

# 5G Fixed Wireless Access



Leslie Barnes

Mathew Joseph

September 6, 2023

# Overview

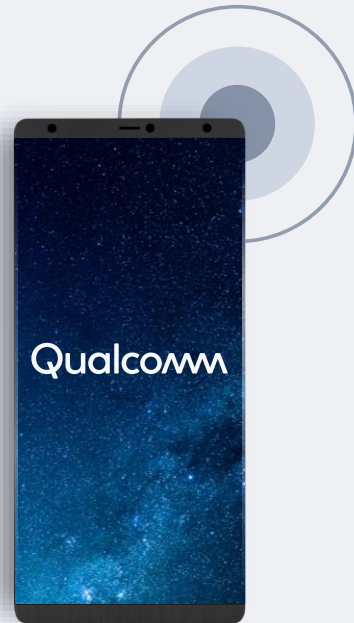
1. Qualcomm's role in the wireless ecosystem
2. 5G explained
3. 5G Fixed Wireless Access (FWA)
  - Spectrum and connectivity
  - Use cases
  - Cost-effective to deploy
  - Operator adoption and current landscape
4. Questions

Qualcomm has led mobile innovation for over 30 years



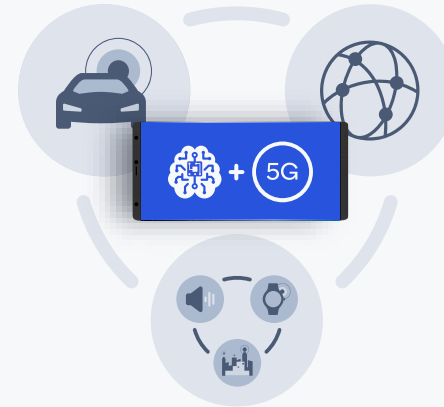
Digitized mobile communications

Analog to digital



Redefined computing

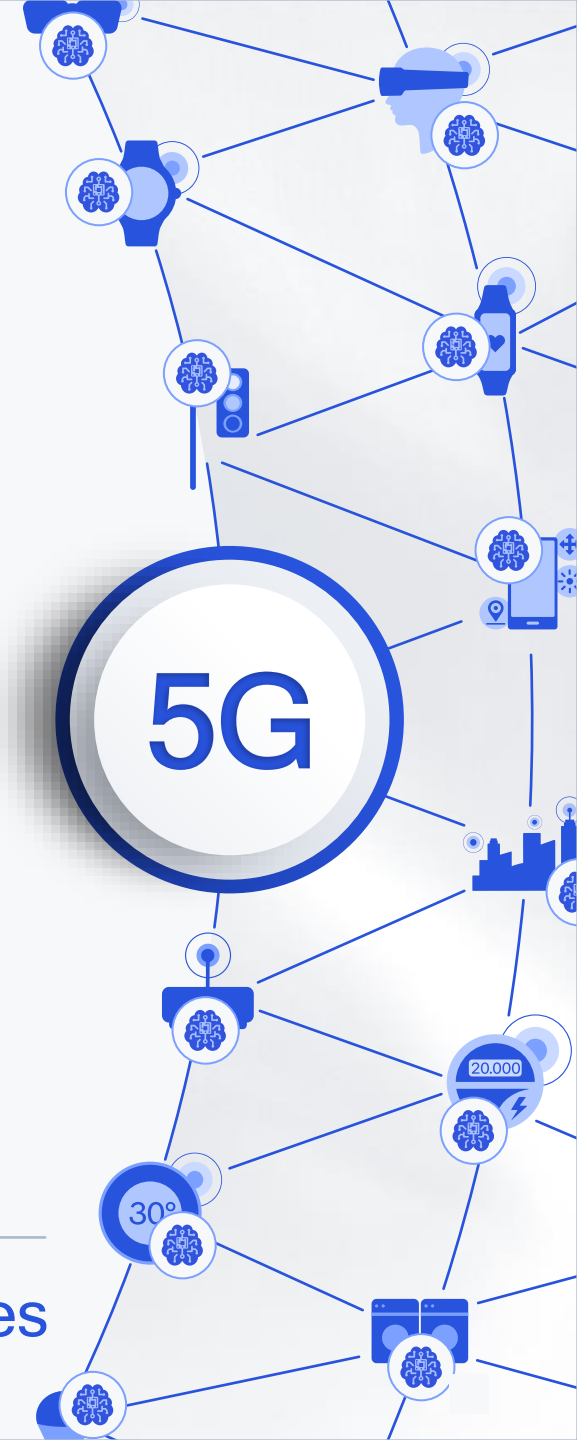
Desktop to smartphones



Transforming industries

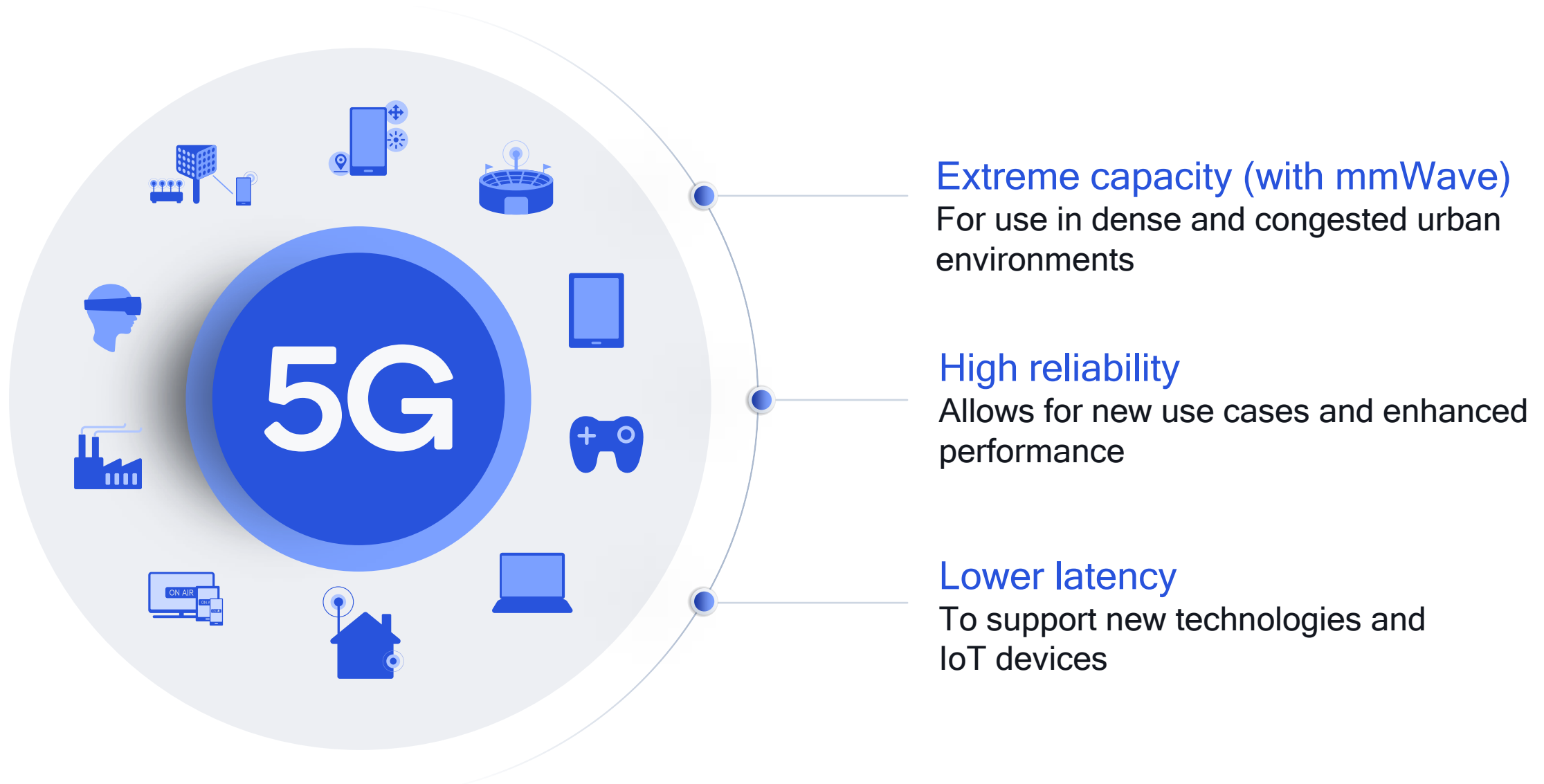
Connecting virtually everything at the wireless edge

