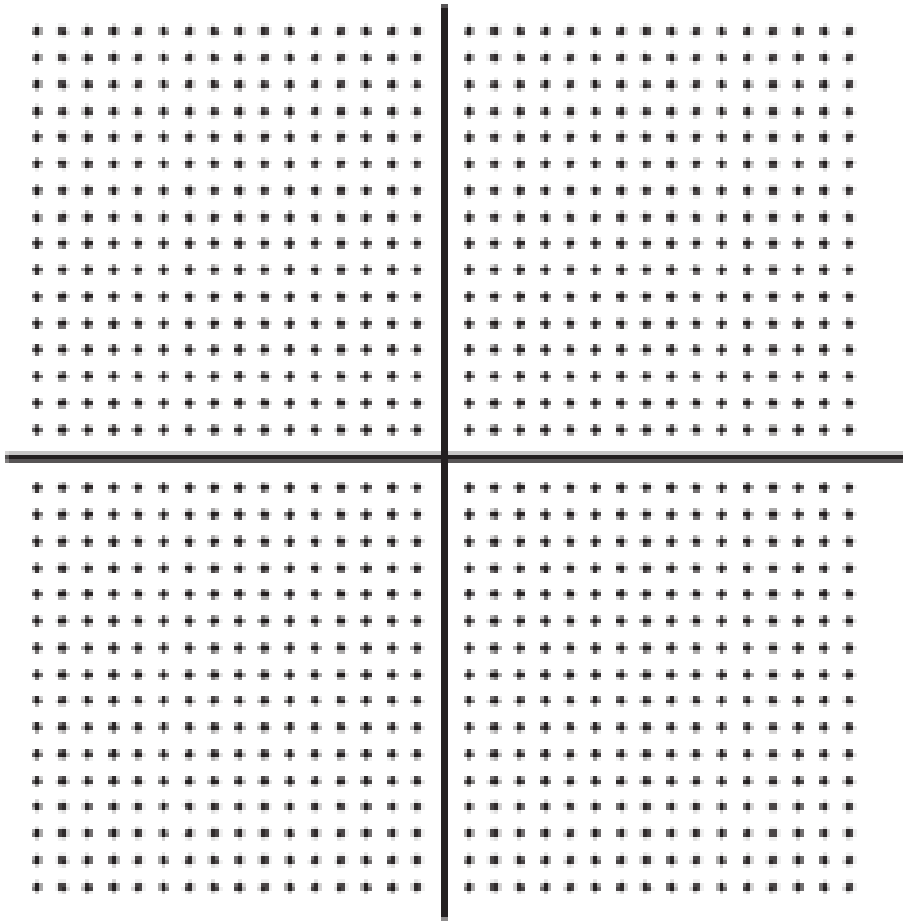
Qty	Low Power Indoor	5925	5dBm/MHz - Net EIRP 18dBM																						
	Radio Band	UNII-5																							
	Center Freq	5.955	5.975	5.995	6.015	6.035	6.055	6.075	6.095	6.115	6.135	6.155	6.175	6.195	6.215	6.235	6.255	6.275	6.295	6.315	6.335	6.355	6.375	6.395	6.415
24	20 MHz	1	5	9	13	17	21	25	29	33	37	41	45	49	53	57	61	65	69	73	77	81	85	89	93
12	40 MHz	3		11		19		27		35		43		51		59		67		75		83		91	
6	80 MHz	7				23				39				55				71				87			
3	160 MHz	15								47								79							

Major Wi-Fi 7 Enhancements ： 4K QAM

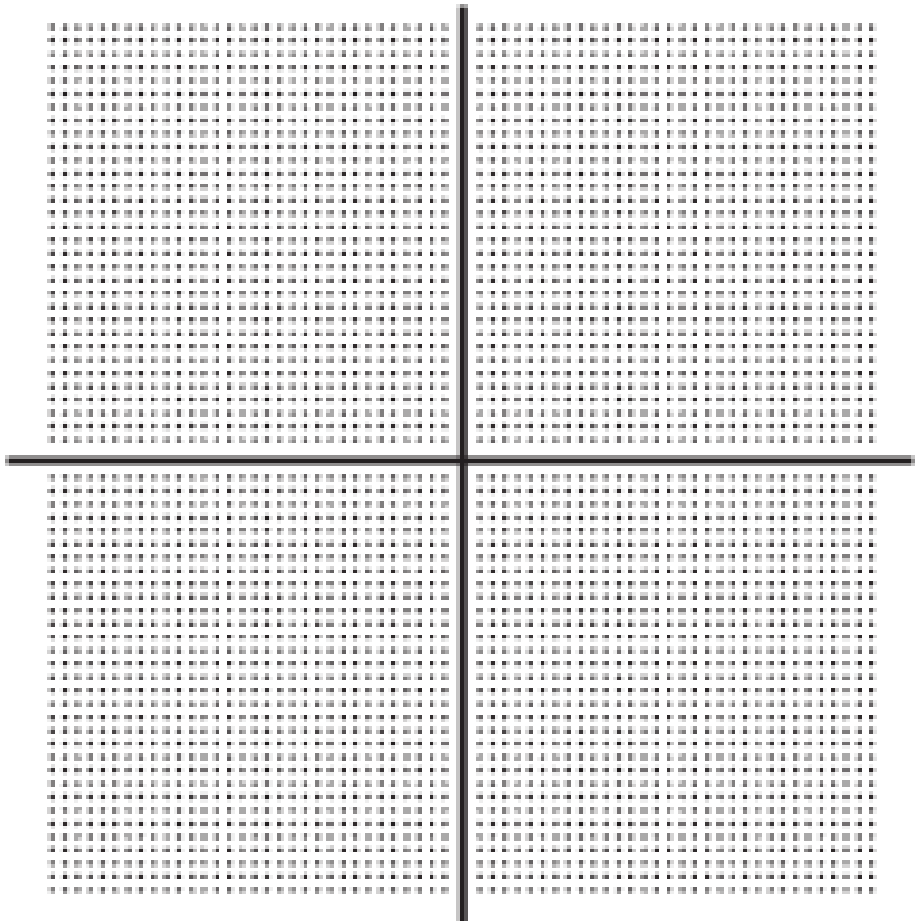
Extremely High Throughput

- 4K QAM

4096 Quadrature Amplitude Modulation



1024-QAM

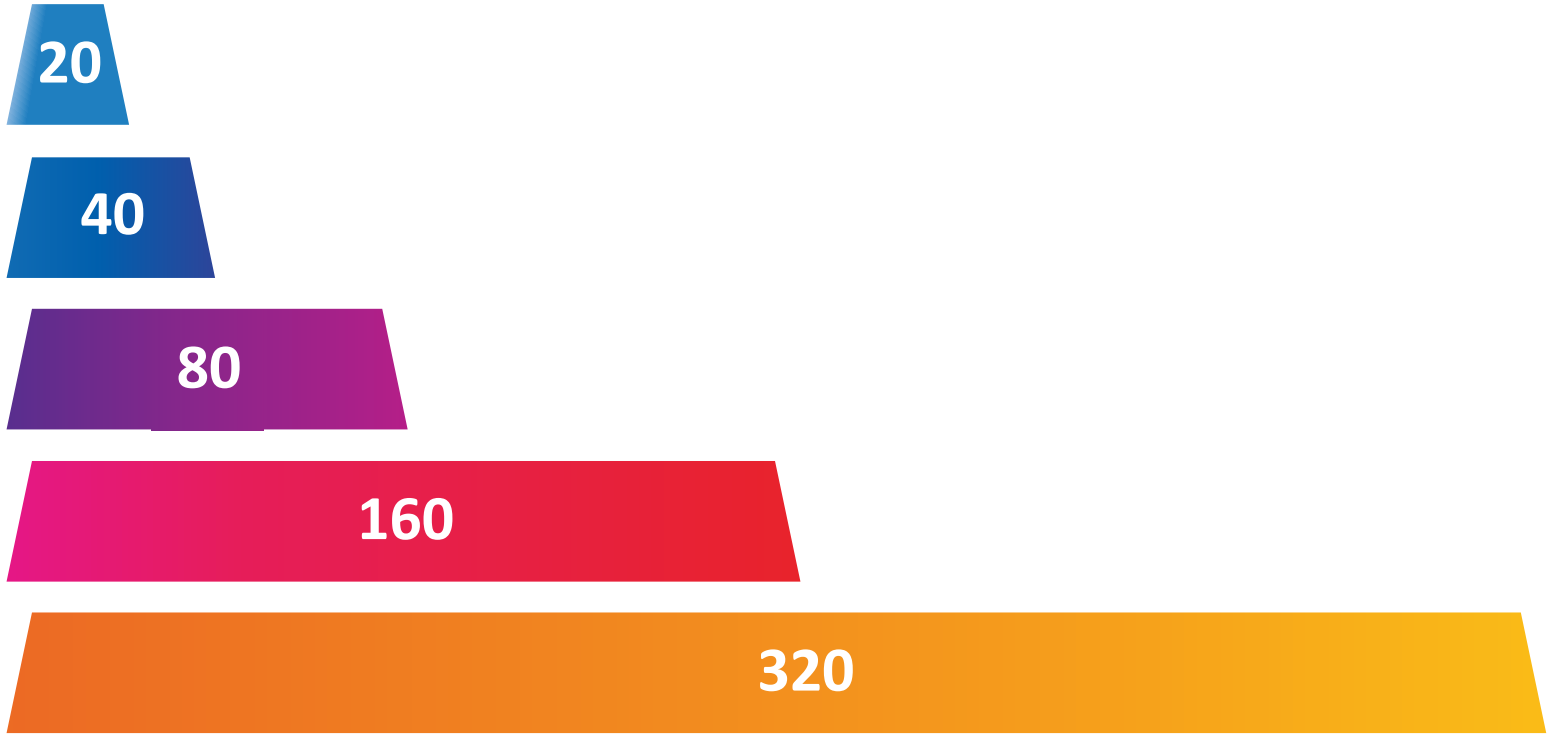


4096-QAM

Major Wi-Fi 7 Enhancements：320 MHz

Extremely High Throughput

- 4K QAM
- 16 spatial streams
- 320 MHz wide channels



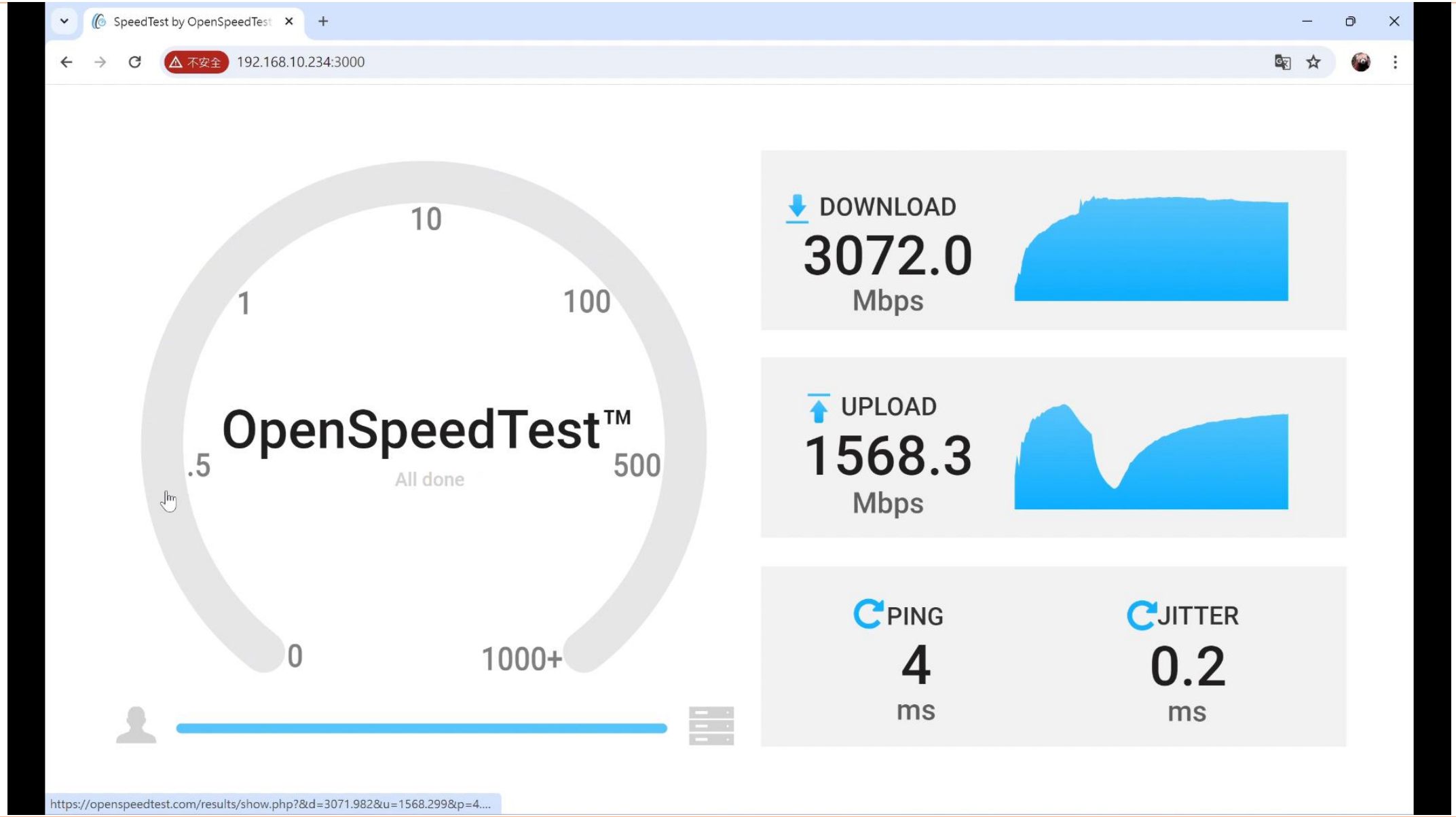
Major Wi-Fi 7 Enhancements： EHT

Extremely High Throughput

- 4K QAM
- 320 MHz wide channels
- Max 16 spatial streams

Standard	Wi-Fi 6/6E	Wi-Fi 7
Max Speed with 1 Spatial Stream	1.2 Gbps	2.9 Gbps
Max Speed with 2 Spatial Streams	2.5 Gbps	5.8 Gbps
Max Speed with Max # of Spatial Streams	9.6 Gbps	46.4 Gbps

