

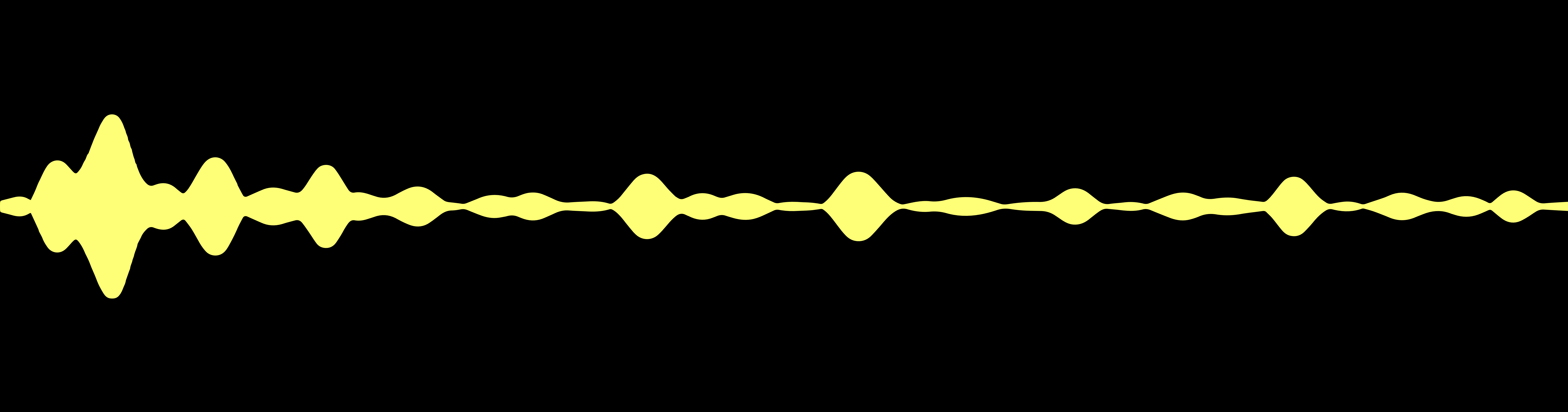


A truly connected world: How 5G will change everything

Matt Grob

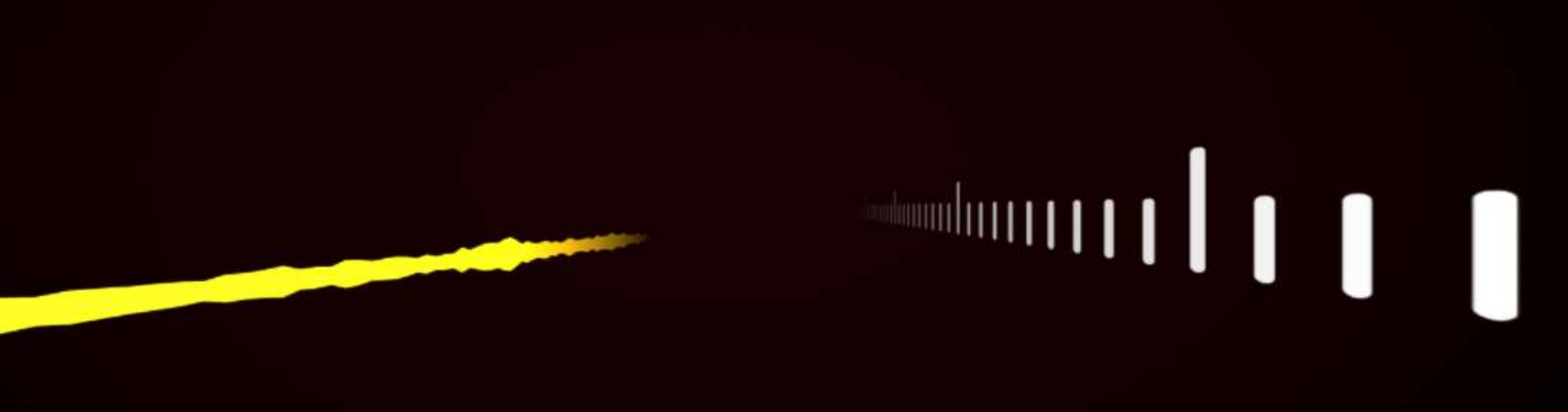
Executive Vice President, Qualcomm Technologies, Inc.
and Chief Technology Officer

@grobmatt #whywait











1910









CDMA Transmitter



3G



2000







The 5G World

More than a new
generation of mobile.
A new kind of network.

Unifying
connectivity
fabric

Scalable
across many
dimensions

Intelligence
at device, edge,
and the cloud





⚠ FIRE AIRTANKER
ETA: 06:04

USER SNAPDRAGON801

Drone 9

SPEED WIND

20.49 5.50
KPH NW

USER FIRE INCIDENT AIR



COORDINATING FLIGHT PATHS



From vision
to reality

5G



Smashing
through barriers

Creating a rock solid
5G design

Delivering technology
on a global scale

5G



Closer than
you think



The background of the entire image is a photograph of two mountain bikers riding down a steep, rocky trail. The bikers are wearing helmets, backpacks, and cycling gear. The terrain is rugged and covered in dry, yellowish-brown vegetation. The lighting suggests a bright, sunny day.

A new era of Immersive experiences

Multi-Gbps
data rate

Low
latency

Lower cost
per bit

THE PROCESSORS

Why Wait

We start by asking questions
We must challenge what
we see today
So we can invent the
tech that shapes tomorrow

CHORUS

Purchase



JAMES

Afterparty @ the Space Club!



PHOEBE

Love this song!



A dense, repeating pattern of overlapping circles in shades of purple and blue. Each circle contains a white icon representing a different smart home or IoT device. The icons include: smart watches, smartphones, laptops, desktop monitors, drones, cars, smart thermostats (one showing 30°C), smart locks, home automation systems (like a house with a signal tower), smart speakers, and various sensors. The overall effect is a vibrant, tech-oriented background.

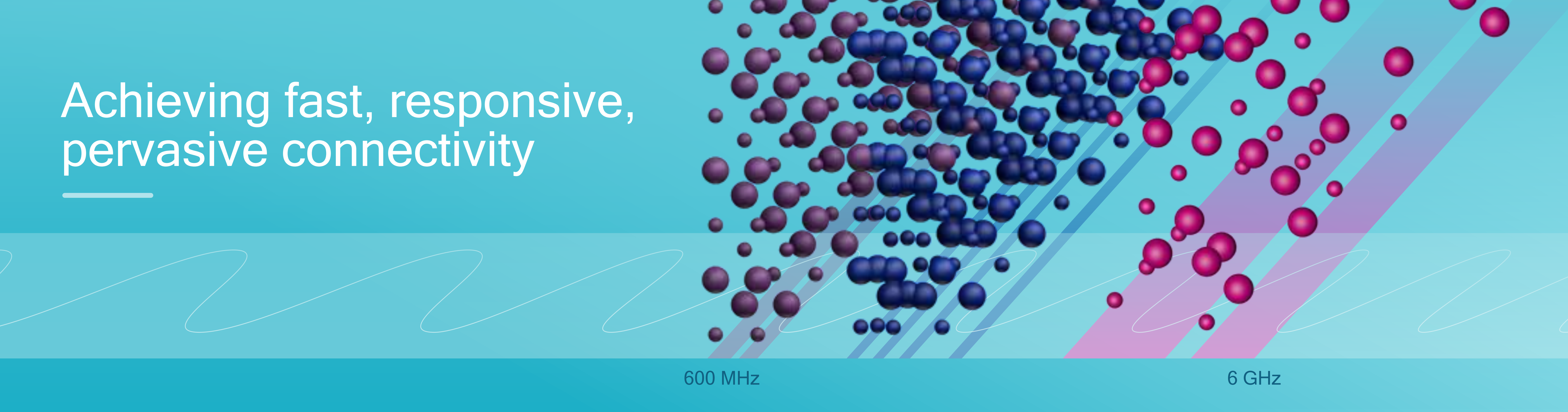
Achieving fast, responsive,
pervasive connectivity

