



هيئة الاتصالات والفضاء والتقنية
Communications, Space &
Technology Commission



Indoor 5G in Every Nook and Cranny: A Feat of Regulatory and Commercial Innovation

Content

• The Interest

- Why mobile connectivity?
- Why indoor connectivity?
- What are the challenges?

• The Innovation

- What is the remedy?
- What is the PoC?
- What are the results?

• The Implications

- What do we learn?
- Where do we go from here?



A Dive into the Interest in Indoor Connectivity

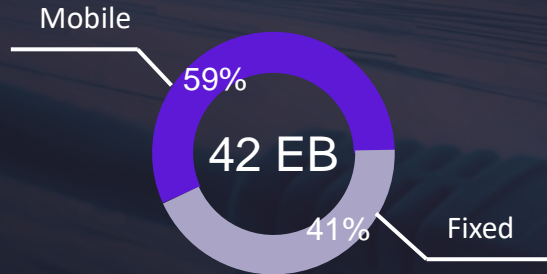




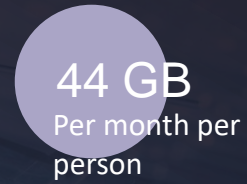
How Popular Is Mobile Connectivity in the KSA?

2023

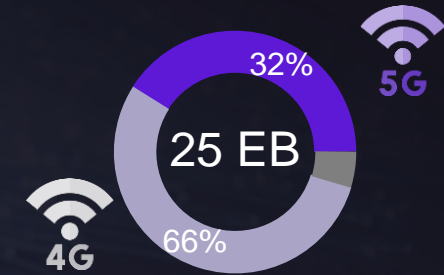
Total Internet Data Traffic



Average Mobile Data Consumption



Share of Mobile Technology





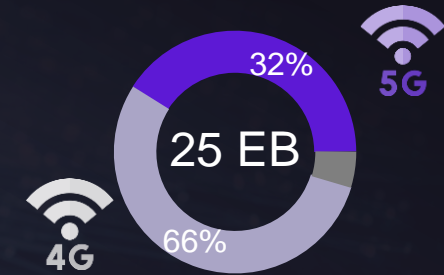
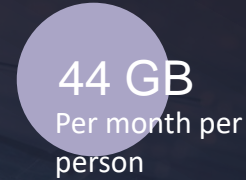
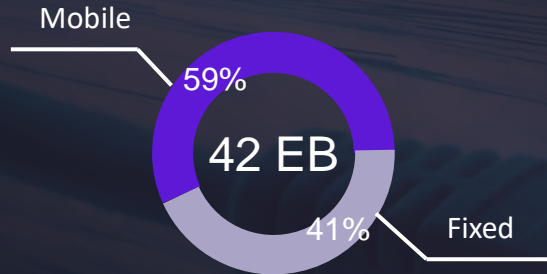
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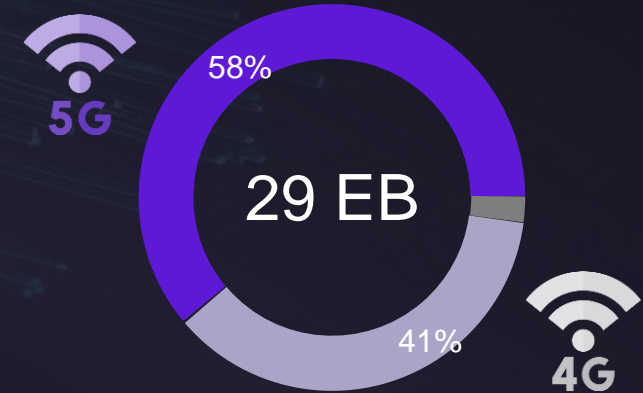
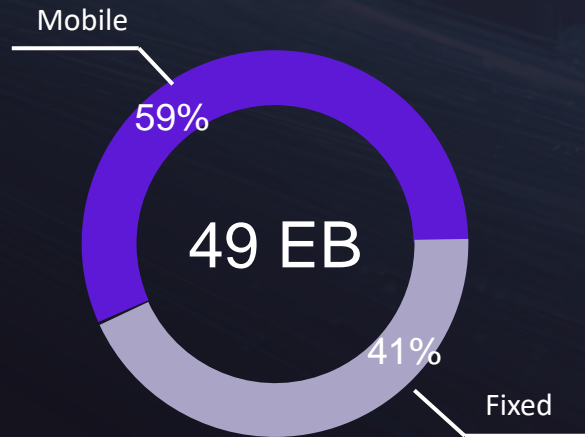
Average Mobile Data Consumption