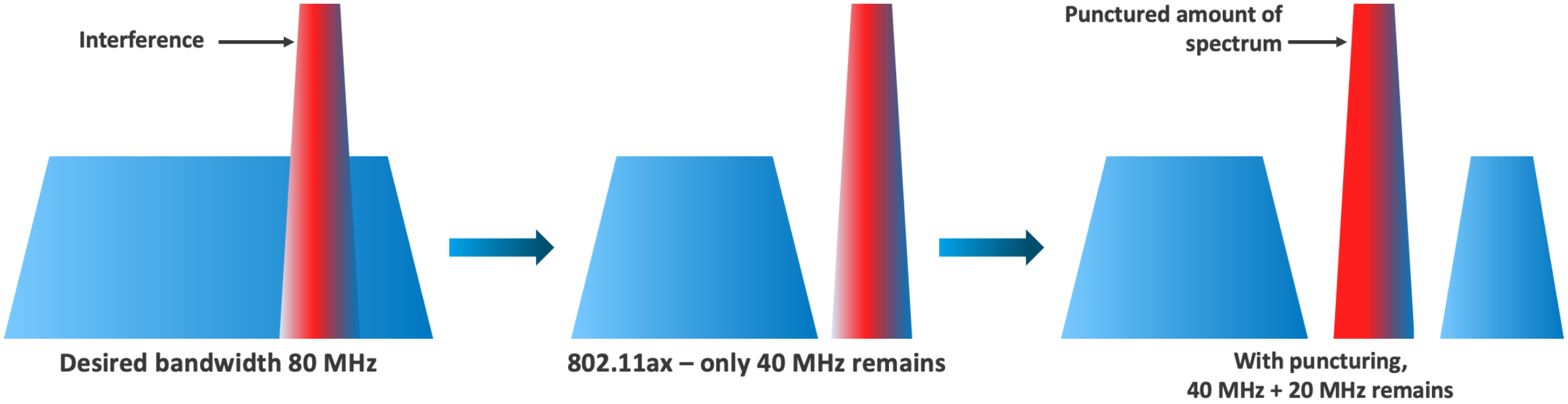
R770 OpenSpeedTest



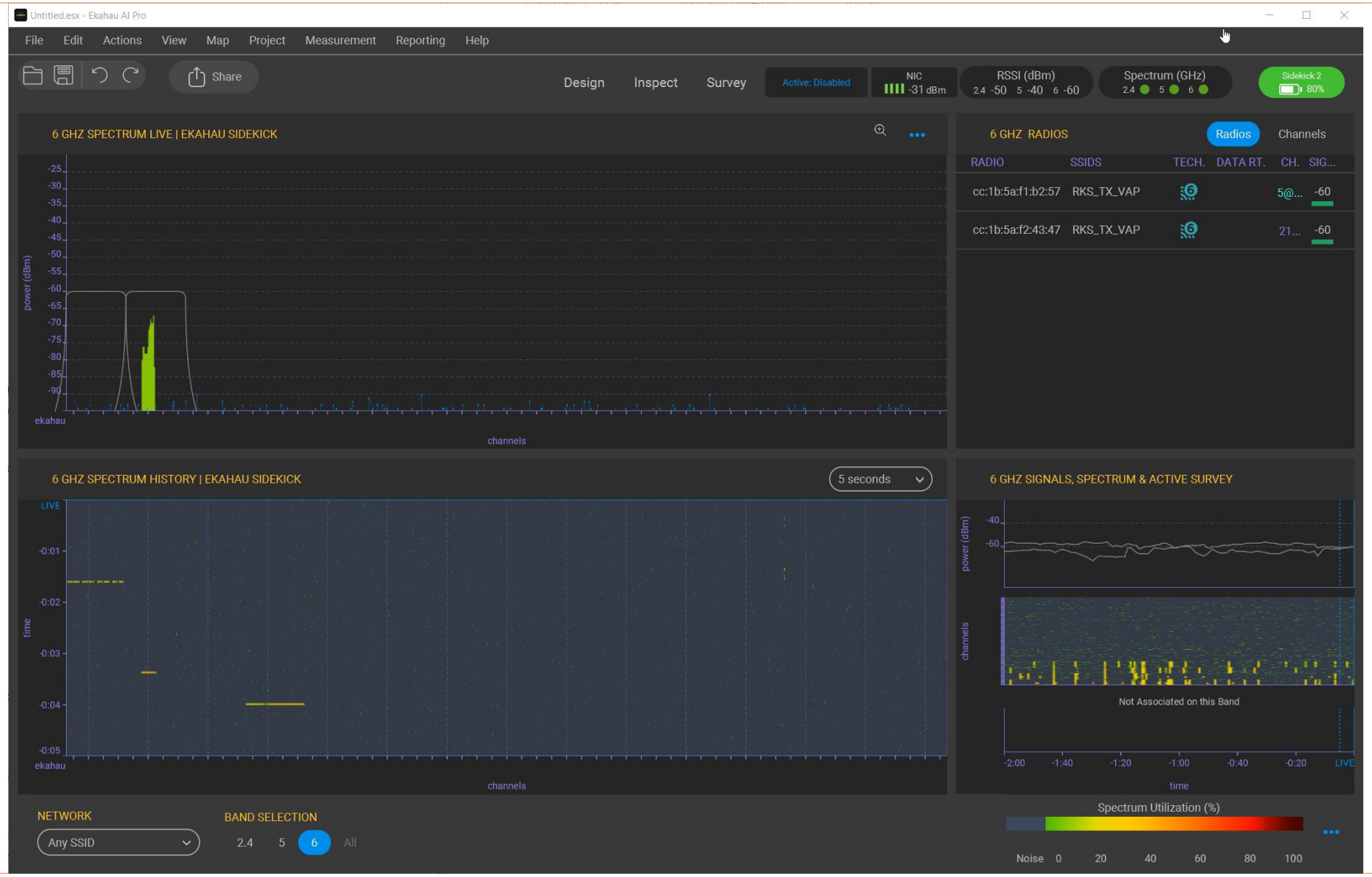
Major Wi-Fi 7 Enhancements：Punctured Transmission

Punctured Transmission

- Increased channel availability
- Better throughput
- Lower latency



R770 Puncturing Demo



Major Wi-Fi 7 Enhancements： MLO

Multi-L

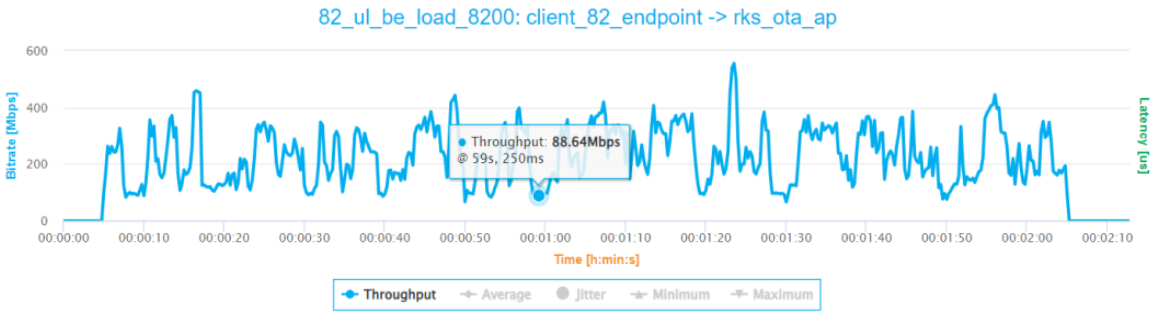
Operat

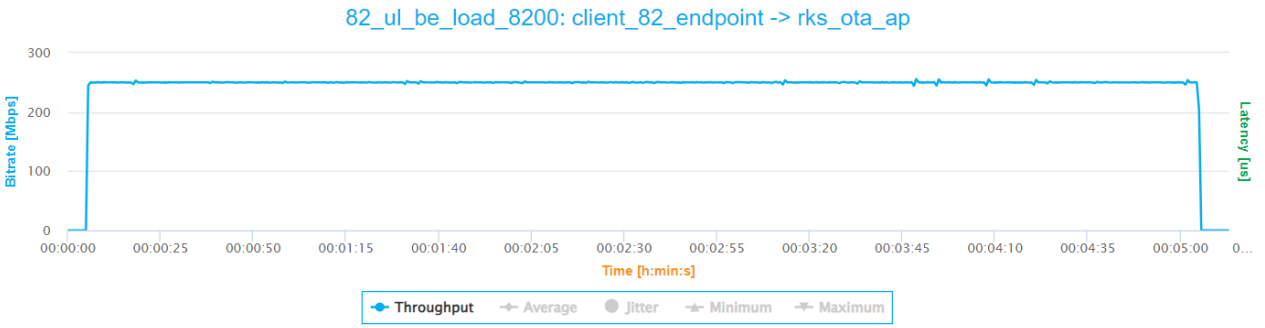
IP A

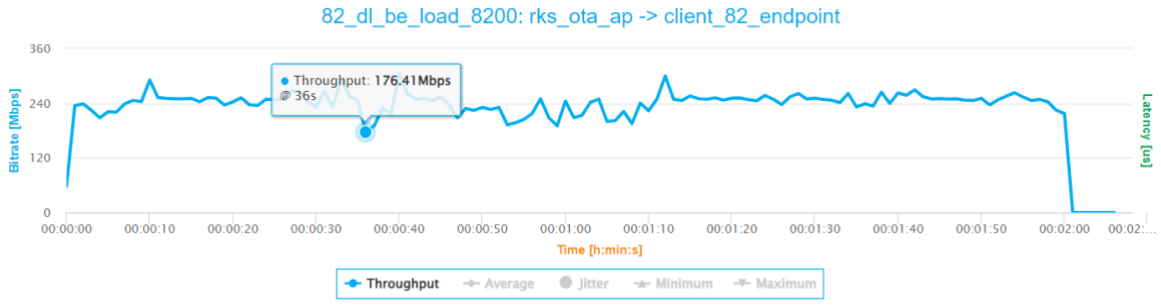
B

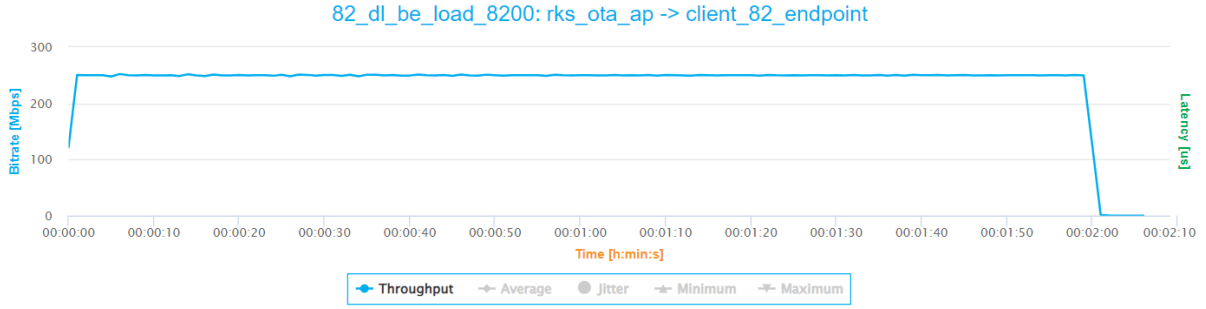
```
系統上有 1 個介面：

    名稱                   : Wi-Fi
    描述                   : Killer(TM) Wi-Fi 7 BE1750w 320MHz Wireless Network Adapter (BE200D2W)
    GUID                   : 9d452e57-9794-4a24-8232-c6f58c946c7d
    實體位址               : a0:02:a5:8f:c5:4b
    介面類型               : 主介面
    狀態                   : 連線
    SSID                   : RKS-NexG
    MLD AP BSSID           : cc:1b:5a:b1:b2:50
        LinkID: 1, 本機: a2:02:a5:8f:c5:4f, AP: cc:1b:5a:b1:b2:50, RSSI: -33, 通道: 36, 頻帶: 5 GHz, BW: 40
        LinkID: 2, 本機: a2:02:a5:8f:c5:4e, AP: cc:1b:5a:f1:b2:50, RSSI: -22, 通道: 5, 頻帶: 6 GHz, BW: 320
    網路類型               : 基礎結構
    無線電波類型           : 802.11be
    驗證                   : WPA3-個人  (H2E)
    加密方式               : CCMP
    連線模式               : 自動連線
    接收速率 (Mbps)        : 5764.8
    傳輸速率 (Mbps)        : 5764.8
    訊號                   : 99%
    設定檔                 : RKS-NexG
已設定     QoS MSCS： 0
    已設定 QoS 對應 ： 0
    原則允許的 QoS 對應 ： 0

    主控網路狀態  ： 無法使用
```


RUCKUS Wi-Fi 7 MLO: THROUGHPUT DESPITE INTERFERENCE









MLO

MLO

QoS Management : MSCS

Live Game or
FaceTime call

- Without QoS Mirroring / MSCS enabled FaceTime call freezes
  - OneDrive Video w MSCS disabled
- With QoS Mirroring / MSCS real time FaceTime traffic is better prioritized so call remains stable.
  - OneDrive Video with MSCS enabled

Chariot
Throughput Test

RUCKUS Wi-Fi 6/6E/7 AP Portfolio

Indoor

R850
Wi-Fi 6: **8x8** (5G) 4800Mbps + **4x4** (2G) 1148Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 5GE

R750
Wi-Fi 6: **4x4** (5G) 2400Mbps + **4x4** (2G) 1148Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 2.5GE

R650
Wi-Fi 6: **4x4** (5G) 2400Mbps + **2x2** (2G) 574Mbps
IoT: BLE & Zigbee concurrent **Ethernet:** 2.5GE

R550
Wi-Fi 6: **2x2** (5G) 1200Mbps + **2x2** (2G) 574Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 1GE

R350 & R350e
Wi-Fi 6: **2x2** (5G) 1200Mbps + **2x2** (2G) 574Mbps
IoT: No onboard IoT **Ethernet:** 1GE

R760
Wi Fi 6E

Wi-Fi 6E: 4x4 (6GHz) 4800Mbps + **4x4** (5GHz) 2400Mbps + **4x4** (2GHz) 1148Mbps
IoT: BLE & Zigbee selectable **Ethernet**: 10GE
LPI and SP modes* supported

* Contingent on AFC rule ratification

R770
Wi Fi 7

Wi-Fi 7: 2x2 (6GHz) 5765Mbps + **4x4** (5GHz) 5765Mbps + **2x2** (2GHz) 689Mbps
IoT: BLE & Zigbee selectable **Ethernet**: 10GE
LPI and SP modes* supported
GA: Q4, 2023

R670
Wi Fi 7

Wi-Fi 7: 2x2 (6GHz) 5765Mbps + **2x2** (5GHz) 2882Mbps + **2x2** (2GHz) 689Mbps
IoT: BLE & Zigbee selectable **Ethernet**: 5GE
LPI and SP modes* supported
GA: Q4, 2024

Indoor Wall Plate

H550
Wi-Fi 6: **2x2** (5G) 1200Mbps + **2x2** (2G) 574Mbps
IoT: BLE & Zigbee concurrent **Ethernet:** 1GE

H350
Wi-Fi 6: **2x2** (5G) 1200Mbps + **2x2** (2G) 574Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 1GE

Outdoor

T750 & T750se
Wi-Fi 6: **4x4** (5G) 2400Mbps + **4x4** (2G) 1148Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 2.5GE