Transforming how the world connects, computes and communicates



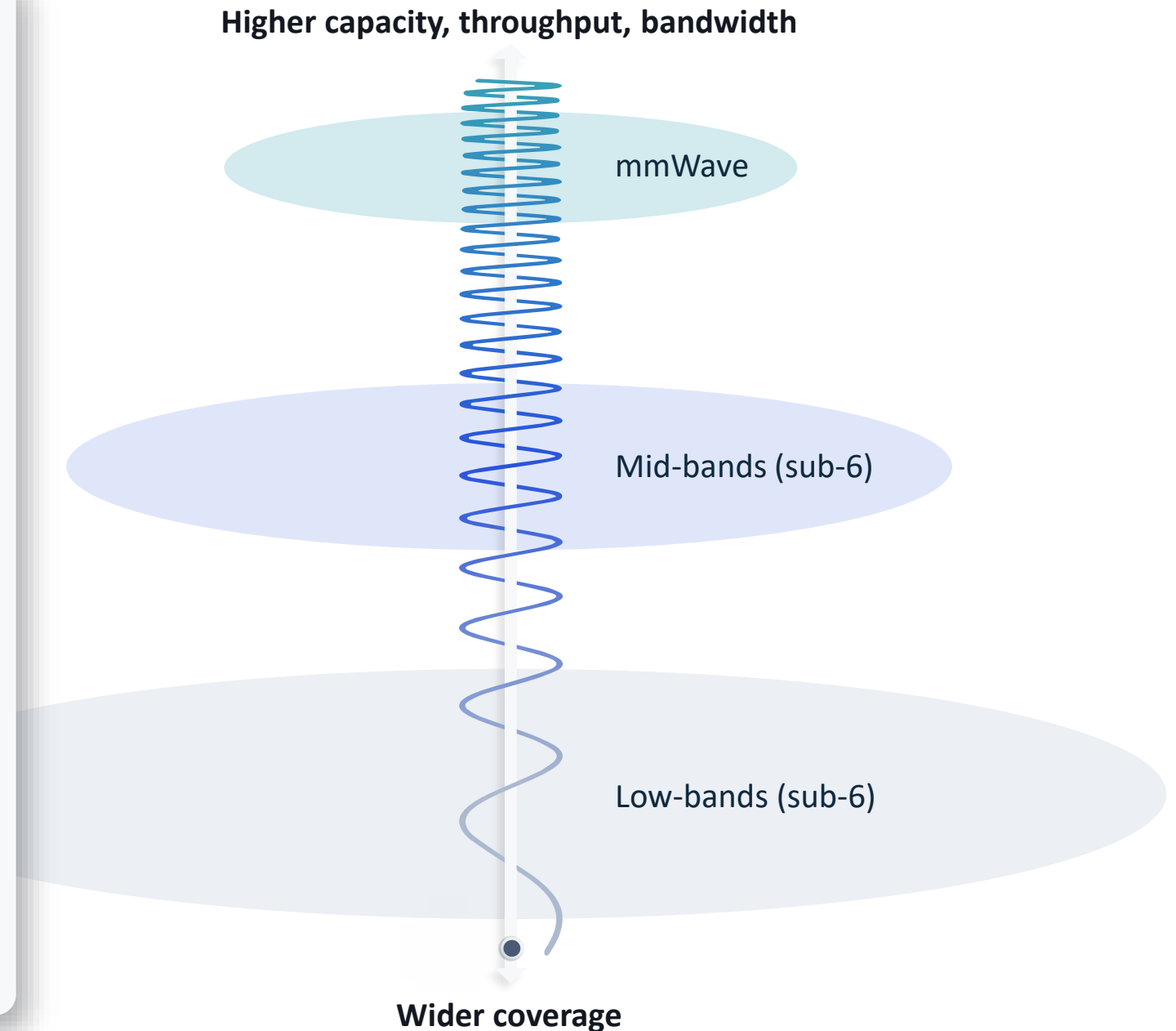


# 5G supports multiple layers of connectivity



# Wireless connectivity relies on spectrum

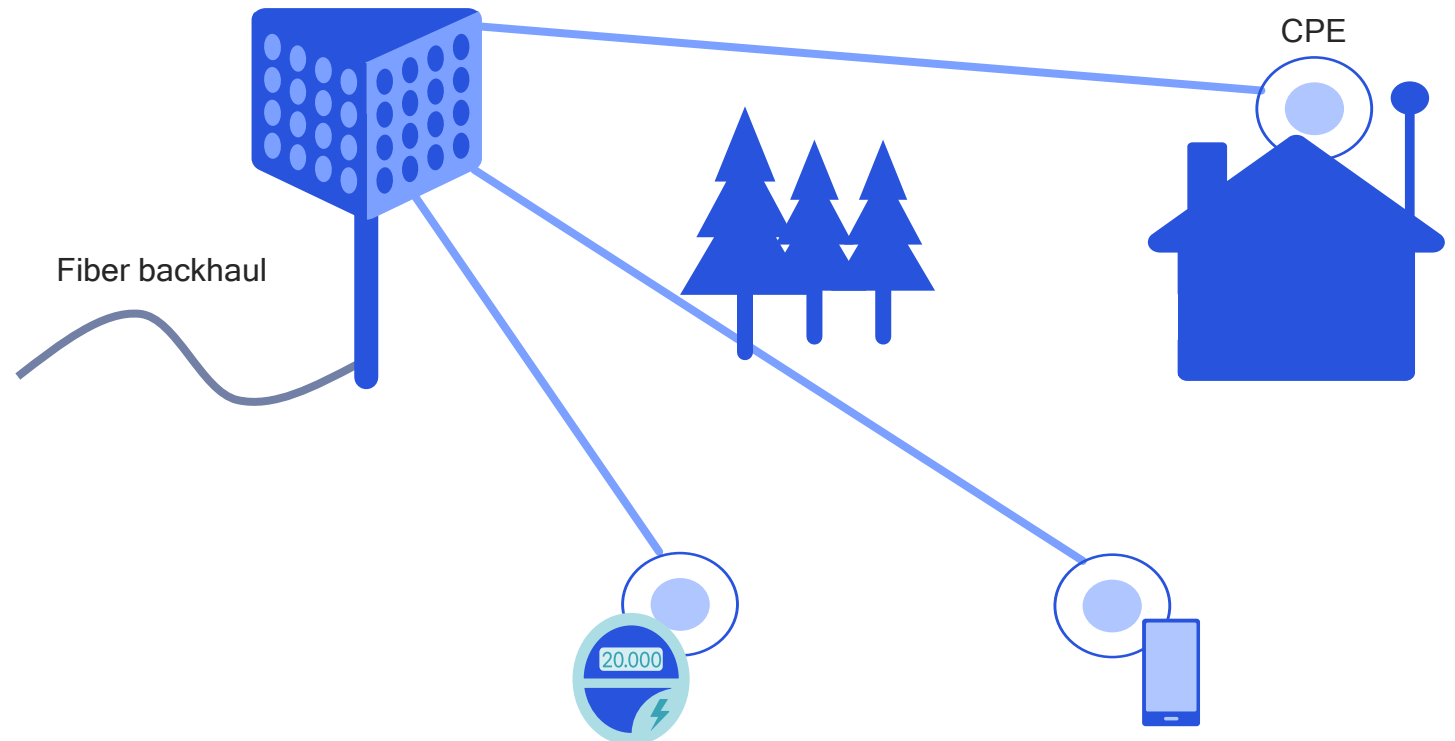
- Low, mid-band, and high-band spectrum is used in wireless communications
- Operators use licensed, shared, and unlicensed spectrum
- The BEAD NOFO defines licensed and hybrid (licensed/unlicensed) fixed wireless as a “Reliable Broadband Service”



# 5G FWA basic network architecture

- Last-mile connectivity is wireless (i.e., no physical connections)
- Fixed wireless connectivity via CPE installed outdoors or indoors using software.
- 5G FWA can also support mobile and IoT connectivity when a device (e.g., a smartphone, sensor) is within range of a cell tower.
- Backhaul can be done via fiber connection or microwave links using mmWave

## Suburban or Rural deployments



North Polk High School



Wireless connectivity is established when a CPE located at an unserved/underserved location connects to a local cell tower.