Share of Mobile Technology

2023



2024



For **2 years in a row**, majority of that traffic is carried over mobile networks^[1]

Consumption is **roughly 3x** the global average^[1]

5G share becomes **dominant two years earlier** than estimated global breakpoint^[2]



The Early Glimpse of Trouble!

Up to

80%

Of mobile traffic is generated indoors^[1]

[1] "Ericsson Mobility Report," Ericsson, June 2023.

Why Is It Seen as a Problem?

Stadiums



Airports



Malls



Extremely high traffic
buildings

Feasible investment for MNO with
relatively good ROI

Hotels



Hospital



Theaters



Enterprises



Banks



High to medium traffic
buildings

Not quite feasible investment with
unclear ROI

Warehouses



Factories



Schools



Low traffic buildings

Infeasible investment with
unconvincing ROI

Why Is It Seen as a Problem?

They are the majority
Clear demand, and challenging deployments

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Identifying Challenges

1 Equip. Cost

2 Duplication of Equip.

3 Telecom Room

4 Foundational Infra.

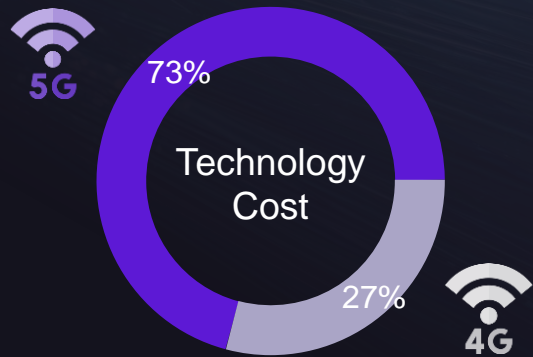
5 Responsibility



Understanding the Challenges

- 1 Equip. Cost
- 2 Duplication of Equip.
- 3 Telecom Room
- 4 Foundational Infra.
- 5 Responsibility

Traditional NSA 5G Solution





Understanding the Challenges



Equip. Cost

2

Duplication of Equip.

3

Telecom Room

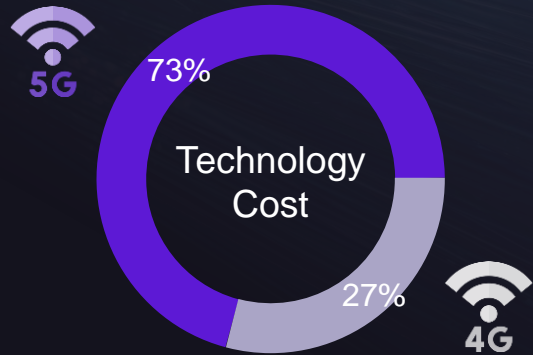
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Foundational Infra.

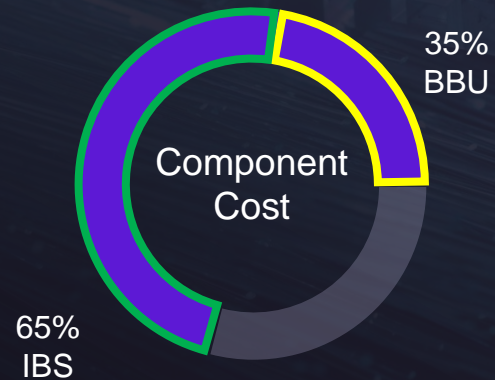
5

Responsibility

Traditional NSA 5G Solution



Going SA 5G



27%

Cost reduction relative
to NSA 5G



Understanding the Challenges



Equip. Cost



Duplication of Equip.