T350 & T350se
Wi-Fi 6: **2x2** (5G) 1200Mbps + **2x2** (2G) 574Mbps
IoT: BLE & Zigbee selectable **Ethernet:** 1GE
(No onboard IoT for T350se)

T670
Wi Fi 7

Wi-Fi 7: 2x2 (6GHz) 5765Mbps + **2x2** (5GHz) 2882Mbps + **2x2** (2GHz) 689Mbps
Ethernet: 5GE
SP modes* supported
GA (Omni): Q3 2024

First Wi-Fi 7 Indoor AP – R770

核心技術

- **三頻運作 (2+5+6): 2x2 (2.4GHz) + 4x4 (5GHz) + 2x2 (6GHz)**
  - 三頻皆支援 Wi-Fi 7
  - 理論最大資料傳輸能力: **12.218 Gbps**
- **6GHz 頻段:** LPI, SP and AFC; GPS 室內定位, 802.11mc
- **RUCKUS 優勢:** Tx BeamFlex 在所有的頻段都支援; PD-MRC; Smart Mesh
- **乙太網路埠:** 1x 100M/1G/2.5G/5G/10Gbps PoE-In 埠 及 1x 10M/100M/1Gbps 埠
- **供電支援:** PoE-in (802.3bt) 或 48V 外接 DC 電源供應器
- **IoT:** 內建 IoT Radio: BLE 或 Zigbee; 具備 USB 2.0 提供外接IoT擴充支援
- **資安保護:** TPM 2.0; Secure Boot; DPSK3; FIPS 140-3
- **運作環境: 運作溫度** -10 – 50 C
- **控制管理:** RUCKUS SmartZone 7.0; RUCKUS One; RUCKUS Unleashed

RUCKUS R670

High Density, High Throughput, Low Latency Tri-band Wi-Fi 7 Indoor AP with 5Gbps Backhaul

RUCKUS R670

High Density, High Throughput, Low Latency Tri-band Wi-Fi 7 Indoor AP with 5Gbps Backhaul

Highlights

RF Configurations

- **Tri-band (2+5+6): 2x2 (2GHz) + 2x2 (5GHz) + 2x2 (6GHz)**
  - Support Wi-Fi 7 in all three frequency bands
  - Max PHY Data Rate: **9.336 Gbps**
- **Dual-band (2+5): 2x2 (2GHz) + 4x4 (5GHz)**
  - Support Wi-Fi 7 in both frequency bands
  - Max PHY Data Rate: 6.454 Gbps

6GHz Band: LPI, SP and AFC; Indoor geolocation with 802.11mc and Mobile App

RF Performance: Tx BeamFlex in all three frequency bands & PD-MRC

Ethernet Ports: One 5Gbps Ethernet backhaul & one 1 Gbps Ethernet auxiliary port

Power Supply: PoE-in (802.3bt and 802.3at) on the 5G Ethernet port & 48V external DC power

IoT: Onboard new IoT Radio: BLE or Zigbee with "Matter" and “Thread” capable; one USB 2.0 port for additional IoT radio

Security: TPM 2.0 security, Secure Boot, DPSK3, FIPS 140-3

LED: Single multi-color LED

Environmental: Operating Temperature 0 – 50 C

Dimension: 220 mm x 220 mm x 49 mm

Control and Management: SZ 7.0; RUCKUS One; Unleashed

R670 GA Target:

R670 Beta: End of May 2024

T670 Wi-Fi 7 Outdoor AP

COMMSCOPE®

Good Wi-Fi 6

Better Wi-Fi 6

Best Wi-Fi 6

Better Wi-Fi 6E/7

Best Wi-Fi 6E/7

R350
Wi-Fi 6
2x2x2 | 1GbE
802.3af class 3

R550
Wi-Fi 6
2x2x2 | 1GbE
802.3at class 4

R650
Wi-Fi 6
4x4:4 | 2.5GbE
802.3at class 4

R750
Wi-Fi 6
4x4:4 | 2.5GbE
802.3at class 4

ICX8200-C08PF
8-ports 1GbE
802.3at all ports

ICX8200-48P/PF/PF2
48-ports 1GbE
802.3at all ports
*Dual PSU (PF2)

ICX8200-C08ZP
4-ports 1/ 2.5/5/10 GbE
4-ports 1/2.5 GbE
802.3bt all ports

ICX8200-24ZP
24-ports 2.5GbE
802.3bt all ports

ICX8200-48ZP2
32-ports 1 GbE (802.3at)
16-ports 1/2.5 GbE (802.3bt)
Dual PSU

ICX7550-48ZP
12-ports 1/2.5/5/10GbE
36-ports 2.5GbE
802.3bt class 8 all ports
Dual PSU

ICX7650-48ZP
24-ports 1/2.5/5/10GbE
24-ports 1GbE
802.3bt class 8 24 ports
Dual PSU

R760
Wi-Fi 6E
Tri 4x4x4 | 10GbE
802.3bt class 5

T670
Wi-Fi 7 Outdoor
Tri-band | 5GbE
802.3bt class 6

R670
Wi-Fi 7
Tri-band | 5GbE
802.3bt class 6

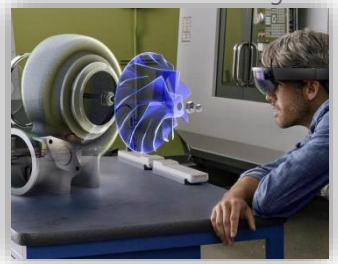
R770
Wi-Fi 7
Tri-band | 10GbE
802.3bt class 6

Wi-Fi 7應用案例

- 擴增實境/虛擬實境 (AR/VR)
- 視訊會議
- 高密度場域 – 會議中心/運動場
- 8K串流媒體播放
- IoT/Operational Technology

Remote Research

Collaborative 3D design



Arena gaming

Operational Technology - IoT

Operational Technology - Manufacturing

Wi-Fi 7適用於下列三大需求：

- **低延遲 – (影響延遲的因素如下：)**
  - 距離 - FSPL
  - 速度 - MCS Rate
  - 頻道競爭 - CCI
- **高可靠**
- **高傳輸**

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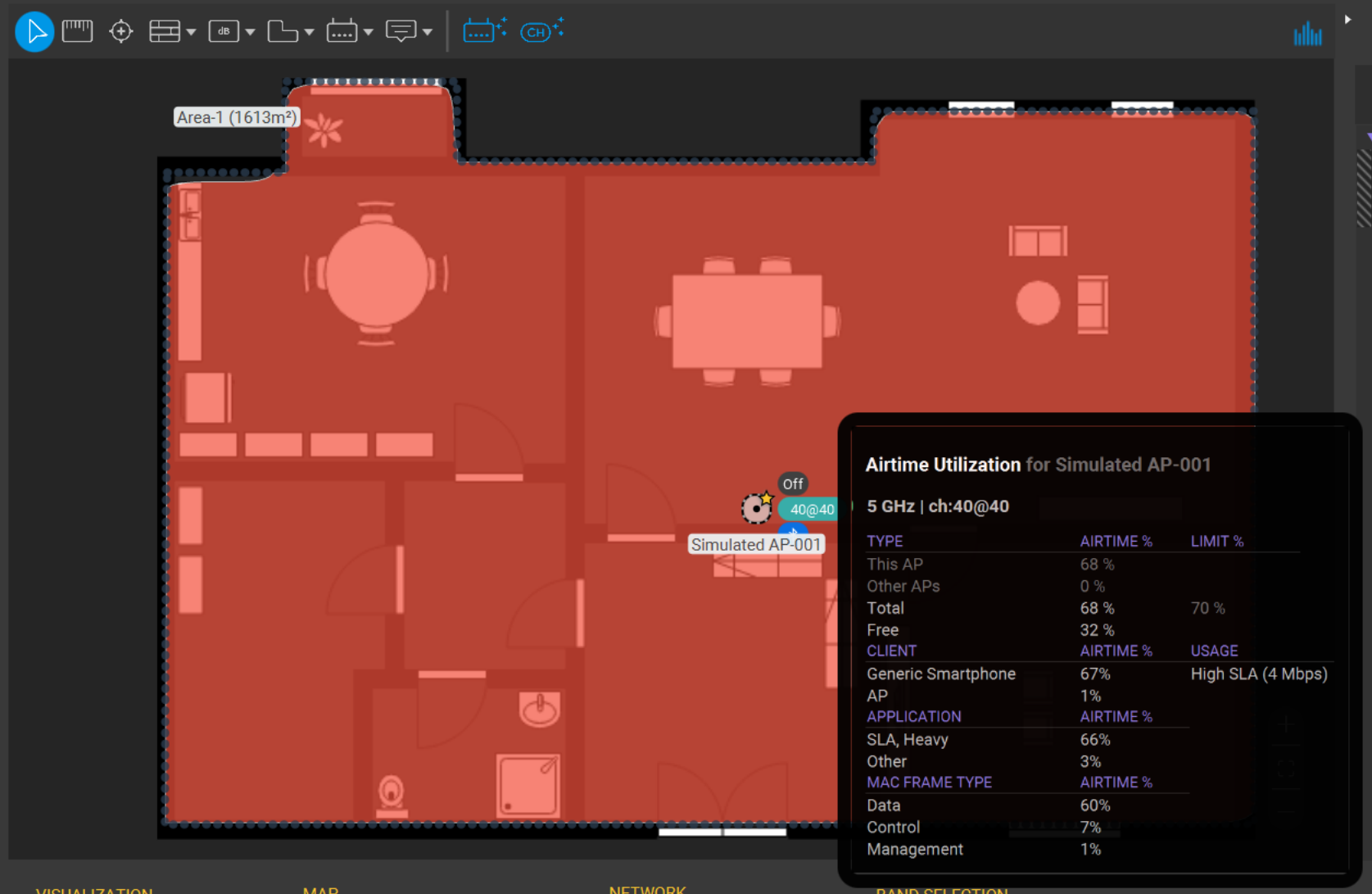
File Edit Actions View Map Project Measurement Reporting Help

Share

Design Inspect Survey Live

No Adapters Connected



Airtime Utilization for Simulated AP-001

5 GHz | ch:40@40

TYPE	AIRTIME %	LIMIT %
This AP	68 %	
Other APs	0 %	
Total	68 %	70 %
Free	32 %	
CLIENT	**AIRTIME %**	**USAGE**
Generic Smartphone	67%	High SLA (4 Mbps)
AP	1%	
APPLICATION	**AIRTIME %**	
SLA, Heavy	66%	
Other	3%	
MAC FRAME TYPE	**AIRTIME %**	
Data	60%	
Control	7%	
Management	1%	

Access Points Areas Building Notes

ACCESS POINTS (1) Title (a...

Home (1)

Simulated AP-001 Ruckus ZoneFlex R750

OFF **40** (40) | 13dBm **BT** | 0dBm

VISUALIZATION: Airtime Utilization

MAP: Home

NETWORK: All Simulated

BAND SELECTION: 2.4 5 6 All

Ruckus Best Practices for 5 GHz

0 10 20 30 40 50 60 70

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Share

Design Inspect Survey Live

No Adapters Connected

Ruckus Best Practices 90 Advanced

AREA OPTIONS FOR AREA-1 (1613M²)

Options Notes (0)

Name Area-1

Coverage profile Ruckus Best Practices

Total 90 devices, total bitrate 360.0 Mbps Add devices

- 90 + Generic Wi-Fi 6E Smar... Wi-Fi 6 2x2:2 160MHz High SLA (4 Mbps)

VISUALIZATION Signal Strength

MAP Home

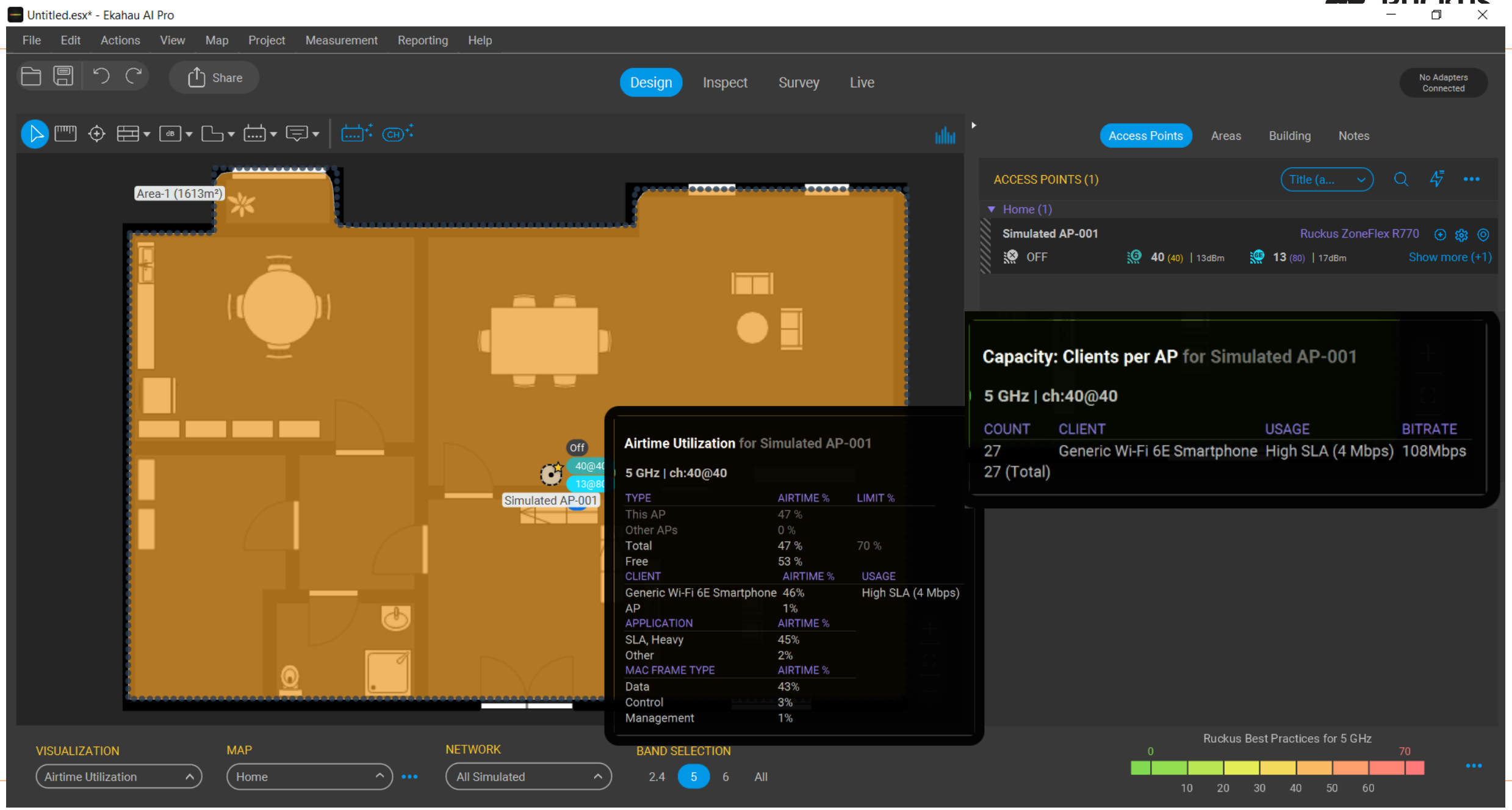
NETWORK All Simulated

BAND SELECTION 2.4 5 6 All

Ruckus Best Practices for 5 GHz (dBm)