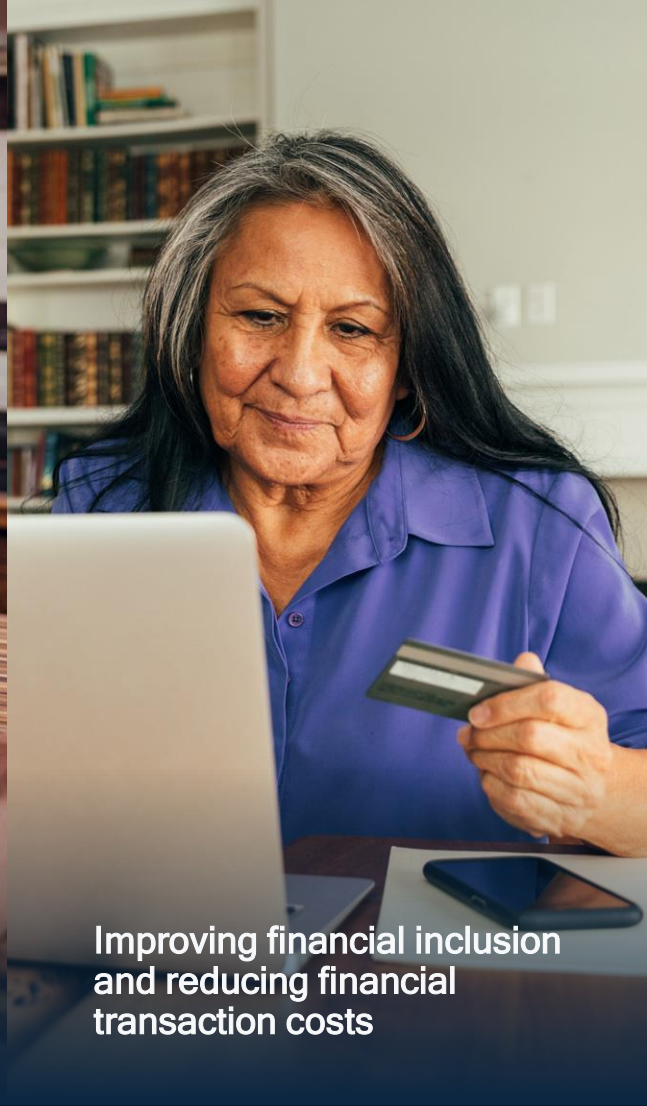
Expanding education access and outcomes



Improving public services through efficient access and outreach



Expanding access to health care services and information



Improving financial inclusion and reducing financial transaction costs

# Fixed Wireless Use Cases



Optimizing crop yields, conserving water, improving soil health, and monitoring livestock