600 MHz

Achieving fast, responsive, pervasive connectivity

600 MHz

6 GHz



Achieving fast, responsive, pervasive connectivity

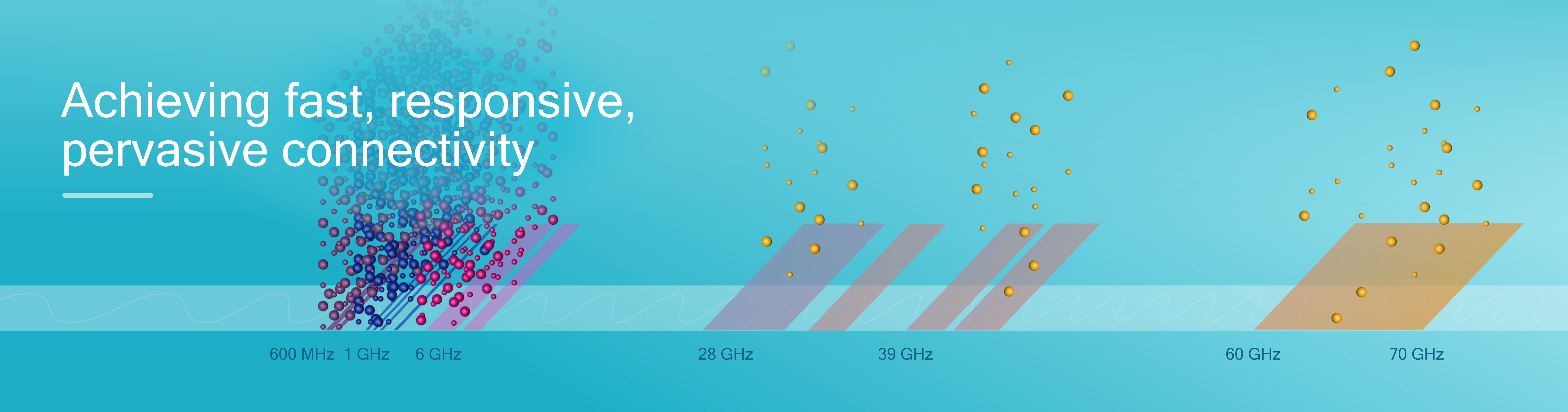
600 MHz 1 GHz 6 GHz

28 GHz

39 GHz

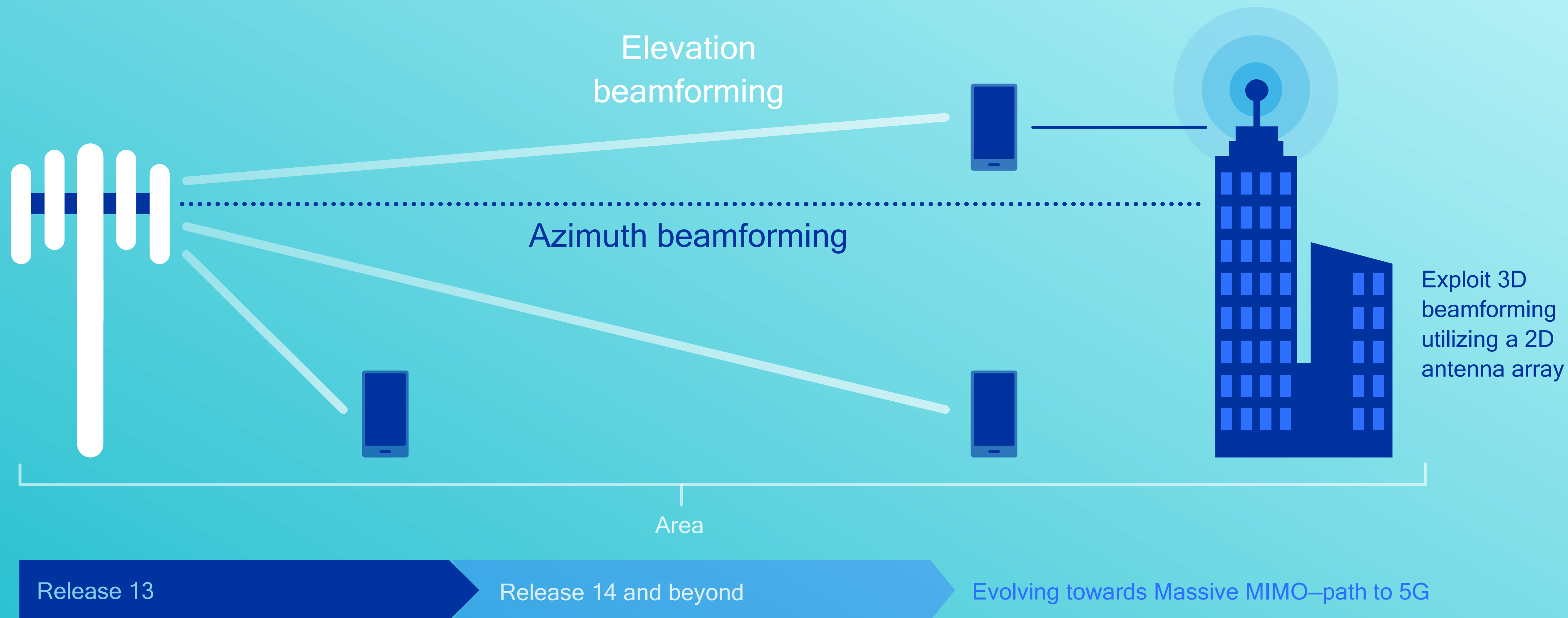
60 GHz

70 GHz



Advanced antenna techniques

A key enabler for higher spectrum bands



Technology enabling
A mission-critical world

High
reliability

Ultra-low
latency

High
availability



Washington General ER Room 3

 PATIENT

Ashley Worley

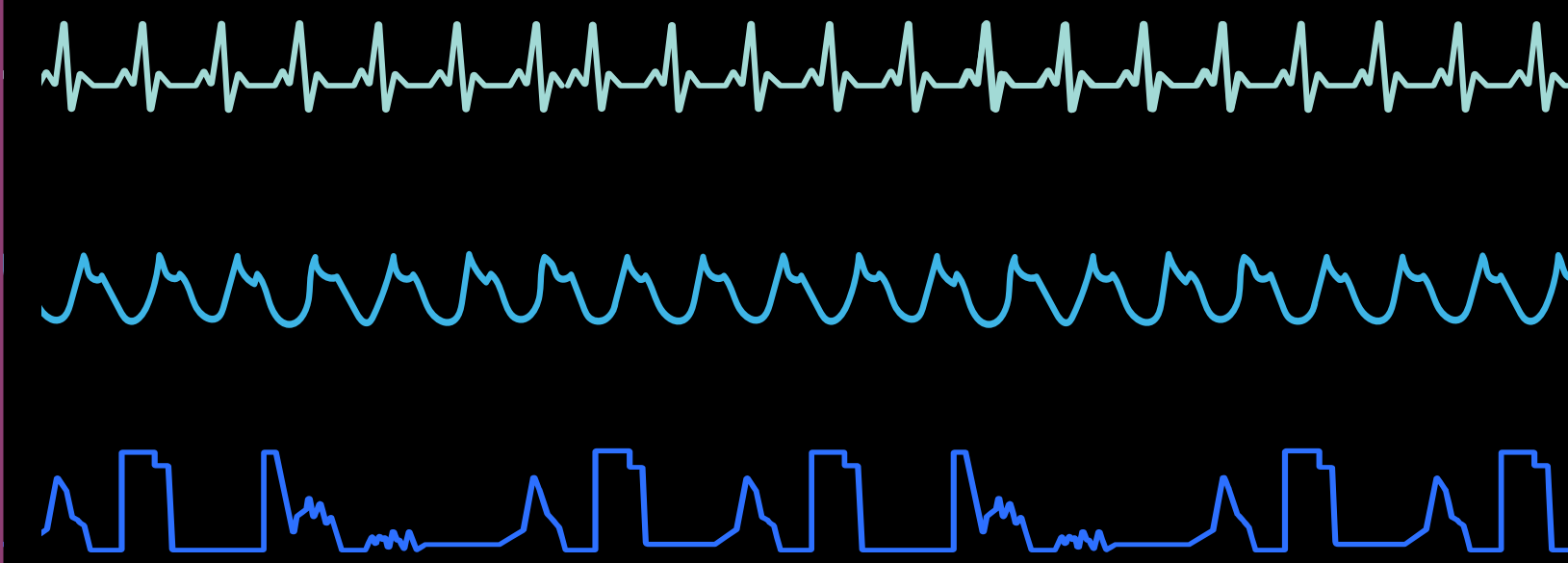
Critical condition



 74 bpm

 100%

 10 rpm



 NETWORK STATUS

Primary network 

Secondary network 

Secure data link 



Sensor fusion
compute



Computer
vision