Telecom Room

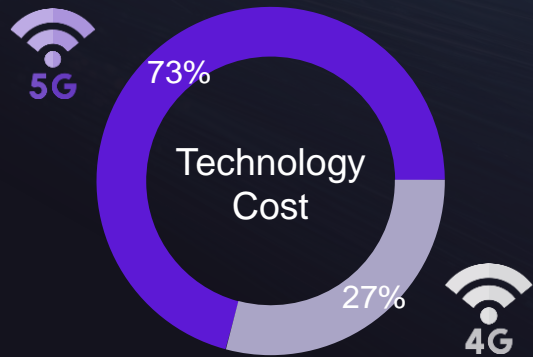
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Foundational Infra.

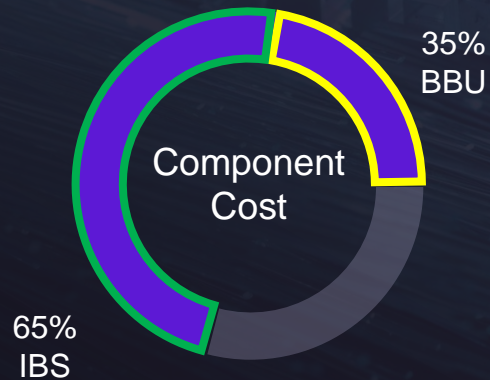
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Responsibility

Traditional NSA 5G Solution



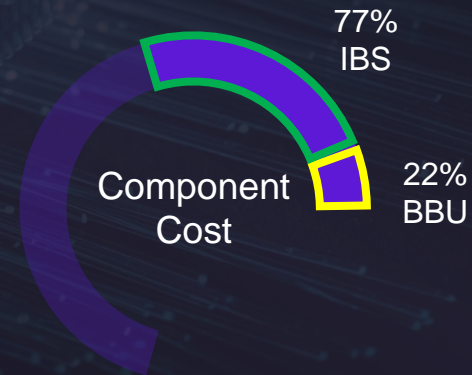
Going SA 5G



27%

Cost reduction relative to NSA 5G

Adopting MOCN with C-RAN



56%

Cost reduction relative to SA 5G



68%

Overall cost reduction relative to NSA 5G

A Dive into Regulatory and Commercial Innovation





Is the 68% Cost Reduction Attainable?

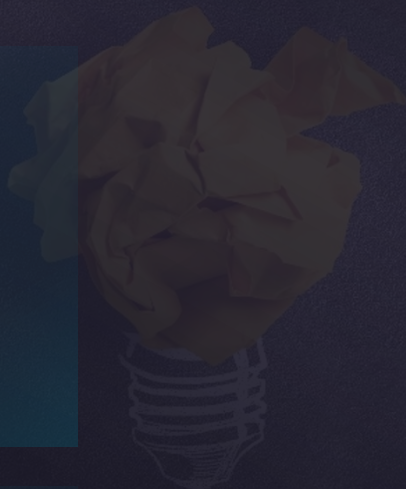
Reaching into CST's regulatory chest

Dedicated Indoor Spectrum

- 100 MHz C-Band
- Available to NHs
- Sharing obligation

Streamlined Access to Fiber Infra.

- Enabling C-RAN deployments
- Unified access framework





Getting Everyone to the Discussion Table

Reaching into CST's regulatory chest

Dedicated Indoor Spectrum

- 100 MHz C-Band
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Streamlined Access to Fiber Infra.