Increasing telework options for those with the longest commute



Supporting climate change understanding and mitigation

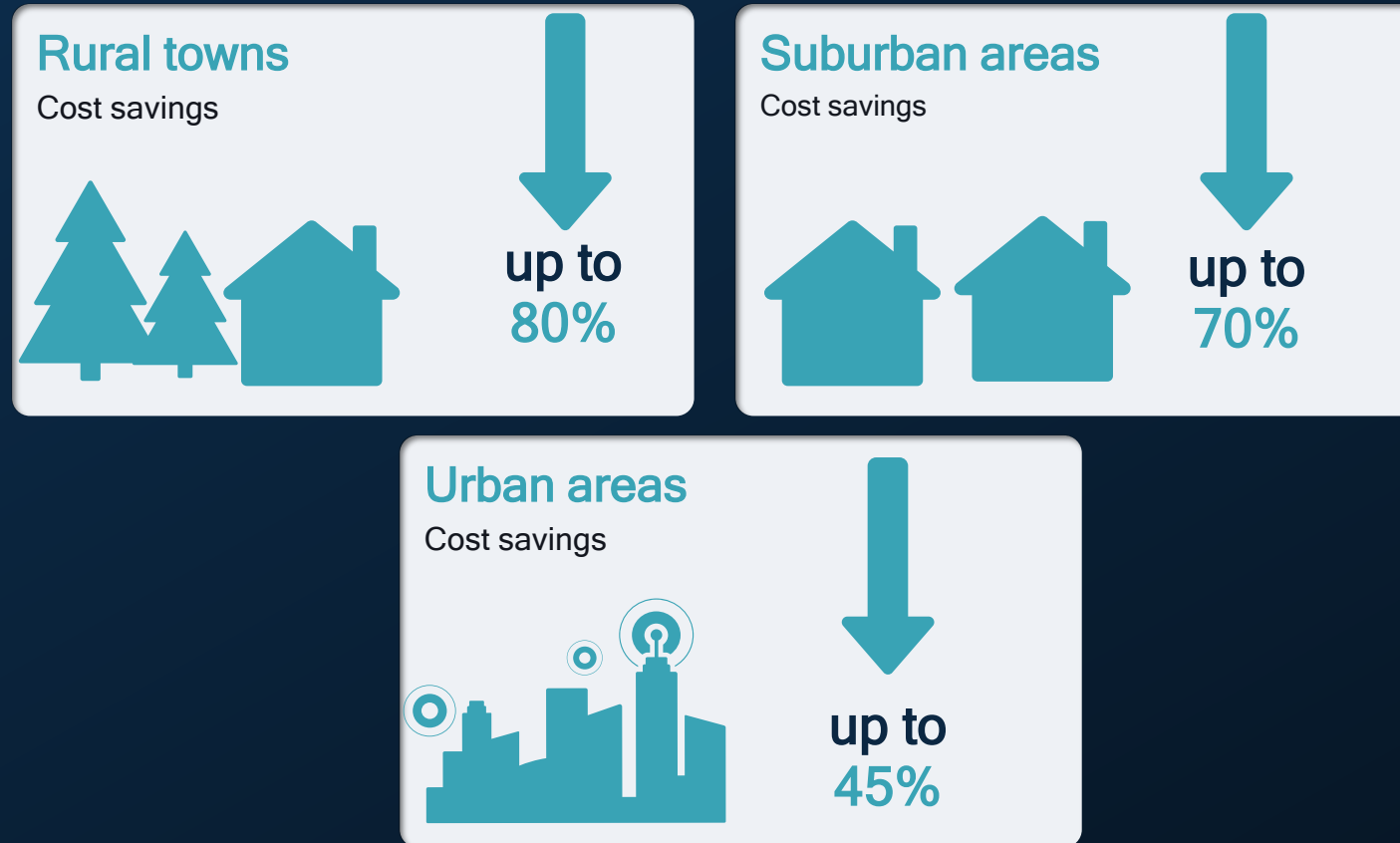


Using drones to significantly reduce pesticide application

5G FWA connectivity also enables Mobile and IoT connectivity

# 5G mmWave FWA delivers fast, reliable, and cost-efficient connectivity in unserved and underserved areas

5G mmWave FWA can be deployed faster and cheaper than fiber to the premises in many cases.



# Major operators have launched 5G FWA services

- Verizon wireless Internet service covers 30+ million homes and 2+ million businesses and expects to have 4 to 5 million subscribers by the end of 2025.<sup>2</sup>
- T-Mobile's 5G FWA service covers 40+ million homes and expects to have 7 to 8 million subscribers by the end of 2025.<sup>3</sup>
- According to Ericsson's June 2023 Mobility Report, two leading service providers in the US have more than 5 million 5G FWA connections collectively.<sup>4</sup>

Questions?

# Thank you

**Qualcomm**

Follow us on: [f](#) [t](#) [in](#) [@](#)

For more information, visit us at:

[www.qualcomm.com](http://www.qualcomm.com) & [www.qualcomm.com/blog](http://www.qualcomm.com/blog)

Nothing in these materials is an offer to sell any of the components or devices referenced herein.

©2018-2022 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm and Wireless Reach are trademarks or registered trademarks of Qualcomm Incorporated. Other products and brand names may be trademarks or registered trademarks of their respective owners.

References in this presentation to “Qualcomm” may mean Qualcomm Incorporated, Qualcomm Technologies, Inc., and/or other subsidiaries or business units within the Qualcomm corporate structure, as applicable. Qualcomm Incorporated includes our licensing business, QTL, and the vast majority of our patent portfolio. Qualcomm Technologies, Inc., a subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of our engineering, research and development functions, and substantially all of our products and services businesses, including our QCT semiconductor business.