Parking space available
near destination



Vehicle-
to-cyclist



Speed limit 30



Vehicle-
to-vehicle



Pedestrian entering
crosswalk

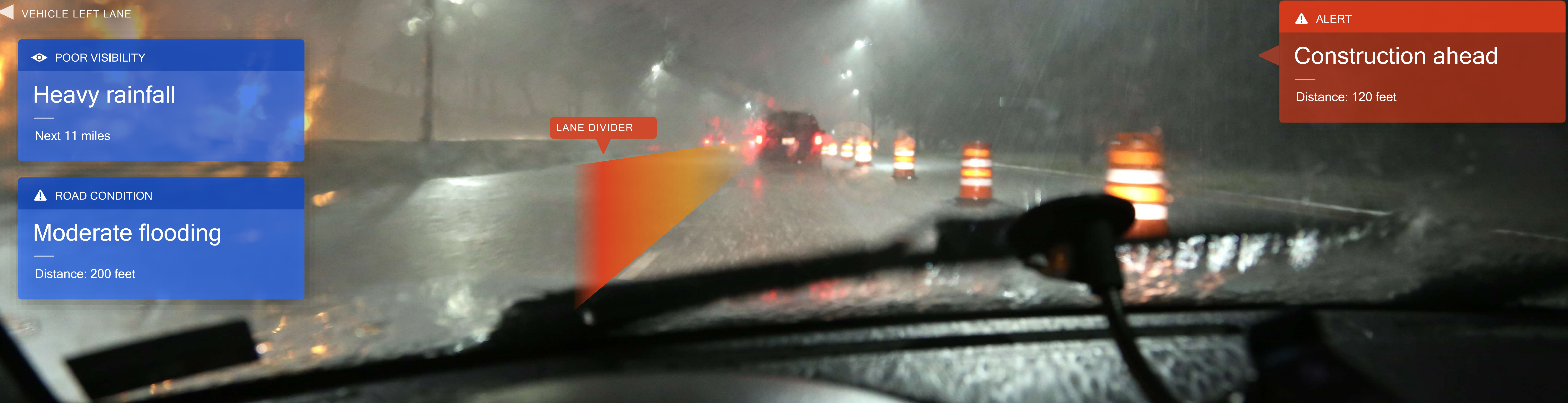


Charging station
300 feet ahead



Smart traffic signal





◀ VEHICLE LEFT LANE

👁 POOR VISIBILITY

Heavy rainfall

Next 11 miles

⚠ ROAD CONDITION

Moderate flooding

Distance: 200 feet

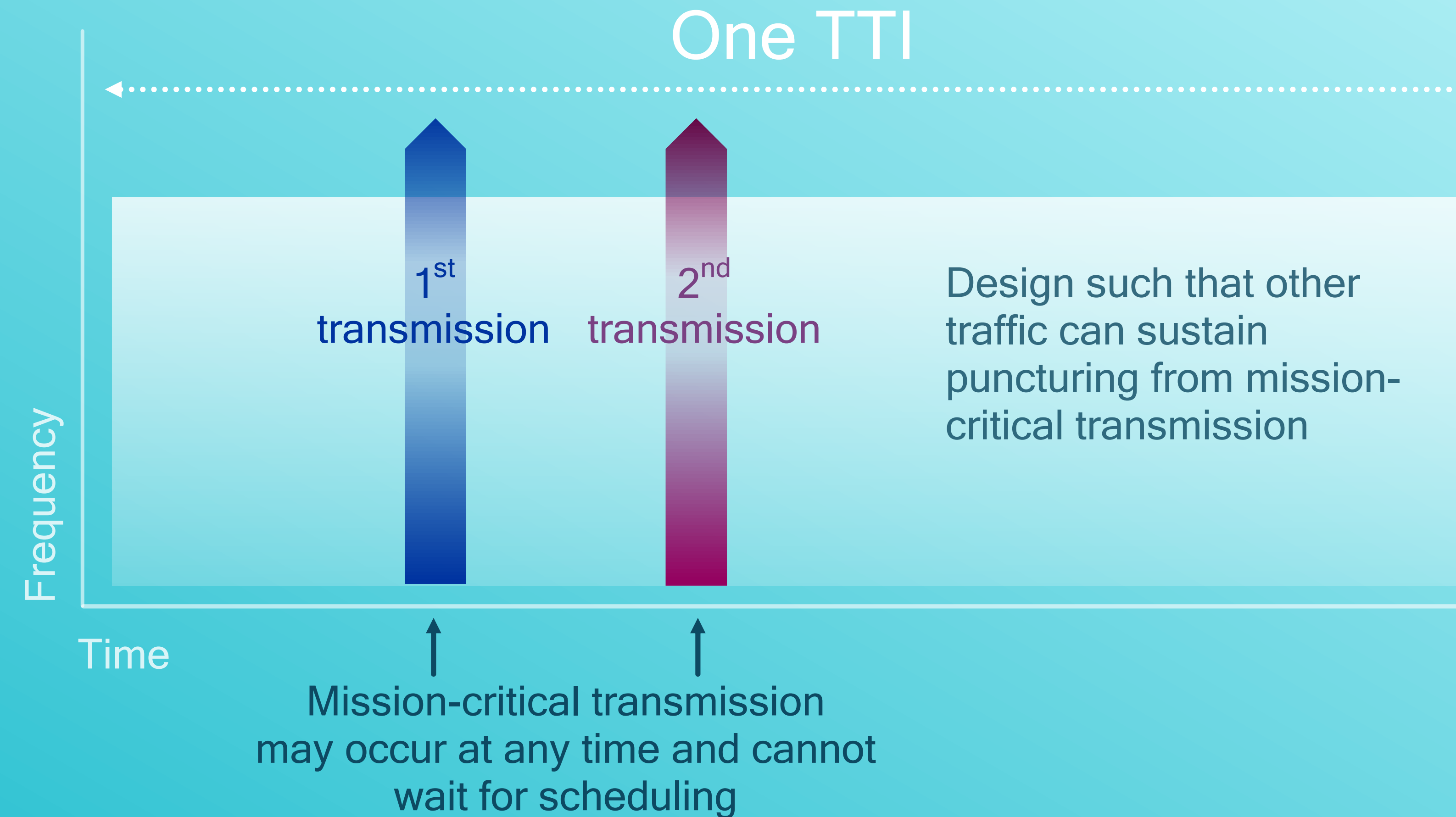
LANE DIVIDER

⚠ ALERT

Construction ahead

Distance: 120 feet

Efficient mission-critical multiplexing with other services





Enabling Massive IoT

Power
efficient

Low
complexity

Long
range

Enabling Massive IoT

Power
efficient

Low
complexity

Long
range



TRAFFIC

Heavy. Use alt route.