- Enabling C-RAN deployments
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OREX SAI

COMMSCOPE



NOKIA





The 5GXtreme Initiative: Seeing is Believing

Reaching into CST's regulatory chest

Dedicated Indoor Spectrum

- 100 MHz C-Band
- Available to NHs
- Sharing obligation

Streamlined Access to Fiber Infra.

- Enabling C-RAN deployments
- Unified access framework



Neutral Host responsible for deployment and operation of the solutions

Technology provider responsible for telecom equip



MNOs responsible for delivery of SA 5G services



5GXtreme

Aims to Test the concept of a C-RAN indoor solution deployed on a dedicated indoor freq. band (4-4.1 GHz)



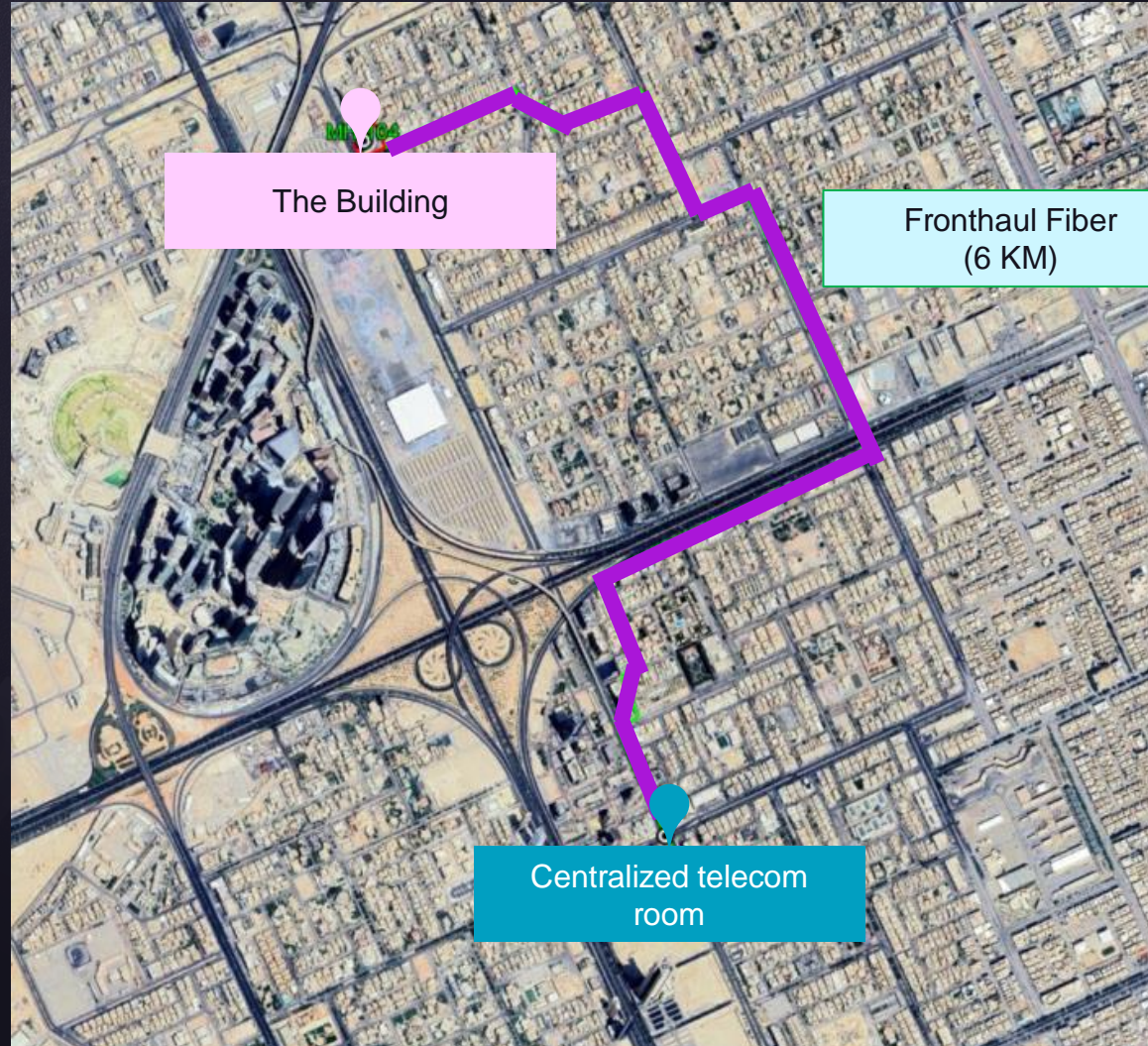
The Proof of Concept: Where and How?