-90 -30

-85 -80 -75 -7 -65 -60 -55 -50 -45 -40 -35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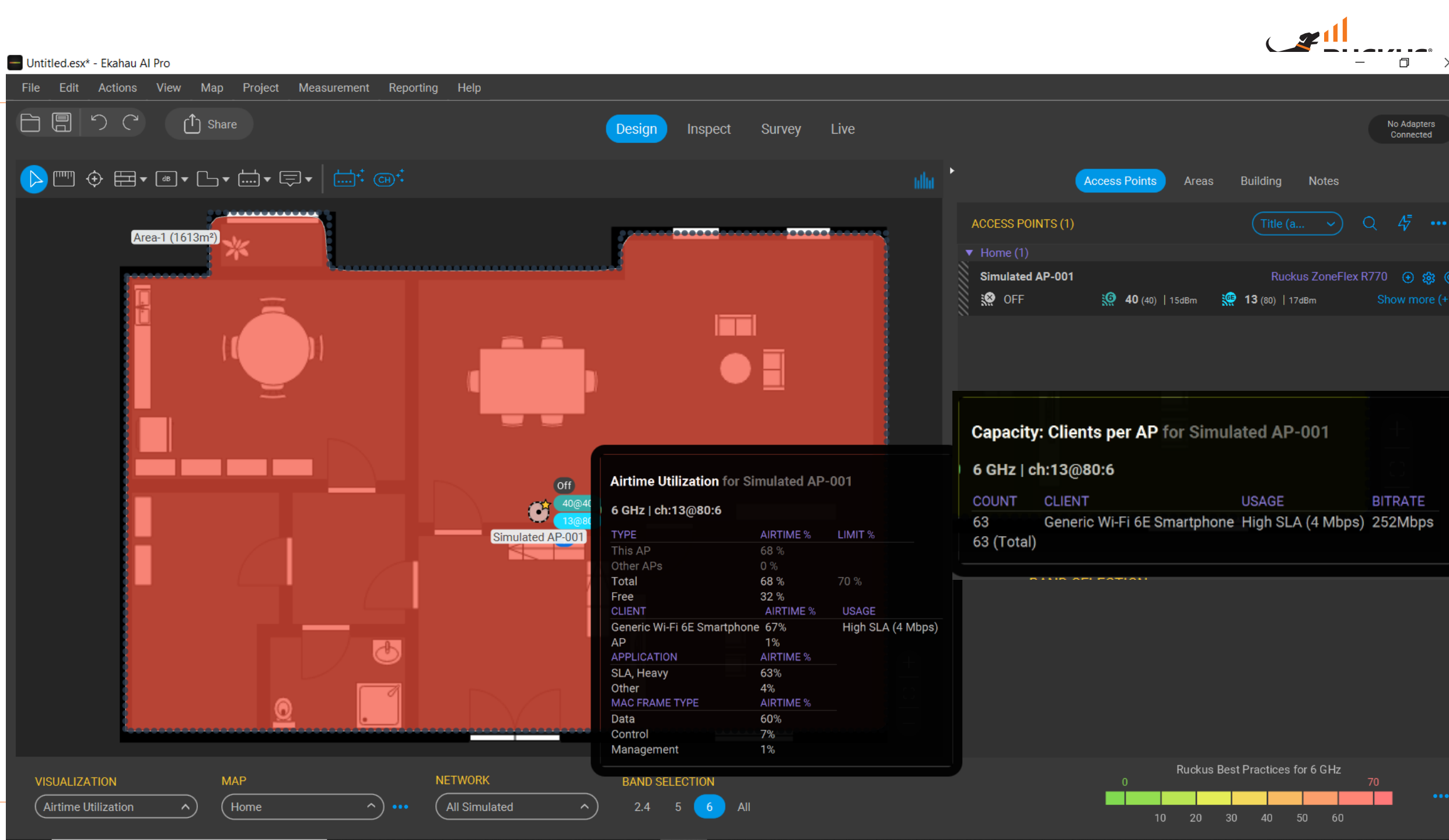
File Edit Actions View Map Project Measurement Reporting Help
Share
Design Inspect Survey Live
No Adapters Connected
Area-1 (1613m²)
Off
40@40
13@80
Simulated AP-001
Access Points Areas Building Notes
ACCESS POINTS (1)
Title (a...
Home (1)
Simulated AP-001
Ruckus ZoneFlex R770
OFF
40 (40) | 13dBm
13 (80) | 17dBm
Show more (+1)
Airtime Utilization for Simulated AP-001
5 GHz | ch:40@40
TYPE AIRTIME % LIMIT %
This AP 47 %
Other APs 0 %
Total 47 % 70 %
Free 53 %
CLIENT AIRTIME % USAGE
Generic Wi-Fi 6E Smartphone 46% High SLA (4 Mbps)
AP 1%
APPLICATION AIRTIME %
SLA, Heavy 45%
Other 2%
MAC FRAME TYPE AIRTIME %
Data 43%
Control 3%
Management 1%
Capacity: Clients per AP for Simulated AP-001
5 GHz | ch:40@40
COUNT CLIENT USAGE BITRATE
27 Generic Wi-Fi 6E Smartphone High SLA (4 Mbps) 108Mbps
27 (Total)
VISUALIZATION
Airtime Utilization
MAP
Home
NETWORK
All Simulated
BAND SELECTION
2.4 5 6 All
Ruckus Best Practices for 5 GHz
0 70
10 20 30 40 50 60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Project
Measurement
Reporting
Help
Share
Design
Inspect
Survey
Live
No Adapters Connected
Access Points
Areas
Building
Notes
ACCESS POINTS (1)
Title (a...
Home (1)
Simulated AP-001
Ruckus ZoneFlex R770
OFF
40 (40) | 15dBm
13 (80) | 17dBm
Show more (+1)
Area-1 (1613m²)
Off
Simulated AP-001
Airtime Utilization for Simulated AP-001
6 GHz | ch:13@80:6
TYPE AIRTIME % LIMIT %
This AP 68 %
Other APs 0 %
Total 68 % 70 %
Free 32 %
CLIENT AIRTIME % USAGE
Generic Wi-Fi 6E Smartphone 67% High SLA (4 Mbps)
AP 1%
APPLICATION AIRTIME %
SLA, Heavy 63%
Other 4%
MAC FRAME TYPE AIRTIME %
Data 60%
Control 7%
Management 1%
Capacity: Clients per AP for Simulated AP-001
6 GHz | ch:13@80:6
COUNT CLIENT USAGE BITRATE
63 Generic Wi-Fi 6E Smartphone High SLA (4 Mbps) 252Mbps
63 (Total)
VISUALIZATION
Airtime Utilization
MAP
Home
NETWORK
All Simulated
BAND SELECTION
2.4 5 6 All
Ruckus Best Practices for 6 GHz
0 70
10 20 30 40 50 60

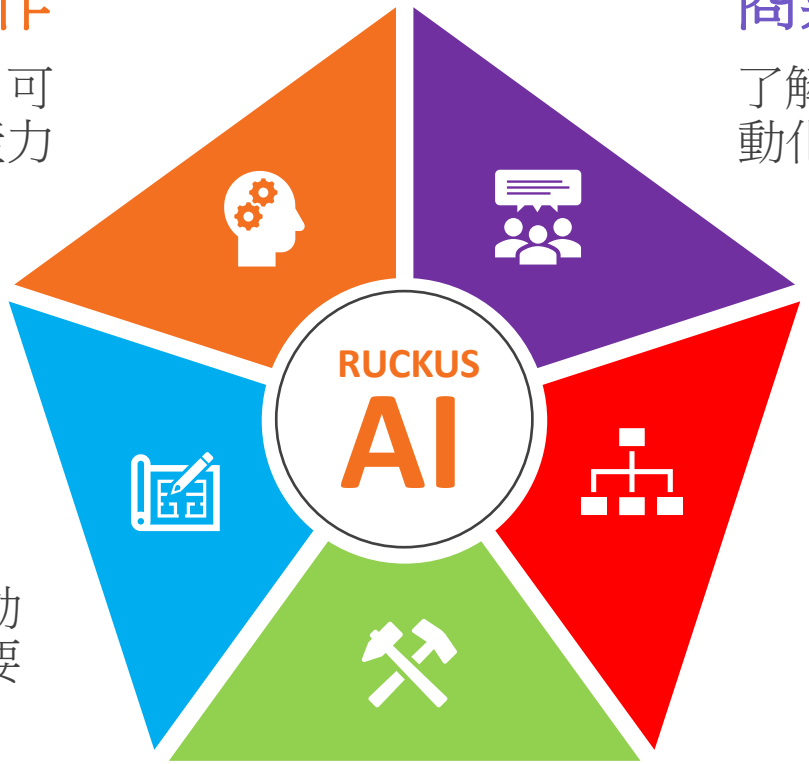
AI運用於企業網路

智能協作

日常和重複性工作的協作與自動化，可大幅地減少人為錯誤並提高生產力

商業意圖認知

了解商業意圖並將業務需求和策略轉化為自動化網路配置



網路優化

隨著無線技術日益複雜，人工智能驅動的網路優化對於網路效能至關重要

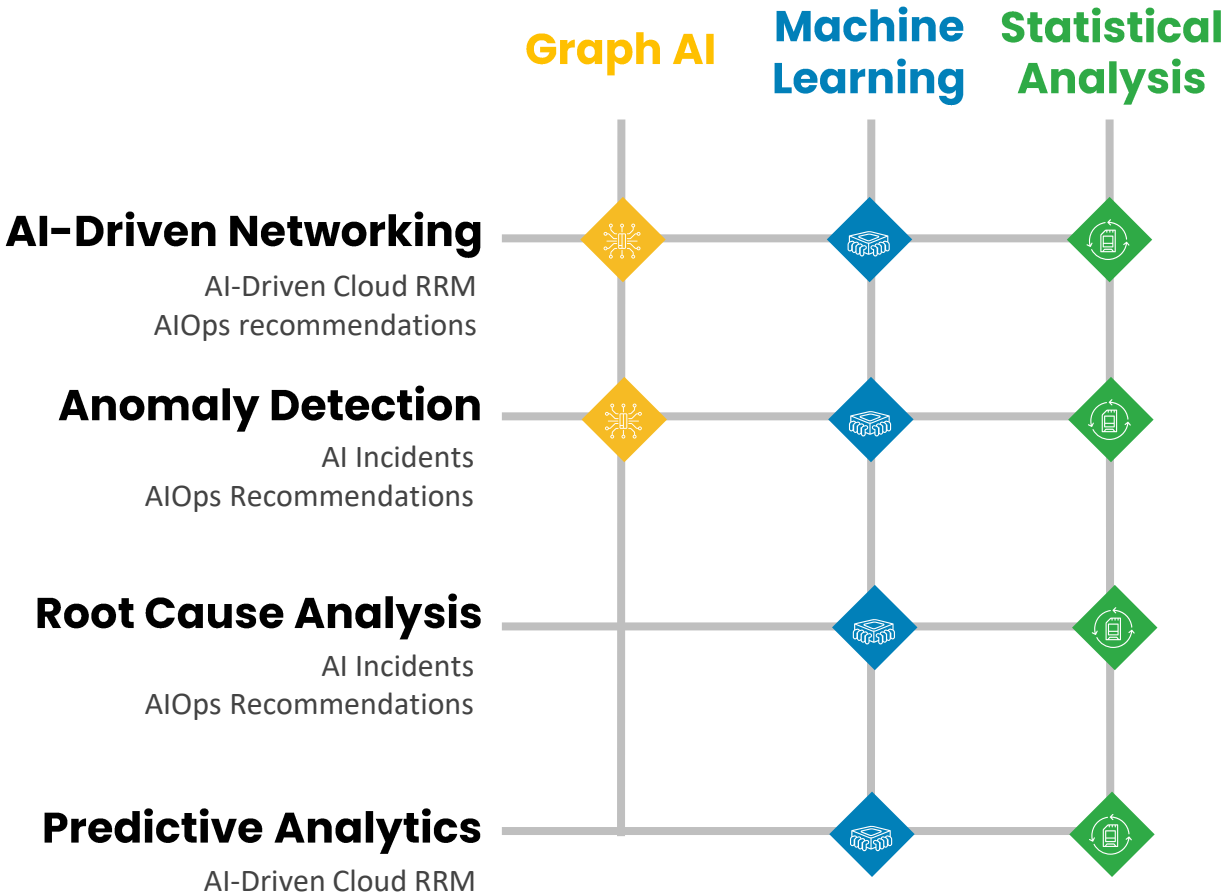
動態網路管理

動態網路配置，可依網路使用、流量模式和 RF 環境來調整網路

網路故障排除

自動辨識、分析根本原因和建議補救措施

RUCKUS 關鍵的 AI 技術



Graph AI

Personalized Pagerank, Label Propagation, Louvain Clustering, Between Centrality, Graph Embedding, Weakly Connected Components

Machine Learning

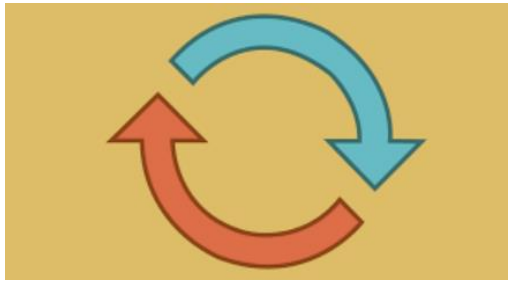
Decision Tree, Reinforcement Learning, Hybrid Federated Learning, Jenks Optimization, Logistic Regression, Local & Isotonic Regression, Dimension Reduction, Mean Shift Clustering

Statistical Analysis

Maximum Likelihood Estimation, Seasonality decomposition, Bayesian Inference, Event Density Analysis, Complex Event Processing

更智慧動態的網路管理

AI-Driven RRM 會即時分析所有 Wi-Fi 頻段（2.4 GHz、5 GHz 和 6 GHz）的數據，並自動調整以獲得最佳效能。這種基於雲端的系統簡化了維護工作並最大程度地減少了人為錯誤，從而實現更快、更可靠且覆蓋範圍更廣的 Wi-Fi 7 網路。