AIR QUALITY INDEX

Good: 40 Ozone: 38 Particles (PM2.5): 54



AMBIENT LIGHT

470 Lumens



STREETLIGHT

Small cell: ON



ROAD CONDITION

20°C Humidity: 37%



TRASH BIN

85% capacity

64% recyclables
15% compostable
21% waste

SCHEDULED PICKUP
22:15 hours



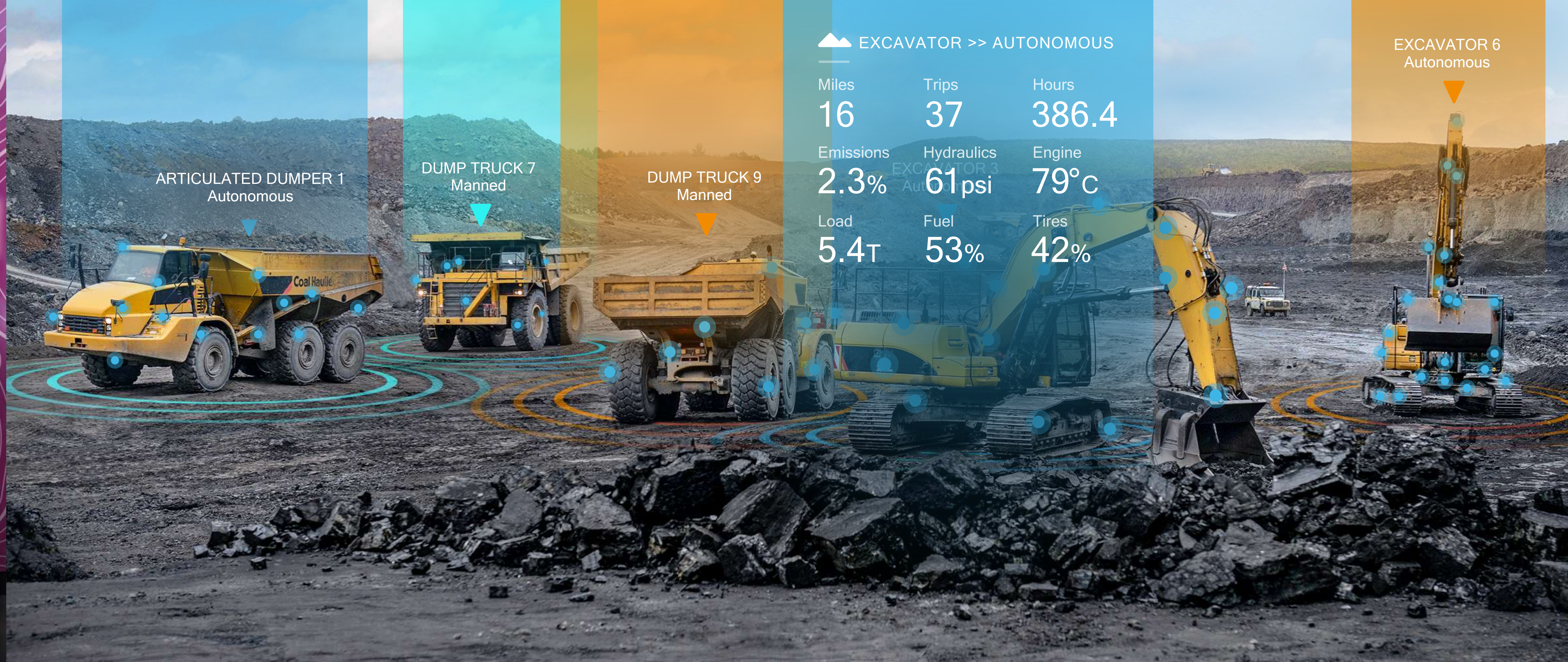
REFRIGERATOR

Door open: 5 minutes



ENERGY EFFICIENCY

70% of peak
Wi-Fi access point: Active



Supporting vast scale with