Social Development Bank,
Riyadh, KSA

A good example of a building with
medium traffic

ACES Meet-Me-Room,
Riyadh Metro Station

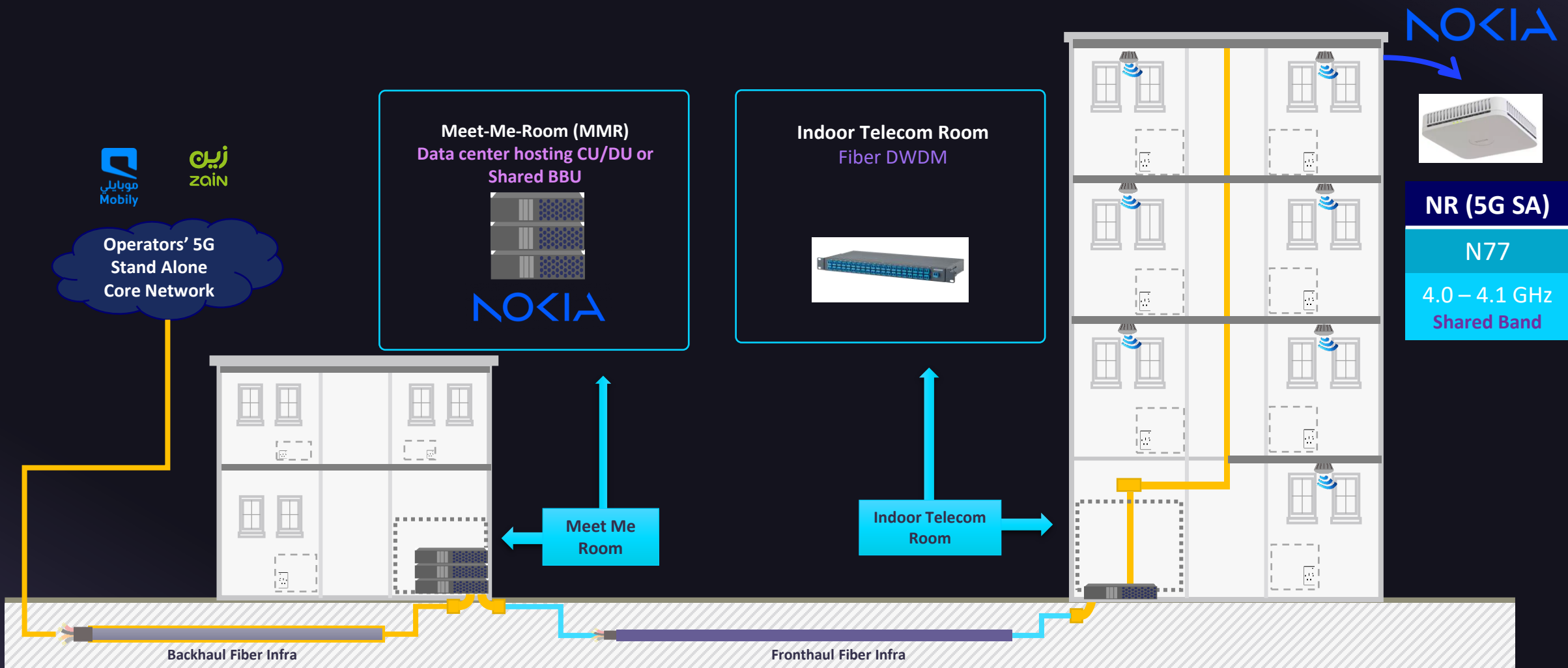
A centralized telecom room to service
multiple building