還原

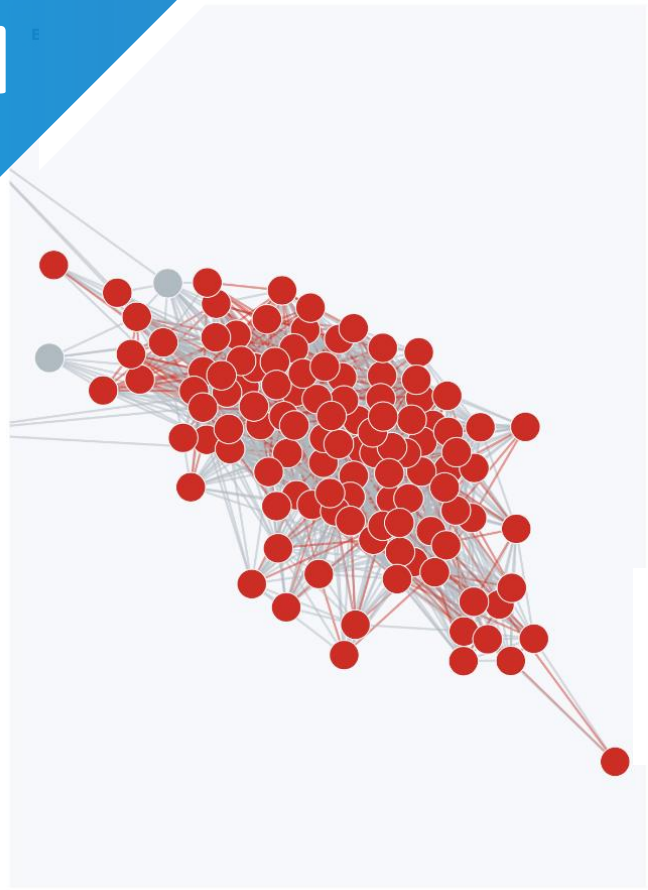
預測

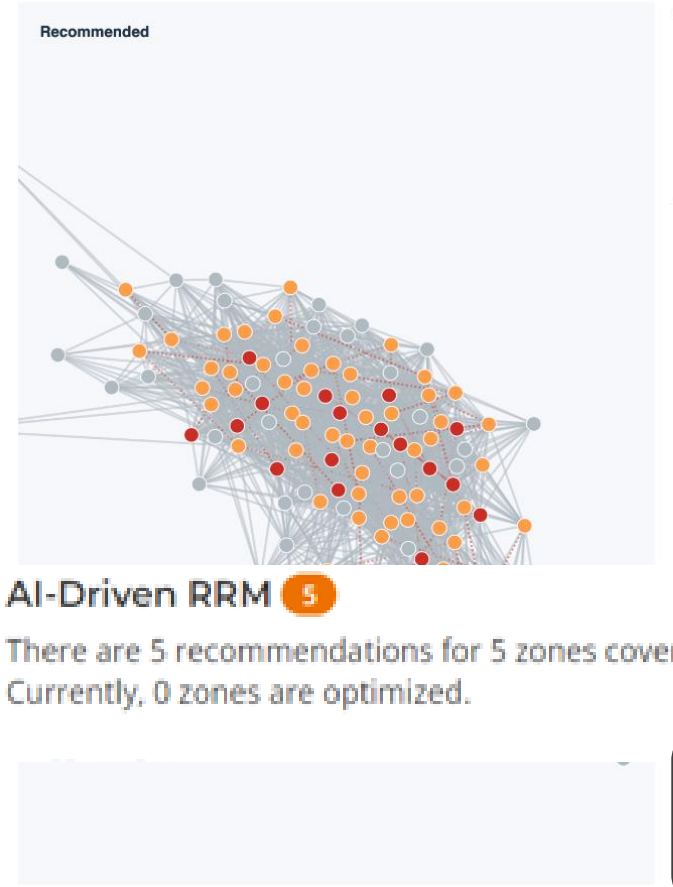
監控

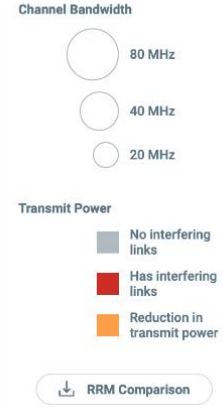
排程

AI-Driven Cloud RRM

Visualize







AI-Driven RRM 5

There are 5 recommendations for 5 zones covering 379.2K possible RRM combinations.
Currently, 0 zones are optimized.

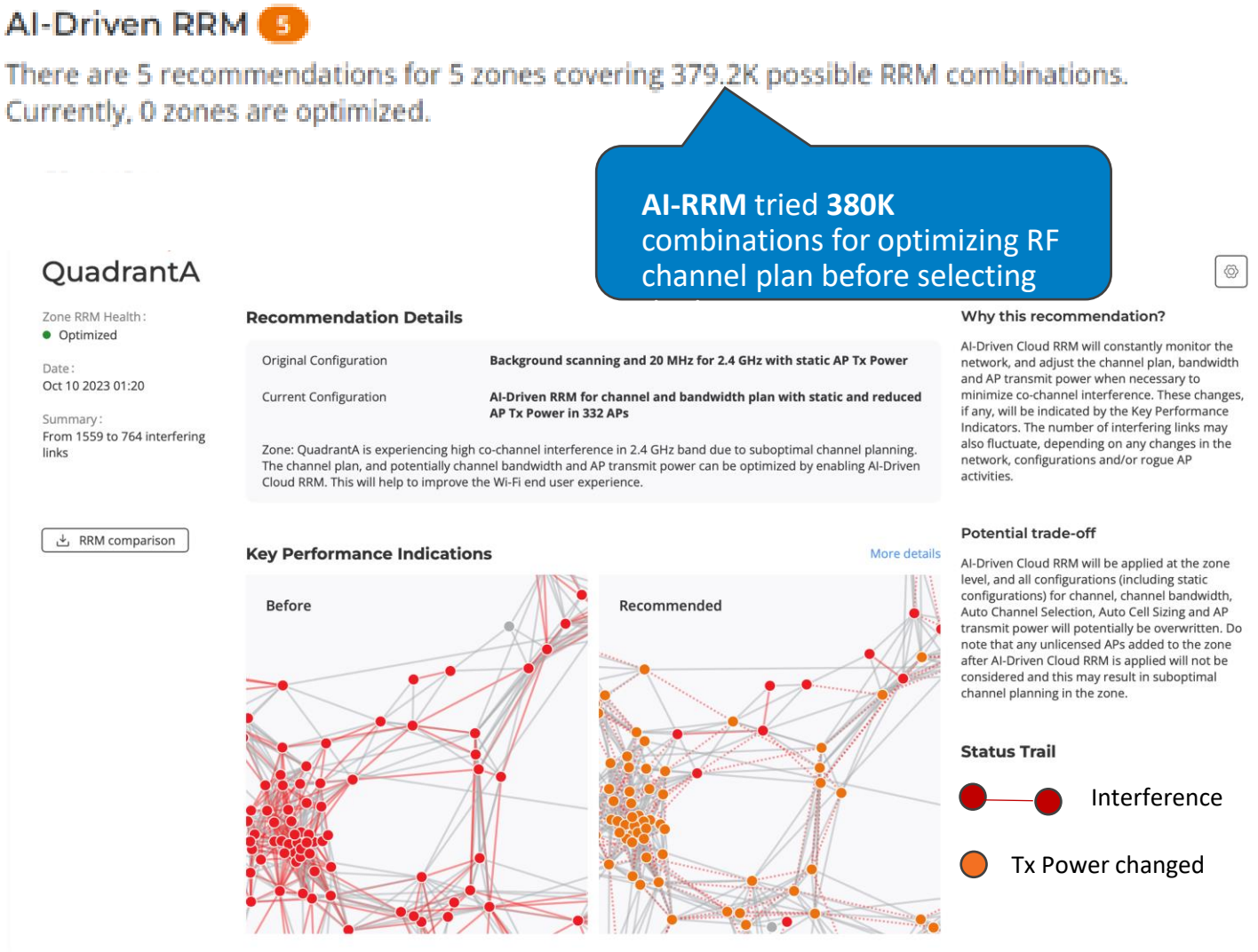
AI-RRM tried **380K** combinations for optimizing RF channel plan before selecting

Proactive, Tx Power Management

Optimized, Network Performance

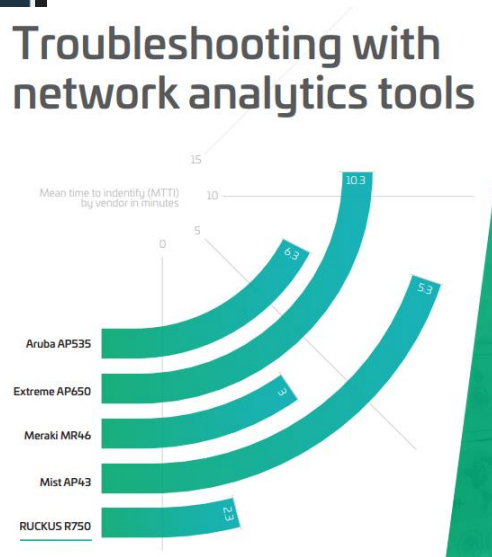
Wireless Digital Twin - AI-RRM and AIOps

- **Harness AI power available in the cloud**
  - Make a **digital copy** of the physical RF network- 'Digital Twin'
  - Run AI-RRM **simulations** on the **Digital Twin**
  - Leave the physical network **unchanged**
  - Make new RF channel plan - ch, width, tx power - available
  - Show potential improvements in the network **visually**
- **Read the RRM summary and apply**
  - **Automate** applying the configuration from the **Digital twin** to the **physical network** using **AIOps**
  - **Predict**, **Schedule**, **Monitor** and **Revert** Options



快速排除問題

- 藉由 AI-Driven Wi-Fi，Try and Error網路問題已成為過去式。先進的演算法可以識別和排列任何事件的優先順序，如P1 ~ P4，無論是傳輸異常到潛在的安全威脅。使管理者可以立即採取正確行動，防止網路中斷並確保關鍵應用程式（如視訊通話或大型下載）正常運行。

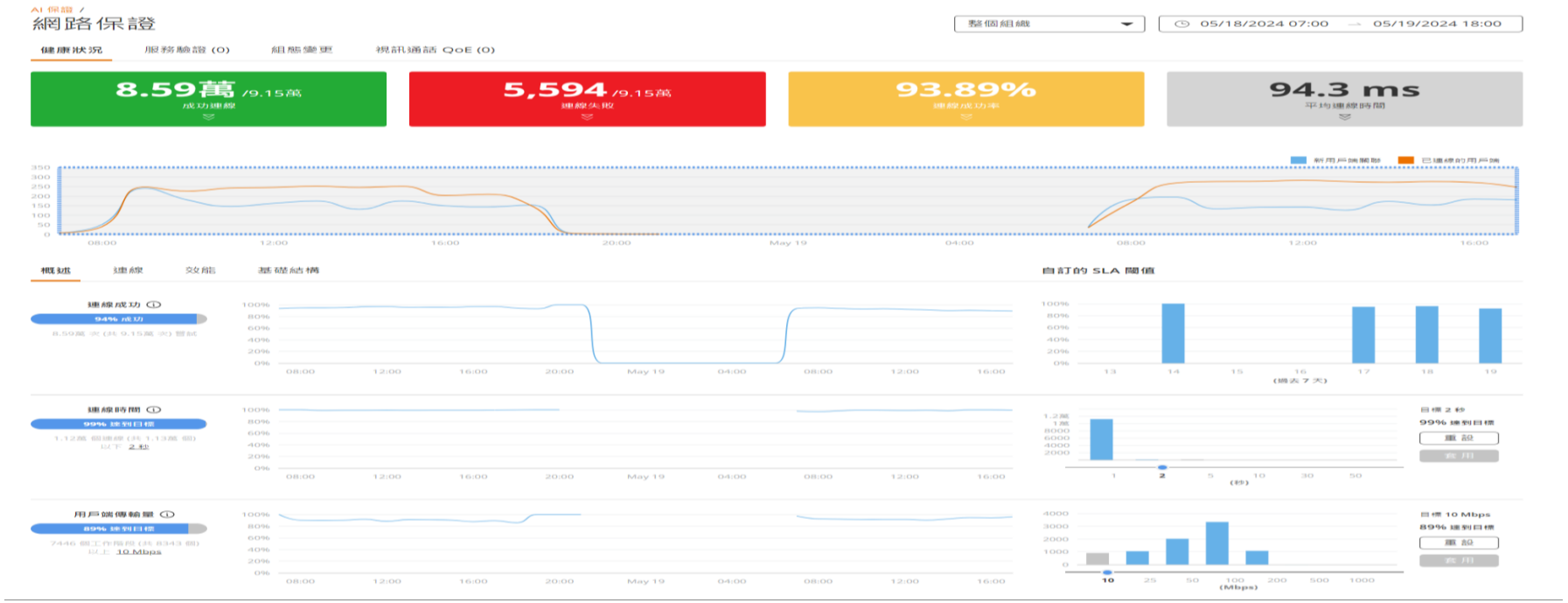


Mean time to identify

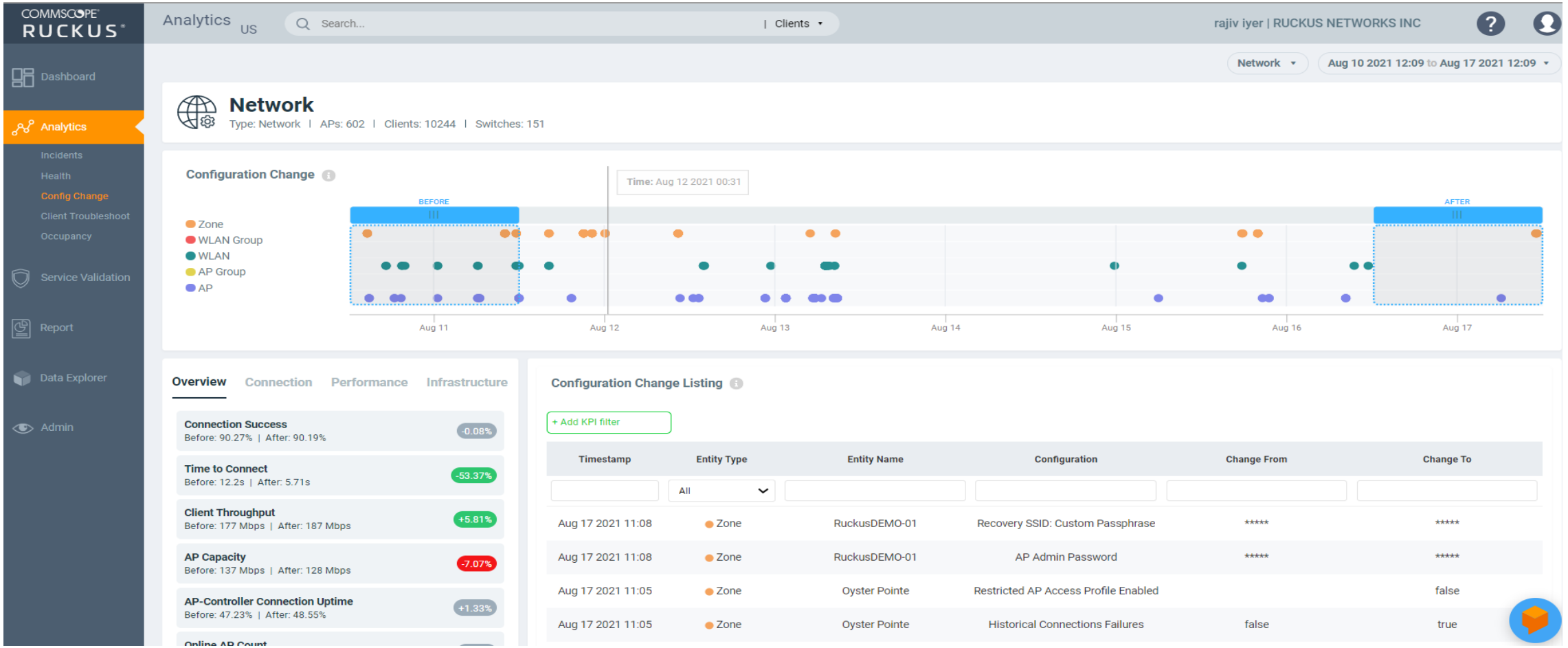
Mean time to identify (MTTI) is the time a network administrator needs to determine the root cause of a network issue or incident. A shorter average MTTI reduces the trouble-shooting burden on IT while improving user experience by allowing IT to more effectively limit incident duration and impact.