Efficient IoT communication

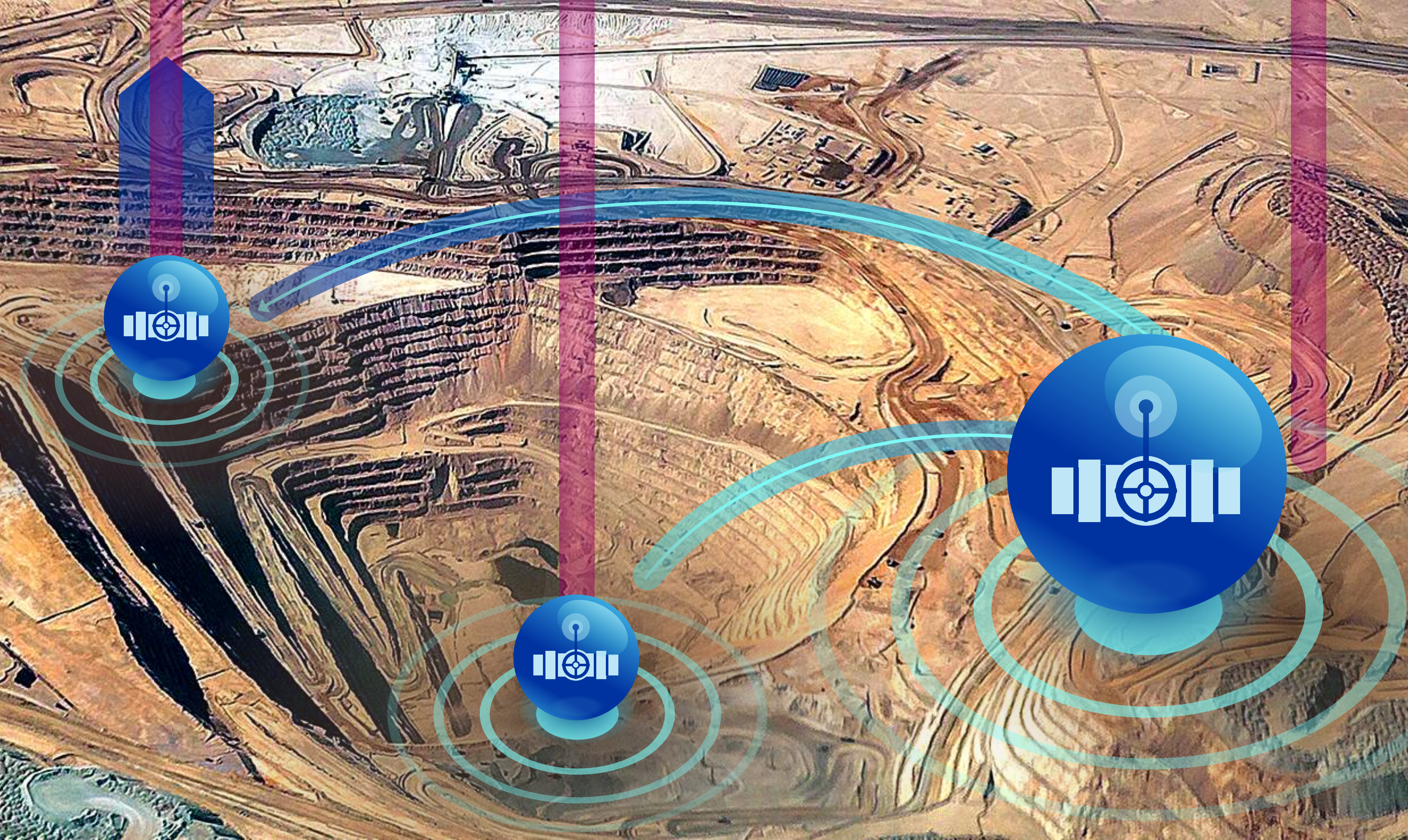
High bandwidth
Greater complexity



Low bandwidth
Deep coverage
High efficiency

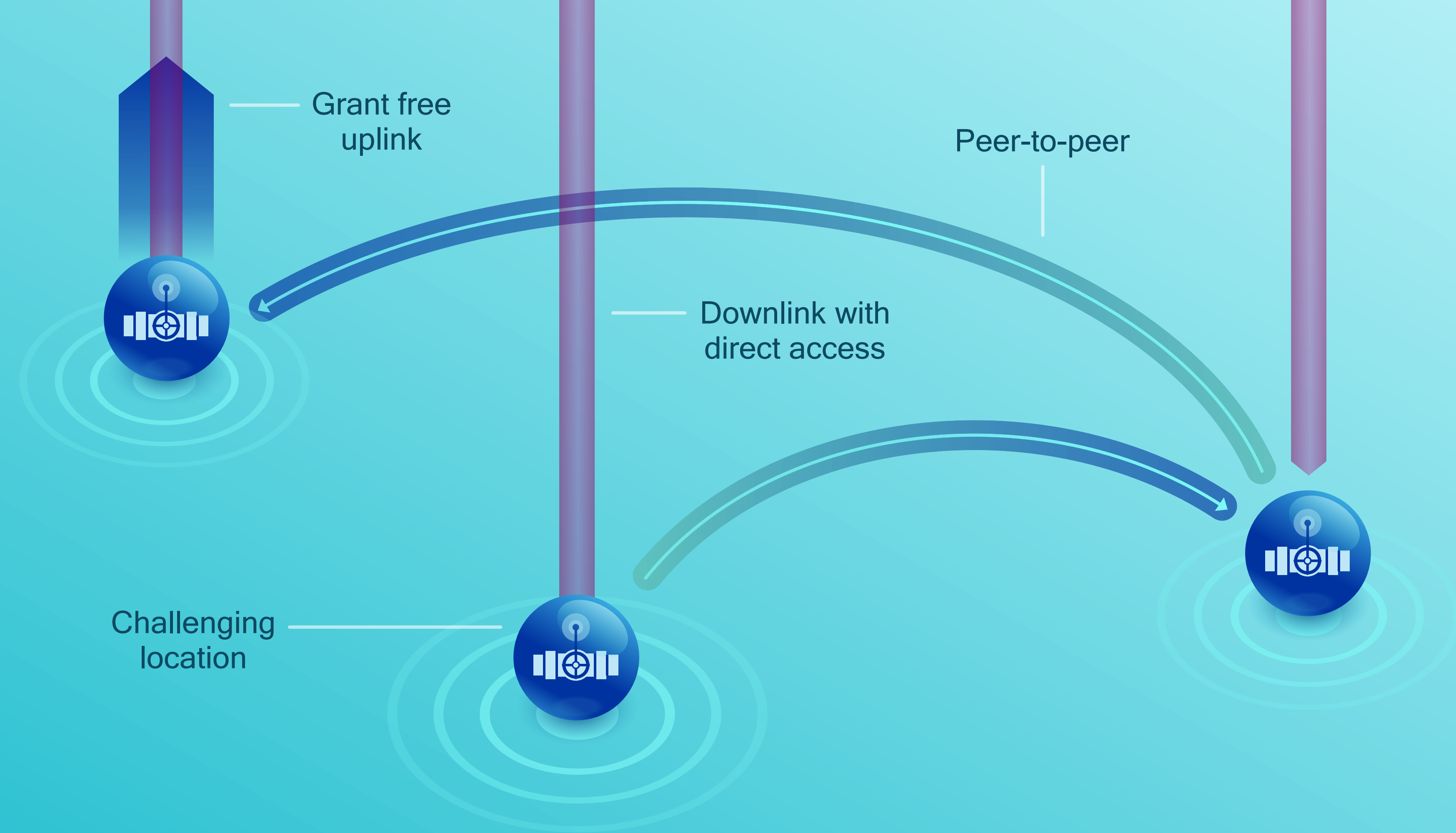


Enabling massive numbers of



Enabling massive numbers of

Low-complexity devices



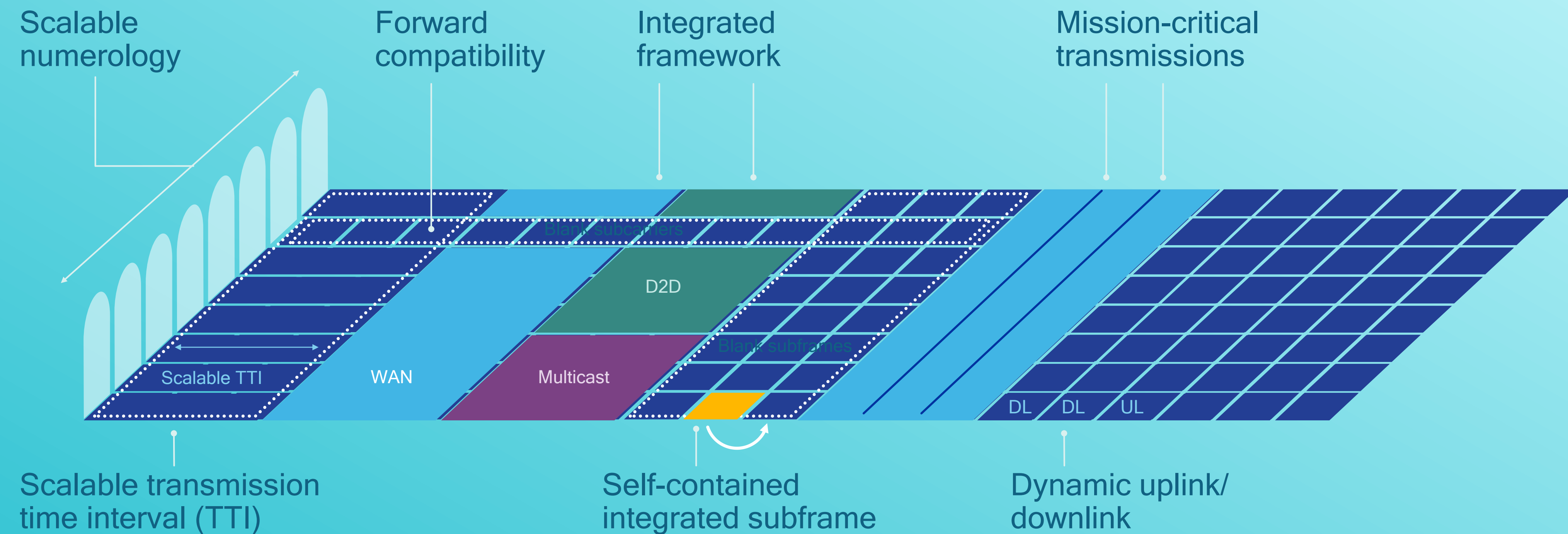
One integrated system

Flexible framework for efficiently
multiplexing diverse services

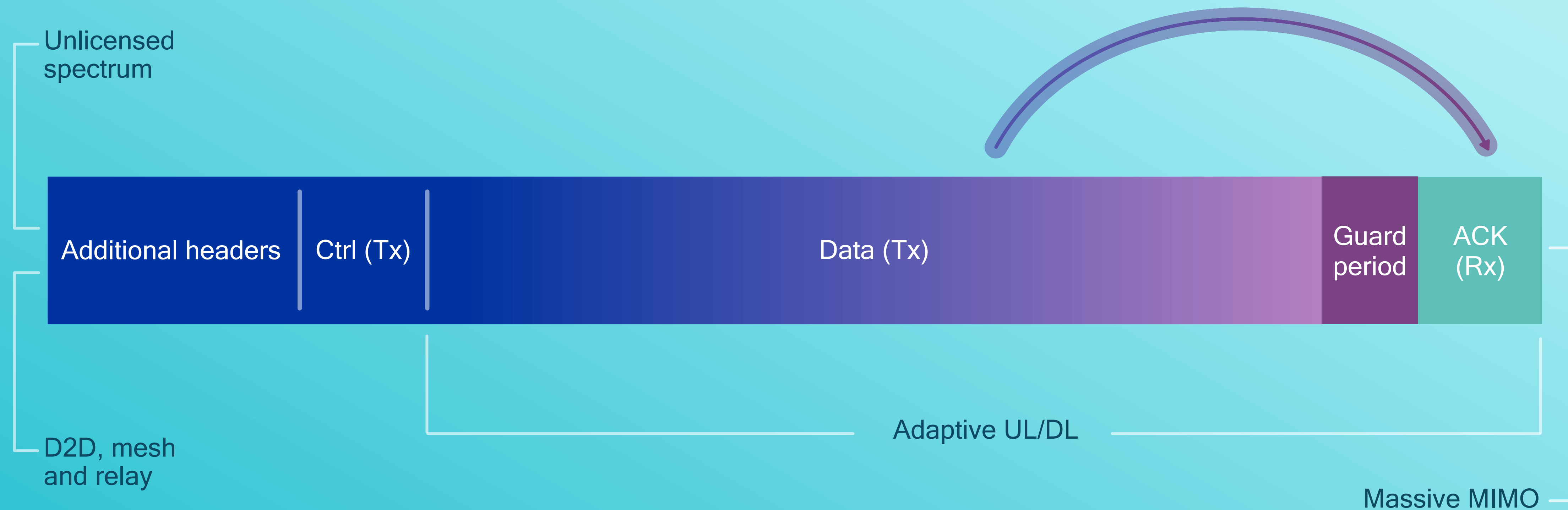