Mobily dark fiber

A point-to-point fiber fronthauling
BBU and IBS

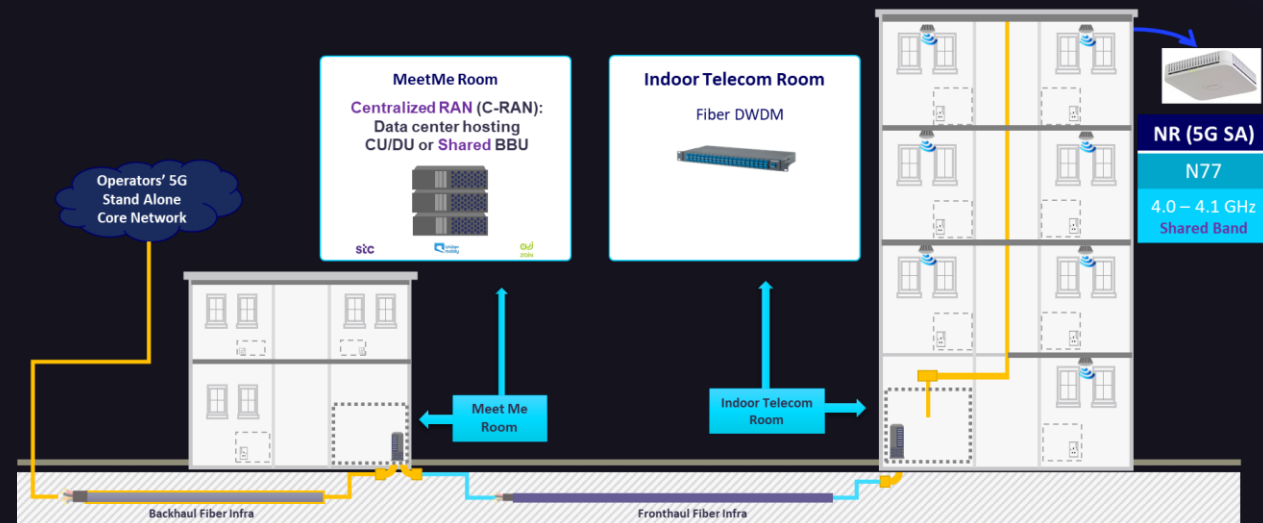
Solution Architecture



Advantages of the new solution

Solution Features:

- 1 Bandwidth tailored to the needs of the targeted buildings
 - Shared 5G BW up to 100MHz
- 2 Shared BBU and NO RRUs
- 3 5G SA
- 4 DWDM for efficient use of fronthaul resources
- 5 C-RAN for unified BBUs & backhaul endpoints



Significant Cost Reduction, Efficient Use of Resources, Easier 5G Deployment

A View from the Site

One cabinet hosting all the equipment in each of the Centralized room and the Building MER