持續監控確保網路正常運行

AI-Driven Wi-Fi 網路會持續監控網路健康狀況，可以更快地識別和解決問題。確保服務等級協定 (SLA) 的遵守，並提供有關網路使用方式的寶貴建議，以進行網路優化。隨著 Wi-Fi 7 功能的增強，AI-Driven的網路健康監控變得更加重要，以確保無虞的網路基礎設施和最好的用戶體驗。

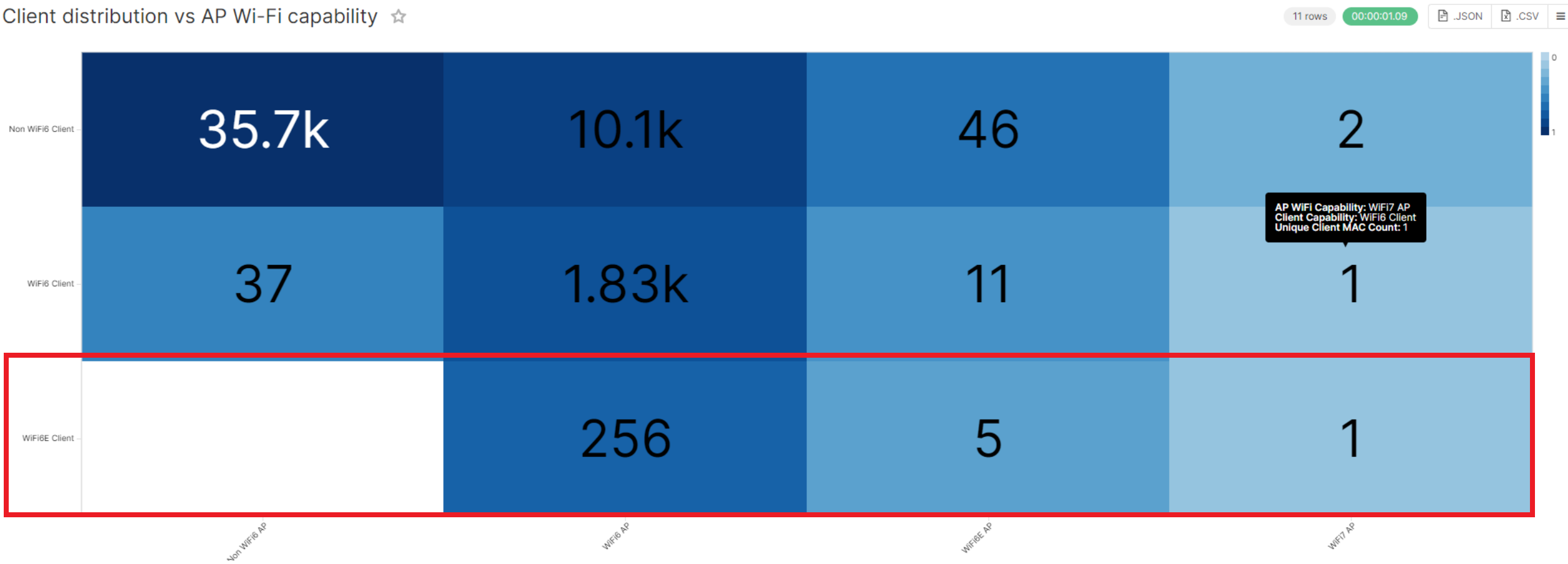


監控網路設定異動風險



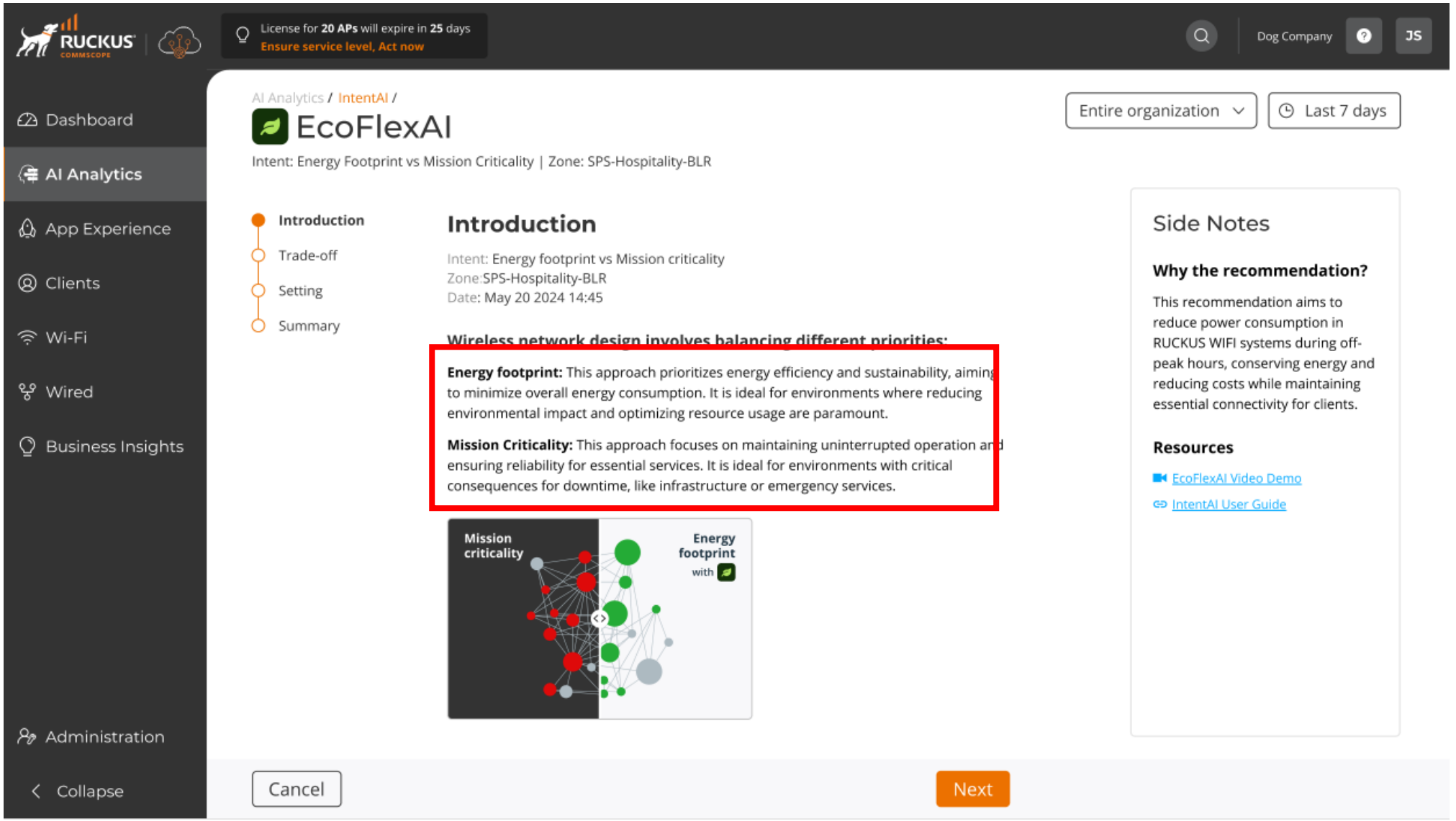
KPIs across connection, performance and infrastructure categories

客製化報表協助企業做出正確的決策



What is our NEXT.

Intent AI – EcoFlexAI



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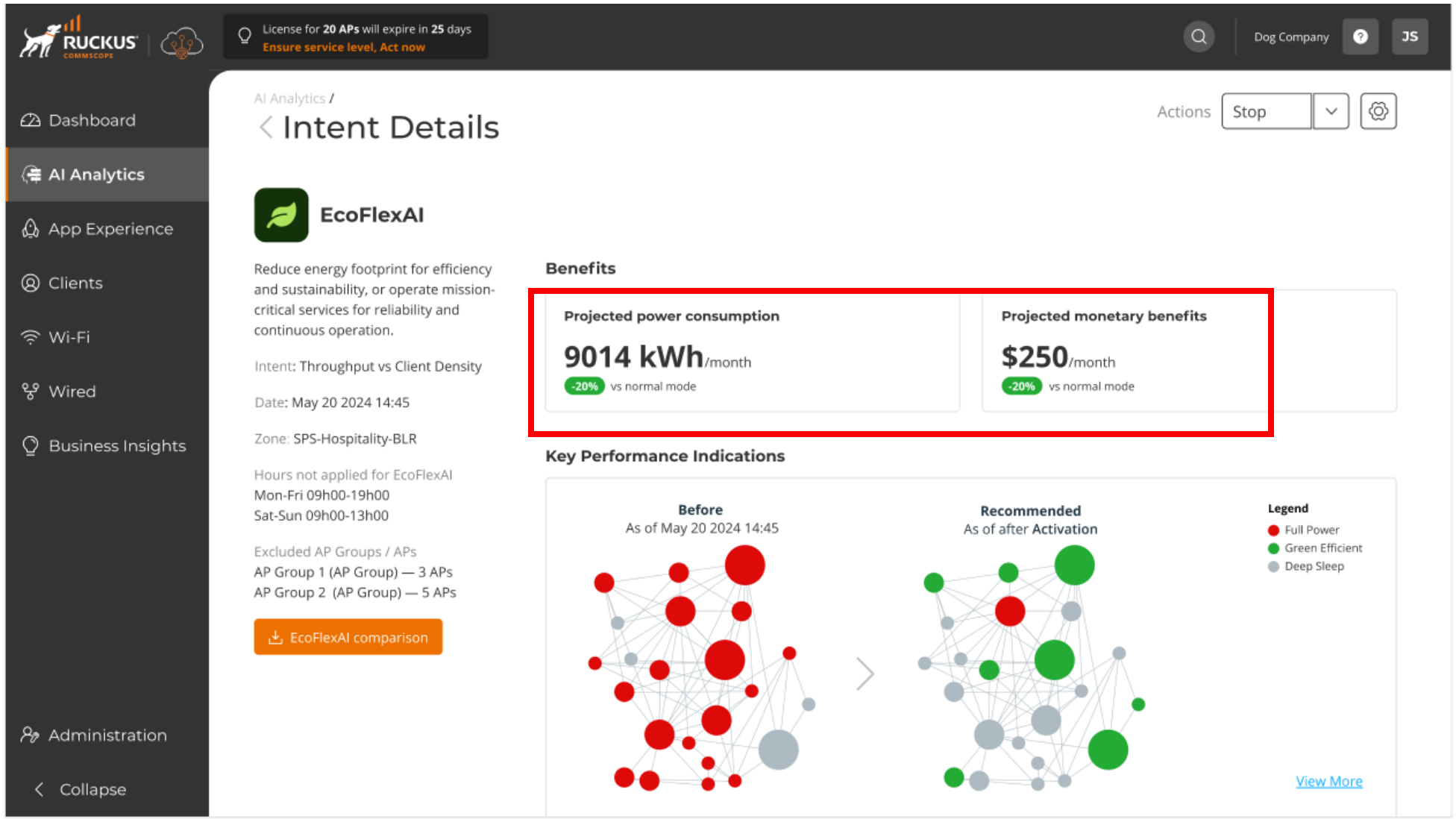
IntentAI - EcoFlexAI



RUCKUS = 節能

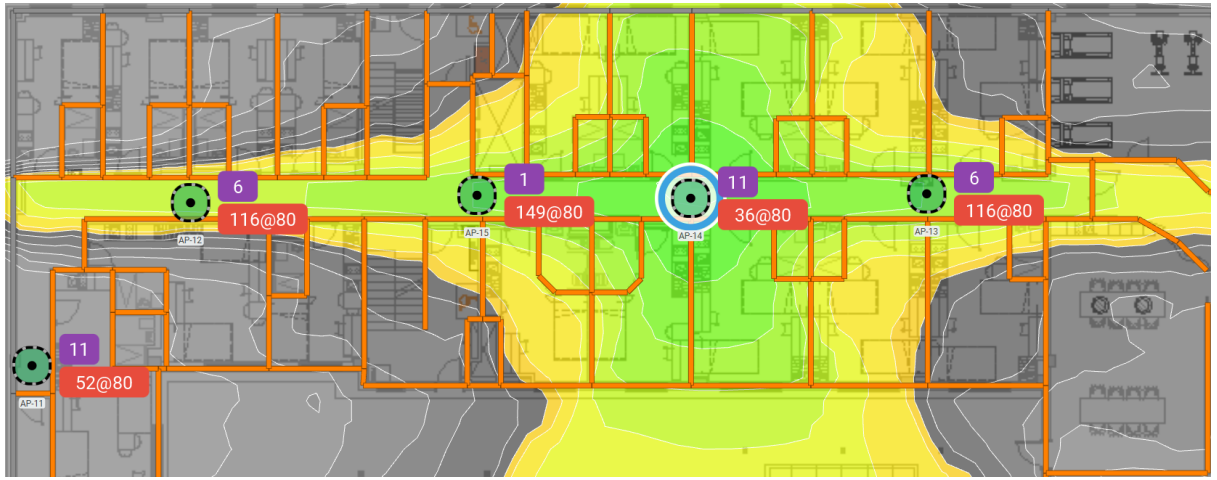
Wi-Fi 6 Indoor 2 x 2 AP 比較試算

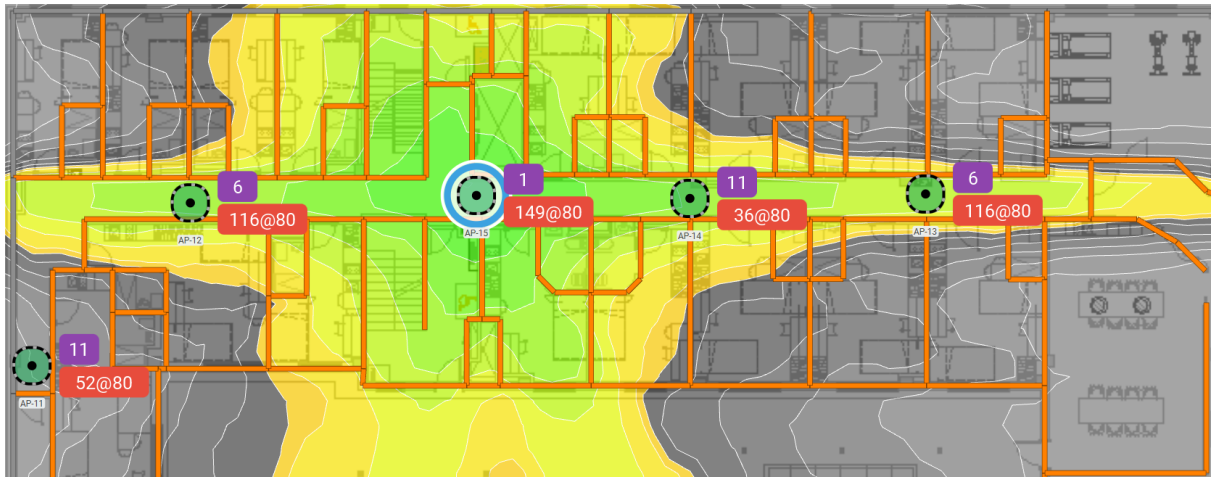
	RUCKUS R350	它牌同級品
Idle PoE (Wh)	7.1	6.2
Maximum PoE (Wh) *Full Functions	12.62	16.5
Average of Max PoE + Idle PoE (Wh)	9.86	11.35
最少 AP 用電量/Hour (kWh)	0.00986	0.01135
最少 AP 用電量/Day (kWh)	0.23664	0.2724
最少 AP 用電量/Year (kWh)	86.3736	99.426
用電量差異	-15%	