A scalable OFDM-based 5G New Radio (NR)

Flexible framework for efficiently
multiplexing diverse services



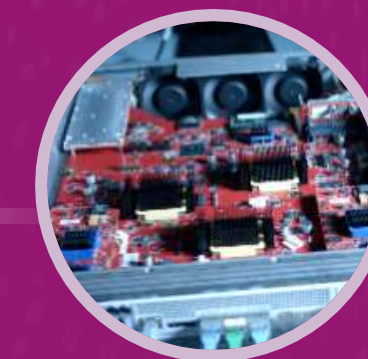
Self-contained, integrated TDD subframe design



Accelerating the path to 5G



Best-in-class 5G
prototype systems
and testbeds



5G standards,
technology and research
leadership

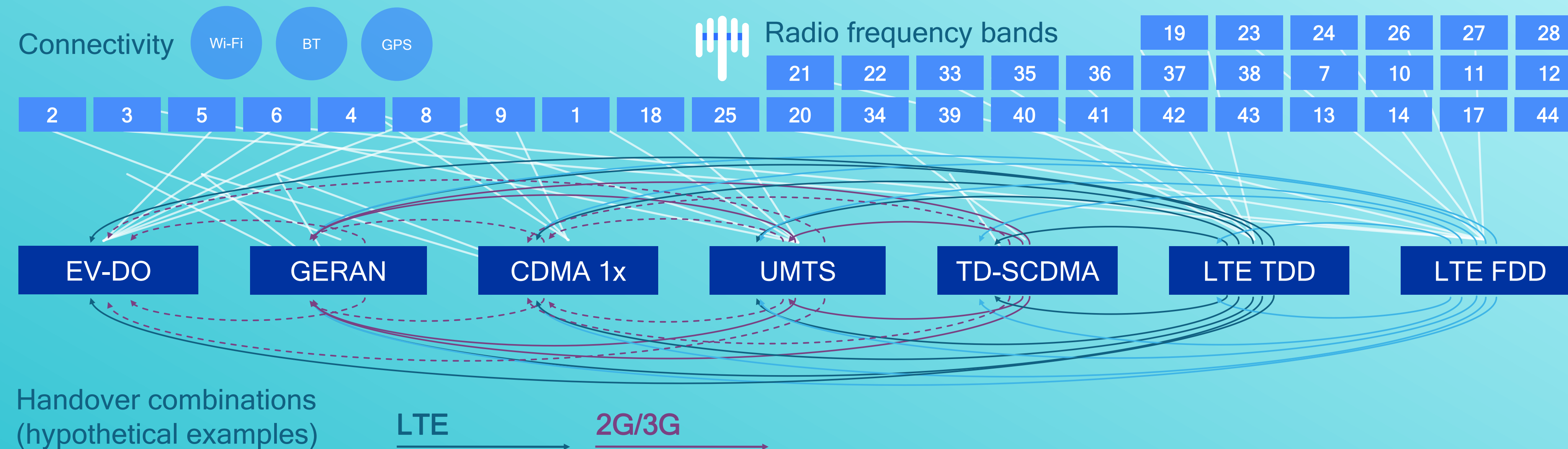
Impactful trials and early
deployments with network
operators