# References

1. The 5G FWA opportunity: a TCO model for a 5G mmWave FWA network, GSMA Intelligence (Jan. 2022), available at: <https://data.gsmaintelligence.com/research/research/research-2022/the-5g-fwa-opportunity-a-tco-model-for-a-5g-mmwave-fwa-network>; The 5G FWA opportunity: series highlights, GSMA Intelligence (Jul. 2022), available at: <https://data.gsmaintelligence.com/research/research/research-2022/the-5g-fwa-opportunity-series-highlights>.
2. Verizon Press Release: Verizon's Wireless Internet Service Now Covers 30+ Million Homes and 2+ Million Businesses (Feb. 2022), available at: <https://www.verizon.com/about/news/homes-businesses-verizons-wireless-internet-services>; The State of Fixed Wireless Access, T-Mobile (Dec. 2022), available at: [https://www.t-mobile.com/news/\\_admin/uploads/2022/12/2945098\\_CCD\\_State-of-Fixed-Wireless-Access\\_Infographic-Report\\_REVW\\_v18\\_RGB-2.pdf](https://www.t-mobile.com/news/_admin/uploads/2022/12/2945098_CCD_State-of-Fixed-Wireless-Access_Infographic-Report_REVW_v18_RGB-2.pdf).
3. The State of Fixed Wireless Access, T-Mobile (Dec. 2022), available at: [https://www.t-mobile.com/news/\\_admin/uploads/2022/12/2945098\\_CCD\\_State-of-Fixed-Wireless-Access\\_Infographic-Report\\_REVW\\_v18\\_RGB-2.pdf](https://www.t-mobile.com/news/_admin/uploads/2022/12/2945098_CCD_State-of-Fixed-Wireless-Access_Infographic-Report_REVW_v18_RGB-2.pdf).
4. Ericsson Mobility Report (Jun. 2023), available at: <https://www.ericsson.com/49dd9d/assets/local/reports-papers/mobility-report/documents/2023/ericsson-mobility-report-june-2023.pdf>.

# References

1. CTIA 5G Wireless Symposium.
2. Answering the Calling: Wireless for Good, CTIA, available at: <https://api.ctia.org/wp-content/uploads/2023/03/2022-Wireless-CSR-Report-Final.pdf>.
3. Ericsson Mobility Report (November 2022), available at: [https://www.ericsson.com/en/reports-and-papers/mobility-report?gclid=CjwKCAjwuqiiBhBtEiwATgvixDcKkoDzBOS3XR\\_1pzdksvcvUa1546QSDJHcNgAFobaVh\\_Fz1EhU5XRoC\\_Sc4QAvD\\_BwE&gclid=aw.ds](https://www.ericsson.com/en/reports-and-papers/mobility-report?gclid=CjwKCAjwuqiiBhBtEiwATgvixDcKkoDzBOS3XR_1pzdksvcvUa1546QSDJHcNgAFobaVh_Fz1EhU5XRoC_Sc4QAvD_BwE&gclid=aw.ds)
4. Verizon Press Release: Verizon's Wireless Internet Service Now Covers 30+ Million Homes and 2+ Million Businesses (Feb. 2022), available at: <https://www.verizon.com/about/news/homes-businesses-verizons-wireless-internet-services>
5. The State of Fixed Wireless Access, T-Mobile (Dec. 2022), available at: [https://www.t-mobile.com/news/\\_admin/uploads/2022/12/2945098\\_CCD\\_State-of-Fixed-Wireless-Access\\_Infographic-Report\\_REVW\\_v18\\_RGB-2.pdf](https://www.t-mobile.com/news/_admin/uploads/2022/12/2945098_CCD_State-of-Fixed-Wireless-Access_Infographic-Report_REVW_v18_RGB-2.pdf)
6. U.S. Cellular Press Release: UScellular, in Collaboration with Qualcomm and Inseego, Launches 5G mmWave High-Speed Internet Service in 10 Cities (April 2022), available at: <https://newsroom.uscellular.com/uscellular-qualcomm-inseego-launches-5g-mmwave-high-speed-internet-service-in-10-cities/#:~:text=in%2010%20Cities-,UScellular%2C%20in%20Collaboration%20with%20Qualcomm%20and%20Inseego%2C%20Launches%205G%20mmWave,Internet%20Service%20in%2010%20Cities&text=UScellular's%20Home%20Internet%2B%20service%20uses,internet%20to%20homes%20and%20businesses.&text=Companies%20plan%20to%20expand%20service%20to%20dozens%20of%20more%20cities%20throughout%202022.>