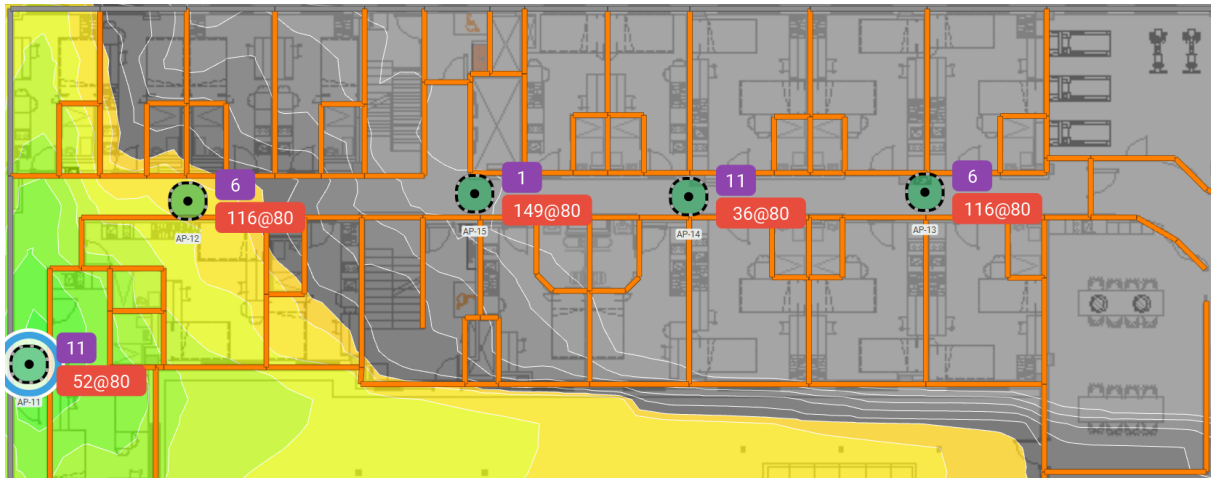
COMMSCOPE®

一般天線

當AP佈放的位置設計不正確時容易產生同頻干擾。同一AP也會受到其他頻道AP的Inter-Channel的干擾，造成底噪增加。





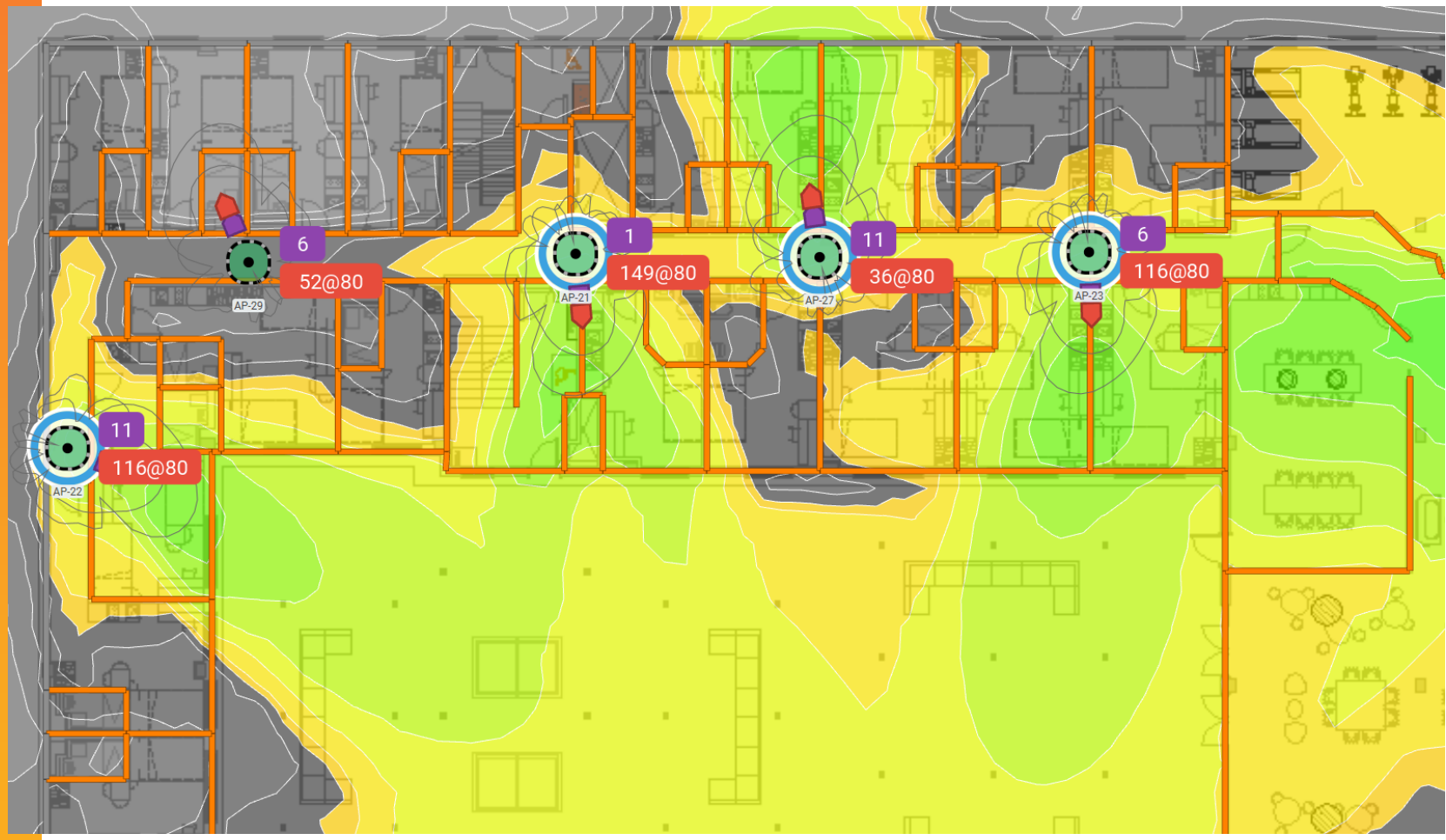


COMMSCOPE®

RUCKUS BeamFlex+

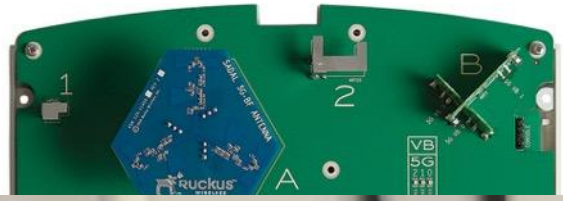
每個 AP 將訊號集中到其終端裝置的方向，降低對前一個 AP 產生的干擾。大幅減少同頻道和頻道間干擾。