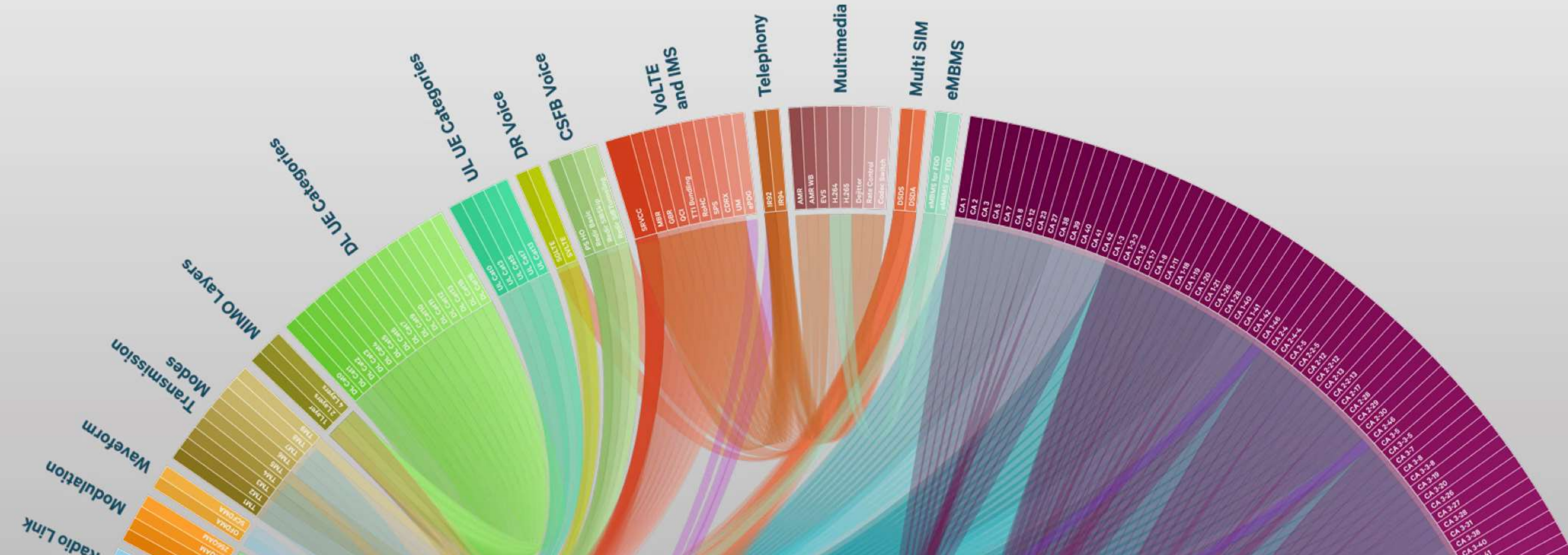


Modem and RFFE
leadership to solve 5G
complexity

Modem and RFFE leadership critical

Flexible framework for efficiently multiplexing diverse services



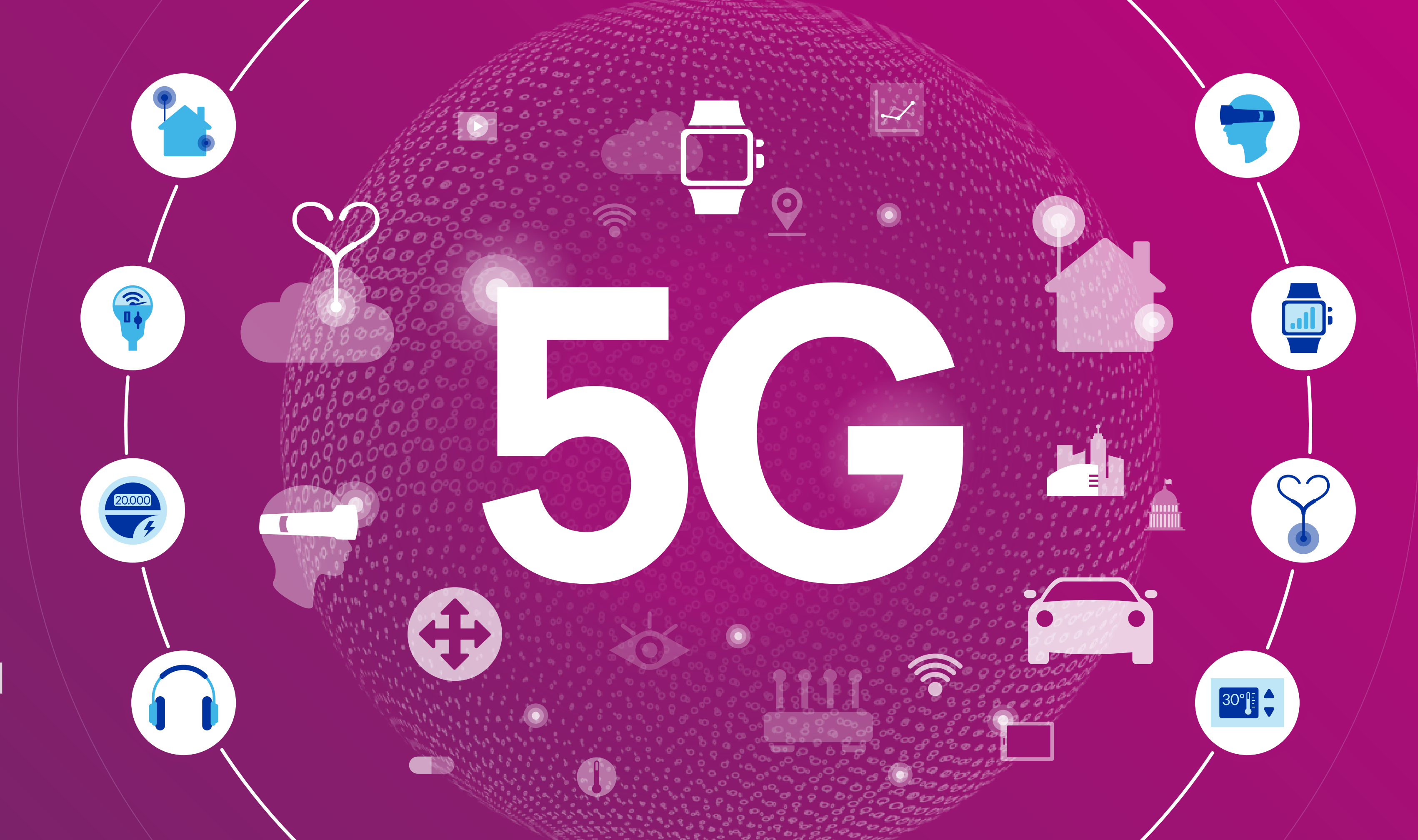


5G drives significant modem and RFFE complexity

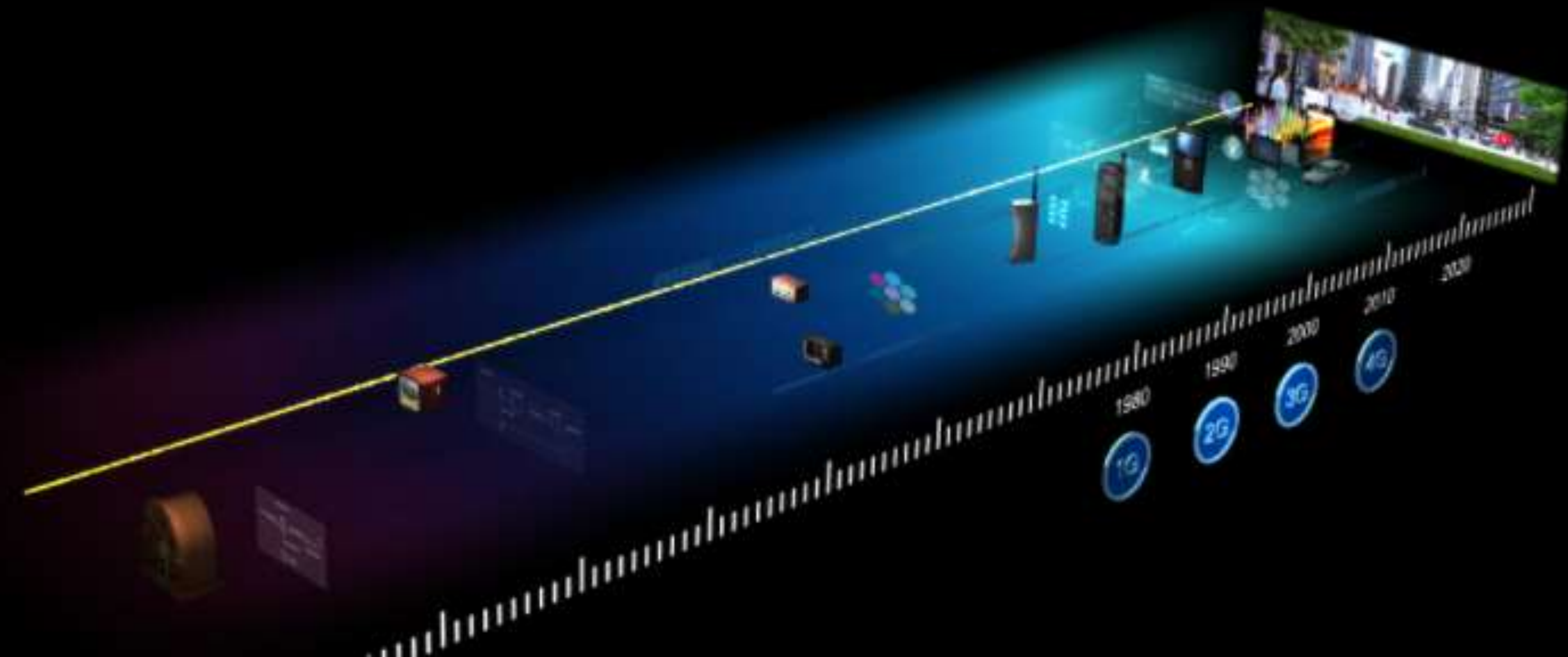
Support for existing LTE networks and services

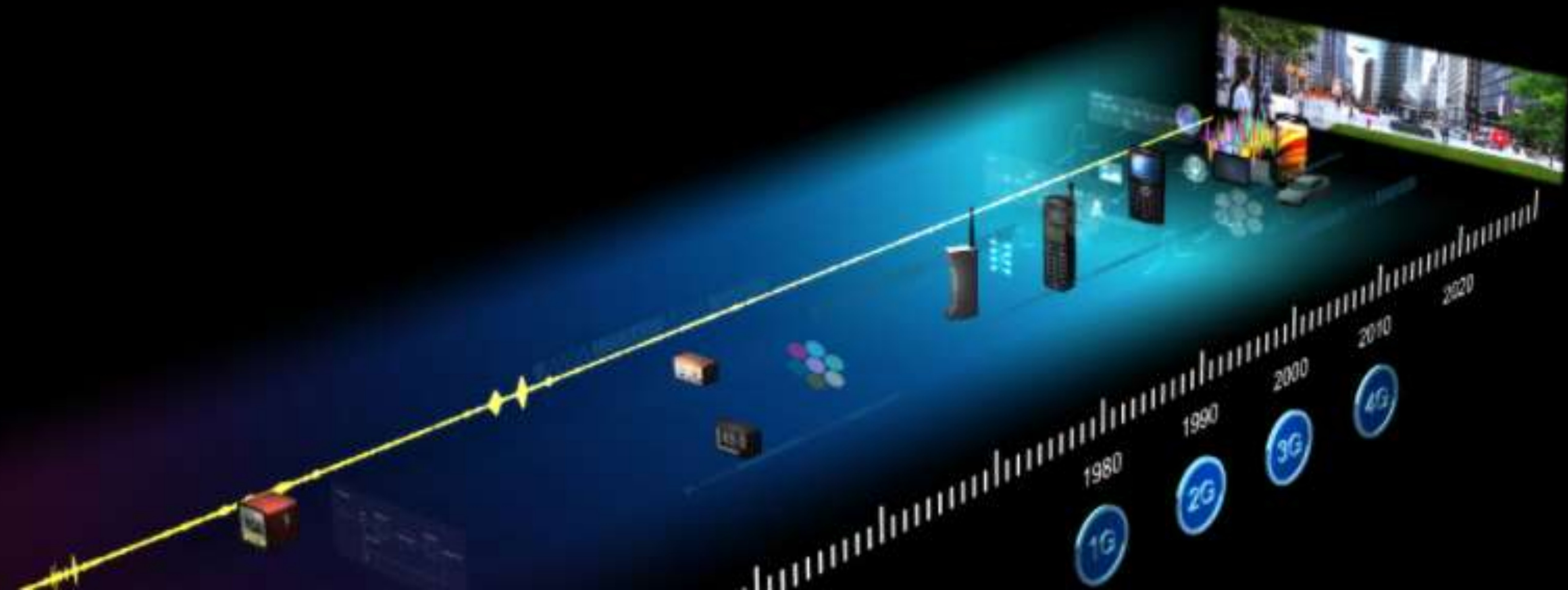
Efficient integration of new 5G spectrum, technologies/services

Power efficient and highly integrated chipset









Leading the
world to 5G



Thank you

Follow us on:    

For more information, visit us at:

www.qualcomm.com & www.qualcomm.com/blog

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

©2016 Qualcomm Technologies, Inc. and/or its affiliated companies. All Rights Reserved.

Qualcomm and Snapdragon are trademarks of Qualcomm Incorporated, registered in the United States and other countries. 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 Qualcomm’s licensing business, QTL, and the vast majority of its patent portfolio.

Qualcomm Technologies, Inc., a wholly-owned subsidiary of Qualcomm Incorporated, operates, along with its subsidiaries, substantially all of Qualcomm’s engineering, research and development functions, and substantially all of its product and services businesses, including its semiconductor business, QCT.