Centralized Room



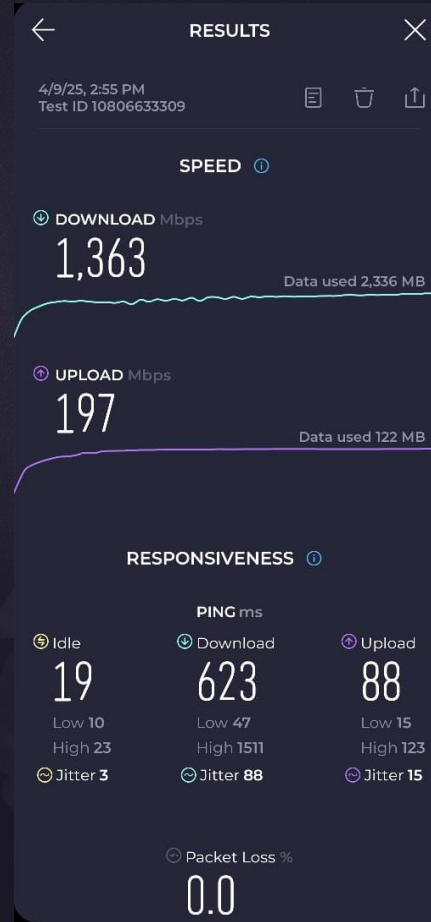
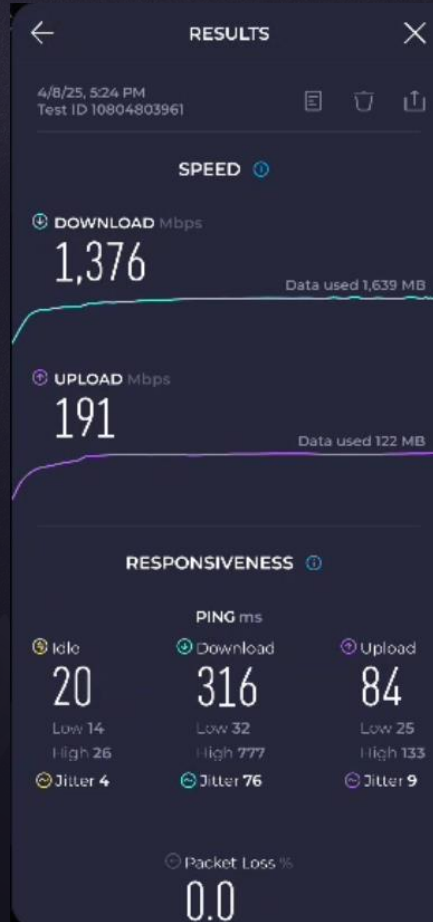
Target Building Room



Testing Results: A Much Needed Vindication

Coordinated walk-
tests

All stakeholders
involved





Numbers Do not Lie

The details of the cost savings resulting from the tested solution compared to a traditional NSA 5G solution



Small cells

54%



RAN

82%



Backhauling

66%



Power consumption

80%



Telecom room area

87%

A Peek into the Implications of 5GXtreme



Handling the Challenges

1 Equip. Cost

2 Duplication of Equip.

3 Telecom Room

4 Foundational Infra.

5 Responsibility



“The Regulations for the Establishing and Provisioning of Telecom Services in Real Estate”
Enacted March 2025



Streamlining the process; identifying parties and roles and responsibilities



Classifying buildings: done from telco profitability perspective



Shifting costs: Building owners shouldering the cost of indoor solutions for building categories



Imposing obligations: Inserting telecom as a utility in the Saudi Building Code



Spectrum Is Key to Enabling the New Solution and More

- 1 Equip. Cost
- 2 Duplication of Equip.
- 3 Telecom Room
- 4 Foundational Infra.
- 5 Responsibility



5GXtreme Initiative
at SDB

A PoC for a MOCN-based C-RAN indoor solution
delivered by neutral host over “neutral” spectrum



Spectrum Outlook
Public Consultation

Getting the industry’s feedback on
dedicating indoor spectrum in the C-band



Making decision on whether or not indoor spectrum
is released and how it’s regulated (light licensing?)



Spectrum allocation and
licensing regime



Done



Ongoing



Upcoming

A conceptual image featuring a person's silhouette standing in a white rectangular doorway. The person is positioned in the center, facing away from the viewer. On either side of the doorway, there are intricate, glowing blue circuit board patterns that spread out horizontally. The background is a dark, textured blue with faint vertical lines, suggesting a digital or technological environment. The overall mood is mysterious and futuristic.

The End