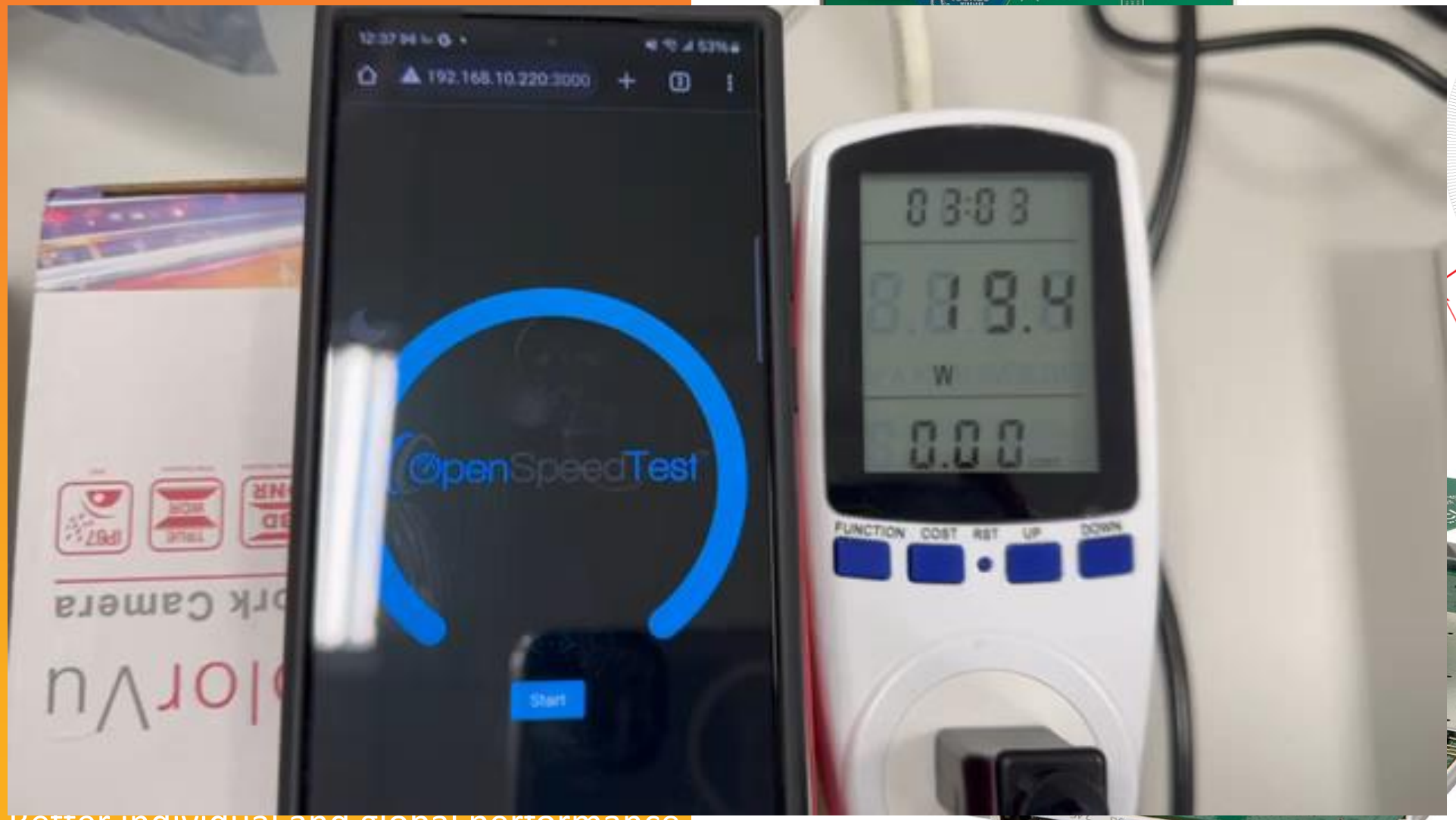
無線規劃與佈建，通常RUCKUS需要的AP數量也比其他友商來的少。

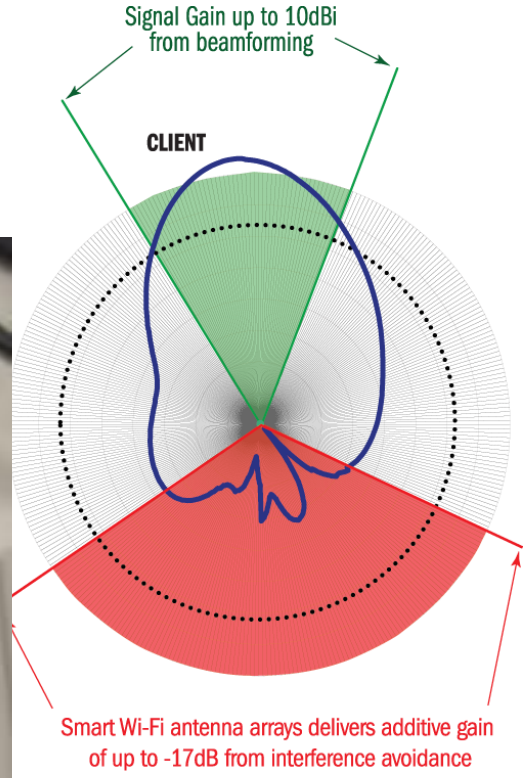


COMMSCOPE®

RUCKUS BeamFlex+







Better individual and global performance

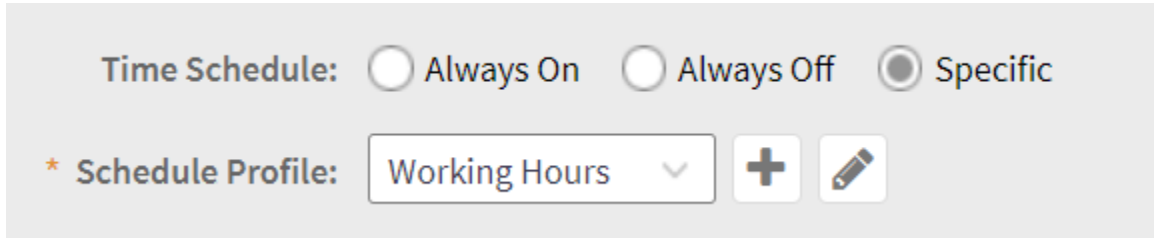
交換器啟動EEE – 802.3az

Energy-Efficient Ethernet

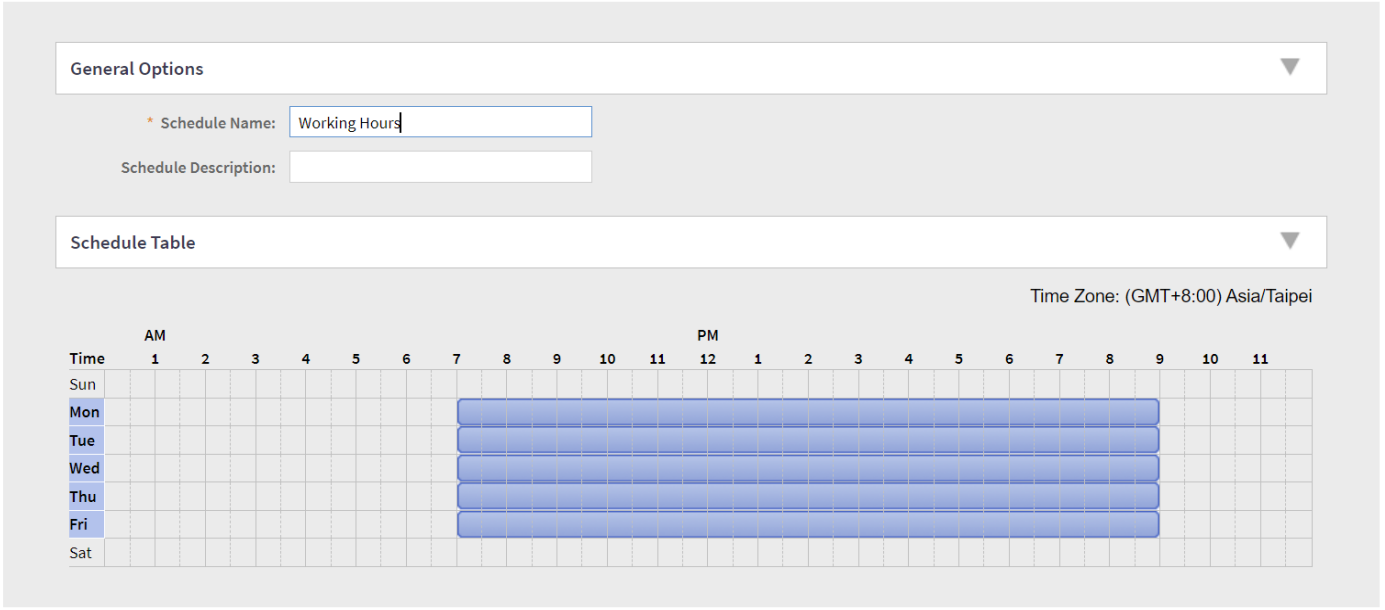
```
c08PF(config)#show eee

Port    EEE-State   RxLpIdleReceived   TxLpIdleReceived

1/1/1   Enable          0                  0
1/1/2   Enable          0                  0
1/1/3   Enable          0                  1
1/1/4   Enable          0                  0
1/1/5   Enable          1                  1
1/1/6   Enable          1                  1
1/1/7   Enable          1                  1
1/1/8   Enable          1                  1
c08PF(config)#no eee
EEE Feature Disabled
c08PF(config)#show eee

Port    EEE-State   RxLpIdleReceived   TxLpIdleReceived

1/1/1   Disable         N/A                N/A
1/1/2   Disable         N/A                N/A
1/1/3   Disable         N/A                N/A
1/1/4   Disable         N/A                N/A
1/1/5   Disable         N/A                N/A
1/1/6   Disable         N/A                N/A
1/1/7   Disable         N/A                N/A
1/1/8   Disable         N/A                N/A
```

```
c08PF(config)#eee
EEE Feature Enabled
c08PF(config)#show eee

Port    EEE-State   RxLpIdleReceived   TxLpIdleReceived

1/1/1   Enable          0                  0
1/1/2   Enable          0                  0
1/1/3   Enable          0                  1
1/1/4   Enable          0                  0
1/1/5   Enable          1                  1
1/1/6   Enable          1                  1
1/1/7   Enable          1                  1
1/1/8   Enable          1                  1
```

無線網路排程自動啟閉



Edit WLAN Schedule Table [Working Hours]



Apply Cancel

R550 working power consumption

```
c08PF(config)#show inline power

Power Capacity:    Total/Reserved/Unconsumed is 124.0/0.0/116.6 Watts.

Power Allocations: Requests Honored 11 times


 Port   Admin    Oper     ---Power(mWatts)---  PD Type   PD Class      Pri  Fault/
        State    State    Consumed  Allocated                                Error
-------------------------------------------------------------------------------
  1/1/1 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/2 On       Off             0          0  n/a       n/a            3  n/a
  1/1/3 On       On           7392      28850* 2P-IEEE   Class 4        3  n/a
  1/1/4 On       Off             0          0  n/a       n/a            3  n/a
  1/1/5 On       Off             0          0  n/a       n/a            3  n/a
  1/1/6 On       Off             0          0  n/a       n/a            3  n/a
  1/1/7 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/8 On       Non-PD          0          0  n/a       n/a            3  n/a
-------------------------------------------------------------------------------
 Total                        7392      28850

(*) Allocated power being dynamically managed.
```

R550 Schedule Radio Disabled power consumption

```
c08PF(config)#show inline power

Power Capacity:    Total/Reserved/Unconsumed is 124.0/0.0/119.7 Watts.

Power Allocations: Requests Honored 11 times


 Port   Admin    Oper     ---Power(mWatts)---  PD Type   PD Class      Pri  Fault/
        State    State    Consumed  Allocated                                Error
-------------------------------------------------------------------------------
  1/1/1 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/2 On       Off             0          0  n/a       n/a            3  n/a
  1/1/3 On       On           4924      28850* 2P-IEEE   Class 4        3  n/a
  1/1/4 On       Off             0          0  n/a       n/a            3  n/a
  1/1/5 On       Off             0          0  n/a       n/a            3  n/a
  1/1/6 On       Off             0          0  n/a       n/a            3  n/a
  1/1/7 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/8 On       Off             0          0  n/a       n/a            3  n/a
-------------------------------------------------------------------------------
 Total                        4924      28850

(*) Allocated power being dynamically managed.
```

PoE交換器啟動Dynamic PoE

```
c08PF(config)#show inline power

Power Capacity:          Total is 124000 mWatts. Current Free is 7450 mWatts.

Power Allocations: Requests Honored 14 times

 Port    Admin    Oper     ---Power(mWatts)---  PD Type   PD Class      Pri  Fault/
         State    State    Consumed  Allocated                          Error
-------------------------------------------------------------------------------
  1/1/1 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/2 On       Off             0          0  n/a       n/a            3  n/a
  1/1/3 On       On           5692      28850  2P-IEEE   Class 4        3  n/a
  1/1/4 On       On           6521      30000  4P-IEEE   Class 5        3  n/a
  1/1/5 On       On           6079      28850  2P-IEEE   Class 4        3  n/a
  1/1/6 On       On           7605      28850  2P-IEEE   Class 4        3  n/a
  1/1/7 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/8 On       Non-PD          0          0  n/a       n/a            3  n/a
-------------------------------------------------------------------------------
 Total                        25897     116550
```

無法再接第五台PD

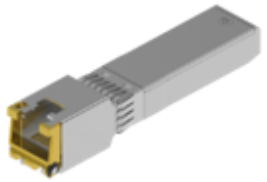
RUCKUS ICX8200 / ICX7550 / ICX7650 PoE Switch支援Dynamic PoE功能。

當啟動Dynamic PoE後PoE Budget是以Pool的方式來使用，這表示某些情境下您也許可以省下購置第二台PoE Switch。

```
c08PF(config)#show inline power

Power Capacity:     Total/Reserved/Unconsumed is 124.0/0.0/84.7 Watts.

Power Allocations: Requests Honored 14 times

 Port    Admin    Oper     ---Power(mWatts)---  PD Type   PD Class      Pri  Fault/
         State    State    Consumed  Allocated                          Error
-------------------------------------------------------------------------------
  1/1/1 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/2 On       On           9604      30000* 4P-IEEE   Class 5        3  n/a
  1/1/3 On       On           5583      28850* 2P-IEEE   Class 4        3  n/a
  1/1/4 On       On          10005      29532* 4P-IEEE   Class 5        3  n/a
  1/1/5 On       On           6136      28850* 2P-IEEE   Class 4        3  n/a
  1/1/6 On       On           7905      28850* 2P-IEEE   Class 4        3  n/a
  1/1/7 On       Non-PD          0          0  n/a       n/a            3  n/a
  1/1/8 On       Non-PD          0          0  n/a       n/a            3  n/a
-------------------------------------------------------------------------------
 Total                        39233     146082

(*) Allocated power being dynamically managed.
```

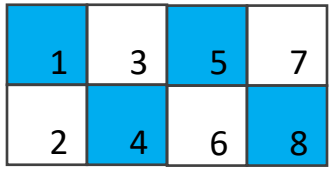
低耗電的光纖模組

- 新型 10G BASE-T光電轉換模組不需要強迫使用者空出 1 個SFP+埠無法使用。
- 消耗較少的Switch供電。
- 降低模組產生的發熱。

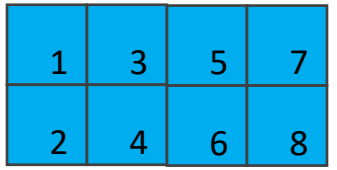


SKU	Max Power Consumption
10G-SFPP-TX-A (EOL)	2.5W
10G-SFPP-TX-LP-A	1.5W

Others



RUCKUS



Q: Is the heat generated when the 10GBASE-T is working?

A: The calorific value is very high. The designed power consumption of the 10GBASE-T is 2.5w. Its heat generation is very high, and the high temperature can be obviously felt during use. The switches with multiple SFP+ interfaces cannot be fully equipped with 10GBASE-T. As for the maximum number of 10GBASE-T that can be equipped with, it depends on the switch availability.

Source from https://community.fs.com/article/get-further-understanding-of-10gbase-t-sfp-copper-transceiver.html

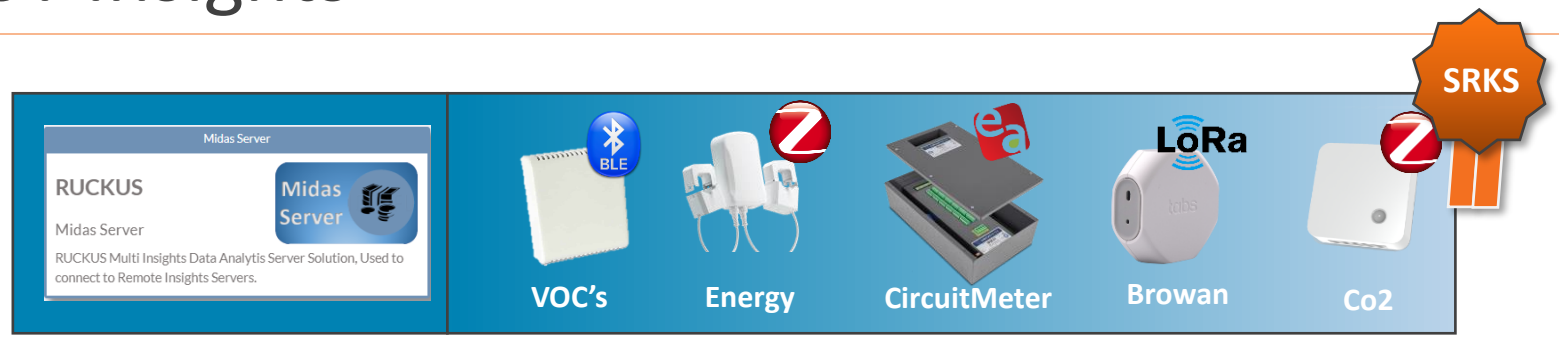
太陽能供電給戶外型AP T350d

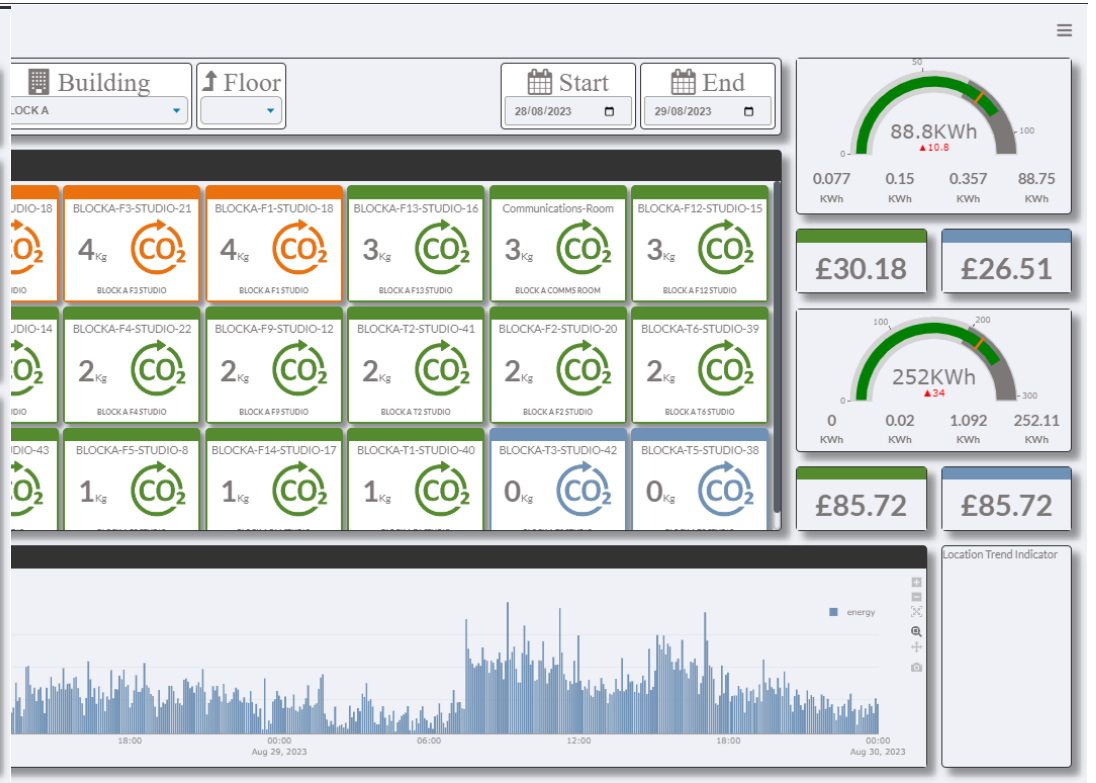
當兩種電源輸入都接上，直流電源輸入會優先於 **PoE** 輸入。

Mesh APs.

太陽能供電

RUCKUS IoT Insights





HSP	SMB	K-12	EDU	MDU	MED	IND	FED
✓	✓	✓	✓	✓	✓	✓	✓

Thanks